Realization of Carbon Neutrality

Nikko Group set forth to achieving virtually zero CO_2 emissions (carbon neutrality) in 2050 as a management goal and has started implementing various initiatives to achieve this.

Initiatives for reducing CO_2 emissions (Scope 2)

❶ Installation of solar power generation facilities

The Group installed solar power generation facilities at the head office factory of Nikko Co., Ltd. in March 2013.

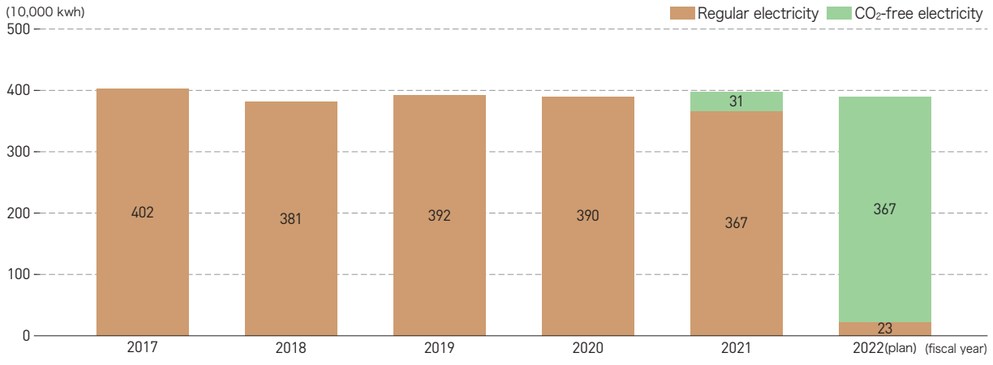
◎Area: 338 m^2
◎Power generated: 415,163 kWh
(cumulative total for FY 2013–2021)

Nikko plans to further increase the number of solar energy power generation facilities within its premises.

❷ Switch to CO_2-free electricity

Nikko Co., Ltd. switched all electricity used at its head office to electricity generated from renewable energy sources in March 2022. It has been promoting similar initiatives at its offices and group companies, and Nikko Group aims to achieve RE100 (100% shift to electricity made using renewable energy) in 2030.

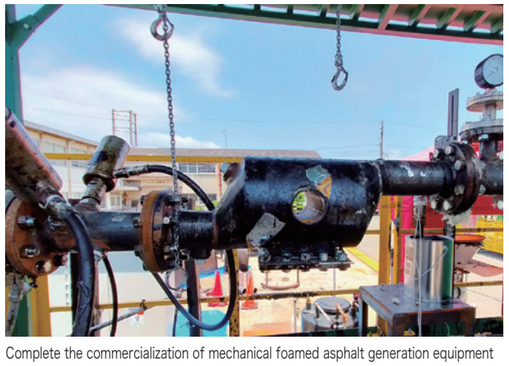
Power usage (parent Nikko)



Initiatives for reducing CO_2 emissions (Scope 3)

❶ Shift to warm mix

We have succeeded in developing and commercializing a mechanical foamed asphalt generation equipment, something which road pavement companies had been actively working on. We are the first Japanese plant manufacturer to develop and commercialize such. The equipment lowers the temperature during the manufacturing of asphalt and thus contributes to a reduction in CO_2 emissions.
Tokyo Metropolitan Government had been verifying the technological aspects of low-carbon (warm mix) asphalt mixture, which is expected to curb CO_2 emissions, and it approved the technology as a new mixture in June 2022.
According to calculation by the Tokyo Metropolitan Government, if the low-carbon (warm mix) asphalt mixture, whose manufacturing temperature is reduced 30°C, are used in projects ordered by the metropolitan government, it is expected to reduce CO_2 emissions by 3,470 tons a year.



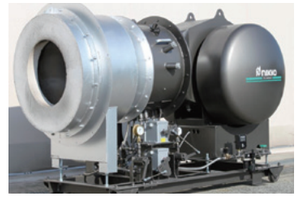
Complete the commercialization of mechanical foamed asphalt generation equipment

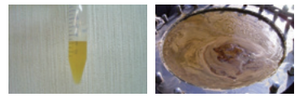
❷ Fuel transition

The Group has been developing liquid and powder biomass burners as well as gas burners that has low CO_2 emissions to replace existing heavy oil burners by applying Nikko's combustion technology. We have been making efforts to change the fuel used in its asphalt plants to low-carbon and decarbonized fuels and have been actively proposing the alternatives to our customers for achieving carbon neutrality.

● Alternative fuel burners that have been developed and launched

Gas burner



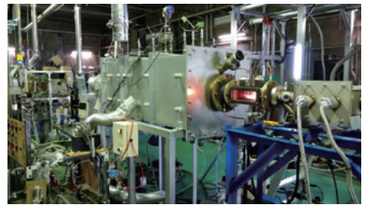


Liquid biomass burner

Powder biomass burner

● Alternative fuel burners in development

Nikko Group has been driving forward to develop burners that use ammonia and hydrogen, which do not emit CO_2 in the combustion process. The development is not just aimed at asphalt plants, as the Group is conducting joint research with Osaka University and Tokyo Gas Co., Ltd. to enable the application of its technology in various industries.



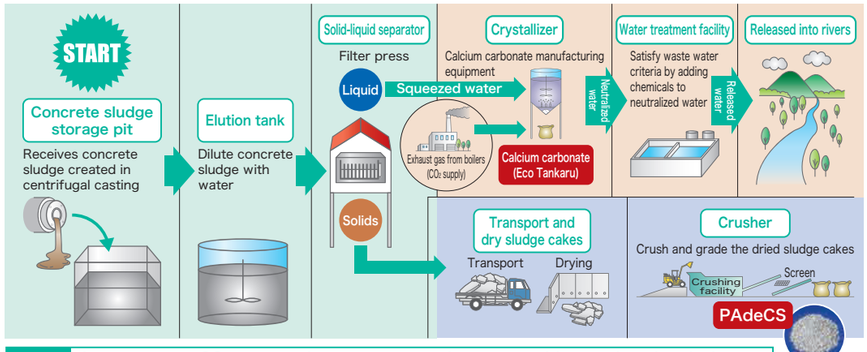
Ammonia burner (in development)

Hydrogen burners (in development)

❸ CO_2 absorption effect in the recycling process of concrete sludge

Calcium carbonate is created when highly alkaline calcium-rich waste water reacts with the exhaust gas (CO_2) in the air. The use as a concrete admixture is expected to reduce CO_2 emissions by 440 kg CO_2-t.

Manufacturing flow of PAceCS and Eco Tankaru



Features: It can capture CO_2 at normal temperature and pressure without using chemicals.
*The technology is called Mineral Carbon Capture & Utilization <MCC&U> technology, and is one of CO_2 reduction technologies.

◎**Eco Tankaru (precipitated calcium carbonate):** A low environmental burden product manufactured by capturing the CO_2 in the boiler exhaust of secondary concrete product factories. It is used in concrete admixtures, paper, coating, rubber products, etc.

◎**PAdeCS:** A highly alkaline environmental purification material derived from cement. It is used as water pollutant remover, as material for recovering phosphorus, which is getting depleted, in deodorizers, etc.

<Source: PAdeCS Study Group>

Information disclosed based on TCFD framework

Climate change caused by greenhouse gas (GHG) emission has an enormous impact on society and economy, and Nikko Group recognizes that it is the most pressing social issue the Group should work on. For the realization of a decarbonized society targeted in the Paris Agreement, Nikko Group is aiming to achieve a 50% reduction in CO_2 emissions (compared with FY 2021) from its business activities as well as operation of Nikko-made plants at customers as an interim target for FY 2030.

The Group is promoting the development of technologies for reducing CO_2 emissions and provision of related products and services towards achieving carbon neutrality in 2050. After endorsing the TCFD recommendations in October 2021, it has been disclosing information in accordance with the TCFD framework for smooth communication regarding climate change issues with stakeholders including shareholders and investors.

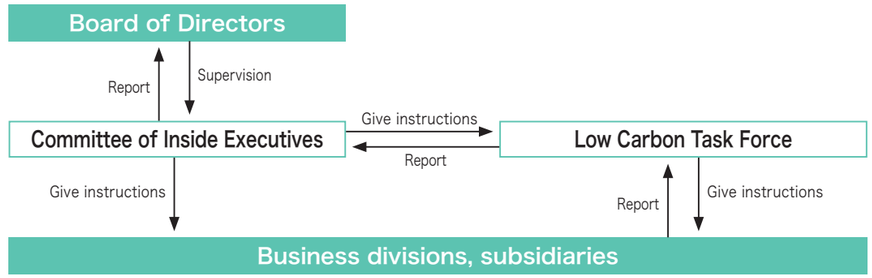
Status of the initiatives related to the four core elements of the TCFD recommendations

	Nikko Group's initiatives
Governance	●The Group has established the Low Carbon Task Force (LCTF) led by the managers of business and development divisions, which gathers and analyzes carbon neutrality-related information and carries out planning (once a month meetings). ●The Committee of Inside Executives sets forth targets based on the proposals by LTCF and formulates detailed strategies for achieving them. ●Key measures and action plans formulated by the committee are promoted company-wide and the progress is reported to the Board of Directors. ●The Board of Directors deliberates on the validity of strategies and inherent risks and supervises the progress towards targets.
Strategy	●Identify risks and opportunities in scenario analysis considering the 2°C and 4°C scenarios ●Analyze the impact of risks and opportunities on business and finance ●Formulate plans for product development and market introduction towards achieving carbon neutrality
Risk Management	●The Risk Management Committee chaired by Senior Managing Director and General Manager of Administrative Division identifies and manages risks that have major impact on business and finance as priority management risks. ●The committee shares risk information with the Committee of Inside Executives and the Board of Directors and decides appropriate responses from the perspective of company-wide risk management.
Metrics and Targets	●Verification of CO_2 emissions by Nikko Co., Ltd. (Scope 1 and 2) ●Switch to renewable energy-based electricity and establishment of RE100 target ●Verification of CO_2 emissions in Scope 3 ●Establishment of the interim target for 2030 and formulation of product development and market introduction plans <FY 2021 results> - CO_2 emissions (Scope 1 and 2): 2,759 t-CO_2 - CO_2 emissions (Scope 3): 779,260 t-CO_2 <FY 2030 target> - CO_2 emissions (Scope 1, 2, and 3): 391,000 t-CO_2 <FY 2050 target> - CO_2 emissions(Scope 1, 2, and 3): aim for virtually zero

Governance Carbon neutrality promotion structure

Nikko established the Low Carbon Task Force (LCTF) led by the managers of the Business and Technology Development Divisions as an organization that promotes the realization of carbon neutrality. Through its monthly meetings, it has a system in place to examine and discuss the issues in a cross-divisional manner for the realization of carbon neutrality based on data verification and evidence. The Committee of Inside Executives discusses the plan proposal drafted by LCTF and formulates concrete target values and specific strategies for achieving the targets. The Board of Directors deliberates on what the Committee of Inside Executives formulated and monitors its progress.

Governance structure diagram



Strategy Climate change scenario analysis

Nikko assumes the future temperature rise scenarios in the range of 2°C and 4°C upon and carries out the medium-term (2030) and long-term (2050) scenario analyses.

<Reference scenarios>
- IEA "World Energy Outlook 2020"
  - -STEPS (stated policies scenario)
  - -SDS (sustainable development scenario)
- IPCC AR5
  - -RCP2.6 (2°C scenario)
  - -RCP8.5 (4°C scenario)

Business and financial impact of climate-related risks and opportunities based on scenario analysis

	Risks	Impact on finance	Opportunity	Impact on finance
2°C scenario (Assuming progress in low-carbonization)	Rapid shift to decarbonized burners (plants)	High	Demand for updating to low-carbon or decarbonized burners (plants)	High
	Request from users to share the carbon tax burden (discount)	High		
	Market introduction of highly carbon-efficient roadbed materials alternative to asphalt	High	Growth in market share due to superiority in the R&D competition	High
	Increase in R&D expenses and capital investment (decarbonized burners, CO_2 capture and storage technology, etc.)	Medium	Increase in demand for concrete products (roadbed materials alternative to asphalt)	Medium
	New entry by boiler, burner, and electric furnace manufacturers	Medium	Growth in demand for recycling and low-carbon plants due to stricter environmental restrictions in China and Southeast Asian countries	Medium
	Decrease in the number of operating plants due to centralization to large plants	Medium		
	Increase in the cost of procurement of raw materials (steel materials, etc.)	Low	Provocation of demand for new plants due to spread of CO_2 fixation concrete	Low
	Increase in the cost of electricity derived from renewable energy	Low		
	Increase in the cost of procurement of alternative fuels	Low	Increase in demand for lithium battery recycling equipment due to expansion of the EV market	Low
4°C scenario (Assuming no progress in low-carbonization)	Expansion of the new roadbed and construction material markets due to measures against heat island effect (shrinkage of the existing asphalt and concrete markets)	Medium	Increase in demand for preemptive maintenance for stable operation	High
	Increase in the cost of procurement of materials due to suspension of supply chains	Low	Increase in demand for disaster prevention or mitigation models	Medium
			Increase in demand for disaster prevention products (waterproof boards, temporary scaffolding, etc.)	Medium
	Increase in BCP expenses	Low	Increase in demand for counter-disaster mobile plants	Low
			Increase in demand for transferring plants to areas with low disaster risk	Low

The degree of financial impact is evaluated across three levels between high, medium, and low, depending on the materialization of the risks and opportunities and the impact on periodic income.

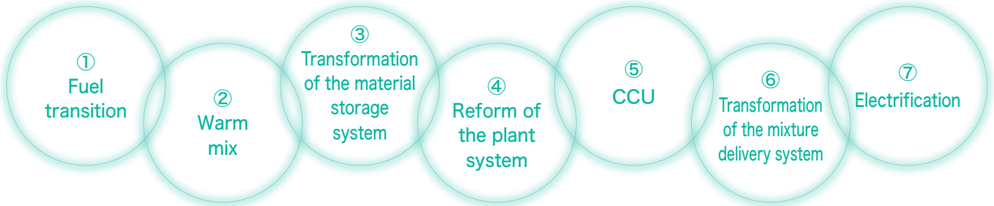
Four steps and seven approaches towards the realization of carbon neutrality

● Four steps

To grasp CO_2 emissions in Scope 1, 2, and 3 as accurately as possible, we verified major categories by setting certain conditions. As a result of the verification, CO_2 emissions from using products such as the Nikko-made plants we sold were 692,000 tons, accounting for 89.3% of overall emissions in Scope 3. The Group will offer products and services by identifying the most cost-effective methods for reducing CO_2 emissions, while sharing with customers the evidence extracted from verification data.

To accurately understand the CO_2 emissions during the mixture manufacturing process, Nikko analyzed the energy consumption at the mixture plants. Since about 80% of energy is used to remove water and heat aggregates (recycled materials), reducing the water content has proved effective in reducing the energy consumption in the drying and heating process. Based on such verified data, Nikko has been taking seven approaches to developing products aimed at decarbonization as part of efforts to reduce emissions.

● Seven approaches



Nikko is conducting product development by combining seven technologies for the realization of carbon neutrality.

①Fuel transition

To replace heavy oil, which has high CO_2 emissions, the Group is considering the R&D of burners using ammonia and hydrogen, which are promising CO_2-free fuels, in addition to the development and improvement of burners that use city gas, natural gas, and biomass fuels.

②Warm mix

Manufactures asphalt mixture at a temperature lower than the usual heating temperature by reducing the viscosity of asphalt by adding water to heated asphalt and foaming it. The energy consumption in heating is reduced as we use warm mix, thus reducing CO_2 emissions.

③Transformation of the material storage system

Reducing water in aggregate, which is the raw material of asphalt mixture, enables to lower energy consumption in the aggregate incineration process, thus reducing CO_2 emissions.

④Reform of the plant system

CO_2 emissions can be reduced by reducing the amount of newly used consumption energy by recycling exhaust gas and heat from plant operation for heating and processing aggregate.

⑤CCU

The external CO_2 emissions of a plant can be reduced by absorbing CO_2 emitted at the plant using the technology to absorb CO_2 with concrete. We are also considering absorbing the CO_2 emitted from the asphalt plant at the concrete plant.

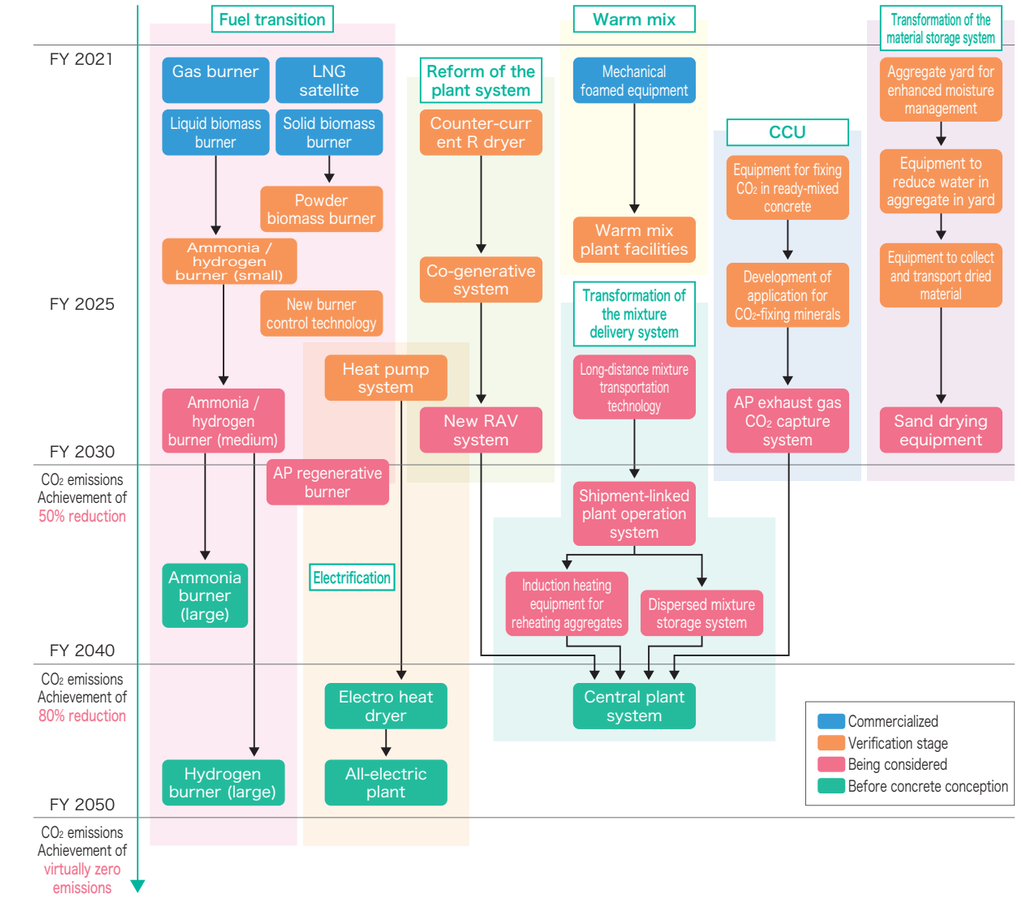
⑥Transformation of the mixture delivery system

CO_2 emissions can be reduced by lowering energy consumption by improving production efficiency of mixture through establishment of technology for extending the distance of mixture transport and improving transport efficiency from the plant to the destination.

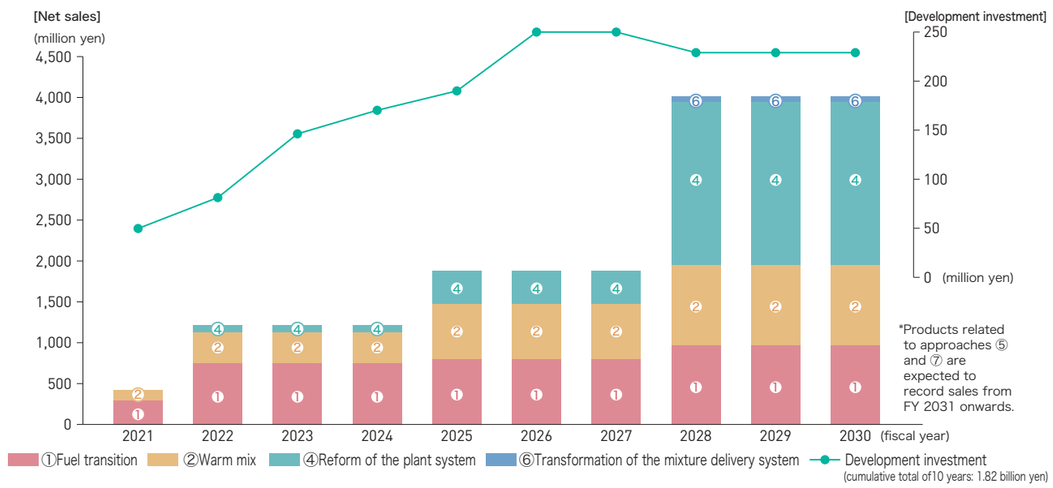
⑦Electrification

Assuming that the use of CO_2-free electricity would spread, we are considering development of an all-electric plant to replace fossil fuels by promoting the electrification of drying and heating equipment.

Road map for the development of carbon-neutral products



Net sales target of related products and investment plan (the figures for FY 2021 are results)



Risk Management

The Low Carbon Task Force (LCTF) formulates and drafts the carbon neutrality-related plans and promotes company-wide response to climate change.
The Risk Management Committee evaluates and identifies climate change-related impact on the Company and manages the effects. Furthermore, it plays the role of integrating the impact of climate change-related risks into company-wide risks by closely collaborating with the Committee of Inside Executives.
The Committee of Inside Executives discusses the impact of and response to climate change and evaluates them. It also formulates policies, key measures and targets, and action plans for minimizing climate risks. The contents of the discussion at the meetings of the Committee of Inside Executives are reported to the Board of Directors twice a year or more.
The Board of Directors performs the supervisory function, regularly receiving reports on climate change-related action plan and risk evaluation from the Committee of Inside Executives and the Risk Management Committee, and deliberating on those reports.

Metrics and Targets

Nikko Group aims to realize virtually zero CO_2 emissions from its business activities and Nikko products it sells in FY 2050. It promotes the development of products that contribute to the reduction of CO_2 emissions as well as thorough energy saving activities and proactive utilization of renewable energy.

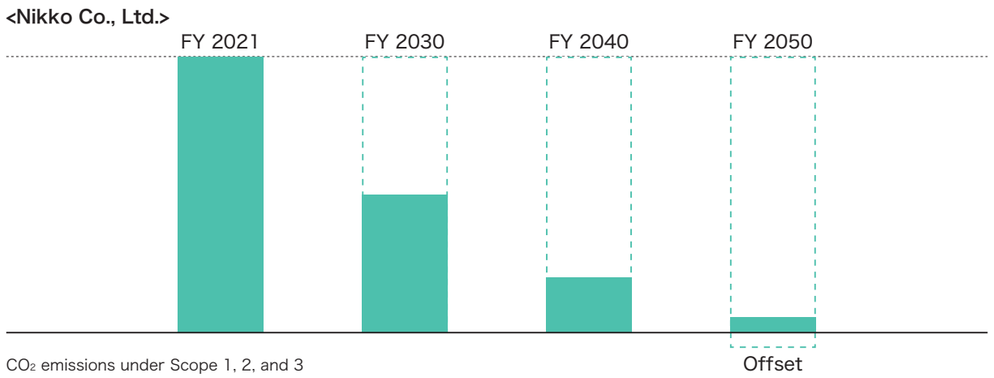
Result of CO_2 emission verification (from April 2021 to March 2022)

Category	CO_2 emissions (t-CO_2)	Target activities
【[Scope 1 and 2]	2,759	
Combustion of fuels	305	Emissions from manufacturing, processing, and experimenting
Use of electricity	2,454	Manufacturing, all offices, branches, and sales offices
[Scope 3]	779,260	
1. Purchased products and services	48,002	Emissions in upstream of the product purchased
2. Capital goods	9,206	Emissions in upstream of capital investment that has been recently introduced
3. Fuel- and energy-related activities not included in Scope 1 and 2	328	Emissions from mining, refining, etc. of fuel used
4. Transport and distribution in upper stream	24,670	Procurement and transport of raw materials and parts, and shipment of products
6. Business trips by employees	83	Use of rail service, airplane, etc.
7. Commuting by employees	323	Rail service, private vehicle, bus, motor cycle, etc.
11. Use of products sold	696,553	Emissions from operation of AP, BP, and conveyors sold
12. Disposal of products sold	95	Emissions from disposal of AP, BP, and conveyors sold

Interim targets (FY 2030) of CO_2 emissions (Scope 1, 2, and 3)

FY 2021 emission results: 2,759 t-CO_2 (Scope 1 and 2); 779,260 t-CO_2 (Scope 3)
FY 2030 emission targets: 39,100 t-CO_2 (Scope 1, 2, and 3; down 50% from FY 2021)

<Nikko Co., Ltd.>



Utilization of renewable energy-based electricity

Nikko Co., Ltd. switched all electricity used at its head office to electricity generated from renewable energy sources in March 2022. A similar initiative will be promoted at its offices around Japan and group companies.

Rate of renewable energy-based electricity used

FY 2021 (results)	7.9%	The result and plan are on a parent Nikko basis
FY 2022 (plan)	94.2%	
FY 2030 (target)	100%	RE100 target Nikko Group (Japan)

Environment-related data

Consumption of fossil fuels (kl) <head office factory + sales offices>

FY 2021	1,145
FY 2020	1,104

CO_2 emissions (t-CO_2) Scope 1 and 2 <head office factory + sales offices>

FY 2021	2,759 (Scope 1: 305; Scope 2: 2,454)
FY 2020	2,892

Power usage (kwh) <company-wide>

FY 2021	3.98 million (down 13% from the peak)
FY 2020	3.90 million
FY 2019	3.92 million
FY 2018	3.81 million
FY 2017	4.02 million

Power usage (kwh/production) output intensity <entire company>

FY 2021	1,858 (down 39% from the peak)
FY 2020	2,038
FY 2019	2,496
FY 2018	2,738
FY 2017	2,370

Power expenses (10,000 yen) <entire company>

FY 2021	6,734 (down 28% from the peak)
FY 2020	6,366
FY 2019	8,051
FY 2018	7,969
FY 2017	7,955

Solar power generated by the company (kwh) <head office building>

FY 2021	45,075
FY 2020	45,713
FY 2019	19,896
FY 2018	31,281
FY 2017	50,160

Industrial waste generated (by category)

	Wood chips	Waste plastics
FY 2021	386㎥	13,915kg
FY 2020	368㎥	20,519kg
FY 2019	332㎥	13,300kg
FY 2018	335㎥	216㎥
FY 2017	365㎥	182㎥

Water usage (m^3)

FY 2021	9,416
FY 2020	9,488
FY 2019	10,509
FY 2018	12,448
FY 2017	14,253