CLIMATE ACTION

Overcoming the COVID-19 Crisis and Accelerating Climate Actions for the Future

Zero Emission Tokyo Strategy 2020 Update & Report

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A little over a year has passed since the Tokyo Metropolitan Government (TMG) announced the Zero Emission Tokyo Strategy aiming for net zero CO₂ emissions by 2050 with the purpose of starting actions against the clear and present crisis of climate change together with all of Tokyo residents and businesses to fulfill our responsibility as one of the world’s largest cities.

During this time frame, society has undergone a drastic and rapid transformation in the face of two major crises: the threat of infectious diseases and the climate crisis.

The world is stepping up its pace toward building a decarbonized and sustainable social system. A range of actors, such as nations, cities, and businesses, are competing with each other to take on the challenge of ambitious efforts that contribute to decarbonization. The world, from the business scene to every aspect of social life, is truly in an age of mega competition for decarbonization.

To achieve the 2050 goal of a Zero Emission Tokyo, actions taken during the decade leading up to 2030 are extremely important.

In this strategy, we have advocated 2030 Carbon-Half Style as a new vision for social change in Tokyo by 2030 to show the approaches and directions of the change in each policy area in order to accelerate effective efforts for decarbonization by keeping up with the trends of the world.

Halve greenhouse gas emissions in Tokyo by 2030.

People tend to focus only on short-term numbers or efforts. To achieve this extremely challenging goal, we need to continue showing a vision of the decarbonized social system Tokyo should aim for, how our lifestyles should fit in it, and how we can reach it.

What kind of measures will be needed for the next 10 years? We will share this issue with a variety of actors, including Tokyo residents, businesses, and organizations, to take action in cooperation with all of them in addition to mobilizing a broad range of policies throughout TMG, city and non-TMG partners, and society.

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Even given the COVID-19 crisis, the climate crisis cannot wait.

To take action against the climate crisis that has become more serious, I announced the Climate Emergency Declaration: TIME TO ACT recently.

To avoid catastrophic damage caused by climate change and resolutely protect Tokyo residents, and

To keep Tokyo an attractive city that draws investment and business partners by calling attention to decarbonization,

In the spirit of the “TIME TO ACT” slogan, we will promote further collaboration to achieve the global common goal of decarbonization by calling on, at every opportunity, all actors in Japan and overseas to accelerate their actions.

“TIME TO ACT” – Now is the Time to Accelerate Effective Actions

For a Zero Emission Tokyo,
Let’s realize 2030 Carbon-Half Style

KOIKE Yuriko
Governor of Tokyo
March 2021
CHAPTER 01 TRENDS IN CLIMATE CHANGE
Clear and Present Crises and the World Is Reacting

CHAPTER 02 UPDATING THE ZERO EMISSION TOKYO STRATEGY

CHAPTER 03 ACCELERATING AND STRENGTHENING POLICY DEVELOPMENT

CHAPTER 04 REALIZING A ZERO EMISSION TOKYO
Threat of Infectious Diseases and the Climate Crisis

Two Crises Facing the World

Even given the COVID-19 crisis, the climate crisis cannot wait

Since first being discovered in December 2019, COVID-19 has spread very quickly all over the world, becoming a major crisis and having a tremendous impact on people’s health and daily lives, socioeconomics, and other aspects. There are no signs of containment even after more than a year has passed since the outbreak.

Even in the midst of the fight against this pandemic, another crisis, that of the climate, relentlessly strikes us. Global warming continues to rage around the world, bringing about unprecedented natural phenomena and life-threatening disasters.

We must overcome the struggle with COVID-19, clearly acknowledge the climate crisis that has become more serious, and continue to stand against the climate crisis.

Impact of major weather disasters in recent times

- **Melting glaciers**
  - India (February 2021)
  - Collapse of Himalayan glaciers resulting in near flooding
  - More than 200 people dead or missing
  - Source: Food and Agriculture Organization of the United Nations

- **Crop damage (Desert Locusts)**
  - Africa and the Middle East (2020)
  - Large outbreak attributed to heavy rains of a cyclone
  - USD 3.5 billion estimated losses (JPY 362.7 billion) [converted using current exchange rate]
  - Over 35 million people* facing food insecurity
  - *Total in the most affected countries: Ethiopia, Kenya, Somalia, the Sudan, and Yemen.

- **Heavy rains**
  - Throughout Japan (July 2020)
  - 30 deaths
  - 10,599 houses damaged
  - JPY 220.8 billion damage to agriculture, forestry, and fisheries
  - Source: Heat Stroke Information, Fire and Disaster Management Agency, Ministry of Internal Affairs and Communications

- **Forest fires**
  - Southern and eastern Australia (July 2019–March 2020)
  - Approx. 35,000 km² burnt, affecting approx. 1 billion animals
  - Over AUD 2 billion estimated insurance losses (JPY 166.4 billion) [converted using ¥83.2]

- **Extreme heat**
  - Throughout Japan (August 2020)
  - 43.1°C in Hamamatsu City, Shizuoka Prefecture, on par with the highest temperature in Japanese history
  - 43,060 patients seeking emergency care for heatstroke throughout Japan in August
  - Source: Tokyo Shimbun, March 1, 2020

- **Comparison of the number of above patients by FY in Tokyo**

<table>
<thead>
<tr>
<th>Year</th>
<th>January–June</th>
<th>July–August</th>
</tr>
</thead>
<tbody>
<tr>
<td>2019</td>
<td>642</td>
<td>1,270</td>
</tr>
<tr>
<td>2020</td>
<td>162</td>
<td>668</td>
</tr>
</tbody>
</table>

* The foreign exchange rate used in the above captions is the closing price at the end of June 2021.
Various changes in society during the COVID-19 crisis

Various changes have appeared during the COVID-19 crisis, such as longer periods spent at home and the use of digital technology. To realize a sustainable society, we have to strengthen our efforts in light of these changes.

- **Electricity demand in Tokyo decreased overall but demand for low voltage electricity for households etc. increased**.

  - Total of extra high voltage, high voltage, low voltage
    - Extra high voltage: FY 2017 - FY 2020
    - High voltage: FY 2017 - FY 2020
    - Low voltage: FY 2017 - FY 2020


- **As for the amount brought into 23 cities’ incineration plants, household waste increased but business waste decreased from 2019**.

- **Package delivery volume increased**.


- **More businesses use digital technology**.

  - IT measures taken against the spread of COVID-19
    - Introduction of remote work systems
    - Introduction of cloud-based mission-critical systems
    - Introduction of cloud-based file servers
    - Introduction of cloud-based security tools
    - Extensive digitization of transaction environment
    - Start of online service business
    - Online sales activities, including contracts
    - Cloud-based mission-critical system

- **We need to strengthen efforts toward the realization of a sustainable society, taking into account changes brought about by COVID-19**.

Changes brought about by COVID-19

Environmental changes due to the stagnation of socio economic activities

Global CO₂ emissions have fallen sharply due to the worldwide stagnation of socio economic activities caused by the spread of COVID-19, resulting in an improved air environment. On the other hand, there is concern about rebound from these changes with the resumption of activities.

Considering the post-corona era from a medium- to long-term perspective, we should not return to our previous state but aim for a sustainable society by increasing our resolve to take action against the climate crisis.

- **Global CO₂ emissions decreased by 5.8% from 2019**


- **Global air pollutants decrease during lockdown periods**

  - Comparison of NO₂ concentrations in Europe
    - March 13 - April 11, 2020

  - Comparison of NO₂ concentrations in China
    - January 1 - 20, 2020
    - Source: Global Aeronautics and Space Administration (NASA) (https://earthobservatory.nasa.gov/images/146362/airborne-nitrogen-dioxide-plummets-over-china)

- **PM2.5 concentration tends to improve year-on-year**

  - Changes in PM2.5 concentrations at monitoring stations (46 general stations) in Tokyo
    - Source: State of emergency documents, including application forms (https://www.mlit.go.jp/k-toukei/content/001388225.pdf)


<table>
<thead>
<tr>
<th>Year</th>
<th>Package delivery volume (thousand packages)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td>250,000</td>
</tr>
<tr>
<td>2019</td>
<td>350,000</td>
</tr>
<tr>
<td>2020</td>
<td>400,000</td>
</tr>
<tr>
<td>2021</td>
<td>450,000</td>
</tr>
<tr>
<td>2022</td>
<td>500,000</td>
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* Preliminary results are shown for April to December 2020.*
The Dawn of the Era of Mega-Competition—Zero Emissions Becoming Mainstream in the World

Trend of decarbonization expanding around the world

- The world powers make a big shift to decarbonization
  With many nations aiming for decarbonization, the United States and China, two of the world’s largest economic powers with the largest CO₂ emissions, as well as Japan have begun to make a big move toward decarbonization.
  - USA announced net zero GHG emissions by 2050, rejoining the Paris Agreement (Jan. 2021)
  - China announced net zero CO₂ emissions by 2060 (Sept. 2020)
  - Japan declared net zero GHG emissions by 2050 (Oct. 2020)

- Worldwide trend of a green recovery
  In European and other countries, there is a movement aiming for a green recovery to “build back better” from the COVID-19 crisis while coping with the climate crisis, strongly promoting the transition to a decarbonized society.
  - EU considered climate change measures as one of core elements in the recovery fund, allocating more than 30% of the entire budget to this end
  - UK mobilized GBP 12 billion (approx. JPY 1.7 trillion) of government funds through the Ten Point Plan for a Green Industrial Revolution (Nov. 2020)
  - Germany utilized more than EUR 33 billion (approx. JPY 4.1 trillion) for climate change measures through the Comprehensive Economic Stimulus Package (June 2020)
  - South Korea appropriated KRW 73.4 trillion (approx. JPY 7.3 trillion) for environmental measures through the Korean New Deal (July 2020)

Expansion of frameworks developed by cities and businesses

- The world’s largest framework formed by non-state actors: Race To Zero
  The UNFCCC (United Nations Framework Convention on Climate Change) launched an international campaign, Race To Zero, to bring together ambitious efforts of non-state actors toward a shift to a decarbonized society.
  - Participants consist of 471 cities including Tokyo, 22 regions, 1,675 businesses, 85 major investors, and 569 universities (as of March 22, 2021)

International initiatives of businesses aiming for decarbonization

- SBT (Science Based Target)
  615 certified businesses including 91 Japanese businesses
  * GHG emission reduction targets set by businesses to hold the temperature rise to 1.5°C

- RE100 (Renewable Energy 100%)
  291 participating businesses including 50 Japanese businesses
  * Efforts aimed at covering all business operations with renewable power alone

Expanded decarbonization movement in economic activities

Mainly at global businesses, there is a growing movement that requests decarbonization efforts from business partners to decarbonize the entire supply chain.

In addition, there is an active movement to raise funds to promote decarbonization. Green or sustainability bonds are actively used to promote business that contributes to environmental improvement, resulting in an increase in the amount issued worldwide.

In this way, the promotion of decarbonization has become a major premise for all businesses to continue their economic activities.

The world is in the era of mega-competition for decarbonization
Tokyo needs to continue its efforts in light of this trend

Source: Website of Agency for Natural Resources and Energy, Ministry of Economy, Trade and Industry
Source: Material for the 146th Global Environment Subcommittee, Ministry of the Environment
Source: Changes in the Issuance of Green Bonds in the World, Ministry of the Environment
2030 is an important milestone for the realization of a Zero Emission Tokyo. The climate crisis has become even more serious as the world faces an unprecedented crisis due to rampant COVID-19 spread. Actions taken during the decade leading up to 2030 are extremely important for the realization of net zero CO2 emissions by 2050. This is our last chance to safeguard the future of planet Earth.

As the world makes rapid progress toward decarbonization, Tokyo must further accelerate its actions as one of the world’s largest cities.

**Formulation of the Zero Emission Tokyo Strategy in December 2019**

Clarifying net zero CO2 emissions by 2050 to start taking action

To pursue efforts to limit the temperature increase to 1.5°C and realize a Zero Emission Tokyo that will contribute to achieving net zero CO2 emissions worldwide by 2050, TMG formulated the Zero Emission Tokyo Strategy in December 2019. We started a range of policies, sharing awareness of the climate crisis facing us, clarifying what we should aim for by 2050, practical efforts to be made, and roadmaps for the future, and calling on Tokyo residents, businesses, and organizations to assist in decarbonization actions.

**Sustainable recovery from the COVID-19 crisis**

COVID-19 has spread all over the world very quickly, damaging socio-economic situations, changing people’s lives and behaviors, and causing a change in the mindset for climate change. In European and other countries, there is a movement aiming for a green recovery to “build back better” from the COVID-19 crisis while coping with the climate crisis. TMG is promoting sustainable recovery that expands the perspective to a more sustainable lifestyle as well as protecting the environment by making full use of digital technology.

**During the decade up to 2030, which is a critical date on the way to net zero CO2 emissions by 2050, the movement toward decarbonization is accelerating around the world**

Even given the COVID-19 crisis, the climate crisis cannot wait. According to the Special Report of IPCC (Intergovernmental Panel on Climate Change), limiting the rise in global average temperature to 1.5°C requires global CO2 emissions to be approximately halved by 2030 and net zero by 2050. Which, in turn, requires a rapid and extensive transition to net zero in energy, urban, infrastructure, and industrial systems.

Many nations are competing with each other to promote climate change measures toward decarbonization by raising targets or developing pioneering initiatives.

**For a sustainable society and economy in the future**

To fulfill its responsibility as a major consumer of energy and resources, TMG announced the Climate Emergency Declaration: TIME TO ACT to accelerate actions against the climate crisis that has become more serious. Actions against the climate crisis also contribute to solving social issues, such as health and livelihoods, security of resources and food, and are important factors for achieving the Sustainable Development Goals (SDGs).

For a brighter future, Tokyo will take the lead in accelerating actions.
Announcing a 50% reduction in greenhouse gas emissions in Tokyo by 2030

Ambitious target to accelerate actions—
Announcing “Carbon Half” to halve GHG emissions by 2030

In January 2021, the governor of Tokyo announced that TMG will reduce GHG emissions in Tokyo by 50% compared to 2000 by 2030 in order to accelerate and strengthen actions taken during the decade up to 2030. For the realization of “Carbon Half” by 2030, it is indispensable to strongly promote a further increase in energy efficiency and shift to the use of decarbonized energy. To this end, we aim to reduce energy consumption by 50% and increase the percentage of power generated by renewable energy to approximately 50% of the total sourced.

The trend toward zero emission vehicles is also accelerating

In countries and cities around the world, the trend toward zero emission vehicles is accelerating rapidly. In December 2020, TMG announced that it will phase out the sale of new gasoline-only passenger cars and motorcycles in Tokyo to stay in line with world trends, demonstrate its commitment to being a leading eco-friendly city, and connect its excellent environmental technology to the sustainable growth of the Japanese economy.

- Phasing out the sale of new gasoline-only passenger cars in Tokyo ⇒ 100% (by 2030)
- Phasing out the sale of new gasoline-only motorcycles in Tokyo ⇒ 100% (by 2035)

Considering FY 2021 as the starting point for phasing out gasoline-only vehicles, TMG will promote the spread of zero emission vehicles by subsidizing vehicle purchases and infrastructure development as well as fostering momentum. In addition, by accelerating proactive actions in collaboration with the national government and automobile manufacturers, TMG will strive to make vehicles zero emission.

* Non-gasoline-only vehicles include ZEVs, such as electric vehicles (EVs), plug-in hybrid vehicles (PHVs), and fuel cell vehicles (FCVs), and hybrid vehicles (HVs)

Accelerating action in all areas is essential to reduce greenhouse gas emissions

Greenhouse gases are composed of energy-related CO2 emitted from the final energy consumption including electricity, CO2 from the incineration of waste, and other greenhouse gases, such as fluorocarbons and methane. To achieve “Carbon Half” by 2030 and net zero CO2 emissions by 2050, we need to accelerate decarbonization actions in all fields.

- Sector breakdown of greenhouse gas emissions in Tokyo (preliminary results for FY 2018)

<table>
<thead>
<tr>
<th>Sector</th>
<th>Emission (Mt-CO2)</th>
</tr>
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<tbody>
<tr>
<td>Industrial sector</td>
<td>63.93</td>
</tr>
<tr>
<td>Commercial sector</td>
<td>39.6%</td>
</tr>
<tr>
<td>Residential sector</td>
<td>25.7%</td>
</tr>
<tr>
<td>Transport sector</td>
<td>15.1%</td>
</tr>
<tr>
<td>Waste</td>
<td>2.8%</td>
</tr>
<tr>
<td>Other greenhouse gases</td>
<td>10.3%</td>
</tr>
<tr>
<td>Percentage of power generated by renewable energy</td>
<td>6.5%</td>
</tr>
</tbody>
</table>

Responsibility of the metropolis of Tokyo: Contribution to reducing CO2 emissions in other regions

In its report published in 2019, C40 (C40 Cities Climate Leadership Group) indicates the importance of considering consumption-based greenhouse gas emissions.

- Greenhouse gas emissions based on production in the C40 member cities are 2.9 Bt-CO2, and those based on consumption are 4.5 Bt-CO2
- Greenhouse gas emissions based on consumption in the C40 member cities are projected to nearly double by 2050

Activities and lifestyle choices in Tokyo lead to CO2 emissions in other regions at home and abroad

In Tokyo, a huge amount of energy, resources, and products are consumed and then discharged as waste. Most of the energy, products, and resources used in Tokyo are produced or extracted in other regions of Japan or overseas. Tokyo also relies on other regions for the recycling and final disposal of its waste. As one of the largest cities in the world, Tokyo needs to take the initiative in reducing CO2 emissions in Japan and overseas.

<table>
<thead>
<tr>
<th>CO2 resulting from urban activities</th>
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</thead>
<tbody>
<tr>
<td>Transportation</td>
</tr>
<tr>
<td>Other regions</td>
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<td>Other regions</td>
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<td>Other regions</td>
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<td>Other regions</td>
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</tbody>
</table>
A vision of social change toward 2030

**Carbon-Half Style**

- The path to realize "Carbon Half" by 2030 is by no means smooth, and it cannot be reached with merely gradual changes.
- We need to implement reconstruction and redesigning that will decarbonize the socio-economic structure in all fields, including business, civic life, and urban development, in addition to strengthening existing efforts.

**TMG advocates “2030 Carbon-Half Style” as a vision for social change for “Carbon Half” by 2030**

**Trend of GHG emissions etc.**

- **2030 “Carbon Half”**
  - CO2 50% reduction
  - Renewable energy
  - Energy consumption
  - 50% reduction

- **2050 CO2 Net zero**

**Energy consumption in Tokyo (preliminary results for FY 2018)**
- Total: 688.3 Mt-CO2 (FY 2018)
- Industrial: 49.6 Mt-CO2 (FY 2018)
- Commercial: 249.9 Mt-CO2 (FY 2018)
- Residential: 189.9 Mt-CO2 (FY 2018)
- Transport: 121.5 Mt-CO2 (FY 2018)
- Waste: 12.3 Mt-CO2 (FY 2018)

**GHG emissions in Tokyo (preliminary results for FY 2018)**
- Total: 63.93 Mt-CO2 (FY 2018)
- Industrial: 4.17 Mt-CO2 (FY 2018)
- Commercial: 29.39 Mt-CO2 (FY 2018)
- Residential: 16.46 Mt-CO2 (FY 2018)
- Transport: 104.0 Mt-CO2 (FY 2018)
- Waste: 1.2 Mt-CO2 (FY 2018)

* Secondary energy equivalents are used for electricity calculation

**Fluorocarbons**
- Expansion of solar power generator installation and self-consumption in Tokyo in collaboration with private businesses and others
- Urban development premised on the use of renewable energy, including the use of electricity from renewable energy generated outside Tokyo and the utilization of decarbonized heat
- Accelerating the use of hydrogen energy while expanding the supply and demand of hydrogen in the Tokyo metropolitan area
- Building the foundation for the use of hydrogen generated from renewable energy etc. from 2030 onward
- Progress in the standardization of zero emission buildings at the time of construction and the transition of existing buildings to zero emission buildings
- Buildings forming cities to be decarbonized to attract sustainable investments etc.
- Progress in the standardization of zero-emission specifications for new houses and the provision of high thermal insulation for existing houses
- Resilient and healthy houses acting as a safety net for the life of Tokyo residents
- Shift to a sustainable and prosperous lifestyle through the review of energy use and consumption behavior
- Establishment of environmentally friendly multi-energy stations as social infrastructure
- Widespread ZEVs, from small to large sizes, due to diversified vehicle types; progress in mobility reform to deliver a society using autonomous driving and MaaS capable of meeting diverse needs
- Larger market for zero emission motorcycles accelerating the phaseout of gasoline-only motorcycles
- A resilient waste treatment system established based on the system with no manual operation and various 3R routes
- Mainstreaming 2R (reduce & reuse) businesses, including selling by weight, sharing, and reusable containers
- Shift to a sustainable circular society focusing on curbing food waste
- Progress in non-fluorocarbon air conditioners and freezer refrigerators, resulting in more products of such kind on the market
- Expansion of efforts to eliminate fluorocarbon leakage

**2030 Carbon-Half Style (Excerpt)**

- Expansion of solar power generator installation and self-consumption in Tokyo in collaboration with private businesses and others
- Urban development premised on the use of renewable energy, including the use of electricity from renewable energy generated outside Tokyo and the utilization of decarbonized heat
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**By establishing a social foundation for decarbonization through these changes and going beyond the target of halving GHG emissions in 2030, TMG will realize**
- a more resilient, affluent, and livable city and
- an attractive city that encourages decarbonized business activities and attracts investment and business partners, which will lead to urban development that takes into account SDGs, including health and sustainable consumption

**Society in 2030 will define the future**

The 2030 Carbon-Half Style advocated by TMG is not only a vision of social change that will be realized by 2030, but also actions or behaviors toward “Carbon Half.”

What we are in 2030 virtually defines what society will look like in 2050. We need to turn the entire social system, including lifestyles and business models, in 2030 into a sustainable version capable of halving our carbon output.

TMG’s visions of change include:

- Shift to a sustainable and prosperous lifestyle through the review of energy use and consumption behavior
- Establishment of environmentally friendly multi-energy stations as social infrastructure
- Widespread ZEVs, from small to large sizes, due to diversified vehicle types; progress in mobility reform to deliver a society using autonomous driving and MaaS capable of meeting diverse needs
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- Progress in non-fluorocarbon air conditioners and freezer refrigerators, resulting in more products of such kind on the market
- Expansion of efforts to eliminate fluorocarbon leakage
To realize “Carbon Half,” each and every participant, including citizens, businesses, and administration, must work on halving CO₂ right now.

**TIME TO ACT for**

Let’s start efforts and actions to halve CO₂ right now!

**Zero Emission Tokyo 2020 Update & Report**

- Land use change
- Zero Emission Tokyo 2020 Update & Report

This is an initiative to help use clean electricity as well as lower businesses, and administration, must work on halving CO₂ right now.

To realize “Carbon Half,” each and every participant, including citizens, emissions in Tokyo (preliminary results for FY 2018)

Breakdown of energy-related CO₂

<table>
<thead>
<tr>
<th>Source</th>
<th>CO₂ (t)</th>
</tr>
</thead>
<tbody>
<tr>
<td>City gas</td>
<td>15.4%</td>
</tr>
<tr>
<td>Electricity</td>
<td>66.7%</td>
</tr>
<tr>
<td>LPG</td>
<td>1.3%</td>
</tr>
</tbody>
</table>

Households that cannot place solar panels on the roof can also use renewables sourced electricity, or “clean” electricity, by switching electricity contracts.

This is an initiative to help use clean electricity as well as lower

- **CO₂ HALF**

Please find your own

2030 Carbon-Half Style

you can start working on to halve CO₂ right now toward 2030. Let’s take action!

*Action aimed at realizing not only CO₂ reduction but also SDGs, including health and sustainable consumption*

**For your reference:**

- Status quo in Tokyo

**A refrigerator uses electricity 24 hours a day, 365 days a year. Half of households do not have power saving measures.**

**Households taking measures for a refrigerator using less CO₂**

<table>
<thead>
<tr>
<th>Source</th>
<th>CO₂ (t)</th>
</tr>
</thead>
<tbody>
<tr>
<td>City gas</td>
<td>22.8%</td>
</tr>
<tr>
<td>Electricity</td>
<td>77.2%</td>
</tr>
</tbody>
</table>

**Energy efficiency**

- Use of high-efficiency home appliances
- Thermal insulation of house/rooms
- Use of ZEVs

**Renewable energy**

- Solar panel installation and self-consumption
- Selection and purchase of renewable power (Participating in the Renewable Electricity Together campaign)

**Resource efficiency, use of recycled resources, etc.**

- Selection and purchase of sustainable products
- Proper disposal of air conditioners (fluorocarbon recovery)
- Reduction of food waste, selection of sustainable food, water efficiency, reduction of plastics, etc.

**Examples of efforts**

**Life**

- Use of high-efficiency home appliances
- Thermal insulation of house/rooms
- Use of ZEVs

**Business**

- Construction and supply of ZEBs and highly insulated houses
- Promotion of zero emission district development
- Realization of zero emission facilities
- Development, supply, and sale of non-gasoline-only vehicles
- Business activities using 100% renewable energy
- Supply of houses with solar panels and storage batteries
- Higher resource efficiency, more use of secondary raw materials

**Tokyo is home to many roofs that are suitable for solar power generation.**

- This is a good chance for homeowners to commence using solar panels. Homeowners can rest assured that repair services will be provided in the event of a failure.

- By using leasing or other means, solar power generation equipment can be installed with no setup costs.

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Updating the Zero Emission Tokyo Strategy to accelerate actions toward 2030

Strengthening strategies to realize “Carbon Half” by 2030

The Zero Emission Tokyo Strategy, formulated in December 2019, systematized priorities for TMG into six sectors and 14 policies, and clarified the goals for 2050 and the targets and actions for 2030.

In order to accelerate the actions over the next decade, this update has strengthened the targets (milestones) to be reached. It advocates 2030 Carbon-Half Style as a vision of social change necessary to realize “Carbon Half” by 2030 and shows the approaches toward 2030 Carbon-Half Style and the efforts to be immediately accelerated and strengthened.

TMG will promote the update by considering it as an initiative based on the “Tokyo in the Future” Strategy formulated in March 2021 as a new guiding principle for TMG.

* 2035 target

Strengthening five 2030 targets

- GHG emissions
- Energy consumption
- Percentage of power generated by renewable energy

Challenges—Improvements

- Items needing a leap to reach the goal

Milestone—Waypoint to the goal

- Targets to reach by 2030

26 visions for 2030 Carbon-Half Style

The image or vision of social change necessary for 2030

36 approaches for 2030 Carbon-Half Style

Six sectors and 14 policies to promote specific efforts

- Energy sector
- Urban infrastructure sector (Buildings)
- Urban infrastructure sector (Transport)
- Resource/industry sector
- Climate change adaptation sector
- Engagement and inclusion

Realizing a Zero Emission Tokyo

- Phasing out the sale of new gasoline-only passenger cars in Tokyo
- Phasing out the sale of new gasoline-only motorcycles in Tokyo

2030

2050

94 efforts immediately accelerated and strengthened

2020

2030

CHAPTER 03
ACCELERATING AND STRENGTHENING POLICY DEVELOPMENT

2020 Update & Report

Zero Emission Tokyo 2020 Update & Report

* Individual plans and strategies have been formulated for sectors requiring prioritized measures.

* In FY 2020, three new plans were formulated: Tokyo Food Loss and Waste Reduction Plan, NEW Food Loss and Waste Reduction Plan, and Zero Emission TMG Action Plan.
Necessity of making renewable energy a major energy source

- Tokyo is a major consumer of energy. To realize a decarbonization society, it is essential to maximize energy consumption efficiency and switch to decarbonized energy.
- Approximately 70% of CO₂ emissions in Tokyo are related to power consumption. Since almost all electricity is supplied from other regions, decarbonizing the electricity supplied from the power grid is crucial. We also realize the need to promote the decarbonization of thermal energy at the national as well as local level.
- Considering the future era of massive introduction and supply of renewable energy, local production and consumption of renewable energy, which does not impose a heavy load on the power grid, is important for improving local resiliency.

Status quo of making renewable energy a major energy source

- Percentage of power generated by renewable energy
- Energy consumption compared to 2000
- Installation of solar power generation equipment in Tokyo
- Renewable power used at TMG facilities (governor’s bureaus/departments)

- The use of electricity from renewable energy and the installation of solar power generation equipment is expanding year on year in Tokyo. TMG facilities have started using power entirely from renewable energy, including a 100% renewable power purchase power project at the TMG City hall and the FIT electricity generated in Tokyo.
- TMG is promoting the introduction of equipment by residents and businesses in Tokyo through its financial support, helping introducing equipment to local production/consumption of renewable energy in buildings and solar power generation on home roofs with no setup costs.

Trends in renewable energy

- Local production and consumption of renewable energy power contributing to improvements in resiliency

More frequent heavy rains and other natural disasters further emphasize the importance of sustainable urban development that can maintain urban functions even in a disaster or emergency. That is why the local production and consumption of renewable energy is attracting more attention, and contributes to securing a stable lifestyle even in such a natural disaster.

Installation of solar power generation equipment in Tokyo is at the beginning stage

Solar panels have been installed on approximately only 4% of buildings deemed "suitable (including conditionally suitable)" for the installation in the Tokyo Rooftop Solar Register (potential map) etc. As the purchase price under the national FIT system decreases, the quantity of equipment for which the purchase period of FIT has ended increases from 2019 onwards, we need to expand the introduction of renewable energy based on the characteristics of Tokyo.

Shift to the use of renewable power is at the beginning stage

Some large facilities in Tokyo are introducing equipment by themselves, but only approximately 9% of them have renewed their contract to that for renewable power and only approximately 5% of households have done the same. A survey conducted by TMG shows that approximately 50% of Tokyo residents are interested in the use of renewable power, citing prices and other economic advantages as well as simple switching procedures as considerations for shift to renewable power.

Accelerating Actions

- All energy used to be decarbonized
- Supply of fully decarbonized electricity using renewable energy as a major power source
- Standardization of local production and consumption of renewable energy and energy sharing

Visions for 2050

- Promoting local production and consumption of renewable power generated in Tokyo
- Further promote the introduction of solar panels with no initial costs and support captive uses of solar power by the installation of storage batteries.
- A corporate power procurement agreement leading to the introduction of new renewable energy equipment outside Tokyo (Corporate PPAs in collaboration with regions outside Tokyo)
- Most all power is supplied from outside Tokyo. Therefore, start subsidizing the introduction of new renewable power equipment in other regions for consumers in Tokyo. Promote actions by consumers to use renewable power in Tokyo via power grid.
- Promoting a zero emission island
- Prepare a demonstration project to realize a Zero Emission Island aiming for supplying power entirely from renewable energy on Hahajima, Ogasawara islands in Tokyo.
- Expanding actions for switching to renewable power use at households etc.
- Promote a campaign, which intends to increase the number of people purchasing renewable power at a low price even if it is difficult to install solar panels on the roof top of their houses, throughout the whole metropolitan area and Japan.

Efforts immediately accelerated and strengthened

- Expanding the use of renewable energy through a program under TMG ordinances and cooperating with businesses
- Further expand the use of renewable energy at buildings and the supply of renewable power in Tokyo through the Tokyo Cap & Trade Program and other policy programs
- Develop measures for expanding the use of renewable power together with RE100 declaration businesses
- Adjustment of supply and demand in anticipation of the massive introduction and supply of renewable energy
- Implement a model project based on the VPP* mechanism in the Minami-Osawa district to promote the use of an existing facility to use renewable power and energy sharing centered on local renewable power generation outside Tokyo.
- Full use of renewable power at TMG facilities
- Promote the TMG Renewable Power Plan that will aggressively use power entirely from renewable energy at TMG facilities, including post-FIT electricity generated by Tokyo residents
- Install solar power generation equipment on home roofs, TMG facilities, etc. in the islands area in Tokyo. Use the generated power at TMG facilities in these islands while installing power storage equipment that can be used in a disaster or emergency.

2030 Carbon-Heavy Style - Visions for social change

- Expansion of solar power generator installation and self-consumption in Tokyo in collaboration with private businesses and others
- Urban development premised on the use of renewable energy, including the use of electricity from renewable energy generated outside Tokyo and the utilization of decarbonized heat

Approaches for 2030 Carbon-Heavy Style

- Standardization of the installation of renewable energy equipment in Tokyo and other regions and the use of renewable power in Tokyo
- In collaboration with private businesses, strongly promote the installation of solar panels and the self-consumption of generated power through the installation of storage batteries to take full advantage of installation potential.
- Expand power purchase that will lead to the installation of new renewable energy equipment outside Tokyo to take advantage of the large demand for electricity in Tokyo (Promotion of Corporate PPAs in collaboration with regions outside Tokyo)
- Further promote the use of electricity and heat from renewable energy used for urban development and existing buildings through programs under the TMG ordinances, such as the Program on Effective Use of District Energy.

- Consider a new mechanism for fundamentally enhancing the installation of PV equipment on housing/building roofs and the expansion of renewable power in Tokyo

* The national government’s system for purchasing renewable power from a power generator at a fixed price for a certain period
* Power purchase agreement that promises to purchase electricity from renewable power sources for a certain period of time
* Virtual Power Plant: A mechanism for centrally controlling, as if it were a single power plant, demand, generation, and storage of electricity, utilizing IoT and the cloud
Policy 2
Expand the use of hydrogen energy

Necessity of expanding the use of hydrogen energy

- Hydrogen has many excellent features, such as diversification of energy supply and emergency response, allows energy storage of large amounts and for long periods, and is also prospective as an adjusting power at the time of the massive introduction and supply of renewable power. Utilizing hydrogen is expected to facilitate the decarbonization of thermal energy that is difficult to electrify.
- TMG will actively promote the effective use of hydrogen-related technologies, advance energy efficiency and decarbonization in all fields, and encourage the revitalization of the market and further technological innovation, backing up the market from various perspectives, such as institutional and financial aspects. We will proceed with examination into the utilization of CO2-free hydrogen from renewable energy and the use of hydrogen energy looking ahead to the era of massive introduction and supply of renewable energy.

Status quo of expanding the use of hydrogen energy

- Introduction of fuel cell vehicles
  - 1,097 (total in FY 2019)
- Expanded use of residential fuel cells
  - Approx. 62,000 (total in 2019)
- Expanded use of commercial and industrial fuel cells
  - Approx. 2.5 MW (total in 2019)
- Introduction of fuel cell buses
  - 43 (total in FY 2019)
- Development of hydrogen stations
  - 17 (total in FY 2019)

Trends in hydrogen energy

The world accelerates the move toward using CO2-free hydrogen indispensable for decarbonization.

In July 2020, the EU announced its Hydrogen Energy Strategy aimed at significantly expanding the use of hydrogen from renewable energy. Australia and other countries are seeing a movement to manufacture and export CO2-free hydrogen taking advantage of abundant renewable energy. In March 2020, in Fukushima Prefecture of Japan, an experimental study was started at one of the world’s largest hydrogen production equipment using electricity from solar power generation.

Further promoting the social implementation of hydrogen energy technology is necessary in preparation for a future full scale use of CO2-free hydrogen from renewable energy.

In Japan, hydrogen has been promoted mainly for fuel cells, FCVs, and FC buses. Hydrogen is energy that is related to a wide range of industries and is projected to be used for many purposes, such as power generation and heat utilization. While the demonstration of hydrogen power generation is underway on production equipment, industry organizations and other bodies have raised the need for efforts to decarbonize heat by utilizing hydrogen.

Toward a society fully making use of CO2-free hydrogen generated from renewable energy, we need to promote the social implementation of hydrogen energy technology in fields with higher potential, such as large vehicles for business use, electricity, and heat utilization, aiming to further expand demand.

Accelarating Actions

Visions for 2050

- CO2-free hydrogen from renewable energy as a pillar for realizing a decarbonized society
- Supporting massive introduction and supply of renewable energy with hydrogen
- Full use of CO2-free hydrogen in all fields
- CO2-free hydrogen as one of the pillars of energy supporting a decarbonized society

Key targets toward 2030

- Promoting efforts for technological development and social implementation of hydrogen
  - Develop fuel cell garbage trucks and carry out test operations in collaboration with universities, a ward in Tokyo, etc.
  - Implement the sharing model project in the Minami-Osawa district, which contributes to the use of hydrogen for residential power in urban development
- Enhance dispatch of Tokyo’s action on promoting hydrogen to overseas
  - Provide information on technologies and corporate initiatives implemented in Tokyo to the rest of the world through international conferences and other occasions
  - Raise public awareness and foster movement through visual depictions of hydrogen energy and other activities by the Tokyo Hydrogen Promotion Team
- Formulating a Tokyo Hydrogen Vision (tentative name)
  - Formulate a new vision to make CO2-free hydrogen a pillar for realizing a decarbonized society to accelerate necessary efforts in the Tokyo metropolitan area

Efforts immediately accelerated and strengthened

2030 Carbon-Half Style – Visions for social change

- Accelerating the use of hydrogen energy while expanding the supply and demand of hydrogen in the Tokyo metropolitan area
- Building the foundation for the use of hydrogen generated from renewable energy etc. from 2030 onward

Approaches for 2030 Carbon-Half Style

- Promoting the introduction of fuel cell-based transportation for business use
  - Promote the early social implementation of fuel cell-based transportation for business use, including buses, based on the consideration of demonstrating the operation of FC trucks and FC forklifts in coastal areas in Tokyo
- Urban development in the bay area centered on renewable energy and hydrogen
  - Utilize green technology to promote urban development that uses 100% clean energy centered on renewable energy and hydrogen to cover the energy used in the area

2030

- Expansion of use of commercial and industrial fuel cells
  - Approx. 2.5 MW (total in 2019)
- Introduction of fuel cell buses
  - 43 (total in FY 2019)
- Development of hydrogen stations
  - 17 (total in FY 2019)

Vehicles:
- Increase FCV subsidies in collaboration with the national government
- For FC buses, merely subsidize part of fuel cost in addition to vehicle purchase cost

Hydrogen stations:
- Support environment-friendly multi-energy stations by encouraging the installation of a hydrogen station or fast chargers at existing gas stations and the introduction of rented or shared ZEVs to such a station

Fuel cells:
- Further promote the adoption of fuel cells by continuously financial support of the introduction by consumers and reorganizing subsidies for equipment using hydrogen from renewable energy

* FCVs: fuel cell vehicles/FC buses: fuel cell buses
Strategy II Urban Infrastructure Sector (Buildings)

Policy 3 Expansion of zero emission buildings

**Necesity of expanding zero emission buildings**

- More than 70% of Tokyo’s CO2 emissions come from buildings. Eliminating emissions from buildings with high CO2 emissions is a common goal of cities around the world, and essential if they wish to attract investment and business partners.
- Buildings are used for decades, and those constructed from now on will define the Tokyo of 2050. It is essential to prepare for buildings, whether new or existing, to achieve high energy efficiency, use renewable energy, and fully utilize materials with lower CO2 emission levels, such as wood.
- It is also necessary to ensure high thermal insulation performance from the perspective of disaster prevention and measures for heat, and consider the use of buildings in the future, such as an increased prevalence of telework.

**Status quo of expanding zero emission buildings**

- **Greenhouse gas emissions compared to 2000**
- **Energy consumption compared to 2000**
- **Percentage of power generated by renewable energy**

**Trends in the expansion of zero emission buildings**

- Increased awareness of decarbonized buildings
- Thermal insulation performance important for energy efficiency at homes
- Consciousness of youth in the time of COVID-19

**Adoption rate of houses with double sash or double glazed windows**

- **Key targets toward 2030**
- **Efforts immediately accelerated and strengthened**

**2030 Carbon-Half Style – Visions for social change**

- **Progress in the standardization of zero emission buildings at the time of construction and the transition of existing buildings to zero emission buildings**
- **Buildings forming cities to be decarbonized to attract sustainable investments etc.**
- **Shift to a sustainable and prosperous lifestyle through the review of consumption behavior etc.**

**Approaches for 2030 Carbon-Half Style**

- **Acceleration of making all buildings zero emission by 2050**
- **Promote efforts to evaluate better real estate in financial terms, such as by conducting case studies on how to disclose information helpful for investment decisions.**
- **Propose a future vision of buildings to be standardized in the 2030s toward 2050 and promote efforts in collaboration with businesses and financial institutions. Consider a new mechanism to expand the use of such buildings**

**0.0 5.0 10.0 15.0 20.0 25.0 30.0 35.0 (%)**

**Source:** Housing and Land Survey of Tokyo 2018, Ministry of Internal Affairs and Communications.

**Source:** “Consciousness of Youth in the Time of COVID-19” Watarashi, Dentsu Inc. (June 2020).

**Zero Emission Tokyo 2020 Update & Report**
Zero Emission Buildings Make Cities More Attractive

Making buildings zero emission not only decarbonizes cities but also contributes to making cities more attractive by strengthening resilience and improving living conditions. Various efforts are underway to keep Tokyo as a vibrant and attractive city which is fun to live in and comfortable to work in.

TMG’s major programs for expanding zero emission buildings

(1) Tokyo Cap & Trade Program
- TMG introduced the Carbon Reduction Reporting Program for Small and Medium-Sized Facilities in FY 2010 to understand the status of CO2 emissions from small and medium-sized facilities and promote the implementation of energy efficiency measures.
- Items applied in FY 2020 (third compliance period) include:
  - Compliance factors 27% at office buildings etc., 25% at factories etc.
  - Expansion of incentives to use renewable power

(2) Carbon Reduction Reporting Program
- In FY 2010, we introduced the Tokyo Cap & Trade Program that requires large facilities to reduce total CO2 emissions.
- Items applied in FY 2020 include:
  - Mandatory reporting on the use of renewable energy
  - A mechanism to evaluate excellent facilities, including the status of using renewable energy

Sustainable finance and real estate

Sustainable finance for realizing a sustainable society is rapidly expanding worldwide. The linkage of real estate to ESG investment is deemed to be important because it has great potential to contribute to solving environmental and social issues as a support of living conditions or economic activities.

While some businesses are actively working on the disclosure of information on ESG investment and SDGs in Japan, only 1% of respondents to an investor questionnaire answered that the disclosure was sufficient. The spread of ESG real estate investment requires more discussions on how investment should be and how information should be disclosed.

Sustainable life in a house

Let all of us—the administration, businesses, and citizens—make the city more attractive.

Improved Insulation Performance Results in an Energy-Efficient and Healthy House

Household energy consumption is particularly high in winter. An effective approach for energy efficiency at houses is to improve thermal insulation performance. Furthermore, it has become clear that maintaining a comfortable thermal environment by improving thermal insulation performance can have a positive effect on human health.

Examples of health effects from thermal insulation renovation

- Maximum blood pressure at the time of awakening has been found to be lower due to room temperature rise

Houses in winter are very dangerous - Are warmer regions actually more dangerous?!

The average death toll of December to March has been found to be greater than that of April to November and this tendency is more obvious in warm regions than in cold regions. This can be attributed to the fact that housing with high thermal insulation performance is not as widespread in warm regions as it is in cold regions, causing room temperatures to be lower. The rate of increase of the winter death toll in Tokyo is 16%, which is 1.6 times that of Hokkaido, the northernmost prefecture of Japan.

Rate of increase of winter death toll (the proportion of monthly average death toll of December to March to that of April to November)


Adoption of insulated houses (with double sash or double glazed windows) in Tokyo (FY 2018)

- National average: Approximately 30% - Tokyo: Approximately 22% with 16-30% in 23 cities, 21-32% in Tama Area

Thermal insulation of a house is critically important to protect our health.
**Policy 4** Promote the spread of zero emission vehicles (ZEVs*)

*ZEVs: Electric vehicles (EVs), plug-in hybrid vehicles (PHVs), fuel cell vehicles (FCVs), that do not emit CO2 or other exhaust gases during driving

**Necessity of promoting the spread of zero emission vehicles**

- CO2 emissions from the transport sector in Tokyo account for 20% of the total with vehicles accounting for 80% of that. To achieve zero emissions in the transport sector, we have to not only change our behaviors to those that do not emit CO2, for example walking and using bicycles, but also decarbonize the vehicles we use.
- In addition to reducing CO2, TMG will realize the full-scale spread of ZEVs that bring new social value, such as the role as an energy infrastructure taking advantage of their power storage and supply functions as well as the creation of new mobility services utilizing autonomous driving technology.

**Status quo of promoting the spread of zero emission vehicles**

- The sales ratio of new non-gasoline passenger cars has increased in recent years, reaching 39.5% in FY 2019.
- The number of zero emission buses introduced by FY 2019 was limited to 62 due to higher prices and fewer vehicle types.

**Status quo**

- Market share of non-gasoline vehicles in new passenger car sales: 39.5% (FY 2019)
- Introduction of zero emission buses: 62 (total in FY 2019)
- New small route buses* for sale limited to ZEVs in principle: Approx. 300 (total in FY 2019)
- Hydrogen stations: 17 (total in FY 2019)

**Trends in ZEVs**

The trend toward zero emission vehicles is accelerating around the world as well as in Japan. We see a worldwide acceleration in strengthening and advancing efforts to make vehicles zero emissions. In Japan, the Prime Minister clarified the policy that by 2035 the only new vehicles sold will be electric in his policy speech made in January 2021. Advances in vehicle technology, entrants into ZEVs at home and abroad.

**Efforts immediately accelerated and strengthened**

- **Developing social infrastructure indispensable for ZEV promotion**
  - Subsidize the development and operation of hydrogen stations and increase the number of fast chargers to be subsidized
  - Support environment-friendly multi-energy stations* that utilize existing gas stations
  - Evaluate the installation of chargers when a building is constructed and promote the spread of fast chargers through the Revised Tokyo Fire Prevention Ordinance (Existing gas stations having hydrogen stations, fast chargers, or renewable energy equipment installed in their sites)

- **Prioritizing the introduction to TMG-owned vehicle fleet and TMG facilities**
  - Ensure the replacement of TMG-owned vehicles (except special-purpose vehicles) with ZEVs in principle when updating—replace all passenger cars with non-gasoline counterparts by the end of FY 2024 and all motorcycles with non-gasoline counterparts by the end of FY 2029
  - Conduct research and study for utilizing FC buses as Toei Bus and introducing EV buses to the Toei Bus Lines
  - Introduce chargers to city hall, parks, and other places

**2030 Carbon-Half Style – Visions for social change**

- Establishment of environmentally friendly multi-energy stations as social infrastructure

**Widespread ZEVs, from small to large sizes, due to diversified vehicle types; progress in mobility reform to deliver a society using autonomous driving and MaaS* capable of meeting diverse needs**

**Larger market for zero emission motorcycles accelerating the phaseout of gasoline-only motorcycles**

**Approaches for 2030 Carbon-Half Style**

- **Considering FY 2021 as the starting year for eliminating gasoline vehicles, making comprehensive efforts to promote ZEVs**
  - Further promote environment-friendly multi-energy stations that utilize existing gas stations
  - Consider a mechanism to promote the installation of charging infrastructure tailored to various types of parking lots
  - Introduce more ZEVs to mobility in the Tokyo metropolitan area and expand its infrastructure development in collaboration with related local governments and businesses

- **Build a new mechanism to encourage the elimination of gasoline vehicles**
  - Encourage businesses to introduce ZEVs through the Tokyo Vehicle Emission Reduction Program that requires environment-friendly behavior
  - Promote the introduction by building a mechanism that will give manufacturers an incentive to develop and sell ZEVs

2030 Carbon-Half Style - Visions for social change

**All cars driven in Tokyo to be ZEVs**

**Expanded use of renewable energy realizing zero emissions from well to wheel**

* A concept that indicates the environmental load generated throughout the entire process, from the stage of obtaining fuel (well to the stage of actual driving (wheel))
**Trends in Zero Emission Vehicles**

TMG announced that it aims to eliminate the sale of new gasoline passenger cars by 2030 and new gasoline motorcycles by 2035 in Tokyo. Vehicle-related policies of overseas cities etc. have been changing rapidly in recent years.

<table>
<thead>
<tr>
<th>Country</th>
<th>City etc.</th>
<th>Publication</th>
<th>Target year</th>
<th>Goal/regulation</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>California</td>
<td>Sept. 2020</td>
<td>2035</td>
<td>Limiting the sale of new passenger cars to ZEVs alone</td>
<td>Will formulate rules to limit medium- and heavy-duty trucks driving in the state to ZEVs alone by 2045</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2030</td>
<td>Prohibition of gasoline cars</td>
<td></td>
</tr>
<tr>
<td>Canada</td>
<td>Quebec</td>
<td>Nov. 2020</td>
<td>2035</td>
<td>Prohibition of the sale of new gasoline cars</td>
<td>Allocates more than half of the budget for a green economy plan to the transport sector, including the addition of charging equipment</td>
</tr>
<tr>
<td>China</td>
<td>Hainan</td>
<td>Mar. 2019</td>
<td>2030</td>
<td>Prohibition of the sale of gasoline cars</td>
<td>Develop policies in three stages (by 2020, 2025, 2030)</td>
</tr>
<tr>
<td>Japan</td>
<td></td>
<td>Jan. 2021</td>
<td>2035</td>
<td>Limiting the sale of new vehicles to EVs alone</td>
<td>Indicate the goal will be achieved around the mid-2030s in the Green Growth Strategy in December 2020 as expressed in the Prime Minister’s policy speech in January 2021</td>
</tr>
<tr>
<td>Japan</td>
<td>Tokyo</td>
<td>Dec. 2020</td>
<td>2030</td>
<td>Eliminating the sale of new gasoline passenger cars</td>
<td>Consider FY 2021 as the starting year for eliminating gasoline vehicles to make comprehensive efforts</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td>2035</td>
<td>Eliminating the sale of new gasoline motorcycles</td>
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</tr>
</tbody>
</table>

(Updated based on information as of January 2021)

**More prosperous life spurred on by the spread of ZEVs**

The spread of ZEVs will not only eliminate CO₂ emissions during driving, but also reduce environmental loads, including vehicle noise and exhaust gas.

Promoting the spread of ZEVs will facilitate the broader use of MaaS (Mobility as a Service). In Japan, efforts are underway to promote MaaS, such as support for demonstration experiments as well as the financial and know-how aspects provided by the Ministry of Land, Infrastructure, Transport and Tourism.

ZEVs, linked and integrated with services, energy, and infrastructure, are expected to help solve social issues by optimizing transportation, mitigating traffic congestion, ensuring power sources in emergencies, and stabilizing the power grid at the time of the massive introduction and supply of renewable energy.

The spread of ZEVs will contribute to solving social issues and bring affluence to people’s lives.

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**Does Hydrogen Have a Color?**

Green Hydrogen, Blue Hydrogen, Gray Hydrogen

One of the features of hydrogen energy is that it does not emit any CO₂ while in use and can be produced from a variety of sources. Hydrogen itself is colorless and transparent, but it may be expressed in different colors, green, blue, or gray, for example, due to the differences in the manufacturing process. Green Hydrogen, in particular, is deemed most promising for decarbonization as it does not emit CO₂ during the manufacturing process.

**Green Hydrogen** is produced by electrolyzing water using electricity derived from renewable energy

**Turquoise Hydrogen** is produced by the thermal decomposition of methane. Byproduct is carbon that is produced as a solid, not as CO₂

**Blue Hydrogen** is made from fossil fuel but does not release CO₂ into the air as CO₂ generated during the manufacturing process is captured and stored (CCS*)

**Gray Hydrogen** is made from fossil fuel, such as natural gas or petroleum

* Abbreviation: Carbon dioxide Capture and Storage, the process that collects CO₂ and stores or presens fits it deep in the ground

**Where is Green Hydrogen made and used?**

Green Hydrogen is produced through demonstration projects in Germany, Australia, and other countries. For example, we support the introduction of Green Hydrogen utilization equipment. During the Tokyo 2020 Games, hydrogen produced with renewable energy in Fukushima Prefecture will be used to generate electricity at the athletes’ village, which in turn will be used at some of athletes’ facilities.

**When you find hydrogen, imagine what color it has.**
Necessity of promoting 3Rs

- The recycling system in Japan is quite well developed, but there is room for further efforts in the Reduce and Reuse aspects. Also, the system has big challenges yet to be resolved, such as overcoming its partial dependence on overseas countries.
- The consumption of natural resources has increased along with the population growth around the world, resulting in global concerns about resource use, and competition for resources. Furthermore, environmental destruction and biodiversity loss are accelerating, placing a heavy burden on the earth.

Status quo of 3Rs

Status quo ▶ Municipal solid waste* recycling rate 22.8% (FY 2018)

- Municipal solid waste recycling rates have been flat for the last five years. However, recycling rates vary by region. In the Tama Area, where recycling is being promoted by controlling the amount of disposal by charging for household waste and through direct separation of waste, the municipal solid waste recycling rate has reached 37%.
- TMG promotes and supports efforts for recycling containers and packaging, home appliances, and small electronic devices based on the Law for the Promotion of Effective Utilization of Resources and various recycling laws. In addition, we have started creating a new recycling mechanism for solar panels and disposable diapers.

Trends in 3Rs

The point in question: How to best organize arterial and venous businesses

COVID-19 has affected various industries causing the suspension of operations at production bases or the stagnation of logistics in Japan and abroad, with approximately 80% of the entire industry seeming to be adversely impacted. A review of production and sales plans and changes in supply chains is underway in arterial industries*, which, in turn, requires vein industries* to do the same.

Waste treatment/recycling systems need optimization and enhancement

Waste treatment has been maintained as part of social infrastructure even in an emergency, such as an outbreak of COVID-19. In response to changes in the social structure due to a super-aging population along with a decrease in population, there is an increasing demand for contactless and optimized operation at waste treatment sites and in business procedures.

While further promotion of recycling is required, the status quo is that sufficient waste suitable for high-quality recycling is not collected or optimal recycling is not always performed according to the type of waste. Therefore, we need to take measures to improve the level of recycling by taking advantage of the potential of waste treatment and recycling businesses.

Key targets toward 2030

Municipal solid waste recycling rate 37%

Efforts immediately accelerated and strengthened

- Creating a mechanism for the effective use of resources utilizing AI/ICT technologies
  - Introduce AI, ICT, and robotics technologies into waste treatment and recycling systems, which have long relied on human labor, to sophisticate and optimize work and improve the quality of processed materials
- Circular use of recycled resources
  - Based on the results of social demonstration research, build a mechanism for the circular use of waste, such as solar panels, for which recycling routes have not been established
  - Circular use of recycled resources by, for example, using products manufactured by converting incineration ash into cement raw materials as civil engineering and construction materials
- Promoting contactless and optimized office work through digitization
  - Contactless and optimized office work related to the consequent of waste treatment by expanding the use of electronic manifest
  - Contribute to not only cost reduction but also improved business continuity by introducing SAP into office work

2030 Carbon-Half Style – Visions for social change

A resilient waste treatment system established based on the system with no manual operation and various 3R routes

Realizing higher-quality recycling by making full use of advanced technologies

Approaches for 2030 Carbon-Half Style

- Strengthening a waste treatment system utilizing the know-how and potential of waste treatment businesses
  - Aiming to build a resilient recycling system that responds to changes in social structure, search for and build a treatment process with no manual operation by making use of the knowledge of waste treatment businesses
  - For optimal treatment and improved resilience in emergencies, promote the diversification of 3R routes by developing a mechanism to create a network of businesses involved in waste treatment and recycling businesses
- Improving the level of recycling by incorporating advanced technologies into waste treatment and recycling processes
  - In order to realize the sustainable use of resources through high-quality recycling, promote efforts to build treatment processes that utilize advanced technologies in collaboration with businesses involved in every aspect from separation to recycling
- Revision of Sustainable Design Tokyo
  - Taking into account international trends in resource use, revise Sustainable Design Tokyo and enhance a mechanism for waste treatment in order to deal with issues facing sustainable resource management and waste treatment in Tokyo
In Japan, discussions about legislation are underway in the Diet to promote the expanded resource circulation routes in Japan.

In January 2021, the revised Basel Convention came into effect, requiring controlled discharging and consistent recycling of business plastic waste.

As global plastic consumption is expected to increase sharply in the future, Tokyo will make the use of plastics sustainable and share its visions with the rest of the world.

Status quo of measures for plastics

Incineration of plastic waste from households and large office buildings (FY 2018)

Approx. 700,000 tonnes

- Incineration of plastic waste from households and large office buildings remained unchanged at approximately 700,000 tonnes in FY 2018.
- TAMG formulated the Plastic Strategy in December 2019 to present the main targets for 2030 and the direction of new policies. We have developed policies and initiatives based on the strategy ever since.

Trends in plastics

Increased use of single-use plastics due to longer periods spent at home

While the amount of waste discharged by businesses is decreasing, the amount of food take-out containers, individual packaging, and mail-order packaging materials is increasing at home.

A movement of reuse revolution accelerated at businesses

Advanced businesses, which provide products in reusable containers at cafes or buildings in collaboration with local municipalities,

Promote separate collection of plastic containers and packaging by providing financial support to local municipalities.

To reduce plastic waste generated from business activities, start trial efforts to dispatch 3R advisors to office and other buildings in collaboration with local municipalities.

Develop demonstration projects for building new domestic resource circulation routes, such as conversion into industrial raw fuels, as emergency measures in response to the tightening of import restrictions on plastic waste in Asian countries.

New policies for plastics

In January 2021, the new Basel Convention came into effect, requiring controlled discharging and consistent recycling of business plastic waste.

As global plastic consumption is expected to increase sharply in the future, Tokyo will make the use of plastics sustainable and share its visions with the rest of the world.

Visions for 2050

Plastic use with net zero CO2:

- Plastic production and recycling completely covered with renewable energy.
- Switching to biomass causing no land use change, limited within the growth rate of plants. Consider social and environmental issues, such as competition with food production.

Key targets toward 2030

Plastic waste from households and large office buildings compared to FY 2017

-40% (approx. 400,000 t)

Efforts immediately accelerated and strengthened

- Fostering empathy to promote behavior change
  - Raise public awareness of good practices, such as reuse and repair that do not depend on single-use plastics, create content that encourages reduction actions in the new normal, and provide information in collaboration with the media.

- Promoting recycling and reducing in cooperation with municipalities
  - Utilize the Plastic Containers and Packaging Recycling Support Project to continue the support of municipalities that work to implement separate collection with a view to collective collection and improve the results of separate collection.

- Measures for marine plastics
  - TOKYO Zero Marine Litter Action focusing on raising awareness of Tokyo residents and a field survey of marine litter.

- International cooperation
  - To reduce single-use plastics and build a circular economy, provide more information in collaboration with overseas cities and international organizations by taking advantage of online content.

2030 Carbon-Half Style – Visions for social change

Mainstreaming 2R* businesses, including selling by weight, sharing, and reusable containers

Implementing closed-loop recycling through diversified and efficient collection/transportation routes and new technologies

Approaches for 2030 Carbon-Half Style

Implementation of innovative technologies and business models

- Encourage the progress of the Reuse Revolution and promote efforts in collaboration with leading businesses etc., towards generalization and mainstreaming of new business styles and consumer behaviors, such as selling by weight, sharing, and using reusable containers for selling and purchasing.

* 2R stands for Reduce & Reuse
Food waste

Necessity of measures for food waste

- Annual food waste in Japan in FY 2017 is estimated to be approximately 6.12 million tonnes, which is the equivalent to every person in Japan throwing away a bowl of rice every day.
- Before reaching us, food goes through production, processing, distribution, and other processes in each of which greenhouse gases are emitted. They account for 21-37% of global emissions. CO2 is also generated when disposing of food thrown away due to the expiration of its use-by date or other reasons. The impacts of food waste on climate change cannot be overlooked.

Status quo of measures for food waste

- It is estimated that the total amount of food waste in Tokyo in FY 2017 was about 510,000 tonnes, of which about 385,000 tonnes were generated by businesses and 125,000 tonnes by households.
- Based on the demand forecast using ICT and other technologies, TMG has implemented model projects in collaboration with businesses working to reduce food waste throughout the supply chain. We have also raised awareness of consumers through online content.

In November 2020, the Proposal for Food Waste Reduction was compiled at the Food Waste Reduction Partnership Conference, which is composed of food-related organizations and consumer groups. According to the proposal, the Tokyo Food Loss and Waste Reduction Plan based on current regulations was formulated in March 2021.

Trends in food waste

The impact of the COVID-19 crisis on the food supply chain
The expansion of COVID-19 has significantly changed the balance between supply and demand, as shown by a sharp increase in demand for household food and a decrease in demand for food for commercial use. In order to respond to such a change, we need to strengthen the supply chain functions.

Responding to changes in people’s consciousness and behavior
There are more opportunities to cook and eat at home due to social restrictions and other reasons, resulting in more occasions of take-out and delivery. As the number of people in need of assistance increases, more attention has been focused on efforts for helping one another, such as food bank activities. We have to accurately recognize these changes in people's consciousness and behavior, promote their understanding of measures against food waste, and encourage them to take concrete action.

Development of businesses targeting food waste reduction
New private businesses have been launched recently to help reduce food waste by utilizing sharing apps to provide information on demand for food or unused food. It is important to accelerate such efforts in collaboration with related industries.

Zero food waste through control and reduction and food recycling

- Maximize efforts to control the occurrence of food waste and eliminate remaining food waste by converting it into feed and fertilizer

Key targets toward 2030

- Efforts to control food waste using advanced technology • Support business that contributes to extending the life of food by utilizing new freezing and packaging technologies • Efforts to share demand forecast information throughout the supply chain using ICT and other technologies
- Developing best practices for reducing food waste • Widely provide food-related businesses with excellent know-how of food waste reduction that is easy to work on
- Raising public awareness to change consumption styles through cooperation with businesses and municipalities • Develop an awareness-raising campaign in collaboration with municipalities, such as introducing recipes at restaurants that minimize generation of leftovers • Continue raising public awareness of efforts at home under the new normal through online content
- Further efforts for effective use of unused food • Encourage the effective use of emergency food stockpiled at municipalities and TMG by matching it with food banks

Efforts immediately accelerated and strengthened

- Consumers making informed choices • Bring about changes in consumer behaviors to help them identify real needs and quantities, such as utilizing discount information on unsold food through apps, buying small-quantity packs at retail stores, and using small serving menus at restaurants
- Efforts in cooperation with the food supply chain • Provide consumers with clear information on the progress of efforts, such as the review of the one-third rule that has become a business practice for food-related businesses

Visions for 2050

- Zero food waste through control and reduction and food recycling
- Efforts to control food waste using advanced technology • Support business that contributes to extending the life of food by utilizing new freezing and packaging technologies • Efforts to share demand forecast information throughout the supply chain using ICT and other technologies
- Developing best practices for reducing food waste • Widely provide food-related businesses with excellent know-how of food waste reduction that is easy to work on
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- Further efforts for effective use of unused food • Encourage the effective use of emergency food stockpiled at municipalities and TMG by matching it with food banks
Better relationship with products in a sustainable way
The Keywords: From Cradle to Cradle

Since the industrial revolution, humankind has produced many goods and prospered under the mechanism of extracting resources from the earth, making products, and throwing away unwanted items. Such an economic model has consumed resources faster than the regenerative capacity of the earth and discharged an enormous amount of waste that the earth cannot handle.

The conditions of the overuse of the earth are decreasing its productive power, resulting in the loss of biodiversity, degeneration of the land, deforestation, and depletion of resources. Furthermore, resource consumption beyond the earth’s limits as well as mass production, mass consumption, and mass disposal generate a large amount of CO₂, which causes climate change and affects life on Earth.

- **How many Earths do we need to sustain human life?**

  **World** 1.7

  **Tokyo** 3.1

  [Source: Global Footprint Network, Research Institute for Humanity and Nature]

  We are consuming natural resources 1.7 times faster than the earth regenerates itself, which means we are using 1.7 Earths. An estimate indicates that if all human beings lived like people in Tokyo, they would need 3.1 Earths. We are borrowing resources future generations should use and consuming all those resources now.

- **Life of products and CO₂**

  A large amount of CO₂ is generated at each stage of the development of products through to their disposal. To realize zero emissions, we need not only to decarbonize energy, including the use of renewable energy and more efficiency in energy use, but also to switch to a circular economy.

Goodbye to a society of “mass production, mass consumption, and mass disposal!”
Toward a society that continues using “existing products”

In response to the critical situation of the earth, such as the loss of biodiversity and climate change, we have to change the conventional way of “mass production, mass consumption, and mass disposal” and use resources efficiently and carefully.

Aiming to shift from the existing economic model, businesses in Japan and overseas are already creating innovative, circular products and services that contribute to the sustainable use of raw materials and goods.

- **Examples of circular products and services which are sustainable uses of resources**

<table>
<thead>
<tr>
<th>Repair services</th>
<th>Upcycling (processing worn-out and useless products)</th>
<th>Car sharing, office furniture, daily necessities</th>
<th>High-quality and highly durable products</th>
</tr>
</thead>
</table>

  [Repairability score (example)]

  Ease of repair is indicated on a scale of 1 to 10 and color coded

  [Source: French Ministry of Ecology Transition]

  These efforts will also strengthen local resilience in the event of a spread of an infectious disease or a natural disaster. The COVID-19 pandemic has disrupted the supply chain on a global scale. Building a mechanism that allows resources and products to be circulated and sustainably used in local communities will not only revitalize the local economy and promote employment, but also help create a sustainable and resilient society.

Sustainable use of resources - From cradle (Earth) to cradle
Let’s be more mindful in how we use products.

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Biodiversity Crisis

What is biodiversity?

Biodiversity is a term which describes an abundance of living things and ecosystems. There are a variety of creatures in different types of nature on Earth, which live interconnectedly and in support of each other. Our lives are built on the blessings of biodiversity.

As for Tokyo, a large amount of food, energy, and supplies necessary for an affluent urban life and business activities also rely on the blessings of biodiversity from inside and outside of the country.

Of the estimated 30 million species of creatures that exist on Earth, approximately 40,000 species go extinct each year. A major factor for this rapid biodiversity loss is a lifestyle based on mass production and consumption as well as global warming.

Since biodiversity loss is an issue as critical as climate change, efforts to conserve biodiversity are underway under an international framework.*

- **Areas in which biodiversity is threatened by Japan’s consumption**

  [Source: Annual Report on the Environment, the Sound Material-Cycle Society and Biodiversity in Japan 2020, Ministry of the Environment]

  - **Examples of flood mitigation functions of the natural environment**

    [Source: Website of WWF Japan]

    - Drought
      - Temperature rise/fall
      - Changes in habitat
      - Water retention in flood mitigation

    [Source: Website of WWF Japan]

    - Biodiversity in Japan 2020, Ministry of the Environment

    - * Preventing the Next Pandemic, a joint report in July 2020 of the United Nations Environment Programme (UNEP) and International Livestock Research Institute (ILRI)*
Fluorocarbons

Necessity of measures for fluorocarbons

- Fluorocarbons have an enormous greenhouse effect that is several tens to more than 10,000 times that of CO2 and cannot be recovered once released into the atmosphere, having a significant impact on climate change.
- Fluorocarbons account for 8% of greenhouse gas emissions in Tokyo. We need to take urgent measures against the emission of fluorocarbons.
- Fluorocarbons are widely used in appliances such as air-conditioners at offices and commercial facilities and freezer/refrigerator showcases at supermarkets. It is necessary to reduce the leakage of fluorocarbons due to the malfunction or disposal of such equipment.

Status quo of measures for fluorocarbons

- The use of HFCs (hydrofluorocarbons), which are regulated as ozone-depleting substances, has shifted to HCFCs (hydrochlorofluorocarbons) which do not destroy the ozone layer. In recent years, HFC use has increased, resulting in more emissions.
- Fluorocarbons leak due to aging of equipment, inadequate inspection and maintenance or disposal of equipment. TMG promotes the prevention of fluorocarbon emissions by identifying the actual situation of leakage while in use, giving guidance to businesses at the time of disposal, and promotes the spread of non-fluorocarbon equipment.

Trends in fluorocarbons

Fluorocarbon regulations accelerated globally

The regulations for the production and sales of fluorocarbons have been applied in stages based on the Montreal Protocol which is an international framework. In addition, to control their emissions throughout the lifecycle, an international initiative was established in December 2019 the leadership of Japan.

Strengthened domestic regulations

In January 2020, Japan enacted a total ban on the production or import of ozone-depleting HFCs. With the revised Act on Rational Use and Proper Management of Fluorocarbons in April 2020, obligations and penalties have been reinforced to ensure the recovery of fluorocarbons at the time of disposal of commercial freezers and air conditioners.

Changes in domestic demand

COVID-19 has made it increasingly important to establish an appropriate cold chain to ensure quality control of pharmaceutical products and food safety. In addition, there is an increase in demand for office air conditioning with enhanced ventilation functions and equipment for cooling digital devices associated with digital transformation, including remote work.

Accelerating Actions

Visions for 2050

- Zero fluorocarbon emissions
  - Significantly reduce equipment with fluorocarbons by expanding the use of non-fluorocarbon equipment
  - Completely prevent leakage during use and disposal by strictly controlling equipment that contains fluorocarbons

Key targets toward 2030

- Accelerating the shift to non-fluorocarbon equipment
  - Promote the introduction of non-fluorocarbon freezer/refrigerator showcases through subsidization
  - Promote the spread by providing support in line with trends in equipment development

- Supporting control of equipment to prevent leakage during use
  - Carry out a pilot project with businesses that have a large amount of leakage, and strengthen measures based on verification of the effects
  - Ensure understanding of the regulation and proper management of equipment through on-site guidance and video

- Strengthening measures for leakage at the time of disposal
  - Ensure understanding of the proper treatment of fluorocarbons when disposing of equipment through on-site guidance at building demolition sites
  - Strictly deal with malicious businesses that repeatedly release fluorocarbons illegally
  - Promote efforts to eliminate leakage when removing home air conditioners

Efforts immediately accelerated and strengthened

Key points include:

- Change in awareness of all the relevant people to prevent fluorocarbon emissions
  - Hold online quality workshops regularly instead of on-site ones during the COVID-19 pandemic, which will not limit the availability of participants

2030 Carbon-Half Style – Visions for social change

- Progress in non-fluorocarbon air conditioners and freezer refrigerators, resulting in more products of such kind on the market
- Expansion of efforts to eliminate fluorocarbon leakage

Approaches for 2030 Carbon-Half Style

- Fostering momentum and promoting systematic initiatives
  - Support the introduction of non-fluorocarbon equipment according to development trends and awareness to encourage the selection of non-fluorocarbon equipment to create a society where everyone chooses non-fluorocarbon equipment
  - Ensure measures against leakage when using or disposing of equipment by utilizing the knowledge obtained through on-site guidance to businesses or pilot projects
  - Accelerate cutting emissions and the reduction in the amount of use by utilizing innovative technologies, such as IoT tools, to prevent fluorocarbon leakage at each stage from using to disposing of equipment

Zero Emission Tokyo 2020 Update & Report
Policy 9

Strengthen adaptation measures

Necessity of strengthening adaptation measures

- As a report from IPCC (Intergovernmental Panel on Climate Change) indicates that mitigation alone can no longer prevent the impacts of climate change. We need to promote not only mitigation measures to reduce anthropogenic CO2 emissions but also adaptation measures to reduce the impacts that still remain after implementing the maximum mitigation measures.
- Strategically working on adaptation measures at the city level leads to sustainable economic and social development as well as protecting people’s lives.

Status quo of strengthening adaptation measures

Status quo

Formulation of the Tokyo Climate Change Adaptation Plan

- The Tokyo Climate Change Adaptation Policy was formulated in December 2019 to confront the impact of climate change in Tokyo and avoid or reduce damage in a wide range of fields, including natural disasters, health, and agriculture, forestry, and fisheries. In addition to the concept indicated in the policy, the Tokyo Climate Change Adaptation Plan was formulated in March 2021 based on the concept of sustainable recovery, incorporating a variety of perspectives, such as the promotion of digital transformation.

Trends in adaptation measures

Increasing need for adaptation measures

As the impact of climate change has become more serious, the need for adaptation measures is greater than ever. To protect the lives and property of Tokyo residents from increasingly intensified disasters, it is essential for TMG to actively utilize innovative technology and promote more advanced adaptation measures. It is also very important for municipalities, Tokyo residents, and businesses to deepen their understanding of climate change adaptation and promote their efforts.

Concerns about combined damage to vulnerable groups

With the spread of COVID-19, there are concerns about the threat of climate change and the combined damage caused by infectious diseases to vulnerable groups. In promoting adaptation measures, it is necessary to enhance the adaptation to not only deal with the threat of climate change, but also various crises related to the lives of Tokyo residents.

Five basic strategies for adaptation

- Implement climate change adaptation into all of TMG’s initiatives
- Promote climate change adaptation based on scientific knowledge
- Support local efforts in cooperation with municipalities
- Promote dissemination of information, including risks, to facilitate understanding of Tokyo residents
- Promote international cooperation in C40 and other organizations to accelerate intercity collaboration

Cumulative frequency distribution of central pressure of typhoons approaching Tokyo

- Source: Press release of the Metropolitan Research Institute, Minato City
- Central pressure (hPa)

Key targets toward 2030

Adaptation measures in fields affected by climate change

- Promote the utilization of innovative technology and the development of urban facilities in both structural and non-structural aspects against natural threats, such as floods, inland floods, storm surges, and landslides caused by increasingly intensified heavy rains or typhoons

Health

- Implement preventative and ex-post measures to minimize adverse health effects due to temperature rise, including cases of heatstroke and infectious disease as well as health problems due to air pollution

Natural disasters

- Promote measures to avoid or alleviate damage caused by natural disasters: floods, inland floods, storm surges, landslides, and typhoons

Water resources and the water environment

- Reduce the risks posed by severe droughts and deterioration of water quality as much as possible
- Create a comfortable water environment by improving the combined sewer system

Using drones for on-site investigations in ordinary times and in times of disaster

A distant view of a collapsed area (Photo taken by a drone)

A close-up view of a collapsed area (Photo taken by a drone)

Visions for 2050

Minimize risks from climate change impacts

- Protect the lives and property of Tokyo residents and realize a city that continues to attract people and businesses

Efforts immediately accelerated and strengthened

- Adaptation measures in fields affected by climate change
- Natural disasters
- Health
- Water resources and the water environment

Key targets toward 2030

Accelerating Actions

Through the activities of TMG, Tokyo residents and businesses, efforts made in all fields affected by climate change will take into account climate change impacts in the future, incorporating the concept of sustainable recovery and the perspective of digital transformation (DX)

Approaches for 2030 Carbon-Half Style

- Promote adaptation measures based on the Tokyo Climate Change Adaptation Plan
- Minimize impacts on biodiversity, such as changes in the distribution of organisms
- Enhance efforts to utilize and restore the functions of the natural environment

2030 Carbon-Half Style – Visions for social change

With the aim of realizing a city that protects the lives and property of Tokyo residents as well as continues to attract people and businesses, efforts will be made into account climate change impacts in the future

Approaches for 2030 Carbon-Half Style

- Promote measures to avoid or alleviate damage caused by climate change impacts in all fields (including natural disasters and health, etc.), by incorporating sustainable recovery and digital transformation
- Actively provide information on climate change impacts and adaptation in cooperation with the Climate Change Adaptation Center

2030 Carbon-Half Style

Source: Press release of the Metropolitan Research Institute, Minato City

Source: Illustration by A-FLAT

Source: Tokyo Climate Change Adaptation Plan

Source: Tokyo Climate Change Adaptation Plan

Source: Metropolitan Research Institute for Environmental Protection

Source: Ministry of Environment, Japan

Source: Ministry of the Environment, Japan
### Improving Air Quality Leads to Climate Change Measures

#### Relationship between the air quality and climate change impacts

Many of the efforts to reduce air pollutants also have the effect of reducing CO₂ emissions, leading to climate change measures. Among air pollutants, the reduction of ozone, the main component of photochemical oxidants, and soot (black carbon) in PM2.5 is said to be effective for both avoiding climate change and improving the air environment, attracting the attention of international organizations. In addition, it has been reported that a temperature rise due to global warming promotes production reaction, increasing the concentration of air pollutants, such as ozone.

In this way, improvements in air quality and the avoidance of climate change are closely related.

#### Changes in the air quality of Tokyo

The air quality in Tokyo has improved as a result of the implementation of vehicle emission reduction measures, including diesel vehicle emission control, and measures for factories. That allowed the environmental standards for PM2.5 to be met at all monitoring stations for the first time in FY 2019. Moreover, there have been many reports of improvement in the air quality throughout the world due to stagnant socio-economic activities associated with COVID-19. In Japan as well, it has been suggested that changes in socio-economic activities due to the measures for the state of emergency have contributed to a decrease in PM2.5 concentration.

#### Toward further improvement of the air quality

To improve its status as an environmentally conscious city, TMG has set a new target for PM2.5 to the world’s most stringent WHO guideline value in order to achieve the highest global standards of air quality:

- **10 µg/m³ or less (average of all monitoring stations) by FY 2030**

TMG will promote efforts for a clean urban environment together with Tokyo residents and businesses by further accelerating and establishing initiatives, such as measures for vehicle emission reduction, factories, and the Clear Sky Supporter Program as well as deepening their content. In addition, TMG will provide air quality data as open data to encourage the development of measures for air pollution utilizing the latest technologies, such as 5G and AI.

TMG will accelerate efforts to improve the air quality and contribute to climate change measures.

### Bicycle Sharing Expanding in Tokyo!

#### CO₂ reduction and bicycle sharing

Bicycles are not only good for your health but also do not emit any CO₂, thus helping to achieve zero emissions in the transport sector.

The use of a bicycle is recommended to avoid the Three Cs (three conditions which are Closed spaces, Crowds and Close contact) during the COVID-19 pandemic. Bicycle sharing has rapidly become widespread in recent years as a type of bicycle use. The system allows users to freely rent and return bicycles at multiple cycle stations, and is expected to be used more widely as a means of local transportation.

#### Situation at home and abroad

Bicycle sharing has been introduced in approximately 2,300 cities, mainly in North America and Europe. In London, Paris, and other cities, it has been well developed and positioned as an alternative or complement to public transportation.

In Japan, the number of cities introducing bicycle sharing is increasing year by year, amounting to 225 cities as of the end of March 2019.

#### Efforts of Tokyo

In Tokyo, bicycle sharing has been introduced in multiple municipalities. The system features wide area interoperation that enables bicycle use across municipalities, with the amount of use being on the rise.

TMG will make bicycle sharing more convenient and ensure its expanded use by promoting cooperation with multiple businesses to broaden the service area and supporting municipalities working to expand cycle stations.

#### Changes in the amount of use in 11-city wide area interoperation

- **Environmentally friendly bicycle sharing is becoming more widespread.**

<table>
<thead>
<tr>
<th>City</th>
<th>Bicycles</th>
<th>Stations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tokyo</td>
<td>9,000</td>
<td>850</td>
</tr>
<tr>
<td>London</td>
<td>11,900</td>
<td>840</td>
</tr>
<tr>
<td>Paris</td>
<td>23,600</td>
<td>1,200</td>
</tr>
<tr>
<td>New York</td>
<td>9,800</td>
<td>750</td>
</tr>
</tbody>
</table>

Tokyo and other cities are based on The Bike Share Planning Guide 2018 Edition, ITDP.

*Wide area interoperation in Chiyoda, Chuo, Minato, Shinjuku, Bunkyo, Koto, Shinagawa, Meguro, Ota, Shibuya, Nakano.*

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Zero Emission Tokyo 2020 Update & Report
Cooperate with various actors in movements and reform of social systems

Necessity of cooperation with various actors

A Zero Emission Tokyo cannot be realized by TMG on its own. CO₂ emissions are closely tied to daily lives and routine activities. TMG will make significant progress in social changes toward decarbonization by working with the Tokyo metropolitan area, the national government, and the rest of the world, integrating actions, technologies, and knowledge of a range of actors, including Tokyo residents, businesses, and organizations, and changing business mechanisms and patterns of behavior.

Progress of the policy

- Collaboration with advanced businesses etc.
- Bottle-to-Bottle Project in collaboration with the beverage industry
- Tokyo Hydrogen Initiative in collaboration with hydrogen suppliers and automobile manufacturers
- Food Waste Reduction Partnership in collaboration with food supply chains

Outreach to individual Tokyo residents—Team Mottainai*

Provide information on the activities who are working on energy efficiency or food waste reduction, and promote efforts for households that respond to lifestyle changes, such as increased demand from people spending a long time at home, due to COVID-19.

* A framework to communicate the consciousness of "Mottainai" (sense of "too precious to waste") to consumers, collaborate with Tokyo residents, businesses, and organizations working on activities to create an opportunity for behavioral changes, expand the scope of efforts toward decarbonization by Tokyo residents, and support efforts for the private sector.

Behavioral changes of individuals as they go about their daily life are a prerequisite for building a decarbonized society

To build a decarbonized society, it is important to transform the daily activities of individuals into decarbonized and sustainable actions, in addition to the efforts of the administration and businesses.

According to an IEA (International Energy Agency) report, behavioral changes in daily life are considered important in the race to achieve a decarbonized society by 2050. TMG is impelled to approach those who could not be sufficiently influenced by TMG alone in cooperation with various actors with the same vision by considering changes in life consciousness or lifestyle to be indispensable elements for the sustainable reduction of CO₂.

Establishing individual practice and connections with various actors of decarbonization actions to put social change on track

We will work with diverse actors, appeal to each consumer for empathy and support from various channels, and aim to establish a sustainable behavior pattern indispensable for accelerating decarbonization actions and further expand the circle of efforts.

- Collaboration with businesses and organizations taking the lead in decarbonization
- Collaborate with businesses and organizations that are actively engaged in decarbonization to accelerate efforts that promote sustainable consumption behavior in the majority of aspects of business and daily life
- Cooperation with TMG’s policy partners

Strengthen cooperation with the Tokyo Metropolitan Public Service Corporation, which has abundant know-how and on-site capabilities cultivated at Cool Net Tokyo* and the Research Institute for Environmental Protection, and promote efforts that encourage concrete behavioral changes by taking advantage of the corporation’s resources

Further fostering a movement for decarbonization actions

- Promote efforts that contribute to fostering momentum, such as public awareness raising activities and the development of specific projects in cooperation with local governments in the Tokyo metropolitan area and large cities across the country

Further strengthening partnerships with local municipalities

Since TMG declared the realization of a Zero Emission Tokyo, the municipalities have worked toward decarbonization to expand the scope of efforts toward decarbonization by Tokyo residents, and support efforts for the private sector.

- Special Wards
- Cities
- Towns/villages
- Total

| Policy | Necessity of strengthening cooperation with local municipalities

To foster the understanding of Tokyo residents, businesses, and organizations and take action together with them, cooperation with the municipalities most familiar to the residents is indispensable. In order to develop climate change measures with TMG and local municipalities as one body, we will further strengthen cooperation with municipalities that are familiar with local circumstances and have the regional networks and resources of local governments.

Progress of the policy

- Support for efforts toward decarbonization by municipalities

Support the efforts of municipalities by adding an assistance menu that contributes to the realization of a Zero Emission Tokyo to a support system for revitalizing local environmental power

- Promotion of sharing of knowledge and cooperation in initiatives

Promote the support for and cooperation in effective efforts, such as joint examination of initiatives in the resource management field and the sharing of technologies and expertise of climate change measures

- Number of projects utilized in the project for revitalizing local environmental power (as of 2021)

<table>
<thead>
<tr>
<th>Special wards</th>
<th>Cities</th>
<th>Towns/villages</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>87 (23)</td>
<td>50 (23)</td>
<td>3 (3)</td>
<td>140 (49)</td>
</tr>
</tbody>
</table>

* * A framework to communicate the consciousness of "Mottainai" (sense of "too precious to waste") to consumers, collaborate with Tokyo residents, businesses, and organizations working on activities to create an opportunity for behavioral changes, expand the scope of efforts toward decarbonization by Tokyo residents, and support efforts for the private sector.

Further fostering a movement for decarbonization actions

- Special Wards
- Cities
- Towns/villages
- Total

| Policy | Climates Actions

Municipalities and TMG working together to strongly promote decarbonization with voluntary efforts by all actors, including residents, businesses, and organizations, firmly established

In addition to strongly supporting efforts in line with the circumstances of municipalities, TMG will take leadership in expanding the circle of efforts for decarbonization to local governments in Tokyo.

- Support for efforts toward decarbonization according to local characteristics

Support efforts toward decarbonization by collecting information and exchanging opinions in detail through separate approaches to each municipality, and reviewing subsidy systems based on local needs and issues

- Promoting horizontal development of effective efforts implemented by municipalities

Foster momentum for decarbonization by creating and utilizing tools that introduce best practices of local governments, TMG’s initiatives for its own sustainability, and collaboration and support menus

- Activities provide follow-up for knowledge and issues found during the process of decarbonization through opportunities, such as liaison meetings that help share information between local governments

* Cool Net Tokyo is a nickname of the Tokyo Metropolitan Government’s Global Environment Subsection, Ministry of the Environment

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Necessity of TMG’s initiatives for its own sustainability

While it is in a position to promote various initiatives, Tokyo is also a large-scale business that consumes a lot of energy and resources. With “Let’s Start from Here” in mind, TMG will take the initiative in implementing efforts contributing to the realization of a Zero Emission Tokyo, in order to foster the understanding and cooperation of Tokyo residents, businesses, and organizations.

Progress of the policy

- **Greenhouse gas emissions at TMG (governor’s bureaus/departments)** compared to FY 2000: Reduced by 20.9% (FY 2019)
- **Energy consumption at TMG (governor’s bureaus/departments)** compared to FY 2000: Reduced by 20.8% (FY 2019)
- **Renewable power used at TMG facilities (governor’s bureaus/departments)**: Approx. 3% (FY 2019)
  - Have reduced both greenhouse gas emissions and energy consumption by more than 20% compared to base-year levels as a result of an all-out effort to increase energy efficiency, promote the introduction of solar power generation, and expand the use of renewable power based on TMG’s Smart Energy Action Plan.
  - Have strengthened the promotional system in TMG to realize a Zero Emission Tokyo by reorganizing its previous promotion council for the energy field into the Zero Emission TMG Promotion Council that deals with additional fields, including ZEVs, plastics, food waste, and measures for fluorocarbons.

“Carbon Half” is an absolute requirement for TMG

It goes without saying that TMG has to take the initiative in accelerating decarbonization action and leading the efforts of Tokyo residents and businesses to realize “Carbon Half” (half of GHG emissions) in the world of Tokyo.

TMG accounts for more than 1% of the total greenhouse gas emissions in Tokyo, which would mean that the success or failure of its efforts is a touchstone for the realization of a Zero Emission Tokyo.

TMG is an integral part of TIME TO ACT and as such must acknowledge that now is the time to accelerate actions. With the consciousness of “Let’s Start from Here”, TMG, in its entirety, needs to take a swift and bold action for decarbonization.

Changes in greenhouse gas emissions at TMG (governor’s bureaus/departments)

<table>
<thead>
<tr>
<th>Year</th>
<th>2000</th>
<th>2007</th>
<th>2010</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO2</td>
<td>936</td>
<td>750</td>
<td>724</td>
<td>749</td>
</tr>
<tr>
<td>CH4</td>
<td>752</td>
<td>752</td>
<td>752</td>
<td>740</td>
</tr>
</tbody>
</table>

Progress of the policy

- **Further strengthening of global networks**
  - Actively participate in international intercity network activities, such as C40 and ICLEI*, collect information on climate change measures in cities around the world, and provide information on initiatives of TMG.
  * C40: C40 Cities Climate Leadership Group, ICLEI: Local Governments for Sustainability

- **Environmental support for Asian cities**
  - In addition to sharing knowledge that contributes to the realization of a Zero Emissions Tokyo, hold technical exchanges on air quality and workshops on resource circulation. Continue providing information on initiatives and exchanging technologies via the Web.

- **Support the formulation of building decarbonization initiatives in Kuala Lumpur together with the Institute for Global Environmental Strategies (City-to-city Collaboration Programme of the Ministry of the Environment).**

Acceptance of overseas visitors in FY 2019

- 173 groups (3,372 participants) (Asia, Europe, etc.)

Dispatch of officials overseas in FY 2019

- 23 groups (52 officials) (Yangon, Beijing, New York, etc.)

Moving the world from Tokyo

As the climate crisis becomes more serious, we must enhance our willingness to act for this crisis throughout the world and take steps toward decarbonization.

We are facing another major crisis in the COVID-19 pandemic. A movement aiming for economic recovery from the impacts of this pandemic in conjunction with coping with the climate crisis is gathering pace throughout the world. To develop the climate action movement from Tokyo in the spirit of the “TIME TO ACT” slogan, TMG held a kick-off meeting in February 2021. TMG will accelerate effective efforts by making the most of Tokyo’s strong influence and ties with cities around the world to call for climate actions from the world.

Necessity of strengthening cooperation with cities and non-state actors around the world

As climate change measures require response on a global basis, we need to enhance and strengthen cooperation with cities and non-state actors around the world. “Let’s Start from Here” in mind, TMG will exercise international leadership as one of the world’s largest cities and further enhance its initiatives and contribute to decarbonization around the world by deepening inter-city cooperation to share knowledge and technologies.

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- **International cooperation based on TMG’s experience and know-how**
  - Expand TMG’s measures for buildings and examples of utilizing hydrogen in other cities in collaboration with C40
  - Promote policy support for and technology exchange with Asian cities in the fields of sustainable resource circulation and air quality
  - Share new business models as best practices with other cities, TMG’s initiatives for its own sustainability, and efforts utilizing green finance
  - Effective provision of information and sharing of knowledge through all diplomatic channels

- **Optimize timing for most effective provision of information and methods of outreach in collaboration with experts who have knowledge of international publications**

- **Demonstrate the presence of Tokyo at conferences and other occasions which attract high international interest**

- **Strengthen the collaboration with international think tanks and organizations**
Finance plays an important role in climate change measures, with environmental finance and investment being a major trend worldwide. To improve its presence as an international financial city and contribute to solving social issues through finance, TMG will revitalize the trend of utilizing investment funds for environmental measures, creating opportunities for Tokyo residents and businesses to invest in environmental measures.


Sustainable finance indispensable for decarbonization

ESG investment is steadily expanding as indicated by an increase in the balance of ESG assets held in the world. In Japan, a trend is emerging to positively evaluate businesses that make capital investment for decarbonization. Further fund injection in both the public and private sectors is essential to change social systems toward the realization of a Zero Emission Tokyo. To this end, TMG needs to promote initiatives to ensure the flow of funds leading to ESG investment and attract investment from home and abroad by acting as a driving force.

Realizing a leading sustainable finance city

We will achieve the rebirth of Tokyo by moving Japanese personal financial assets and enticing investment from the rest of the world by communicating the attractiveness of Japanese businesses with high ESG values.

Tokyo green finance market (tentative name)

- To make Tokyo a city where ESG knowledge, technology, and funds are concentrated on a global scale, consider the establishment of a Tokyo green finance market to collect ESG funds from home and abroad

Subsidy to Support Base of Operations of Overseas Financial Corporations

- Provide focused and intensive support for new investment etc. required when an overseas financial business working on green finance starts a business in Tokyo

Tokyo Green Bonds

- Support further revitalization of the green bond market and realization of SDGs from the financial sector, such as increasing the issuance in FY 2021

Sustainable energy fund (tentative name)

- Promote the development of clean energy bases, such as hydrogen stations, and renewable energy power plants through the scheme of a public-private partnership fund that is backed up by investment from TMG
Bring about changes toward “Carbon Half” through a variety of approaches

The year 2030, the target year for “Carbon Half,” is not just some distant future, but will be here in no time. The pathway to “Carbon Half” leads to the realization of a Zero Emission Tokyo by 2050. And in order to make it happen, bold redesign and reconstruction of our socio-economic system, rather than just some tweaking of the past, is indispensable. From the perspective of co-benefits, which aim to contribute to both the progression of climate change measures and resolution of various social issues, we have to refine Tokyo into a city full of attractions, including human-centered urban development that enables good and comfortable living as well as harmony with nature, and affluence, vitality, and the competitiveness that is specific to megacities.

In order to achieve this change, we will collect ideas from all fields and aspects in social life and urban activities to create a new mechanism that will change society based on not only all-out efforts throughout TMG but also cooperation with a range of actors who have the same aspirations for decarbonization, such as Tokyo residents, businesses, organizations, and cities at home and abroad.

Ramp up and accelerate efforts for social change from every angle

The previous chapter shows the visions and approaches in different policy areas for social change leading up to 2030. We need to ramp up efforts to increase the effectiveness of these actions and accelerate the momentum for bold changes.

The next page presents envisaged key considerations from the perspective of backcasting to promote the acceleration and progression of social change. To incorporate them into concrete initiatives and implement them in society, we will need to overcome different challenges, such as garnering the understanding of stakeholders, the resolution of legal issues, and working within financial constraints. Next fiscal year, TMG will ensure a step toward a decarbonized and sustainable city by discussing what future measures should be taken in light of the perspective of key considerations at the Tokyo Metropolitan Environmental Council as well as involving all actors in the efforts of TMG.

With improved awareness, technological innovation, and organization

Let’s Create the Future Together

Ensure the progression to a sustainable city through decarbonization

Key considerations to promote the acceleration and progress of social change

1. Transition to a decarbonized society through a circular economy: Tokyo will change the ways to make, sell, and use things
   - Mainstream circular economy-oriented businesses: support consumers’ circular choice
   - Contribute to the reduction of consumption-based CO2 by prolonging the life of products and using low-carbon materials

2. Collaboration with all initiatives/projects of TMG
   - Cooperate in a range of policy areas, such as buildings/houses, welfare, health, transportation, urban development, disaster preparedness, and industrial initiatives
   - Promote the leadership of the entire administration sector (public facilities etc.) including TMG

3. Bold use of digital technology and financing
   - Utilize big data, depict/evaluate environmental values

4. Further cooperation with other regions at home and abroad
   - Interchange renewable energy with other regions, create demand for hydrogen in collaboration with other prefectures in the Tokyo metropolitan area

5. Human resource development and capacity building to support decarbonization actions
   - Activate the exchange of human resources with expertise in climate change measures at businesses or local governments

6. Further fostering momentum to encourage a shift in the behavior of each individual Tokyo resident

7. Efforts for sustainability, including coexistence with nature and improvements in the air environment
   - Our key considerations include making the best use of various policy approaches and inventiveness in order to move ahead with these efforts and achieve social change. Some examples of them are:

   a. Promoting policies through various approaches
      - Improve accessibility for Tokyo residents and businesses to decarbonization actions
      - Utilize subsidy programs that call for active efforts of each entity, including subsidies to promote the development and spread of products that contribute to decarbonization, and subsidies in proportion to the level of efforts

   b. Promoting policies through sunset/sunrise legislation
      - Utilize a method of providing generous preferential treatment and specific support measures for a limited time to rapidly establish and implement efforts or initiatives in society, and a means of leading society by presenting in advance what should be institutionalized or standardized in the future

   c. Others, including the utilization of the public procurement and tax system, encouragement through institutional or regulatory incentives and disincentives

8. Image of policy promotion
   - Preferential treatment, support measures, calling for action, fostering momentum (Sunset)
   - Institutionalization and standardization (Sunrise)
Promote both technological innovations for decarbonization and social implementation of existing and advanced technologies

Even though the world strengthens and accelerates its efforts toward decarbonization, the realization of zero emissions by 2050 is an extremely daunting challenge and indubitably involves the utilization of technology and innovations. Considering innovation as the key to achieving decarbonization, the national government will create a JPY 2 trillion fund to support research and development for decarbonization by the private sector. A vast majority of countries are also planning large amounts of fiscal investment to promote technological development in addition to the environmental motivation for decarbonization: the need to recover an economy that has been depressed by the COVID-19 crisis. Investing in decarbonization technology is seen as an opportunity for growth, as the ability to proactively establish promising decarbonization technology is expected to be a focus of international competition in the near future. Against this backdrop, the industrial world including start-ups is actively moving toward the innovation and social implementation of decarbonization technology based on digital technology etc.

Making the most of existing technology is top priority
Support through policies is indispensable to that end

To realize “Carbon Half” by 2030 and a Zero Emission Tokyo by 2050, we have to, instead of simply waiting for future innovations, make the most of existing and advanced technologies with a potential for great CO2 savings for lower costs, higher performance, and more sophisticated and widespread implementation. To this end, support through policies is essential, including subsidies and institutional support. We also need to strategically consider and implement efforts for regulatory reform and standardization, creating further demand for technology and lowering prices. By being committed to ambitious goals and clearly showing the direction of initiatives, TMG aims to realize a virtuous cycle of technologies and initiatives in which we enhance predictability in the private sector to encourage technological development, revitalize the market, and promote investment.

Combine different initiatives to Strongly promote social implementation of existing and advanced technologies

To ensure that existing and advanced technologies with great CO2 savings, such as storage batteries, fuel cells, and green hydrogen, will become widespread as highly versatile technologies, TMG will support the introduction in the initial stages of market launch and additional support in infrastructure development and institutional aspects.

Tokyo will take the initiative in promoting verification projects and encouraging the utilization and spread of technology in Tokyo in collaboration with the private sector at home and abroad that takes on the challenge of business models that utilize advanced technology. In the Bay Area in particular, we will support the swift social implementation of cutting-edge technologies, such as green technology, and realize a sustainable urban model by attracting green technology businesses and developing a variety of projects. Furthermore, we will strive to create more innovations by building and supporting a mechanism that encourages collaboration between businesses.

Acceleration in the movement of technological innovations for decarbonization

- Technology development toward 2050
- Examples of negative emission technologies to remove CO2 from the atmosphere
- Priority areas to be supported by the national government for 10 years

The role of the national government is crucial for realizing a decarbonized society

In the fall of 2020, the national government announced the long-awaited 2050 Carbon Neutral Declaration. It is a great pleasure for Japan to be regaining a voice in the international community regarding climate change measures. TMG welcomes the statement of intention of the national government.

In the face of climate change, we are forced to take concrete action that will lead to net zero emissions by 2050. In accordance with the recognition that efforts during the decade up to 2030 are extremely important given by the IPCC Special Report on Global Warming of 1.5°C, we call for the national government to appropriately clarify new 2030 greenhouse gas targets and clear paths to them at an early stage, and take action for reduction as soon as possible. Specifically, we strongly urge them to work on carbon pricing as well as incisively promote further improvement of energy efficiency and expansion of the use of renewable energy from manufacturing to buildings and civic life by making full use of the existing and advanced technologies currently available.

Flexible response to changes in time or circumstances - Agility*

Focus on PDCA cycle to continue developing highly effective initiatives

This strategy is intended as a whitepaper with the aim of realizing a Zero Emission Tokyo. We are continuing to monitor and verify the progress of the Zero Emission Tokyo Strategy formulated in December 2019. Against this background, we have shown our vision and efforts toward “Carbon Half” by 2030.

As the movement toward decarbonization progresses rapidly in the world, we will continue to precisely identify changes in social structure and trends in scientific knowledge and technological development, listen to the opinions of Tokyo residents, businesses, and experts, keep on working on the PDCA cycle, and consider and implement the upgrade of the goals and initiatives as necessary.

National government’s 2050 Carbon Neutral Declaration is welcomed
Essentials: Clarifying the path to 2030 to take action

Since the national government has a major responsibility and role in energy supply, we will press for maximized acceleration of efforts to make renewable energy a major energy source and a dramatic increase in the proportion of renewable energy in electricity by 2030. It is also important to link the circular economy policy to climate change measures to promote it in an integrated manner. We hope that the national government will discuss effective policy approaches for the sustainable use of resources and promote decarbonization efforts that will contribute to the achievement of SDGs.

The role of the national government is crucial for realizing a decarbonized society. We will continue to request that the national government work on the formulation of initiatives to support the independent and proactive efforts of Tokyo and other regions, strive for further technological development toward 2050, and play a leading role in realizing the decarbonized society promoted by the international community.

* Agility is used here to mean a flexible and swift response to changes in time or circumstances.
Zero Emission Tokyo Strategy 2020 Update & Report

In 2030, solar power generation may well be standard in every home.

Tokyo is a densely built city with many buildings but it is also a residential city home to approximately 14 million people. In Tokyo, solar panels have not yet been installed on approximately 95% of roofs* that are suitable for solar power generation (This applies to houses including apartment buildings).

* Houses are deemed "suitable (including conditionally suitable)" for installation by the Tokyo Rooftop Solar Register and other programs.

In California, in the United States, a system that requires the installation of solar panels in new houses started in 2020.

Total power consumption in Tokyo Approx. 78.8 TWh/year (2018) (Installation potential of houses in Tokyo is over approx. 8,000 MW)

By each of us doing our part to save electricity, we can increase this ratio even more.

By installing solar panels on all roofs (houses) suitable for power generation, and...

Home appliances that shape a decarbonized society: Solar power generators

If you install solar power generation equipment on the roof of your house, you can use clean electricity yourself, save on electricity bills, sell electricity, and use electricity in the event of a power outage. If you add a storage battery, your house will have the added advantage of high energy self-sufficiency and excellent disaster preparedness.

Installing solar power generation equipment on all eligible roofs of houses in Tokyo can cover approximately 13% of the total power consumption in Tokyo (approximately 41% in the residential sector). The realization of a Zero Emission Tokyo is required to utilize such potential and make a shift to a society in which solar panels are installed as standard at each home like home appliances.

Percentage of renewable power used in Tokyo

By installing solar panels on all roofs (houses) suitable for power generation, and...

Renewable power
Goal 50%
15.3%

Total power consumption in Tokyo Approx. 78.8 TWh/year (2018) (Installation potential of houses in Tokyo is over approx. 8,000 MW)

Renewable power
Goal 50%
15.3%

+13%

By each of us doing our part to save electricity, we can increase this ratio even more.

Use as power supply during power outages or disasters (daily practice recommended)

In normal times, a solar power generation system operates in a linked operation mode that connects to a power company. By switching the operation mode to the self-sustained operation mode, you can use electricity even in the event of a power outage or emergency.

There are seven steps for actual use as shown below. Practice on a regular basis in case of emergency.

How to use self-sustained operation mode

(1) Check the location of the outlet for self-sustained operation.
(2) Read the instruction manual to check how to switch to the self-sustained operation mode.
(3) Turn off the main circuit breaker.
(4) Turn off the solar power generation breaker.
(5) Switch to the self-sustained operation mode.
(6) Connect the home appliance you wish to the outlet for self-sustained operation and use the appliance.
(7) Make sure to restore the unit after power restoration. Cancel the self-sustained operation mode = Turn on the solar power generation breaker = Turn on the main circuit breaker.

Source: Material of Japan Photovoltaic Energy Association (JPEA)

In 2030, solar power generation may well be standard in every home.

Renewable power
Goal 50%
15.3%

+13%

Source: Japan Photovoltaic Energy Association (JPEA)