

2025

Environmental
Report
2025

Digest Version



Message from the President and Chief Executive Officer

These days, various social issues, such as climate change, energy, and the economy, are bringing near-constant changes to our environment every day.

In terms of climate change in Japan, the report “Climate Change in Japan 2025” by the Ministry of Education, Culture, Sports, Science and Technology and the Japan Meteorological Agency was released on March 26, 2025. This report includes future projections based on observation results related to global warming and climate change.

Universities, as institutions of both education and research, are expected to play a significant role in solving global environmental issues that include these challenges.

Science Tokyo is a new university established in October 2024 through the integration of two national universities, Tokyo Medical and Dental University and Tokyo Institute of Technology.

Science Tokyo envisions a future desired by people across diverse scales — from building a better life, better society, and better planet — and takes an active role in creating a “brighter future” by integrating research and education toward these goals. Science Tokyo will continue to create scientific research on innovative areas and new industries, tackle social issues such as infectious diseases and carbon neutrality.

In order to realize this “brighter future,” Science Tokyo has introduced a research system called “Visionary Initiatives” (VIs), aimed at transforming the current field-specific, vertically segmented research structure—spanning medicine, dentistry, science, engineering, informatics, and liberal arts—into a

cross-disciplinary system. All researchers will gradually participate in the VIs, and in conjunction with graduate education, six VIs have already been established to work towards realizing Science Tokyo’s vision: better life, better society, and better planet. One notable VI is GX Frontier (achieving a sustainable future through green transformation), through which Science Tokyo plans to tackle challenges such as climate change and realizing nature-positive goals. Through these initiatives, Science Tokyo will accelerate integrated research, including the medical-engineering collaboration that has been a central focus of its integration efforts. Through the VIs, Science Tokyo will also build a new ecosystem for innovation creation together with diverse organizations in society.

This is Science Tokyo’s first environmental report, showcasing a range of environmental research and initiatives by the faculty, staff, students, and hospital, all of which will contribute to the realization of a better future.

In addition, in accordance with the Environmental Reporting Guidelines issued by the Ministry of the Environment, Science Tokyo has aligned this report with the internationally recognized Sustainable Development Goals (SDGs). The report summarizes environmental and safety activities in FY 2024 – by Tokyo Medical and Dental University and Tokyo Institute of Technology for the first half of 2024, and by Science Tokyo for the second half.

We sincerely invite you to read this report, and appreciate your continued understanding and support for Science Tokyo’s future activities.

September, 2025

Naoto Ohtake, President and Chief Executive Officer, Science Tokyo



Basic Principle

With the mission of “advancing science and human wellbeing to create value for and with society,” Institute of Science Tokyo integrates the wisdom of medical and dental science fields and science and engineering fields, and recognizes environmental issues as the most critical global challenge affecting the survival of humankind and all life on Earth. Science Tokyo strives to conserve the environment and reduce environmental impact through education, research, medical care, and all other activities to create a sustainable society and fulfill our responsibility to future generations.

Basic Policies

1. Revitalizing Research Activities

Promote scientific and technological research that contributes to the creation of a sustainable society and to creating knowledge that will help solve environmental issues.

2. Talent Development

Cultivate talent with high environmental awareness and specialized knowledge, and develop leaders who will contribute to solve environmental issues in diverse areas of society.

3. Social Contribution

Contribute to both Japan and international society through our research activities, talent development, and medical care as described in 1 and 2.

4. Reduce Our Environmental Footprint

Establish and implement specific environmental goals to minimize the environmental impact of our activities.

5. Environmental Management System

Establish an advanced environmental management system and strive for effective operation and continuous improvement to realize environmentally friendly university operations.

6. Promote Environmental Awareness

Conduct environmental education and awareness-building activities for all faculty, staff and students to raise their awareness of environmental issues.

7. Legal Compliance and Disclosure

Comply with environmental laws, regulations, and agreements, while communicating Science Tokyo’s environmental initiatives to relevant parties, and disclosing basic policies and initiatives externally.

Iron Catalysts Paving the Way for Sustainable Organic Synthesis

Our society is supported by diverse organic compounds such as pharmaceuticals, pesticides, chemical fibers, and functional materials. These substances are produced through organic synthesis—a technology that constructs molecules with desired properties by strategically assembling molecular building blocks. During this process, catalysts are used to increase the efficiency and selectivity of the reaction. Catalysts are indispensable in this process because they enhance reaction efficiency and selectivity without being consumed, thereby reducing both energy use and byproduct formation.

Traditionally, rare metals such as palladium and rhodium have been used in high-performance catalysts. However, these metals are expensive, limited in natural abundance, and require significant energy for mining and refining, resulting in substantial environmental impact. Against this background, global demand for cheaper and environmentally friendly alternative metals is growing.

Among them, iron catalysts are attracting particular attention. Iron is one of the most abundant metals on Earth, and is an inexpensive and environmentally friendly resource. Moreover, iron is biologically safe—it is a key component of hemoglobin, which transports oxygen in living organisms.

Our laboratory is currently developing new synthetic methods that utilize iron catalysts. For example, we have developed a highly efficient and selective method for synthesizing active pharmaceutical ingredients and biologically active organic compounds using iron catalysts. These methods have the potential to significantly reduce environmental impact and cost compared with conventional rare-metal-catalyzed processes.

The study of iron-catalyzed reactions continues to advance through the integration of multiple disciplines, including organic synthesis, coordination chemistry, and materials science. Selectivity and reactivity are being improved through innovations such as molecular design and ligand control, and industrial applications are now within sight.

Harnessing iron—a familiar and abundant element—will guide us toward next-generation manufacturing that makes effective use of limited resources while minimizing environmental impact. The potential for expanded applications continues to grow, and expectations for its future contributions remain high.

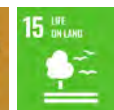
School of Life Science and Technology
Department of Life Science and Technology
Associate Professor Takeshi Hata
Hata Lab HP <https://www.hata-lab.life.isct.ac.jp/>



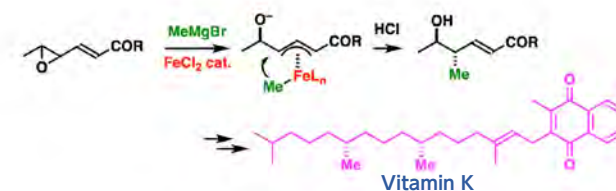
Advantages of using safe, sustainable, and inexpensive iron



- Iron is an essential metal from the standpoint of element strategy and environmental sustainability.
- Iron plays an important role in manufacturing processes aligned with a sustainable society.



Examples of iron catalysts in the synthesis of biologically active molecules



Coral reefs -inside your computer? Towards the coexistence of humans and nature~

Have you ever seen live corals? Coral reefs are an extremely important ecosystem, supporting approximately 25% of marine life while covering about 0.2% of the total ocean area. Corals, which belong to the sea anemone family, have symbiotic algae in their bodies called zooxanthellae (Photo 1) and receive energy from them. However, their ecology is very complex and unclear, making conservation and restoration difficult.

Coral is susceptible to the impacts of coastal development activities and agriculture. Furthermore, recent global warming has disrupted the symbiotic relationship between corals and zooxanthellae, leading to frequent occurrences of a phenomenon called "coral bleaching," which ultimately causes their death. In Okinawa Prefecture, my research site, a mass bleaching event occurred in 2024, and I witnessed the coral sea being devastated in one summer (Photo 2).

If this trend continues, there may be almost no coral left in twenty years. To overcome this situation, my research simulates coral reef ecosystems on a computer and predicts the state of coral reef ecosystems in various environments.

Detailed observation is indispensable as the first step toward digitally reproducing corals. Every summer, I go to Okinawa to study real coral reefs and conduct stress tolerance experiments on coral reefs in aquariums (Photos 3 and 4). In winter, an ocean circulation model and a biological model of corals at the study area are developed based on the summer results (Chart 5).

Since the mechanism of bleaching has not yet been well modeled at present, we are analyzing the lipids (roughly equivalent to body fat) of coral and zooxanthellae based on the theory that coral starvation results from the loss or dysfunction of zooxanthellae.

This research will clarify the relationship between human activities on land and coral reefs in the ocean, where the linkage has been unclear. This is indispensable for achieving our goals of sustainable development and coexistence between humans and nature, and above all, it allows us to keep enjoying these fascinating aspects of nature.

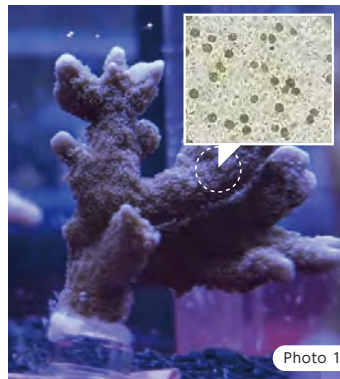
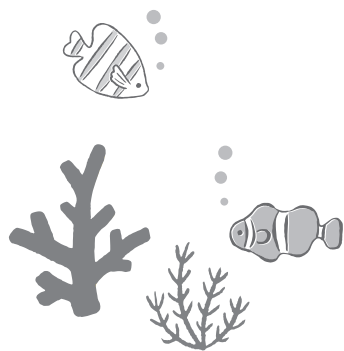


Photo 1

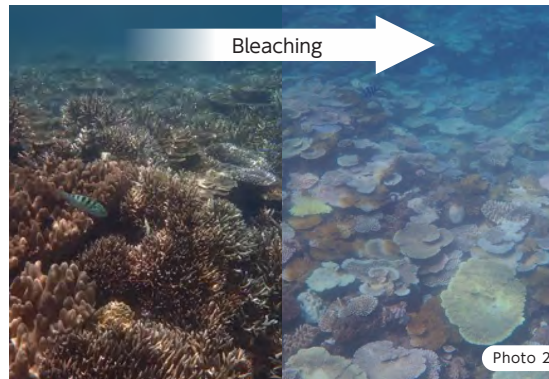


Photo 2

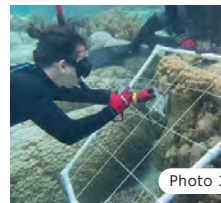


Photo 3

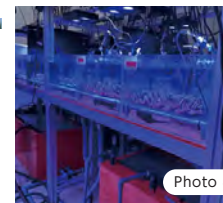


Photo 4

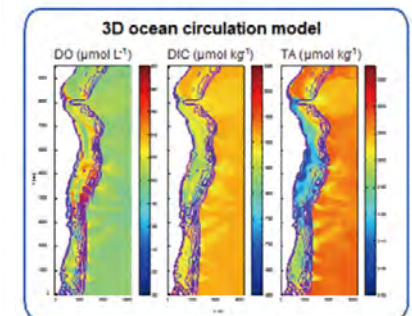
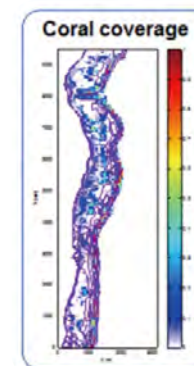


Chart 5

School of Environment and Society
NakamuLab

3rd-Year doctoral student Kazuma Uesugi

NakamuLab website URL: http://www.nakamulab.mei.titech.ac.jp/homepage_eng



Activities of the Science Tokyo Student's Volunteer Group (VG)

Collecting empty disposable contact lens cases

Since February 2025, boxes for collecting empty contact lens cases for the "Eyecity Eco Project" have been placed on the first floor and B2 floor of Hisao & Hiroko Taki Plaza (Taki Plaza) .

The empty disposable contact lens cases are made of recyclable materials and are collected at retail stores and other locations, but the nationwide recycling rate is only about 2% (see note below). There are many contact lens users at Science Tokyo, but it is presumed that not many people store empty cases and bring them to the collection boxes in the stores. We thought that setting up collection boxes would make it easier for people to cooperate with the collection. Collected empty cases are not only recycled into regenerated polypropylene material, but will also contribute to social initiatives, including support for the corneal donor system and independence and employment of people with disabilities through the "Eyecity Eco Project."

Between February and March 2025, approximately 3,500 empty cases were collected, enough to fill half of a large collection box. We plan to continue our efforts, with the possibility of adding more boxes in the future. Since the collection boxes on the first floor of Taki Plaza are open to people outside the campus, we hope that this will help expand the circle of recycling from Science Tokyo to the local community.

Note: From "Eyecity Contact Lens Sales Results in 2023"



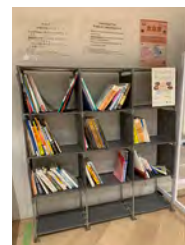
Collection box on the B2 floor of Taki Plaza

Secondhand Book Market

Many of the textbooks and reference books become unused after the classes are over.

The VG runs a book donation activity, "Secondhand Book Market," to promote the reuse of textbooks and reference books. Secondhand Book Market has set up a used book collection box on the B1 floor of Taki Plaza, where anyone can freely donate books. After the VG members check the condition of the donated books, they are placed on the bookshelves on the second basement floor of Taki Plaza. Any student is free to take any used book on the bookshelf.

In FY 2024, approximately 150 books were collected and given away (For reference, in FY 2023, approximately 130 books were collected from September to March). We would like to continue "Secondhand Book Market" activities and contribute to the revitalization of reuse.



The bookshelf used to distribute used books

Midori Santa Project

Every year, the VG participates in the "Midori Santa Project," an environmental conservation activity in Midori Ward, Yokohama City. This year, together with local elementary school students, we picked up trash around Nakayama Station, reaffirming the importance of environmental conservation and collaboration with the local community. After that, students from four universities that have campuses in Midori Ward shared diverse ideas on how to reduce trash in the city, which served as a great inspiration for us.

Through these familiar activities, the VG will also contribute to raising environmental awareness in the local community.



Picking up trash while wearing Santa hats



Discussion on litter reduction

School of Science
Department of Mathematics
2nd-year undergraduate student
Koki Sakamoto



School of Engineering
Department of Information and
Communications Engineering
2nd-year master's student
Shota Matsuo



✕ <https://x.com/titechVG>

📷 https://www.instagram.com/tokodai_vg/

Student Success Support Section, Ookayama Student Support Center <https://www.sienp.titech.ac.jp/ScienceTokyo/index.html>

5S Activities in Hospitals -Promoting Hospital Beautification through 5S Activities-

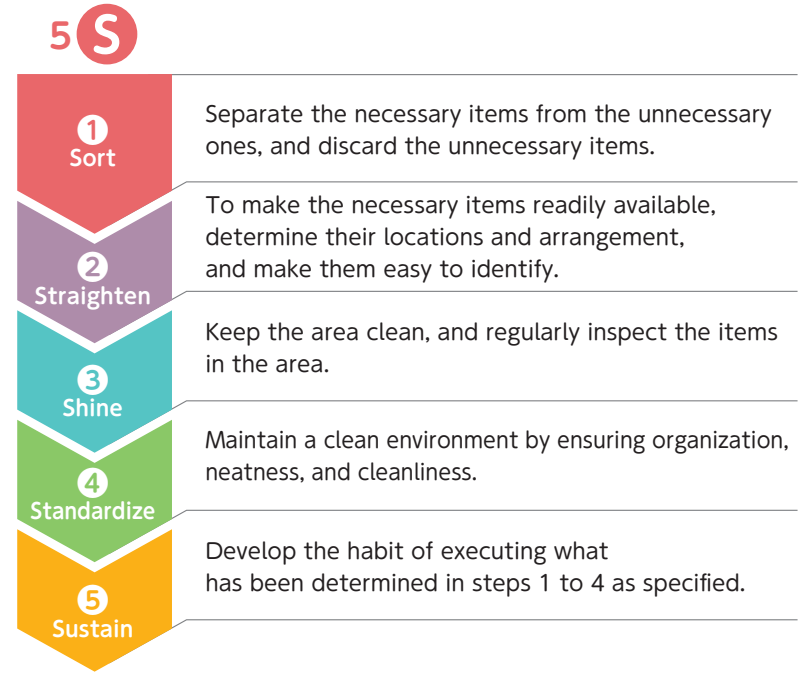
The hospital (Division of Clinical Dentistry) has been engaged in 5S activities since 2011, marking its 15th year in 2025.

"5S" is an activity to build a foundation for workplace management, consisting of five steps: (1) Sort, (2) Straighten, (3) Shine, (4) Standardize, and (5) Sustain, which are taken from the initial letters in Japanese for these five steps.

It contributes to reducing medical accidents and saving time and effort, including preventing human errors and patient accidents, reducing the time spent on searching for things, effective use of space, improving the quality of management, enhancing management skills of supervisors, improving problem-solving abilities of the team, and encouraging a mindset of autonomy, all of which are anticipated to lead to a better hospital.

After the integration of the Medical and Dental Hospitals in 2021, Science Tokyo Hospital is continuing 5S activities with the goal of expanding practices cultivated in the Division of Clinical Dentistry to the Division of Clinical Medicine. In 2024, focusing on improving areas visible to patients, the hospital undertook a thorough reorganization of the bulletin board, which had become overcrowded with information.

The original mascot character (5S Ranger) also contributes to the hospital's 5S activities.



A mutual evaluation system has been implemented, and inspections are conducted in all departments.



Regular evaluations by external instructors (Outpatient care for Orthodontics)



Daily cleanup activities



Before and after 5S activities (Dental Laboratory)

Hospital Meals for People and Planet Health

“Healthy Diets From Sustainable Food Systems,” published by the EAT-Lancet Commission in 2020, calls for a major transformation in global food production and current dietary habits. In 2021, the United Nations held the Food Systems Summit, and the transition to sustainable food systems that do not deplete resources is increasingly accelerating.

Nutrition Services at Science Tokyo Hospital also make various efforts to minimize food waste, such as adjusting deliveries of food items to the day before, and adjusting the volume of food prepared before serving time. If there are leftovers, they are vacuum packed and frozen, and porridge is creatively reused as an easy-to-swallow food or as a thickener for a soup. For each individual patient, meal portions are halved to make them easier to finish, while any deficiencies are supplemented with nutrient-dense foods to ensure the required intake is met.

The amount of food waste at Science Tokyo Hospital (defined as the difference between the cost of food purchased and the cost of food actually served) was approximately 3.1 million yen in FY 2014, and has been reduced to about 2.5 million yen in FY 2024.

Recently, there has been a trend to replace meat with plant-based protein to address climate change, reduce CO₂ emissions, and reduce

food loss and energy usage, while maintaining healthy and nutritious meals.

Hospital meals and school lunches are a form of public food, reflecting the broader food culture of the country or region. Transitioning public meals to sustainable meals that consider both people and the environment will have a significant impact on both public awareness about dining and on local food education. Therefore, striving for hospital food that considers both human and planetary health is important for the future of our society.

Research by the National Cancer Center Japan has revealed that a higher proportion of plant protein intake relative to total energy intake is associated with a lower risk of mortality, particularly from cardiovascular diseases (JAMA Intern Med. 2019 Oct 1;179 (10):1448.). According to the National Health and Nutrition Survey, the ratio of animal to plant protein was 54.7% in FY 2023. At Science Tokyo Hospital, the average in FY 2024 was 54.3%, which the hospital aims to reduce to 45–50% in the future.

Therefore, the hospital is working to develop menus that incorporate more soybean-based products, meat substitutes, and plant-based meats.

Plant-Based Meats Menu

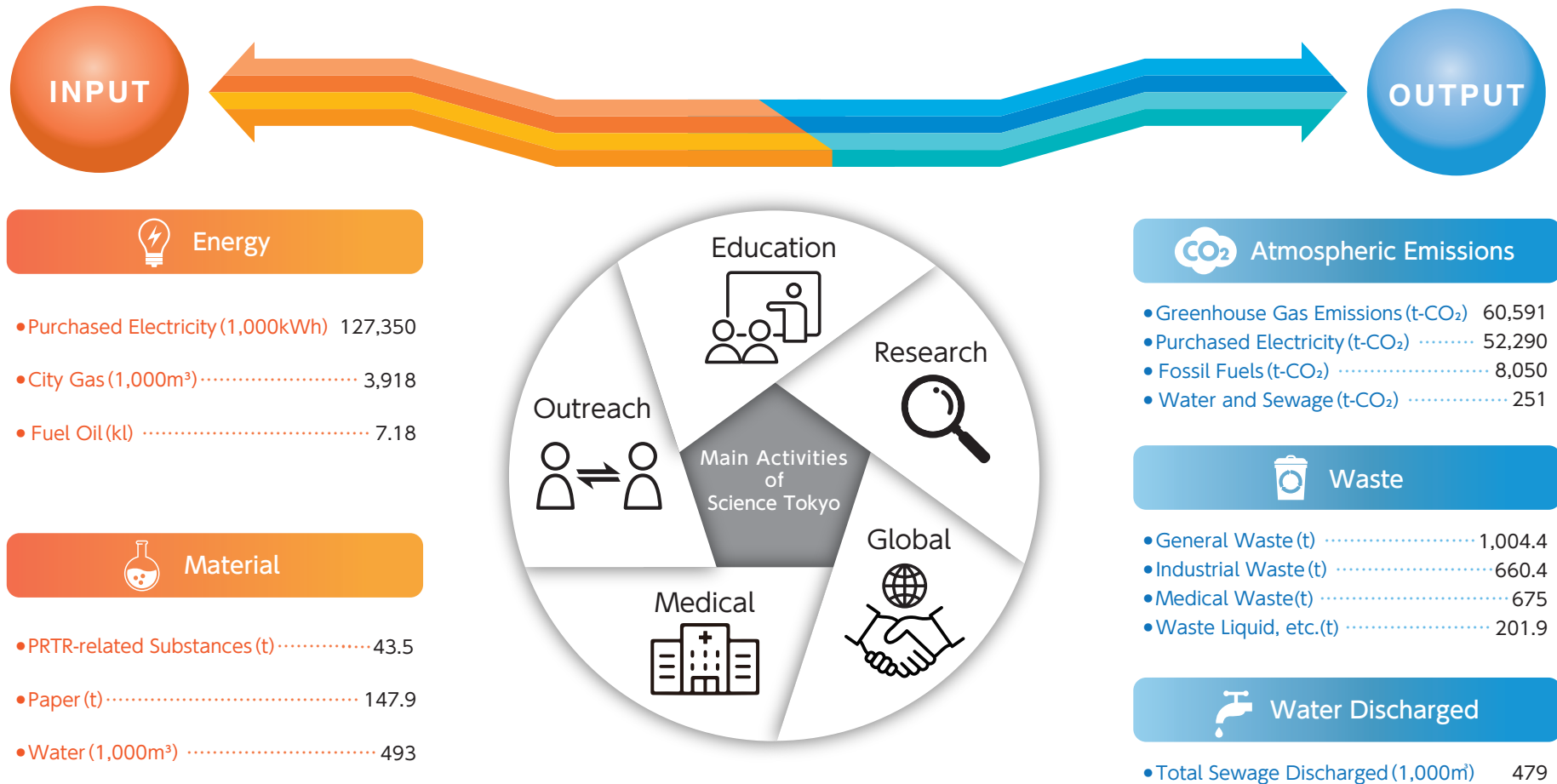




Material Balances

Science Tokyo activities consume a great deal of energy and a wide range of materials. Most of the energy we consume is in the form of electricity and gas. The primary materials we use are chemical substances, paper, and water. While we need to use these to conduct our cutting-edge education/talent development activities and research activities, we're also engaged in minimizing the environmental footprint of our operations.

We have summarized our FY2024 inputs (resource and energy used) and outputs (environmental emissions) as the material flow shown below.





Energy Conservation and CO₂ Reduction Initiatives

Proactive Introduction of High-Efficiency Devices and Systems

Science Tokyo has set the goal of making its campuses low-carbon, environmentally friendly places, and every fiscal year we formulate a plan for implementing improvements. That includes transitioning to LED lighting and installing high-efficiency air-conditioning systems. We have also worked to boost energy conservation through energy management measures such as installing a centralized air-conditioning control system and a centralized power meter reading system. We even started an electric power consumption visualization project to make faculty, staff and students aware of energy conservation. Also, we began installing renewable energy equipment such as solar power systems and fuel cells.

● Upgrade air conditioners to high-efficiency models

Former university name	Campus	Number of updates
Tokyo Institute of Technology	Ookayama	125
	Suzukakedai	0
	Tamachi	12
Tokyo Medical and Dental University	Yushima	151
Total		288

● Upgrade lighting fixtures and outdoor lights to LED types

Former university name	Campus	Number of updates (construction)	Number of updates (lease)	Total
Tokyo Institute of Technology	Ookayama	309	0	309
	Suzukakedai	676	0	676
	Tamachi	0	0	0
Tokyo Medical and Dental University	Yushima	1,589	5,239	6,828
	Surugadai	66	0	66
	Konodai	293	0	293
	Todateiko	42	0	42
Total		2,975	5,239	8,214

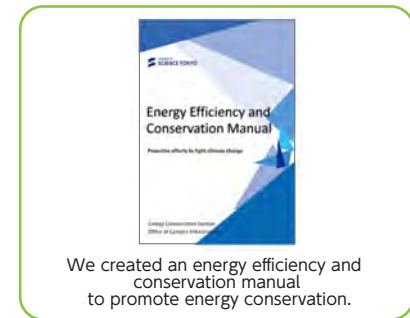
Implementation of Cool Biz / Warm Biz

We used posters and other means to proactively call for cutting electrical usage during high-usage seasons.

● Implementation of Cool Biz ● (March 1 to October 31)



● Implementation of Warm Biz ● (December 1 to March 31)



We created an energy efficiency and conservation manual to promote energy conservation.

The target room temperatures of 28°C during the Cool Biz period and 20°C during the Warm Biz period were guidelines, not designated thermostat settings. Please keep room temperatures at a reasonable level in consideration of factors such as location, the situation and your physical condition.



Initiatives to Reduce Environmental Impact of Chemical Substances

Proper Management of Chemical Substances

Science Tokyo handles a wide variety of chemical substances in educational, research, and medical activities. In consideration of the hazards and risks related to chemical substances, Science Tokyo has established a system to comply with laws and regulations from three perspectives: conserving the environment, preventing health problems, and preventing accidents.

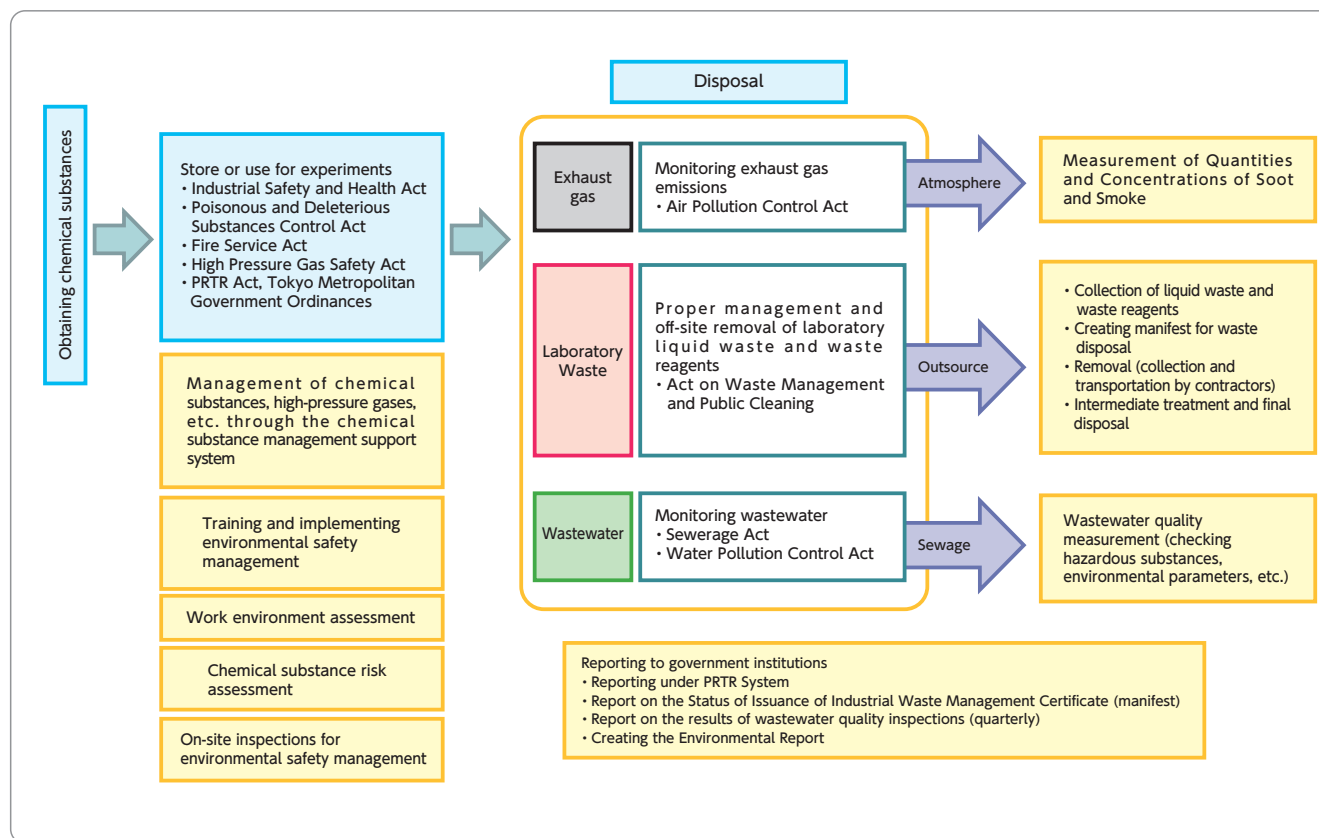
In order to maintain this system, last year we established regulations including Environmental Safety Management Regulations, Waste Management Regulations, Chemical Substance Management Regulations, Regulations for Safety and Health Management, Hazardous Materials Management Regulations, Regulations on Poisonous and Deleterious Substances, and Science Tokyo Regulations Concerning Safety and Health Management of Students and others.

Science Tokyo has a large number of laboratories that handle chemical substances, and their usage situations varies. For this reason, a chemical substance management support system is used to manage a series of processes related to chemical substances (acquisition, storage, use, and disposal).

In laboratories, chemical substances are managed using barcode labels on bottles, and each process is registered in the chemical substance management support system. As a result, the status of chemical substances throughout Science Tokyo can be monitored in real time, and the accumulated data is utilized to calculate annual usage and conduct risk assessments.

In addition, training sessions for faculty, staff, and students are conducted in order to enhance knowledge regarding relevant laws and regulations, internal regulations, and the chemical substances management support system, as well as improve appropriate management skills. Through regular laboratory inspections, we also make sure that chemical substances are handled safely and responsibly.

Through these initiatives, Science Tokyo is contributing to the proper management of chemical substances, ensuring compliance with relevant laws and regulations while reducing environmental impact.



Series of processes related to chemical substances (acquisition, storage, use, and disposal).

Editorial Note

In October 2024, Tokyo Institute of Technology and Tokyo Medical and Dental University integrated to establish Institute of Science Tokyo. I was concerned about the future of the Environmental Report, but I am very pleased that we were able to release the report for FY 2025 successfully.

Each of the predecessor universities had previously created and published environmental reports, and this year marks the first year after the integration. Due to limited time, the work was done without sufficient discussion among stakeholders. Still, we have made efforts to ensure that the content is as easy to understand as possible, targeting mainly middle and high school students as our primary audience. Every year, in conjunction with "United Nations World Environment Day" on June 5, we have designated June as "Environment Month" and Tokyo Institute of Technology's Environmental Report Working Group have organized special lectures co-hosted with Ota Ward and Meguro Ward. Unfortunately, however, the event was not held this year. We would very much like to bring it back next year, and feel that it is one of the goals for the working group going forward.

After the integration, the fields of research and education have expanded, and we believe that the content and perspectives that the Environmental Report should cover have expanded as well. We will continue to consider how to reflect the unique features of Science Tokyo in our Environmental Report through trial and error. We sincerely appreciate your continued kindness and warm support. We would also be very encouraged if you could give us your comments and suggestions.

Finally, we would like to express our sincere gratitude to all those involved in the preparation of this report. We welcome all thoughts and feedback from those who have taken the time to read it.

September 2025
Environmental Report 2025 Preparation Working Group Chair

Yoh-ichi Tagawa



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