


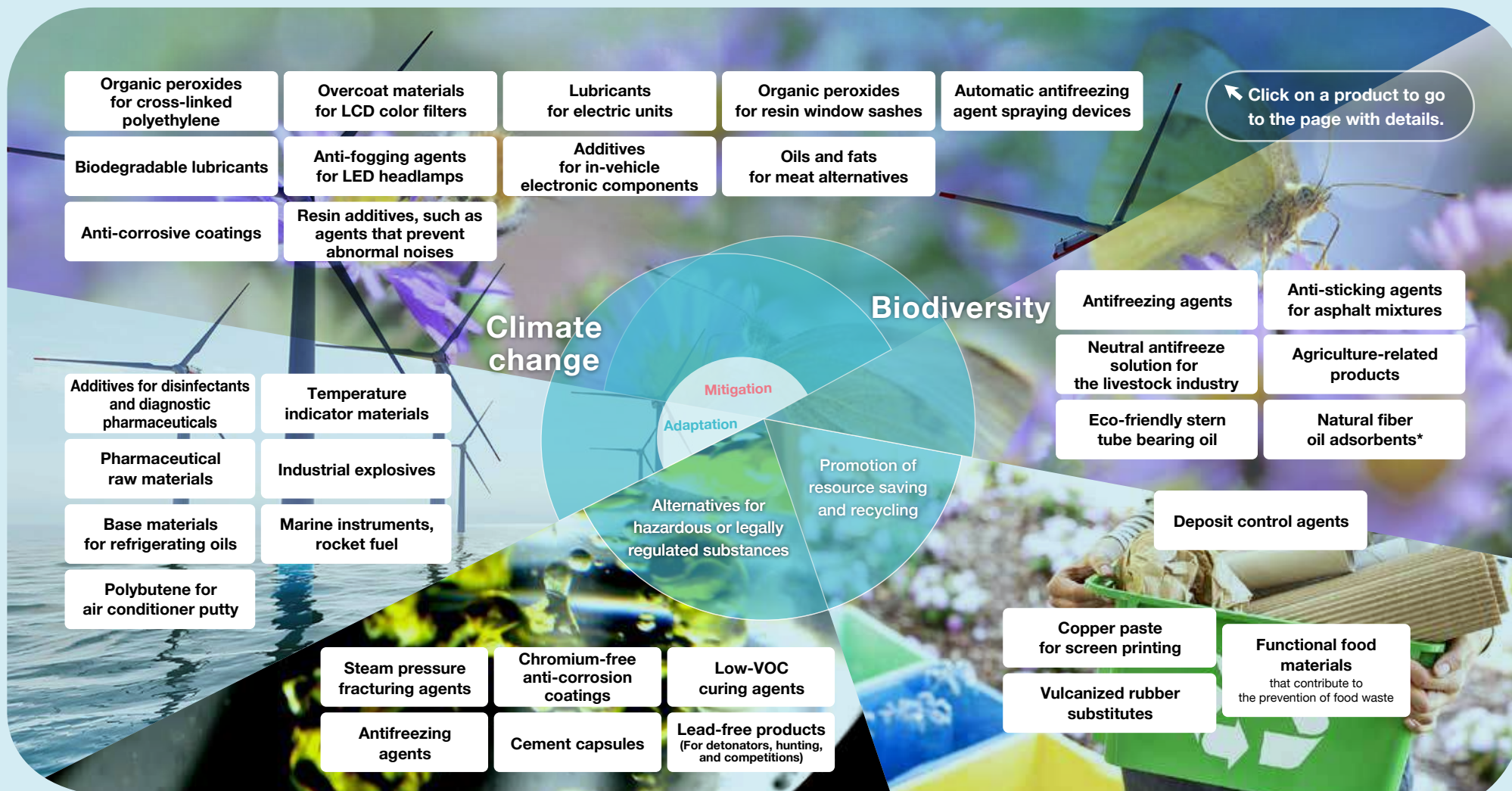


We in the NOF Group are always asking ourselves, “How can we utilize our technology in order to reduce our environmental loads to the possible minimum?” and are earnestly meeting many different requests from diverse fields.

 Response to climate change (TCFD) |  P.088-099

 Biodiversity conservation |  P.110-115

**Technologies related to climate change and biodiversity among NOF's clean tech-related products**



\*Sold by sales agents

Climate change    Biodiversity    Promotion of resource saving and recycling    Alternatives for hazardous or legally regulated substances

## Products that contribute to the shift to EVs

Functional Materials business

Metal Coatings business

- Additives for in-vehicle electronic components
- Lubricants for electric units
- Anti-corrosive coatings
- Overcoat materials for LCD color filters
- Resin additives, such as agents that prevent abnormal noises
- Anti-fogging agents for LED headlamps



Electric vehicles (EVs) contribute to climate change mitigation because they generate less greenhouse gas emissions than gasoline-powered vehicles. In addition, compared to gasoline-powered vehicles, EVs are expected to require more electronic components (passive components), electric units, screws to hold the components in place, LCD panels, very quiet components, and power-saving components. Thus, the NOF Group's products used in these applications provide positive contributions in this area. Climate change mitigation also contributes to biodiversity because it reduces the ecological imbalance caused by global warming.

Climate change    Biodiversity    Promotion of resource saving and recycling    Alternatives for hazardous or legally regulated substances

## Products that contribute to renewable energy

Functional Materials business

Metal Coatings business

- Organic peroxides for cross-linked polyethylene
- Biodegradable lubricants
- Anti-corrosive coatings



Oil readily biodegradable in the environment (Biodegradability 60% or more in 28 days) (Under OECD 301C tests)

Eco Mark Certification Number  
08110006

Name of utilizing contractor:  
NOF CORPORATION  
Product: MILLUBE® Series

Renewable energy such as wind power and solar power are becoming increasingly important because they do not produce greenhouse gases. Our anti-corrosive coatings and biodegradable lubricants used in wind turbine blades and gears provide positive contributions in this area. In addition, ultra-high voltage and high-voltage electric wires are indispensable to transmit electricity from wind and solar power generation sites. Thus, our organic peroxides for cross-linked polyethylene used as a coating material provide positive contributions to the spread of renewable energy.

Climate change   Biodiversity   Promotion of resource saving and recycling   Alternatives for hazardous or legally regulated substances

## Products that contribute to reducing greenhouse gas emissions and securing water resources

Functional Foods business

- Oils and fats for meat alternatives



Plant-derived meat alternatives such as soy meat hamburgers are attracting attention from the perspective of increasing environmental awareness and health consciousness, including reducing greenhouse gases from livestock and excrement and securing water resources. Our oils and fats for meat alternatives contribute to improving the flavor and texture of these meat alternatives.

Climate change   Biodiversity   Promotion of resource saving and recycling   Alternatives for hazardous or legally regulated substances

## Products that contribute to the spread of energy conservation

Functional Materials business

- Organic peroxides for resin window sashes



Window sashes made using vinyl chloride resin contribute to the spread of energy-efficient housing because of their excellent heat insulation. Organic peroxides are used as polymerization initiators for the vinyl chloride resin, and thus contribute to the spread of energy conservation.

Climate change    Biodiversity    Promotion of resource saving and recycling    Alternatives for hazardous or legally regulated substances

## Products that contribute to biodiversity, climate change mitigation, and environmental conservation

Explosives & Propulsion business    HOKKAIDO NOF CORPORATION

- Antifreezing agents
- Automatic antifreezing agent spraying devices



KAMAGU®, together with AUTOKAMAGU® JET, is proving highly effective against the freezing of road surfaces.

Antifreezing agents, such as calcium chloride conventionally used on road surfaces in cold areas, have posed the problem of “salt damages.” NOF’s antifreezing agent KAMAGU®, an acetic acid-derived chemical containing no chloride, poses no fear of salt damages. It is also an eco-friendly anti-freezing agent with minimal impact on plants. AUTOKAMAGU® JET, an automatic antifreezing agent spraying device, is a sensor-based system that automatically sprays KAMAGU® onto snowy or frozen roads. It works using 100% natural energy (solar energy), and thus contributes to climate change mitigation. It can also perform advanced road surface management via remote monitoring and control, and therefore contributes to both environmental conservation and road safety along with the antifreezing agent.

Climate change    Biodiversity    Promotion of resource saving and recycling    Alternatives for hazardous or legally regulated substances

## Products that contribute to the prevention of ozone layer depletion

Functional Materials business

- Base materials for refrigerating oils



HFC (Hydrofluorocarbon) refrigerants, which do not deplete the ozone layer, are increasingly used as refrigerants for air conditioners and refrigerators. Eco-friendly base materials for refrigerating oils enhance co-solubility with HFC refrigerants and improve its thermal stability, electrical insulation performance, and other factors. Moreover, the low viscosity contributes to saving energy consumption. In recent years, refrigerants with a smaller global-warming potential compared with previous products are required. NOF is now supplying refrigerating machine oil for refrigerants with a low global-warming potential.

Climate change    Biodiversity    Promotion of resource saving and recycling    Alternatives for hazardous or legally regulated substances

## Products that contribute to climate change adaptation (air conditioners / refrigerators)

Functional Materials business

- Base materials for refrigerating oils
- Polybutene for air conditioner putty



As temperatures rise, there is an increasing need for air conditioners and refrigerators around the world, including in developing countries. Base materials for refrigerating oils, which are used for refrigerator lubricants, as well as polybutene for putty used for air conditioners, which fills in gaps in outer walls, provides positive contributions in this area.

Climate change    Biodiversity    Promotion of resource saving and recycling    Alternatives for hazardous or legally regulated substances

## Products that contribute to climate change adaptation (diagnostic pharmaceuticals / pharmaceutical raw materials)

Functional Materials business

Life Science business

- Additives for disinfectants and diagnostic pharmaceuticals
- Pharmaceutical raw materials



If tropical infectious diseases and other diseases and disorders spread due to the effects of climate change, then positive contributions in this area will be made by our disinfectants for infectious diseases and additives for diagnostic pharmaceuticals as well as our pharmaceutical raw materials that combat diseases and disorders.

Climate change   Biodiversity   Promotion of resource saving and recycling   Alternatives for hazardous or legally regulated substances

## Products that contribute to climate change adaptation

(environmental information / disaster prevention and mitigation products)

Explosives & Propulsion business   NiGK Corporation

- Marine instruments, rocket fuel
- Industrial explosives
- Temperature indicator materials



As climate change progresses, there may be an increase in the need to survey the entire world, including seawater temperatures. In addition, there may be an increase in embankment construction to safeguard against the risk of storm surges and other such conditions. Marine instruments and rocket fuel for these environmental surveys, as well as industrial explosives used to procure rocks and sediment from the mountains, will make positive contributions in this area.

Climate change   Biodiversity   Promotion of resource saving and recycling   Alternatives for hazardous or legally regulated substances

## Products that contribute to conservation of marine environments

Functional Materials business

- Eco-friendly stern tube bearing oil

MILLUBE® ST-100U	Mineral oil	Eco-friendly lubricants supplied by competitors	
		Company A	Company B
After 30 days	After 30 days	After 7 days	After 5 days
No rust or corrosion	No rust or corrosion	Visible rust, corrosion	Visible rust, corrosion

Results of anti-corrosive coatings (The shafts were soaked in a 60°C mixture of lubricant (95%) and natural seawater (5%) for a certain period of time to compare anti-corrosion performance of lubricants.)

After a major oil spill in the Gulf of Mexico in 2010, the United States' 2013 Vessel General Permit (VGP) regulations came into effect for all vessels in 2013. This regulation has led to growing global demand for biodegradable, eco-friendly lubricants. We developed MILLUBE® ST-100U stern tube bearing oil that meets the needs of the market by greatly improving the lubrication and anti-corrosion performance of conventional biodegradable lubricants offered by other companies. The product, which satisfies 2013 VGP regulations in terms of high biodegradability, low toxicity, and low bioaccumulation, is a superior lubricant that can help conserve marine environments.