December 2023

TOKYO METROPOLITAN GOVERNMENT

For a Tokyo Where Everyone Can Feel Safe for the Next 100 Years

This year marked the centennial of the Great Kanto Earthquake, an earthquake that not only devastated Tokyo, but wrought enormous damage to the National Capital Region as well. A massive project was implemented through the visionary efforts of Goto Shinpei, president of the Bureau for Reconstruction of the Imperial Capital, and other leaders of that time to rebuild from this disaster. The social infrastructure developed then remains today, forming the framework of the metropolis of Tokyo.

Tokyo's current safety and security could be called the crystallization of such efforts by our predecessors. It is thus our mandate to take these to the next level for the benefit of future generations. To that end, the Tokyo Metropolitan Government launched the "Tokyo Resilience Project" in December 2022 as a government-wide initiative to address the five key risks confronting our city. This project reveals our vision for a more resilient Tokyo in the 2040s and lays out the paths to take to achieve this vision.

Assuming all kinds of risks and being fully-prepared for the worst-case scenario are key to crisis management. Risks are constantly changing. Global warming is becoming more severe, and there is no time to lose in dealing with floods and storms that are increasing in frequency and intensity as a consequence of climate change. Disaster can strike at any time. This not only includes the looming threat of a major earthquake or a volcanic eruption, but the possibility of a large-scale communications failure or outbreak of a new infectious disease as well. To ensure that the project launched last year will serve as a solid roadmap to achieving our unwavering vision for Tokyo, we have compiled the "Tokyo Resilience Project Upgrade I" to precisely identify changing risks and to strengthen and improve measures from the aspects of both hard and soft infrastructure.

Cooperation and collaboration with diverse stakeholders including the national government, the municipalities of Tokyo, other local governments, businesses, related organizations, and communities are essential for the promotion of this project. Having all actors prepare for disasters before they happen by working hand in hand to strengthen self-support, mutual support, and public support as three inseparable parts of a whole, will accelerate this program.

"Always be prepared." Under this banner, let us together build a strong and sustainable Tokyo where people can live with peace of mind for the next 100 years.

December 2023

Koike Yuriko
Governor of Tokyo

TOKYO Resilience Project *upgrade* I

Aiming for "Safety for the Next 100 Years"

Overview

Contents

Chapter 1: Concept of the Tokyo Resilience Project

1 Background of the project's formulation

2 Positioning of the project

3 Basic policy for project formulation

Chapter 2: Five Imminent Risks and Compound Disasters Facing Tokyo

1 Five risks

(1) **Floods and storms** that are becoming increasingly frequent and severe due to climate change
(2) **Earthquakes** that can happen any time and cause extensive damage
(3) **Ash falls from volcanic eruptions** that will directly lead to complete evacuation of an island or paralyze urban functions
(4) **Disruption of power, communications, etc.** that will hinder residents' lives and social activity
(5) **Infectious diseases** " that make close contact a risk and threaten socioeconomic activities

2 Risk of a compound disaster that will lead to more extensive and prolonged damage

Chapter 3: Vision for a More Resilient Tokyo in the 2040s

1 Basic concept

2 Resilience to each type of crisis

(1) Protecting residents from increasingly severe **floods and storms**
(2) Building a city that "does not collapse, does not burn, and people survive" even in the event of a **major earthquake**
(3) Maintaining urban activities even if **ash falls from volcanic eruptions**
(4) Eliminating concerns about **power, communications, and data** when a disaster strikes
(5) Creating a city that is also highly prepared for **infectious diseases**

Chapter 4: Projects to Address Each Risk

1 Project structure

2 Projects to address each risk

(1) Protecting residents from increasingly severe **floods and storms**
(2) Building a city that "does not collapse, does not burn, and people survive" even in the event of a **major earthquake**
(3) Maintaining urban activities even if **ash falls from volcanic eruptions**
(4) Eliminating concerns about **power, communications, and data** when a disaster strikes
(5) Creating a city that is **resistant to infectious diseases**

3 Surviving a Tokyo metro area-wide compound disaster

Chapter 5: Project Promotion

1 Concept for project promotion

2 Effective project promotion measures

(1) Collaborating with diverse entities
(2) Fostering momentum to advance the project
(3) Developing initiatives that incorporate DX
(4) Promotion of green infrastructure that takes advantage of natural functions

3 Disseminating information to Tokyo residents, etc.

Chapter 6: Coordination with Related Initiatives

1 Coordination with initiatives related to the project

(1) Promotion of HTT
(2) Efforts to protect Tokyo residents from missile attacks

Chapter 7: Project Scale

1 Rough estimate of the project's scale

Chapter 1: Concept of the “Tokyo Resilience Project”

1 Background of the project’s formulation

○ **Faced by the threat of natural disasters, all measures must be upgraded** to **protect the lives and livelihoods of Tokyo’s residents and to maintain the functions and economic activities of the capital, which support all of Japan.**
○ Making the city more resilient will be very expensive and take a long time. To ensure that **measures looking to the future will be carried out in a stable and continuous manner over the medium to long term,** the projects carried out by the TMG have been compiled in this Tokyo Resilience Project.
○ **The project has been upgraded in order to ensure a solid roadmap to the realization** of the vision for Tokyo in the 2040s.

2 Positioning of the project

(1) TMG’s basic concept

○ **The safe and secure city of Tokyo, which could be called the crystallization of efforts of our predecessors, will be taken to higher levels and passed on to future generations.**

(2) Purpose of the project

○ The **projects to be undertaken by the TMG** are organized under **five risks** (floods and storms, earthquakes, Ash fall from volcanic eruptions, disruptions of power, communications, etc., and infectious diseases), with the addition of **compound disasters.**
○ The responsible bureaus will collaborate with each other and implement their respective projects by **reflecting the resiliency project’s contents in their individual measures and project plans.**

(3) Scope of the project

○ Among projects positioned as part of the “Future Tokyo: Tokyo’s Long-Term Strategy,” those that meet the following three criteria fall under this project.

① **Projects addressing the five risks** (measures responding to the five risks of floods and storms, earthquakes, volcanic eruptions, disruption of power, communications, etc., and for becoming a city resilient to infectious diseases)
② **Projects expected to be effective in overcoming risks in the promotion of this project*** (of projects to renew existing facilities, includes initiatives with the main purpose of ensuring the maintenance of functions in the event of a disaster)
③ **Projects for which TMG is taking the initiative in participation and implementation** (including subsidies and policy guidance)

*However, there are other projects which contribute to improving disaster preparedness in addition to those positioned as part of this project.

3 Basic policy for project formulation

(1) From a backcasting approach, upgrade measures based on assumptions shared throughout the TMG

○ **Utilizing a backcasting approach,** this project will begin by **envisioning a more resilient Tokyo in the 2040s,** and then work backwards to establish the roadmap from the present to that future vision. Along with determining projects for each risk and compiling the various measures and projects, **pioneering and distinctive efforts** will be listed as **leading projects.**
○ **Assumptions on the situation that are shared throughout the TMG are established as “common perspective,”** and along with sharing crisis awareness throughout the TMG, **measures will be upgraded through the collaboration** of the relevant bureaus

(2) Develop highly effective measures that center on hard infrastructure and its combination with soft infrastructure

○ **While focusing mainly on hard infrastructure measures, such as infrastructure development,** from the standpoint of maximizing the effectiveness of hard infrastructure preparations, also combine soft infrastructure measures such as utilizing digital technologies.

(3) Promote measures based on the standpoint of collaboration with diverse entities

○ Strengthen measures while **taking into consideration the importance of collaboration with various entities such as the national government, municipalities, businesses, Tokyo residents, and communities,** who work together with the TMG to realize a more resilient Tokyo.

Chapter 2: Five Imminent Risks and Compound Disasters Facing Tokyo

1 (1) Floods and storms that are becoming increasingly frequent and severe due to climate change

Situation in Tokyo

■ Tokyo is often subject to **flood damage** such as **river flooding and inland flooding** occurring from large volumes of stormwater flowing into rivers and sewer systems.

■ Sediment disasters in **the Tama mountains and the Tokyo islands** can have a serious impact on residents' lives by cutting off road access and isolating entire villages.

■ **Flood and storm damage could become more severe as temperatures are expected to rise and the amount of rainfall to increase** in the future.

Future direction

➡ Continue to implement measures for floods and storms based on currently estimated levels.

➡ **Measures also need to be upgraded to address further intensification of floods and storms due to climate change.**

Common perspectives

■ Climate change scenario for development of infrastructure for the 2040s: Based on a **2 ℃ increase in average temperature** , the **amount of rainfall will increase by 1.1 times, and the sea level will rise as high as by about 60cm.**

■ Very strong tropical cyclones with **maximum wind speeds of at least 59m/s** will form more frequently in the future.

1 (2) Earthquakes that can happen any time and cause extensive damage

Situation in Tokyo

■ **A magnitude 7 class earthquake** has a **70% probability** of striking the southern Kanto area **within the next 30 years.**

■ While **damage estimates** by the TMG, which were revised in May 2022, presented an improvement from previous estimates, it was again shown that **a major earthquake, such as one directly striking Tokyo, would cause extensive damage.**
Evacuation may be prolonged with the restoration of lifelines estimated to take 4 days for power and about 6 weeks for low pressure gas* in a maximum damage scenario.

*Depending on the damage situation, it may take more time before service is available for use in homes, etc.

Future direction

➡ While showing some improvement, damage estimates are still high, making it **necessary to upgrade measures.**

➡ Appropriate response to **challenges arising from changes such as the city's demographics and housing environment** is

Common perspectives

■ Estimated damage from a **major earthquake directly striking the southern part of central Tokyo**:
- **Deaths: about 6,000; Buildings damaged: about 194,000**
- Possibility of **traffic disruption** on designated disaster response routes (in areas with a seismic intensity of upper 6 or higher)
- People needing to evacuate their homes due to **elevators stopping**, etc.
- Use of air conditioning, toilets, etc. disrupted due to suspension of **lifeline utilities**

■ Estimated damage from a **Nankai Trough megathrust earthquake**
- **Suspended delivery of daily commodities to the islands**

1 (3) Volcanic eruptions that will directly lead to complete evacuation of an island or paralyze urban functions

Situation in Tokyo

■ There have been **7 volcanic eruptions on the Tokyo islands** in the last 100 years. After the Miyakejima volcano eruption in 2000, it took about **four and a half years for the island evacuation order to be lifted**.

■ **Mt. Fuji** last erupted about 300 years ago. Low frequency volcanic earthquakes occurring frequently around the year 2000 have again struck home that Mt. Fuji is an **active volcano.**

■ In a worst-case scenario, a massive eruption of Mt. Fuji would result in **ash fall reaching the Tama area and even the 23 wards**, causing power outages, road traffic disruptions, suspension of rail services, and other **damage to the city's infrastructure**.

Future direction

➡ In the islands, promote the upgrading of measures based on **lessons learned to date**.

➡ To address potential **ash fall from Mt. Fuji, developing systems such as to clear roads and for the disposal of ash in residential areas will be necessary.**

Common perspectives

■ In the event of an eruption in the **islands**:
- **Residents will have to evacuate** due to tephra, ash fall, lava flow etc.

■ In the event of a large eruption of **Mt. Fuji** (worst-case scenario):
- Ash fall will affect **transportation in 3 hours**
- **Ash fall will be 2-10 cm deep** in most parts of Tokyo's 23-ward area
- **Power outages, traffic disruption, suspended rail services**
- **Ash fall equivalent to nearly 10 times** the debris from the Great East Japan Earthquake (approximately **490 million m³)**

1 (4) Disruption of power, communications, etc. that will hinder residents' lives and social activity

Situation in Tokyo

■ The March 2022 earthquake off the coast of Fukushima* caused **around 2.1 million households in TEPCO's service area to lose power**. It took about 3 hours to restore power, and even in the city, **elevators and traffic lights stopped working.**

■ With the widespread use of ICT devices, **telecommunication services have become an indispensable infrastructure for the everyday lives and social activities of Tokyo's residents**.

■ **Communication services were disrupted** at the time of the 2011 Great East Japan Earthquake. And a communications provider's equipment failure that occurred in July of that year not only disrupted voice and data communications but had **significant impacts on urban activities** including ATMs and freight transport.

Future direction

➡ Although urban development to secure energy supply and strengthen communications in preparation for a disaster is making progress, it would be necessary to strengthen initiatives for **securing the stability of the information and communications infrastructure, and for its early restoration.**

Common perspectives

■ Power outage in the city caused by a major earthquake directly striking Tokyo
Percentage of power outages: **11.9%** (4 days for full restoration*)
*Depending on the damage, it may take more time for service to become available in homes, etc.

■ Percentage of households possessing **smartphones**: **about 90%**

■ During the Great East Japan Earthquake, **voice calls were restricted by as much as 70-95%** due to congestion of mobile communications networks.

■ Build digital infrastructure for **business continuity even in the event of a disaster.**

1 (5) Infectious diseases that make close contact a risk and threaten socioeconomic activities

Situation in Tokyo

■ Tokyo is a **cosmopolitan city with an active inflow and outflow of people and things from overseas** for reasons including a concentration of businesses, diverse tourism resources, and a variety of conferences and events.

■ Due to factors such as more global movement of people and things, **new infectious diseases** originating in various parts of the world **spread beyond national borders**.

■ Although COVID-19 was legally downgraded in May 2023 to a Category 5 disease, there is still **the risk that a new infectious disease will be brought** into Japan from overseas **and spread** in the future.

Future direction

➡ As people's awareness and behavior change as a result of their experience during the pandemic, **a city that is resilient to infectious disease** as well must be built to prepare for future outbreaks of new infectious diseases.

Common perspectives

■ **Due to the COVID 19 pandemic, Awareness of avoiding crowds and closed in spaces** has made inroads.
When it is recommended to wear a mask:
Indoors: When it is not possible to **physically distance (by about 2 meters)**
Outdoors: When conversing with others without physically distancing
High need for outdoor spaces (ways for their greater use are needed)
Over 50% of people surveyed want off peak commuting and remote work to **become established practice.**

2 Risk of a compound disaster that will lead to more extensive and prolonged damage

Situation in Tokyo

■ Amid the increasing risk of each of these disasters, there is also a growing risk of compound or cascading disasters, such as a **new disaster striking before recovery from a disaster**, or **a natural disaster occurring during an infectious disease outbreak**.

■ Compared to damage caused by a single disaster, it is feared that **damage will be amplified by a compound disaster**.

■ The heavy rains of July and August 2021 during the COVID 19 pandemic, caused extensive damage across a wide area of Japan, and also revealed the **need to consider how to evacuate COVID patients recuperating at home and to set up infection prevention measures at evacuation centers.**

Possible compound disasters

○ **A large typhoon striking Tokyo during its recovery from a major earthquake directly hitting the city**

The typhoon could cause storm surges and other damage in areas where coastal protection facilities, river facilities, and others were damaged by the tremors and liquefaction.

○ **An earthquake or flood occurring during the several years of a global pandemic**

Outbreaks of mass infection among evacuees

Chapter 3: Vision for a More Resilient Tokyo in the 2040s

1 Basic concept

Vision for a more resilient Tokyo in the 2040s

- **A city that can protect the lives of its residents to the maximum extent possible, keep damage within the city to a minimum, and restore urban functions quickly** achieved through the implementation of hard infrastructure measures, as well as soft infrastructure measures based on shifts in the social landscape, to address threats such as climate change and earthquakes.
- **A safe, secure, and sustainable city known for its thorough preparations for a broad range of crises** that attracts different forms of investment, as well as people from Japan and overseas.

Preparations for floods and storms

Preparations for earthquakes

Preparations for volcanic eruptions

Preparations for power and communications outages, etc.

Creating a city that is also highly prepared for infectious diseases

2 (1) Protecting residents from increasingly severe floods and storms

Vision for a more resilient Tokyo in the 2040s

■ Residents can live their lives **without feeling worried about flood and storm damage** even in low lying areas and areas alongside rivers or by the sea.

- Through reinforcement of river facilities and sewer system facilities, raising the height of sea walls, measures to ensure the accurate and prompt opening and closing of floodgates, strengthening of measures for underground shopping centers and subways, and improved disaster resistance of slopes and quays, as well as the conservation and utilization of natural features for flood control in line with the green infrastructure concept, flood damage and sediment disasters no longer occur.

■ Even if a disaster strikes, **evacuation sites and routes have been secured**.

- Safe evacuation is facilitated through pr- determined steps for phased evacuation and accelerated damage assessment and dissemination of information.
- A well-developed road network prevents disruptions in the transport of relief and keep residents from becoming isolated.

	Interim Policy Goals (around 2030)	Policy Goals for the 2040s
Flood control measures	■ Promote the development of facilities to respond to climate change ▶ Develop new regulating reservoirs with a capacity of approx. 2 million m³ ▶ Study the construction of underground rivers, etc., for the development of facilities that can accommodate the impacts of climate change	**Ensure the ability to handle rainfall increasing by a factor of 1.1 due to climate change** • Raise the target rainfall for the entire Tokyo metro area to "the equivalent of 1/20 the annual rate of excess rainfall due to climate change* *Rainfall increase factor of 1.1 taken into account (85mm/hour in the central wards)
Storm surge measures	■ Raise the height of sea walls that need to be raised by the 2030s ▶ Begin work to raise about 24km of sea walls (Port of Tokyo)	**Ensure the ability to deal with rising sea levels due to climate change** • To counter the rise in sea levels over time (up to 60cm by the year 2100), prioritize approximately 60km of sea walls in the Port of Tokyo and implement construction in phases (the planned maximum sea wall height in 2100 will be up to 1.4m higher than the current plan*). *Subject to revision as necessary based on future findings and monitoring results.
Evacuation to higher ground	■ Develop higher ground to serve as evacuation sites and a base for functions in the event of flooding of the Arakawa, Edogawa, and Tamagawa rivers (Shinozaki district, etc.)	**Ensure access to emergency evacuation sites** that can be accessed even by people who are late to evacuate • Secure higher ground to protect people's lives in areas where there is a lack of higher ground for evacuation
Subways, etc.	■ Promote flooding countermeasures for subways ▶ Promote urban flooding countermeasures to be completed by the mid-2030s ▶ Promote flood control measures for the Arakawa river	**Ensure that subway users can evacuate safely** even when rainfall exceeds the target amount
Sediment disasters	■ Eliminate concerns by deterring and taking measures to prevent sediment disasters ▶ Establish a system to watch over embankments in the Tama region and in Tokyo ■ Make progress with developing roads that can be used as alternative routes in a disaster (road along the south bank of the Tamagawa river, etc.)	**Prevent loss of human life and isolation** due to sediment disasters
Measures for strong winds	■ Promote countermeasures to prevent damage caused by strong winds ▶ Promote the removal of utility poles ▶ Diagnosis and countermeasures for roadside trees on 217 metropolitan roads	**Prevent power outages and accidents caused by objects such as signboards that turn into projectiles** due to strong winds

2 (2) Building a city that “does not collapse, does not burn, and people survive” even in the event of a major earthquake

Vision for a more resilient Tokyo in the 2040s

- **Earthquake resistant buildings and communities that do not burn or spread fire** protect the lives and livelihoods of Tokyo residents.
  - Along with improving the fire resistance of areas with close set wooden houses, improving local disaster prevention capabilities will prevent the outbreak and spread of large scale fires.
  - Progress in making buildings earthquake resistant and eliminating utility poles prevents them from collapsing or falling over when an earthquake occurs.
- The **transportation network** that supports emergency response activities following an earthquake **has been secured**, enabling rescue and relief agencies to quickly reach their destinations.
  - Extensive earthquake proofing has been carried out along roads and an emergency transport network can be set up promptly by leveraging digital technology to assess damage at the time of a disaster.

Interim Policy Goals (around 2030)		Policy Goals for the 2040s
■ Ensure emergency vehicle access to key disaster management facilities ▶ Overall completion rate of 99% for movement of vehicles between designated points on designated disaster response routes	Emergency routes	**Eliminate the causes of road blockages** for designated disaster response routes (also prepare backup alternate routes in the event blockage does occur) • **Overall completion rate of 100" for movement of vehicles** between designated points on designated disaster response routes
■ Promote road projects, etc. to ensure access routes to wide-area disaster prevention facilities ▶ Promote the project to build the JR Nambu line multi-level crossing, etc. ▶ Begin work to operationalize the Harumi line extension of the Metropolitan Expressway	Disaster management facilities	Realize **improved disaster response capabilities** • **Secure multiple routes for the transport of emergency relief, as well as regional medical transport** in the Tachikawa area and Tokyo’s waterfront area
■ Significantly improve the fire-resistance of areas with close-set wooden houses ▶ Make 70% or more of the area fire-resistant in all 28 development districts	Areas with close-set wooden houses	Realize **communities that do not burn or spread fire** • **Achieve a fire-resistant ratio of 70% or higher** in development districts, etc.
■ Cut the number of deaths due to building collapse, etc.in half ▶ Generally eliminate homes with inadequate earthquake-proofing built to the old standards Reduce by half the number of wooden houses built to the newer standard that have inadequate earthquake-proofing (about 200,000 houses)	Earthquake -resistant homes	**Reduce the number of deaths due to building collapse, etc. caused by** an earthquake that directly strikes Tokyo, etc. **by around 80%**※ • **Ensure that 100% of homes meet standards for earthquake resistance** (year 2000 building codes) *Based on estimates for damage mitigation effects outlined in the May 2022 TMG damage estimates for a major earthquake that directly strikes Tokyo, etc.
■ Reduce overcrowded evacuation shelters ▶ Increase the number who can evacuate at home and reduce the burden on evacuation centers	Evacuation measures	**Eliminate crowding in evacuation centers** (evacuation centers **in Tokyo can** currently **accommodate approximately 3.2 million people)**
■ Secure transportation bases for relief supplies, etc. on the Tokyo islands in the event of a disaster ▶ Begin work to build one quay per island for emergency transportation	Tokyo islands	**Prevent** the Tokyo islands from **becoming isolated** • Ensure that each island has a quay designed for emergency transport

2 (3) Maintaining urban activities even if ash falls from volcanic eruption

Vision for a more resilient Tokyo in the 2040s

■ The lives and property of residents of Tokyo's islands are protected from debris flows, etc., and **island residents can evacuate safely.**

- Evacuation sites have been reinforced to protect against volcanic ash and prior preparations for evacuation facilitate proper evacuation actions.

■ Even in the event of ash fall generated by an eruption of Mt. Fuji, **transportation and lifelines will not be cut off for a prolonged period of time**.

- Damage to lifelines caused by ash fall is minimized by removing utility poles, covering water purification facilities or converting them into indoor facilities , and sharing ash fall forecasts.
- Prolonged interruption of urban functions is prevented by removing ash in stages based on information that is promptly obtained and analyzed.

Interim Policy Goals (around 2030)		Policy Goals for the 2040s
■ Promote measures to ensure that lifelines are not cut off for a prolonged period of time ▶ Complete the covering of necessary water purification facilities ▶ Make progress with removing utility poles ▶ Develop and implement technology to remove ash from sewer lines *The supply of natural gas will not be impacted by ashfall	**Lifelines**	**Ensure that** power, water, and gas **continue to be supplied**
■ Establish a system to quicky restore the functionality of roads ▶ Designate priority roads for ash removal, based mainly on emergency transportation routes, and establish a system for eliminating road obstacles focusing on Tokyo roads	**Transport ation**	**Quickly restore the functionality of roads** leading to critical facilities • Ensure a **24-hour system** for removing ash through public-private collaboration.
■ Establish a system for cooperation with the national government, etc. to remove ash fall ▶ Secure temporary storage sites in Tokyo ▶ Agree on the division of roles and steps to be taken by related organizations regarding the method for collecting, transporting, and disposing of the ash	**Disposal of accumulated ash**	In cooperation with the national government, other prefectures, etc., **secure temporary storage sites for the** total **anticipated volume of ash fall** from an eruption of Mt. Fuji **(approximately 490 million m³)**
■ Complete the development of two facilities necessary for evacuating island residents by boat ▶ Develop waiting areas for boarding boats located within 3km of the mouth of a volcano designed to specifications that take cinders into account	**Island areas**	**Ensure the secure evacuation** of all island residents

2 (4) Eliminating concerns about power, communications, and data when a disaster strikes

Vision for a more resilient Tokyo in the 2040s

- Electricity can be "generated and stored," so **there is no need to worry that the city will go dark when a disaster strikes.**
  - In addition to emergency power generation equipment, through promotion of self-sufficient and decentralized installation of power sources that use sustainable energy, such as solar panels, and urban development that facilitates distribution of energy throughout an area, including installation of conduits, it is possible to generate and use energy even when a disaster strikes.
- Multiplexing forms of telecommunications will facilitate uninterrupted access to services, even during a disaster, **connecting anyone, anywhere, at any time**.
  - When a disaster strikes, it is possible to use telecommunications services in all areas of Tokyo, including at evacuation centers and in the mountainous areas of Tama and on the Tokyo islands.
  - Data and IT systems have been strengthened to ensure business continuity in the event of a disaster.

Interim Policy Goals (around 2030)		Policy Goals for the 2040s
■ Accelerate the adoption of renewable energy to also contribute to securing power sources in the event of a disaster ▶ Solar power generation equipment installed in Tokyo: capable of generating 2 million kW or more ▶ Solar power generation equipment installed at TMG facilities: capable of generating 74,000 kW ▶ Renewable energy usage ratio: approximately 50% ■ Hydrogen project to support the large-scale adoption of renewable energy ▶ Increase demand for and social implementation of hydrogen	**Power**	Reinforce the ability of public facilities that protect the lives of Tokyo residents to **secure power** Promote the adoption of **self-sufficient and decentralized power sources**, and develop an environment where people can safely evacuate
■ Secure communications networks ▶ Public Wi-Fi that supports open roaming installed at 100% of evacuation centers ▶ Deploy and operate satellite communications in areas like the Tokyo islands that are high risk of communication failures	**Communications**	**Realize a "Connected Tokyo"** where anyone can be connected anytime, anywhere • Completely eliminate areas where people live and work in Tokyo with poor connectivity • Ensure a reliable communications environment even in the event of a disaster
■ Data preservation and utilization ▶ Complete the shift of all business systems to a cloud-based systems. ▶ Implement disaster prevention simulation using digital twins.	**Data**	**Make digital infrastructure even more resilient** to ensure continuity of operations in the event of a disaster, and implement **disaster prevention measures using data** • Ensure an environment in which operations can continue even if a disaster strikes

2 (5) Creating a city that is also highly prepared for infectious diseases

Vision for a more resilient Tokyo in the 2040s

- Urban activities continue to play out as usual in **spaces where people can avoid crowding and gather with peace of mind,** even in the case of a new infectious disease outbreak.
  - Public spaces have been updated to be more human centric, creating a city where people can check congestion levels at locations and gather with peace of mind.
- Residents can choose from **diverse modes of transportation**, and everyone can move about the city comfortably, without worrying about the risk of infection.
  - Diversification of transportation methods has progressed through upgrades to the cycling environment and development of water transportation routes, as well as the more widespread use of next-generation mobility.
  - Thanks to progress in the development of office sharing, the environment for remote work, etc., and promotion of off peak commuting and more even distribution of passengers in trains, etc., it is possible to comfortably use the train at any time of day.

Interim Policy Goals (around 2030)		Policy Goals for the 2040s
■ Create settings for urban activities where people can gather with peace of mind every year ▶ Remake areas around major train stations and streets whose usage has changed into pedestrian-centered public spaces ▶ Community development organizations regularly hold a wide variety of events in public open spaces ■ Develop an appealing network of parks and waterfront areas ▶ Extensive development and management of parks, etc. leveraging the ingenuity of the private sector	**Urban space**	**Comfortable public spaces** that can be used for a variety of purposes, such as leisure activities or improving one's health, are conveniently located, enabling everyone to gather outdoors with peace of mind, anywhere, anytime
■ Establish commuting to work or school without concern about infection ▶ Develop bicycle lanes on Tokyo streets, with about 250km of priority development areas (about 570km in total) ▶ Develop multiple boat transit routes as a means of transportation	**Modes of transportation**	**Cycling and other new modes of transportation** are firmly established as a way to commute • Secure **approximately 1,800km of bicycle lanes, etc.**
■ Start revitalization of central Tokyo as the forerunning area for implementing diverse ways of working and living ▶ Establish renovation mechanisms such as converting existing small and medium-sized office buildings into homes	**Work styles & lifestyles**	Make Tokyo a city where people have **flexible options,** including living near their place of work, **facilitating diverse workstyles and lifestyles**

Chapter 4: Projects to Address Each Risk

1 Project structure

Five Risks: Common Perspectives	22 Projects (hard x soft infrastructure measures)	List of projects (including 44 leading projects*) *Pioneering and distinctive projects, mainly new initiatives
(1) Protecting residents from increasingly severe floods and storms		
• Climate change scenario for development of infrastructure for the 2040s: Based on a **2 ℃ increase in average temperature**, the amount of rainfall will increase by **1.1 times**, and the sea level will rise as high as by about **60cm**. • Very strong tropical cyclones (maximum wind speeds of at least **59m/s**) will form more frequently in the future	01 Prevent flooding due to torrential rain, storm surges etc. 02 Protect the lives and livelihoods of residents from flooding 03 Prevent landslides along with ensuing isolation. 04 Prevent damage from strong winds due to typhoons, etc. 05 Enhance measures for floods and storms on the islands	• Further develop river facilities (including revetments and regulating reservoirs) • Raise sea walls in the port of Tokyo, river revetments, etc. • Rainwater runoff control using green infrastructure, etc. • Promote urban development on higher ground and the building of high standard revetments as urban infrastructure • Use satellite data to detect improper embankment • Making sewer system facilities more water-resistant, etc.
(2) Building a city that "does not collapse, does not burn, and people survive" even in the event of a major earthquake		
• Possibility of traffic disruption on designated disaster response routes (in areas with a seismic intensity of upper 6 or higher) • Deaths: **about 6,000**; Buildings damaged: about **194,000** • **Elevators stopping, lifelines cut off,** etc. • **Suspended delivery of daily commodities to the islands**	01 Secure emergency transportation routes 02 Create communities that do not burn by improving areas with close set wooden houses 03 Create communities that do not collapse and are not destroyed by improving earthquake resistance, etc. 04 Ensure sustainability of housing, infrastructure, and residents' lives 05 Measures for earthquake resistance and tsunamis on islands	• Seismic retrofitting of wooden houses built before 2000 according to the new earthquake-proofing standards • Promotion of the development of designated maintenance routes (early realization of project effects) • Support for all development districts, including priority development districts • Establish a system for eliminating utility poles on private roads, etc. and subsidizing the costs • Implement projects such as roads to serve as access routes for wide area disaster prevention facilities • Restore earthquake recovery parks, etc.
(3) Maintaining urban activities even if there is a volcanic eruption		
• In the event of a large eruption of **Mt. Fuji** (worst case scenario): **Power outages, impeded traffic, etc.** due to **ash fall** (of **2-10cm** in most of the city) • Ash fall equivalent to nearly 10 times the debris from the Great East Japan Earthquake (about 490 million ㎥) • In the event of an eruption in the **islands, residents will have to evacuate**	01 Improve the sustainability of urban infrastructure 02 Rapid restoration of urban infrastructure 03 Establish a system for volcanic ash removal 04 Facilitate the smooth evacuation of island residents	• Enhance the disaster information system functions and establish a network for sharing information with relevant organizations, etc. • Establish a system for eliminating road obstacles in cooperation with the national government, municipalities, etc. • Prompt removal of volcanic ash for early resumption of daily life and other urban activities (secure temporary storage sites, etc.) • Implement ash fall countermeasures for water facilities • Develop waiting areas for boarding boats and parking lots that are needed for evacuation, etc.
(4) Eliminating concerns about power, communications, and data when a disaster strikes		
• **Power outage rate** in the city caused by a major earthquake directly striking Tokyo: **11.9%** • Percentage of households possessing smartphones: about **90%** • During the Great East Japan Earthquake, voice calls were restricted by **as much as 70-95%**	01 Power supply measures for infrastructure facilities 02 Creating a city resilient to power supply insecurity 03 Securing communications networks 04 Data integrity and utilization	• Utilize satellite communications • Project to realize a hydrogen society • Promote further adoption of locally-produced, locally-consumed renewable energy • Install public Wi-Fi that supports open roaming • Promote changing business systems to be cloud-based, etc.
(5) Creating a city that is also highly prepared for infectious diseases		
• **Social distancing** has become widespread. • Recommendations for when to wear a mask (indoors: when it is not possible to **physically distance** (**by about 2 meters**), etc.) • High need for outdoor spaces (ways for their greater use are needed) • **Over 50%** of people surveyed want off peak commuting and remote work to become established practice.	01 Create comfortable outdoor public spaces 02 Open development of parks and waterfront facilities 03 Diversify modes of transportation 04 Develop work environments that are within walking distance	• Create walkable urban spaces (Nishi Shinjuku) • Revitalize the Tokyo Expressway (KK line) • Develop comfortable, charming waterfront spaces along the Sumida river, etc. • Increase opportunities to use public open spaces • Use boats to diversify modes of transportation, etc.

Chapter 4: Projects to Address Each Risk

2 (1) Protecting residents from increasingly severe floods and storms

Project Structure

Projects to address each risk	(Hard Infrastructure Measures)		(Soft Infrastructure Measures)
01 Prevent flooding due to torrential rain, storm surges etc. to the maximum extent possible	Further develop regulating reservoirs, etc. Raise sea walls, etc.	×	AI-based water level forecasting, etc.
02 Protect residents' lives and livelihoods from all possible forms of flooding	Prevent the spread of damage caused by flooding Accelerate urban development on higher ground	×	Use cutting-edge technology to identify and mitigate risks Prepare for Distributed Evacuation, etc. combining multiple evacuations
03 Prevent life-threatening landslides as well as isolation	Implement safety measures for landslides Reinforce access routes to the Tama mountains and island areas	×	Grasp risks in advance by using digital technology, etc. Accurate evacuation and prevention of isolation
04 Prevent damage from strong winds due to typhoons, etc.	Remove utility poles Eliminate factors leading to collapse or flying debris	×	Promote taking measures in advance for approaching typhoons
05 Enhance measures for floods and storms on the islands	Reinforce coastal protection facilities and harbor facilities on islands Remove utility poles on the islands	×	Assess damage using drones, satellites, etc. Use digital technology to accelerate and improve disaster recovery

Chapter 4: Projects to Address Each Risk

2 (1) Protecting residents from increasingly severe floods and storms

Leading Projects

Further river development (revetments, regulating reservoirs, etc.)

○ The effectiveness of regulating reservoirs, etc., that have been built so far have been demonstrated.

○ In December 2023, the Study of River Improvement in was formulated to addresses future increases in rainfall and other climate change-related issues, which raised the target maintenance level to rainfall "1/20 the rate of annual excess rainfall due to climate change."

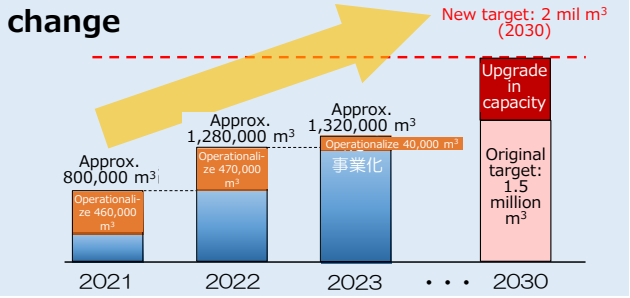
○ Implement efficient and effective measures for the increase in rainfall by effectively utilizing existing facilities, etc., based primarily on the use of regulating reservoirs, etc.
(The proposed approach includes the development of downstream facilities (e.g., underground rivers) and the linking of multiple regulating reservoirs).

Set new development targets execution capabilities

New target set: Develop new regulating reservoirs, etc. (capacity of approx. 2 mil. m³) by 2030.

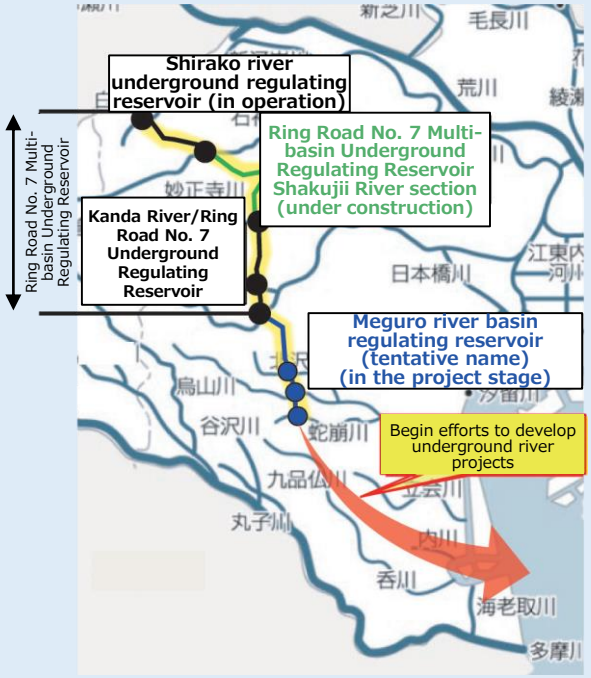
Begin efforts to develop underground rivers, etc.

【New target set】
The original project development target of 1.5 mil. m³ has been revised to 2 mil. m³ in consideration of climate change

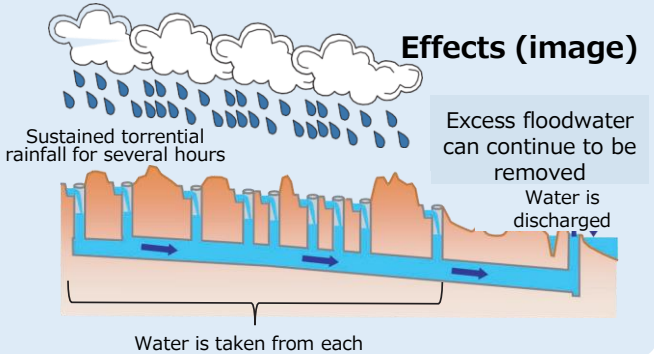


[Studies on development of "underground river" projects]

Image of underground rivers study



Effects (image)



Chapter 4: Projects to Address Each Risk

2 (1) Protecting residents from increasingly severe floods and storms

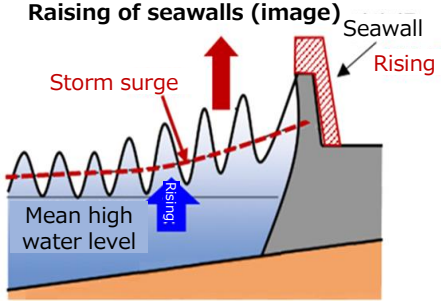
Leading Projects

Raising sea walls in the Port of Tokyo

- The 1959 Super-Typhoon Vera was a key trigger that led to commencing the construction of seawalls to protect the entire Port of Tokyo. Today, the seawalls are nearly complete.
- Given the future rise in sea levels (by as much as 60cm in 2100) and stronger typhoons, the height of the sea walls will be raised in stages.

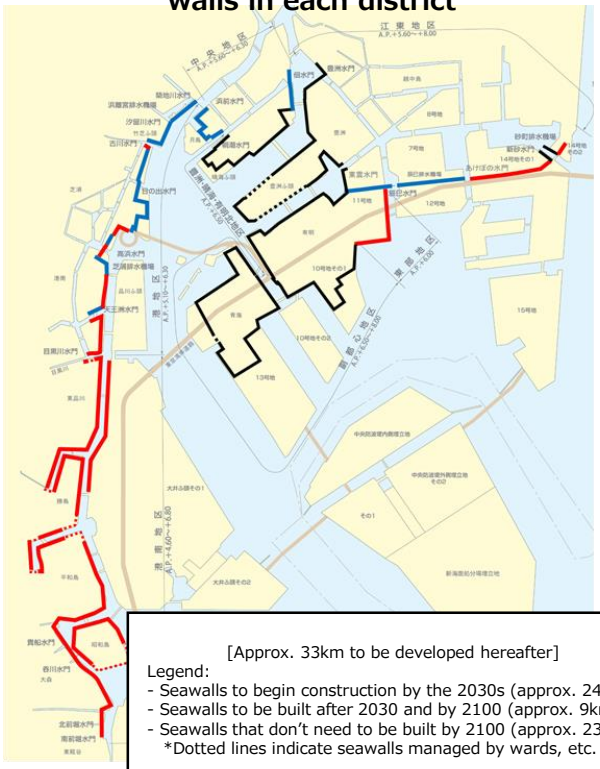
- As sea levels will rise over time, in order to ensure that the rise can be accommodated by the sea walls, each area will be studied to determine priority in the staged increase of sea wall height.
- Of the approximately 60km of sea walls, priority will be given to raising the height of the approximately 24km* that will not be high enough in the 2030s (first phase).
  - Surveying and design work began in 2023.

Raising of seawalls (image)



*Does not include sea walls managed by wards, etc.

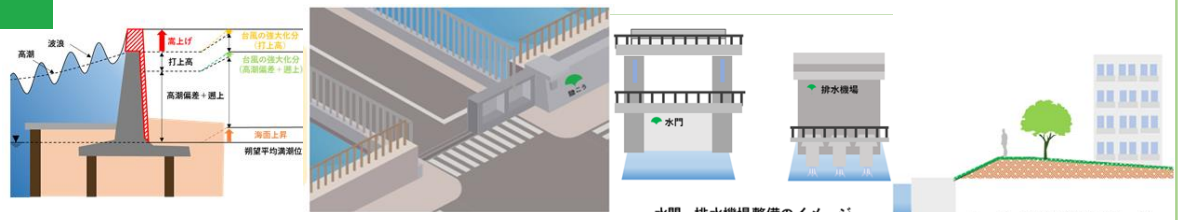
Estimated timing for work to raise sea walls in each district



[Approx. 33km to be developed hereafter]
Legend:
- Seawalls to begin construction by the 2030s (approx. 24km)
- Seawalls to be built after 2030 and by 2100 (approx. 9km)
- Seawalls that don't need to be built by 2100 (approx. 23km)
  *Dotted lines indicate seawalls managed by wards, etc.

Raising river levees, etc.

- Determine the optimum development method for each river. Formulate the Policy for Storm Surge Measures for Rivers in FY2024 to promote the development of their heights.



- Initiatives will also be advanced to promote the development of super levees which not only secure the necessary height, but also improve the landscape and water friendliness of the river.

Chapter 4: Projects to Address Each Risk

2 (1) Protecting residents from increasingly severe floods and storms

Leading Projects

Using green infrastructure for rainwater runoff control, etc.

○ Raise targets and strengthen measures for torrential rainfall to cope with a 1.1-fold increase in rainfall due to climate change.

○ In view of the uncertain nature of climate change predictions, prepare for rainfall that exceeds the target levels.

○ Promote rainwater runoff control as a "just in case" measure, consistent with the concept of green infrastructure, making use of the functions of the natural environment to address social issues.

・Promote the introduction of <u>green infrastructure in TMG-owned facilities</u>

・Promote measures to support the introduction of <u>green infrastructure in private-sector facilities, etc.</u>

Basic measures for torrential rainfall

Evacuation measures
Enhance dissemination of information on risks
Improve local disaster prevention capabilities, etc.

Home building and urban development measures
Develop a city that is resilient to floods through urban development on higher ground and green infrastructure

Sewer system development
Develop main lines and storage facilities
Expand subsidies for municipalities' public sewer systems, etc.

River development
In addition to river channels, develop regulating reservoirs, underground rivers, etc.

Watershed measures
Improve support for rainwater runoff control
Step up publicity to encourage cooperation, etc.

Creation of rain gardens and greenery in urban development, etc.

Examples from abroad of green infrastructure

New York City

Portland, Oregon

Chapter 4: Projects to Address Each Risk

2 (1) Protecting residents from increasingly severe floods and storms

Leading Projects

Promote urban development on higher ground and building of high-standard revetments as urban infrastructure

○ (Near term) Using parks and other public facilities, accelerate efforts to secure elevated locations.
○ (Medium to long term) In cooperation with the national government, introduce <u>new schemes for promoting development of high-standard levees</u> in locations with a high need for development of higher ground, and promote urban development to serve as a base for emergency functions, etc.

Develop an evacuation network to vertical evacuation sites and out of flooded areas
Shingashi Water Reclamation Center (Itabashi ward)

Public facilities such as metropolitan parks moved to higher ground
Shinozaki Park (Edogawa ward), etc.

Secure higher ground to serve as a base for rescue and relief operations, etc.
(Arakawa, Edogawa, and Tama rivers)

*3rd meeting of the working group on promoting measures for building on higher ground

*Images taken from the working group on promoting measures for building on higher ground

Use satellite data, etc. to detect embankment instability

○ <u>Efficiently detect</u> embankment instability
Mountainous areas: Utilize satellite observation data
Urban areas: Utilize apps for posting apps for posting and automatic AI detection

Image of using satellite data to detect embankment instability

Flooding measures for subways and evacuation guidance in underground shopping centers, etc.

○ <u>Prevent water inflow from the ground level</u> by installing watertight plating at station exits and entrances.
○ Stop the spread of flooding to underground areas by installing watertight gates, etc.

Toei Subway flooding measures

*Tokyo Metro is also promoting flooding measures

Schedule for completion:

Urban flooding: mid-2030s
Arakawa river flooding: circa 2040
Storm surge: mid-2040s

○ Improve evacuation guidance measures in the event of flooding, mainly in large underground shopping centers, etc. in 12 districts.

Make sewer system facilities more water-resistant

○ Promote <u>water-tightness</u> in the event of storm surges, tsunamis, external and internal flooding <u>at the maximum height</u> at each facility.

○ Ensure sewerage functions such as pumping through a combination of hard and soft infrastructure measures.

Making the facility more watertight (image)

Chapter 4: Projects to Address Each Risk

2 (2) Building a city that "does not collapse, does not burn, and survives" even in the event of a major earthquake

Project Structure

Projects to address each risk	(Hard Infrastructure Measures)		(Soft Infrastructure Measures)
01 Secure the emergency transportation network in the event of a major earthquake	Expand and strengthen the emergency transportation network Reinforce access to disaster prevention facilities, etc.	×	Utilize AI and other technologies for infrastructure maintenance and management Assess damage using drones and social media
02 Create communities that do not burn by improving areas with close-set wooden houses	Promote improved fire resistance in urban areas Reduce the risk of fire spreading and blocked roads through the development of designated Routes for Improvement	×	Enhance disaster response capabilities based on local characteristics Improve regional disaster prevention capabilities by using digital technology, etc.
03 Create communities that do not collapse and are not destroyed by improving earthquake resistance, etc.	Promote the seismic resistance of buildings Remove utility poles in conjunction with development, etc. Promote earthquake-proofing and countermeasures for liquefaction in communities	×	Promote risk assessment for the implementation of liquefaction countermeasures
04 Ensure the sustainability of housing, infrastructure, and residents' lives following a major earthquake	Ensure the sustainability of urban infrastructure	×	Improve the home evacuation environment, including medium- to high-rise housing Prompt and smooth preparation of evacuation centers, etc. to receive evacuees Strengthen citywide measures for people who have difficulty returning home Raise residents' disaster prevention awareness and improve their response capabilities in normal times
05 Measures for earthquake resistance and for tsunamis on islands	Remove utility poles on the islands Secure sites for transport of supplies in the event of a disaster	×	Strengthen system to secure safe evacuation sites Assess damage using drones, satellites, etc. Use digital technology to accelerate and improve disaster recovery

Chapter 4: Projects to Address Each Risk

2 (2) Building a city that "does not collapse, does not burn, and survives" even in the event of a major earthquake

Leading Projects

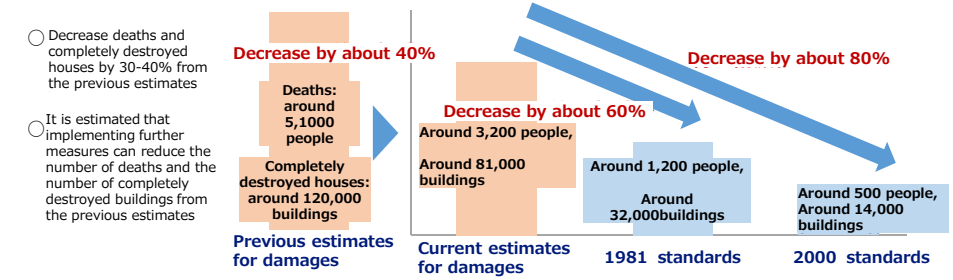
Improving the earthquake resistance of wooden houses built before 2000 under the newer standards

- **By promoting improved earthquake resistance in buildings constructed under old earthquake-proofing standards (those built before 1981), damage from earthquake tremors or buildings collapsing has been steadily decreasing.**
- **To further reduce damage, it will be effective to improve the earthquake resistance of around 200,000 wooden houses constructed under lower earthquake-proofing standards (built between 1981 and 2000), prior to the latest earthquake-proofing standards that came into effect in 2000.**
  - As of 2019, the ratio of houses in Tokyo that meet the year 2000 earthquake-proofing standards is estimated to be in the upper 89.1% range.
  - Completing earthquake-proofing is estimated to be able to reduce the number of deaths by about 80%.
    (from estimates for damage following a major earthquake directly striking Tokyo)

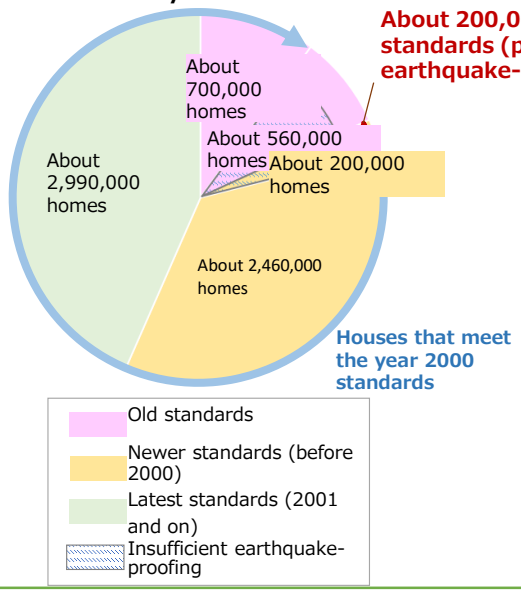
- **<u>Begin providing support</u> to improve the seismic resistance of wooden houses built under the newer standards (between 1981 and 2000).**
- **Expand the advisory system by architects, etc. Provide information on energy-saving and barrier free remodeling, etc. in conjunction with seismic resistance (improving disaster preparedness along with environmental friendless and comfort)**

Damage mitigation effects
(estimates for damage following an earthquake under Tokyo, etc.)

Item	Currently	Promote 1	Promote 2
Promote improved earthquake resistance	92% earthquake-proofing rate for houses, etc.	100% earthquake-proofing rate (1981 standards)	Year 2000 standards



Building Age of Houses in Tokyo



About 200,000 houses of those built to the newer standards (prior to 2000) are not sufficiently earthquake-resistant

A wooden house built to the pre-2000 standards that collapsed due to the Kumamoto earthquake

Source: Quick Report of the Field Survey and Building Damage by the 2016 Kumamoto Earthquake
(National Institute for Land and Infrastructure Management)
http://www.nilim.go.jp/lab/hbg/0929/pdf/isshiki.pdf

Chapter 4: Projects to Address Each Risk

2 (2) Building a city that "does not collapse, does not burn, and survives" even in the event of a major earthquake

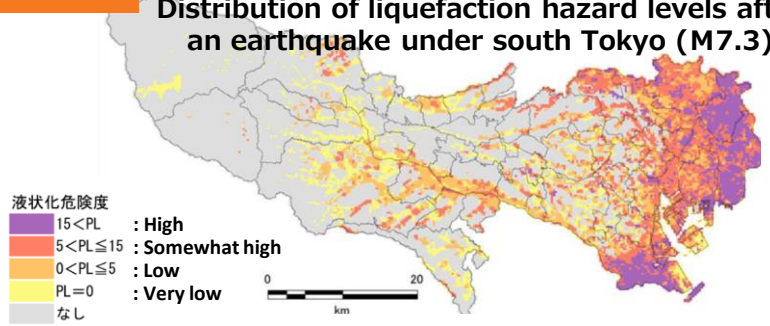
Leading Projects

Support for building owners considering measures for liquefaction, etc.

○ From the standpoint of ensuring building safety and promoting home evacuation, it is important to mitigate damage caused by liquefaction.

○ Expand consultation services for building owners considering measures for liquefaction.
In addition to raising awareness through dedicated portal websites, etc., dispatch advisory personnel to relevant locations free of charge.
○ Promote <u>further support measures</u> for liquefaction going forward.

Distribution of liquefaction hazard levels after an earthquake under south Tokyo (M7.3)



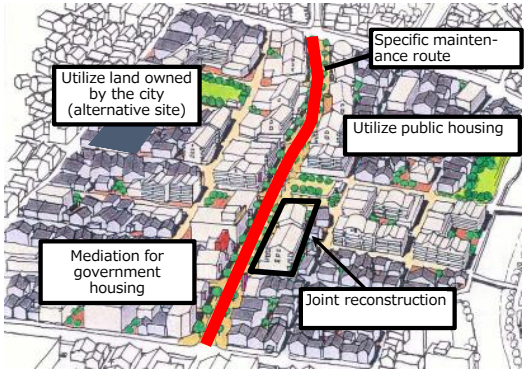
Source: "Report on estimated damage from a major earthquake directly striking Tokyo."
(May 2022, TMG Disaster Prevention Council)

Promote development of designated routes for improvement(early realization of project results)

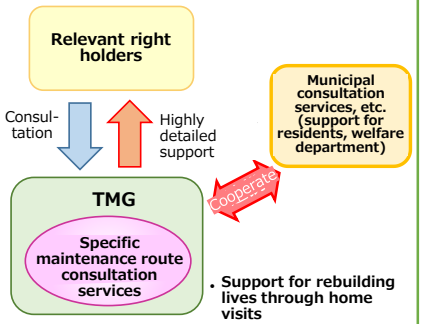
○ Until now, relocation has been promoted through consultation services provided in cooperation with private-sector providers, development of support measures for rebuilding of people's lives (mediation for relocation destinations, loans), joint reconstruction, etc. Going forward, it will be important to continue to promote highly detailed efforts that cater to the wishes and circumstances of individual right holders.

○ Accelerate acquisition of land by utilizing the human resources and know-how of policy coordination organizations.
○ Use project sites to establish temporary evacuation routes and access routes for emergency vehicles.
○ In addition, promote multiple efforts to <u>secure a safe and comfortable place for the elderly and others to live</u>, in consideration of the local community.
- Along with mediation for government housing, also utilize other public housing
- Provide support for rebuilding lives through home visits

Efforts to increase the options for relocation in the neighboring area



Efforts to support the rebuilding of people's lives



Chapter 4: Projects to Address Each Risk

2 (2) Building a city that "does not collapse, does not burn, and survives" even in the event of a major earthquake

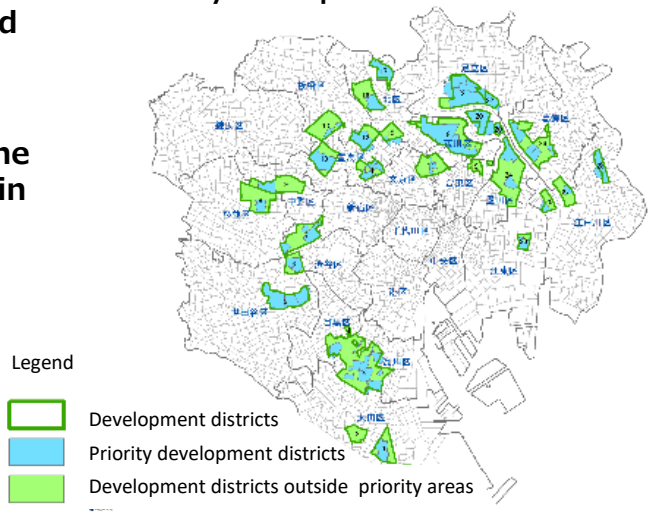
Leading Projects

Support for the Development Districts, including the Priority Development Districts

○ Through support for efforts including the removal or reconstruction of old houses, renovations to ensure a city that does not burn have made progress in areas with close-set wooden houses, but support must be expanded in order to speed up progress.
(Ratio of fire-resistance in the Priority Development Districts: 65.5% of the area for fire-proofing as a whole (2021) against the 2025 target of 70% in half the areas

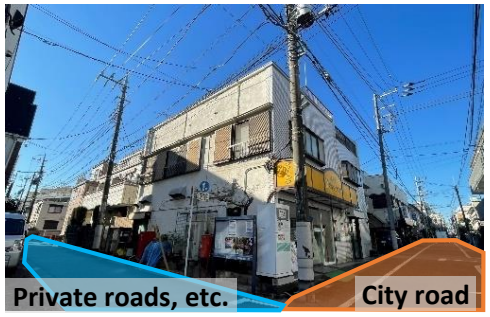
○ Priority development districts: Add subsidies for building construction expenses in the Fireproof Zone system (strengthen existing program)
○ Development districts outside priority areas: Establish subsidies for design and supervision costs associated with removal or reconstruction (from 2023)

Status of designation of Development Districts and Priority Development Districts



Establish a system for eliminating utility poles on private roads, etc. and for subsidizing the costs

○ While support is provided for removing utility poles on private roads, etc. in priority development districts, because private roads, etc. that pose a high risk of utility poles collapsing span entire areas with close-set wooden houses, it is necessary to encourage the removal of utility poles without missing any potential needs.



(Road eligible for subsidies)

○ Expanding the areas eligible for subsidies to include "development districts" and "disaster prevention and redevelopment promotion zones", which have a high risk of disaster.
○ Refine existing programs by compiling more case studies early on, beginning with the survey and design of 2 districts (wards) in FY2023

Chapter 4: Projects to Address Each Risk

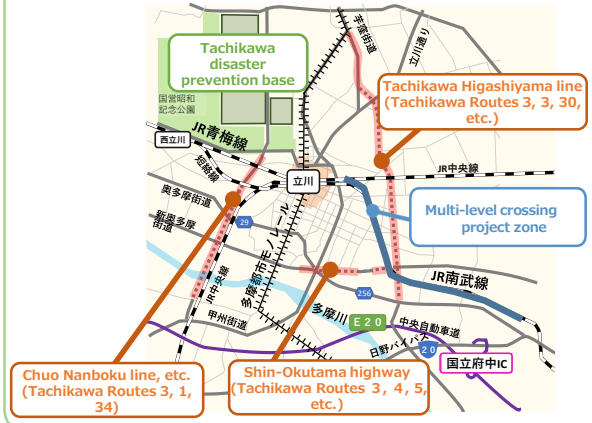
2 (2) Building a city that "does not collapse, does not burn, and survives" even in the event of a major earthquake

Leading Projects

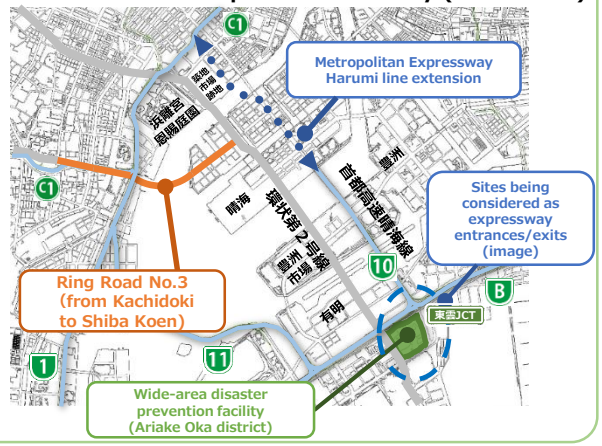
Implement projects such as roads to serve as access routes for wide-area disaster prevention facilities

- Develop roads in the vicinity of the Tachikawa wide-area disaster prevention base, and add raised intersections with the JR Ome line.
- Promote efforts in cooperation with the national government, etc. in order to develop the project for Harumi Line extension of the Metropolitan Expressway, which will contribute to strengthening the links between the city center and the waterfront area.

TMG-planned roads in the vicinity of the Tachikawa wide-area disaster prevention base



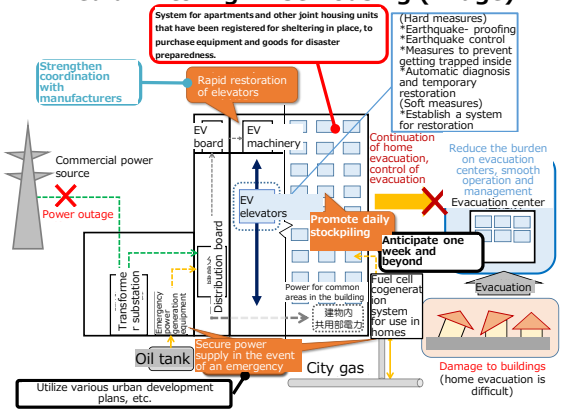
Area surrounding the Tokyo Bay waterfront core wide-area disaster prevention facility (Ariake Oka)



Enhance and strengthen disaster prevention for apartment buildings, etc.

- Support home evacuation in medium- to high-rise housing by promoting the securing of power sources in the event of an emergency, strengthening coordination with manufacturers to ensure rapid restoration of elevators, raising awareness of preparing daily stockpiles, and popularizing and strengthening support for sheltering in place.

Development of the home evacuation environment in medium- to high-rise housing (image)



Reinstate reconstruction parks

- Earthquake recovery parks were developed adjacent to elementary schools under the reconstruction plans following the Great Kanto Earthquake by proposal of the city of Tokyo.
- Taking into account elements including the thinking of that time, restore the parks as local disaster prevention centers while also serving as a place for social interaction and relaxation, etc. (installing of plaques, support for renovations by the ward).
- By restoring earthquake recovery parks, we hope to raise awareness of disaster prevention among all generations.

Example of a park where restoration work has begun (Kojima Park, Taito ward)

Utilize the city's excess capacity to promote the protection of visitors to Tokyo

- Have measures in place to augment private-sector measures for people having difficulty returning home by working in cooperation with local community development councils that offer help to visitors to Tokyo in areas around major train stations, etc., depending on the disaster situation.
  - Start information sharing using the operation system for people who have difficulty returning home around the Tokyo station area.

Chapter 4: Projects to Address Each Risk

2 (3) Maintaining urban activities even if there is a volcanic eruption

Project Structure

Projects to address each risk	(Hard Infrastructure Measures)		(Soft Infrastructure Measures)
01 Improve the sustainability of urban infrastructure in the event of ash fall	Ensuring the functioning of lifelines (power, water)	×	Enhance and utilize cooperation on ash fall forecasting
02 Rapid restoration of urban infrastructure in the event of ash fall			Establish a system for early restoration of road functions Strengthen cooperation for early restoration of the transportation network Restore lifelines (power, sewage, etc.) as soon as possible Strengthen response capabilities for rescue, etc.
03 Establish a system for volcanic ash removal as a city-wide effort to restore daily life			Remove volcanic ash in order to reopen facilities as soon as possible Dispose of volcanic ash to restore urban functions Foster awareness of preparing for ash fall
04 Smooth evacuation of island residents in the event of a volcanic eruption	Develop evacuation facilities	×	Assess damage using drones, satellites, etc. Prepare in advance to ensure a smooth evacuation Use digital technology to accelerate and improve disaster recovery

Chapter 4: Projects to Address Each Risk

2 (3) Maintaining urban activities even if there is a volcanic eruption

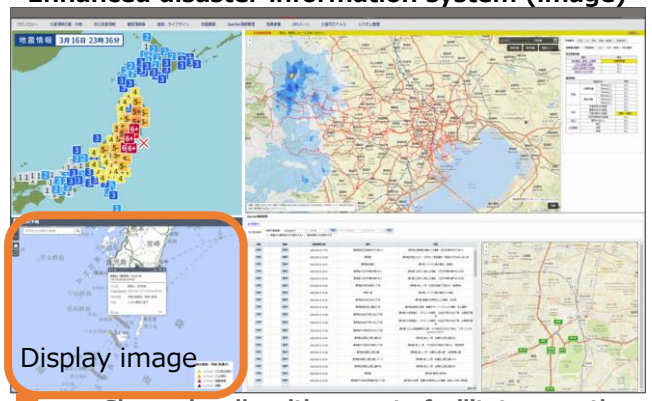
Leading Projects

Enhance the disaster information system and establish a network for sharing information with relevant organizations, etc.

- As the areas that will be impacted by ash fall vary significantly depending on the wind direction, it is vital to assess damage quickly.
- Enhancing coordination with relevant parties on disaster information is necessary for emergency countermeasures and accelerating the restoration of infrastructure (common to response to floods and storms, earthquakes, etc.).

- Speed up initial response by adding the display of national ash fall forecasts and buildup of ash in Tokyo to the disaster information system.
- In the future, as part of the revision of the regional disaster prevention plan (volcano edition), arrange systems for communicating with relevant local governments and specified public institutions (infrastructure, transportation, etc.)

Enhanced disaster information system (image)



Share visually with maps to facilitate smooth cooperation with relevant parties to open up roads and restore lifelines.

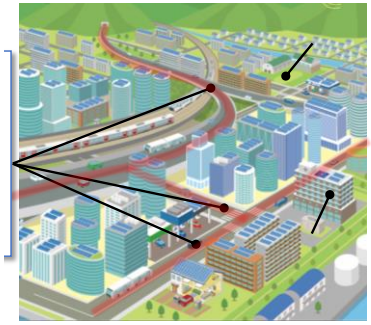
Establish a system for eliminating road obstacles in cooperation with the national government, municipalities, etc.

- Quickly eliminating road obstacles is important for ensuring the sustainability of transportation infrastructure that underpins urban activities.

- Roads for prioritized ash removal in the event of ash fall because they link key locations will be designated as priority ash removal roads, and selected in the revision of the regional disaster prevention plan (volcano edition).
- Agree in advance on the basic concept for ash removal procedures and the approach for securing materials and equipment.
- In the future, organize a system in cooperation with the national government, other local governments, etc., to secure materials and equipment from a wide area, including outside of the ashfall area.

Basic concept and procedure for removing ash from roads

Priority ash removal roads (roads for prioritized ash removal that link key locations*)
*TMG head office, municipal government buildings, important sea ports and airports, JSDF, police, firefighters, medical institutions, lifeline-related organizations and facilities, etc.



Share information as needed on the scope of ash removal, removal method, etc.
*Scope of ash removal, priority ash removal roads, restricted areas for vehicular traffic, etc.

+

Make arrangements for equipment and materials and equipment operators

In principle, ensure that at least one lane is open for traffic going in each direction
※*Ash should be moved to the center of the roadway using wheel rotors, etc., and the outer lanes should be opened for traffic (ash will be brought to temporary storage sites separately)

Materials from the Muroran Development and Construction Department, Hokkaido Regional Development Bureau (Mount Usu, 2000)

Chapter 4: Projects to Address Each Risk

2 (3) Maintaining urban activities even if there is a volcanic eruption

Leading Projects

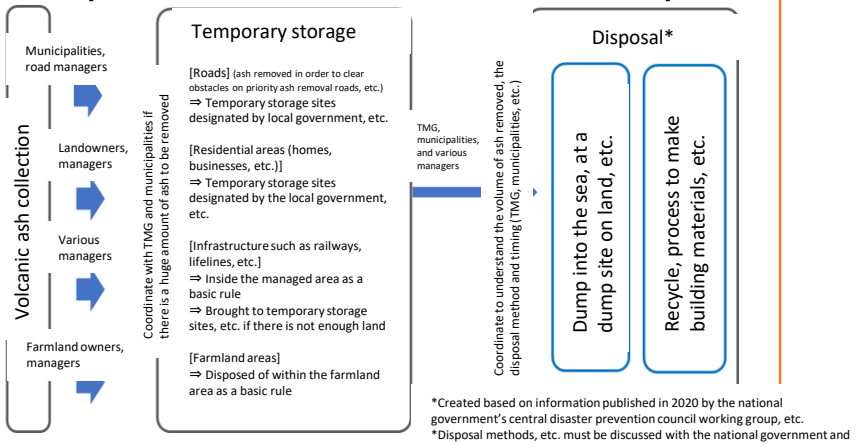
Prompt removal of volcanic ash for early resumption of daily life and other urban activities (secure temporary storage sites, etc.)

○ Establishing a systematic method for disposing of volcanic ash is necessary in order to restore urban functions

- The estimated amount of ash fall is equivalent to about 10 times the amount of debris from the 2011 Great East Japan Earthquake.
- Consider TMG's basic approach to ash disposal in cooperation with the national government, etc.

○ Sort out the division of roles between relevant organizations and the steps to be taken based on research and discussion of <u>temporary storage sites for volcanic ash and methods for collection and transport</u>.
○ Sort out the concept for selecting temporary storage sites in Tokyo (conditions for choosing or excluding locations, etc.)

Steps from removal of volcanic ash to final disposal



*Created based on information published in 2020 by the national government's central disaster prevention council working group, etc.
*Disposal methods, etc. must be discussed with the national government and other local governments, etc.
*A decision by the national government is required in the case of dumping volcanic ash into the sea.

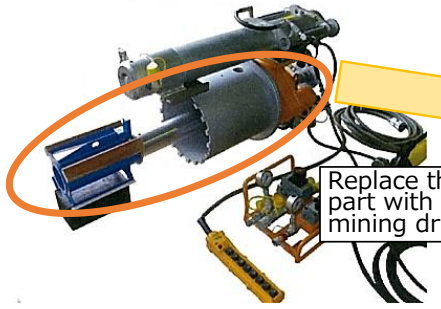
Develop technology to remove volcanic ash from sewer lines

○ As inflow of volcanic ash into sewer pipes has effects including rendering the pipes unusable, appropriate information dissemination and public awareness are important.
○ Ash can be removed from sewer lines with existing cleaning technology (high-pressure washing), but preparation is needed in case cleaning water cannot be secured.

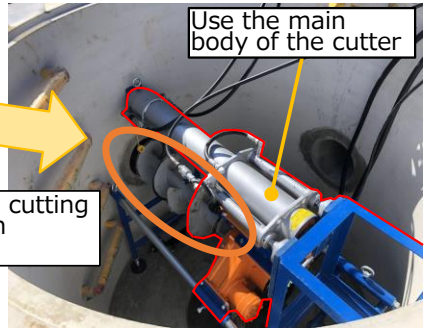
○ <u>Develop technology to remove volcanic ash, etc.</u> that has hardened or built up in sewer lines (in practical use by FY2025)
○ Establish emergency restoration plans based on the results of technological development in order to promptly secure sewer functions after ash fall.

Develop technology that applies existing technology for earthquake-resistant construction methods

Existing cutting machine (used in earthquake-resistant construction)



Status of ash removal technology development experiments



＊Development and production of mining drills that match manhole diameters is under way.
It has been confirmed that removal is possible from manholes with a diameter of 120cm or larger.
Going forward, the drills will be put into use after confirmation and technical verification that removal is possible from manholes with an inner diameter of 90cm.

Chapter 4: Projects to Address Each Risk

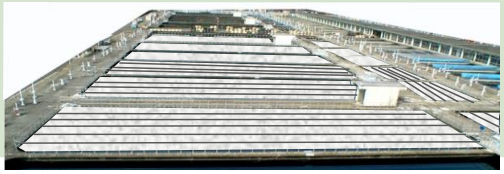
2 (3) Maintaining urban activities even if there is a volcanic eruption

Leading Projects

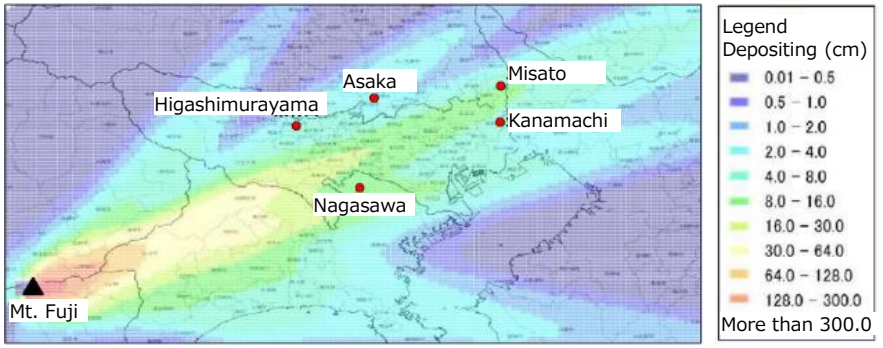
Implement ash fall countermeasures for water facilities

○ Add roofing to the sedimentation tanks at the Nagasawa water purification plant, which is at risk of exceeding the criteria for water quality in the event of ash fall.
*The impact from ash fall at large water purification facilities (Higashi Murayama, Kanamachi, Misato, and Asaka) is not at a level that would result in exceeding the water quality criteria, and can be reduced further with advanced water purification treatment.

Development to add roofing to sedimentation tanks (image)

At normal times	During ash fall
	

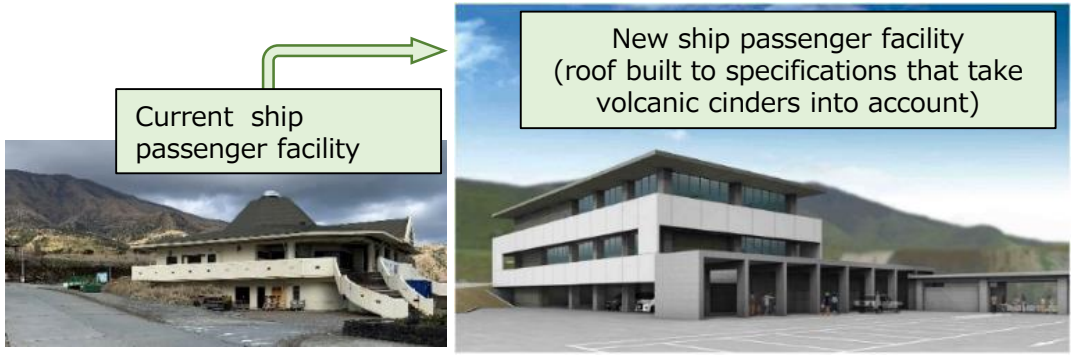
Simulation of ash fall deposit amounts (WSW winds prevailing)
(created based on a national study on ash fall in the event of a large eruption)



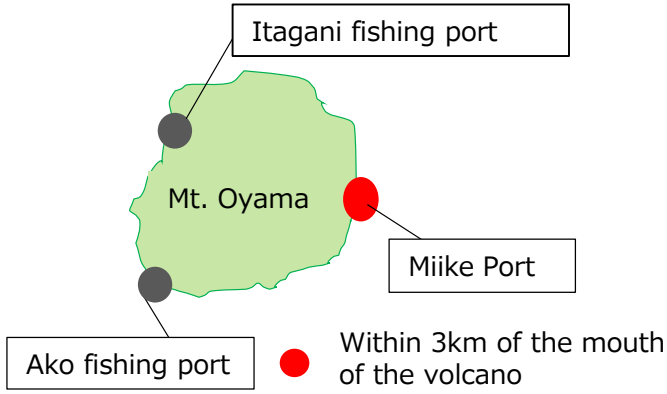
Develop ship passenger facility and parking lots needed for evacuation after a volcano disaster

○ Renovate ship passenger facility located within 3km of the mouth of a volcano to ensure that roofing is designed to specifications that take cinders into account and into a facility that has a parking lot.

Development of Port of Miike passenger waiting area (image)



Map of Miyakejima Island locations



Chapter 4: Projects to Address Each Risk

2 (4) Eliminating concerns about power, communications, and data when a disaster strikes

Project Structure

Projects to address each risk	(Hard Infrastructure Measures)		(Soft Infrastructure Measures)
01 Power supply measures for infrastructure facilities that protect the lives of residents	Promote the securing of self-reliant and decentralized power sources Implement area-wide energy distribution at city-owned facilities	×	Cooperation for stable power supply Cooperation for early restoration of power after an outage
02 Create a city resilient to power supply insecurity as a city-wide effort	Promote the securing of self-reliant and decentralized power sources Promote area-wide energy distribution	×	Promotion of securing self-reliant and decentralized power sources, etc. that lead to home evacuation Support for the introduction of disaster prevention measures
03 Ensure a reliable communications network	Ensure an environment in which everyone can safely access digital services	×	Establish systems for public-private cooperation
04 Ensure data integrity and utilize data to improve resilience	Develop the digital infrastructure necessary for business continuity in the event of a disaster	×	Realize advanced disaster prevention measures through the effective use of data

Chapter 4: Projects to Address Each Risk

2 (4) Eliminating concerns about power, communications, and data when a disaster strikes

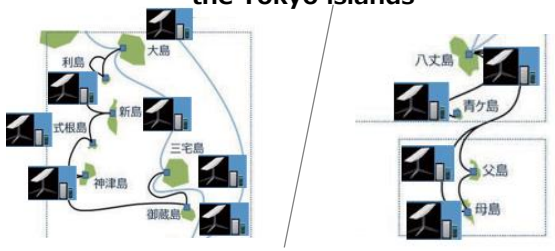
Leading Projects

Utilize satellite communications to strengthen disaster response capabilities

○ **Utilize satellite communications, which enable high-speed, high-capacity communications, to ensure communication at disaster sites and disaster response headquarters, etc.**
The usefulness of satellite communications was confirmed in 2023 when Typhoon No. 7 was approaching the Tokyo islands, as the islands are at high risk of communications disruptions during disasters. Going forward, satellite communications will be systematically deployed and operated.

○ **Incorporate new technologies taking into account the progress of satellite communications technology, etc., to respond to increasingly diverse and sophisticated communications needs (transmission of images and other kinds of data, etc.).**

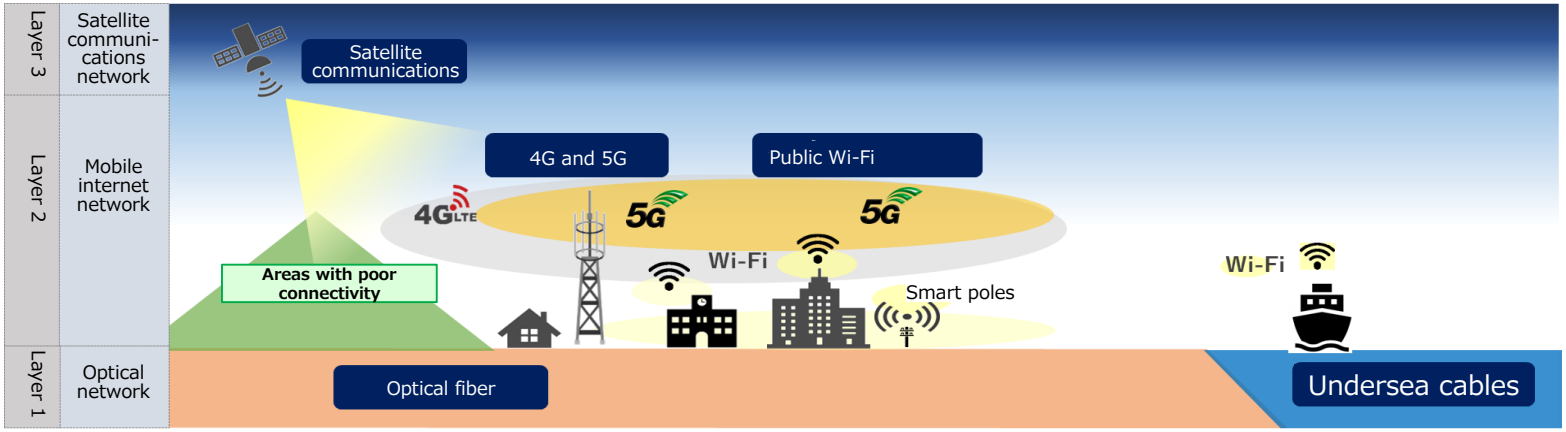
Use of satellite communications on the Tokyo islands



Efforts to raise the resilience of undersea cables in the islands that were laid by Tokyo, install public Wi-FI that supports OpenRoaming, eliminate areas with poor connectivity, facilitate city-wide OpenRoaming, and expand areas with 5G services

○ **By utilizing various means of communication such as 4G, 5G, and Wi-Fi, realize a "Connected Tokyo" where anyone can access digital services anytime, anywhere, no matter what the circumstances, in not just normal times, but in the event of a disaster.**
・Construction work to reinforce the undersea fiber optic cables in landing areas around Toshima and Mikurajima.
・Adopt Wi-Fi that supports secure and seamless Open Roaming* at evacuation centers and other facilities where many people gather in order to multiplex forms of communications in the event of a disaster.
・Also consider utilizing satellite communications, etc. to resolve poor connectivity in areas such as the Tama mountains region and the Tokyo islands.

*Open Roaming: A globally common authentication platform that enables the use of encrypted, secure Wi-Fi with a single account registration.



Chapter 4: Projects to Address Each Risk

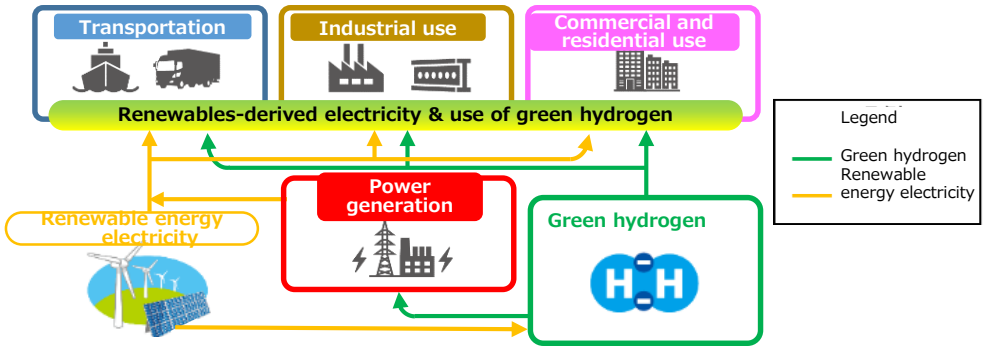
2 (4) Eliminating concerns about power, communications, and data when a disaster strikes

Leading Projects

Project to realize a hydrogen society

○ Promote full-scale use of renewable energy-derived green hydrogen in all fields, including considering systems for supplying hydrogen, including pipelines (in the airport waterfront area) and the use of green hydrogen in TMG-owned facilities in collaboration with Yamanashi Prefecture.

Use of green hydrogen



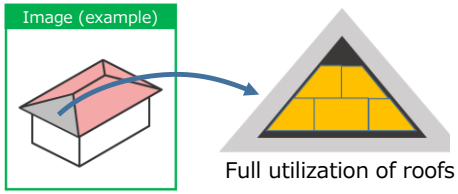
Project to boost locally-produced, locally-consumed renewable energy

○ Support the installation of solar power generation and storage batteries for Tokyo residents (households) and businesses and by municipalities, etc. in order to expand the spread of locally-produced, locally-consumed energy.

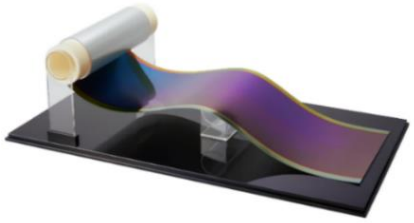
○ Provide additional support to home builders, etc. for installation of PV systems deemed to be highly functional, etc.

○ Promote efforts to implement next-generation renewable energy technologies.

Examples of PV systems deemed to be highly functional (small panel) products



Perovskite solar cell (image)



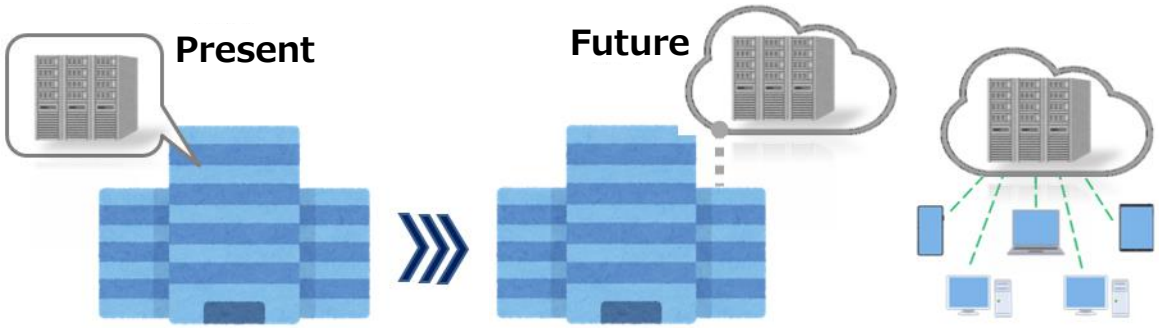
(provided by Sekisui Chemical Co.)

Promote changing business systems to be cloud-based

○ It is vital that IT systems and information assets necessary for business continuity are properly preserved in the event of a disaster.

○ Develop digital infrastructure that allows data to be used and business operations to continue even if government buildings sustain damage.

Switching to cloud-based business systems (image)



Chapter 4: Projects to Address Each Risk

2 (5) Creating a city that is also highly prepared for infectious diseases

Project Structure

Projects to address each risk	(Hard Infrastructure Measures)		(Soft Infrastructure Measures)
01 Create comfortable spaces that will lead to enhanced outdoor urban activities	Create outdoor spaces that can elicit a variety of urban activities	×	Further utilization of these spaces by expanding the scope of ways they can be used Making a Tokyo a smart city by obtaining and disseminating information on the movement of people, etc.
02 Develop open parks and waterfront areas that anyone can use	Create unique spaces that make use of the natural environment	×	Use these spaces in a more appealing way through the ingenuity of the private sector Disseminate data on crowd congestion
03 Diversify modes of transportation that also contribute to reducing the risk of infection	Promote the use of bicycles Revitalize boat transit	×	Facilitate the comfortable use of railroads Introduce next-generation mobility
04 Improve working environments that are within walking distance	Develop the environment for remote working and working close to home	×	Raise awareness to create opportunities for diverse ways of living and working

Chapter 4: Projects to Address Each Risk

2 (5) Creating a city that is also highly prepared for infectious diseases

Leading Projects

Create walkable urban spaces where people can unwind and enjoy taking a stroll (Nishi Shinjuku)

○ Half a century has passed since the construction of the Shinjuku subcenter area, and reorganization is necessary to make it into a human-centric urban space in response to changes in society and the surrounding environment.

Shinjuku's vast public open spaces and roads are not being fully utilized, and it is not a comfortable place to be for workers or visitors.

It is not an easy environment to navigate, as destinations like train stations and parks are far apart, and there are physical barriers to easy movement such as differences in elevation.

Meanwhile, the COVID-19 pandemic has created the need for new urban development, such as outdoor workspaces.

The Nishi Shinjuku redevelopment policy, formulated in March 2023, presents the direction for urban development for integrated reorganization of roads and open spaces, etc., with a view to upgrading the functions of skyscrapers in the area.

○ Create iconic and bustling spaces through an integrated reorganization of roads, public spaces, etc. (No. 4 road, Citizen's Plaza, etc.)
○ Promote the introduction of next-generation mobility (self-driving cars, etc.) and reorganizing the areas around TMG, etc.
○ Utilize cutting-edge communications infrastructure, etc. to develop comfortable workspaces for indoor or outdoor use.
○ Provide Tokyo residents, etc. with attractive, walkable urban spaces as soon as possible
Start development first in the areas where it is feasible
Hold an event (October 2023) in which everyone can experience a safe and enjoyable stroll through streets, parks, and city blocks that form an integrated walkable space.

Integrated reorganization of roads, public spaces, etc.

Public spaces that give rise to diverse interactions and ways of spending time there
(“Fun More Time Shinjuku” event in October 2023)

Comfortable outdoor work spaces
(“Fun More Time Shinjuku” event in October 2023)

Chapter 4: Projects to Address Each Risk

2 (5) Creating a city that is also highly prepared for infectious diseases

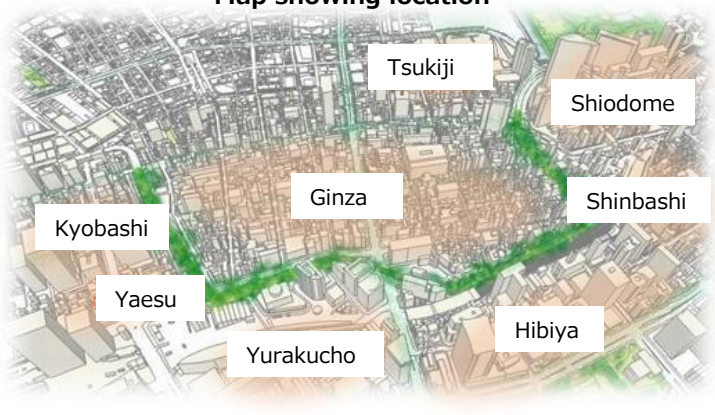
Leading Projects

Revitalize the KK line as a pedestrian-centered public space

- As a measure to ensure the smooth traffic flow of large vehicles moving in a circular direction, which will be necessary as a section of the Metropolitan Expressway in the Nihonbashi area is being moved underground, a policy has been announced to develop the Shin Kyobashi connecting route (underground) to serve as a new loop route for the city center. This will significantly reduce the role of the Tokyo Expressway (KK line) as an automobile only roadway.
- To create new value and appeal for Tokyo, the upper area of the KK line will be revitalized and utilized as a pedestrian centered public space.

- Taking advantage of the KK line's existing form as an elevated roadway, construct a wide area pedestrian network along with a large scale green network utilizing the continuous outdoor space, making use of existing structures to enhance the value and attractiveness of the area.
- Development of the KK line's upper area will begin after the closure of the Metropolitan Expressway Yaesu Route in the mid-2020s. The target timeline for completion of all sections of the KK line's upper area is between 2030 and 2040, with certain sections opening earlier through phased development in coordination with urban development in the area.
- Make the project widely known by holding events to promote the revitalization of the KK line, etc.

Map showing location



Example of development details

Chapter 4: Projects to Address Each Risk

2 (5) Creating a city that is also highly prepared for infectious diseases

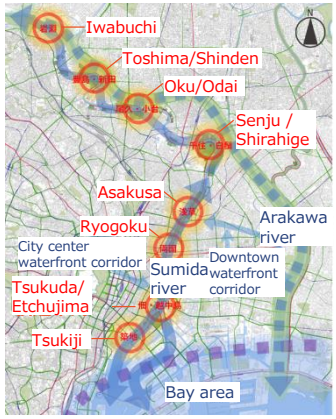
Leading Projects

Develop comfortable, charming waterfront spaces along the Sumida river, etc.

○ Initiatives to enhance waterfront routes and create walkable waterfront spaces will be <u>expanded in the downstream areas of the Sumida river and extended to the upstream areas.</u>

Creation of walkable waterfront spaces with comfort-minded landscaping (image)

Establish a waterfront network



Increase opportunities to use public open spaces, etc.

○ Relaxing the physical area requirements for utilizing public spaces will make it possible for <u>small-scale activities like open-air cafes and sales of goods to take place</u> (strengthen dissemination of information, such as posting examples of how spaces are utilized on official websites).

Activities conducted in public open spaces (image)

Open-air cafes

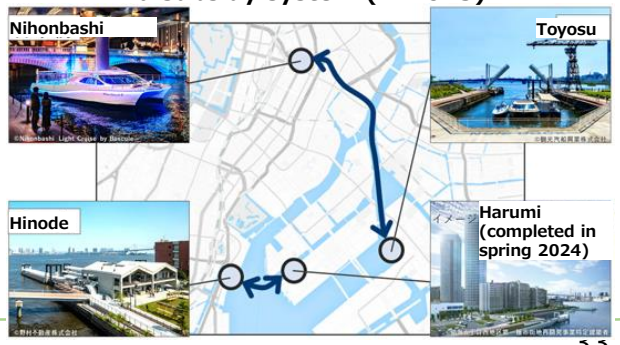
Art exhibits

Use boats to diversify modes of transportation

○ Consider and provide support for implementing boat transit routes, which will offer <u>new lifestyle options</u>, such as the ability to sit and do some work or to enjoy the scenery while commuting to the office by boat.

Transit by boat (image)

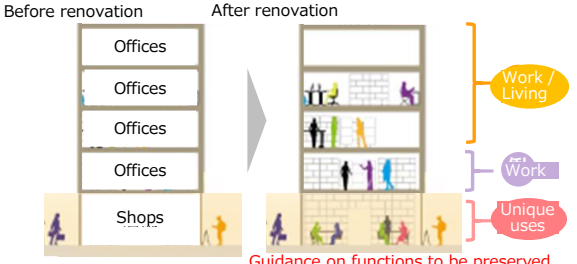
Operation of boat commuter service trips using a subsidy system (FY2023)



Promote the renovation of existing buildings (to upgrade functions)

○ Establish a system to <u>select and support "renovation promotion districts"</u> in unique areas where functional renewal of buildings should be promoted.

Renovation (image)



Guidance on functions to be preserved, industries with special characteristics, etc.

Magnet area for the anime industry (Ikebukuro)

Used bookstore district (Kanda Jimbocho)

Chapter 4: Projects to Address Each Risk

3 Surviving a Tokyo metro area-wide complex disaster

■ For complex disasters, which can cause severe and prolonged damage, the project's approach is organized around pre-disaster and post-disaster **timelines**. Here, two specific examples are presented (a **major earthquake followed by a large typhoon**, and **infectious disease combined with flooding/storm or an earthquake**) to illustrate the measures and projects undertaken.

Example of efforts (major earthquake ➡ large typhoon)

Aim of the efforts

There is a risk of increased flooding from places where damage to seawalls, etc. was caused by a major earthquake, and people may not be able to stay in evacuation centers or in their homes. After accelerated forecasting and assessment of damage, it will be important to provide accurate guidance to safe evacuation sites by disseminating information on appropriate evacuation sites and routes, while also considering wide-area evacuation in accordance with the disaster situation.

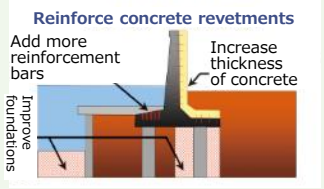
Hard infrastructure measures

Soft infrastructure measures

Efforts for each risk × Assess damage → Disseminate information → Conduct evacuation

Develop evacuation sites in coordination with building on higher ground

Earthquake- and waterproofing of river facilities and coastal protection facilities



Quick forecasting and assessment of damage when a disaster strikes

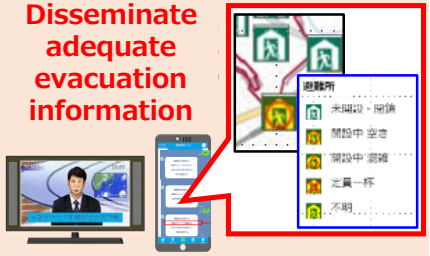
Enhance disaster information system functions

×

Step up dissemination of information on evacuation sites and routes as necessary

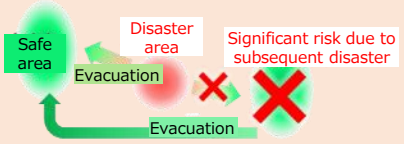
Disseminate information appropriate to the disaster situation

Disseminate adequate evacuation information



Establish a system to support area-wide evacuation

Consider area-wide evacuation



Chapter 4: Projects to Address Each Risk

3 Surviving a Tokyo metro area-wide complex disaster

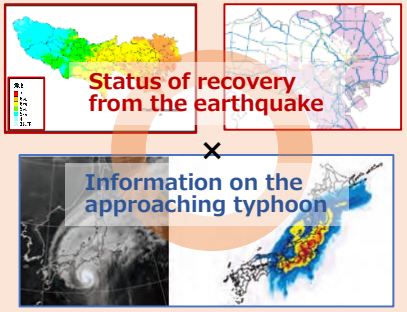
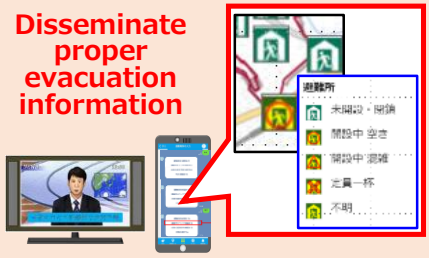
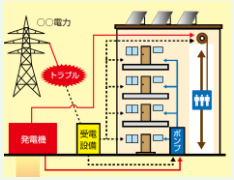
Example of efforts (infectious disease + flood/storm or earthquake)

Aim of the efforts

If a large typhoon or an earthquake strikes in the midst of an epidemic, the risk of infection spreading at evacuation sites increases. Speeding up the forecasting and assessment of damage and disseminating information as necessary about crowding conditions at evacuation centers and which ones are open will help prevent concentration at particular evacuation centers. In addition, taking appropriate measures to prevent infection at evacuation centers will allow people who have no choice but to evacuate to shelters to stay there with peace of mind.

Hard infrastructure measures

Soft infrastructure measures

Efforts for each risk	Assess damage	Disseminate information	Conduct evacuation
Use various urban development programs, etc. to promote the installation of emergency generators	**Quick forecasting and assessment of damage when a disaster strikes**	**Further promotion of distributed evacuation in view of insufficient evacuation center capacity**	**Support self-support and mutual support by Tokyo residents and businesses**
	**Enhance disaster information system functions**	**Disseminate information appropriate to the disaster situation**	**Promote measures to prevent infection in evacuation centers**
Popularize sheltering in place, which are resilient in a disaster, and strengthen disaster prevention in apartment buildings (rapid restoration of elevators)		**Disseminate proper evacuation information** 	**Flow from arriving at the evacuation center to acceptance (measures to prevent infection)** 
			

*In addition to the scenarios of a major earthquake followed by a large typhoon and an infectious disease coinciding with a flood/storm or earthquake, there are other possible factors that could cause severe and prolonged damage. For example, if a volcano erupts after an earthquake, even a few centimeters of ashfall could disrupt traffic, making rescue operations, transport of supplies and fuel, removal of rubble and other emergency measures and recovery work difficult. For these and other complex disasters, it is necessary to identify the direction to take as necessary, based on the assumption of specific events that could occur.

Chapter 5: Project Promotion

1 Concept for project promotion

(1) Implement projects in coordination with "Future Tokyo: Tokyo's Long Term Strategy"

○ In order to continuously develop this upgraded project as a concerted effort of the entire TMG, we will **promote and constantly strengthen measures** as part of Future Tokyo: Tokyo's Long Term Strategy."
○ In the event of major changes in the scale of potential disasters or the circumstances surrounding the risks in the future, **further project updates will be made as necessary** while ensuring consistency with related plans, etc.

(2) Strengthen execution capabilities for project promotion

○ To ensure realization of the vision for Tokyo in the 2040s, it will be necessary to speed up project execution and strengthen the system for execution more than ever.
○ Strengthen the TMG's execution capabilities by reviewing the **ideal form of operations themselves** as well as the **use of digital technologies**, and by **hiring and developing staff** taking into account changes in society.

Accelerate & streamline project execution

- Streamline operations by using digital technologies, including digitalization of relevant documents.
- More advanced construction through the use of DX
- Improve internal operational efficiency by promoting the adoption of ChatGPT, AI consultation, etc.
- Review core business operations, including project estimations
- Promote collaboration with the private sector by utilizing technical capabilities, etc. etc.

Strengthen the system for execution

- Secure and train technical staff who will be needed to steadily implement the project
- Promote the appeal of technical work and do recruiting to secure technical staff.
  - ➢ Revise exams so that recruits looking for jobs in the private sector could also consider taking them.
  - ➢ Expand exam opportunities so that young workers can more easily pursue employment at the Tokyo government. etc.

(3) Efforts to secure human resources on the contractor side

○ In cooperation with the national government, TMG will strengthen efforts to secure human resources who will be responsible for infrastructure development over the medium to long term, such as by promoting reform of work styles in the construction industry, in order to ensure steady implementation of projects.

(4) Establish a system for business continuity in the event of a disaster

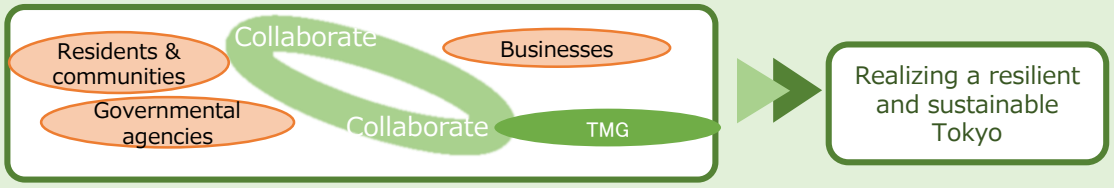
○ This project includes measures to be taken in the event of a disaster such as dissemination of information and assessment of damage, and it is important to establish a system to ensure business continuity within the TMG so that these measures can be executed smoothly.
○ In the event of a disaster, business continuity will be ensured based on the TMG Business Continuity Plan (revised in November 2023), which outlines the policy for response by the TMG as a whole.

2 Effective project promotion measures

(1) Collaborating with diverse entities

○ Implement measures while working in close cooperation with diverse entities. These include measures addressing challenges that cross jurisdictions, measures tailored to local conditions, measures to encourage efforts by businesses, such as strengthening lifelines, and measures by Tokyo residents for self support and mutual support.

<Collaboration Model>



(2) Fostering momentum to advance the project

○ **Proactively communicate the significance of the project and its contents** to develop a **shared sense of urgency** with Tokyo residents, businesses, etc. **Raise awareness** effectively to **further strengthen self-support, mutual support, and public support.**
○ Continue to promote efforts to foster momentum for disaster prevention, while utilizing various contents created on the occasion of the centennial of the Great Kanto Earthquake.

2 Effective project promotion measures

(3) Developing initiatives that incorporate DX

○ From the standpoint of maximizing the effectiveness of hard infrastructure preparations, initiatives for DX will be integrated to increase their synergistic effects.

<Examples of efforts>

- **Use of satellite data, etc. to grasp risks in advance**
- **Simulations with a digital twin of Tokyo**
- **Assess damage using drones and satellites, etc.**
- **Utilization of AI**

(4) Promotion of green infrastructure that takes advantage of natural functions

○ Green infrastructure is a concept that aims to utilize the functions of the natural environment in order to resolve various social issues, such as adaptation to climate change and the preservation of biodiversity.
○ Going forward, we will boost the effectiveness of this project by utilizing green infrastructure that has various functions of the natural environment, including disaster prevention and mitigation.

3 Disseminating information to Tokyo residents, etc.

○ In order to **minimize damage and keep people from panicking** when a disaster strikes, it is essential to **promptly and accurately share information** on evacuation and the actual state of damage and encourage people to behave calmly.
○ Provide information on disaster risks to residents, businesses, municipalities, etc. in advance, and **in the event of a disaster**, proactively **disseminate information in an integrated way and by utilizing digital technology.**

Chapter 6：Coordination with related initiatives

1 Coordination with initiatives related to the project

○ **The further worsening of the climate crisis poses a major challenge.** In conjunction with the promotion of this project, **we will coordinate our efforts with HTT efforts in order to contribute to achieving a carbon-neutral society.**

○ **The threat posed by successive missile launches is a realistic risk.** Countermeasures against ballistic missile attacks will be **presented as a related initiative to this project, and the direction of those efforts will be shared.**

(1) Promotion of HTT

○ As **renewable energies such as solar power generation**, which is positioned as one of the countermeasures against power disruptions in this project, and **green hydrogen**, which serves as a regulator for renewable energies and supports their large-scale adoption, will contribute to decarbonization, we will **promote their adoption in coordination with HTT efforts in order to realize a resilient and sustainable Tokyo.**

(2) Efforts to protect Tokyo residents from missile attacks

○ Continue efforts to **secure evacuation facilities** that can mitigate damage from blasts. Make progress on researching and considering facilities that enable safer evacuation, and **work on hard infrastructure measures with an eye to the future.**

○ Enhance soft infrastructure measures such as **raising awareness about proper evacuation,** practicing evacuations through **drills**, and confirmation of the areas for **cooperation with relevant organizations.**

Chapter 7: Project Scale

1 Rough estimate of the project's scale

○ The scale of the projects to achieve this overall project is as shown below.
○ In implementing individual projects, it will be necessary to promote highly effective measures while taking into account the estimated damage and the effects of the projects.

(1) Total project scale (rough estimate)

Total project scale (rough estimate)	In next 10 years
JPY 17 Tn	7 Tn

*The project scale required to implement this project from 2023 through the 2040s is shown.
*Some projects will be completed after the 2040s.
*These figures represent the current scale of the project and may change in the future.

(2) Breakdown of the project scale (rough estimate)

*Totals for each category do not add up to the grand total as some projects address more than one type of crisis.

Category	Project scale breakdown (rough estimate)	In next 10 years	Key projects
Protecting residents from increasingly severe **floods and storms**	**JPY 7.1 Tn**	2.0 Tn	• Further river development (revetments, regulating reservoirs, etc.) • Strengthened sewer system stormwater runoff measures • Building communities on higher ground as urban infrastructure
Building a city that "does not collapse, does not burn, and survives" even in the event of a **major earthquake**	**JPY 9.6 Tn**	3.8 Tn	• Projects for disaster response route networks, roads to serve as access routes, etc. • Strengthening the earthquake resistance of quays • Earthquake-proofing of water supply and sewer lines
Maintaining urban activities even if there is a **volcanic eruption**	**JPY 2.1 Tn**	0.6 Tn	• Ash fall countermeasures for water supply facilities • Building waiting areas for boarding boats and parking lots needed for evacuation in response to volcanic eruptions • Ensuring police and firefighting activities during ash fall
Eliminating concerns about **power, communications, and data** when a disaster strikes	**JPY 1.4 Tn**	1.3 Tn	• Promote further adoption of locally produced, locally consumed renewable energy • Project to realize a hydrogen society • Install public Wi-Fi that supports open roaming
Building a city that is **resistant to infectious disease**	**JPY 0.7 Tn**	0.4 Tn	• Enhancing the convenience of areas around train stations and creating expansive spaces by seizing opportunities provided by urban development projects • New development of metropolitan parks and marine parks based on user needs • Building bicycle lanes