

**northvolt**

TCFD report 2022

# Contents

## This is Northvolt

Founded in 2016 to enable the transition to a decarbonized future by supplying sustainable lithium-ion batteries.

In leading the development of a new and critical battery industry for Europe, Northvolt is determined to set a new benchmark for sustainability in the industry. To deliver on this ambition, and to do so at scale and at speed, Northvolt has taken the unique approach of integrating the battery value chain, including cathode production, cell manufacturing and recycling, into its own operations.

As a pioneer of sustainable battery manufacturing, we are taking a holistic approach to identifying, managing and reducing negative impacts throughout our business.

Through our work so far, we know that we are on the right path. With sustainable raw materials suppliers, use of fossil-free energy, increased circularity, resource efficiency and the use of recycled material, we can massively reduce the carbon footprint of our batteries. Creating a sustainable battery company takes time, but we are determined honor our commitment to sustainability.

About this report	3
Governance	5
Strategy	6
Risk Management	10
Metrics and targets	12

## About this report

This is Northvolt's first Task Force on Climate-Related Financial Disclosures ("TCFD") Report and we have written it based on the TCFD recommendations. We aim to work towards full alignment with TCFD recommendations. All data in this report cover financial year 2022 unless otherwise noted.

This report describes how climate change may impact our business and how we can successfully transition to a lower-carbon economy and adapt to global warming. This may change as our understanding of the challenges around climate change continues to evolve on an ongoing basis.

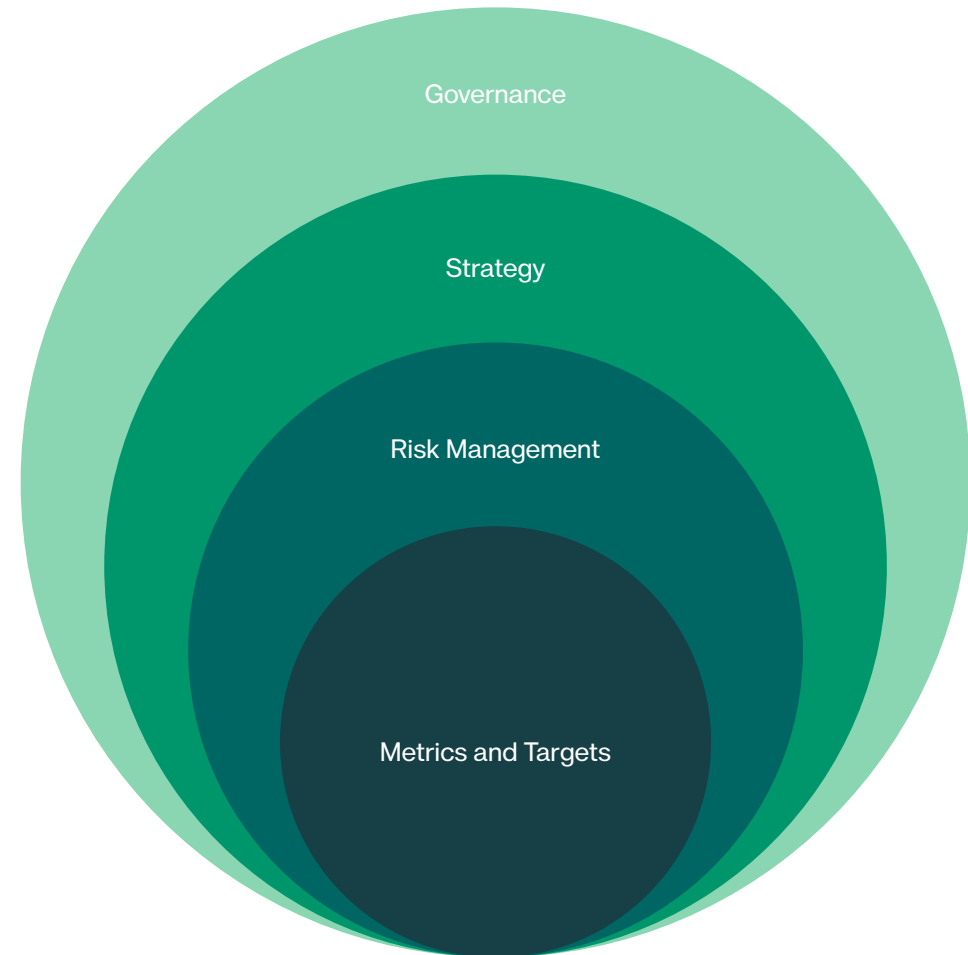
### TCFD Recommendations

The TCFD Recommendations, first launched in 2017, are designed to encourage consistent and comparable reporting on climate-related risks and opportunities by companies to their stakeholders. The TCFD structures the recommendations around four thematic areas that are core elements of how organizations operate, as shown in the figure to the right. A total of 11 recommendations set out the information that companies should disclose to provide transparency and stability in the face of climate-related risks and opportunities. Throughout this report we have strived to provide information on all four pillars and 11 recommendations.

### Other sustainability disclosures

While this report is focused on climate-related risks and opportunities, Northvolt has also published its first Sustainability and Annual report for 2022. Here we outline our goals, operations, and strategy on a broader scale as well as the challenges we face in our mission and work to enable the future of energy.

→ [Read more in our first Sustainability and Annual Report 2022](#)



Core elements of recommended climate-related financial disclosures

## Status tracker

Status of Northvolt's compliance with the different categories of TCFD recommendations framework.

TCFD recommendations	Progress
<b>Governance</b>	
a. Describe the board's oversight of climate-related risks and opportunities	✓
b. Describe management's role in assessing and managing climate-related risks and opportunities	✓
<b>Strategy</b>	
a. Describe the climate-related risks and opportunities the organization has identified over the short, medium and long term	✓
b. Describe the impact of climate-related risks and opportunities on the organization's businesses, strategy and financial planning	✓
c. Describe the resilience of the organization's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario	Planned achievements in 2023–2024
<b>Risk Management</b>	
a. Describe the organization's processes for identifying and assessing climate-related risks	✓
b. Describe the organization's processes for managing climate-related risks	✓
c. Describe how processes for identifying, assessing and managing climate-related risks are integrated into the organization's overall risk management	✓
<b>Metrics and Targets</b>	
a. Disclose the metrics used by the organization to assess climate-related risks and opportunities in line with its strategy and risk management process	Planned achievement in 2023–2024
b. Disclose Scope 1, Scope 2, and, if appropriate, Scope 3 greenhouse gas (GHG) emissions, and the related risks	✓
c. Describe the targets used by the organization to manage climate-related risks and opportunities and performance against targets	✓

## Next step

Our main focus ahead will be:

- **Update Climate-related risks and opportunities assessment methodology**
- **Integrate climate-related risk and opportunities assessment through our company's existing Enterprise Risk Management**
- **Second round assessment of our key facilities**
- **Assessment of our supply chain and action plan to improve discussion with suppliers about climate-related risks and opportunities they might face.**
- **First proposal for metrics and targets development and deployment**



# Strategy

Strategy is defined in the TCFD recommendations as: “an organization’s desired future state. An organization’s strategy establishes a foundation against which it can monitor and measure its progress in reaching that desired state. Strategy formulation generally involves establishing the purpose and scope of the organisation’s activities and the nature of its businesses, taking into account the risks and opportunities it faces and the environment in which it operates.”

In 2022, we focused our efforts on understanding climate-related risks and opportunities (CRROs). We have mainly worked on the identification of these risks and opportunities and on our ability to implement appropriate action plans. At the same time, we have laid the foundations for an assessment methodology which will be improved in 2023.

Assessing climate-related risks and opportunities is part of our risk management. Effective and strategic management of climate change related risks and opportunities across all aspects of our business is considered vital to our continued ability to operate.

42 potential risks and opportunities were identified as a first round and a major part of them are tagged in the Supply Chain and in our Facilities (more than 70% in total). An action plan has been proposed to implement a response plan together with the relevant internal stakeholders. As the next step we will go through various actions such as, requesting suppliers to undertake a climate-related risks and opportunities assessment and improving our physical risks assessment procedure for new sites.

## Our 2022 approach on climate-related risks and opportunities (CRROs) assessment



### 1) Identification

- Classification and description of CRROs
- Value chain step where the CRROs happen



### 2) Assessment & prioritization

- Time-horizon
- Impact scoring
- Responsibility
- Potential Financial impact



#### Physical risks specific

- Climate scenarios analysis (RCP 4.5 and RCP 8.5, time horizon 2030 and 2050) to support impact scoring



### 3) Risk response implementation

- High-level response for prioritized CRRO with high and medium impact score



#### Physical risks specific

- Provide adaptation solutions for risks with high and medium impact score per asset

Scope of physical risks assessment



● Site covered by the assessment

\*Site in development/under consideration

## Scenario analysis

Scenarios are plausible versions of the future based on a coherent and internally consistent set of assumptions about driving forces and key relationships. We utilized two scenarios\* to investigate a variety of potential risks and opportunities related to climate change. While both scenarios are accepted widely and are recommended by the TCFD for Climate Scenario Analysis, we acknowledge that any scenario is based on a set of restrictive assumptions. Due to the variety of risks and their potential financial impact, we approach Climate Scenario Analysis as an ongoing activity.

Northvolt conducted our first Climate Scenario Analysis in 2022. Out of 42 potential climate-related risks and opportunities along our entire value chain, four physical risks, three transition risks and one opportunity were identified to be most relevant for Northvolt based on their expected impact and timeline.

The results of our initial Climate Scenario Analysis are summarized below. We aim to strengthen the internal process of Climate Scenario Analysis, increase the number of scenarios we use and utilize the outcomes to a greater extent to inform our strategic decision-making. The results presented below will be used to increase awareness of climate-related risks and opportunities for our company and inform key decision-makers.

\*UN Intergovernmental Panel on Climate Change (IPCC) and the International Energy Agency (IEA).



The table showcase the selected risks and opportunities that Northvolt might face in different scenarios, and the potential impact on financial performance.

SCENARIO	RISKS AND OPPORTUNITIES	EXPECTED TIME HORIZON	POTENTIAL FINANCIAL IMPACT
<p><b>Net Zero Emissions by 2050 (NZE) – Low emissions scenario</b></p> <p>The NZE represents a scenario with a fast transition to a net zero emissions economy with the achievement of universal energy access by 2030. Developed by the International Energy Agency, the Goal of the Paris Agreement to limit global warming to 1.5°C is achieved in this scenario.</p> <p><b>Key scenario characteristics</b></p> <ul style="list-style-type: none"> <li>• Energy projection: share of renewable energy rising from 28% in 2021 to 88% in 2050</li> <li>• Increased demand for minerals for electric vehicles and battery storage, up from 0.4 Mt in 2020 to 21.5 Mt in 2040</li> <li>• Annual battery demand for electric vehicles growing from 0.16 TWh in 2020 to 14 TWh in 2050</li> </ul>	<p>⚠ Increased competition and increased demand for securing access to renewable energy supply as major industry players shift their energy supply</p>	Medium term	Costs passed through from raw materials suppliers who face increased operational expenditures, in particular for cathode active material
	<p>⚠ Scarcity of raw materials due to accelerated transition to electric vehicles with demand for key minerals in batteries exceeding supply</p>	Short term	Increased operating costs at Northvolt manufacturing locations as demand for renewable energy increases prices
	<p>⚠ Fuel taxation impacting logistics in upstream supply chains with limited ability for Northvolt to change their dependency on fossil fuels</p>	Medium term	Increased revenues from new products and new emerging markets as Northvolt's positioning on the market becomes more attractive
	<p>🏆 New products and market segments due to increased demand for electric vehicles brings Northvolt into a favourable competitive position</p>	Medium term	Northvolt benefiting from an increase in capital availability for clean energy technologies
<p><b>RCP 8.5 – High emissions scenario</b></p> <p>The RCP 8.5 is a high-emission scenario developed by the Intergovernmental Panel on Climate Change (IPCC) that represents a pathway with limited climate policy, an energy-intensive industry and dependence on fossil-fuels.</p> <p><b>Key scenario characteristics</b></p> <ul style="list-style-type: none"> <li>• Increase of extreme heatwaves beyond current levels with higher frequency, intensity and duration</li> <li>• Increase in level and frequency of extreme precipitation</li> <li>• Increase in global average temperatures</li> <li>• Increased number of extreme weather events such as wildfires and flooding</li> </ul>	<p>⚠ Water damage to equipment and infrastructure at battery manufacturing sites as well as suppliers in the upstream value chain, in particular raw materials</p>	Medium term	Reduced revenues from sale of batteries due to decreased production output caused by disruptions at manufacturing locations
	<p>⚠ Outages in supply of power and water at battery manufacturing sites causing production process disruptions</p>	Medium term	Necessity of write-offs for existing assets such as manufacturing equipment and building, as well as increased maintenance costs at Northvolt manufacturing sites
	<p>⚠ Damage of exposed harbours and mines as a result of sea level rise, with potential disruption to the availability of key supplies such as raw materials for cathode production</p>	Long term	Higher energy costs for cooling in production processes of battery manufacturing
	<p>⚠ Heatwaves impacting health of employees, equipment efficiency and causing disruption to production processes</p>	Long term	Costs passed through from raw material suppliers facing severe disruptions in their operations caused by extreme weather events, in particular mining operations

# Risk Management

TCFD recommended that organizations disclose their processes for identifying, measuring and managing climate-related risks, as well as describing how these processes are integrated into the organization's overall risk management.

We apply a holistic risk management perspective, conducting both top-down and bottom-up risk management inspired by the COSO Enterprise Risk Management (ERM) framework and ISO 31000 Risk Management standard. In a structured manner, we work to identify, analyze, assess and then manage relevant and significant risks that business operation encounter. The annual risk management cycle is integrated and connected to the company's objectives and budget process.

The ERM Framework is supported by various processes:

- A top-down assessment is performed yearly and consists of individual risk interviews with member of the Management team to identify risks with impact to their area of responsibility as well as a joint workshop where the Management team analyze and assess risks.
- The bottom-up risk management is performed on an ongoing basis by each Business Unit and Function to identify, assess, analyze, mitigate, and manage risks connected to the effect of uncertainty of objectives by using a risk register. Business Units and Functions retain ownership of their risks and escalate and report on both scheduled and event driven basis.

## Climate risks assessment

Through 2022 we have strengthened our methodology and tools to identify, assess and manage our climate risks and opportunities, both related to TCFD framework and EU taxonomy. We believe that our comprehensive risk assessment program is reasonably designed to identify and manage climate change-related enterprise-wide risks that have the potential to significantly affect our businesses over the short, medium and longer terms. Our risk assessments cover exposures to both physical and transition climate-related risks and their respective financial impact.

A Work instruction and dedicated template have been produced to guide us to assess climate-related risks and opportunities for new projects.

High impacts rated risks and opportunities will be escalated through a process currently under construction with Risk & Insurance group. Each risk and opportunity will be owned by the relevant Business unit.



## Risk management process

Our risk management process is based on identification, assessment, response and monitoring.



# Metrics and targets

A clear understanding of our climate impact is critical to achieving our mission. Only through accurate accounting of where our impact exists can we formulate responses geared towards reduction.

About 98% of our climate impact through 2022 results from activities external to our production sites, as reflected in our Scope 3 (indirect) emissions seen to the right. Materials used in battery manufacturing and our supply chain are the largest contributors to this category of emissions.

In 2022, we introduced Carbon Roadmap 2030 – a data-driven approach to secure a reduction of our cell production carbon footprint from 33 kg today to 10 kg CO<sub>2</sub>e/kWh by 2030 through coordinated actions across our value chain. Our goal represents an approximate reduction in carbon footprint of 90% compared to an industry reference cell\*.

Our work with life cycle assessment (LCA), which we performed on our cell portfolio and of our energy storage system (ESS) help us account for our environmental impact of our cells. We have

certified LCAs of six Northvolt battery cell models to quantify their cradle-to-gate environmental impacts. This year, we expanded our work by performing cradle-to-cradle LCAs on the same cells, thereby extending the scope of assessment to include the full life cycle: from extraction of resources (cradle), through to end of production (gate) to the disposal or recycling of the product (grave).

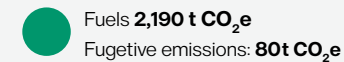
We report on scope 1, 2 and 3 carbon emissions and as we begin to establish a baseline, we will develop more comprehensive carbon reduction targets, on an absolute basis.

The journey we are drawing here will also let us understand how our activities will behave according to different scenarios and then assess the realistic risks, opportunities and impacts we might face, mitigate and manage in the future. The development of metrics and targets, additionally to those presented here for 2022, will be the key work of 2023 and 2024. KPIs will be set up to follow our performance in terms of climate-related risks and opportunities management according to TCFD Guidance.

\*Industry reference based on IVL 2019 lithium-ion NMC 111 cell,

Understanding our climate impact enables us to take meaningful actions, aligned with our commitment to sustainability and goal of 10kg CO<sub>2</sub>e/kWh by 2030.

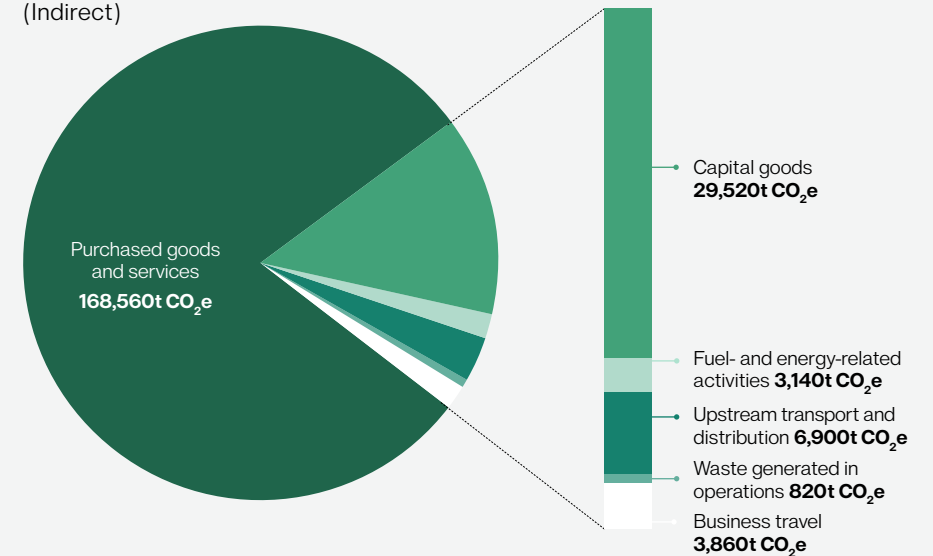
## Scope 1 (Direct)



## Scope 2 (Indirect)



## Scope 3 (Indirect)



Calculated in accordance with the Greenhouse Gas Protocol.

Category

Energy

Emissions

Recycling

Goal

**100%**

fossil-free energy on an annual basis

**10kg**

CO<sub>2</sub>e/kWh by 2030

**50%**

recycled material by 2030

Progress 2022

**95%**

fossil-free energy

**33 kg**

CO<sub>2</sub>e/kWh

**6%\***

recycled material

\*The percentage of recycled material includes recycled copper.

→ Read more about our climate efforts in our Sustainability and Annual Report 2022, page 30–35