



UTokyo CLIMATE ACTION

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Foreword



Last September, the University of Tokyo (UTokyo) released a statement of the guiding principles of our university, titled “UTokyo Compass – Into a Sea of Diversity: Creating the Future through Dialogue,” which describes the ideals to which our university should aspire and the direction it should take. As a university that serves the global public, one commitment we make in the UTokyo Compass is to mobilize knowledge across all disciplines at UTokyo to seek solutions to the global problems that confront human society in areas including health, economic disparity, gender equality, conflict and division, energy, resource circulation, and Climate Action.

With this principle in mind, UTokyo has embarked on many new international, national, and local initiatives related to energy and Climate Action. For example, through the initiative of the Center for Global Commons, we developed the Global Commons Stewardship Index in 2020 to visualize domestic and spillover environmental impacts of countries in order to promote behavioral changes that will lead to the protection of the global commons. We also established a new industry-academia platform called the Energy Transition Initiative, which was launched during COP26 in Glasgow. Its purpose is to help design pathways to net zero within Japan.

Furthermore, UTokyo joined the “Race to Zero for Universities and Colleges” campaign, which was launched by the United Nations Framework Convention on Climate Change, in October 2021 to contribute to the mitigation efforts of greenhouse gas emissions by achieving net-zero emissions from our campuses and operations.

The campaign participants need to draw up a plan by showing the roadmap to net zero, especially through short to medium-term targets, within 12 months of joining. This UTokyo Climate Action is to show our commitment to this requirement.

Looking back through our history, UTokyo launched the Todai Sustainable Campus Project (TSCP) in 2008 and advanced various initiatives to create a low-carbon campus by taking measures for energy savings. Based on the knowledge we have accumulated so far, and in cooperation with industry, local governments, and like-minded citizens, UTokyo aims to become a driving force behind a global “green transformation.”

Teruo Fujii

President

The University of Tokyo (UTokyo)

Executive Summary

The University of Tokyo (UTokyo) aims to be a world-class platform for education and research, contributing to human knowledge in partnership with other leading global universities. At the same time, UTokyo aims to nurture global leaders with a strong sense of public responsibility and a pioneering spirit, possessing both deep speciality and broad knowledge. Herein, the UTokyo Climate Action (CA) is created to visualize and embody the roadmap to Net Zero Carbon.

In April 2008, UTokyo launched the "University of Tokyo Sustainable Campus Project" (TSCP), intending to present a model of a future sustainable society from the campus as an educational and research institution. In October 2021, UTokyo joined the international Race to Zero (R2Z) campaign. Setting mid-term targets for 2030 is essential to achieve carbon neutrality by 2050. An important target is aiming for 50% reduction of the university's effective CO₂ emissions in scopes 1 and 2 by 2030 compared to the fiscal 2013 with clarifying the systems and policy measures required to achieve this target.

Accelerating energy-saving measures and introducing energy-creating systems on-site/off-site are crucial to meet these targets. Simultaneously, strategic procurement of green energy will be necessary. The TSCP announced a reduction target for CO₂ emissions related to energy use. The target aims for more than 50% reduction in fiscal 2030 (TSCP2030), compared to fiscal 2006, which had lower emissions than fiscal 2013. Currently, UTokyo is working to improve the efficiency of air conditioning and converting more than 100,000 Hf lights on campus to LED over the next several years.

UTokyo CA includes the Scope 3 GHG emissions inventory results from 2006 to 2021, as well as projected emissions forecasts and proposed mitigation strategies. As of 2021, the total campus emissions were approx. 700,000 metric tons of CO₂ equivalent (MTCO₂e), including approx. 171,000 MTCO₂e of scope 1 and 2 emissions. Total scope 1 and 2 emissions (with no offset considered) are forecasted to be reduced to approx. 100,000 MTCO₂e by 2030. This first UTokyo CA proposes an approach for achieving the 2050 carbon neutrality goal that includes a recommended set of "emissions reduction actions" that will help the university meet its GHG emissions reduction commitment.

In addition to reducing its own environmental footprint, UTokyo has extensive experience with student engagement regarding sustainability and carbon neutrality, and various student initiatives are flourishing on campus, besides ordinary educational and research activities. In July 2021, students formed an umbrella group called "UTokyo Sustainable Network", comprising the major environmental student groups working actively on the campuses. In 2021, the "Fostering Advanced Human Resources to Lead Green Transformation (GX)" project was accepted as a program to support graduate students to pioneer the research in the field of sustainability.

The ambitious targets set up by UTokyo will require the commitment of all students and staff from the university; it will also require solid partnerships with other stakeholders. Periodic reviews of the UTokyo CA will be conducted every year to update targets and actions.

Introduction

The climate emergency urgently requires global and regional action. The Sixth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) highlights the magnitude and severity of the coming challenges. According to the IPCC, global warming currently averages more than 3°C, with some regions warming faster. The IPCC report also found that Climate Change is clearly a human-induced phenomenon, which has already caused severe environmental and social impacts.

The requirement for additional climate actions is evident, and rapid improvement is necessary. The IPCC states that aggressive measures to ensure that global cumulative GHG emissions, which will peak by 2040 will help mitigate climate impacts and avoid social and ecological catastrophes.

At a national/ international level, there is also a requirement to follow the Paris Agreement; a legally binding international treaty on Climate Change that was adopted by 196 parties at the COP21 in Paris on December 12, 2015, and implemented on November 4, 2016. It aims to limit global warming to below 2°C, preferably 1.5°C, compared to pre-industrial times. Countries must reach the global greenhouse gas emissions peak as soon as possible and achieve a climate-neutral world by mid-century.

Following the Paris Agreement, Japan's updated 2030 Paris Agreement target commits to a 46% reduction in emissions from 2013 levels, with "continued challenging efforts" toward a 50% reduction. It represents a significant step forward from the previous reduction target of 26%.

Along with the new NDC (Nationally Determined Contribution), the Japanese government in October 2021 also approved a new "Basic Energy Plan" that took an important step toward the achievement of the new 46% target. This plan includes revised electricity mix targets for 2030, such as those for 36-38% renewable energy (previously 22-24%), 20-22% nuclear (no change), 22% gas (previously 27%), and 19% coal (previously 26%).

As a global megacity, Tokyo declared its goal of becoming a "Zero Emission Tokyo" at the U20 Tokyo Governor's Summit in May 2019. Tokyo aims for zero net

CO₂ emissions by 2050, and intends to limit the increase in global average temperature to 1.5°C.

The Tokyo Metropolitan Government has also formulated the "Zero Emission Tokyo Strategy," which outlines a vision, specific measures, and a roadmap to realize this goal.

It comprehensively develops mitigation measures to halt Climate Change and adaptation measures to prepare for the impacts of Climate Change that have already begun to occur. It also fully integrates sustainable resource management into Climate Change policies to help reduce CO₂ emissions outside Tokyo.

The following section discusses some initiatives toward system revisions that pertain to the Tokyo Metropolitan Environmental Security Ordinance. As a premise, the Tokyo Metropolitan Government recognized that actions to be taken till 2030 will be critical to the achievement of Zero Emission Tokyo by 2050. Based on this recognition, it announced "Carbon Half," a plan to halve greenhouse gas emissions by 2030. The plan includes the development of a cap-and-trade program that mandates large-scale business facilities in Tokyo to reduce their total CO₂ emissions and also allows them to achieve their reduction targets by the procurement of the excess emission reductions of other facilities through emissions trading. Measures for the reinforcement of the current system to enhance energy conservation and expand the use of renewable energy include:

- Setting mandatory reduction targets for the following term (the fourth term of the plan: 2025-2029)
 - The criteria for covered business facilities, baseline emissions, and other factors are expected to be the same as with the third term of the plan (2020-2024).
 - The reduction rate proposed as a preliminary mandatory reduction target for the fourth term is 35%.
- Handling of renewable energy to diversify procurement channels and other moves made by business operators
 - Renewable energy sources installed outside the facility site are to be deemed as power sources that can be deducted from the emission total and included in the reduction amount.
 - Direct purchase of non-fossil fuel (renewable energy)

certificate by business facilities to be recognized as emission reduction.

Given these circumstances, the University of Tokyo (UTokyo) has positioned Green Transformation (GX) as one of the pillars of its action plan in the UTokyo Compass. At the same time UTokyo has responded to the call of the United Nations Framework Convention on Climate Change (UNFCCC) to become the first Japanese national University to join the “Race to Zero for Universities and Colleges” (hereinafter, “Race to Zero”) campaign that has pledged to reduce its greenhouse

gas emissions to virtually zero by 2050. UTokyo plans to accelerate specific initiatives, such as the formulation of a roadmap toward net zero greenhouse gas emissions for UTokyo as a business entity, and collaboration with the local community where the campuses are located. In addition to measures that expand energy efficiency and renewable energy, UTokyo aims to strengthen its efforts in all areas, inclusive of sustainable procurement, sustainable management of materials, waste treatment, reduction of unnecessary business travel, and various environmental measures.



Mission of UTokyo

The University of Tokyo (UTokyo) aims to be a world-class platform for research and education that contributes to human knowledge in partnership with other leading global universities. At the same time, UTokyo aims to nurture global leaders with a strong sense of public responsibility and a pioneering spirit, and those who possess both a deep specialty and extensive knowledge. It aims to expand the boundaries of human knowledge in partnership with society.

UTokyo's Commitment to Climate Change

Climate Change is undoubtedly one of the most pervasive sustainability challenges that we currently face. The IPCC's recent Sixth Assessment Report has clearly articulated that the scale of recent changes in the climate system as a whole has been unprecedented and more rapid than previously predicted. In the past five decades the change in air temperature has been more rapid than at any other such period in the last two thousand years; sea level rise has also increasingly accelerated during the last century, faster than at any point in the last several thousands of years. We do not know how much longer our planet and our societies can withstand the grave consequences of global warming. Thus, urgent action is imperative.

Green Transformation (GX)

The guiding principles of UTokyo in the "UTokyo Compass," which was made public on September 30, 2021, stated that UTokyo has positioned Green Transformation (GX) as one of the pillars of its action plan, which includes leading international GX. In the future, UTokyo will accelerate specific initiatives, such as the formulation of a roadmap, for UTokyo as a business entity to achieve virtually zero greenhouse gas emissions and collaborate with the local communities where its campuses are located.

UTokyo will lead an international green transformation in collaboration with industry, local government, and other

partners, informed by scientific expertise that mobilizes the knowledge generated in UTokyo. Specifically, it will strengthen and steadily implement the Global Commons Stewardship Initiative, an international collaborative project that aims to develop mechanisms for the better management of stable global systems as the shared property of all humankind (global commons). Moreover, it aims to convene the ETI-CGC (Energy Transitions Initiative - Center for Global Commons) as an industry-academia collaborative platform to discuss pathways and policies for Japan to decarbonize (effectively achieve zero greenhouse gas emissions) by the middle of this century, and contribute to the transformation of Japanese society from a scholarly perspective.

It aims to decarbonize the activities of the entire UTokyo organization. Specifically, a roadmap toward the goal of halving the university's effective GHG emissions in scopes 1 and 2 by 2030 as against the 2013 figure will be formulated, and the systems and policy measures required to achieve this goal will be clarified. UTokyo will also collaborate with international society and participate in the international Race to Zero campaign as an institution that promotes action to reach effectively zero greenhouse gas emissions by 2050.

We will work on green transformation initiatives with local governments, residents, companies, and whole communities in the areas home to UTokyo's campuses and facilities, which occupy approximately 0.1% of Japan's total land mass. Specifically, we will collaborate on green transformation with at least seven local government authorities, and provide support to the development of decarbonization action plans. We will also disseminate models of community collaboration toward green transformation to serve as reference points for other universities and communities.

Accomplishments

Activities for Sustainability

■ Alliance for Global Sustainability (AGS)

Numerous research projects related to the sustainability of mankind had been carried out separately across various departments and divisions of UTokyo, a comprehensive university. The Alliance for Global Sustainability (AGS) was built to integrate those individual research projects toward the common goal of sustainability and provide the first mechanism for collaboration among various research fields in the tackling of complex issues. The AGS was created with the aim to accelerate progress toward the goal of the sustainable development of mankind. It was formed as a unique international partnership between four of the world's leading universities—the University of Tokyo (UTokyo, Japan), the Massachusetts Institute of Technology (MIT, U.S.), the Chalmers University of Technology (Sweden), and the Swiss Federal Institute of Technology (ETH Zurich, Switzerland)—to advance research collaboration in pursuit of the sustainability of the anthropogenic sphere. When the AGS was first formed in 1994, it began with the participation of only three universities, namely MIT, ETH Zurich, and UTokyo; Chalmers joined the Alliance in 2001.

Issues related to the sustainability of the anthropogenic sphere—such as global-scale Climate Action, types and effective use of resources and energy, securement of safe food and water, development of efficient means of transportation, environmentally- and resident-friendly urban development—are all important challenges that need to be addressed today. Although universities engage in education and research of wide-ranging fields across technology, science, and economy, it is impossible for a single university, region, or academic discipline to find a solution to these imposing and complex sustainability issues related to the global environment and the whole of human activity. Therefore, the four aforementioned universities decided to form a partnership across the boundaries of academic discipline and geography, to engage in collaborative research. Research conducted under the AGS aims to deepen the scientific understanding of the challenges that face

the anthropogenic sphere and the practical application of the research findings through policy proposals and other means. Another mission of the AGS was to foster next-generation leaders with the knowledge, skills, and passion to pursue sustainable development in various fields. Until 2014, the AGS member schools hosted annual meetings on a rotating basis. The AGS significantly contributed to education activities as well, by the provision of short-term intensive programs for international education on sustainability themes; these included the Youth Environmental Summit (YES; later renamed to Youth Encounter on Sustainability) and Intensive Program on Sustainability (IPoS).

■ Institute for Collaborative Research on Sustainability Studies (IR3S)

The Integrated Research Systems for Sustainability Science (IR3S) was launched by the AGS in 2005 with the support of Special Coordination Funds for Promoting Science and Technology. The IR3S aimed to build a sustainable society by the integration of the systems of the Earth, society, and man. It was established to develop and maintain a super-interdisciplinary and world-class research center for sustainability science and to form a base for an international network that connects both developed and developing countries. By fiscal 2009, the final year of the project period funded by the Special Coordination Funds, the IR3S produced significant outcomes and developed into a world-class research center. It networked with Japanese universities and research institutions with strengths in the sustainability field; these included five participating universities (UTokyo, Kyoto University, Osaka University, Hokkaido University, and Ibaraki University), and seven collaborating institutions (Toyo University, National Institute for Environmental Studies, Tohoku University, Chiba University, Ritsumeikan University, Waseda University, and the United Nations University)

■ Institute for Future Initiatives (IFI)

The Institute for Future Initiatives (IFI) was established in 2019 to organically integrate the IR3S and the Policy Alternatives Research Institute (PARI). The IFI serves as a

hub for the creation and delivery of scientific knowledge to society in a further integrated, rapid, and accurate manner to respond to increasingly complex social issues. It is positioned as one of the core organizations that support the Future Society Initiative (FSI) of the University of Tokyo, a framework to accelerate university-level efforts to promote and achieve the Sustainable Development Goals (SDGs).

■ Division of Environmental Studies Graduate School of Frontier Sciences

The importance of the knowhow of interdisciplinary collaborations, such as those that are accumulated through AGS activities, came to be strongly recognized as essential for the solution of issues related to not only sustainability but also various others. In 1998, under the concept of “transdisciplinarity” which pushes beyond the interdisciplinary approach, the Graduate School of Frontier Sciences was established with the aim to create new science fields through collaboration among diverse disciplines. Its Division of Environmental Studies (formerly the Environmental Studies Department) was established in 1999. The Division’s research and education programs have worked toward the provision of solutions to complex and diversified environmental problems through close collaboration among experts from different disciplines based on the core principle of “transdisciplinarity.” It aims to shift from science that merely pursues truth or principles by the analysis of phenomena and events, to one that establishes a new academic field that encourages the synthesis of various components associated with complex environmental issues; it postulates plausible approaches to conflicting issues. The Division of Environmental Studies engages in research and education activities through its six departments: Natural Environmental Studies; Ocean Technology, Policy, and Environment; Environment Systems; Human and Engineered Environmental Studies; Socio-Cultural Environmental Studies; and International Studies. These departments together integrate multiple disciplines with the aim of treating various environmental issues related to the sustainability of mankind in a holistic and comprehensive manner. Based on this

structure, the Division of Environmental Studies aims at the establishment of environmental studies as a new academic field that will lead to the design and creation of the future environment through a transdisciplinary approach.

Education

The Youth Environmental Summit (YES; later renamed to Youth Encounter on Sustainability) is a program launched as an experiment in 2000 under the AGS. It was a groundbreaking educational program where students of diverse backgrounds and nationalities gathered from across the world in an isolated mountain cottage in Switzerland to experience and discuss various aspects of sustainability. The Intensive Program on Sustainability (IPoS) began as the Asian version of YES in 2004 through a collaboration between UTokyo and the Asian Institute of Technology in Thailand. The IPoS was alternately hosted in Japan and Thailand annually until 2014. These short-term intensive programs served to not only provide students with knowledge on sustainability but also significantly contribute to the establishment of a pedagogical approach (on-site training and group exercises in particular) to help students understand the inherent complexity of sustainability issues, such as Climate Action, global food problems, urban problems, and poverty, and to enable them to realize the importance of diversity as a basic principle behind a sustainable society.

Based on the experience gained through YES and IPoS, the Master’s Program in Sustainability Science (MPSS) and the Graduate Program in Sustainability Science (GPSS) were established as new graduate school programs within the Division of Environmental Studies Graduate School of Frontier Sciences in 2007 and 2009, respectively. Subsequently, the Graduate Program in Sustainability Science Global Leadership Initiative (GPSS-GLI) was created after being selected for the JSPS Program for Leading Graduate Schools in 2012. These all-English graduate school programs attract students with diverse nationalities, cultures, and skill sets from around the world. They were designed to

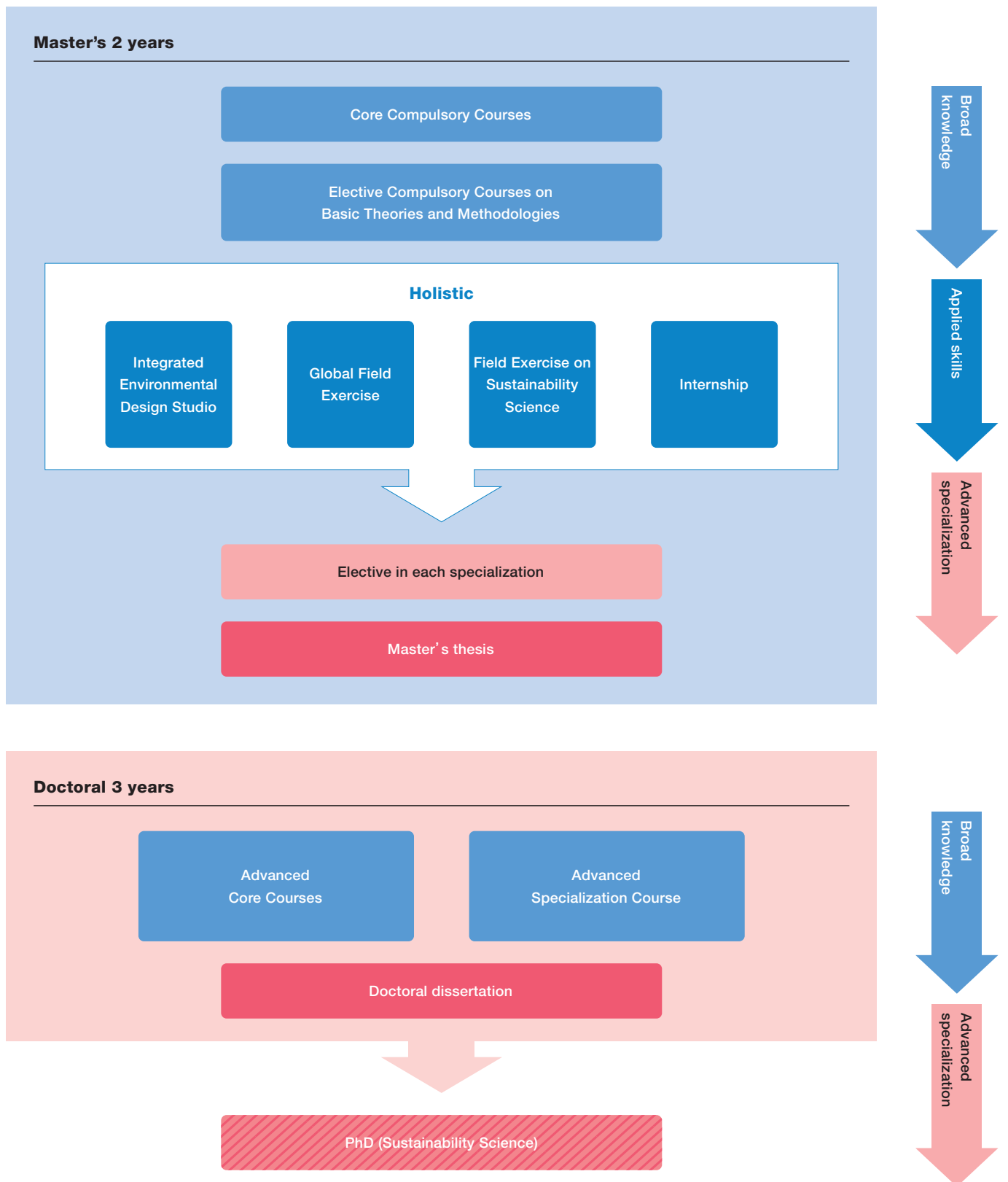


Figure 1 Image of the GPSS-GLI curriculum

provide education centered around practical exercises where students from diverse backgrounds collaborate on specific sustainability issues and experience the entire process from the identification of the key problems, to the understanding of the complex structure and different perspectives of various stakeholders, and the proposal of solutions. Uniquely positioned as a graduate school program that confers a doctor's degree in Sustainability Science, the GPSS-GLI may be considered the culmination of this form of an educational program (Figure 1).

The "Fostering Advanced Human Resources to Lead Green Transformation" project proposed by Professor Shin-ichi Ohkoshi (Project officer) has been accepted as a program for the Support for Pioneering Research Initiated by Next Generation (SPRING) of the Japan Science and Technology Agency (JST) from autumn, 2021. This project is referred to as "SPRING GX" from here on. Six hundred doctoral students from all schools of UTokyo participated in this project. The SPRING GX aims to produce globally competent researchers who will contribute to the large-scale realization of a GX across all fields. UTokyo will invest all existing assets to:

- Create an environment where students with expertise and high-level research ability can freely conduct challenging and emergent research to feed their curiosity.
- Foster an 'awakened culture where GX encompasses the future vision of society and each student's research is related to societal issues.
- Develop transferable skills to demonstrate professional abilities in society fully.

UTokyo has developed three core programs and advanced skill training programs. The project manager will select students with the assistance of the steering committee based on the students' will to position their research in GX, their expertise, and the potential of the doctoral study. To ensure transparency is maintained, experts from national research institutes and the industrial sector will be engaged in the student selection process. The overall structure of the program is illustrated below (Figure 2):

Future Society Initiative

UTokyo established the UTokyo Future Society Initiative (FSI) in July 2017, under the direct leadership of the university president. Its aim is to promote effective collaboration and to contribute to the future of humanity and the planet, based on UTokyo's mission of service to the global public as outlined in UTokyo Charter. Under the Headquarters for Collaborative Creation of Future Society, there are subcommittees for Vision Formation, Knowledge Creation, GX Promotion, International Collaboration, Social Collaboration, International Excellence Education, and Industry-University Collaborative Creation. Planning, communication, and coordination of strategies, and so on.

GX Promotion Subcommittee

In April 2022, UTokyo established the GX Promotion Subcommittee under the Future Society Co-Creation Promotion Headquarters. The GX Promotion Subcommittee will coordinate activities related to GX and create the UTokyo "Race to Zero" roadmap. Additionally, the following task forces and initiatives will divide the duties of the subcommittee and contribute to its smooth execution.

- 1 Global Commons Task Force
 - Leading international GX
 - Promotion of industry-academia collaborative creation related to GX
- 2 Campus GX Task Force
 - Promotion of decarbonization of the university
 - Promotion of TSCP activities
- 3 GX Communication Task Force
 - Visualization and dissemination of university-wide and departmental GX-related activities
- 4 Student GX Initiative
 - Revitalization of students' voluntary activities related to GX
 - Promotion of inter-university collaboration activities by students for GX

In addition to the GX Promotion Subcommittee, other subcommittees are also considering overseas bases related to GX, international collaboration and domestic and regional collaboration activities that contribute to GX,

along with the establishment of GX-related educational programs.

CGC

The Center for Global Commons was established in August 2020 to realize then-President Makoto Gonokami’s vision that “universities should play a leading role in driving social change through collaborative creation with leaders in a wide range of fields that transcend the boundaries of academia in order to seek fundamental solutions to the challenges facing humanity.” Nahoko Ishii, who had served as CEO and Chair of the Global Environment Facility (GEF) for eight years immediately prior to its establishment, was appointed as the first Director; the mission of the Center was to “build a new framework for stewarding the Global Commons for a sustainable future.”

<https://cgc.ifi.u-tokyo.ac.jp/en/>

ETI-CGC

On September 30, 2021, UTokyo positioned GX as one of the pillars of its action plan. It also launched the Energy

Transition Initiative-Center for Global Commons (ETI-CGC), a platform for industry-academia collaboration to consider paths and policies Japan should take to achieve net-zero emissions by 2050.

https://www.u-tokyo.ac.jp/focus/en/articles/z1304_00015.html
<https://cgc.ifi.u-tokyo.ac.jp/en/research-en/eti-cgc-en/>

GCS Initiative

The Global Commons Stewardship (GCS) Initiative aims to present and promote the implementation of pathways and tools for socioeconomic system transformation, with the goal of building a sustainable human society within the framework of Planetary Boundaries.

Specifically, it consists of four workstreams: "Indexing" (development of comprehensive indicators) to measure the extent and increase/decrease of environmental impacts of each country on the global commons (international, supranational, and global resource to which all countries have access). "Modeling" (analysis of social and economic scenarios) and "Promotion and monitoring of socio-economic system transformation" to show the pathways of system transformation required

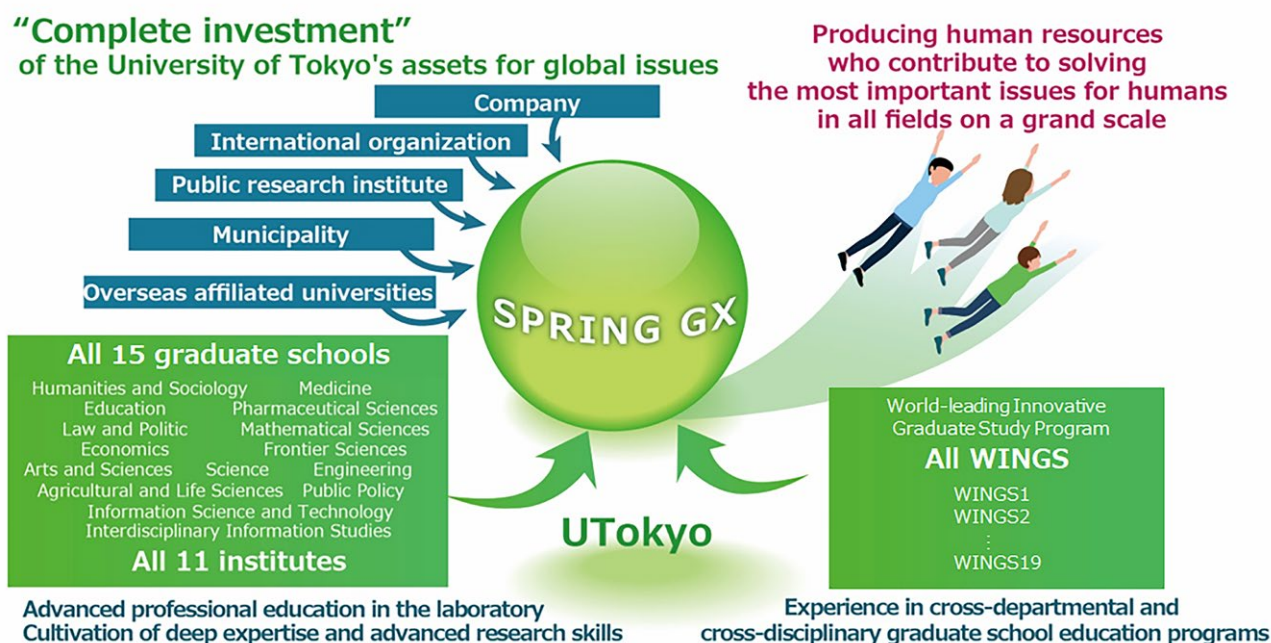


Figure 2 Spring GX image

for human society by the middle of this century. Finally, “Framing,” which integrates these four workstreams to envision a viable strategic framework for the management of the global commons.

In addition, a workstream on data ("cyberspace") one of the foundations supporting the GCS initiative, is established.

In each of the workstreams of the GCS Initiative, CGC is working closely with international partners.

<https://cgc.ifi.u-tokyo.ac.jp/en/research-en/gcsi-en/>

Green Procurement

As a public research university, UTokyo has been following Japan's green purchasing law the 2000 “Act on Promotion of Procurement of Eco-friendly Goods and Services by the State and Other Entities.” The Japanese government issued basic guidelines and a list of 101 designated procurement goods and their standards in 14

product categories as early as January 2001. The list was increased to 270 items in 21 categories in 2016 (paper, office equipment, appliances, vehicles, etc.)

The Implementation of the Green Purchasing Legislation in Japan resulted in an increase in the market share of environmentally-friendly products. The estimated national CO₂ emission reduction was about 210,000 tons of CO₂ equivalents in 2013. UTokyo will ensure that not only the university’s administration follows that law in the future, but also that all the laboratories on the different campuses follow these standards.

<https://www.env.go.jp/content/000051059.pdf>

Facilities Department TSCP Team

In April 2008, UTokyo launched the "University of Tokyo Sustainable Campus Project" (TSCP), which intended to present a model of a future sustainable society from the campus. The TSCP, an entire organization under the

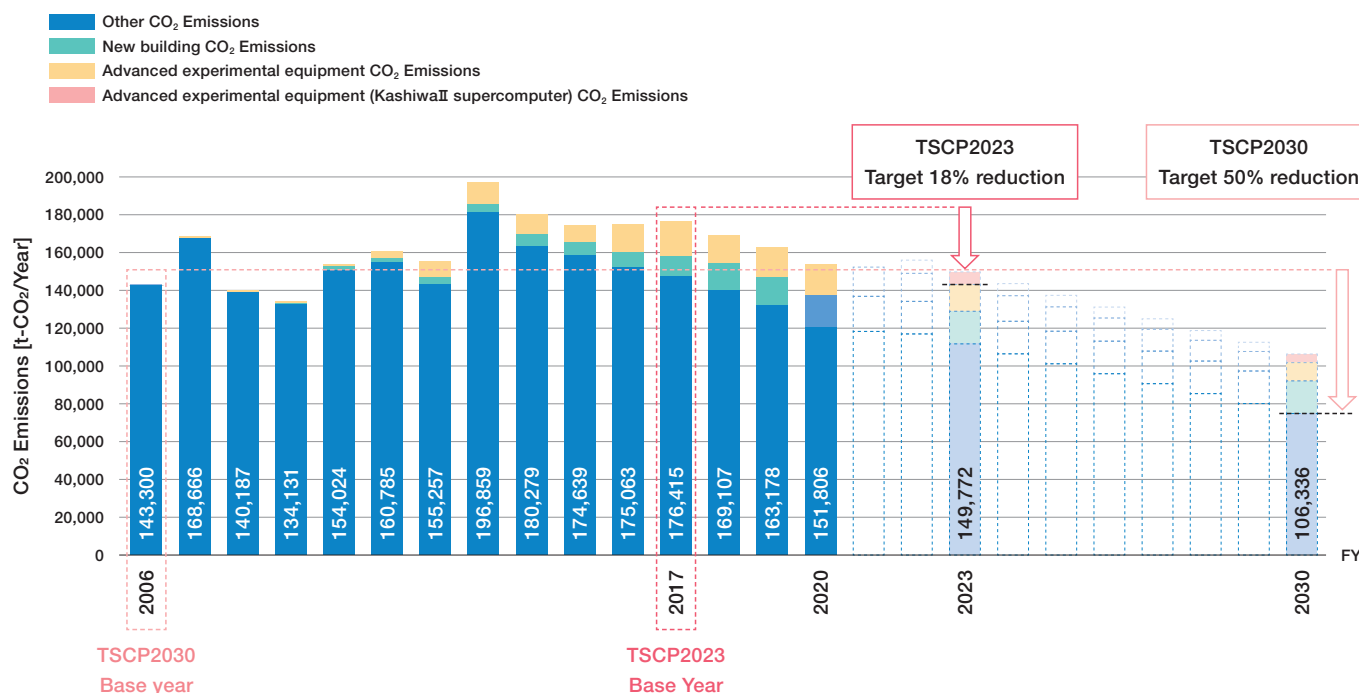


Figure 3 Trends in CO₂ emissions related to energy use in UTokyo and future targets¹

¹ Due to the requirements of the Tokyo Metropolitan Environmental Security Ordinance, these CO₂ emissions values use different electricity emissions factors from those used in the GHG inventory results section.

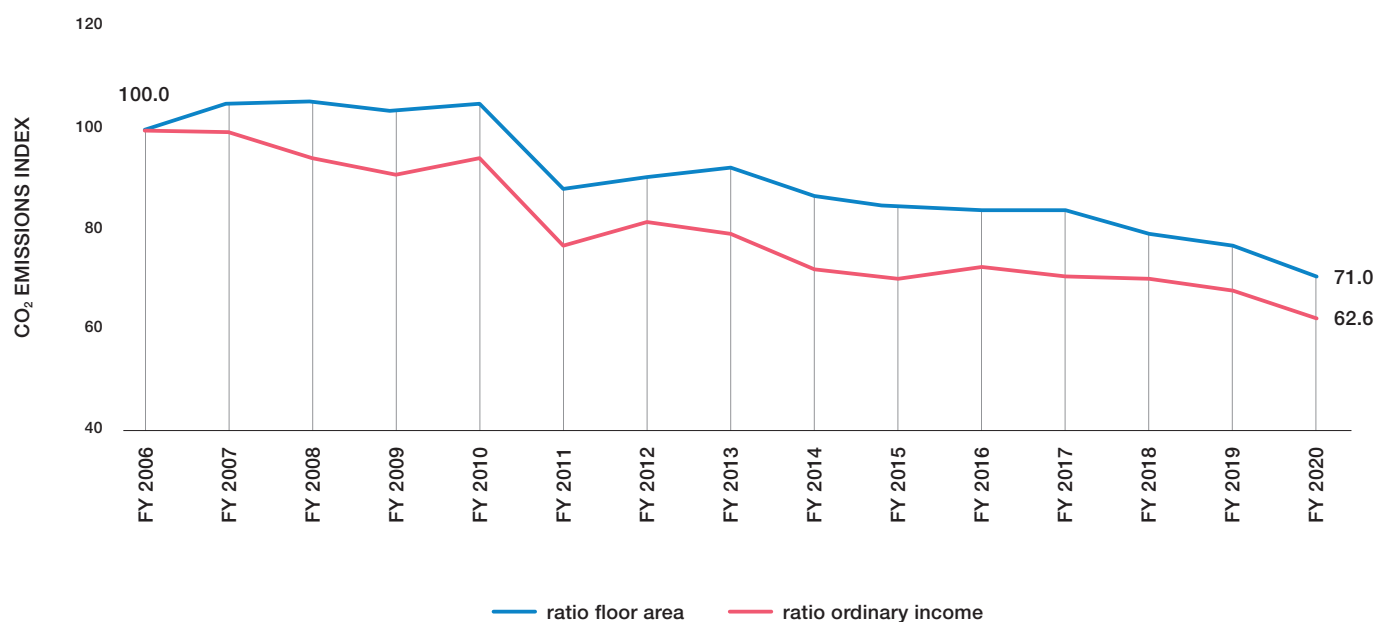


Figure 4 Changes in the CO₂ emissions index related to energy use in UTokyo (excluding cutting-edge experimental facilities)

president's direct control, was launched. Since 2018, UTokyo has continued activities as the TSCP under the Facility Planning Section, Facilities Department. The actions of TSCP are related to "7. Energy" of the 17 SDGs to change the world and focus on the reduction of CO₂ emissions related to the use of electrical energy, gas energy, and heavy oil energy necessary for university activities.

During its launch, the TSCP announced a reduction target for CO₂ emissions related to energy use. It used fiscal 2006 as the base year and aimed for a 50% reduction by fiscal 2030 (TSCP2030) (Figure 3). The short-term goal TSCP2012 and medium-term goal TSCP2017 were both achieved with the cooperation of each department. At present, the TSCP aims to consider the achievement of the Paris Agreement as the next medium-term goal and is working toward the reduction of emissions by 18% from the FY2017 levels by the end of FY2023 (TSCP2023).

Figure 4 summarizes the changes in CO₂ emissions related to energy use as an index based on fiscal

2006, excluding cutting-edge experimental equipment. Considering FY2006 as the standard of 100, the basic unit (floor area) in FY2020 is 71.0 (-29.0%) and the basic unit (ordinary income) is 62.6 (-37.4%). Although the COVID-19 pandemic has led to activity restrictions, the TSCP has been able to suppress the increase in CO₂ emissions compared to the increase in activity. This reduction is largely due to the efforts made by TSCP and the understanding and cooperation of university members.

To upgrade energy-saving equipment, UTokyo has focused on the implement of the efficiency of large-scale air conditioning equipment and individually distributed air conditioners (Figure 5).

The TSCP has prioritized energy-saving measures to increase energy use efficiency at the university. Currently, UTokyo is working on converting more than 100,000 Hf lights on campus to LEDs over the next several years. Additionally, as an energy conservation enlightenment activity, UTokyo has been involved in the visualization of

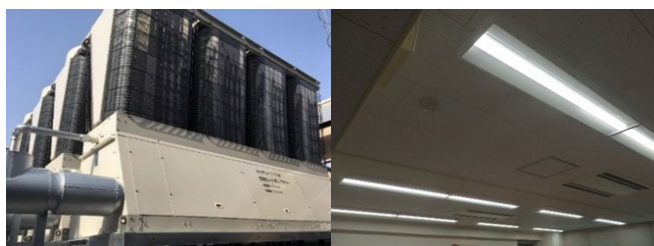


Figure 5 Energy-saving equipment renewal measures Left: After renewal of large air conditioning heat source equipment, Right: After conversion to LEDs lighting for Hf

power consumption, distribution of energy conservation enlightenment stickers, and formulation of energy conservation guidelines for experimental facilities. the TSCP aims to work on the acceleration of energy-saving measures and the introduction of energy-creating equipment by 2030.

UTokyo has just under 40,000 members; the size of a city. If it can reduce GHG emissions and achieve a low-carbon university, it will contribute to many SDGs and be instrumental to the realization of a low-carbon society. One of the primary missions of our university is education and research activities. The TSCP is aware of the challenges to reducing CO₂ emissions while ensuring the maximum number of such activities but promote the project with the belief that it is its mission to take on this challenge.

Overview of the TSCP Student Committee

With the cooperation of the TSCP team that is conducting the "University of Tokyo Sustainable Campus Project (TSCP)", the TSCP Student Committee (UTokyo Sustainability) is working to realize a sustainable campus that makes a low environmental impact from the standpoint of students. Despite being restricted to online activities due to the COVID-19 crisis, the TSCP student committee has engaged in the following activities through monthly meetings (Figure 6);

- Promotion of energy conservation on campus
- Increase students' awareness of sustainability
- Student exchange activities and information dissemination on the theme of the environment

Promotion of energy conservation on campus

One of the representative projects of the TSCP Student Committee is the "SHUT the SASH" campaign. This campaign closes the sash (front door) of a draft chamber. This device maintains a safe indoor environment by sufficient local ventilation of harmful substances generated in chemical experiments when not used. This activity prevents excessive ventilation of the air in the entire room and reduces the energy consumption of air conditioning. There are many chemical laboratories at UTokyo, and many draft chambers are in use. Since 2018, the TSCP Student Committee has been distributing



Figure 6 Online Meetings



Figure 7 The six posters that convey the results of the "University of Tokyo Student SDGs awareness survey 2020"

posters and stickers to promote the campaign.

Discussions raised concerns that shutting the sash would not reduce energy as expected. Therefore, the TSCP Student Committee conducted a hearing with the research equipment manufacturers that supplied draft chambers to UTokyo and sorted out the standards and performance of these chambers.

Additionally, the TSCP Student Committee began a new project, "The University of Tokyo Building Sustainability Evaluation Project."

Raising students' awareness of sustainability

The TSCP Student Committee has been conducted the "University of Tokyo Student SDGs Awareness Survey" since 2017 to investigate the degree of SDG awareness and everyday environmental behavior among UTokyo students. The results of the third survey conducted in 2020 were publicized on campus (Figure 7) though six types of posters, with an emphasis on visual design to attract the attention of more students. The fourth survey will be conducted in 2022; it will review past question items and generate ideas for new ones.

Student exchange activities and information dissemination on the theme of the environment

Despite the restrictions of the online medium, the



Figure 8 "EcoPro 2021" exhibition booth

TSCP Student Committee actively interacted with other environmental student groups. Some activities from 2021 are listed below:

- Participation in the Student Summit, which gathers environmental student groups worldwide
- Participation in an opinion exchange meeting of environmental student groups in Japan
- Leading a workshop for university students in Japan and China on the decarbonization of campuses
- Dissemination of information inside and outside the university, such as exhibiting at "EcoPro 2021", Japan's most prominent environmental exhibition (Figure 8)

Environmental Report

<https://www.u-tokyo.ac.jp/ja/about/actions/public05.html>

Electricity Visualization

UTokyo uses CIMX to visualize its electricity use throughout the campuses

- <https://ep-monitor.adm.u-tokyo.ac.jp/campus/monitor/>
- https://www.cimx.co.jp/01_dox/2011_10_06_CEATEC/CEATEC.pdf

2

GHG Inventory

Standards

The University of Tokyo (UTokyo) GHG inventory is compiled and in alignment (where applicable) with the GHG Protocol². UTokyo will adopt the operational control approach to assess its GHG emissions.

Emission sources

The GHG protocol classifies GHG emissions according to 3 Scopes.

■ Scope 1:

This scope represents on-site GHG emissions from fuel usage in the operation of UTokyo's various locations and vehicles. In UTokyo's case, this is primarily the result of the consumption of town gas and heavy fuel oil.

■ Scope 2:

This scope represents on-site electricity consumption and is calculated using the emissions factors of Tokyo Electric Power Company (TEPCO).

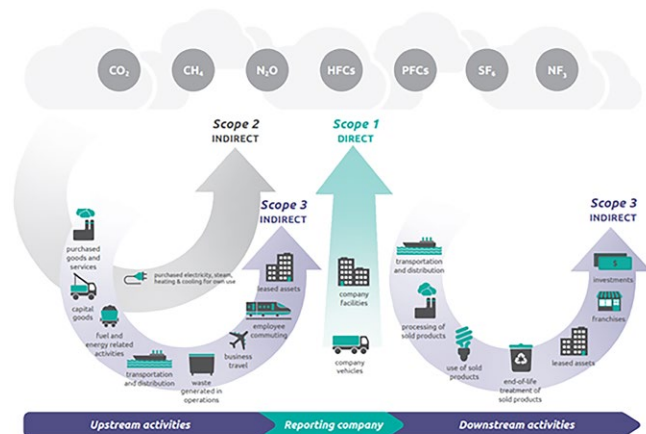


Figure 9 Overview of GHG Protocol scopes and emissions across the value chain³

■ Scope 3:

This scope represents emissions that are induced by UTokyo's activities and occur either upstream or downstream. Emission sources are typically not owned or controlled by UTokyo and occur in the supply chain of purchased goods and services, acquisition of infrastructure, business travel, staff and student commuting, waste treatment and other fuel- and energy-related activities and emissions that are not included in scope 1 or scope 2, such as, mining, refining and transport of energy, and so on.

The following graphical image (Figure 9) is sourced from the GHG protocol website to demonstrate how the GHG protocol defines different scopes and categories.

Global Warming Potential

IPCC 2013 GWP 100A coefficients were used to record the global warming potential, as demonstrated in the Table 1:

Greenhouse Gas	Chemical Formula	100-Year GWP
Carbon dioxide	CO ₂	1
Methane (fossil)	CH ₄	30
Methane (biogenic)	CH ₄	28
Nitrous oxide	N ₂ O	265
Hydrofluorocarbons (HFCs)	Various	Various
Perfluorocarbons(PFCs)	Various	Various
Sulfur hexafluoride	SF ₆	23500

Table 1 IPCC 2013 GWP 100-years of major substances relative to CO₂⁴

2 WRI WBCSD, Greenhouse Gas Protocol A Corporate Accounting and Reporting Standard REVISED EDITION

<https://ghgprotocol.org/sites/default/files/standards/ghg-protocol-revised.pdf>

3 WRI WBCSD, Greenhouse Gas Protocol Corporate Accounting and Reporting Standard Supplement to the GHG Protocol Corporate Accounting and Reporting Standard

https://ghgprotocol.org/sites/default/files/standards/Corporate-Value-Chain-Accounting-Reporting-Standard_041613_2.pdf

4 IPCC, Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change

<https://www.ipcc.ch/report/ar5/wg1/>

Scope and Boundary

Reporting Period, Boundary and Scope

As of September 2022, the University of Tokyo (UTokyo) has 51 domestic locations⁵, and 30 overseas locations. There are five main campuses in Japan: Hongo, Komaba 1, Komaba 2, Shirokane, Kashiwa, with Hongo being the largest campus that also includes a university hospital. Due to the lack of data availability the GHG emissions scopes related to UTokyo's activities are reported as indicated in Table 2:

Financial information used to assess the GHG inventory for scope 3 emissions covers all funds that are managed by UTokyo's budget.

Other Boundaries and Exclusions

The current GHG inventory does not include the following items due to lack of raw data; however, the GX promotion subcommittee will work with relevant stakeholders to increase coverage and accuracy in future assessments.

- Refrigerant leakage from air conditioning
- Chemical substances used in experiments that are directly released to the atmosphere
- Student commuting
- Emissions related to all downstream activities including investments made by UTokyo

FY/ Locations	5 Main Campuses	Other domestic locations	Overseas locations
2006	Scope 1,2,3	-	Scope 3 (*a)
2007	Scope 1,2,3	-	Scope 3 (*a)
2008	Scope 1,2,3	-	Scope 3 (*a)
2009	Scope 1,2,3	Scope 1,2,3	Scope 3 (*a)
2010	Scope 1,2,3	Scope 1,2,3	Scope 3 (*a)
2011	Scope 1,2,3	Scope 1,2,3	Scope 3 (*a)
2012	Scope 1,2,3	Scope 1,2,3	Scope 3 (*a)
2013	Scope 1,2,3	Scope 1,2,3	Scope 3 (*a)
2014	Scope 1,2,3	Scope 1,2,3	Scope 3 (*a)
2015	Scope 1,2,3	Scope 1,2,3	Scope 3 (*a)
2016	Scope 1,2,3	Scope 1,2,3	Scope 3 (*a)
2017	Scope 1,2,3	Scope 1,2,3	Scope 3 (*a)
2018	Scope 1,2,3	Scope 1,2,3	Scope 3 (*a)
2019	Scope 1,2,3	Scope 1,2,3	Scope 3 (*a)
2020	Scope 1,2,3	Scope 1,2,3	Scope 3 (*a)
2021	Scope 1,2,3	Scope 1,2,3	Scope 3 (*a)

Table 2 Fiscal Years and Scopes that are covered

(*a) It is estimated that scope 1,2 emissions are included in scope 3 emissions.

⁵ Domestic and overseas locations of UTokyo (website in Japanese):

https://www.u-tokyo.ac.jp/ja/about/campus_guide/national.html

https://www.u-tokyo.ac.jp/ja/intl_activities/o_verseas_offices/list_of_overseas_offices.html

Calculation Methodology

Calculation Flow

GHG emissions were estimated by the multiplication of activity amount data with an emissions factors associated with the activity that is being measured. Figure 10 below roughly outlines the flow of the different steps of the calculation of the greenhouse gas emissions.

Emissions factors

- Scope 1 emissions factors are acquired from the “Greenhouse Gas Emissions Calculation, Reporting, and Disclosure System”⁶.
- Scope 2 emissions factors are acquired from TEPCO⁷ applying the yearly basic emissions factors.
- Scope 3 emissions factors are mostly acquired

from the Japanese LCA database IDEA v2.3.⁸ and supplemented with emissions factors from the Green Value Chain Platform⁹.

- 6 Ministry of the Environment (MOE), List of Emissions factors
<https://ghg-santeikohyo.env.go.jp/calc>
- 7 Tokyo Electric Power Company (TEPCO)
 Transition of CO₂ emis sions factors
<https://www.tepco.co.jp/ep/company/warming/>
- 8 AIST, SuMPO LCI database IDEA version 2.3 (27 December 2019)
<https://idea-lca.com/>
- 9 Ministry of the Environment (MOE) MOE), Ministry of Economy, Trade and Industry (Green Value Chain Platform, Emissions intensity database v3.1
https://www.env.go.jp/earth/ondanka/supply_chain/gvc/estimate_tool.html#no07 Green
 Value Chain Platform, Emissions intensity database v3.1
https://w ww.env.go.jp/earth/ondanka/supply_chain/gvc/estimate_tool.html#no07

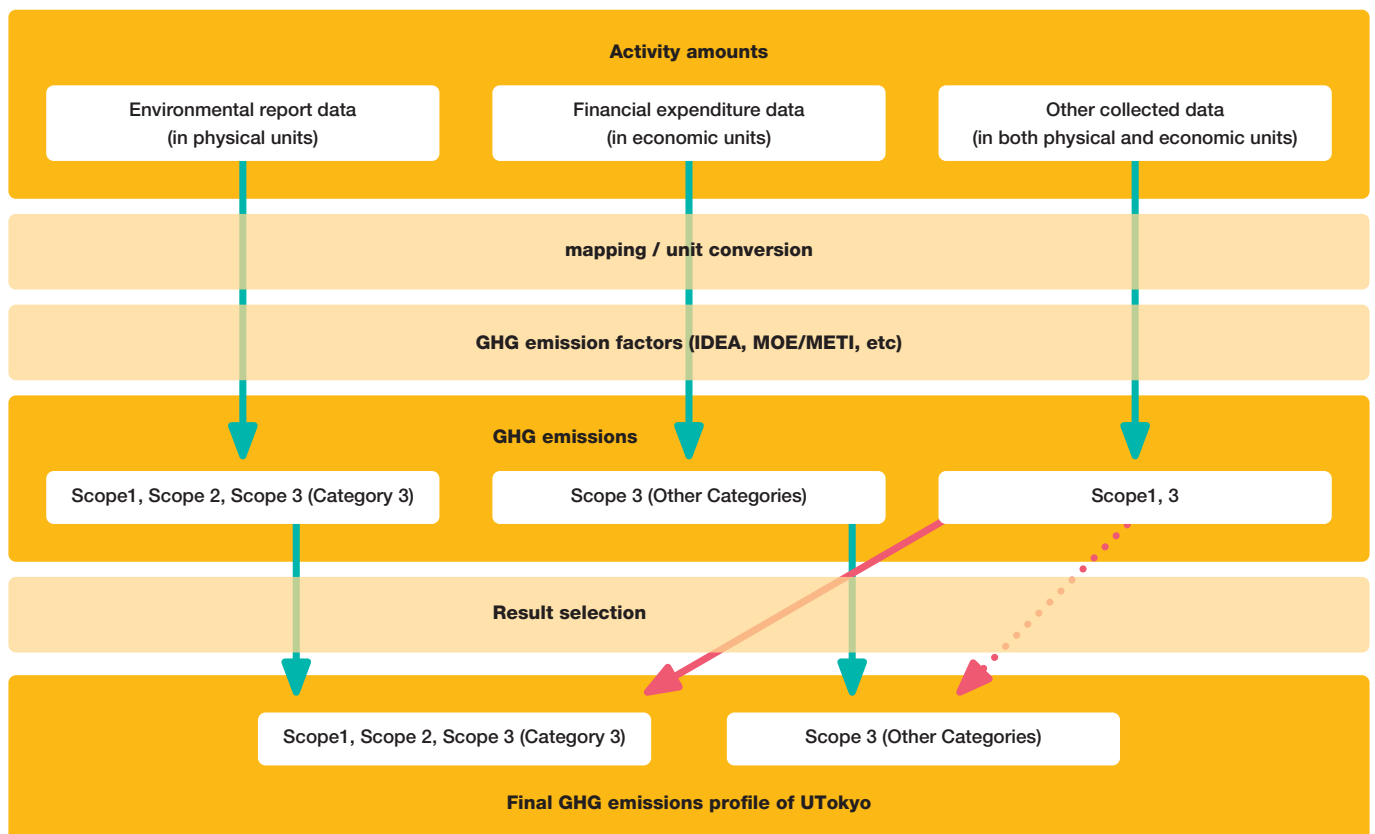


Figure 10 GHG emissions calculation flow

Results

Calculated Scope 1,2,3 GHG emissions for the stated reporting period is illustrated in Figure 11:

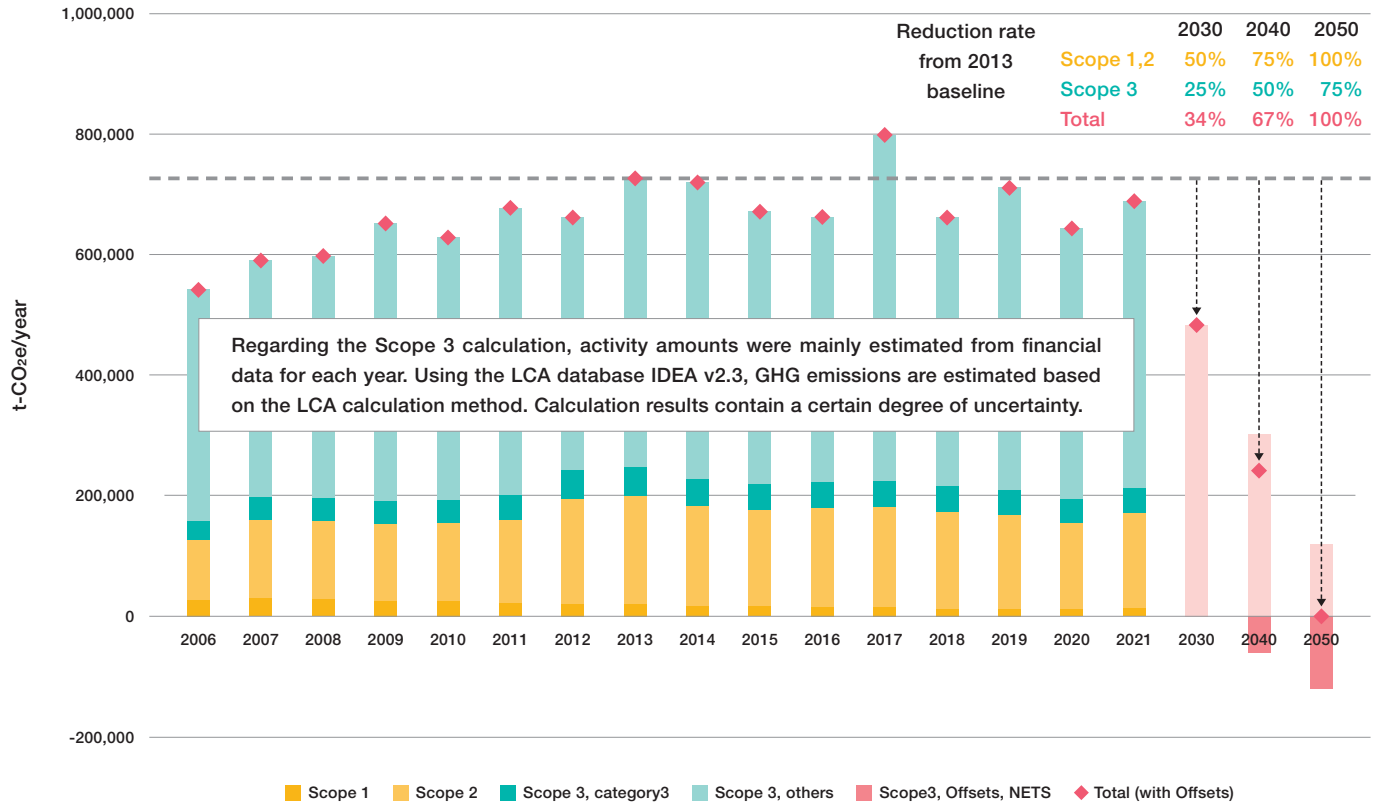


Figure 11 UTokyo Scope1,2,3 GHG calculation results with projections to the future

Limitations

- Due to data collection limitations, the following data gaps exist in the Scope 1 GHG emissions data at present. This information will be collected soon to improve the completeness of the Scope 1 emissions.
 - ▶ Fuel usage from vehicles owned by the University of Tokyo (UTokyo) is only available for vehicles registered in the Tokyo metropolitan area. Therefore, fuel usage from vehicles registered in other prefectures are not included.
 - ▶ The impact of the leakage of chemicals (CFCs, methylene chloride, chloroform, etc.) into the atmosphere is not included.
 - ▶ Fuel usage data for overseas sites are not included.
- With regard to Scope 2, GHG emissions calculations have been done using the emissions factors of TEPCO for the relevant year as the carbon intensity of electricity. The reason for using these emissions factors is the consistency and continuity of these emissions factors. Although UTokyo's five major campuses are located within TEPCO's jurisdiction, calculations for outer sites are also currently done using TEPCO's emissions factors. Future Scope 2 GHG emissions calculations will be considered further so that regional grid and menu-specific emissions factors are used for each site and term. Additionally, if valid emissions factors become available, in terms of both continuity and validity, location-based and market-based reporting will be considered.
- Scope 3 Category 3 was calculated from the ratio of direct (fossil fuel combustion) and indirect (fuel procurement and transmission loss) GHG emissions derived from electricity and fuel datasets in IDEA v2.3. There is a certain degree of uncertainty with regard to electricity, because the direct/indirect ratio was calculated for the power mix of TEPCO in 2015 and applied to the years up to 2021 due to data limitation.
- The calculation of each Scope 3 item has been mainly conducted using the monetary method. In other words, financial data is classified and aggregated by account title, and calculations have been done by the selection of the GHG emissions factor that is considered most applicable to the relevant account title. However, in some cases, the granularity of these account titles is much coarser than that of the IDEA emissions factors, and there are many candidate GHG emissions factors that can be selected. Thus, uncertainty exists in the calculated GHG emissions. Future improvement measures could include the refinement of the calculation of accounts with larger expenditure amounts through breakdown subdivision where possible, and the assignment of more appropriate GHG emissions factors.
- Currently, secondary data such as LCA databases were used to calculate the GHG emissions of purchased goods and services, which are only a proxy of the actual emissions that occur in the UTokyo supply chain. In the future, UTokyo plans to identify the emissions in physical quantities as far as possible in consultation with supply chain stakeholders, and replace them with GHG emissions data reported by the suppliers' primary data.

Verification

The University of Tokyo (UTokyo) does not currently pursue external third-party verification of its GHG emissions profile; it will rather undergo internal verification by a panel of LCA experts in UTokyo. The objective of this verification is not only to increase the coverage, accuracy, and consistency of the assessment, but to ensure that necessary insights and tracking information can be obtained to assist each climate action and UTokyo CA targets.



Climate Action

Purpose



The UTokyo Climate Action (CA) was created to visualize and embody the roadmap to Net Zero Carbon. It is an operational planning document that embodies UTokyo's vision and will be revised over time.

The purpose of the UTokyo CA is to:

- Anticipate and respond to future national and international regulations related to Climate Change
- Make UTokyo become the most carbon-efficient university campus in Japan
- Promote GHG emissions reductions in other universities and surrounding municipalities
- Implement a circular economy model in UTokyo context
- Further improve the quality of education and research by taking action on Climate Change
- Keep providing, research results that contribute globally to the realization of a lowcarbon society

The implementation of the UTokyo CA not only aims to achieve the GHG emissions reduction targets but also considers the reduction of the medium to long-term operational costs associated with Climate Change mitigation, so that the pathway towards meeting the goals set up by the Paris Agreement can be a financially sustainable one.

The scope of the UTokyo CA includes emission reductions through renewable energy supply, efficiency improvement, green procurement, and some other Scope 3 category (e.g., business travel, waste, etc.) reduction actions. It includes buildings and assets, which the university has operational control over. Some climate actions are already underway, while others require further data collection and analysis, and discussions with various stakeholders.

Approach/Principles

Major premise

The UTokyo Climate Action must be developed in a manner so as not to compromise the effectiveness of the university's research and education activities as a research-driven comprehensive university. Therefore, we will not deter such activities by limiting the use of facilities and equipment; at the same time, we will spare no effort to eliminate waste. The comfort and usefulness of the environment will not be compromised, but improved.

As a general rule, approaches to reduce GHG emissions will be considered in the priority order of Avoid, Reduce, Substitute, Switch to on-site renewable sources, Switch to off-site renewable sources, Sequester, and Offset. A mechanism will be developed to consult the faculty, staff, and students of UTokyo no matter what measure is considered and implemented, to enable their active participation in the decision process. Climate actions will be considered and implemented through the use of existing discussion bodies and other means.

Scopes 1 and 2 emissions

Multiple targets have been set with regard to the reduction of Scope 1 and 2 emissions, including the reduction targets set in TSCP, Race to Zero, and those specified in the Tokyo Metropolitan Environmental Security Ordinance. UTokyo must work to achieve each of these reduction targets, in consideration of the commonalities and differences between them in terms of target figures, target year, and rules to comply with the reduction of emissions. It is important that each member of the university recognizes that the ultimate goal of these reduction targets is to realize a sustainable and carbon-neutral campus, and in doing so, to contribute to a sustainable and carbon-neutral society.

To achieve the abovementioned CO₂ emission reduction targets, we will formulate and implement a reduction scenario by back-casting from the target year. A long-term scenario will also be developed to achieve carbon neutrality by 2050. The PDCA cycle will be regularly implemented to update the scenario according to societal changes and progress status.

The following are some of our targets for the reduction of Scopes 1 and 2 CO₂ emissions.

- ① TSCP2023: Achieve an 18% reduction of CO₂ emissions by 2023 compared to fiscal 2017.
TSCP2030: Achieve a 50% reduction of CO₂ emissions by 2030, using 2006 as the base year (Figure 12).
- ② Race to Zero: Achieve a 50% reduction by 2030 against a 2013 baseline as the mid-term goal, and carbon neutrality by 2050 as the long-term goal.
- ③ Tokyo Metropolitan Environmental Security Ordinance: Achieve a 35% reduction in the fourth term (FY2025–2029) compared to the emission level of the baseline years (average of the three consecutive years up to 2010) tentatively.

The reduction scenario will be comprised of the Owner's Project Requirements (OPR), various measures to be introduced, how the measures will be implemented, schedule of implementation, estimated effect, and budgetary measures for each of the buildings on campus. The commissioning process will be introduced in the formulation, execution, and updating of the scenario to ensure the appropriate implementation of the measures and their effectiveness. In other words, we will establish and execute the process, such as planning and placing the order and ensuring that the facility will function as per the owner's project requirements. It is desirable to have a dedicated specialist team execute this work.

Various measures will be devised on both the demand and supply sides. Measures to address the demand side include energy-saving measures introduced in buildings on campus, use of renewable energy (Photovoltaics, etc.), and energy storage measures (batteries, thermal storage tanks, etc.); while measures applied on the supply side include the self-consignment scheme, green power generation (Photovoltaics, wind power, etc.), and the credit scheme. The next section is an outline of the of the specific measures.

Outline of Measures

Energy used in building operations must be saved. Not only must architectural planning be well devised in terms

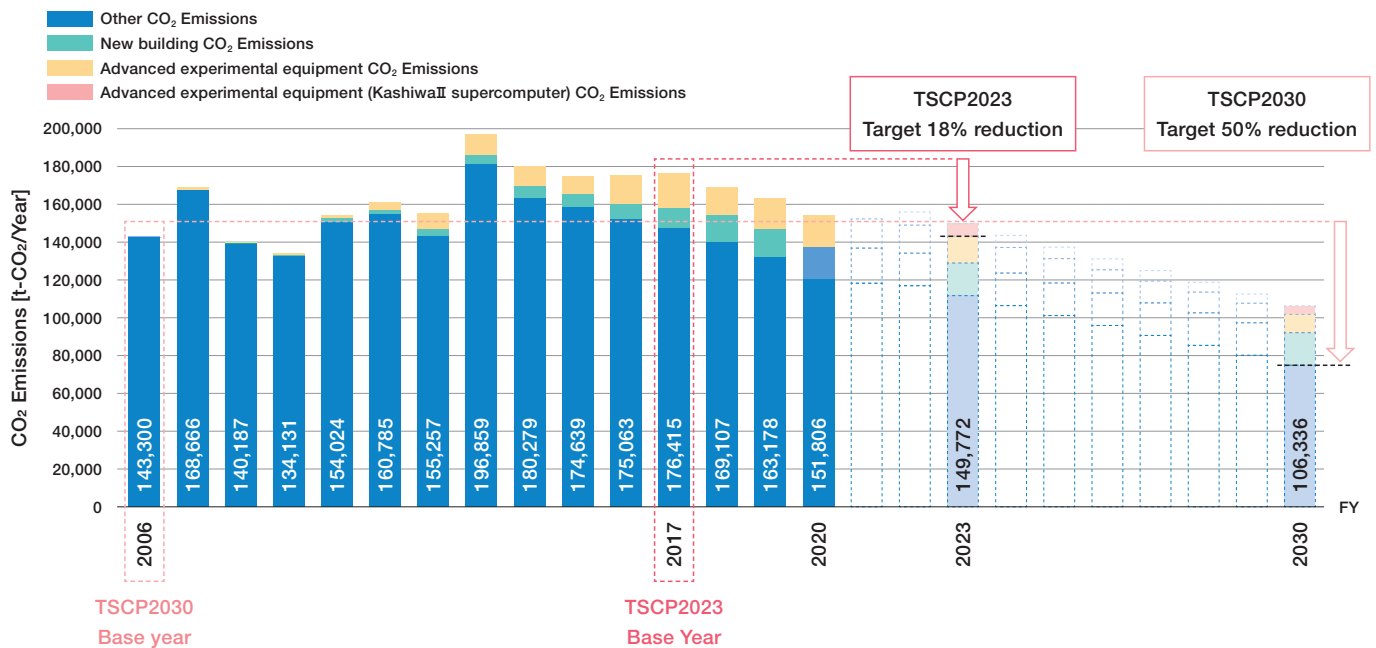


Figure 12 Trends in Scope 1,2 emissions and reduction targets at UTokyo

10 Due to the requirements of the Tokyo Metropolitan Environmental Security Ordinance, these CO₂ emissions values use different electricity emissions factors from those used in the GHG inventory results section

of thermal insulation, airtightness, and ventilation, but sophisticated building equipment is also necessary to enable efficient operation throughout the year. The planning and design of the construction of new buildings or the refurbishment of existing ones will be aimed at meeting the requirements for Net Zero Energy Building (ZEB) Oriented status or higher. Such measures as introducing photovoltaic power generation, on-site energy storage (batteries), and Business Continuity Plan (BCP) will be considered. Not only non-experimental facilities but also experimental equipment and systems will be reconsidered with a view to consolidating equipment and laboratories.

Environmental and energy management systems will be reinforced. Here, management does not simply mean monitoring but also the examination of the environmental and energy consumption status of the building to actively optimize the operation of the energy system based

on data analysis (detect/diagnose any malfunctions, optimize the control logic and parameters of the energy system, etc.).

Even if high-performing equipment and systems were introduced in the design and construction phases, they will not be able to deliver high performance if they are not appropriately managed in the operation phase. Generally speaking, the energy-saving effect can be increased by 10 to 20% compared to the design performance through appropriate management. Conversely, if the systems are not appropriately managed, their energy-saving performance can degrade by 10–20%, which denotes that the difference in performance between well and badly-managed systems may be as large as 20 to 40%. Going forward, it is necessary to implement advanced management in conjunction with electricity procurement and other aspects of energy supply to further reduce CO₂ emissions.

To conduct appropriate environmental and energy management, we will promote appropriate measurement, storage, and utilization of data to facilitate effective data-driven management and the development and introduction of applications. To this end, it is necessary to consider the introduction of data platforms and data models.

There are multiple methods to use renewable energy sources both on-site (power generation on campus) and off-site (power generation off campus and transmission to campus). There are also multiple options for using off-site power generation: one is to install the power source on UTokyo's property off-campus and transmit the generated power to the campus (i.e., self-consignment). Another is to engage a retailer and purchase power generated by power sources installed on the sites of other operators. However, even if the power source is installed on the site of another operator, the operator and UTokyo can form a union and transmit the power through self-consignment. The system for the use of renewable power is complicated and is often revised; thus, we need to monitor the latest changes in the system. Additionally, it is not yet clear whether off-site renewable power sources will be considered an emission reduction under the Tokyo Metropolitan Environmental Security Ordinance. We, therefore, need to thoroughly understand the latest developments in related ordinances and systems in the consideration of how such systems can be used.

Green energy "attributes" are separated from renewable energy itself and sold in the form of certificates such as renewable energy certificates (RECs) and non-fossil fuel certificates. Likewise, the amounts of CO₂ reduced or removed through officially certified CO₂ reduction projects are sold and purchased as "J Credits." Whether or not and to what extent these certificates and credits should be used for the reduction of UTokyo's CO₂ emissions must be considered from the viewpoint of university management and otherwise. It is important to strategically procure/purchase these certificates and/or credits and consider whether their use will be approved by the regulations that govern CO₂ emission reduction.

Lastly, Various guidelines will be prepared, and

workshops held to promote the energy-saving behavior of the members of UTokyo. For example, energy conservation guidelines for the use of draft chambers, server rooms, and clean rooms have already been prepared and are expected to be effectively utilized as part of the TSCP.

Scope 3 emissions

There are many challenging issues related to the measurement of Scope 3 GHG emissions, development of reduction measures, and evaluation of the emission reduction effect of the measures implemented. The measurement of emissions requires an accurate understanding of UTokyo's activities and selection of the right life-cycle emission factors, including emissions associated with the production of raw materials, product manufacturing, and waste disposal. In terms of the development of reduction measures, it is important to consider actions for the optimization of activities in UTokyo, what and where to procure goods, and waste disposal, without compromising the effectiveness of the University's research and education activities. In the evaluation of the emission reduction effect of the measures implemented, it will be necessary to obtain the appropriate emission factors that accurately reflect the difference between the emission levels before and after the implementation of the measures, or to measure the actual emissions. The emission factor database we are using as of 2022 is the publicly available LCA database, which is not necessarily an appropriate emission factor for the evaluation of the emission reduction effect of the measures implemented. It is essential to obtain cooperation from suppliers, contractors, and other external partners to calculate the environmental load caused by activities that fall under each of the Scope 3 categories. At the same time, filling the gap in data availability for organizational LCA, developing appropriate methodologies for GHG measurement, developing reduction measures, and evaluating the emission reduction effect toward the achievement of carbon neutrality in UTokyo are Climate Action in themselves.

Organizational Structure

The following organizational structure (Figure 13, Table 3) was undertaken to define the CA. The GX Promotion Subcommittee developed the initial UTokyo CA and included climate actions that set forth specific climate

activities to achieve targeted greenhouse gas reductions. The UTokyo CA was reviewed by the GX Promotion Subcommittee and further approved by the Future Society Initiative.

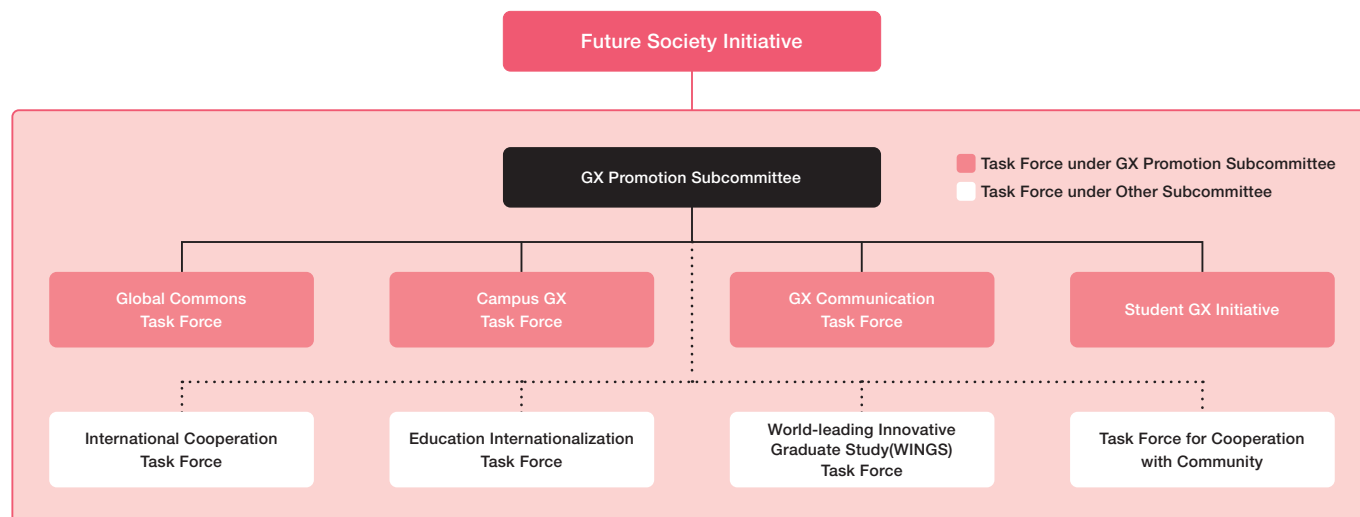


Figure 13 GX promotion organizational structure

Group Name	Explanation
Future Society Initiative	The University of Tokyo (UTokyo) established the UTokyo FSI in July 2017, under the direct leadership of the university president. The aim of the Initiative is to promote effective collaboration and to contribute to the future of humanity and the planet, based on the University's mission of serving the global public as outlined in the University of Tokyo Charter.
GX Promotion Subcommittee	Established under the Future Society Initiative in April 2022, the GX Promotion Subcommittee is responsible for the coordination of GX-related activities and formulation of the Race to Zero roadmap.
Global Commons Task Force	(Responsibilities) • Leading international GX • Promotion of industry-academia co-creation related to GX
Campus GX Task Force	(Responsibilities) • Promotion of the decarbonization of UTokyo • Promotion of TSCP activities
GX Communication Task Force	(Responsibilities) • Visualization and communication of university-wide and department-specific GX activities
Student GX Initiative	(Responsibilities) • Facilitation of students' voluntary activities related to GX • Promotion of inter-university student collaboration for GX
International Cooperation Task Force (International Cooperation Subcommittee)	(GX-related responsibilities) • Building of GX-related overseas bases • International collaboration activities related to GX
Education Internationalization Task Force (International Cooperation Subcommittee)	(GX-related responsibilities) • GX educational programs (Global Citizenship education)
World-leading Innovative Graduate Study (WINGS) Task Force (International Innovative Education Subcommittee)	(GX-related responsibilities) • SPRING GX
Task Force for Cooperation with Community (Social Cooperation Subcommittee)	(GX-related responsibilities) • Regional collaboration activities that contribute to GX (7 municipalities including the Bunkyo Ward)

Table 3 Group and its roles

Planning Process & Targets

The events that led to the development of the UTokyo CA related to the “Race to Zero” campaign are illustrated in the Table 4.

In developing the UTokyo CA, the GX Promotion Subcommittee reviewed several GHG reduction guidelines. The Japanese government and the Tokyo Metropolitan Government have developed timelines for GHG reductions. Additionally, several peer University CAs were also reviewed. The Table 5 illustrates the GHG targets for the Japanese Government and Tokyo Metropolitan Government.

Through the process of taking into consideration external GHG timelines and referring to peer Climate Action Plans, the GX Promotion Subcommittee has set targets that UTokyo should achieve.

To make the work to achieve carbon neutrality more manageable, the UTokyo CA implementation process is

divided into 3 phases. A summary of the GHG reduction targets associated with each phase is provided below (Table 6). These phases are designed to complement each other, with the earlier phases that laid the groundwork for the more ambitious projects in the later phases.

While Scope 1 and 2 emissions reduction actions defined in the UTokyo CA will be steadily implemented, various climate actions will be further refined so that more concrete Scope 3 reduction targets and paths can be set. The refinement of various climate actions is important in that they will embrace the achievement of the GHG emissions reduction targets. However, it is still difficult to develop concrete quantifiable action plans that will reduce Scope 3 emissions due to the limitation of data and widespread operation. Therefore, the planning procedure for Scope 3 emissions reduction actions is estimated to take until 2024. It is also presumed that further efforts will be required to increase the coverage.

Date	Event
July 2021	<ul style="list-style-type: none"> The "Green Transformation (GX) Promotion Task Force" was established under the "Academic Knowledge Creation Subcommittee, Headquarters for Collaborative Creation of Future Society" This task force began a project about the participation announcement to the "Race to Zero for Universities and Colleges" campaign
August 2021	<ul style="list-style-type: none"> The beginning of data collection and analysis of campus activities (energy such as electricity, purchase of foodstuffs, research equipment, assets, water supply, chemicals, business travel of members, waste treatment, and other information)
September 2021	<ul style="list-style-type: none"> Based on the results of the above analysis, the decision to participate in the "Race to Zero" campaign as a university was deliberated and approved at the university's internal meeting.
October 2021	<ul style="list-style-type: none"> Participation in the "Race to Zero" campaign secretariat, and press release were announced
October 2021- March 2022	<ul style="list-style-type: none"> Refinement of the calculation of GHG emissions under Scopes 1, 2, and 3 was implemented
April 2022	<ul style="list-style-type: none"> The "GX Promotion Subcommittee" was established under the "Future Society Co-Creation Promotion Headquarters." In addition, the "Global Commons Task Force," "Campus GX Task Force," and "Student GX Initiative" were established under this subcommittee. The consideration for the development of the UTokyo CA under the "GX promotion subcommittee" was begun.

Table 4 Events related to the development of the UTokyo CA

Milestone	Japanese government ¹¹			Tokyo Metropolitan Government ¹²		
	Target	Baseline	Target year	Target	Baseline	Target year
1	46%	2013	By 2030	50%	2000	By 2030
2	100%	2013	By 2050	100%	2000	By 2050

Table 5 GHG Targets for the Japanese Government and Tokyo Metropolitan Government

For Phases 1 to 3, the UTokyo CA will be implemented, and include the Scope 3 emissions reduction actions. Further, the UTokyo CA will be revised in these phases every year to confirm that all climate actions are effective and ensure that GHG emissions reduction targets are on track.

The Figure 14 illustrates the historical and projected GHG emissions profile for UTokyo. Historical transitions from 2006 to 2021 are indicated, and targets specified in UTokyo's CA for 2030, 2040, and 2050 are also plotted.

COVID-19 has created uncertainty in future projections due to the University's implementation of a hybrid classroom model, which represents a temporary decrease across 2020 and 2021. Roughly, on average, future GHG emissions are projected to decrease to approximately 15,000 tCO₂-eq/year until 2050, and a substantial amount of carbon offsetting and/or sequestration will still be required since the reduction of emissions to zero is practically difficult for some purchased items.

In September 2022, the proposed new targets and draft of the UTokyo CA were presented to the members of the Future Society Initiative and approved. While every effort will be made to meet these goals, there will be no penalties if the projected reductions are not reached by the scheduled dates.

During the development of the UTokyo CA, the following themes were listed. Climate action examples that apply to all UTokyo campuses and locations, including business air travel, food systems, and carbon offsets, were identified. Targeted faculty staff, students, and external experts will discuss specific measures and develop concrete CA recommendations.

- Energy
- Procurement
- Food system
- Building Construction
- Waste treatment
- Business Travel
- Commuting
- Carbon Offset

11 Prime Ministers' Office of Japan, 47th Global Warming Prevention Headquarters

https://www.kantei.go.jp/jp/99_suga/actions/202109/03ondanka.html

12 Tokyo Metropolitan Government, Formulation of "Basic Policy for Revision of Ordinance System to Realize Carbon Half"

<https://www.metro.tokyo.lg.jp/tosei/hodohappyo/press/2022/09/09/13.html>

Zero Emission Tokyo Strategy

https://www.kankyo.metro.tokyo.lg.jp/policy_others/zeroemission_tokyo/strategy.html

Phase	Baseline	Reduction Target (Scope 1,2)	Reduction Target (Scope 3)	Target year
Phase 1	2013	50%	25%	By 2030
Phase 2	2013	75%	50%	By 2040
Phase 3	2013	100%	75%	By 2050

Table 6 UTokyo Reduction Targets by Scope and Phase

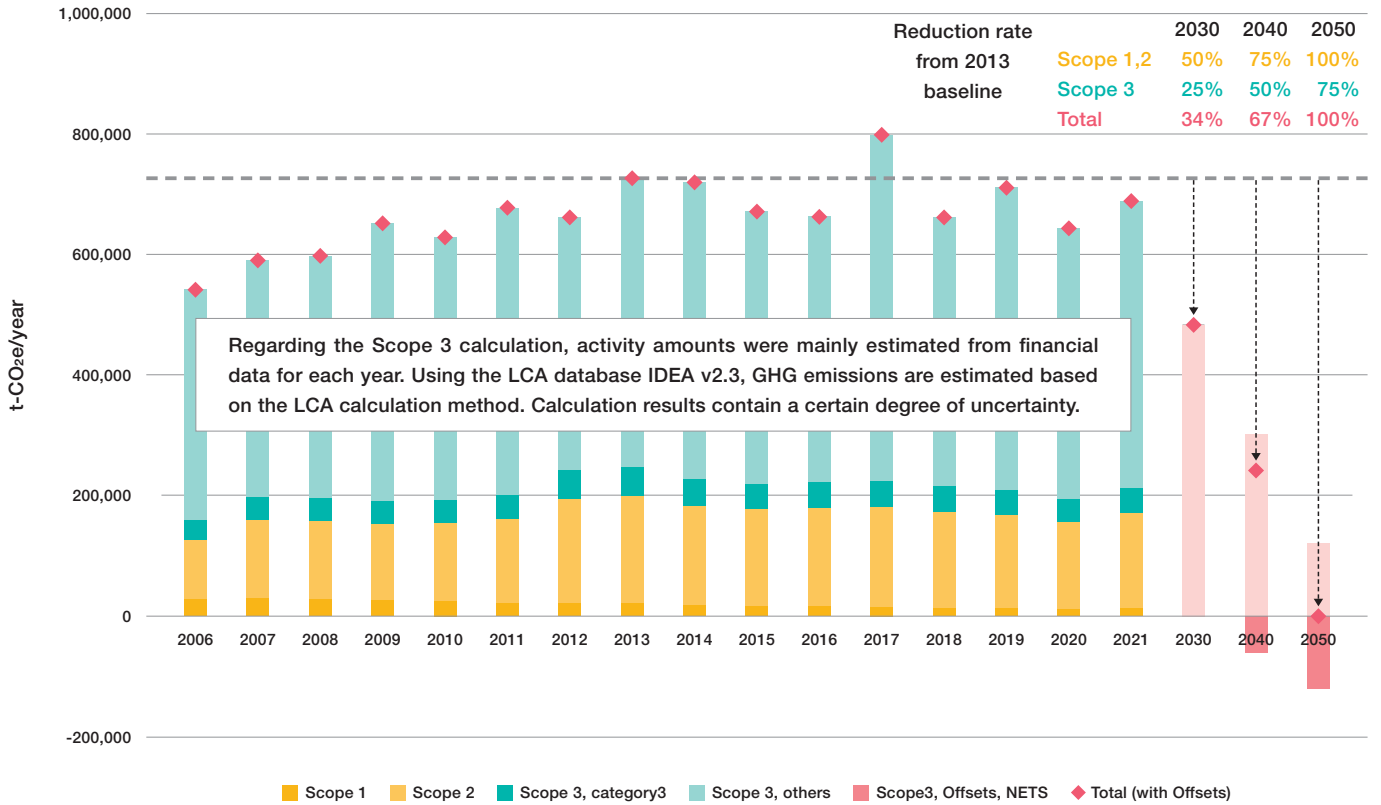


Figure 14 UTokyo Scope1,2,3 GHG calculation results with projections to the future

Emission reduction actions overview

The University of Tokyo (UTokyo)'s Climate Action examples listed by each GHG scope and category is described below (Figure 15). The leadership of quantifying/promoting/monitoring each climate action

will be taken by the GX Promotion Subcommittee. Each climate action will be solidified into more quantifiable concrete targets by discussing further with relevant stakeholders.

Scope	Category	Area	Average share in total GHG emissions	Actions	
1,2	-	Energy Use	33%	Improve digital infrastructure and controls by moving to a smart campus and BEMS.	
				Manage peak demand and deploy smart grids on campus.	
				Install building-level metering for all utilities and record all building activity with monitoring software.	
				Installation of additional PV on existing campus building roofs.	
				Increase renewable energy produced onsite/offsite.	
				Switch to renewable tariffs and targeted REC purchases that meet the UTokyo standards.	
3	1,2	Procurement	44%	Collect physical amount procurement information and require all significant vendors to report on the carbon footprint of their products. Further, classify products by their carbon footprint and set thresholds per product category.	
				Require all major vendors to report progress to meet UTokyo sustainability standards and acquire third-party environmental certifications.	
				Establish sustainable packaging criteria for vendors and ensure that vendors meet those standards.	
	1	Food system			Monitor and increase plant-based foods served in dining halls and restaurants.
					Actively seek an increase in the sourcing of local foods.
	2	Building Construction		8%	Require all significant vendors to comply with building certification schemes.
					Ensure that all new and refurbished buildings prefer low-carbon materials.
					Minimize the use of new materials and promote reuse and refurbishment.
	5	Waste reduction		1%	Separate plastic waste further and apply material/chemical recycling.
					Improve provision and coordination of e-waste reuse and recycling.
					Ensure hazardous and nonhazardous medical/research wastes are minimized and appropriately managed.
					Separate food waste from the general waste stream for composting or anaerobic digestion.
	6	Business Travel		4%	Review business travel policy concerning flights.
Implement an internal carbon price and establish a cap on non-research-related air travel per business unit.					
Implement programs for offsetting air travel emissions.					
7	Commuting		Reporting limited	Establish baselines for telecommuting and teleconferencing.	
				Install electric vehicle charging infrastructure for staff, students, and visitors.	
-	-	GHG inventory	-	Pursue refinement of GHG calculation methods so that calculation results are adequate to monitor progress and promote actual GHG emission reductions.	
-	-	Carbon Offset	-	Continue promoting programs for carbon offsets that meet the Tokyo standard.	
				Evaluate carbon offset potential from university lands.	

Figure 15 List of climate action examples now under discussion

Removals and Other reduction methods

Sequestration

As an example of carbon sequestration at UTokyo, the forest that was used for research and education is discussed below (Table 7).

The University of Tokyo Forests (UTF) affiliated to the Graduate School of Agricultural and Life Sciences, UTokyo are on a mission to be “forests that connect science and society.” Utilizing their strengths, such as the accumulation of long-term data that spans over 100 years and the practice of education and research in collaboration with the local community, the forests will contribute to the green transformation (GX) of UTokyo through research on sustainable timber production and other efforts. In addition to the management of seven university forests that spread across a total area of 31,000 ha (land area) in various parts of Japan as fields for practical research and education on forests and forestry, the UTF educates graduate school students through Cooperative courses established in the Department of Forest Science and the Department of Ecosystem Studies.

Forest resources are renewable natural resources that have been widely used regardless of time or region, and their usage can be roughly divided into fuelwood and timber as raw materials. In the prewar period,

wood production for fuel was greater than that of raw material. Fuelwood was used for both domestic and industrial applications (including the silk industry, tea manufacturing, pottery, smelting industry, etc.), and timber was used for construction, civil engineering, furniture, fittings, sundry goods, mining, transportation, communication, power generation, vehicles, vessels, pulp, packaging, plywood, and veneer. In more recent years, fuelwood was replaced by fossil fuels and much of the raw material timber was replaced by less expensive and stronger materials such as concrete, metal, and resin. However, the materials that have replaced wood/timber emit large amounts of carbon dioxide in their manufacturing process, which impose a significant load on the global environment. We are therefore required to return to the sustainable use of forest resources in the green transformation toward a decarbonized society. However, because the demand for energy and raw materials in Japan today is beyond comparison with the prewar period, the soil which stores carbon may run off or be disrupted, if we fail to properly manage forest resources. This will damage forests to the extent that it may become impossible for them to regenerate.

In light of such historical backgrounds and with a forward-looking focus, the UTF Graduate School of Agricultural and Life Sciences uses the seven university forests located across the areas from Hokkaido to

Forest Name	Year Established	Forest Area [ha]	Altitude [m]	Climate Zone
The University of Tokyo Chiba Forest	1894	2,160	50 - 370	Warm-temperate zone
The University of Tokyo Hokkaido Forest	1899	21,863	190 - 1,459	Cool-temperate and subarctic zones
The University of Tokyo Chichibu Forest	1916	5,726	530 - 1,990	Cool-temperate zone
The University of Tokyo Tanashi Forest	1929	7	60	Warm-temperate zone
Ecophysiology Research Institute	1922	1,252	2 - 692	Warm-temperate zone
Fuji Iyashinomori Woodland Study Center	1925	37	990 - 1,060	Cool-temperatezone
Arboricultural Research Institute	1943	214	10 - 520	Cool-temperatezone
Total		31,259		

Table 7 UTokyo forest resources

Aichi to pursue research on various themes, including sustainable timber production, carbon sink by old-age planted forests that are expected to increase in the future, reconversion of remote planted forests to natural forests, forestation with fast-growing tree species other than cedar and cypress, countermeasures against disease, insect and animal damage, water retention, and other hydrological functions of forests, healing forests built around small-scale and cyclical use of forest resources. Leveraging its unique strengths such as the accumulation of long-term data and research and education promoted in collaboration with the local community, the UTF will contribute to the green transformation of UTokyo through forest science and forestry. This will be done, for instance, by the development of technologies for the monitoring of carbon fixation by forests and forest management technologies to facilitate carbon fixation; development of interdisciplinary talents required to realize a decarbonized society; promotion of the decarbonization of UTokyo through the utilization of university forests; and co-creation of plans for the decarbonization of local communities.

Carbon Offsets

UTokyo has not purchased any carbon offset as of September 2022. Carbon offset is not necessarily a priority as a climate action to achieve net zero carbon emissions. However, UTokyo will endeavor to reduce GHG emissions that cannot be avoided in daily life and economic activities and will consider compensation for unavoidable GHG emissions by investment in GHG emissions reduction activities that are commensurate with the amount of GHG emissions. A substantial amount of carbon offsetting and/or sequestration will still be required since the reduction of such emissions to zero is practically difficult for some items.

Avoided Emissions

Some of UTokyo's research activities involve the development of elemental technologies, implementation of demonstration tests, practical use, and social implementation of specific technologies and systems. Additionally, some research activities have actually led to GHG emissions reductions through the design of systems in specific regions and the promotion of diffusion and deployment through transdisciplinary research. These studies can be also considered climate actions, and the GHG reductions that result from their direct and indirect spillover effects are positioned as Avoided Emissions.

For example, the Future Society Initiative SDGs Project¹³ lists research projects at UTokyo that contribute to the United Nations' 17 Sustainable Development Goals, with the aim of promoting synergies between research activities and ensuring the social impact of value created by these projects. As many as 202 projects have been registered as of 2022-7-1.

¹³ <https://www.u-tokyo.ac.jp/adm/fsi/en/projects/sdgs/index.php>

Maintenance

The University of Tokyo(UTokyo)'s greenhouse gas emissions and Climate Change measures and CA will be revised and updated every year. UTokyo has completed its first CA in 2022, and subsequent CAs are to be completed every year.

The GX Promotion Subcommittee will meet every month to perform a follow-up on the green

transformation. Faculty, staff and students will have meetings periodically. Towards the end of each year the following actions will be achieved; updating of the GHG inventory, reporting of progress to the board, compilation and release of the CA.

The Table 8 illustrates a summary of the CA yearly maintenance schedule.

CA maintenance events	Month of Year											
	11	12	1	2	3	4	5	6	7	8	9	10
GX Promotion Subcommittee	1	1	1	1	1	1	1	1	1	1	1	1
Update GHG inventory										1	1	
Progress report to FSI											1	
CA compilation										1	1	1
CA release												1

Table 8 UTokyo CA maintenance schedule



Stakeholder engagement

The GX Promotion Subcommittee will be responsible for the overall stakeholder engagement actions on the campus, and ascertain that necessary stakeholders become familiar with the contents of the UTokyo CA and provide the necessary support to their climate actions. Faculty, staff and student workshops will be held periodically.

Faculty and staff engagement

The faculty and staff workshops will aim at making every staff at the University of Tokyo (UTokyo) aware of the various climate actions for its green transformation. It will collect feedback and reflect opinions to the UTokyo CA. In September 2022, the GX Promotion Subcommittee hosted the event "Dialogue on Green Transformation (GX)" to initiate a discussion with the members of the university community in order to accelerate specific initiatives toward the realization of GX. 75 faculty and staff members and 6 students attended the event to exchange ideas with the president on how to accelerate the GX.

Student engagement

UTokyo has extensive experience with student engagement with regard to sustainability and decarbonization, and various student initiatives besides ordinary research and educational activities are flourishing on campus. Race to zero (R2Z) will build on past achievements and experiences.

The Alliance for Global Sustainability (AGS) had its student committee, which put forward several initiatives. The AGS student community held international student conferences several times jointly with students abroad. More recently, students have participated in global initiatives such as the Alliance for Sustainability Leadership in Education (EAUC) and the Global Alliance of University on Climate (GAUC). Internally, the Todai Sustainable Campus Project (TSCP) team has actively involved students through their student committee. For example, the student committee has been leading the campaign "Shut the Sash" to improve the energy

efficiency of laboratories. They have also conducted biennial university-wide surveys on student attitudes toward sustainability and SDGs and a comprehensive sustainability assessment of university buildings using globally recognized tools. In addition, many students and student groups, including the TSCP student committee, have contributed articles to the Annual Environmental Report. Students are expected to take on an expanded role in future annual environmental report drafting. Additionally, some students have joined the committee through the on-campus "hands-on experience" programs. UTokyo is considering the potential of expanding the program and offering green transformation opportunities for students to participate in the TSCP team and other administrative and research groups.

In July 2021, student groups formed an umbrella group called the UTokyo Sustainable Network (UTSN), which comprised the major environmental student groups: the TSCP Student Committee, Kankyo Sanshiro, ECHO, and Climate Action UT. Membership is open to everyone and now includes around 90 members. UTSN has been leading bottom-up changes in the management of UTokyo and behavior changes among university members. It has its own R2Z planning project, which undertakes an independent analysis of UTokyo's Climate Change-related risks, opportunities, and decarbonization scenarios. They are planning a series of workshops with invitees from various student unions to communicate their findings and spark discussion within the student body, and seeking to drive a consensus on relevant matters. Other UTSN projects regarding water server installation, plant-based menu introduction, and on-campus community farm are seeking to contribute to scope 3 emissions reduction.

UTokyo began a constructive discussion on sustainability through UTSN and student dialogues. It also organized multiple closed meetings for interested students to have a conversation about their sustainability initiatives with the relevant faculty and administrative staff members. Recently, a Student GX initiative that consisted of faculty members was launched to provide structured support for diverse student initiatives. Students will be able to present their suggestions formally and receive feedback from mentors through regular meetings with

the Student GX initiative. UTokyo plans to introduce additional periodic dialogues with the student body to review the progress of CA implementation and update its contents accordingly.

UTokyo will continue to endeavor to take necessary measures to ensure the inclusiveness of its decarbonization journey. Through these measures, UTokyo and its students look forward to working together in the participatory and iterative CA development process and implementation.



Challenges and Recommendations

Throughout the planning process, a series of limitations and barriers were identified. This section attempts to break down these barriers through identification and recommendations for improvement.

Funding

Failure to obtain the necessary financial support could pose a significant threat to the University of Tokyo (UTokyo)'s ability to achieve carbon neutrality by 2050. In addition to the uncertainty of government funding, the ever-changing global situation makes it difficult to predict the funds available for mitigation projects.

Recommendations:

The establishment of a long-term financial policy that ensures continuity could eliminate some future economic uncertainty. Additionally, the diversification of funding sources will prevent the disruption associated with the plan's implementation.

Data Collection and Tracking

The task of collecting data and accurately tracking it can be problematic as it can lead to the underestimation or overestimation of GHG emissions. For example, Scope 3 emissions, which consist of indirect GHG emissions (e.g., manufacturing of goods), are not easy to track. It is important to understand that the data and benchmarks presented in this plan were obtained in the best way possible with the current resources at hand.

Recommendations:

There are existing methods to track Scope 3 emissions in a relatively accurate manner; however, there is always room for improvement. The maintenance of transparency is one of the keys to the promotion of this improvement and this should always come before achieving individual targets. Establishing policies that allow for greater transparency between the departments holding the data and the individuals requesting the data will also become very important. Additionally, centralizing this data will

reduce the time it takes to respond to investigations and other requests for information from various stakeholders. Continuous efforts should be made to switch to a more hybrid calculation method in the future, and consider not only the monetary activity but also the collection of the physical consumption amounts of all goods and services. Further, primary data collected from suppliers and background LCA databases must be updated in a timely manner, so that they reflect the realistic status of their time.

Communication

Effective communication and participation are critically important to the success of the UTokyo CA. If the UTokyo community is unaware of or unwilling to learn how to make UTokyo a sustainable campus, the targets of the UTokyo CA may be difficult to achieve. Lack of communication will ultimately lead to decreased participation and support, which are critical to the success of the plan.

Recommendations:

Marketing experts must be involved, and methods to disseminate information and provide opportunities for UTokyo community to participate in the planning process must be offered. This will educate the community on relevant issues and empower them to make the right decisions based on best practices.

Removals and Other reduction methods

Sequestration and the avoidance of emissions could be some of UTokyo's essential climate actions.

Excessive reliance on carbon offsetting methods to achieve targets may hinder UTokyo's efforts to reduce emissions. It is also extremely important to determine under what conditions carbon offset credits will be accepted, in order to achieve UTokyo's goals.

Recommendations:

Carbon offsets should be introduced only as a last resort to achieve targets within a timeline. They should only be adopted as a temporary measure to bridge future



transition in areas that are difficult for UTokyo itself to reduce. Furthermore, except for some carbon offset methods such as Direct Air Capture and Storage (DACCS) and Bio-Energy with Carbon Capture and Storage (BECCS), most carbon offset credits are based on additionality in setting various baselines. The selection of the type of carbon credits that will be used up to 2050 will be extremely important, as the adoption of carbon credits with an inappropriate baseline will not contribute

to the achievement of carbon neutrality but will simply endorse carbon emissions both in and out of UTokyo. We will academically examine methods to calculate the protection and utilization of the Experiment Forest and the GHG emissions reduction effects of research and educational activities and their results, so that we can visualize the contribution to society through the expansion of research.

Emission Reduction Actions

Scope 1 and 2: Campus energy

It is essential to set mid-term targets for 2030, accelerate energy-saving measures and introduce energy-creating equipment to achieve carbon neutrality in 2050.

Ultimately, strategic procurement of green power, etc., will also be necessary. The outline of the plan for the Campus GX Task Force is illustrated in the following figure (Figure 16):

Establish Energy Conservation

The University of Tokyo (UTokyo) will consider a drastic review of the TSCP countermeasures and position energy conservation as a core measure of its UTokyo Climate Action, and work on it as a university. UTokyo will implement the energy conservation program in the following two steps:

- Strengthen the energy conservation system
- TPromote energy conservation actions as specific plans

In doing so, UTokyo will clarify the energy and environmental management implementation system. Further, UTokyo will promote the consolidation of equipment and laboratories in experimental facilities to save energy. However, it will only do so under the condition that these measures will not interfere with educational and research activities and not deteriorate the indoor environment or usability. UTokyo will also strengthen the data management and analysis necessary to promote energy conservation.

Energy creation and energy storage

UTokyo will consider the installment of solar power generation facilities on-site (on campus) and off-site based on self-consignment (outside the site of demand, inclusive of remote locations).

Renewable energy procurement

UTokyo will consider strategic procurement of green power (renewable energy power) and make decisions to introduce them from a university management perspective.

Summary

- Strengthen energy conservation measures
- Adopt on-site/offsite energy creation and energy storage
- Procure renewable energy

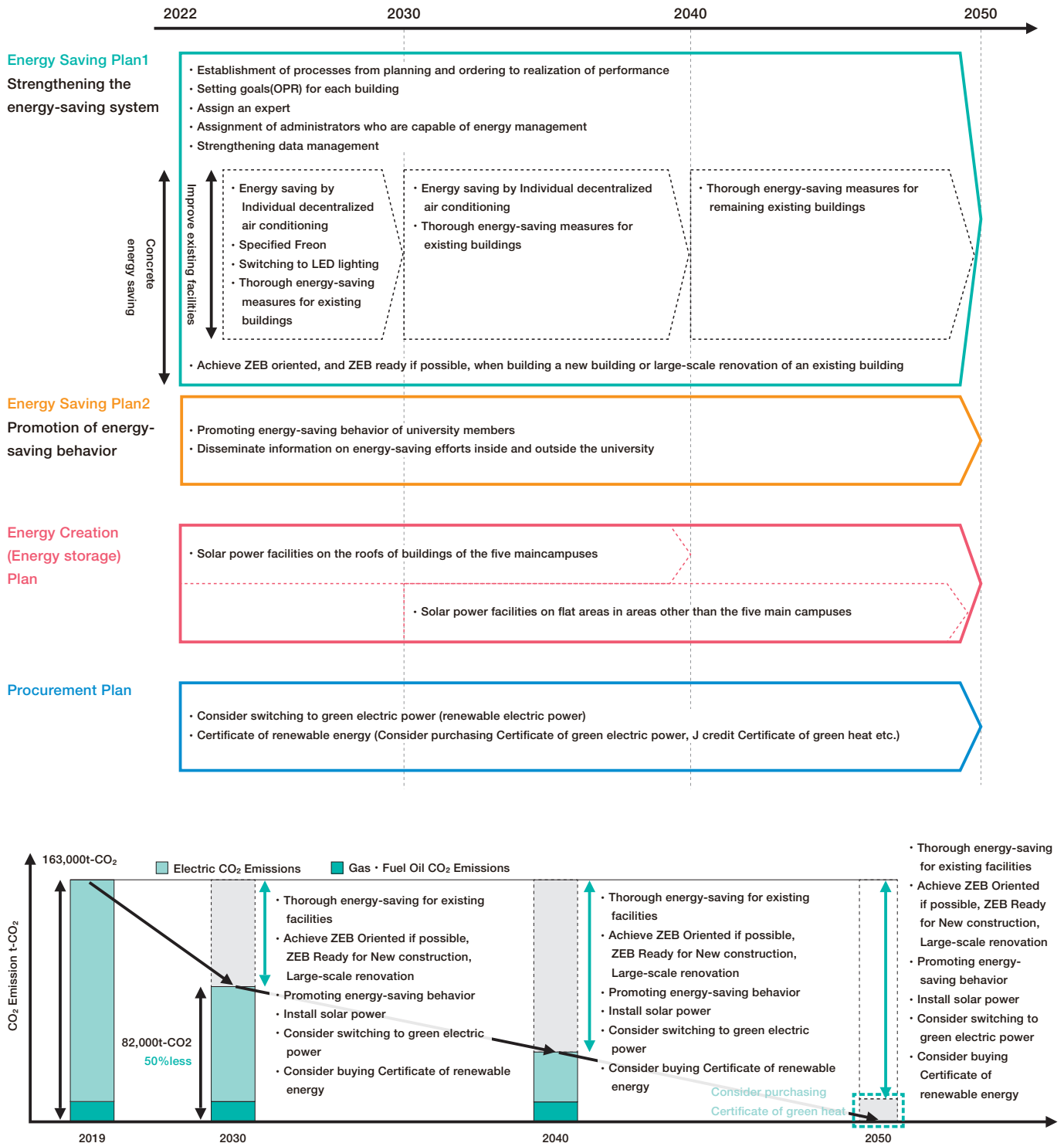


Figure 16 Campus GX Task Force plan outline¹⁴

14 Due to the requirements of the Tokyo Metropolitan Environmental Security Ordinance, these CO₂ emissions values use different electricity emissions factors from those used in the GHG inventory results section.

Scope 3

There are several challenges related to the measurement of Scope 3 GHG emissions, development of reduction measures, and evaluation of the emission reduction effect of the measures implemented. Measurement of emissions requires an accurate understanding of the UTokyo activities and selection of the right life-cycle emission factors, including emissions associated with the production of raw materials, product manufacturing, and waste disposal. In the development of reduction measures, it is important to consider actions for the optimization of activities in UTokyo, what and where to procure goods, and waste disposal without compromising the effectiveness of the University's research and education activities. In the evaluation of the emission reduction effect of the measures implemented, it will be necessary to obtain the appropriate emission factors that accurately reflect the difference between the emission levels before and after implementing the measures or to measure the actual emissions. The emission factor database we are using as of 2022 is the publicly available LCA database, which is not necessarily appropriate to use as the emission factor for evaluating the emission reduction effect of measures implemented. It is essential to obtain cooperation from suppliers, contractors, and other external partners to calculate the environmental load caused by activities that fall under each of the Scope 3 categories. At the same time, filling the gap in data availability for organizational LCA and developing appropriate methodologies for GHG measurement, development of reduction measures, and evaluation of the emission reduction effect toward achieving carbon neutrality in UTokyo are Climate Action in themselves.

Emission reduction measures along with measurement methods are being considered for Scope 3 categories. Some examples follow.

For product categories with very high purchase volume, efforts to acquire the carbon footprint of the procured products should also be pursued. Products that report their carbon footprint and products that have obtained environmental certifications should be favored over those which do not. Further, products that are within a low carbon footprint group should be given preference over others.

In addition, sustainable food on campus should be carefully discussed. Recent scientific studies have demonstrated that greener food options exist to reduce GHG emissions such as the local cultivation and production of food, the reduction of food loss/waste issues, and the elaboration of specific menus provided on the campuses. UTokyo's cafeterias can help provide more sustainable options on campuses, such as foods grown locally in a sustainable and responsible manner.

The construction plan should also outline goals for materials to be selected for new construction and renovation projects. Materials that are locally produced, highly recyclable, renewable, and low in toxicity and emissions must be emphasized.

Backend costs and environmental impacts should be addressed to select appropriate methods of the management of experimental, domestic, and infectious wastes.

GHG emissions reductions associated with transportation should also be considered. The students' share of each commuting method has not yet been evaluated. Thus, their contribution to the Scope 3 emissions is still uncertain. A survey could be conducted on each campus to evaluate which methods the staff and students are using. Based on the survey results, an awareness campaign and incentives (reduction of commuter passes) could be delivered. Additionally, UTokyo should educate faculty, staff, and students about the impact of official travels. UTokyo should also develop a list of "greener" official traveling options.



UTokyo
Green
Transformation