Responses to Climate Change (TCFD) | Disclosure in Line with TCFD Recommendations: Governance

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The NOF Group analyzes the risks and opportunities posed by climate change based on the 1.5°C and 2°C scenario as well as the 4°C scenario. The key risks and opportunities are as follows.

Category	Scenario	Major risks and opportunities	Overview	Level of impact (2030)	Countermeasures
Transition risks	1.5°C 2°C	**Tighter domestic and international regulations**	Increased financial burden due to introduction of carbon tax, etc.	Large	・Promotion of measures toward reducing greenhouse gas emissions
		Sharp rise in raw material prices	Sharp rise in prices of raw materials such as petrochemicals and vegetable and animal-based oils due to a decrease in the supply of petroleum, etc. and an increase in demand for biofuels	Large	・Securing stable raw materials through multiple purchases and long-term contracts ・Switching from petrochemical-based raw materials to plant-based raw materials ・Utilization of biomass chemicals ・Carbon recycling (solvent recycling, etc.)
		Sharp rise in energy and transportation costs	Sharp rise in prices of oil and natural gas	Medium	・Introduction of energy-saving equipment, review of processes ・Promotion of joint delivery and modal shifts
		Changes in the sales destination environment due to the shift to a decarbonized market	Decrease in sales due to decline in market share of gasoline and diesel vehicles	Medium	・Strengthening our response to decarbonized markets, such as electric vehicles and renewable energy
		Deterioration of evaluation/reputation	Deterioration of evaluation from investors in ESG investment and reputation among customers due to delay in climate change countermeasures	Small	・Active promotion of measures to reduce greenhouse gas emissions and information communication
Physical risks	4°C	**Natural disasters such as torrential rains, floods, typhoons, storm surges, etc.**	Increased risk of business interruption in production sites and supply chains due to increased torrential rainfall, sea level rise, and storm surges caused by stronger typhoons as a result of climate change	Large	・Rain water countermeasures and disaster prevention measures for buildings and facilities ・Review the business continuity plan (BCP) and conduct education, training, and audits ・Multiple purchases of raw materials
		High temperatures and heat waves	Impact of rising temperatures on refrigeration, air-conditioned storage, etc. in warehouses	Medium	・Ongoing review of capital investment plans
Opportunities	1.5°C 2°C	**Growing needs for products that contribute to climate change solutions**	Expanding needs for products that contribute to climate change mitigation and adaptation (see p. 092-094 for details)	Large	・Development and provision of products that contribute to climate change mitigation and adaptation
		Improvement of evaluation and reputation	Improve evaluation from investors in ESG investment and reputation among customers through active climate change countermeasures	Small	・Development and provision of products that contribute to climate change solutions and communication of information on promotion of greenhouse gas reduction

* 1.5°C and 2°C scenario: A decarbonization scenario that assumes that necessary measures will be implemented to limit temperature increase to 1.5°C or 2°C or less compared to pre-industrial times (International Energy Agency (IEA) “Net Zero Emissions by 2050” (NZE2050), “Stated Policies Scenario” (STEPS), etc.)

* 4°C scenario: A scenario in which climate change has progressed to the point where the average global temperature has increased by 4°C at the end of the 21st century compared to pre-industrial times (UN Intergovernmental Panel on Climate Change (IPCC) “RCP8.5,” etc.)

* Level of impact: **Financial amount of impact of risks** - over 1 billion yen (large), less than 1 billion yen and over 100 million yen (medium), less than 100 million yen (small)
Market scale of opportunities - over 30 billion yen per year (large), less than 30 billion yen and over 3 billion yen (medium), less than 3 billion yen (small)

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Financial impacts (selected)

Steam, electricity, and other forms of energy are consumed mainly in the manufacturing processes of the NOF Group. As transition risks brought about by climate change, the financial burden is expected to increase due to rising carbon tax costs and higher unit prices of renewable energy charges,* and the total impact is estimated to be around 3.3 billion yen. In addition, the NOF Group has established a business continuity plan for physical risks with the 4°C scenario assuming 7.7 billion yen in facilities damage in the event that a typhoon, which occurs once every 500 to several thousand years, breaks through embankments and floods our waterfront plants.

*Charges for promotion of renewable energy generation

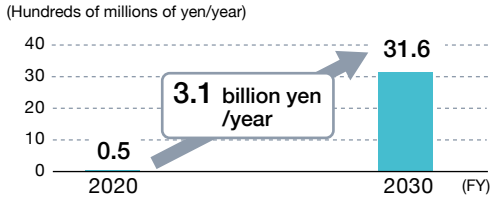
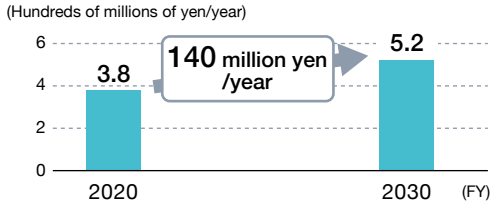
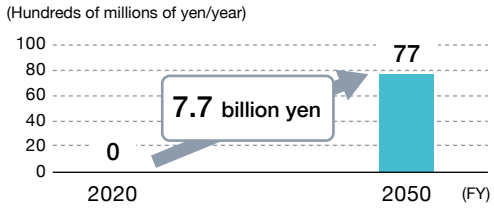
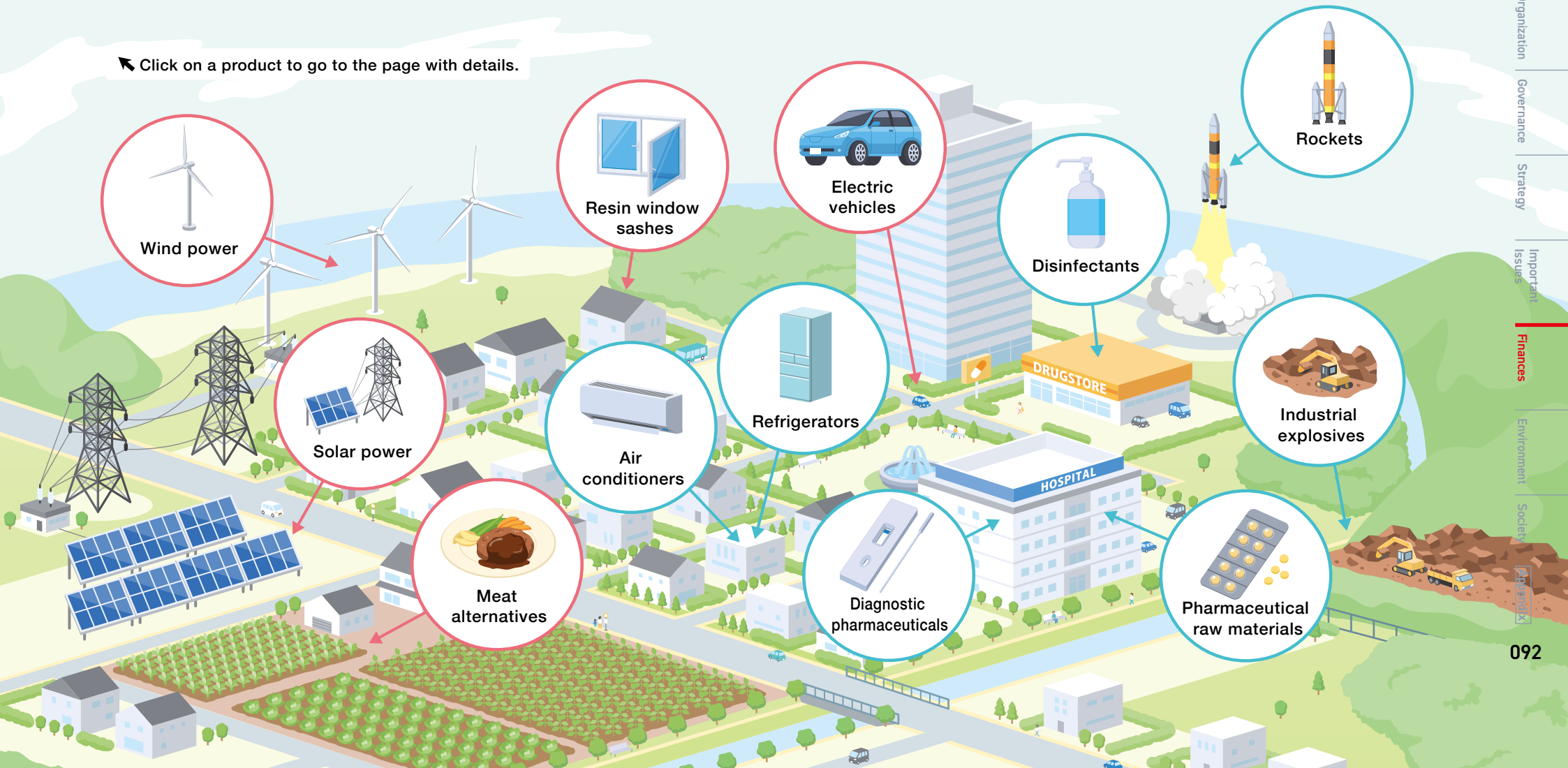
Category	Scenario	Risks	Details of risks	Financial amount of impact	Notes
Transition risks	1.5°C	Carbon tax	Financial burden from tax increases		CO_2 equivalent emissions in fiscal 2020, with a carbon price of 20,000 yen per ton of CO_2 in fiscal 2030. Domestic Group
		Renewable energy charges	Increased energy costs		The unit price of the renewable energy charge for fiscal 2030 is set at 4.1 yen/kWh based on fiscal 2020 electricity consumption. Domestic Group
Physical risks	4℃	Storm surges	Flooding of facilities due to storm surges		Typhoons and embankment failures every 500 to several thousand years. NOF

Illustration of products that contribute to climate change

Based on the risks and opportunities posed by climate change, the NOF Group will co-create new value with the power of chemistry by working to develop and provide products that contribute to the reduction of greenhouse gases to mitigate the progression of climate change, and products that contribute to adaptation by reducing the impact of climate change.



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Mitigation: 1.5°C and 2°C scenario

*Mitigating the progression of climate change by reducing greenhouse gas emissions

Electric vehicles

Functional Materials business | Metal Coatings business

Market scale: Large

Compared to gasoline-powered vehicles, EVs are expected to cause increased demand for additives for in-vehicle electronic components, lubricants for electric units, anti-corrosive coatings, and overcoat materials for LCD color filters due to the increase in electronic components (passive components), electric units, and screws to hold the components in place, as well as more and larger LCD panels. In addition, because LED lights are effective in reducing power consumption of EVs, demand for antifogging agents for LED headlamps is expected to increase. Furthermore, EVs will make vehicles quieter, which is expected to increase demand for resin additives, such as agents that prevent abnormal noises caused by resins rubbing against each other in interior parts.

End uses of the NOF Group's products

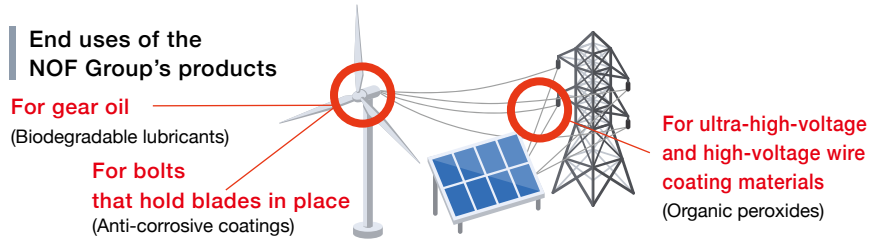
Wind power / Solar power

Functional Materials business | Metal Coatings business

Market scale: Medium

Demand is expected to increase for anti-corrosion coatings for bolts used in wind turbine blades and biodegradable lubricant required for gear lubrication. Demand is also expected to increase for organic peroxides for cross-linked polyethylene, which is used as a coating material for ultra-high-voltage and high-voltage electric wires used to transmit electricity from wind and solar power generation sites.

End uses of the NOF Group's products



Meat alternatives

Functional Foods business

Market scale: Small

Demand is expected to increase for meat alternative oils and fats that help improve the flavor and texture of plant-derived meat alternatives that reduce environmental impact.

End uses of the NOF Group's products

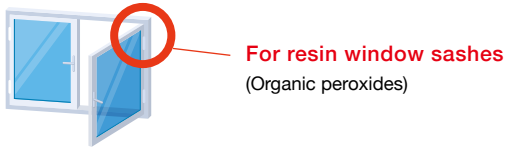
Resin window sashes

Functional Materials business

Market scale: Small

Demand for organic peroxides is expected to increase with the spread of energy-efficient housing because vinyl chloride resin is used in resin window sashes with high thermal insulation properties.

End uses of the NOF Group's products



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Adaptation

*Reduction of climate change impacts through disaster prevention, etc.

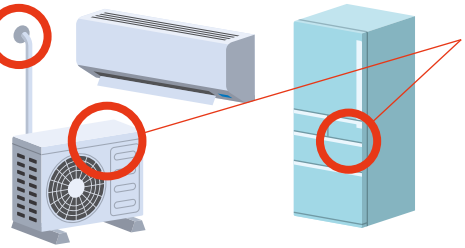
Air conditioners / Refrigerators

Market scale: Large

Functional Materials business

Demand for base material for refrigerating oils, a lubricant for refrigeration equipment, and polybutene for air conditioner putty is expected to increase due to the global increasing need for air conditioners and refrigerators accompanying rising temperatures. The refrigerating machine oil sold by NOF is for alternative CFC refrigerants and contributes to climate change adaptation.

End uses of the NOF Group's products



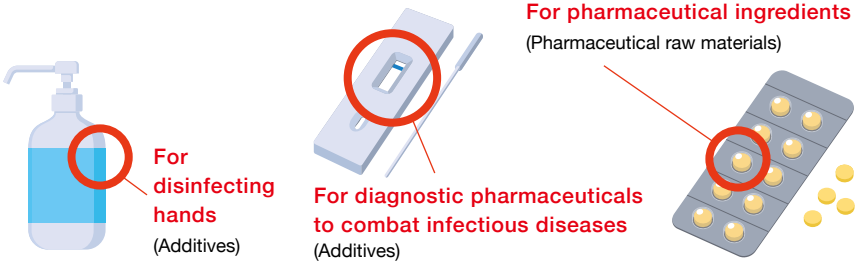
Diagnostic pharmaceuticals / Pharmaceutical raw materials

Market scale: Large

Functional Materials business | Life Science business

Due to climate change, there are concerns about the spread of tropical infectious diseases and other diseases and disorders. Therefore, demand for pharmaceutical raw materials is expected to increase due to the rise in disinfectants and additives for diagnostic pharmaceuticals to combat infectious diseases as well as the number of pharmaceutical products against diseases and disorders.

End uses of the NOF Group's products



Environmental information / Disaster prevention and mitigation products

Market scale: Small

Explosives & Propulsion business

As climate change progresses, the need to survey the entire world, including seawater temperatures, may increase, and the amount of marine instruments, rocket launches, etc., for research may increase. In addition, there may be increased applications for temperature indicator materials (labels, stickers, etc.) for temperature control that change color when a specific temperature is reached. Furthermore, with the increased risk of storm surges and other such conditions, there may be an increase in embankment construction using industrial explosives involving procurement of rocks and soil from mountainous areas.

End uses of the NOF Group's products