[Overview version]

Tokyo Metropolitan Public University Corporation Carbon Neutrality Promotion Plan

~Establishing a sustainable society to transcend the climate crisis~

Average global temperatures in 2022 were 1.16°C above preindustrial levels. Various extreme weather events worldwide were attributed to global warming. In its Sixth Assessment Report in 2021, the Intergovernmental Panel on Climate Change (IPCC) concluded that "it is unequivocal that human influence has warmed the atmosphere, ocean and land."

The latest discussions on climate change are based on active research on various tipping points—climatic turning points at which dramatic changes may occur once a certain point is reached. The research suggests five tipping points, if not already breached, may lie very close ahead. This points to the need to transform social systems before climate changes become irreversible. There is no time to waste. We face a climate and environmental emergency.

As part of efforts to respond to this crisis, the Tokyo Metropolitan Public University Corporation issued a Climate Emergency Declaration on July 16, 2021, the first such declaration by a national/public university or college. The declaration sets forth our commitment to take a leading role in helping to achieve a sustainable society, with the goal of achieving carbon neutrality by 2050. Following university-wide discussions, we then developed a Carbon Neutrality Promotion Plan, setting forth, as a socially responsible institution of higher learning, the basic direction for future efforts and specific quantitative targets for reducing greenhouse gas emissions.

This plan sets an ambitious target for Scopes 1 and 2 that exceed the targets of the national and metropolitan governments: namely, to achieve carbon neutrality by the 2030s. For Scope 3, the disclosure of information related to which is a clear social obligation, many issues remain to be addressed, including the accuracy of the associated calculations and the challenges that lie ahead in reducing emissions. Nevertheless, we believe we must calculate and assess emissions as best we can and actively seek to reduce them.

The announcement of the plan marks just the first step in efforts to achieve carbon neutrality. Moving forward, we will promote initiatives related to academic research, human resource development and student activities, and energy management. The members of this Corporation will work as one to achieve our goal of carbon neutrality.



Ryoichi Yamamoto, Chairperson, Tokyo Metropolitan Public University Corporation March 28, 2023

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Introduction

Background to and purpose of developing the plan

The global warming attributed to the enormous volumes of greenhouse gas (GHG) emitted due to accelerated expansion of human activity since the latter half of the 20th century now poses serious risks. One million species are said to be on the verge of extinction. Climate change and associated environmental issues are arguably beginning to impinge on the viability of not just human life, but the life of all living creatures on Earth.

Against this backdrop, the Paris Agreement of 2015 and the adoption of the Sustainable Development Goals (SDGs) by the United Nations represent key milestones in determining the direction of future efforts. According to the Special Report on Global Warming of 1.5°C^{*1} compiled in 2018 by the IPCC, the 1.5°C target will reduce climate risks significantly compared to the so-called 2°C target.*² The goal of limiting the increase in global temperatures to no more than 1.5 degrees from preindustrial levels has emerged as an international consensus.

Nevertheless, even if countries reduced GHG emissions as planned, a report by the United Nations Framework Convention on Climate Change (UNFCCC) published in 2022 indicates we would fall well short of achieving the 1.5°C target of the Paris Agreement. Furthermore, reports suggest the 1.5°C target will be breached by around 2030.

Today, with a population of about 14 million, Tokyo emits about 60 million tons of GHG (CO₂ equivalent) and generates about four million tons of waste annually.

The primary mission of the Tokyo Metropolitan Public University Corporation ("the Corporation" hereinafter) is to explore and seek to achieve ideal forms of human society in large cities. Given the environmental impact caused by the high consumption of resources and energy by major cities, it is quite natural that the Corporation would take the initiative in striving to establish sustainable cities.

The Corporation has promoted environmentally-friendly initiatives through eco-campus and green campus activities, and has also undertaken research on environmental innovations and urban environmental policies. We have developed this plan in response to the current climate and environmental crises.



(Photo) Flood damage in Europe



(Photo) The Conference of Parties to the UN Framework Convention on Climate Change (COP)

*1 An IPCC special report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty. (Source: website of the Ministry of the Environment https://www.env.go.jp/press/106052.html)

*2 A global goal to keep the increase in global average temperatures to well below 2°C of preindustrial levels and to pursue efforts to limit this increase to 1.5°C. (Source: website of the Decarbonization Portal of the Ministry of the Environment https://ondankataisaku.env.go.jp/carbon_neutral/about/)

Introduction

Developments around the world

The goal of the Paris Agreement is to limit the temperature rise to no more than $1.5-2.0^{\circ}$ C above the preindustrial average. However, some studies indicate that even the current level of global warming (1.1° C above preindustrial levels) may have already passed several tipping points, including the collapse of the Greenland ice sheet. To overcome the climate crisis, countries around the world have declared climate emergencies^{*1} and set the goal of achieving carbon neutrality—that is, reducing net GHG (CO₂ equivalent) emissions and absorption to zero—by 2050. Eighteen countries, the EU, and more than 2,300 local governments in 41 countries have issued such declarations.^{*2}

Domestic Developments

On October 26, 2020, Japan's Prime Minister announced the goal of achieving carbon neutrality by 2050. A declaration of climate emergency was passed by the House of Representatives on November 19, 2020, and by the House of Councillors on November 20, 2020. More than 130 local governments have issued such declarations to date. In addition, the number of local governments seeking to promote carbon neutrality is steadily expanding, with nearly 800 declaring net-zero CO₂ emissions by 2050.

Developments in Tokyo

The Tokyo Metropolitan Government issued the Declaration of Tokyo's Climate Crisis Mobilization in 2019, ahead of the national government. Efforts are underway to achieve carbon halving, or reducing Tokyo's GHG emissions by 50%, by 2030 (compared to 2000 levels) and Zero Emission Tokyo by 2050 to help achieve the goal of net zero global CO₂ emissions.

In September 2022, the Tokyo Environmental Master Plan of the Tokyo Metropolitan Government was revised for the first time in some six years. The goal was to dramatically strengthen and implement comprehensive measures targeting decarbonization and to resolve environmental issues in various fields, including restoring biodiversity and establishing high-quality urban environments. The new Environmental Master Plan consists of "3+1 strategies", the three strategies being "energy decarbonization and sustainable resource use," "realization of an environmentally symbiotic, prosperous society," and "realization of a better urban environment"; and, as an additional "zero strategy," initiatives to deal with the impending energy crisis promptly.

Other efforts seek to strengthen initiatives to rapidly set in place the foundations for a decarbonized society, including the December 2022 amendment of the Ordinance on the Environment to Ensure the Health and Safety of Tokyo Residents, which led to the establishment of a new system to ensure the environmental performance of certain new small and medium-sized buildings, including those for housing purposes.

*1 Climate Emergency Declaration (CED). Official declaration by the administrative agencies of countries, cities, municipalities, etc. recognizing the serious impact of climate change and pledging action A climate emergency has now been declared not just by local and national governments, but by various entities including universities, academic associations, museums, art galleries, and corporations.

*2 Based on statistics from the Australian NGO Climate Emergency Declaration and Mobilization in Action (CEDAMIA) as of March 2023

Introduction

	Actions by Tokyo	Metropolitan Public University Corporation
1	Climate Emerge	ency Declaration
	July 16, 2021	Issued a climate emergency declaration, a first by a national/public university or technical college. (Issued jointly by the Chairperson of Tokyo Metropolitan University Corporation, President of Tokyo Metropolitan University, President of the Advanced Institute of Industrial Technology, and Principal of the Tokyo Metropolitan College of Industrial Technology)
	≪Tokyo Metropo	litan University Corporation's Climate Emergency Declaration ≫
	With humankind initiative in contri	facing a serious climate crisis, the Tokyo Metropolitan University Corporation hereby declares a climate emergency in order to take the buting to the realization of a sustainable society and to achieve carbon neutrality by 2050.
	1. Develop act and campus	tion plans for mitigation and adaptation of the climate change and reflect these activities in our operations as well as in education, research, s life.
	2. Collaborate corporation	widely with government and local authorities, other university corporations and related organizations, the general public, and private sector s.
	3. Develop hu	man resources who will tackle the challenge of achieving carbon neutrality.
	 Collaborate working with 	and cooperate with three educational institutions and promote efforts for the Sustainable Development Goals (SDGs), including climate, by n faculty, staff and students throughout the Corporation.

② Carbon Neutrality Promotion Plan Development Study Committee

April 1, 2022	April 1, 2022 Establishment of the Carbon Neutrality Promotion		(Carbon Neutrality Promotion Plan Development Study Committee Members)			
Plan Development Study Committee		Chairp	person			
	Public University Corporation and each school)		Director of Administration, Tokyo			
July 11, 2022	First committee meeting					
October 20, 2022	Second committee meeting	Committee Members				
November 17, 2022	Third committee meeting	Vice President, Tokyo Metropolitan University Dean, Graduate School of Industrial Technology, Advanced Metropolitan Public University		Senior Director of Management Metropolitan Public University C	and Planning Office, Tokyo Corporation	
January 31, 2023	Fourth committee meeting	Institute of Industrial Technology Vice Principal, Tokyo Metropolita	n College of Industrial	Senior Director of General Affai Metropolitan Public University C Senior Director of Administrative	rs Department, Tokyo Corporation e Affairs Department, Tokyo	
(Opinions on the draft plan solicited from students, faculty, staff,		Technology		Metropolitan University Senior Director of Administrative Affairs Department, Advanced		
March 10, 2022	Fifth committee meeting			Senior Director of Administrative Metropolitan College of Industria	y e Affairs Department, Tokyo al Technology	
	Fillin committee meeting					

Current status of GHG emissions

Outline of Corporation

[Name]

Tokyo Metropolitan Public University Corporation (Public University Corporation Tokyo Metropolitan University until March 31, 2020)

[Date of establishment]

April 1, 2005

[Address]

2-3-1 Nishi-Shinjuku, Shinjuku-ku, Tokyo

Organizational chart





Current status of GHG emissions

Actual GHG emissions (Scopes 1 and 2)

*1 as determined in accordance with GHG Protocol



* Figures reported by Tokyo Metropolitan Public University Corporation as specified by the Act on Rationalizing Energy Use (Energy Conservation Act) and the Act on Promotion of Global Warming Countermeasures As with the figures reported under the Energy Conservation Act, the emissions factor adopted is as specified for the market standard method (CO₂ emissions factors, etc. for electricity contracted individually by each campus/office).

Approx. 15,000 t-CO₂ equals

Absorption by approx. 1,700 ha of artificial cedar forest

Emissions of approx. 5,600 households

for the last one year Approx. 500 times the absorption of Minami-Osawa Campus's Green Space

* Emission/absorption amount

GHG emissions breakdown for major campuses



*1 International standard for calculating and reporting GHG emissions published in 2011 WRI WBCSD, Greenhouse Gas Protocol A Corpora te Accounting and Reporting Standard REVISED EDITION https://ghgprotocol.org/sites/default/files/standards/ghg-protocol-revised.pdf

Trends in energy consumption

(Historical energy consumption and breakdown for the Minami-Osawa Campus)

In the 2021 academic year, the Minami-Osawa Campus used 224,796 GJ of energy (calculated using the standard calorific value and carbon emissions factor by energy source given in the Agency for Natural Resources and Energy's "Comprehensive Energy Statistics"). Nearly 90% of this was electricity.

In terms of electricity consumption by location, the building housing lab equipment consumes a significant portion of this electricity (about 60-70%). By application, lab equipment uses a significant amount of electricity (about 30-40%), followed by air conditioning (about 30%) and lighting (about 20%).

Cold and hot water generators account for the majority of gas consumption (about 70%).



⇒ Measures to address electricity are key to achieving carbon neutrality for the Corporation.

Current status of GHG emissions

Estimates of Scope 3 GHG emissions (Minami-Osawa Campus)



		Classification	Emission [t-CO ₂]	Ratio
Scope 3 (other emissions) total				100.0%
Category 1	Goods and services purchased	Emissions associated with activities leading to and including the manufacture of goods, etc. necessary for business activities	11,408	48.7%
Category 2	Capital goods	Emissions from the construction and manufacture of capital goods of each school	7,651	32.7%
Category 3	Fuel and energy-related activities not included in Scope 1, 2	Emissions associated with upstream fuel and electricity processes (e.g., mining, refining)	1,693	7.2%
Category 4	Transportation and distribution (upstream)	 (1) Emissions associated with the distribution (transportation, cargo handling, storage) of goods and services purchased during the year in question from suppliers to each school (2) Emissions associated with distribution services (transportation, cargo handling, storage) other than those in (1) purchased during the year in question (emissions associated with distribution services paid for by each school) 	331	1.4%
Category 5	Waste generated in business operations	Emissions associated with transportation and disposal of waste generated at each school	461	2.0%
Category 6	Business travel	Emissions associated with business travel by faculty and staff	145	0.6%
Category 7	Employee commuting	Emissions associated with commuting by faculty, staff, and students	1,725	7.4%
Category 8	Leased assets (upstream)	Emissions associated with the operation of assets leased by each school (except when calculated under Scope 1 or 2)	10	0.0%

Basic policy



Basic Policy

Targets for reducing GHG emissions from business activities

[Target] *Scopes 1 and 2

- Strive to achieve carbon neutrality by the 2030s
- Achieve minimum 50% reduction compared to 2013 academic year by 2030.
- * We will work actively on Scope 3 including appropriately calculating emissions and considering countermeasures.
- * The targets will be revisited five years before 2030 (in 2025) in light of the difficulties posed by energy and resource procurement worldwide during the 2022 academic year and the uncertain outlook for future electricity supply and other factors at the time the plan was formulated.



Achieving carbon neutrality



Initiatives to help achieve carbon neutrality



Energy Management

As of academic year 2022, the Corporation is charged with achieving the (ideal) target of reducing average annual energy consumption per unit over the last five years by at least 1% per year, as required by the Act on Rationalizing Energy Use (Energy Conservation Act). The Minami-Osawa Campus is required by the Ordinance on the Environment to Ensure the Health and Safety of Tokyo Residents (Tokyo Metropolitan Government Environmental Security Ordinance) to reduce the average annual emissions of specified GHG emissions between academic years 2020 and 2024 by at least 27% compared to the standard emissions amount.

The Corporation has systematically undertaken various energy-saving activities at each campus (i.e., eco-campus and green campus activities). In addition to continuing to engage in energy-saving activities, we will actively promote the procurement of renewable energy to improve the likelihood of achieving our GHG emissions reduction targets.

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Energy-saving activities and campaigns

• Use of energy-saving diagnostics

We will examine operating procedures at facilities and other issues with the goal of reducing inefficient and wasteful energy consumption based on energy-saving diagnostics conducted by an external company. We will incorporate the results into energy-saving activities.

• Temporary closures of offices in the summer, etc.

We will implement office closures during periods of the summer and winter when no classes are held. (These dates were first set during the 2022 academic year at the Tokyo Metropolitan College of Industrial Technology and elsewhere.) We will also track the resulting effects on students, faculty, and staff, including inconveniences and negative impacts on work.

• Strengthening awareness by visualizing power consumption

We will visualize real-time electricity consumption at the Minami-Osawa Campus and disseminate this information at the Tokyo Metropolitan University website, thereby strengthening awareness of efforts to shift peak power consumption among faculty, staff, and students.

Retrofitting with energy-saving equipment, etc.

• Retrofitting with LED lighting equipment We will retrofit with LED lighting at the five campuses Estimated reduction effect 2,129 t-CO₂

managed and operated by the Corporation, namely Minami-Osawa Campus, Hino Campus, Arakawa Campus, Shinagawa Seaside Campus, and Kosen Shinagawa Campus and Kosen Arakawa Campus.

npact)	t) Conventional equipment		LED Fixtures		Reduction rate	
	FLR40 model for 2 lamps	86W	LED-embedded lighting fixture	25W	Approx. 71%	
	FHP32 3-lamp square base light	88W	LED square base light	43W	Approx. 51%	
	Incandescent bulbs	54W	LED bulbs	7.5W	Approx. 86%	

Source: Tokyo Metropolitan Center for Climate Change Action (Cool Net Tokyo) Textbook on Energy Conservation Measures by Industry (School Facilities <Revised Edition>)

• Repairing and upgrading aging equipment

With a medium- to long-term perspective in mind, we will repair and upgrade aging facilities and equipment, such as air conditioning equipment to provide a stable environment conducive to learning and research for students and faculty. We will consider the energy-saving performance of the equipment to be installed when making these improvements. This will be done systematically and steadily while carefully monitoring the impact of the measures. This, in turn, should further reduce GHG emissions.

Initiatives to help achieve carbon neutrality



Tokyo Metropolitan Government Model Project to Promote the Adoption of Solar Carports Hachioji Water Supply Office (Cool Net Tokyo seminar materials)

Enhancement of existing solar power generation systems

We will increase the capacity of the existing solar power generation system at the Minami-Osawa Campus from 10 kW to 20 kW.

Installing rooftop solar panels

We will install solar panels with a power generation capacity of 20 kW on the roof of the new building to be constructed on the Hino Campus to supplement power consumed on campus.



A method in which another company (power generation company) installs solar panels outside the campus site and transmits electricity to the campus on consignment.

There are many variations. Initial costs and maintenance are often borne by the other company (power generation company), making it possible to reduce initial costs.

Breakdown of reduction methods to achieve the target



* Plan to be revisited five years before 2030 (2025) given the uncertainty regarding the outlook for future power supply and other factors at the time the plan was formulated.

Promoting human resource development and student activities

We will provide an educational environment in which areas related to climate change and overcoming the climate crisis, such as the environment, resources, and energy, can be learned.

We will promote voluntary activities outside the classroom to develop human resources who will lead a sustainable society to transcend the climate crisis. Specifically, we will support initiatives that promote climate actions, such as activities by students, faculty, and staff to reduce environmental impact, offer volunteer programs, etc.

Providing a learning environment

• Offering highly specialized curricula, etc.

We will continue to offer curricula that contribute to the development of environmental human resources at our two universities and one college taking into account the characteristics of each school.

At Tokyo Metropolitan University, we will continue to offer specialized courses related to the climate crisis and carbon neutrality, including global environmental issues, climate change, the relationship between the environment and energy, renewable energy, and energy conservation methods.

• Program of Arts and Sciences

At Tokyo Metropolitan University, we will offer specific theme-based programs (the Program of Arts and Sciences) consisting of related liberal arts courses, foundational courses, general seminars, and language courses selected across humanitiessciences disciplinary boundaries from diverse educational programs, leveraging the characteristics of a comprehensive university to cultivate the ability to respond flexibly to change (i.e., broad education, multifaceted cognitive capacity, etc.). We will establish "Resources, Energy, Environment" under this concept as one of the specific themes.

(Themes)

 \bigcirc Disaster and epidemic prevention \bigcirc AI and humans \bigcirc Resources, energy, environment

Support for environmental activities

• Support for environmental activities

We will assume a portion of the expenses for initiatives promoting climate actions (actions to overcome the climate crisis), including activities undertaken by students, faculty, and staff at the two universities and one college to reduce environmental impact.

The particulars of such support will be reviewed by the Eco Activity Promotion Committee.

Community volunteer program (Matsuki Hinata Green Space Program)

We will offer a program jointly with the Hinata Ryokuchi society for the study of citizens, a community organization with which we have an agreement, using the Matsuki Hinata Green Space on the Minami-Osawa Campus as the site for one of the volunteer activity programs organized by Tokyo Metropolitan University.

These activities will provide instruction on the impact of a derelict *satoyama* on the ecosystem and other social issues and help cultivate human resources who can voluntarily and proactively tackle these issues.

Promoting Academic Research

Each department, research center, faculty, etc. of our two universities and one college engages in research activities that contribute to overcoming the climate crisis from a variety of perspectives.

We also collaborate with the Tokyo Metropolitan Government on many occasions and contribute to solving various issues facing the Tokyo Metropolitan Government as its think tank. We will further promote such research in the future and help solve the global climate crisis.

Promoting research		Cooperation with the Tokyo Metre	opolitan Government		
Promoting research activities related to the climate crisis Our two universities and one college are educational institutions with different characteristics. Each conducts distinctive research across a wide range of fields and in-depth specialization. [Examples of Research Themes]		 Tokyo Research Initiative for Sustainability In January 2022, the Tokyo Research Initiative for Sustainability was established at the Corporation to strengthen research and study capabilities that will help solve environmental and other SDGs issues. From an academic perspective, the Initiative explores issues to help solve issue pertaining to the administration of the municipal affairs of Tokyo under the them 			
Climate change, ecosystems, energ environmental impact analysis, CO ₂	y, resources, materials, capture and utilization, etc.	of sustainability, and also works diligently on studies to help achieve carbon neutrality, including effective energy use.			
Against this backdrop, Tokyo Metropolitan L pursuing research for the realization of a hy emit CO_2 and research on technologies that capturing CO_2 from the atmosphere. We will continue to actively contribute to the and the progress of science and technology to realize a sustainable society to transcend We will also actively publicize such research including our website, symposiums, etc.	Jniversity (as one example) is drogen energy society that does not directly reduce CO_2 , such as future of the global environment through research activities in order the climate crisis. h through using various media,	Image of matching between administrative need Tokyo Metropolitan Adu a su Presentation of challenges Commissioning research and studies	s and seeds of research ministrative challenges in realizin ustainable society Planning and proposal for research and studies	g	
		Tokyo Research Initi Research and studies into policy issue regarding sustainability fro	ative for Sustainability s of the Tokyo Metropolitan Governmer om an academic perspective	t	
⑦ 東京都立大学	完大学 Tokyo Metropolitan College of Industrial Technology 東京都立産業技術高等専門学校	Joint studies	Commissioned projects		