

Efforts against Global Warming by the Sanitary Equipment Industry

- FY 2023 Results for Carbon Neutrality Action Plan -



1st April 2025
Japan Sanitary Equipment Industry Association

1. Overview of Sanitary Equipment Manufacturing Industry
2. Sanitary Equipment Manufacturing Industry “Carbon Neutrality Action Plan” Phase II
3. Reduction of CO₂ emissions in FY2023
4. Contributions in Other Sectors through Low-Carbon Products and Services
5. Contributions to Reduction Overseas
6. Status of Development and Introduction of Innovative Technologies, BAT, Best Practice Progress and Introduction
7. Other efforts

1. Overview of Sanitary Equipment Manufacturing Industry (1)

■ Manufacturing Industry of Sanitary Equipment

- Water closets, urinals, wash basins, etc.
- Plumbing equipment (residential and public)



■ Industry size (FY 2023)

- Number of companies: 3
- Participating companies: Janis Ltd., LIXIL Corporation, TOTO LTD. (in alphabetical order)
- Market size: approximately 714.7 billion yen



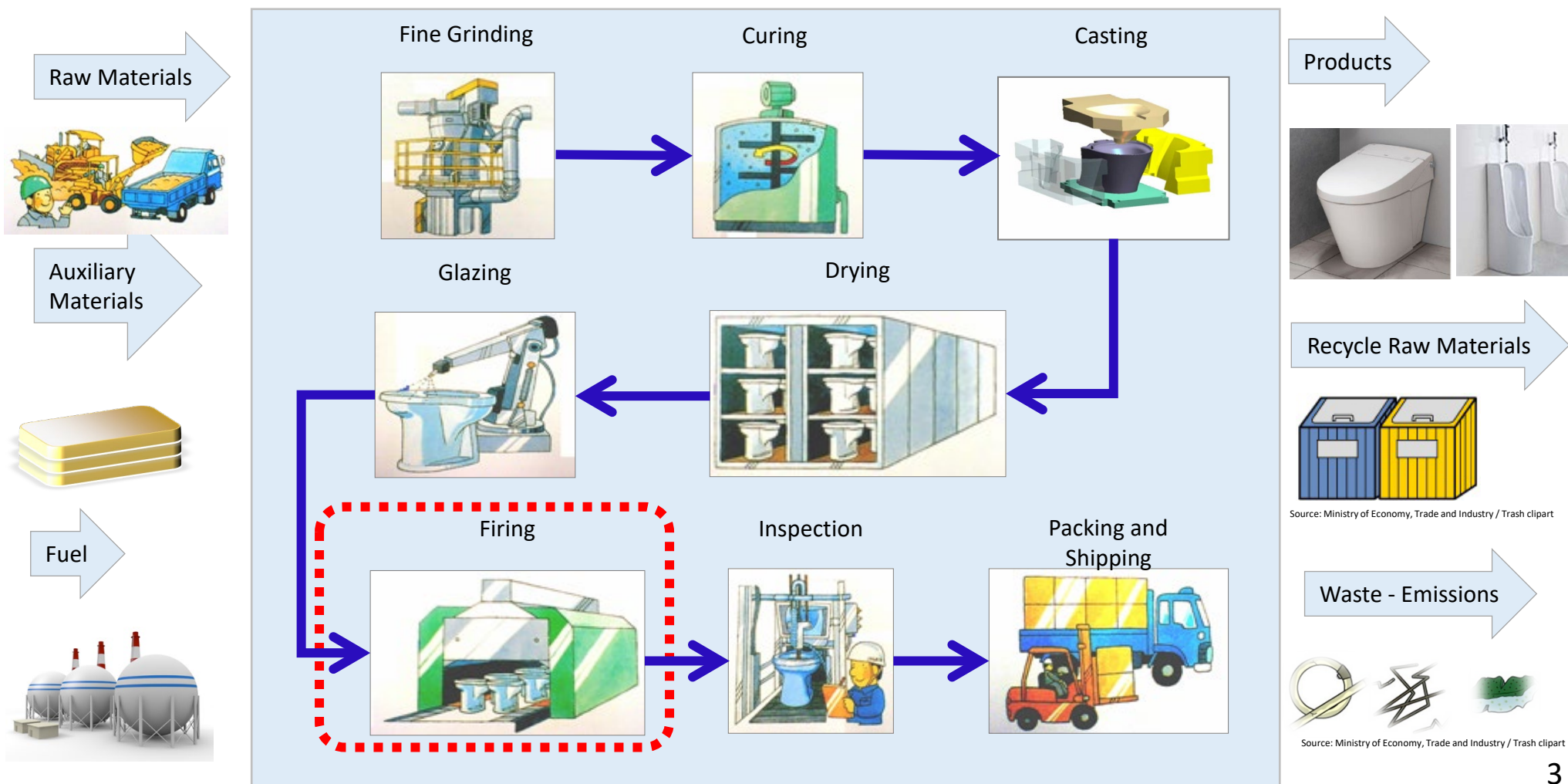
■ Current State of Industry

As social and economic activities continued to normalize after the coronavirus pandemic in FY 2023, a gradual recovery continued. In regard to housing investment, the number of new housing decreased to 820,000 units (down 4.6% from the same period last year), and the demand for renovation hasn't changed.

The production value, which is an indicator of the amount of production activity in the industry, also decreased from last year and was 714.7 billion yen (down 5.6% from the previous year, a 9.5% increase from FY 2013).

1. Overview of Sanitary Equipment Manufacturing Industry (2)

- Overview of sanitary ceramics production process (representative products of the industry)
 - About 60% of energy consumption in sanitary ceramics production process is in the firing process.
 - Energy consumption of the entire industry including other production processes is about 50% of electricity, about 50% of fuel.



1. Overview of Sanitary Equipment Manufacturing Industry (3)

■ Efforts for Low Carbon Society Achievement Plan and Carbon Neutrality Action Plan

*Was active as (former) Japan Sanitary Equipment Industry Association until 2014

FY2001	Participated in the Keidanren Voluntary Action Plan on the Environment (Section on Global Warming Measures) "Target: Reduce CO ₂ emissions from production bases by 20% or more in FY2010 compared to FY1990"
FY 2005	Participated in the Ministry of Economy, Trade and Industry's "Global Warming Countermeasures Initiatives" and started reporting
FY2007	Keidanren Announces Raising Targets in the Voluntary Action Plan "Target: Reduce CO ₂ emissions from production bases (average value for the five years of FY2008~FY2012 during the first constraint period of the Kyoto Protocol) by 25% or more compared to FY1990"
FY2010	Participated in the KEIDANREN's commitment to a Low Carbon Society and set targets for (Phase I) "Phase I Targets: Reduce CO ₂ emissions from production bases by 35% or more in FY2020 compared to FY1990"
FY2013	Report of results of the first commitment period of the Kyoto Protocol ⇒Average actual value for FY2008~FY2012 reduced by 50.3% compared to FY1990... Target of the Voluntary action plan achieved
FY2014	Targets for the KEIDANREN's commitment to a Low Carbon Society (Phase II) set "Phase II target: Improve CO ₂ emissions per unit of production by 49% in FY2030 compared to FY2005"
FY2015	The Japan Sanitary Equipment Industry Association and the Japan Toilet Seat Association merged to form the Japan Sanitary Equipment Industry Association . the KEIDANREN's commitment to a Low Carbon Society continued.
FY2018	The targets of the KEIDANREN's commitment to a Low Carbon Society (Phases I and II) updated and announced: "Phase I: Target: Reduce CO ₂ emissions from production bases by 50% in FY2020 compared to FY1990" and "Phase II: Target: Reduce CO ₂ emissions from production bases by 55% in FY2030 compared to FY1990"
FY2021	Report on results of the KEIDANREN's commitment to a Low Carbon Society (Phase I) ⇒ Reduce CO ₂ emissions from production bases by 63.3% in FY2020 compared to FY1990... Achieve Phase I targets Participated in the Keidanren Carbon Neutrality Action Plan
FY2022	Vision for Achieving Carbon Neutrality by 2050 and Phase II CO ₂ Emissions Reduction Target announced "Phase II Target: Reduce CO ₂ Emissions from production bases by 40% in FY2030 compared to FY2013" *Equivalent to 70% reduction compared to 1990

Vision Towards Realization of Carbon Neutrality by 2050

Japan Sanitary Equipment Industry Association has been contributing to the betterment of living culture for people all over the world through sustainable development.

Going forward, we will continue our efforts in realizing a sustainable society by providing a safe, simple to use, and environmentally friendly restroom space.

● Details about CO₂ Emission Reduction Activities and Vision Setting So Far

Our industry was the first to complete the fuel conversion for firing kilns, which consume the largest amount of energy. Additionally, we have set reduction targets for 2020 and 2030 in the KEIDANREN's commitment to a Low Carbon Society, and have been working to reduce emissions from our domestic business activities.

In the future, in order to contribute to the "realization of a Carbon Neutral Society by 2050" announced by the government, we will strive to further reduce CO₂ emissions under the Keidanren Carbon Neutrality Action Plan.

【First Pillar】 (Reduce Emissions from Domestic Business Activities)

Based on the Keidanren Carbon Neutrality Action Plan, targets have been set for 2030 to strive to reduce emissions from domestic business activities and contribute to the global warming countermeasure plan set by the Japanese government.

【Second Pillar】 (Strengthening Cooperation with other interested groups)

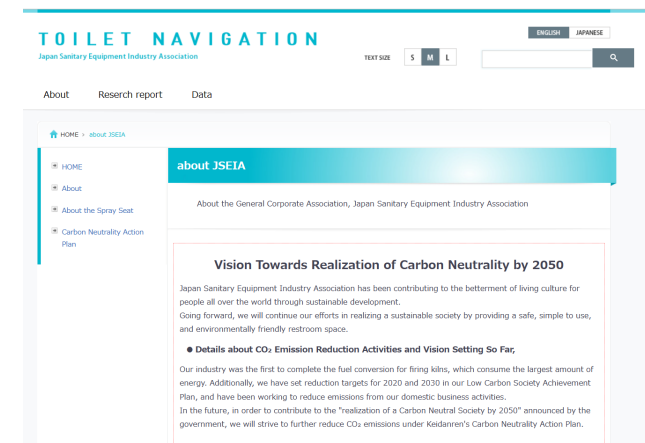
With the proliferation of water-saving toilets and energy-saving spray seat, households, businesses and other sectors, etc. will contribute to the reduction of CO₂ during use.

【Third Pillar】 (Promotion of International Contribution)

The proliferation of using water-saving toilets will contribute to the reduction of CO₂ during use overseas.

【Fourth Pillar】 (Development of Innovative Technologies Toward Carbon Neutrality by 2050)

Innovative technologies for carbon neutrality, which are being studied in other industries, will be applied to the production and business activities of sanitary ware of each member company, with the aim of practical application.



■ Target Index: FY 2030 (Phase II)

- Reduce CO₂ emissions in FY 2030 generated at production bases by **40% compared to FY 2013**.
(ref. Equivalent to a 70% reduction compared to FY1990)

■ Applicable business scope

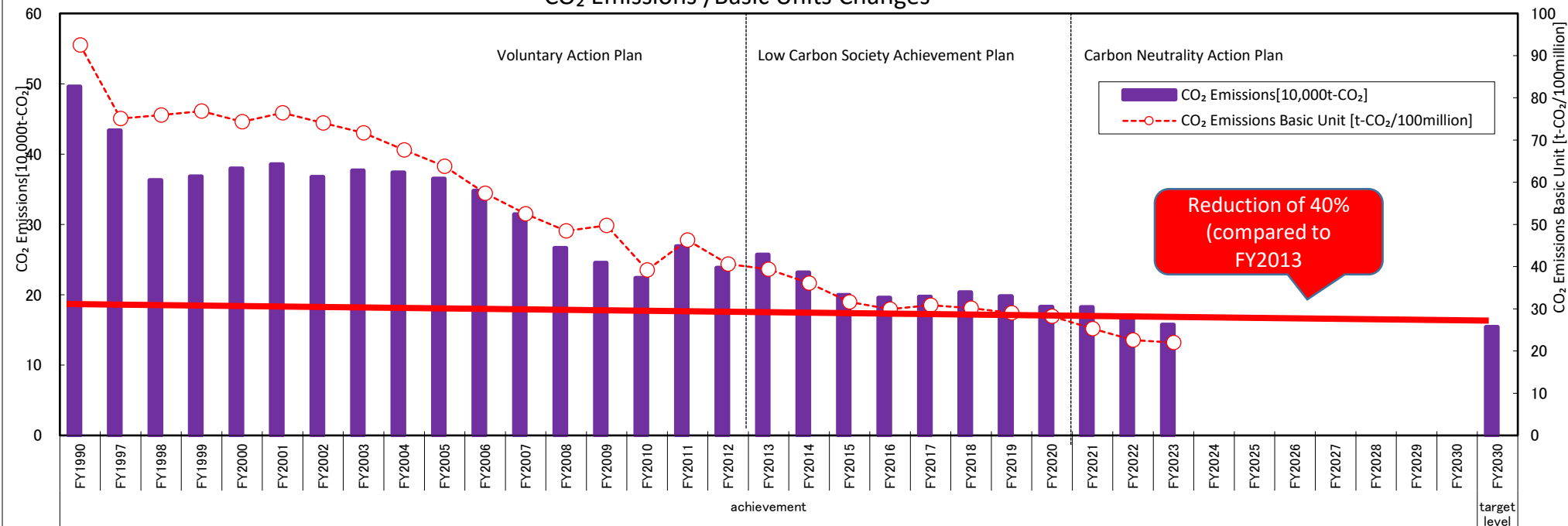
- Domestic production bases for sanitary equipment of each company which participates in Carbon Neutrality Action Plan.

3. Reduction of CO₂ emissions in FY2023 (1)

■ FY 2023 Achievements

- CO₂ Emissions: 157,000 t- CO₂ (reduction of 38.9% vs. FY 2013)

CO₂ Emissions /Basic Units Changes



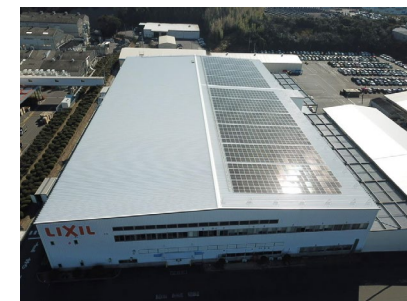
【Factor analysis】

Energy consumption in FY2023 decreased by 5,000 kl from the previous fiscal year (5.5% decrease from the previous year) during a decrease in production activities (5.6% decrease from the previous year). While there were factors that increased energy consumption, the main reason is considered as a small decrease in energy per unit from the previous fiscal year through continuous energy-saving improvements such as switching to LED lights and replacing with high-efficiency equipment, and implementing kiln consolidation. The electricity emission coefficient was 4.21 t-CO₂/10,000 kWh, and CO₂ emissions decreased by 38.9% compared to the base year and 8.2% compared to the previous year, and CO₂ per unit decreased by 44.2% compared to the base year and 2.3% compared to the previous year.

3. Reduction of CO₂ emissions in FY2023 (2)

- Continued highly efficient manufacturing through renovation of manufacturing facilities also in FY 2023.
- Each company promoted energy-saving measures, such as upgrading to energy-saving equipment and improving equipment efficiency.
- Shifting to frequent and smaller measures and yet continuing investment in CO₂ reduction projects.

Major measures implemented in FY 2023	CO ₂ Reduction per FY (t-CO ₂)	Investment Amount (1,000 yen)
Renewal of production equipment	37	170,300
Insulated Building renovation	Not measurable	12,900
Equipment efficiency improvement, energy saving measures, introduction of renewable energy	12,264	483,297
Total	12,301	666,497



Solar power generation installation



Energy-saving and highly efficient injection molding machines



Update to latest Compressor

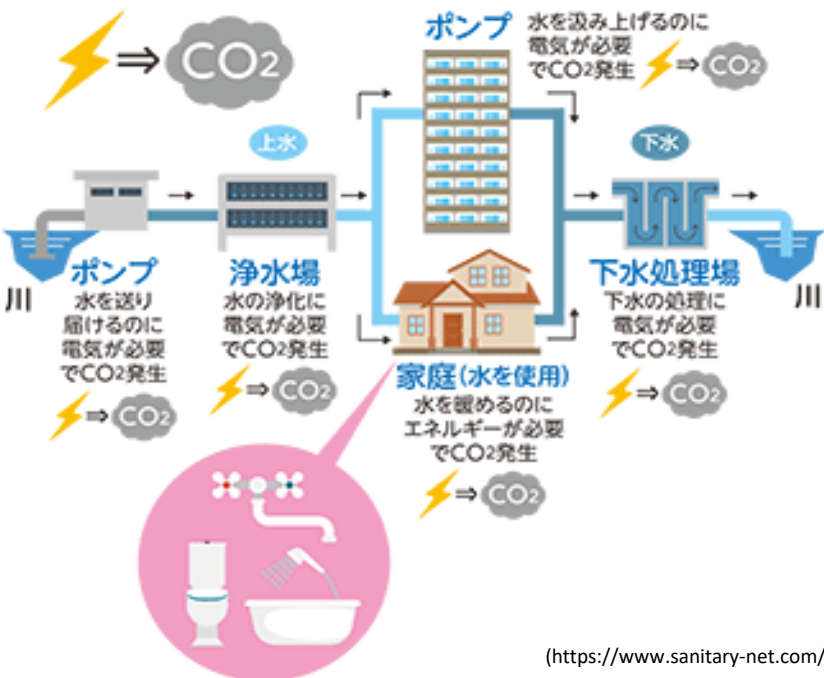
■ Contribution to CO2 Reduction from Saving Water

Water consumed by toilets is connected to the water supply and sewage systems, and electricity is consumed in the process of passing through these water supply and sewage infrastructures, resulting in the emission of CO₂ (Fig. 1). Therefore, we think that saving water through the spread of water-saving toilets will contribute not only to the conservation of water resources but also to "CO2 reduction".

■ Publication of CO₂ Conversion Coefficient of Water

The industry association has compiled and published the recommendation value of " CO₂ Conversion Coefficient of Water" so that the amount of CO₂ reduction from conserving water can be calculated, and this conversion coefficient "0.49kg CO₂ / m³ (value announced in 2021 * 1 ~ * 4)" is recommended in calculations.

It was published that if all toilets used in Japan is replaced with a water-saving toilet with a flush water volume of 6 liters, the amount of CO₂ reduction converted from the amount of water conserved would be about 5,200t per year.



(<https://www.sanitary-net.com/saving/>)

Fig. 1: Image of power saving and CO₂ reduction at water purification and sewage treatment plant due to water conservation

規格・基準

水のCO₂換算係数について

上下水道に接続される水まわり製品を使用することによって発生する水使用に由来するCO₂排出量の算出に当たり、当工業会では、次の換算係数を用いて計算することを推奨しています。

水のCO₂換算係数

0.44kgCO₂/m³

※ As of 1 Apr 2025

- * 1 Source: "Waterworks Statistics" published by Japan Water Works Association, "National Sewage Works Database" published by Japan Sewage Works Association
- * 2 Calculation of CO₂ emissions from factory wastewater, etc., are not considered.
- * 3 CO₂ conversion coefficient: water supply CO₂ conversion coefficient (CO₂ emission volume ÷ water supply volume) + sewage CO₂ conversion coefficient (CO₂ emission volume ÷ sewage treated water volume)
- * 4 Published value: CO₂ conversion coefficients is calculated based on actual data published for the past 5 years and average of the 5 years

- Improving the performance of water-saving toilets and promoting their use. Enlightenment on the website of the association.

Water-Saving Toilets

● **Contribution to reducing CO₂ emissions through the spread of water-saving toilets: 5,200 t-CO₂/year**

Eco-friendly toilets

Water-saving toilets • CO₂ reduction

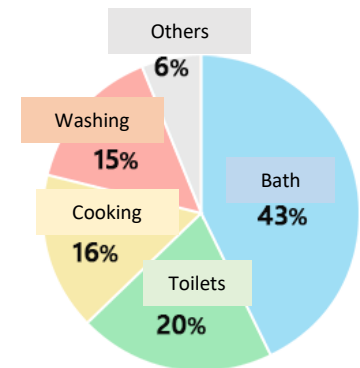


Until around 1996, the flushing water volume of the main shipments of toilets was 13 liters. If all toilets used in Japan were replaced with a water-saving toilet with a flush water volume of 6 liters, the amount of water conserved would be about 10.66 million m³ per year and the amount of CO₂ reduction converted from the amount of water conserved would be about 4,700t per year.

This means changing to the latest model with small flush water volume saves not only water, but also reduces CO₂ emissions.

(Reference) Water consumption when using sanitary facilities at home

According to a survey by the Tokyo Metropolitan Government Bureau of Waterworks in FY2015, among water consumed at home, water used in toilets was said to be the second largest after baths, and can contribute to the conservation of water resources by conserving the amount of wash water used each time. The amount of water flushed in toilets, which was 13L until around 1996, has improved since 2006 by the efforts of companies participating in this industry, and the performance of water-saving toilets has improved and their use has progressed, resulting in water-saving toilets of 6L or less. 6L water-saving toilets contribute to water saving by about 60% compared to 13L toilets. (For a family of 4, about 45,260L per year, industry estimate)



Source: Bureau of Waterworks, Tokyo Metropolitan Government, FY2021 Fact-finding Survey by Purpose of General Household Water Use

※ As of 1 Apr 2025

- Amount of contribution to CO₂ emission reduction: Amount estimated by multiplying the difference between the annual amount of flush water per unit of non-water saving and water-saving toilets by the number of water-saving toilets shipped this fiscal year and using the CO₂ conversion factor for water.
- Non-water-saving toilets: Toilets with average flush water volume in the market stock (estimated by the Japan Sanitary Equipment Industry Association)
- Water-saving toilets: All water-saving toilets are calculated as water closets with large flush: 6L, small flush: 5L.

4 . Contributions in Other Sectors through Low-Carbon Products and Services (3) **JSEIA**

JAPAN SANITARY EQUIPMENT INDUSTRY ASSOCIATION

- Improve the performance and promote the use of energy saving spray seats, and raise awareness on the website of the Association.

Spray Seats

- **Energy saving (compared to 2008) Hot water storage type: Approx. 21% energy saving Instantaneous type: Approx. 30% energy saving**
- **Contribution to reducing CO2 emissions through the proliferation of energy-saving spray seats 48,600 t-CO2/year**

<Industry Association web pages "Energy-saving spray seat">
<http://www.sanitary-net.com/saving/ecology.html>

Eco-friendly toilets

Energy-saving of spray seats



Spray seat is "a seat that has function to cleanse bottom with hot water". According to the Cabinet survey (March 2016), penetration rate for households is about 80%. This means many families use spray seats. Energy-saving products save electricity charge and reduce CO₂ emissions.

Annual power consumption is the amount of power consumed in one year when the spray seat is used in an average manner at home.

■ Comparison of annual power consumption with spray seats in 2008



* Source: A Simple average value in the model list described in "Energy Saving Performance Catalog Winter 2008 Edition", "Energy Saving Performance Catalog 2023 edition" of the Agency for Natural Resources and Energy, Ministry of Economy, Trade and Industry.

- Contribution to CO2 emission reduction: Based on the annual power consumption of the current standard (FY2012 standard), the difference in the annual power consumption of each energy-saving product shipped, in other words, the amount of electricity saved, is multiplied by the CO2 conversion factor of electricity*, and the total amount is the contribution to CO2 emission reduction. (*The preliminary Figure of FY 2023: 4.21t-CO2/10,000 kWh (Japan Business Federation source 2024 Aug 23))
- Hot water storage type: The water in the tank is heated by a heater, and can be cleaned with plenty of hot water at once, but electricity is required to keep the hot water warm.
- Instantaneous type: There is no tank, and the water is heated with an instantaneous water heater for each use. Since no electricity is required to keep the hot water warm, the power consumption is lower than the "storage type", but the amount of hot water is limited. It also momentarily requires a large amount of power.

<Industry Association web pages "How to choose a spray seat">

<http://www.sanitary-net.com/saving/ecology02.html>

Various Power Saving Function are Included for Points to Select Products

*Energy saving technology of evolving spray seats.

Power saving control	Timer power saving	Stop power to the heated toilet seat and hot water tank for a certain period of time.
	Automatic power saving	-Power saving with learning function- Learn what time period the toilet is not being used much and lower heating during that time.
Automatic open and close toilet Lid	Sensor will automatically open the lid when approached and close when leaving and prevents forgetting to close the lid. This improves the warming function of the heated seat and is effective in power saving.	
Instantaneous type (hot water)	Since water is heated only when using the bidet or rear wash, there is no need to maintain heating and saves power.	
Momentary heating toilet seat	Saves power when heating seat is not in use.	
Toilet lid that fits shape of toilet seat	Prevents heat dissipation from sides of toilet seat.	
Toilet lid that covers main unit	Prevents heat dissipation from gaps between toilet seat and main unit.	

4. Contributions in Other Sectors through Low-Carbon Products and Services (4) *JSEIA*

JAPAN SANITARY EQUIPMENT INDUSTRY ASSOCIATION

■ Popularization of water-saving appliances due to revision of JIS A5207 (sanitary wares)

-By establishing water volume classification for urinals, unifying testing methods, and additional settings for the JIS code for water closets, it is expected that this will serve as guidelines for the promotion of water-saving equipment as well as for product procurement and selection and that popularization for use of such products will contribute to water resource conservation and reduction of CO2. In June 2022, the ISO31600 (Water Efficiency labeling programmes – Requirements with Guidance for Implementation) was enacted, and JIS A5207, which is consistent with ISO, was revised and published in August 2022. The JIS is currently in operation.

Contribute to water resource conservation and CO2 reduction by revising JIS A5207 (sanitary wares)

[Flush volume classification of water closets]

Type	Classification	Flush Volume (L)	
Water closet	Type I	8.5 or less	—
	Type II	6.5 or less	*Water-saving type
Urinal	Type I	4.0 or less	*Water-saving type
	Type II	2.0 or less	*Water-saving type

[Types of Urinals]

Type	Type Name			Type I	Type II
	Water supply system	Installation	size		
Urinal	Flush valve-type	Floor-mounted	Large	○	—
			Small	○	—
		Wall-mounted	Large	○	—
			Small	○	—
	Dedicated flush valve-type	Floor-mounted	Large	—	○
			Small	—	—
		Wall-mounted	Large	—	○
			Small	—	—

*Water closets Type II, Type I and II of Urinals are clearly stated as “Water-saving type”

[Types of Water closets]

Type	Type name			Type I	Type II
	Water supply system	Installation	Drain		
Water closet	Tank-type	Floor-mounted	Floor drain	○	○
			Wall drain	○	○
		Wall-mounted	Wall drain	—	—
	Flush valve-type	Floor-mounted	Floor drain	○	○
			Wall drain	○	○
		Wall-mounted	Wall drain	○	○
	Dedicated flush valve-type	Floor-mounted	Floor drain	—	○
			Wall drain	—	○
		Wall-mounted	Wall drain	—	○

■ Activities to further popularize water-saving toilets

— The distance of waste transported in the water closet is affected by the installation conditions of the drainage piping. We edited the results of transport tests (paper published by the Society of Heating, Air-Conditioning and Sanitary Engineers of Japan) with the cooperation of universities in which the drainage piping conditions (elbow pipe position, confluence fitting types) and published it on the Japan Sanitary Equipment Industry Association website as useful data for the design of drainage piping. Through disclosing and disseminating the impact of drainage piping, it is expected to further promote the spread of water-saving toilets by improving the performance of waste transport, contributing to the conservation of water resources, and the reduction of CO2 emissions.

The effect of different piping conditions at the confluence pipe on waste transport in the water closet

- Experimental examples
- ① Experiments on transport by confluence fitting types

② Water flow by confluence fitting types

The effect of different piping conditions at the single pipe on waste transport in the water closet

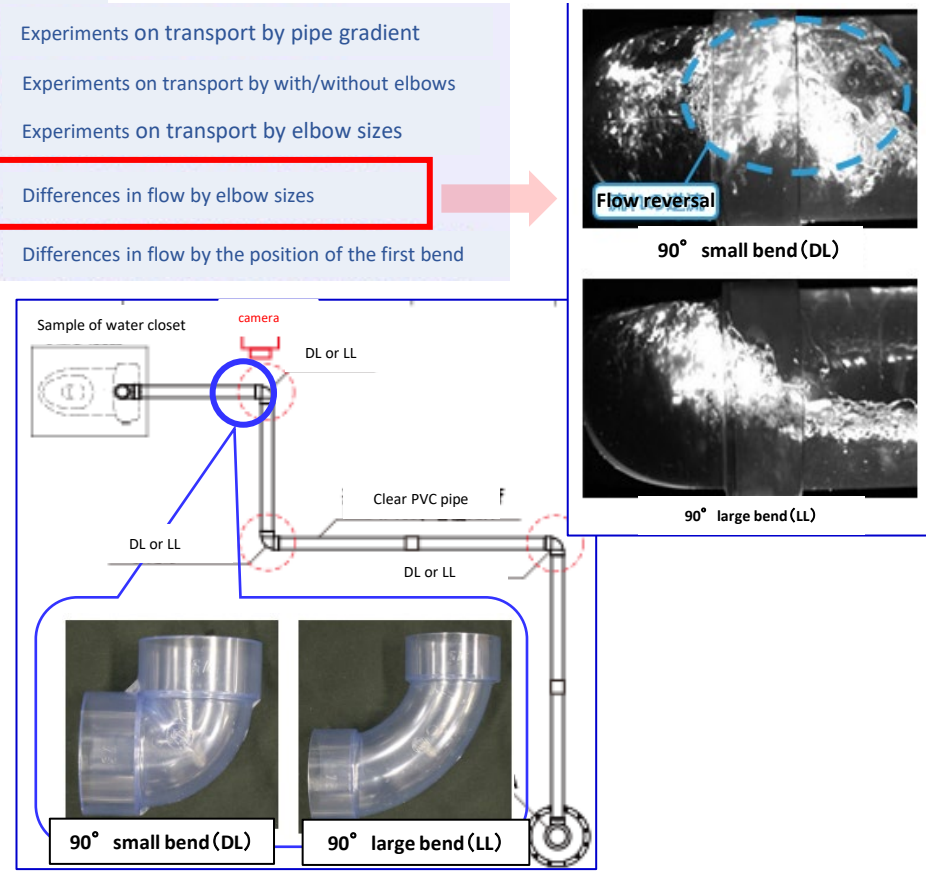
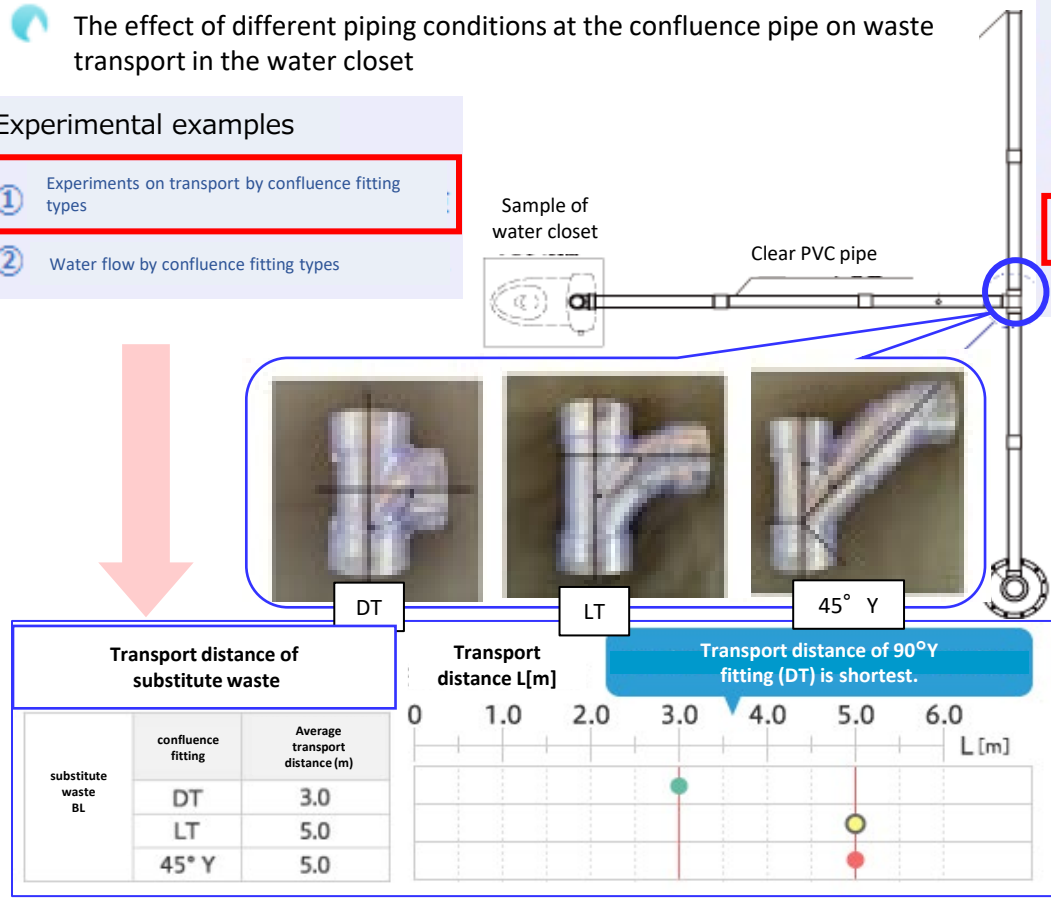
- Experimental examples
- ① Experiments on transport by pipe gradient

② Experiments on transport by with/without elbows

③ Experiments on transport by elbow sizes

④ Differences in flow by elbow sizes

⑤ Differences in flow by the position of the first bend



5. Contribution to Reduction Overseas

■ Contributing Internationally by Popularizing Water-Saving Toilets

- In order to popularize water-saving toilets overseas, participated in the promotion of the Green Building Materials Project (common name for the Ministry of Economy, Trade and Industry project commissioned by the Japan Building Materials and Housing Equipment Industries Association) and is continuing activities to introduce Japan water-saving toilet standards to ASEAN countries. In FY2023, we exchanged opinions on establishing water conservation rules through ISO31600 with government agencies in Vietnam and Indonesia.
- Seminars or workshops will be held to promote discussions with ASEAN countries using the ACCSQ (ASEAN Consultative Committee on Standards and Quality) in FY2024. Plans and preparations for this will be made.

Information development activities for international standards on water saving rules for the proliferation of water-saving equipment

● ISO31600 has been published in June 2022. Exchanged opinions with countries that have not standardized water conservation rules.

【Draft ISO 31600 Requirements】

Should include the following in existing national standards of each country:

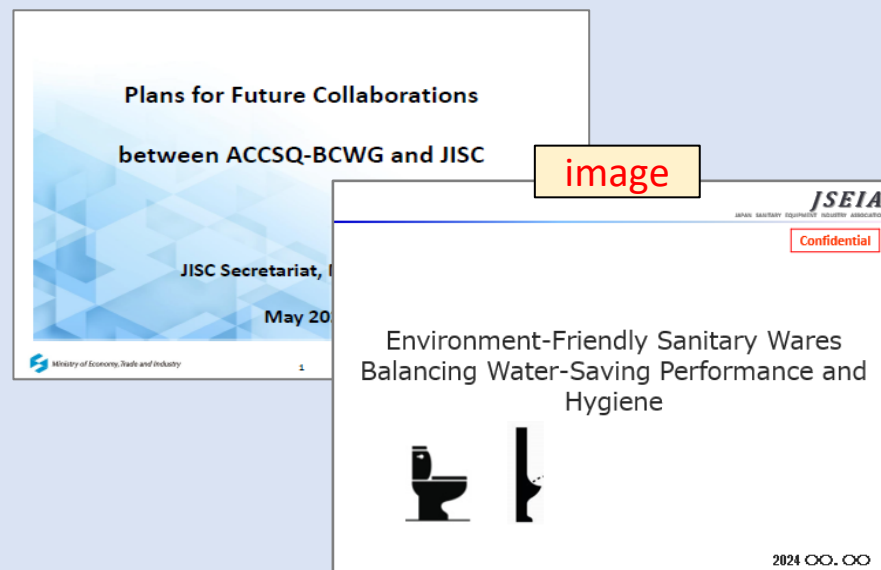
- ① Product testing method
- ② Water saving effect evaluation criteria
- ③ Labelling &/or Rating

Conforms to ISO if compliant

【Exchange of Opinions on Water Conservation Rules with ASEAN Countries】

- 1) Feb 2023: Japan participation in the APEC Workshop
→ Presentation of Japanese environmentally friendly products
- 2) Jul 2023: Exchange of Views with Badan Standardisasi Nasional of Indonesia
- 3)) Aug 2023: Exchange of Views with the Institute of Building Materials of Vietnam

● In order to expand information of ISO 31600 and JIS A 5207 which covers both hygienic and water efficiency to ASEAN countries, plans and preparations for the workshop in ACCSQ will be made.



6. Status of Development and Introduction of Innovative Technologies, BAT, Best Practice Progress and Introduction

■ Best Practice, Introduction and promotion of BAT*

- Innovative technologies are being studied by individual companies. Maximum introduction of top-runner equipment is being promoted.

Introduction of BAT



eg. Solar power generation installation



eg. Energy-saving and highly efficient injection molding machines



eg. Update to Latest . Compressor

7. Other efforts (1)

■ Efforts by Operations Division

- Each individual company promotes company-wide CO₂ reduction activities involving Operations Division.

■ Initiatives by Transport Division

- Each company as a consignor, collaborates with transport companies to carry out measures to improve transport efficiency.

- 1) Review logistics plan (development of redistribution bases, routine routes pickup, etc.)
- 2) Improve transport efficiency (loading efficiency, request eco-driving to drivers etc.)
- 3) Periodically report as a specific consignor of Energy Saving Act.
- 4) No idling while loading
- 5) CO₂ reduction by reducing use of trucks
- 6) Use of joint delivery

■ Efforts to dispatch information (in Japan)

- Industry Association: Introduce CO₂ emissions reduction efforts through water conservation on website.



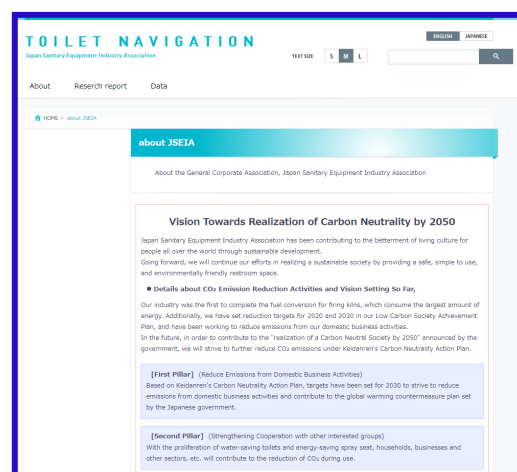
eg. Light Switch Array



eg. Reduction of showroom lighting



TOILET NAVIGATION (JP)
<http://www.sanitary-net.com/>



TOILET NAVIGATION (EN)
<http://www.sanitary-net.com/global>



TOILET NAVIGATION (Water-saving and CO₂ reduction of water closets)
<https://www.sanitary-net.com/saving/>

A photograph showing a person in white clothing walking a light-colored dog on a leash. To the right of the person is a modern, white smart toilet. A semi-transparent blue circle is drawn around the dog's head, and the text "Happy life with Toilets" is overlaid on this circle.

Happy life with Toilets

JAPAN SANITARY EQUIPMENT INDUSTRY ASSOCIATION

<https://www.sanitary-net.com/>