

ENVIRONMENT AND SUSTAINABILITY POLICY

NORDOX AS



Nordox AS manufactures dicopper oxide (Cu_2O) and formulated products containing Cu_2O and other inorganic materials at its production site in Oslo. The products are used in a wide range of applications; roughly 60% as the active ingredient in marine anti-fouling paints; 25% for various agricultural applications, primarily as a fungicide; and 15% for a range of industrial applications, including fish farming, animal feed production, and roofing materials.

Nordox will issue, on a yearly basis, a comprehensive annual report on Nordox' environmental sustainability performance, also outlining our environmental ambitions for the future.

This document does not address critical sustainability parameters in areas such as human rights, social responsibility, and labor rights as these are covered elsewhere and fall outside the scope of this document.



Environmental sustainability has been a key factor in Nordox' decision making processes for many years. We recognize that this emphasis on environmental sustainability is increasingly shared by our customers, suppliers, and other stakeholders, and we also note that there is a growing regulatory pressure to structure and regulate the subject area.

We trust that the annual environment and sustainability reports provide our stakeholders with a holistic structure sufficiently comprehensive to be included in the consideration of Nordox' impact on their own environmental sustainability profile. Most importantly we hope that this document gives our customers the information needed to rate Nordox as an attractive partner also from an environmental sustainability point of view.

RECOGNITIONS

Nordox was an early adopter to the EcoVadis¹ rating universe, and we submitted our first data already in 2015. For several years we have been awarded the “Gold” sustainability rating in recognition of our work, not only on environmental sustainability, but also human and labor rights, ethics, and sustainable procurement. It is our goal to achieve a “Platinum” sustainability rating from EcoVadis and we are continuously working to achieve this goal.

See Nordox’ annual report for more details on our current Ecovadis rating.

Nordox AS has, over the past few years, been subject to a wide range of other sustainability performance systems and tool, mostly initiated by our customers.

In addition, Nordox AS has achieved the following certifications for our operations and/or products:

- ISO 9001
- ISO 14001
- Institute for Marketecology (IMO)
- GMP+
- Tfs

We are subject to very strict Norwegian laws and regulations that, in our consideration, makes ISO 50001 Energy Management certification superfluous.



Nordox AS plant on the same site in Oslo where activities started in 1886

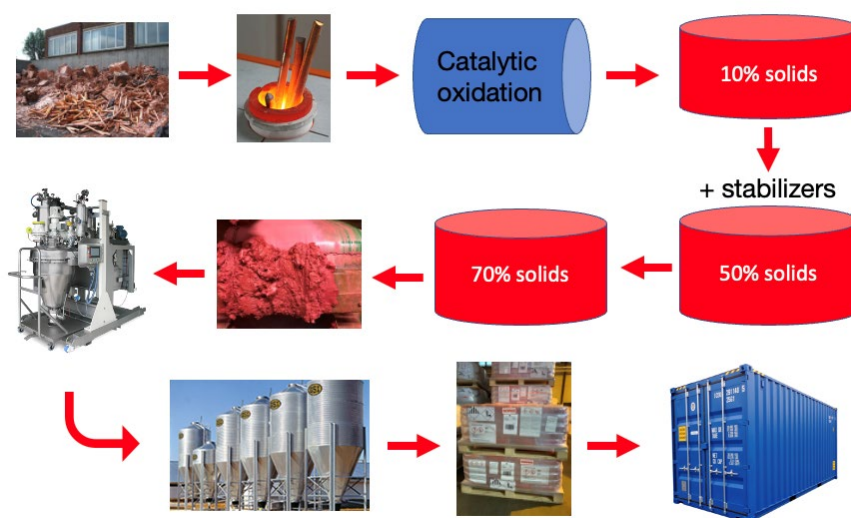
¹ See <https://ecovadis.com> for further details on the EcoVadis rating platform.

ENERGY CONSUMPTION AND GHGS

Scope 1 and 2: Nordox Operations

The Nordox production process transforms secondary (recycled) copper into dicopper oxide (Cu_2O) using a proprietary catalytic process. Recycled copper is our sole source of copper.

Nordox production process



Nordox also has an on-site toll manufacturing of net treatment products. These products, a blend of Nordox dicopper oxide and other materials sourced by our tolling partner, are filled into 1000 liter IBCs. The energy used for the mixing and the heating of the production site total around 500 MWh per year.

Nordox' activities are reported to, and closely monitored by, the Norwegian Environment Agency (Miljødirektoratet).

Nordox has, over the past few years, completed a major transformation process whereby all steps in the production process, except one, became electricity based. These steps include:

- Induction based melting of copper (previously based on oil)
- Electrical forklifts (replacing diesel forklifts)
- Electrical driers (substituting heating oil-based systems) are planned, but we are constrained by local grid regulations on the availability of power, forcing us to put this project on hold

Consequently, Nordox is primarily electrical energy based (excluding around 800 t/y oil for our driers) and, as the Norwegian grid is basically 100% based on renewable energy, Nordox is around 70% renewable energy based.

Nordox pays a substantial annual CO2 fee in addition to the environmental surcharges placed on our electricity consumption.



Nordox EV forklift being re-charged

Scope 3 Upstream: Raw Materials, External Transport and Services

The recycled copper is primarily sourced from Norwegian suppliers but, in order to secure a stable and reliable supply, we also include other Northern European (Sweden, Denmark, UK, Germany) recyclers in our supplier mix. A weighted average transport distance for the copper is calculated at 200 km, equivalent to 11.4 kg greenhouse gases² (GHG) per mt recycled copper, or around 10 kg GHG per mt Cu₂O produced³. This is assumed to be constant over the years.

As the recycled copper is largely untreated⁴ waste streams from other activities⁵ there are negligible GHG-emissions connected with the collection and preparation of the recycled copper.

Scope 3 Downstream: Shipping Products and Corporate Travel

Whereas we derive quality and economies-of-scale advantages from having our production at one site, the transport of our finished goods to the customer contributes substantially to our Scope 3 GHG emissions.

² Primarily CO₂, and recalculated as CO₂ equivalents (CO₂e)

³ Calculated at 57 g GHG per ton-km.

⁴ See comments under Scope 4 regarding the alternative processing of recycled copper.

⁵ The recycled copper comes from a wide range of sources including de-commissioned electricity installations, disused transmission cables, railway catenaries, and scrap copper from demolition sites.

Consequently, it is crucial that we seek to minimize these emissions by taking advantage of shipping as much as possible FCL by vessel. In 2022 we had a split 16%/84% between road/sea transport. Some of the road transport is optimal due to distance, but we also have avoidable instances where customers request urgent supply, and only road transport can respond to the urgency. Until 2016 we even had cases with customers requesting deliveries by air, but this is a service we no longer offer.

Kg GHG emissions per mt, based on 23 mt cargo	Oslo-Rotterdam (1408 km)	Oslo-Shanghai (20342 km)	Oslo-Dubai (12364 km)
Road	77	NA	NA
Rail	16	NA	NA
Ship	16	89	70

Source: www.carboncare.org

Averaging GHG emissions across all our finished goods we estimate our impact to be around 80 kg GHG per mt Cu₂O sold and shipped.

Corporate travelling is a necessary element in Nordox' emission balance, whether the purpose is sales, marketing, attending scientific gatherings, or performing technical reviews, our traveling has a negative impact on the environment.

We calculate annual corporate traveling at around 50 mt GHG emissions, or around 2.5 kg per mt Cu₂O sold. During Covid (2020-2022) we estimate this to have been less than 1 kg per mt Cu₂O sold.

Scope 4 Avoidance: Reduce Fuel Consumption, Protect Property, and Reduce Additional Refining

The Nordox process generates excess heat. This results in a surplus of hot water that Nordox, being in the fortunate position of being in an office district, sells to heat nearby office blocks. This excess of hot water, equivalent to around 400 MWh, is supplemented using around 750 MWh electrical energy off the grid to ensure a steady supply through the year.

Approximately 60% of Nordox' dicopper oxide production ends up as an environmentally benign⁶ biocide in marine antifouling (AF) paint. The most efficient of these paints provides a guaranteed performance⁷ over six years before new AF paint needs to be applied. Although sea freight represents the most efficient means of transportation it stands for 2.8% of the global GHG emissions.

Alternatives to using copper-based AF have questionable environmental and/or human health impact as they are environmentally persistent chemicals and are thus increasingly under scrutiny by international regulatory bodies. This secures the position of dicopper oxide in the foreseeable future, both with ship-owners and regulatory authorities.

⁶ Natural seawater contains copper, and the contribution from AF is "a drop in the ocean".

⁷ Maximum loss of fuel efficiency.



Antifouling paint - the main application for Nordox dicopper oxide

Hypothetically, we could calculate with a high degree of accuracy the contribution from dicopper oxide in avoiding GHG emissions through fuel efficiency, but it suffices to say that it runs into millions of tons of GHG, dwarfing the scant GHG emissions from Nordox' production.

Of considerable environmental value, although not quantifiable in any sensible way, is AF paints' contribution to the prevention of the spreading of invasive species.

Around 25% of Nordox' dicopper oxide production is marketed and sold for use in agriculture, either as a pesticide or as a fertilizer. In agriculture Nordox dicopper oxide is seen as a natural product, and it is, consequently, certified as a product that can be used both in organic as well as conventional farming.

Further use of cuprous oxide is found in fish farming and the building material industry. Common for all applications is the need to protect values in an environmentally friendly way.

WATER

Nordox' process uses municipal water which is normally available in abundance in Norway. In 2023 Nordox completed a project to collect surface water, and to use this reservoir as a source of process

water to supplement our rather extensive use of municipal water. This measure was not primarily aimed at reducing Nordox' water consumption but to further reduce, or basically eliminate, all remaining copper emissions to the municipal water system from our factory premises. Only in the case of excess rainfall do we emit storm water from our premises, and this can contain small amounts of copper. Regardless, the impact on our water consumption was substantial as we decreased our municipal water consumption from around 27,000 m³ in 2019 to less than 15,000 m³ in 2023.

LOCAL AND ENVIRONMENTAL POLLUTION

Nordox' process releases small amounts of copper to the air (in the form of dust) and municipal wastewater system. These emissions are continuously monitored, and annual emissions are reported to the Norwegian Environmental Directorate (Miljødirektoratet). Nordox has worked hard over the years to reduce these emissions (e.g. see above), and this is reflected in the annual reduction in both aerial and water emissions of copper every year over the last 10+ years⁸.

MATERIALS, CHEMICALS, AND WASTE

The bulk of the non-copper materials bought and used, and subsequently disposed of, by Nordox in its production consists of packaging material. Nordox strives to buy various chemicals in bulk, and raw materials such as acids are bought in bulk and pumped into the Nordox storage tanks. For other raw materials (lecithin, sodium lignosulphonate, etc.) we consistently recycle 100% of the bagging material, largely polypropylene (PP) big bags.

Our out-going product is either shipped in polyethylene (PE) lined paper bags of 10 or 25 kg, or in 700 lbs, or 500, or 1000 kg PP bags. The split between the bag types is roughly 35% PE bags and 65% PP bags.

The bags are stacked on 1 mt wooden pallets and PE shrink wrapped.

Kg packaging material per mt Cu ₂ O	10 and 25 kg bags	500/1000 kg, and 700 lbs bags
Paper	5	-
Plastics	6	2
Wood	22	21
Total	33 kg	23 kg

⁸ See <https://www.norskeutslipp.no/no/Diverse/Virksomhet/?CompanyID=5015> for our publicly available annual emissions data.

Obviously, our environmental footprint can be improved, in cooperation with our industrial customers and where we sell our dicopper oxide as a formulation ingredient, by shifting even more of our sales to big bags rather than 10-25 kg bags.

Our usage of other products apart from recycled copper and packaging materials is negligible.

As for copper our raw materials are largely sourced locally, except for big bags, as these are largely manufactured in China and Turkey.

We check suppliers' QA systems and perform site visits when deemed appropriate. During annual contract negotiations we evaluate the suppliers' sustainability performance, and we include this as our overall supplier evaluation.

As mentioned, all waste streams are identified, segregated for collection, and reported on a regular basis to the Norwegian Environment Agency (Miljødirektoratet).

Paper, plastics, metal, and wood are segregated and collected by certified recyclers. Slag, off-spec, and other copper containing bi-products contain, on average, around 40% copper, and it is sold for recycling to a certified recycler.

As we have seen, Nordox dicopper oxide is well protected when shipped to our customers. Ideally, we would have liked to ship either in bulk or in reusable packaging material. Whereas the first alternative is unfeasible, we have not found a satisfactory solution for the latter. Consequently, we send considerable volumes of packaging material to our customers.

We have reason to believe that our big bags are reused for other packaging purposes at certain destinations, but our packaging materials are, in general, not recyclable.

PRODUCT END-OF-LIFE

Following previous incidents with our dicopper oxide located in storage around the world, we have established routines for recovering damaged dicopper oxide to ensure proper recycling of a valuable raw material.

As an example, in 2019 there was a fire in a warehouse adjacent to the warehouse where Nordox had a consignment stock of 42,150 kg dicopper oxide in 25 kg bags. The fire spread and engulfed also the Nordox consignment warehouse. Within shortly the Nordox packaging material caught fire, leaving an amorphous heap of dicopper oxide, carbonized packaging, and fire extinguishing material.

The adjuster hired by our insurance company recommended that the material should be taken to a local landfill, but Nordox convinced the insurance company that the material was recoverable and should be recycled.

Consequently, under Nordox supervision, the material was collected in its entirety in steel drums and returned to Norway, resulting in a substantial saving for the insurance company and for the environment.



Collecting damaged dicopper oxide in Pt.Klang, Malaysia in November 2019

NORDOX' AMBITIONS FOR THE FUTURE

Nordox has shown a high ambition level in its drive to reduce GHG emissions over the past several years, and the company aims to show similar ambitions for the future with our goal of becoming GHG-neutral.



Several zero-emission ideas have been presented, but this is among the more realistic ones: Yara Eide, supposed to be fully operational in 2026 and using green ammonia for its propulsion.

An important step will be to for our production to become 100% electrical. Currently we are facing grid limitations, and we have been given 2035 as a date for additional grid capacity to become available. We do expect, however, that growing dissatisfaction with the tardiness of the capacity expansion will speed up the process, and we are hopeful that we may be 100% electrical by 2030 at the latest.

Nordox believes that the biggest savings can be achieved in co-operation with its customers and suppliers:

- Reduce waste by increased sourcing and supply in bulk or big containers, possibly reusable bags or containers.
- Develop and promote products with the same biocidal effect, but with a lower biocide load. Examples of such products include XLT G and a range of our agricultural products
- Further reductions in Nordox waste streams, including measures such as full recycling of office waste.
- Reduce road transport further and move to sea or rail whenever possible.

For additional savings we must rely on further technological paradigm shifts, particularly in the area of transport, where considerable steps have been taken towards emission-free vessels and trucks.

Lars Tomasgaard
Managing Director
Oslo, January 31st 2025

