20. Use of technology

1. Overview

In collaboration with the private sector, we work to establish a communication environment at competition venues and other places such as 5G* and Wi-Fi, so that people visiting the Tokyo 2020 Games can connect to the Internet comfortably.

We promote technology development in Tokyo and Japan in collaboration with the national government, private companies, universities, and research institutions in order to solve various urban issues using advanced technologies.

- ○ We promote the dissemination of advanced hydrogen energy technologies by making the Olympic and Paralympic Village after the Games a model for the realization of a hydrogen society.
- ○ We promote smooth traffic using ITS* technologies such as automated driving systems and demand forecast signal control.
- ○ We support small and medium-sized enterprises working on the development of new technologies and products such as robotic hospitality and care support, and sports equipment for people with impairments with an eye on the Paralympics.

2. Legacy in a nutshell

The "Tokyo Data Highway", the main public infrastructure of the 21st century, is built by the private sector and TMG, with which the "Connected Tokyo", where anyone can connect to the Internet anytime, is achieved.

Taking the Tokyo 2020 Games as an opportunity, in cooperation with the national government, private companies, universities and research institutions, we will promote technology development aiming at realizing an advanced hydrogen society and a city without traffic jams, and dealing with the super-aged society with the help of robots, etc., which will lead to the achievement of a sustainable and smart city with high QOL utilizing the state-of-the-art technologies for the life of Tokyo residents and the city as a whole.

In addition, through the Games that attract attention all over the world, we will disseminate advanced technologies in Tokyo and Japan to the world, and our presence in the science and technology field will be further improved.

Stakeholders	Private companies, universities / research institutions, the national government, etc.
Type of legacy	Economy & Technology

Geographical scope	Tokyo
Timing scope	Long term
Responsible for implementation	TMG (in collaboration with several private companies)
Source of legacy	Candidacy file, Action Plan for 2020, Future Tokyo: Tokyo's Long-Term Strategy
Associated SDGs	4-Quality Education, 7-Affordable and Clean Energy, 8-Decent Work and Economic Growth, 9-Industry, Innovation, and Infrastructure, 11-Sustainable Cities and Communities, 13-Climate Action, 17-Partnerships

3. Development

(1) Why

Building an infrastructure for the Internet connection was an urgent task to ensure smooth Internet connection under conditions where many people gather for large-scale events such as the Tokyo 2020 Games.

In order for Japan, which is scarce of resources, to continue to grow, it is important to promote the utilization of hydrogen energy that contributes to global warming countermeasures with low carbon. In order to realize a hydrogen society, it is necessary to take full advantage of the Tokyo 2020 Games as a great opportunity, which attracts attention from both inside and outside Japan, so as to promote the understanding and promotion of utilization by various people including Tokyo residents and private companies.

Furthermore, it is necessary to further alleviate traffic congestion, as the average travel speed during congestion in Tokyo wards is lower than that of major cities both inside and outside Japan. In Tokyo, where the aging rate is expected to exceed 30% in the 2040s, the contribution of robots is being sought as a new labor force for dealing with labor shortages in the industrial and welfare fields.

In order to solve these various urban issues, we must promote technological development and transmit the technologies of Tokyo and Japan, taking the Games as an opportunity, so as to further enhance the spirit of technological innovation.

(2) When

FY2015	The support for companies aiming to develop and commercialize service robots started
FY2016	The "Hyper-Smooth Tokyo" project started

	*A project to alleviate traffic congestion by utilizing existing roads and taking measures using ITS technologies at major traffic congestion points in Tokyo
FY2017	The "Tokyo Automated Driving One-stop Center" was established *This provides information about procedures related to relevant laws and regulations, consultation services, etc. in a one-stop manner in order to promote demonstration experiments of automated driving on public roads
	The support for companies aiming to develop superior technologies and products for sports for persons with impairments started
FY2019	The “Tokyo Data Highway Basic Strategy” was established *A guidepost showing the road ahead for a bright future to be developed by 5G
	The “Smart Tokyo Implementation Strategy – For Realizing Society 5.0 Tokyo Version” was established *We clearly show the ideal state of “Smart Tokyo” more specifically, where Tokyo’s potential is drawn out with digital technologies and Tokyo residents can lead a quality life. In addition, we introduce the contents of projects for FY 2020 for each theme and embody and accelerate the initiatives.
FY2020	The “Smart Tokyo Implementation Strategy –Efforts for FY 2021” was established *We reposition projects of “Shin Tosei” strategies for the promotion of the “Smart Tokyo Data Highway Strategy” shown in “Future Tokyo: Tokyo’s Long-Term Strategy”. And in order to clarify the vision of Smart Tokyo in more concrete terms, we introduce projects for FY 2021 for each theme and embody and accelerate the initiatives

(3) Who

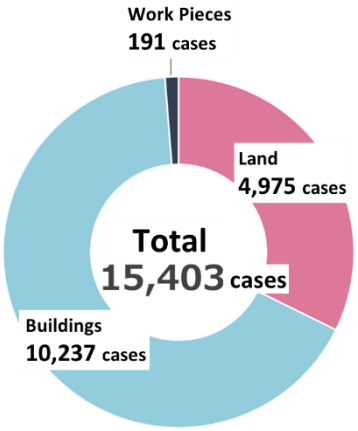
TMG (in collaboration with several private companies)

(4) How

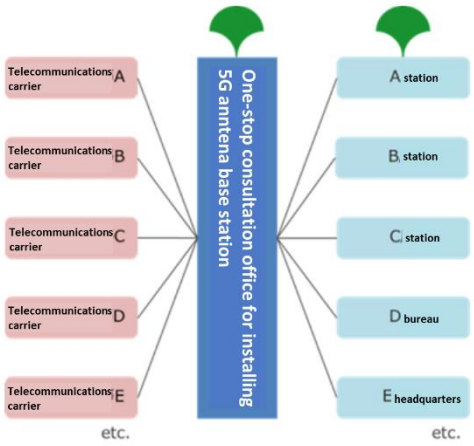
① Establishing “Tokyo Data Highway”

○ In order to promote the installation of 5G antenna base stations, etc., we actively open up assets owned by TMG and release database of TMG-owned assets to simplify the procedures for use. In addition, we set up one-stop consultation office on the installation of 5G antenna base stations. We also assigned advisors for the installation of the base stations.

<Publication of asset database> [1]



<Image of one-stop consultation office>[2]

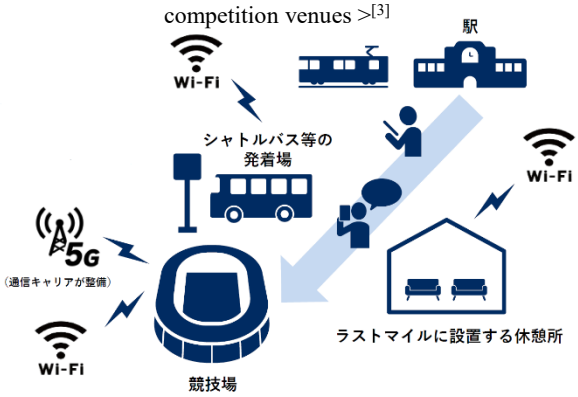


○ We share know-how on releasing assets with municipalities in Tokyo and other prefectures to expand the 5G network.

○ We establish a Wi-Fi environment at competition venues and shuttle bus stations to the competition venues.

○ We designate the competition venues and their surrounding areas, Nishishinjuku and Minamiosawa (Tokyo Metropolitan University), as the key areas to establish the 5G environment.

<Wi-Fi network for spectators at the Tokyo 2020 competition venues >[3]



○ In Nishishijuku we install 5G antennas, set smart poles in the entire area, implement showcasing projects and gather startups to realize “Connected Tokyo”.

○ We contribute to the realization of Society 5.0 by creating new use cases through advanced researches and industry-academia-public collaboration making use of one of the largest local 5G network in Japan established in the Tokyo Metropolitan University Minamiosawa Campus and Hino Campus.

○ TMG takes the lead in developing 5G/ICT* measures to update Quality of Life (QOL) of Tokyo residents.

② Dissemination and expansion of hydrogen energy technology

○ In the city development of the Olympic and Paralympic Village after the Tokyo 2020 Games, we promote initiatives to realize a city that becomes a model for

---

[1] Smart Tokyo Implementation Strategy –Efforts for FY 2021 (TMG)

[2] Bureau of Digital Services website（https://www.digitalservice.metro.tokyo.lg.jp/tokyodatahighway/assetdb.html）

[3] Smart Tokyo Implementation Strategy (TMG)

environmentally-advanced cities, such as introducing hydrogen as a leading energy source.

○ Based on the agreement concerning the research and development of CO_2-free hydrogen* among the four parties consisting of Fukushima Prefecture, the National Institute of Advanced Industrial Science and Technology, TMG, and the Tokyo Environmental Public Service Corporation, we promote the utilization of CO_2-free hydrogen produced in Fukushima Prefecture in Tokyo during the Games.

○ We introduce fuel cell* vehicles to the BRT* that connects the center of Tokyo and the waterfront area.

○ We investigate and publish the layout plan and construction costs, etc. in the case that hydrogen stations are juxtaposed with existing gas stations, and create an environment where small and medium gas station operators can easily enter the hydrogen station* business.

○ Regarding the characteristics and safe use of hydrogen, etc., we implement dissemination activities through utilization of the hydrogen information center "Tokyo Suiso-miru", which is a base for transmitting hydrogen energy information, and holding events and seminars for general citizens.

<Hydrogen Information Center "Tokyo Suiso-miru">[4]

○ We promote education to learn about hydrogen, which is expected to be one of the main energies in the future, for children who are responsible for the next generation of society, and implement effective public awareness using media such as SNSs* and pamphlets for Tokyo residents who are not familiar with hydrogen.

○ In order to foster a movement to disseminate hydrogen energy, the “Tokyo Hydrogen Promotion Team*”, an industry-academia-government collaboration organization, shares information on advanced technologies and transmits information by holding events.

③ Traffic smoothing such as efforts to utilize automated driving technology and measures against traffic congestion

○ Regarding demonstration experiments of automated driving on public roads, the "Tokyo Automated Driving One-stop Center", which provides information at

[4] Towards 2020 –Building the Legacy – (TMG)

each stage from the experimental concept stage to the implementation stage related to the procedures of relevant laws and regulations as well as providing consultation services, etc., supports implementation of demonstration tests.

○ We support demonstration tests for the realization of mobile services that utilize automated driving technology such as automated driving buses and taxis promptly.

<Image of automated driving bus>[5]

○ In anticipation of the development of city development with an eye on a society where automated driving technology has become widespread, we proceed with investigation and examination of the impact and effects on urban road traffic and road spaces, utilization methods, etc., in collaboration with the national government and automobile manufacturers, etc.

○ In addition to conventional traffic jam countermeasures such as advanced signal control and improvement of road facilities, we promote the traffic jam countermeasure, that incorporates ITS technologies such as the utilization of probe information* for major traffic congestion points in Tokyo, so as to alleviate traffic congestion throughout Tokyo.

④ Support for development of robot technology, etc.

○ We promote development, productization, and commercialization of robot technology through collaboration among industries, academia, and public authorities, so as to create a place for robots to play active roles in various situations that attract attention during the Tokyo 2020 Games, etc., and transmit robot technology from Tokyo to both inside and outside Japan.

<Demonstration of a delivery robot at Tokyo Big Sight>[6]

○ In order to improve productivity of small and medium enterprises, we provide the best knowledge and information for small and medium enterprises, and support efforts to introduce and utilize cutting-edge technologies such as IoT*, AI*, and robots. In addition, we support the service industries regarding initiatives using analytical tools of customer data, etc.

[5] Future Tokyo: Tokyo's Long-Term Strategy (TMG)

[6] Tokyo Metropolitan Industrial Technology Research Institute

○ We organized the “Tokyo Robot Collection” to form a new social implementation model to address issues of Tokyo and also publicized advanced technologies in the robot industry, etc.

<Demonstration of an AI guide robot at JR Shinagawa Station >[7]

○ We provide opportunities for children who have difficulties in coming to the venues of the Games due to impairments or illnesses to enjoy the Games in real time by utilizing advanced technologies.

○ We implement demonstration tests of automated delivery robots to support elderly people with shopping in Minami-Osawa area.

○ We establish the optimum methods of guarding making use of digital technologies through demonostration tests using guard robots in the TMG buildings.

○ In anticipation of the Paralympic Games, based on the opinions of competition organizations and related companies, etc., we promote the development of superior technologies and products for para-sports etc. to contribute to the improvement of capabilities of atheletes.

<Equipment for sports for people with impairments (wheelchairs)> [8]

○ For effective utilization of multilingual tools, we continue to promote efforts of multilingual services in various ways inlcuding the introduction of our initiatives and multitingual-related technologies on the Multilingual Services Council’s portal site. During the Games period, we introduce multilingual services using ICT for the Games management by providing translation tools for the staff around the competition venues. Through the expansion of opportunities for demonstration, we promote functional enhancement and promote utilization by local governments.

(5) Benefits

5G and Wi-Fi networks are established where necessary, and an environment in which many people can connect to the Internet smoothly is established.

In addition, various technological developments, such as an advanced hydrogen supply system and an autonomous driving system, will be promoted, leading to sustainable urban growth.

Furthermore, advanced technologies of Tokyo and Japan will be disseminated to the

[7] Future Tokyo: Tokyo’s Long-Term Strategic Vision (TMG)

[8] FY2018 Results of Business of the Tokyo Metropolitan Industrial Technology Research Institute

world through the Tokyo 2020 Games, and their presence in the science and technology field will be further improved.

4. Facts and figures

Dissemination of state-of-the-art automated driving technology to both inside and outside Japan	・Utilization results of the Tokyo Automated Driving One-stop Center: 720 inquiries in total, 35 demonstration supports, 74 utilizing groups(at the end of March 2021) ・Investigation and examination with the aim for building a business model were implemented ・Test drive events and symposiums for general Tokyo residents were held
Steps to urban development utilizing automated driving technology	A review meeting of experts and representatives from related municipalities is set up, where members discuss the methods of utilizing automated driving technologies including the direction of use, such as by area (central Tokyo, Tama area) or by purpose (for commuting, shopping, etc.)
Robot industry field	Products and commercialization of service robots: 34 (including business matching)

(Items in the table are achievements to March 2020 unless otherwise noted)

5. Explanation of Terms

5G	The 5th generation mobile network, featuring high-speed and large-capacity broadband services, 100 times faster than that of current mobile network; ultra-low latency that achieves 10 times accurate real-time communication than LTE; and massive Machine Type Communications (mMTC) to enable connection of 10 times more devices than the current mobile networks
ITS	An abbreviation for Intelligent Transport System. This refers to a transportation system that aims to solve traffic accidents, traffic congestion, etc. by networking people, roads, and vehicles with information using the most advanced information communication technologies
ICT	An abbreviation for Information and Communication Technology. A generic term for technologies, industries,

	facilities, services, etc. in various fields related to data processing and information communications
CO_2-free hydrogen	Hydrogen, etc. produced by electrolyzing water with electricity generated by renewable energy
Hydrogen station	A facility for supplying hydrogen to fuel cell vehicles. This includes an off-site type that stores hydrogen transported from outside in the hydrogen station, and an on-site type that reforms city gas, etc. to produce hydrogen in the station
BRT	An abbreviation for Bus Rapid Transit. A new public transportation system that has transportation capabilities and functions comparable to trams and new transportation systems, with flexibility thanks to adopting articulated buses, IC card systems, etc.
Fuel cell	A system that generates electricity by reacting hydrogen with oxygen in the air to directly produce electricity. Only water is discharged at the stage of use
SNS	An abbreviation for Social Networking Service. A service that enables social networks to be built on the web
Tokyo Hydrogen Promotion Team	An organization established with more than 100 private enterprises and local governments in Tokyo in order to foster a movement powered by both public and private sectors for the dissemination of hydrogen energy (started in November 2017)
Probe information	Information gathered in the information center by recording travel data such as position, time, speed, direction, etc. onto in-vehicle devices such as car navigation systems
IoT	An abbreviation for Internet of Things. By providing communication functions to not only information and communication devices such as computers, but also various objects (things) that exist in the world, connection to the Internet or communication with each other can be realized, so as to enable automatic recognition, automatic control, remote measurement, etc.

AI	Software and systems that mimic the intellectual work that the human brain is doing with computers. Specifically, it refers to computer programs that can understand the natural language used by human beings, make logical inferences, and learn from experience.

6. References

- Towards 2020 –Building the Legacy- (PR Edition)
- Towards 2020 –Building the Legacy - (Main Part)
- New Tokyo. New Tomorrow. –The Action Plan for 2020-
- Strengthening of Policies to Realize the "Three Cities" (FY2018)
- Strengthening of Policies to Realize the "Three Cities" (FY2019)
- Strengthening of Policies to Realize the "Three Cities" (FY2020)
- Future Tokyo: Tokyo's Long-Term Strategy
- Tokyo Data Highway Basic Strategy (Version 1.) Update Tokyo
- Smart Tokyo Implementation Strategy – For Realization of Society 5.0 Tokyo Version –
- The Grand Design for Urban Development
- Energy Development Plan for the Olympic and Paralympic Village Area