

northvolt

Sustainability

Report 2021

Our World

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Our

World



northvolt

① This is Northvolt

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The year in brief

2016 – 2021 milestones

Letter from our CEO

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Market overview

This is Northvolt

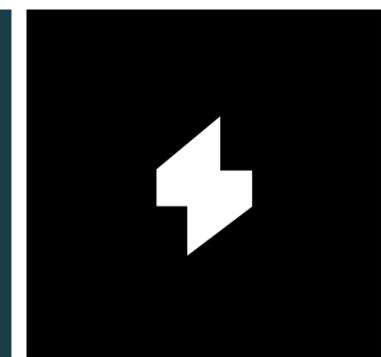
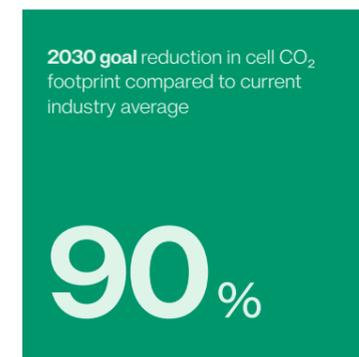
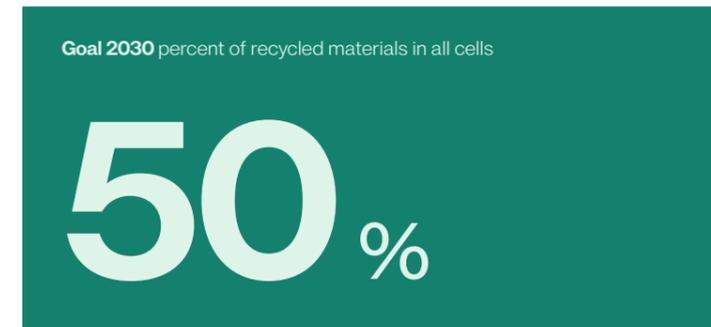
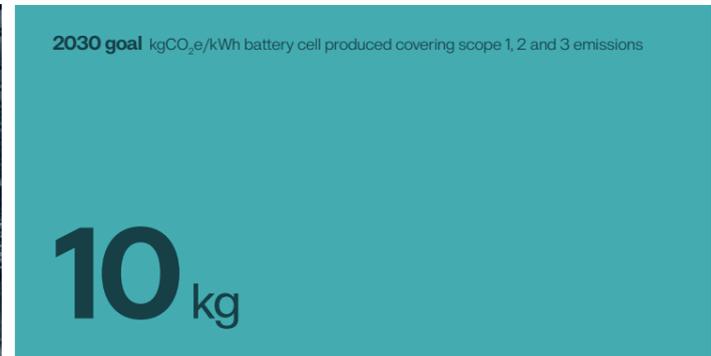
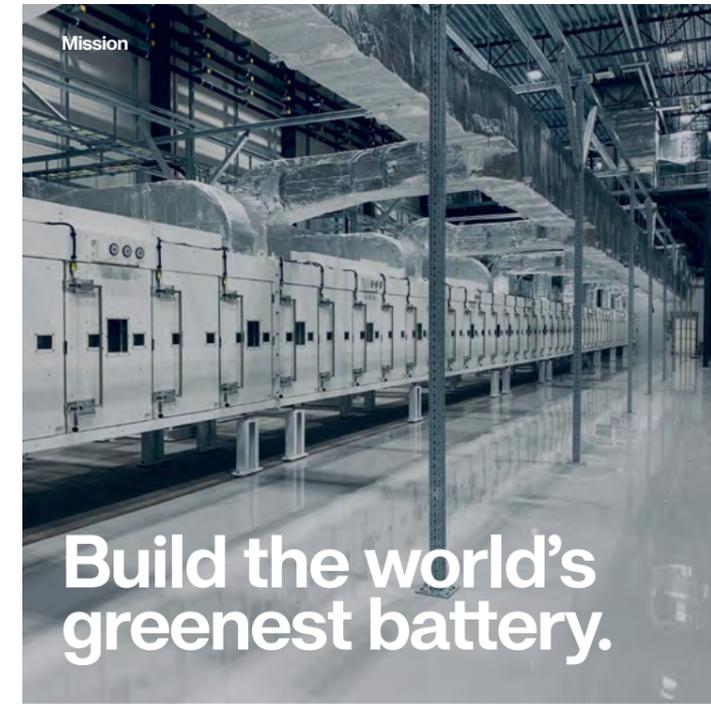
Founded in 2016 to enable the transition to a decarbonized future, Northvolt is a European supplier of sustainable, high-quality lithium-ion battery cells and systems.

We aim not only to pioneer a new battery industry for Europe, but to set the global benchmark for sustainability in the battery industry.

Having grown to a team of over 3,000 people by April 2022, we have established partnerships with some of Europe's leading automotive manufacturers and industry players seeking to transition to an all-electric future. The significant demand for our offering of sustainable batteries has enabled us to secure an order book of cell supply agreements of \$55 billion by March 2022.

Now focused on the task of scaling up our production, Northvolt aims to establish 150 GWh of annual cell production capacity in Europe by 2030, with accompanying recycling capacity to ensure we create a circular system and close the loop for batteries.

We are in the battery business. And we are building them into solutions to make the world a better, cleaner place.



The year in brief

We moved into 2021 with a clear direction and strong momentum towards our aim to establish a new battery industry in Europe.

While a central focus through the year was the development and commissioning of our first production lines at Northvolt Ett gigafactory, we placed great attention on stabilizing our production operations at Northvolt Labs, necessary for fulfilling our commitments to key customers. Meanwhile, key initiatives were set in motion to mature the company in terms of our business practices.

When undertaking an endeavor as massive as Northvolt, no year will ever be without challenges. Most certainly, the Covid-19 pandemic impacted our activities, not least in terms of our engagement with suppliers, customers and other stakeholders. Like many businesses, however, we quickly adapted to the circumstances we faced.

In a more material sense, the global logistics crunch and availability of key primary construction materials were harder to compensate for and did impact the construction and installation schedules of Northvolt Ett. Managing the situation proactively, we pivoted in several respects to assure the project proceeded in as streamlined a manner as possible.

Our rapid industrialization rate has also brought with it a number of key challenges in itself: onboarding and training of hundreds of new Northvolters, a dependency on equipment and materials from

across the world as we push towards establishing a full European supply chain, managing a large number of suppliers at our construction projects and tackling the lack of transparency in the construction industry.

Despite challenging circumstances, we achieved a number of major accomplishments throughout the year.

In February, we acquired U.S. battery technology company Cuberg to commercialize next-generation lithium-metal battery cell technology, opening up new potential future avenues for electrification.

That same month, we secured a \$14 billion battery cell supply order from Volkswagen. In June, we concluded an equity raise of \$2.75 billion to finance the expansion of Northvolt Ett to 60 GWh as well as several other key programs within the company. In November, we produced our first battery cell with 100% recycled nickel, manganese and cobalt and announced plans to expand recycling capacity at Revolt Ett to 125,000 tons/year.

Approaching the end of the year, the developments did not slow. In December, Northvolt and Volvo Cars announced a joint venture for the development and sustainable production of batteries for the next generation of pure electric Volvo and

Polestar cars. Also in December, we entered into a joint venture with Portuguese energy company Galp to develop a lithium conversion facility in Portugal to establish a European lithium supply chain. And finally, just before New Year, the first cell was assembled at Northvolt Ett.

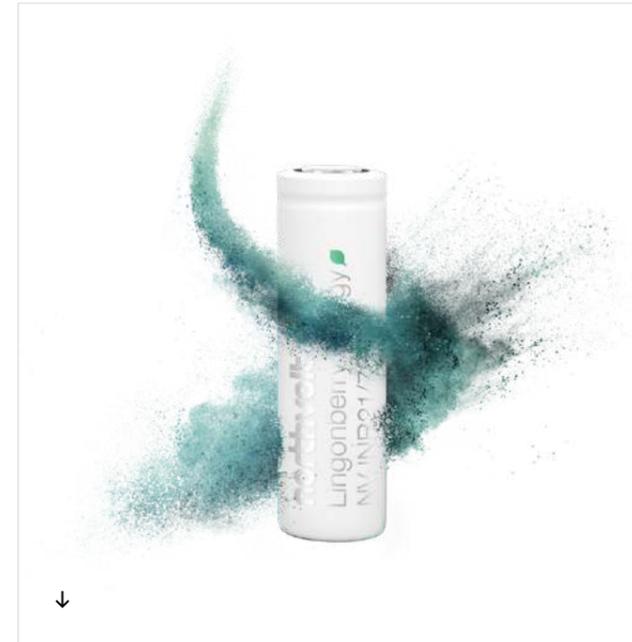
Through the year, we more than doubled the size of our team. Growth was mirrored in how Northvolt matured its internal operating systems and business practices, including the establishment of certified Management Systems.

In sum, 2021 was a year in which we saw Northvolt cement its foundations, enhance its industrial position and set all the pieces in place to begin delivering on its promise: a blueprint for sustainable manufacturing of batteries to enable the shift to a decarbonized society.

KEY METRICS	2021
Scope 1 GHG emissions (tCO ₂ e)	6 460
Scope 2 GHG emissions (tCO ₂ e, market based)	546
Scope 3 GHG emissions (ton CO ₂ e, market based)	47 767
Share of renewable energy inputs (%)	98
Water consumption (m ³)	15 373
Share of female employees (%)	29
Share of permanent employees covered by collective bargaining agreement (%)	93
Lost Time Injury Frequency Rate (LTIFR)	1.8
Suppliers screened against environmental, social and governance criteria (#)	309
Share of employees that have agreed to our Code of Conduct (%)	100

2016 – 2021 milestones

- 10 / 2016 Northvolt is founded with the mission to pioneer sustainable battery manufacturing and establish a new European industry to enable the transition to a decarbonized future.
- 10 / 2017 Northvolt confirms Northvolt Ett gigafactory is to be built in Skellefteå and Northvolt Labs cell industrialization and research facility in Västerås.
- 08 / 2019 Northvolt produces its first cells at Northvolt Labs.



12 / 2019 Northvolt launches Revolt battery recycling program.



- 06 / 2020 Hydro and Northvolt launch Hydrovolt, a joint venture to establish a battery recycling facility in Norway.
- 07 / 2020 Northvolt raises \$1.6 billion in debt financing.
- 07 / 2020 First customer delivery of cells from Northvolt Labs.
- 08 / 2020 Northvolt commissions Revolt pilot recycling plant.



- 09 / 2020 Northvolt signs an equity raise of \$600 million.
- 02 / 2021 Northvolt acquires US-based company Cuberg, developing high-performance lithium metal cells.



- 02 / 2021 Northvolt announces development of Europe's largest factory for battery systems, Northvolt Dwa.
- 03 / 2021 Northvolt receives a \$14 billion order for premium battery cells for Volkswagen Group.
- 04 / 2021 Northvolt announces project agreement with Fluence for development of grid-scale energy storage.
- 06 / 2021 Northvolt raises \$2.75 billion in equity.
- 07 / 2021 Groundbreaking for \$750 million investment into expansion of Northvolt Labs campus.
- 11 / 2021 Northvolt produces first battery cell containing 100% recycled cathode active material and announces an expansion of Revolt Ett recycling plant.



- 12 / 2021 Volvo Cars Group and Northvolt sign Joint Venture agreement for battery R&D and production.
- 12 / 2021 Northvolt and Portuguese energy company Galp announce lithium conversion joint venture Aurora in Portugal.
- 12 / 2021 Northvolt breaks ground at Northvolt Systems Dwa energy storage systems factory, in Gdańsk, Poland.
- 12 / 2021 Northvolt assembles first battery cell at Northvolt Ett.



Letter from our CEO

Our most precious commodity is no longer energy, water, or raw materials – it is time.

During the past two years in the face of the Covid-19 pandemic, we have seen communities, corporations and governments come together to take swift action. We have proven that we can act rapidly and collaboratively towards common goals. With climate change already making its impact felt, and set to only worsen in consequence, there is a lesson to be drawn here. We need to act with the same sense of urgency and commonality to solve this crisis too. And I believe we can.

We know from the IPCC that we must reduce global greenhouse gas emissions by half by 2030

With less than a decade to solve these challenges, the time for discussion is over. We already have the knowledge and technologies we need.

Northvolt aims to play a key role in the transition to a low carbon economy by delivering battery solutions which act as an enabling technology across society and industry. Batteries support the electrification of transport by land, by sea and by air. They enable greater and more efficient use of renewable energy and they enable the replacement of diesel generators in virtually every circumstance we find them.

Of course, the battery is not a silver bullet. But it is a critical component in tackling climate change and reducing our dependence on fossil-fuels. The con-

sequence of this, however, is that we must massively increase our capacity to produce batteries. In 2020, the demand for batteries was roughly 300 GWh. In 2025, it is expected to increase more than four-fold to more than 1,700 GWh. By 2030, it will have increased to more than 4,500 GWh.

Enabling a cleaner future through scaling up battery manufacturing capacity can have a profoundly positive impact on society. But it matters how we do this. And it was the recognition of this point which led to the founding of Northvolt.

Northvolt began with a vision – to not only create a new battery industry in Europe, but to demonstrate how battery manufacturing can be undertaken sustainably. The approach being taken by



↑ Peter Carlsson, CEO at Northvolt, writing in March 2022

Northvolt and embodied in our mission to build the world's greenest battery is just this.

To succeed in our endeavor, we have taken a fundamentally new approach to battery manufacturing – bringing almost the entire manufacturing process into our own operations. This is a challenge to be sure, but the opportunities that stem from this are profound, extending beyond allowing for Northvolt to produce truly sustainable batteries to providing us with control over the safety and performance of our products. At Northvolt, we control our supply of raw materials and components, our sourcing of electricity and work to integrate circularity and recycling into our setup, all in a way that has never been seen before.

Increasingly, we see Northvolt's ambition to demonstrate a new model for sustainable batteries taking hold. The European Union has taken notice and has proposed to introduce carbon footprint labelling, raw materials due diligence and recycling requirements for batteries – an important indication that we are pushing the entire industry forward, or at the very least lie ahead of the curve.

Looking back on 2021, it is clear to me that Northvolt took great strides forward. Above all, we cemented our industrial position and secured our initial manufacturing capacity in Sweden.

As the CEO of Northvolt, I am proud of what we have managed to achieve within such a small amount of time. I want to continue to make Northvolt not only a key enabler in the energy transition, but also a place where our employees look after each other and continue to inspire their colleagues to keep making the world a better place. I have always maintained that the people at Northvolt are our greatest asset, strongest driver, and best guarantee that we will deliver on our vision.

This report, our first ever Sustainability Report, is our testimony. It outlines what we are doing, how we are doing it, and the challenges we face in our mission and work to enable the future of energy. As we look ahead to 2022, we are excited by what the future holds for us. We know challenges await, but we are determined in our work and committed to live up to our values and set a standard for others to follow.

Letter from our Chairman of the Board

We find ourselves amidst unprecedented change within the industrial landscape that is as exciting and dynamic as it is challenging.

As society and industry awaken to the full extent of the need for change in the face of climate change, no corner of our world will be left untouched. At the same time, however, the application of science and engineering to find and develop innovative solutions has surely never been greater nor as well-financed.

It is precisely this world into which Northvolt was founded – as a direct response to and solution for the European transition to a decarbonized world.

At Northvolt, things move at great speed. Through 2021 alone, we witnessed tremendous developments in virtually every facet of the company. In many ways, it would be fair to suggest that an inflection point was reached, one marked by securing financing and customer agreements, milestones in technological development, and in the readiness of Northvolt Ett. Now, moving into 2022 and beyond its days as a start-up, Northvolt

is set to change gear and enter into a new phase, rooted first and foremost in its commencement of mass volume manufacturing of batteries at Northvolt Ett.

Taking a step back from the development of Northvolt itself, it is remarkable to take note of the changes and evolutions we see in the markets and that wider landscape into which Northvolt fits.

Since Northvolt's founding in 2016, market forces have moved in a singular direction with respect to electrification, and more broadly a push for sustainability within business and industrial activities. The pace at which leading European automotive makers first embraced and, increasingly of late, fully committed to electric vehicles is remarkable. When we first entered the market, the notion of going all-in on battery electric was hotly debated. Today, this trajectory appears as an indisputable fact.

Supported by these circumstances, the business case of Northvolt has only grown stronger. What's more, the understanding of the environmental significance of creating a sustainable model for battery manufacturing has grown considerably.

With the rapidly growing demand for batteries, it is beyond contestation that we must chart a path forward in which batteries are manufactured in such a way as to not repeat mistakes of the past and leave a burden for future generations.

While we might not be able to directly influence manufacturing practices on the other side of the world, we certainly can hope to set a standard that can be replicated here in Europe as this new domestic battery industry emerges. And here, Northvolt will not, and should not, be the only player in town. It is to be acknowledged and commended, therefore, the work being undertaken in Brussels to introduce new legislation which aims to introduce new binding sustainability requirements for the European battery industry.

The European battery industry journey unfolding

before us is tremendously exciting. Beyond this, it is also encouraging to witness what I believe is a pivotal shift taking place: industry is not only accepting that how we produce products matters, but they are clearly acting upon it. Especially with new industry and start-up establishments, we are seeing access to clean energy being prioritized in factory site selection, and increased adoption of proactive approaches towards sustainable sourcing of materials and manufacturing of products. It is a movement perhaps best characterised by a much-needed and long-overdue sense of accountability being embraced by industry.

We can also be encouraged to see Sweden emerging at the forefront of new clean technology industries. Both new and old industry are involved in this shift, and the nation has every reason to continue its embrace of this movement.

Northvolt has tremendous opportunities within a world of industry and environmental challenges. Progress can be made at a remarkable pace when we commit ourselves to something. The work of the Northvolt team is exemplary in this respect. My hope is that many other companies will come to find motivation of their own in Northvolt as they seek out solutions to challenges that unite us all.



↑ Carl-Erik Lagercrantz, Chairman of the Board

Market overview

Never before has the world known a period of such **rapid technological, industrial and societal change.**

The state of our world

The immense change happening around us brings both challenges and opportunities. While there should be no underestimating the consequences of the climate crisis, at Northvolt we tend towards the hope and opportunity present in the world. We have most if not all of the tools, solutions and knowledge we need to fundamentally shift towards a sustainable society.

Although the task is extraordinary in scale, we are thankfully already starting to see the change we believe is necessary.

As a company operating at the intersection of several major global trends and driving forces, our approach is to capitalize on the opportunities, mitigate the risks and at all times minimize any adverse impacts from our company's activities.

We are at a crossroads. The decisions we make now can secure a liveable future. We have the tools and know-how required to limit warming.

↑ IPCC Chair Hoesung Lee, 2022

Key trends influencing Northvolt's approach

	LOW CARBON SOCIETY	ELECTRIFICATION	RAW MATERIAL DEPENDENCE
Trend	<p>Growing industrial and societal momentum to reduce dependence on fossil-fuels.</p> <p>Increased adoption of renewable energy as means to generate electricity.</p> <p>Acknowledgement that how we manufacture products matters as much as the use case of the products themselves.</p>	<p>Rapid uptake of electrification of transportation as means to transition away from internal combustion engines.</p> <p>Supportive EU regulatory frameworks for zero emission vehicles.</p> <p>Electrification of other industrial areas gaining momentum, e.g., mining, maritime, manufacturing, aviation, off-highway vehicles.</p>	<p>Increased dependence on raw materials for battery materials.</p> <p>Current global supply of most battery minerals well below requirements to meet projected global demand.</p> <p>Increased awareness of adverse environmental and social impacts in the battery raw material supply chain.</p>
Risks and opportunities	<ul style="list-style-type: none"> ▲ Missed opportunity to secure a leading position in the new energy landscape. ▲ High CO₂ emissions of traditional battery manufacturing. ▲ Slow roll-out of renewable energy generating capacity. <p>→ Massive and increasing demand for cleantech solutions to support transition to decarbonized society.</p> <p>→ Job creation and prosperity resulting from establishment of new industry driving the energy transition.</p> <p>→ Availability of capital for cleantech and sustainably focused businesses.</p>	<ul style="list-style-type: none"> ▲ Delays in battery production slow the roll-out of EVs and other electrified solutions in Europe. ▲ Inability to compete with market competition on battery cost and performance. <p>→ Massive and increasing battery demand to support transition to decarbonized society.</p> <p>→ Economic potential of a new, future-proof battery industry in Europe.</p> <p>→ Support a European policy environment which facilitates a sustainable battery industry and drives achievement of climate goals.</p>	<ul style="list-style-type: none"> ▲ Dependency on raw materials is perceived to undermine the sustainability of batteries. ▲ Suppliers contributing to environmental or social harm. ▲ Insufficient supply of materials impacting battery production. <p>→ Build-up of raw materials supply chain globally and locally.</p> <p>→ Market demand for recycled raw materials.</p> <p>→ Define new benchmarks for responsible sourcing and use of raw materials.</p>
Northvolt approach	<p>Rapid build-up of battery manufacturing capacity in Europe, with a commitment to use fossil-free energy and circular solutions within production to set a new global benchmark for sustainability within the industry.</p>	<p>Establish a world-leading strategic platform covering the full battery value chain from which to develop and deliver sustainable battery solutions to the market to enable wholesale electrification.</p>	<p>Create a vertically integrated model coupled with an in-house recycling program, to increase level of supply chain control and traceability, reduce dependence on fresh raw materials and drive positive change in the industry.</p>

The need for change

We have the opportunity to embed sustainability into the battery industry. We also have the responsibility to do so.

The opportunities associated with battery solutions are far-reaching. However, we cannot be naive about the potential risks and challenges involved with battery production. There is a sustainable way to produce batteries, and it is not the way that dominates the industry today.

By default, this is an industry requiring significant amounts of energy and massive volumes of raw materials. A focused, comprehensive and proactive approach is therefore required. How we respond to this point will surely come to be judged as a defining feature of the energy transition.

For every kilowatt-hour (kWh) of battery capacity produced, between 60-100 times as much energy is required in the manufacturing process.

A variety of factors feed into this situation, but most significant is the use of high-temperature upstream chemical processes and requirement for energy-demanding clean & dry rooms in which to conduct downstream electrode and cell assembly operations.

Fortunately, simply through using fossil-free energy in these contexts, total life cycle emissions of a battery can be reduced by around 50%. With additional actions, including the selection of sustainable raw materials suppliers, increased circularity and resource efficiency and the use of recycled material, we can reduce the footprint even further.

How we produce batteries therefore makes a tremendous difference. Other sustainability risks across the battery value chain relate to resource use, pollution of air, land and water, and human rights. We cannot afford to ignore these challenges. Throughout our operations and value chain, we must ensure consideration of our impacts on global climate, local environments, and the livelihoods and human rights of those affected directly or indirectly by our activities.

Finally, we cannot underestimate the effort required to establish a European battery production footprint and wider ecosystem fast enough to meet climate commitments. The European battery industry is in its infancy, and to meet expected demand, Europe needs both production capacity and expertise. Both require extensive investment into construction of new facilities as well as the training and upskilling of people.

At Northvolt we are determined to set a new standard for sustainability within the battery industry. The hope is that other battery producers will follow, such that they too will lower their environmental footprints and improve their business practices across all indices of sustainability. It is in this way that we intend to have a positive impact on the battery industry which extends far beyond our own activities.

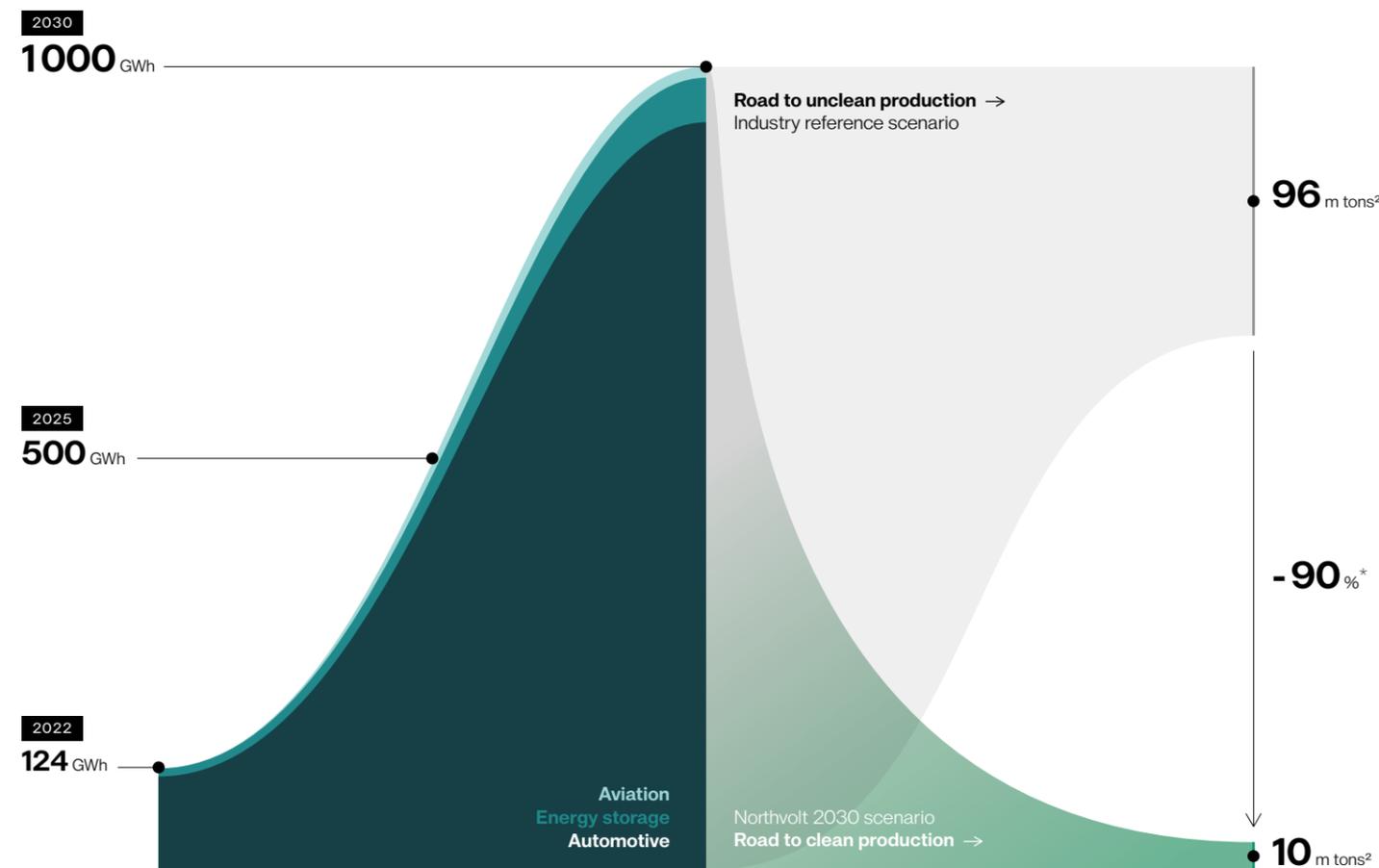
Strategies deployed

- ✓ Fossil-free energy supply
- ✓ Circularity in production
- ✓ Supplier decarbonization and localization
- ✓ Recycling of end-of-life volumes
- ✓ Holistic assessment of environmental and social impacts

SOURCE IVL 2019, refer to section of Life Cycle Assessment for further details

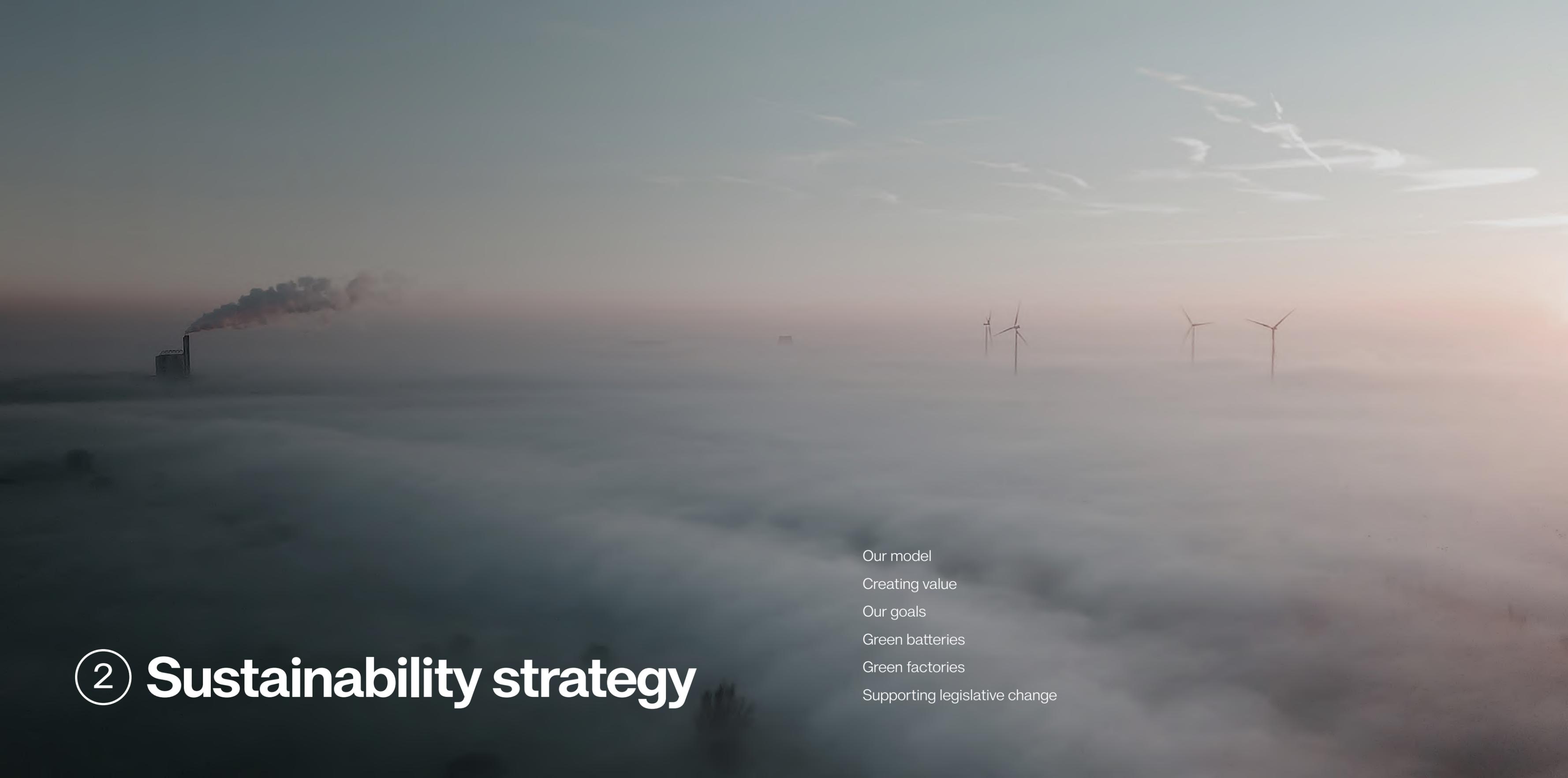
↓ Annual battery demand in Europe (GWh)

↓ Carbon emissions associated with production of 1000 GWh
Scenarios: Industry reference / Northvolt 2030



SOURCE Third-party consultants carbon footprint based on Northvolt analysis, refer to section Life cycle assessment for further details, IEA 2022

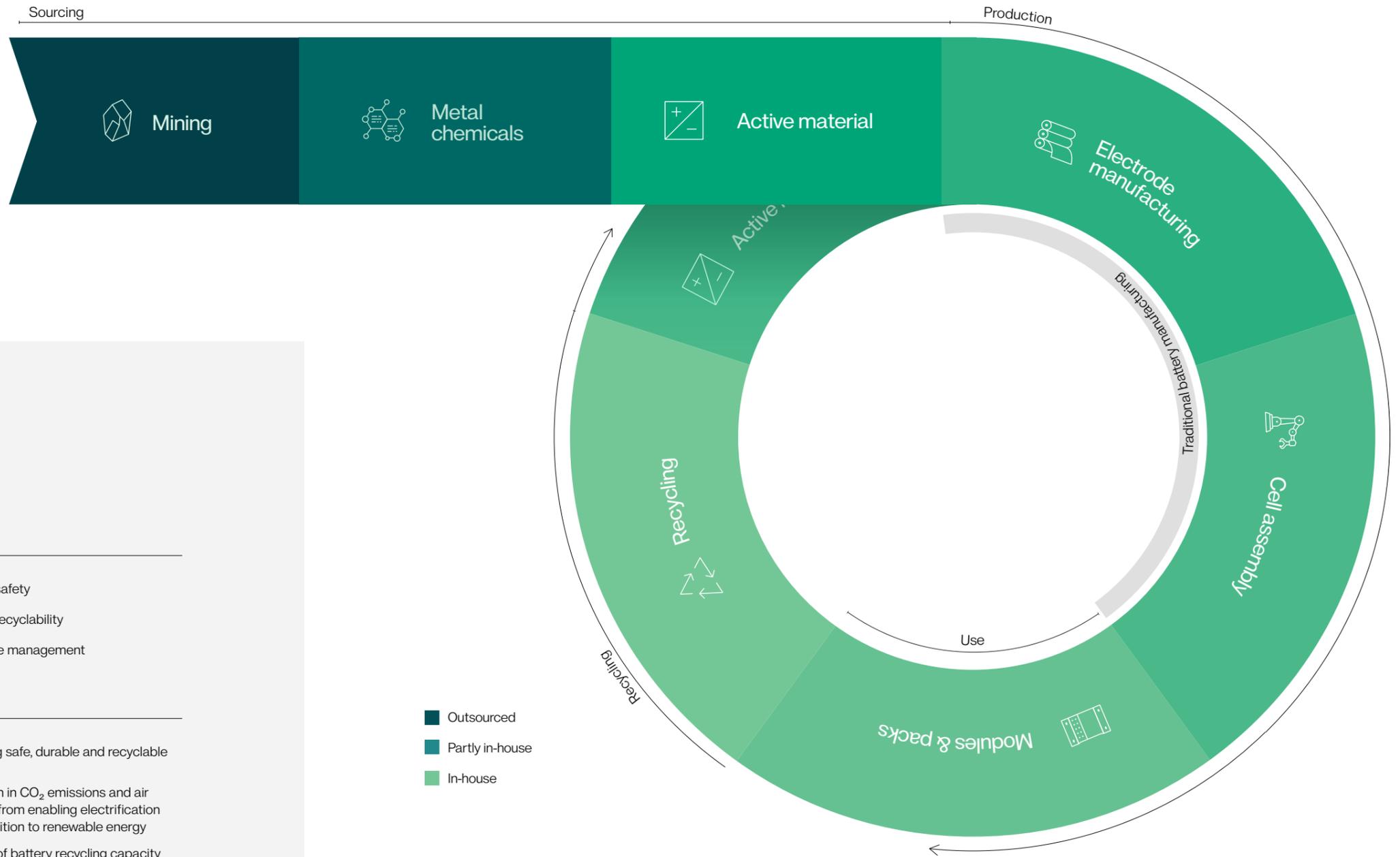
* Equivalent to 2.5x annual CO₂ emissions of Sweden in 2020



② Sustainability strategy

- Our model
- Creating value
- Our goals
- Green batteries
- Green factories
- Supporting legislative change

Our model →



Creating value

	UPSTREAM	PRODUCTION	USE PHASE
Key topics	<ul style="list-style-type: none"> Resource consumption Climate change impact Working conditions and human rights Local environmental degradation 	<ul style="list-style-type: none"> Resource consumption Climate change impact Impact on local biodiversity and nature Community relations 	<ul style="list-style-type: none"> Product safety Product recyclability End-of-life management
Value creation	<ul style="list-style-type: none"> Active engagement with suppliers to drive positive change Establishing recycling capacity to reduce dependency on virgin raw materials Supporting a new European battery value chain 	<ul style="list-style-type: none"> Designing for resource efficiency and circularity Commitment to fossil-free energy use Selecting factory sites with minimal impact on local environment Active community engagement 	<ul style="list-style-type: none"> Designing safe, durable and recyclable products Reduction in CO₂ emissions and air pollution from enabling electrification and transition to renewable energy Build-up of battery recycling capacity
Level of influence	—————	—————	—————

- Outsourced
- Partly in-house
- In-house

- ✓ **Vertical integration** enables complete product control, traceability, sustainability and structural cost advantages
- ✓ Commitment to **fossil-free energy** in cell production
- ✓ Embrace of new methods, **innovation and R&D** to advance our products and solutions
- ✓ Collaboration with **strategic partners** who share our vision for the future
- ✓ **Sustainable & ethical sourcing** of raw materials
- ✓ Working actively with suppliers, with particular focus on materials and equipment, to **drive positive change** throughout value chain and establish **local battery ecosystem**

Our goals

We are operating at the forefront of the push for a cleaner world, and our goals reflect that.

Through the last quarter of 2021 and into 2022, we have undertaken a review of our sustainability strategy and goals to ensure that we are prioritizing and target setting in line with our material sustainability topics.

A key development is an expanded focus on social impacts, including our employees' health & safety, diversity and work satisfaction, as well as local community impact. We are currently implementing structures for systematic reporting and steering on our achievement of these goals.

Due to our high pace and everchanging market context, we will continuously revisit our strategy and goals. As the availability of our impact data increases during our scale up, we will be establishing additional baselines upon which we will aim to continuously improve.

Sustainable development goals

The UN Sustainable Development Goals (SDGs) set a global framework for countries, businesses and other stakeholders to address society's most important challenges and gather everyone to work together for a sustainable future.

Our business activity touches the majority of the SDGs and we are focusing our efforts on those that we could make the most impactful contribution to. These are integrated into our business model, strategy and our material topics.

	OUR GREEN BATTERIES & FACTORIES	OUR RESPONSIBILITY	OUR PEOPLE
Mission & vision	To build the greenest battery in the world, with a minimal footprint.	To act as a positive force for change throughout the value chain.	To be an awesome place to work, which enriches surrounding communities.
Guiding principles	<ul style="list-style-type: none"> ✓ Clean ✓ Circular 	<ul style="list-style-type: none"> ✓ Innovative ✓ Safe ✓ Traceable ✓ Sustainable ✓ Engaged 	<ul style="list-style-type: none"> ✓ Bold ✓ Passionate ✓ Excellent
Key policies	<ul style="list-style-type: none"> Energy policy Environmental policy Quality policy 	<ul style="list-style-type: none"> Anti corruption policy Business partner policy Code of Conduct Supplier Code of Conduct 	<ul style="list-style-type: none"> Code of Conduct Salary policy Supplier Code of Conduct Work environment policy
Material topics	<ul style="list-style-type: none"> Climate change & climate risk management Product sustainability & safety 	<ul style="list-style-type: none"> Responsible sourcing Ethical business conduct 	<ul style="list-style-type: none"> Occupational health & safety Talent attraction & retention

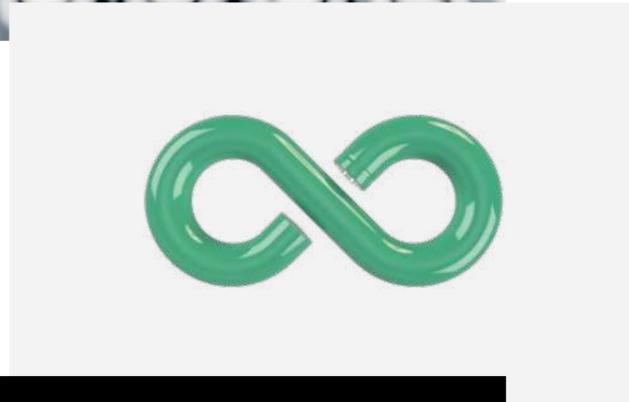
Goals



CLIMATE CHANGE & RISK MANAGEMENT <ul style="list-style-type: none"> 100% fossil-free energy supply for production 10 kg CO₂/kWh by 2030 on a cell level covering Scope 1, 2 and 3 emissions 	RESPONSIBLE SOURCING <ul style="list-style-type: none"> 100% traceability to mine for raw materials 100% of suppliers screened for sustainability risks 100% supplier Code of Conduct acceptance by significant suppliers 	TALENT ATTRACTION & RETENTION <ul style="list-style-type: none"> 40% female employees by 2030 Employee net promotion score >30 Local communities >75% positive to Northvolt
PRODUCT SUSTAINABILITY & SAFETY <ul style="list-style-type: none"> Products which set the industry benchmark for battery safety 50% recycled materials in cells by 2030 	ETHICAL BUSINESS CONDUCT <ul style="list-style-type: none"> 100% of employees adhere to our CoC 100% of employees conducted Anti-Corruption and Bribery training 	HEALTH & SAFETY MANAGEMENT <ul style="list-style-type: none"> Safest workplace in our industry

We are defined by our ambition to produce green batteries from green factories.

Here is what that means to us →



Our approach to sustainability is grounded in state-of-the-art technologies and driven by environmental and industrial logic.

Green batteries

SUSTAINABLE Our blueprint for battery manufacturing represents an architecture built upon a commitment to sustainability. This begins with conscientious sourcing of raw materials and fossil-free energy, but extends to taking a proactive approach to ensuring a minimal environmental footprint throughout the value chain.

TRACEABLE We strive to have a full understanding of our batteries' impact on the environment by collecting and analyzing data throughout the life cycle.

RECYCLABLE No battery is ever without value. Even at end-of-life, batteries can be recycled and the materials within them recovered to be recirculated back into manufacturing. Through recycling we substantially reduce the environmental costs of battery production and solve the issue of how to handle batteries being retired from the market.

Green factories

CLEAN We will implement technologies and solutions to minimize the use of energy, chemicals, waste, water and other resources within our production facilities.

CIRCULAR We believe in closing the loop in the battery industry. To make this a reality, we are engineering a model for recycling end-of-life batteries and other materials wherever possible to circulate recovered materials back into manufacturing processes.

INNOVATIVE We are proactive in seeking to understand the environmental concerns of tomorrow and developing new solutions to mitigate them. We are committed to engaging with like-minded groups when synergies arise to deliver solutions which improve our environmental footprint.

Supporting legislative change

Northvolt is part of a much larger industry. Alone, we cannot enforce the radical changes required to bring sustainability to the battery industry. But we can be a voice for change. Our Public Policy team works at both Swedish and EU levels to support regulatory change in the direction we believe the industry should move.

We are primarily involved in the development of the new EU Battery Regulation. We are happy to see that the new proposed Battery Regulation brings significant improvement to the existing legislation. The regulation is set to introduce a carbon footprint label on batteries, ban the worst performing cells from sale on the market, introduce due diligence requirement for the sourcing of raw materials, set minimum recycling recovery rates and mandatory amounts of recycled materials in new cells.

However, we believe the proposal can go even further in its sustainability requirements for batteries in Europe and should be introduced without any delay to the key sustainability provisions. We want more businesses to be held accountable and to ultimately move in the right direction. See our [position paper](#) for further details on changes we are advocating for.

③ Our operations

made from batteries



- Northvolt Ett
- Northvolt Labs
- Northvolt Jeden & Dwa
- Northvolt Revolt
- Northvolt Cuberg

Northvolt Ett



↑ **Northvolt Ett is Europe's first homegrown battery gigafactory** and it is being established in Skellefteå, northern Sweden. Northvolt Ett will host both upstream cathode active material production and cell assembly. Construction started during the fall of 2019, the first cells were assembled late December 2021 and customer production will ramp up during 2022. The factory will expand to enable an annual cell production capacity of 60 GWh per year, sufficient for approximately 1 million electric vehicles.

Northvolt Labs



↑ **Northvolt Labs is a battery technology campus** located in Västerås, Sweden. Equipped with all the capacities necessary for Northvolt to develop, produce and validate materials and cells, Northvolt Labs has been online since Spring 2019. The primary function of Northvolt Labs is to serve as a platform for the industrialization of cell products, but more broadly functions as an ecosystem for advancing battery science, technologies and solutions.

Northvolt Jeden & Dwa



↑ **We are not only manufacturing battery cells.** We develop them into complete solutions to power everything from mining machines and energy storage systems to ferries. Our modules and packs are assembled at Northvolt Jeden and Dwa in Gdańsk. The facility Northvolt Jeden has been operational since 2019 and construction is currently ongoing for Northvolt Dwa.

During 2022, we have adopted the name of Northvolt Dwa to cover our full Polish operations, and will use that nomenclature for future reports.

Northvolt Revolt



↑ **Our in-house program for battery recycling is Revolt.** The group is spread across a number of facilities including the Revolt pilot recycling plant at Northvolt Labs and Hydrovolt recycling plant in Norway. We are also developing Europe's largest battery recycling plant, Revolt Ett, alongside Northvolt Ett.

Northvolt Cuberg

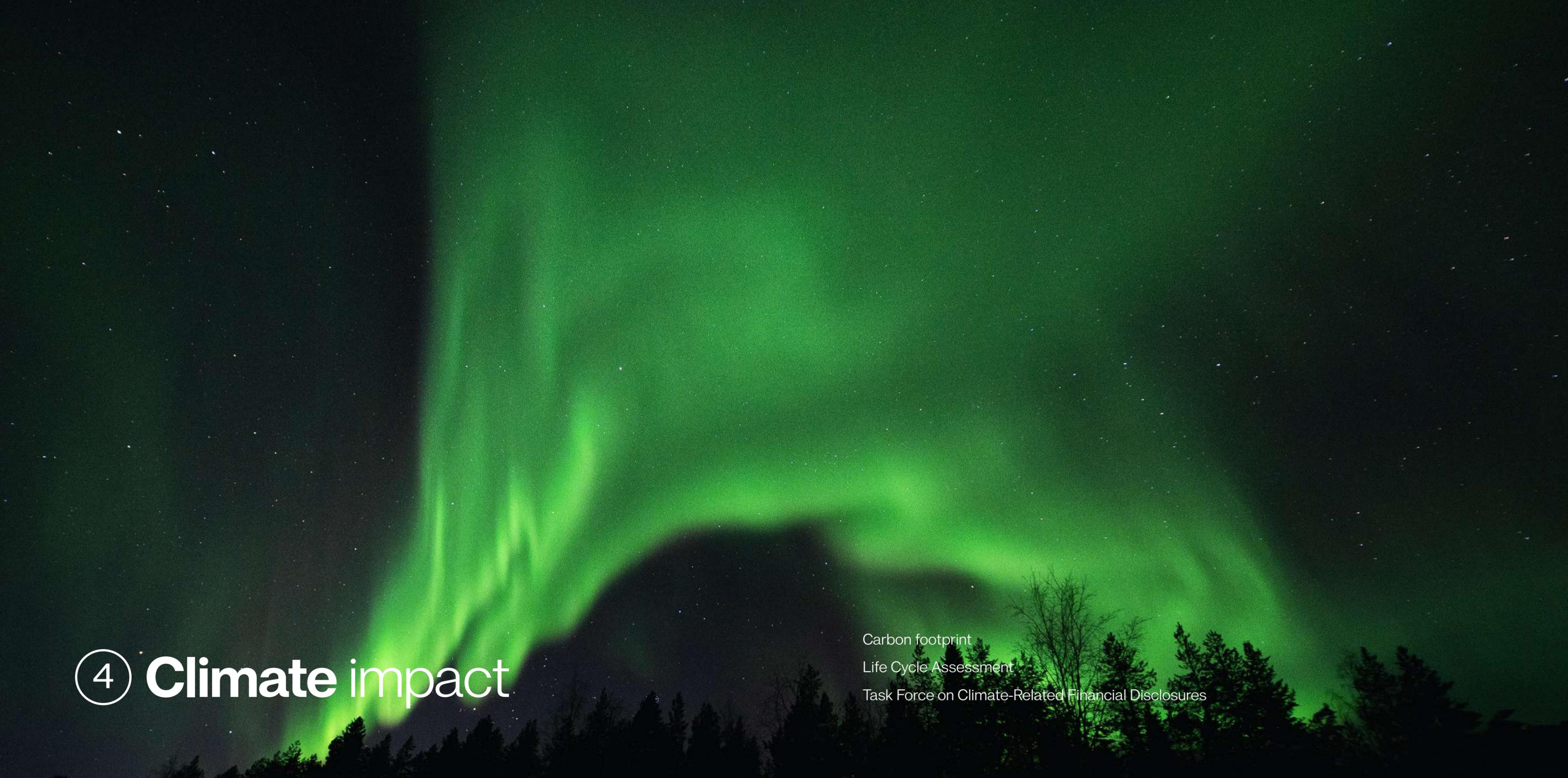


↑ **Cuberg is a San Francisco Bay Area start-up** acquired by Northvolt in March 2021. Cuberg is developing a novel cell technology based around a pure lithium metal anode and nickel, manganese, cobalt (NMC) cathode, leveraging a novel liquid electrolyte. The cell technology holds great potential to reach significantly higher energy densities than conventional NMC lithium-ion chemistries and enable electric aviation and the heavy automotive industry.





Our Impact



④ Climate impact

Carbon footprint

Life Cycle Assessment

Task Force on Climate-Related Financial Disclosures

Carbon footprint

The climate crisis is the largest environmental threat facing the world, and Northvolt was founded to play a part in providing the solution.

Managing our impact

As our energy supply in 2021 was 98% derived from renewable energy sources, our Scope 1 and 2 emissions were low. The majority of Northvolt's CO₂ impacts result from activities external to our production sites, and is reflected in our Scope 3 emissions.

We will continue our efforts to reach a 100% fossil-free energy supply for our factories. This includes generation of heat and steam based on renewable energy rather than burning of fuels wherever possible.

To date, the volumes of materials purchased in 2021 constitute our largest impact, followed by upstream logistics associated with purchased goods.

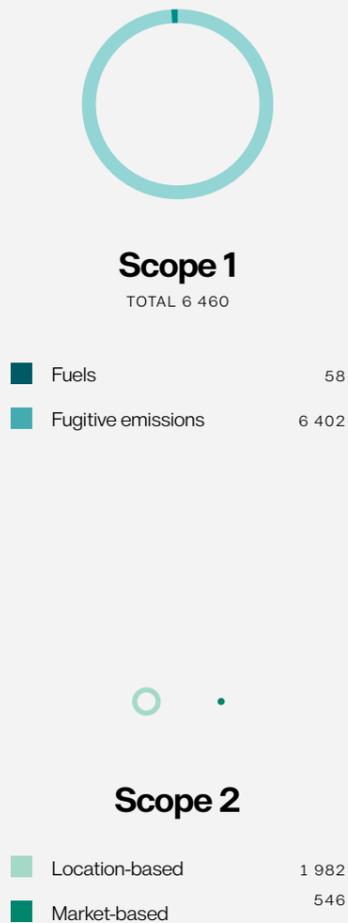
Whilst the construction of the first phase of Northvolt Ett drew to a close in 2021, reducing the impact from capital goods during the year, we expect our expansion over the coming years to make this category a large contributor to our total footprint. For our new sites, we are working to gather data from construction earlier in order to have an accurate representation from this category.

Determining our carbon footprint

Our carbon footprint is calculated on an annual basis, using the methodological framework established by the Greenhouse Gas Protocol. We promote a comprehensive approach to our carbon footprint by including direct (scope 1) and indirect (scope 2 and 3) GHG emissions which cover the value chain of our businesses. This is complemented by our ongoing Life Cycle Assessment (LCA) work, which provides us with enhanced granularity compared to standard databases.

[LEARN MORE](#)

[How we report](#)



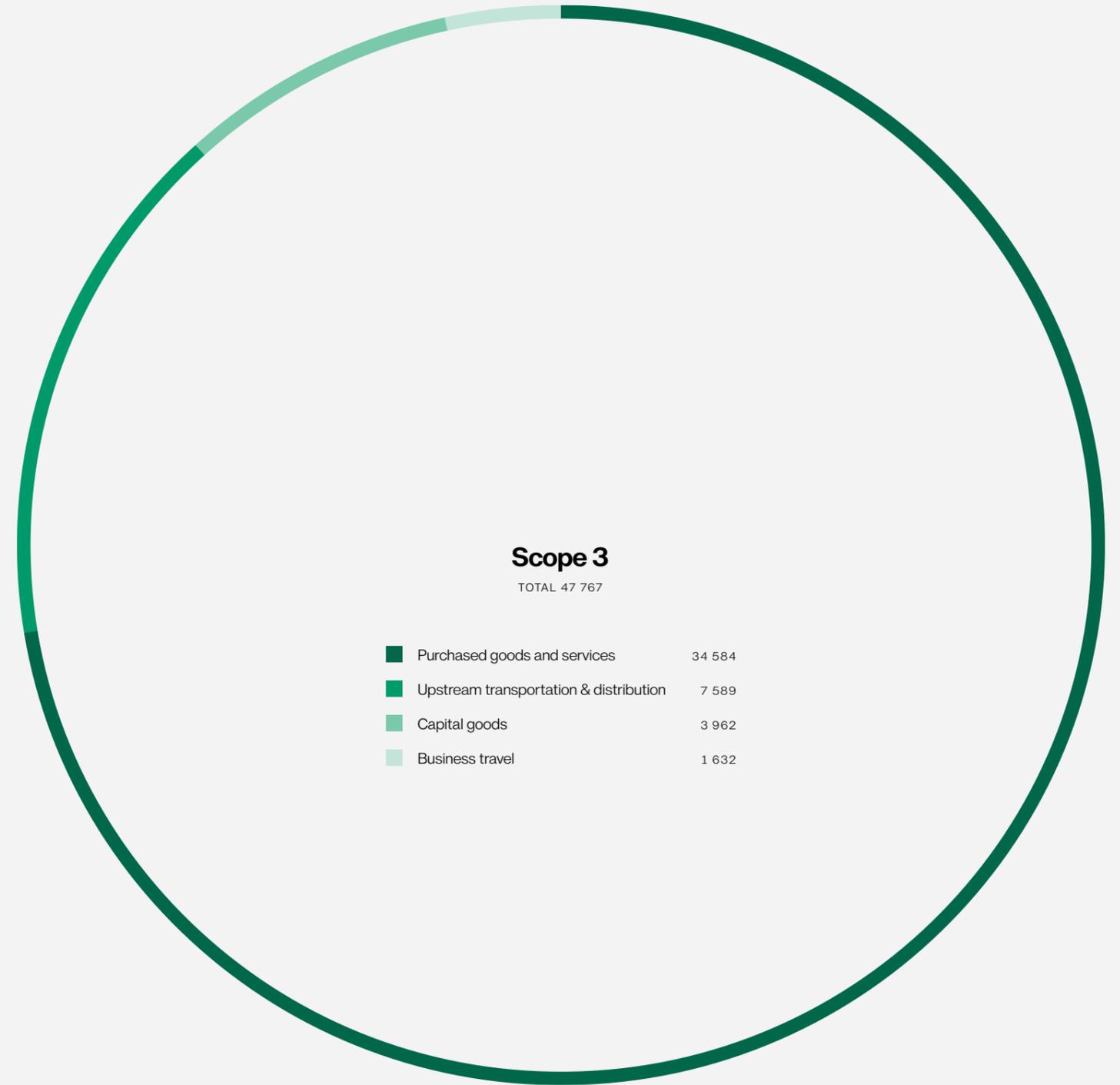
Scope 1

TOTAL 6 460

Fuels	58
Fugitive emissions	6 402

Scope 2

Location-based	1 982
Market-based	546



Scope 3

TOTAL 47 767

Purchased goods and services	34 584
Upstream transportation & distribution	7 589
Capital goods	3 962
Business travel	1 632

↑ Our 2021 emissions (tons CO₂e)

Life Cycle Assessment

Leveraging Life Cycle Assessments (LCAs) for a holistic view of our environmental impact across the value chain.

Methodology

The LCA methodology quantifies the environmental impacts of a product from extraction of resources (cradle), through to end of production (gate) to the disposal or recycling of the product (grave).

We calculate the environmental impacts according to 16 impact categories covering climate change impact, water use, ecotoxicity, land use and resource use amongst others.

In September 2021, we certified the LCAs of our first six battery cell models to quantify their cradle-to-gate environmental impacts. The certification was undertaken by a third-party reviewer in accordance with ISO 14040:2006 and ISO 14044:2006 standards.

The analysis incorporates both secondary and estimated data, since production at Northvolt Ett had not yet commenced at the time of analysis.

Relying on secondary and estimated data does not, however, provide a fully accurate representation of our true impacts. For example, the literature and data sets available today consistently under-represent the impacts of anode and chemicals for cell production.

Therefore, we are focusing on refining our LCA modelling through the collection of higher resolution data from our own production and in collaboration with our suppliers. As many of our suppliers lack previous experience in conducting LCAs we offer trainings to enhance their capacity to provide the data we require. By the end of 2021, we had collected supplier-specific LCAs for around 60% of our cell material suppliers.

While this initiative will directly benefit our own LCA assessments, it also increases our suppliers' awareness of their own impacts and serves as a baseline for improvements.

The path to 10 kg CO₂e/kWh

Considering a blended portfolio average for our cell models, 3% of total climate change impacts are attributable to production and 3% to transport and logistics; leaving 94% attributable to the materials we purchase.

The carbon footprint of our battery cells is significantly reduced compared to the industry reference. Moving towards higher nickel NMC chemistries in itself helps reduce the carbon intensity of our batteries. However, the most significant factor contributing to our lower cell carbon footprint today is powering cell production with

fossil-free energy.

In order to meet our target of 10 kg CO₂e/kWh cell produced, we need to lower our footprint further through working with our suppliers to improve the efficiency of upstream activities, further improve the resource efficiency of our factories, and scale up our recycling operations to ensure a circular feed.

End 2021 Share of Northvolt's cell material suppliers from which we have collected supplier-specific data

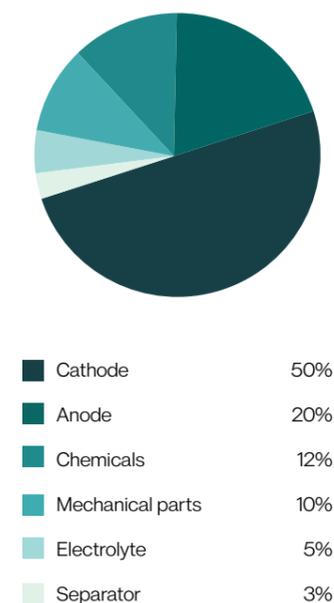
60%

LEARN MORE

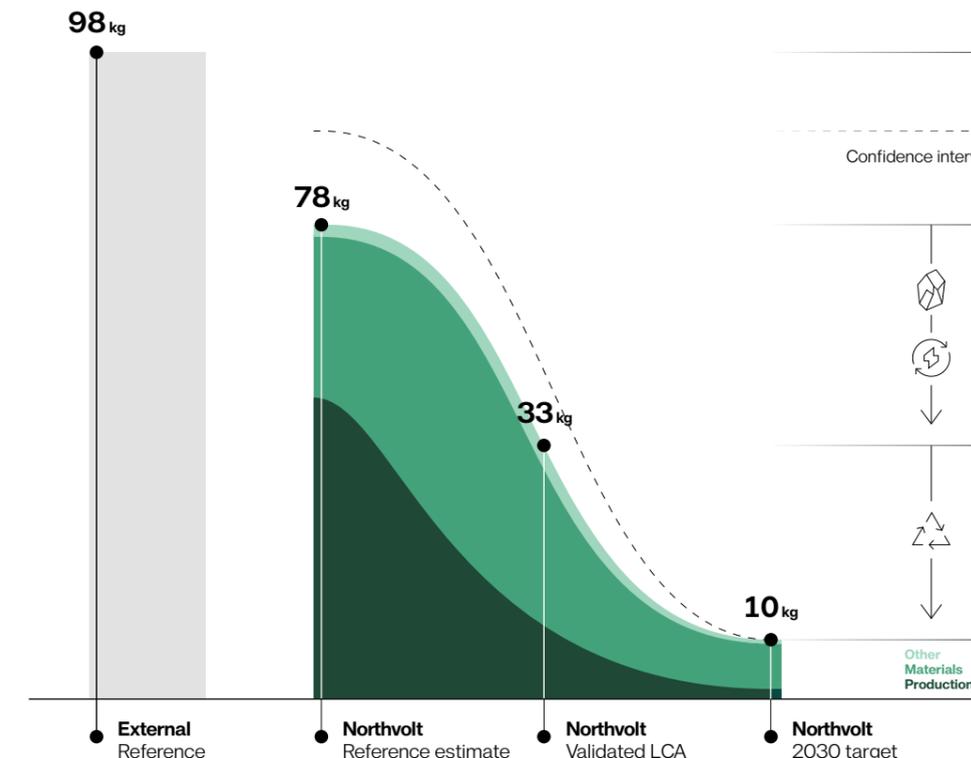
[Revolt](#)

Insights from our LCA initiative, alongside several scenarios for battery cell production to illustrate how decisions in raw material sourcing and energy consumption impact the carbon footprint of cells.

Carbon footprint distribution (%)
Materials – Northvolt



Carbon footprint of battery cell production (kg CO₂e/kWh)
Comparison across multiple scenarios



NMC type	NMC 111 ¹	NMC 811 ²	NMC 811 ³	NMC 811
Energy supply	Fossil rich	Fossil rich	NV production	NV production
Recycling	—	—	—	✓
Further supply chain transformation	—	—	—	✓
Energy density increase	✓	✓	✓	✓

SOURCE (1) IVL, 2019; (2) Northvolt estimate based on our bill of material but with fossil-fuel rich energy supply; (3) average of cell product portfolio validated in 2021, to be produced at Northvolt Ett.

Task Force on Climate-Related Financial Disclosures

This year represents our first disclosure against the TCFD recommendations. As our company and reporting matures, we will go towards full alignment with the framework.

Climate-related opportunities are a central part of Northvolt's overarching mission.

A key upcoming activity for us in 2022 is to develop climate-related scenario analyses to identify our climate-related risks and responses.

GOVERNANCE We have integrated climate-related issues as a key focus within our company strategy. This focus extends to the highest levels of governance of the company, including the Northvolt Board which has oversight of all our business plans and operations.

By design this means that all Board activities are undertaken through a lens of sustainability and climate-change.

Northvolt's Management team continuously assesses risks and opportunities for the company, which informally includes climate-related risks and opportunities. Examples of focus areas include changes in regulations, availability and access to fossil-free energy, access to green markets, and risks and opportunities to our climate performance based on the takeaways from Northvolt's LCAs.

Our Chief Executive Officer is ultimately responsible for all climate-related issues but supported by our Chief Environmental Officer. The Management

team is also responsible for planning responses to risks and opportunities, delegating responsibilities for these responses across the organization and relevant teams.

Our core goals are clearly communicated to all employees. The business currently assesses progress and performance on core business objectives on a monthly basis.

STRATEGY Our business strategy identifies 2025 and 2030 as milestones on short- and medium-term horizons. At present, however, specific climate-related issues potentially arising within each time horizon are not identified. Material financial impacts are also not quantified or assessed at this time.

The strategy going forward will in a more formalized manner address our climate-related risks and opportunities to ensure we capture these in our sustainability work, and ensure that our business is resilient to a range of climate scenarios.

RISK MANAGEMENT We have commenced a process of identifying climate risks and opportunities, including the assessment of external driving forces using the STEEP framework and the impact on the value chain of Northvolt in terms of transition and physical risks. We leverage industry

reports and the TCFD recommendations together with inputs from relevant functions within the organization.

The systematic identification of climate-related risks and opportunities across the value chain will provide a baseline for conducting a climate scenario analysis. The analysis will be used to assess significance of risks and opportunities across varying time horizons. The ongoing process of climate scenario analysis is set to be aligned within our risk management program.

METRICS AND TARGET We report on scope 1-3 carbon emissions and have the ultimate goal of reaching 10kgCO_{2e}/kWh by 2030. As we begin to establish a baseline, we will develop more comprehensive carbon reduction targets, on an absolute basis.

[LEARN MORE](#)

[Our approach to risk management](#)

[Our full KPIs](#)





5 Responsible sourcing

Raw material sourcing

Driving change

Critical materials overview

Raw material sourcing

We place particular focus on the sustainable sourcing of our key battery raw materials.

Battery manufacturing is a raw materials intensive activity. Ultimately, we aim to significantly reduce our dependency on virgin raw materials through scaling up our recycling activities via Revolt.

In the more immediate timeframe, as recyclable battery volumes are not sufficient to fully replace use of virgin raw materials, primary raw materials extraction will be necessary for battery production. This point underscores the need to ensure we source raw materials in the best possible way. To this end, we have developed a comprehensive raw materials strategy for sustainable sourcing.

We prefer to source raw materials directly from mines and refineries. By simplifying and shortening our supply chains, we improve the traceability of our raw materials and enables a more direct relationship with each individual supplier.

This approach stands in contrast to the traditional battery industry and serves to overcome several major shortcomings resulting from complex chains of intermediaries such as traders, refineries and producers of active materials.

In cases where we purchase cathode active material and cells rather than raw materials, we leverage the due diligence process established for raw materials contracts. We work actively to

improve the materials traceability and general sustainability profile of these suppliers.

An initiative which will take some time, but will improve both the sustainability performance and security of supply for the battery industry, is the development of a European raw materials supply chain.

While raw materials is a key focus area for us, our responsible sourcing practices are applied across purchasing categories. For equipment specifically, which forms a large portion of our purchasing activities, we work actively to build up new capacities in Europe to support the growing regional industry, and seek solutions to improve resource efficiency in our production.

Selecting the best

Our selection of raw materials suppliers follows a comprehensive due diligence process, geared towards assessing suppliers across a full spectrum of sustainability areas.

Into our selection process we have incorporated best practice from international standards including the UN Guiding Principles on Business and Human Rights and OECD Due Diligence Guidance.

Covid-19 posed challenges for conducting on-site audits throughout 2020/2021 and this prompted additional reliance on external, third-party assessments.

A key part of our supply chain strategy is actively engaging with our suppliers to jointly drive positive change.

→ **Raw materials** supplier selection process

Our standard procedures leverage third-party audits in addition to our own site visits, but primarily where a supplier is deemed to have higher risks than other raw material suppliers. External verification adds reliability to our process and can be helpful in discussions surrounding implementation of improvement measures which we require to be included in the contract.

Driving change

Following due diligence processes, ongoing engagement and dialogue as well as formal corrective action plans and improvement measures agreed between us and our suppliers are important tools. We base our initial corrective action plans on the outcome of the due diligence and audit phases.

If the supplier agrees to the improvement measures and a contract is signed, the process shifts into the monitoring phase. We continuously engage with our suppliers to follow their operations and progress on any improvements, including ongoing monitoring meetings and dialogues, and conducting site audits.

1

Initial assessment

- ✓ Northvolt self-assessment questionnaire
- ✓ Identifying ultimate beneficial owners and politically exposed persons
- ✓ External screening for sanctions
- ✓ Risk assessment scorecard
- ✓ Remotely conducted due diligence and media screenings

2

Due diligence

- ✓ Site visit, with third-party audit in high-risk cases
- ✓ Know Your Counterpart (KYC)
- ✓ Gap analysis against Northvolt's supplier Code of Conduct
- ✓ Identification of improvement measures

3

Approval

Suppliers may need up to three approvals before they are accepted for contract negotiations, depending on the risk classification:

- ✓ Sustainability & Compliance Committee
- ✓ Audit & Risk Committee
- ✓ Board of Directors

4

Contract negotiations

Besides economic and technical aspects, we also ask our suppliers to:

- ✓ Agree to the Northvolt Supplier Code of Conduct
- ✓ Accept the suggested improvement measures, audit rights and provision of life cycle assessment and carbon data

Critical materials overview



Responsibility towards raw materials is a defining feature of our business strategy.

Cobalt has received a lot of highly warranted attention in recent years. But it is worth noting that in general there is a low degree of attention paid to raw material supply chains; cobalt is the exception. The fact that cobalt is considered high risk is partially a reflection of it being the most investigated material.

The extraction and refining of raw materials has in general been associated with significant environmental and social risks, notably greenhouse gas and other air emissions, degradation of local environment and human and labor rights violations.

Additionally, each battery raw material holds its own set of challenges, as laid out across the next pages. That is why we strongly believe that traceability through as direct sourcing as possible is important for all raw materials.

INTEGRATED SUPPLIER DEFINITION An integrated supplier has full control of the supply chain from mine to metal.

Cobalt

Key industry dynamics

Over 70% of world supply is mined in the Democratic Republic of Congo (DRC), no other country contributes more than 5% of world production.

Globally, large scale mining (LSM) accounts for 87% of mined cobalt, while artisanal and small-scale mining (ASM) accounts for 13%.

Over 60% of global refining capacity is located in China.

Key sustainability risks

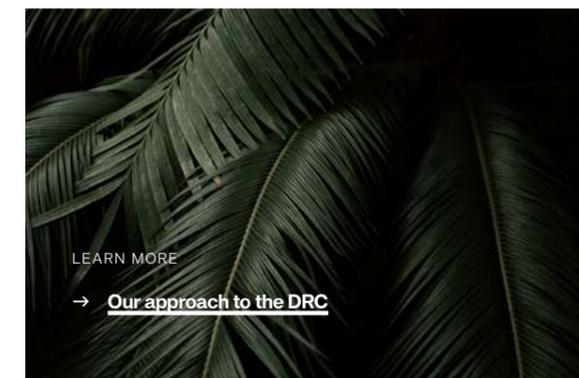
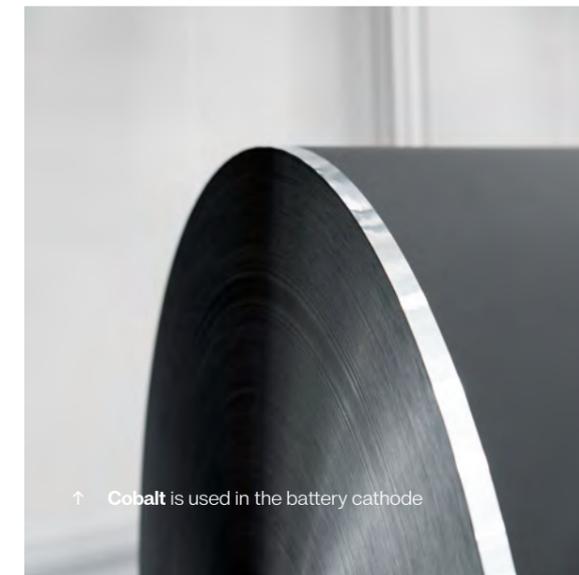
Due to the large volume of cobalt originating from the DRC, the following sustainability risks are most often connected to cobalt sourcing:

- ▲ Serious human rights abuses, particularly connecting to the use of artisanal mining, including child labor, forced labor and unsafe working conditions.
- ▲ Habitat destruction, water and air pollution from mining.
- ▲ Community conflict.
- ▲ Corruption and political instability.
- ▲ Poor traceability of materials.

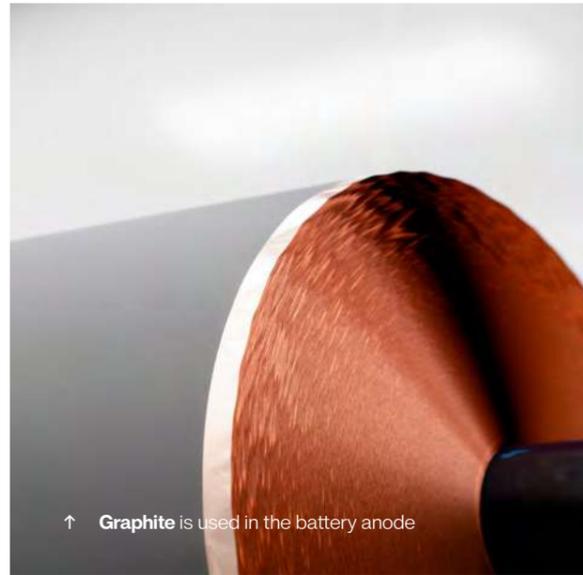
How Northvolt is addressing it

For our current long-term contracts for mass production, Northvolt has chosen to not source cobalt from the DRC. We source from integrated suppliers in regions without artisanal mining and subject to comparatively strict local regulations. However, we are exploring possibilities of sourcing from the DRC in a responsible and contributing manner in the future.

SOURCE Cobalt Institute 2020, Cobalt Institute 2022, USGS 2022



Cobalt is a by-product from Nickel (~29%) and Copper (~55%) mining as well as other forms of mining (~16%)



↑ Graphite is used in the battery anode

Graphite is a mineral that consists of the chemical element carbon (C)



↑ Graphite used in battery production is mostly either mined in China or produced synthetically in the US

Graphite

Key industry dynamics

There are two kinds of graphite used in battery production: synthetic and natural graphite

NATURAL GRAPHITE Mining and refining predominantly found in China

SYNTHETIC GRAPHITE The US is the largest producer of synthetic feedstock. Conversion to synthetic graphite mainly occurs in China.

Key sustainability risks

Graphite production has been connected to:

- ▲ Air pollution (particulate matter and dust)
- ▲ Water contamination
- ▲ Insufficient health and safety measures at industrial mines.

Synthetic graphite in particular:

- ▲ Requires a considerable amount of energy, and can therefore be carbon intensive.
- ▲ Refining causes significant emissions of NOx and SOx to the air.

How Northvolt is addressing it

Northvolt is investigating the potential of sourcing natural graphite from mines and refineries closer to our factories, produced through more sustainable purification methods.

We are also looking to source synthetic graphite that has been produced with a cleaner electricity mix.

SOURCE US Geological Survey, 2017, 2022

Lithium

Key industry dynamics

World production of lithium is broadly divided into two groups:

LITHIUM FROM BRINE From the arid regions of Chile and Argentina.

LITHIUM FROM HARD ROCK The most common mineral of which is Spodumene, primarily mined in Australia.

China controls around 80% of the world's lithium refining capacity.

Key sustainability risks

Lithium production from brine generally has a considerably lower CO₂ footprint than production from hard rock. However, the existing brine resources generally hold other sustainability concerns:

- ▲ Considerable fresh water usage
- ▲ Adverse impact on local communities and indigenous populations

Lithium from spodumene is known for the following sustainability challenges:

- ▲ High carbon intensity of production
- ▲ Pollution to air (NOx, SOx) during refining

How Northvolt is addressing it

We source from integrated suppliers subject to strong environmental regulation.

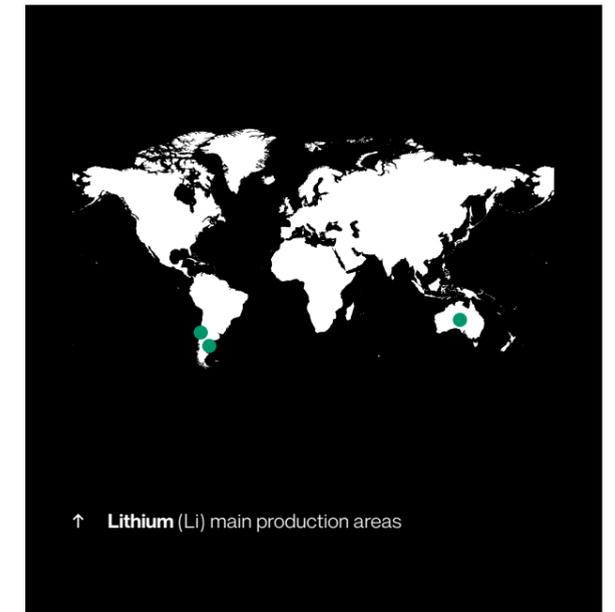
Northvolt has a clear ambition to develop a European supply chain for lithium, recognizing the significant deposits in the region. This is exemplified by Northvolt's commitment to build a lithium conversion facility in Portugal under the **Aurora project** (see page 30).

We are closely following the developments of new processes that can support a more sustainable European supply of lithium.

SOURCE BNEF, 2020 / S&P Global, 2019



↑ Lithium is used in the battery cathode & electrolyte



↑ Lithium (Li) main production areas



↑ Manganese is used in the battery cathode

Manganese

Key industry dynamics

Mostly mined in open pits located in South Africa (28%), Australia (17%), Gabon (13%) but also China, India, Ukraine, and Brazil. China holds 90% of the supply of high-purity manganese.

Battery production represents less than 1% of world demand and usually requires high-purity manganese in the form of sulphate or metal.

Key sustainability risks

Manganese has been connected to:

- ▲ Pollution of soil and rivers affecting nature and local populations from mining.
- ▲ Depletion of water resources from mining.
- ▲ Violations to human rights, including water rights and free and prior informed consent around mine sites.

A majority of the world production is located in countries with unstable governance and risk for conflicts.

How Northvolt is addressing it

Northvolt sources manganese from a refinery which is subject to strong environmental regulation. It is one of few refineries with a traceable feed.

As with our other raw materials, we are following the development of new sources which can support full a European supply chain.

SOURCE US Geological Survey, 2020

Nickel

Key industry dynamics

Australia, Indonesia, South Africa, Russia and Canada account for more than 50% of the global nickel resources. There are two major types of mineral from which nickel is extracted for the battery industry: laterite and sulphide ores.

SULPHIDE ORES Requires sulphur and other impurities to be removed.

NICKEL LATERITE Processed into intermediate forms of nickel that need to be further refined for use in the battery sector, often done via new High Pressure Acid Leach (HPAL) process. HPAL projects are primarily found in South East Asia.

Key sustainability risks

Nickel production has been connected to:

- ▲ Local pollution to air, land and water where sulphur from sulphide ore refining is not captured and removed
- ▲ Environmental damage from the disposal of toxic slurry waste into the ocean, which may occur for HPAL projects
- ▲ High CO₂ footprint, in particular for HPAL projects
- ▲ Deforestation may occur depending on location

How Northvolt is addressing it

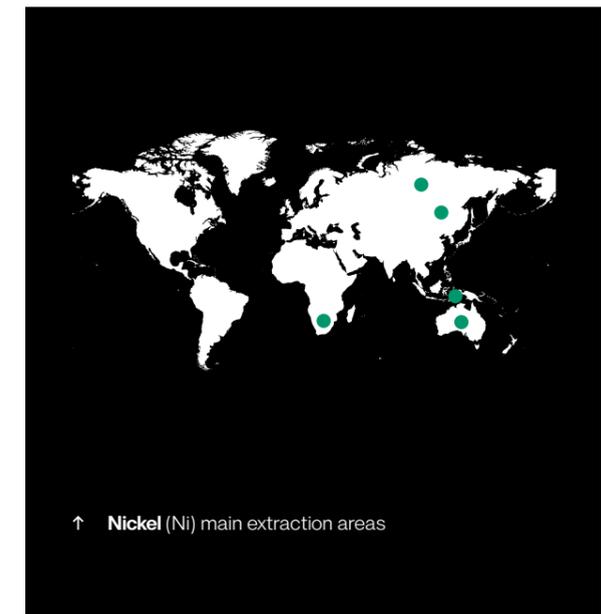
We work with integrated suppliers which provide us with full traceability. We work closely with our suppliers on agreed improvement plans for an even more sustainable supply as we scale. A focus area for Northvolt when assessing suppliers is the capture of sulphur emissions from the smelting process to reduce and eliminate these. We object to any release of sulphur to the environment.

We continue to push for a fully European supply chain while recognizing the challenges of developing deposits which are economically viable and sustainable in Europe.

SOURCE US Geological Survey, 2022



↑ Nickel is used in the battery cathode



↑ Nickel (Ni) main extraction areas

Battery production represents less than 1% of world demand of manganese (Mn) and usually requires high-purity manganese in the form of sulphate or metal.

The critical question of cobalt and the DRC

Around 70% of global cobalt mining is located in the Democratic Republic of Congo (DRC), and human rights, health and safety and ethical challenges have been reported in connection with cobalt extraction in the region.

Whilst the majority of cobalt mined in the DRC is derived from industrial sources, artisanal mining contributes a sizeable share, upwards of 30%.

Cobalt is a crucial raw material for our battery production, and sourcing of cobalt is a complex matter.

The OECD and the World Economic Forum have stated that engagement with the artisanal mining sector should be strengthened and the practice formalized. It is important to recognize that artisanal

mining itself is not the problem. It is not a question of artisanal mining or industrial mining, but a question of good practice or bad practice. It is the exploitation of the miners and the country's raw materials, without benefits fairly flowing back to miners or the wider population, which is the problem. The proper formalization of artisanal mining is, however, a complex process which is likely to take a long time.

We believe the international community has a role to play in proactively engaging with the DRC to strengthen the political landscape, as well as explore the possibilities to support the industrialization of the country. This is the best way to reduce the associated human rights risks in the long-term and support the generation of value in the country.

As a contributor to global cobalt demand, we hold a responsibility to engage in this issue. As we continue to grow, we will be actively investigating ways in which to source cobalt responsibly from the DRC, in a way that prevents harm and contributes to the overall development of the country.

Aurora: enabling a European lithium value chain

In December 2021, we announced the Northvolt-Galp joint venture 'Aurora' which aims to serve as a springboard for the development of an integrated lithium value chain aligned with European ambitions.

The principal goal of Aurora is to establish Europe's largest and most sustainable integrated lithium conversion plant, with an initial annual production capacity of up to 35,000 tons of battery grade lithium hydroxide – a critical material required by the lithium-ion battery manufacturing industry. Start of operations at the plant is targeted for 2026.

Establishing a European value chain for lithium will not be simple. While Europe hosts considerable amounts of lithium resources, and multiple commercial mining operations are in preparation phases, we must acknowledge that these projects have been met with considerable resistance, typically from local communities.

Nevertheless, securing a sustainable European lithium value chain will bring immense benefits.

Aside from the economic opportunity in play, Europe could set a new environmental standard for lithium mining and refining – something which would confer benefits to the battery and electric vehicle industries. Additionally, we stand to improve Europe's security of supply for a critical raw material for which global demand is set to skyrocket in coming decades.

In pursuit of this new European lithium value chain, we must ensure, however, that buy-in is received from local communities, and that every effort is made to ensure that impacts on local communities and environments are reduced to the greatest extent possible.

[LEARN MORE](#)

[Aurora](#)

A person wearing a white protective suit, goggles, and a respirator mask is working in a laboratory. The person is holding a black rectangular object, possibly a tablet or a piece of equipment. The background shows industrial equipment and a clean, well-lit environment. The person's suit has the 'northvolt' logo on the head and sleeve.

⑥ Responsible production

Northvolt Ett

Scaling up capacity at Northvolt Labs

Health & safety

Chemicals management

Northvolt Ett

During our intensive construction activities for our first gigafactory, learnings and challenges arose in equal measure.

We made significant progress at Northvolt Ett through 2021. The installation and commissioning of production equipment in our first downstream block was a primary focus throughout the year. From what were empty halls in January, our first cells were assembled in December.

Progress was also made in our first upstream cathode active material (CAM) production block. By the end of the year, the majority of equipment was installed alongside an integrated wastewater treatment plant.

Additional facilities supporting cell production were also equipped through the year, including Formation & Ageing, and necessary service and utility buildings.

The Northvolt Ett team, including our Health, Safety and Environment (HSE), engineering and construction teams, worked diligently to ensure all environmental considerations and requirements in our permit were fulfilled. We identified a number of available improvement measures which we were able to introduce prior to start of production.

Another key focus area for the Northvolt Ett HSE team in 2021 was the implementation of routines across the organization. Numerous trainings were delivered to relevant teams on environmental leg-

islation, conducting risk assessments, investigations, iChemistry system for storage of chemical information, TIA system for reporting incidents and deviations, and tailored training to relevant staff on waste and chemical handling and storage.

Through the year, we also hired our first production operators. A series of training initiatives were employed to ensure our operators were prepared for their role, oftentimes leveraging the experiences of operators from Northvolt Labs. Considering the scale of onboarding required for Northvolt Ett's expansion, as well as the role of production operators in assuring safety of our products, our training programs continue to develop.

The development of environmental measurement points and routines for monitoring of emissions to air, land and water was also a key activity in 2021, which will extend into 2022 as production ramps up.



Construction of Northvolt Ett

Construction itself does not contribute significantly to the environmental impacts across a battery's life cycle. Nevertheless, we have engaged proactively to address our potential impact on local environment and communities.

Prior to the construction of Northvolt Ett, the site hosted an industrial forest which was harvested and processed at local saw plants, yielding around 10,000 m³. Samples from the local water stream were gathered to provide a baseline for future measurements. Around two million tons of bedrock was removed during ground preparations and was later used for foundations.

A project as large as Northvolt Ett is also a social matter, especially when the local city has a population of just 35,000. Acknowledging this, during the permit process, we held open consultations with stakeholders, including the public and state agencies.

To engage the public in our first consultation in Skellefteå, we advertised in local and social media and conducted press interviews. It is not uncommon that such consultations are scheduled in the middle of the workday, when locals do not have time to attend, and rushed through. We wanted to do it differently; to make ourselves available to the public to answer their questions. Scheduling the consultation for an evening, in a large conference space, we welcomed

over 1,000 people, likely an unofficial Swedish record for an open consultation.

During the public consultation process we maintained a website providing frequent project updates, alongside an anonymous whistle-blower system (detailed on page 56). To mitigate disturbances to local residents associated with necessary rock blasting we invested in an advance warning system, which informed locals of blasting schedules.

Addressing the social challenges associated with the construction industry

Through the development of Northvolt Ett, structural problems in the European construction industry have become painfully clear. We see how there are breaches of contract and irregularities, which have led to construction workers working in Sweden with incorrect conditions or on incorrect grounds.

Northvolt has therefore joined forces with the Swedish Union for Construction Workers (Byggnads), to leverage their expertise and experience to set a new best practice for larger industrial projects in Sweden.

→ **Our joint actions** are outlined on the right.

✓ **AUTHORITY AND UNION EXPERTISE IN PROCUREMENT**

Swedish governmental agencies already carry out ongoing workplace inspections of major construction sites, where they check the construction companies' subcontractors. But we will work to ensure that the unions' and authorities' expertise is applied much earlier in the process; in the procurement phase of construction companies, and in the work with the client's own ongoing inspections, so that the problems can be prevented instead of reacted towards.

✓ **COLLECTIVE BARGAINING AGREEMENTS AS A NORM**

Northvolt is a union-organized company, with collective bargaining agreements for all employees through IF Metall, Unionen and Sveriges Ingenjörer. We will work together with Byggnads and other unions to support their negotiations for collective bargaining agreements with relevant suppliers.

✓ **INCREASED CONTROL**

Northvolt has introduced patrolling guards who will ensure that only authorized and authorized persons are at the workplace, at the same time as we will carry out stricter background checks on all actors on the construction site. But above all, the control needs to be comprehensive and structural, and therefore we will limit the number of stages of subcontractors that construction companies may establish – which facilitates the possibility of control for both the customer and the unions.

As part of our national cooperation with Byggnads, we will also work together to implement these practices at future sites in Gothenburg, Borlänge and Västerås.

We do not believe that we are sitting on solutions that quickly and easily clean up decades of structural problems in the construction industry. We know that we will face these problems in the years to come, with successes and setbacks. But we see an opportunity and a responsibility, together with authorities, trade unions and other companies, to create a new best practice – which can make the green industrial revolution not only contribute to a better climate and a stronger economy, but also a more socially sustainable construction industry.

Technical improvements

Powering battery production with 100% fossil-free energy makes a remarkable impact on the carbon footprint of batteries. But at Northvolt, we know that there are many more avenues to explore to reduce environmental impacts further still.

We take an iterative approach to our projects, incorporating learnings and experiences from each into the design and engineering of the next. This engineering philosophy is proving especially beneficial as continuously look for and act towards opportunities to improve resource efficiency and circularity within our production.

We have learnt a great deal from our experiences at Northvolt R&D and Northvolt Labs, both of which have been in operation since 2019. The lessons learnt from these facilities continue to feed into our wider company knowledge and inform our development of production processes and facilities.

For Northvolt Ett, we have conducted multiple studies, including two external assessments, to identify novel solutions to reduce energy and resource consumption, and ultimately deliver as sustainable a production setup as possible for our first production block at Northvolt Ett.

In the continued expansion of Northvolt Ett to its full size we are applying learnings from the initial two production blocks to further improve our processes.



Upstream cathode active material production

- ✓ **RECYCLING** Ongoing projects to evaluate the recycling of process gases such as oxygen.
- ✓ **DI WATER** Changed our use of technologies to reduce deionized (DI) water consumption.
- ✓ **IMPURITY REMOVAL** Optimized impurity removal stages to prevent contaminants in later exhaust gases.
- ✓ **UPCYCLING WASTE** From the wastewater we will recover sodium sulphate as market-ready salts instead of releasing it into the local river (as is common industrial practice), saving an estimated 200,000 tons of dry substance yearly.



Downstream production

Including electrode manufacturing & cell assembly

- ✓ **NMP RECOVERY** Selected an NMP (organic solvent) system which uses liquid water instead of vapour and therefore complements our recycling of hot water into the municipal water system.
- ✓ **WASTE HANDLING** Focused on design of waste handling, adding a solid removal process to improve our capacity to recover graphite and NMC from cleaning processes.
- ✓ **ENERGY EFFICIENCY** Raised the temperature of cooling media in cathode NMP recovery to secure better energy efficiency, alongside CAPEX and OPEX savings.
- ✓ **DRYERS** Raised the temperature set point of supply air to dryers to secure increases in energy efficiency of solvent recovery, alongside OPEX savings.



Cell assembly

- ✓ **HEATING** We use residual heat from factory processes for heating as far as possible.
- ✓ **LASER NOTCHING** Optimized machinery to increase efficiency, for example, optimized laser notching machines for energy savings and scrap rate reduction.



Formation

Where battery cells are repeatedly charged and discharged

- ✓ **ENERGY** Optimizing equipment electronics dimensioning with formation process to lower energy requirements.
- ✓ **AIR** Significant reduction in compressed air consumption by switching to low-power electrical systems.
- ✓ **TEMPERATURE** Minimizing room volume to improve temperature control efficiency.
- ✓ **ELECTROLYTE INJECTION** Consolidation of all electrolyte processes to one single area for better hazardous substances control.
- ✓ **OVERALL LAYOUT** We have consolidated all equipment into functional areas to minimize the un-utilized space while maintaining process flexibility, space efficiency and ultimately energy efficiency.

LEARN MORE

[Cinis](#)

Scaling up capacity at Northvolt Labs

2021 represented Northvolt Labs' first full year of production for customer deliveries.

Great advances were made towards securing steady-state production and across multiple automotive cell development programs which Northvolt Labs hosts as our platform for cell industrialization. It is from Northvolt Labs where we have delivered all cells to our customers up until the end of 2021.

As production activities matured, so too did the supporting systems and processes. We strengthened our working protocols and safety procedures and implemented several new routines, including to manage operational disturbances and incidents involving chemicals, alongside our iChemistry chemicals inventory system.

For existing routines, internal audits were conducted across all production areas to ensure compliance. An ISO 14001 audit was conducted in December 2021 (certification was received in Q1 2022).

Waste management at the facility was also substantially enhanced, in places supported by Stena recycling.

Through 2021 we neared completion on a new wastewater treatment plant, which will enable us to process our waste streams on-site and recycle cleaned water for deionized water production.

In the year we also announced a \$750 million investment to expand Northvolt Labs to establish the world's first battery R&D campus covering the entire battery value chain – from materials research, cell design and production, to battery systems development and recycling.

Altogether, the initiative will dramatically expand capabilities at Northvolt Labs – enhancing its standing as a world-class platform for battery technology R&D and industrialization.



↑ Northvolt Labs, Västerås

Cuberg: a next-generation battery technology

Our acquisition of San Francisco Bay Area start-up Cuberg in March 2021 opened the doors to a fundamentally new kind of cell architecture – one featuring a pure lithium metal anode enabled by a novel liquid electrolyte.

The technology promises to deliver a commercial battery cell with energy densities exceeding 1,000 Wh/L by 2025. The fundamentals have been validated and the results published, and now our task is to scale from concept to product.



[LEARN MORE](#)

'One year in: the state of play at Cuberg'

Cinis: enabling circularity at Northvolt Ett

In October 2021, we announced a partnership with Cinis Fertilizer – a Swedish start-up aiming to produce the world’s most environmentally friendly mineral fertilizer.

Enabled by a novel wastewater treatment plant integrated into Northvolt Ett, some 200,000 tons of salt per year will be recovered, purified and delivered to support Cinis’ ambition to produce a fertilizer with a CO₂ footprint 75% smaller than that of traditional fertilizers.

The solution is ideal for Cinis and supports our ambition to embed circularity into our production processes wherever possible.

[LEARN MORE](#)

‘A greener kind of battery factory’

Health & safety

When working to produce state-of-the-art batteries within a short amount of time, we must work twice as hard to look after each other and to make sure we do not compromise on our safety.

The health, safety and wellbeing of our employees is a priority to us. Especially in construction and operational environments a focus on safety is of paramount importance, but the pace and pressures our employees face in our offices is also something we need to be mindful of.

We have always aimed to establish a safety-first culture. Through 2021, this approach was formalized in several ways and the message remains a permanent fixture in internal communications.

Multiple training and onboarding programs have been established through the year, all of which integrate safety components. Risk awareness training and protocols for handling safety incidents are now in place across the company.

Across our sites, we have initiatives in place encouraging participation in physical training, including yoga and running groups. Employees are also reminded of their access to Health & Wellbeing benefits.

Although we would sooner prefer to report zero injuries, we are pleased that few injuries have been incurred at the company, and that employee absence for sickness or health reasons is very low and considerably below comparable company levels.

Product safety

Battery safety is a focus area deeply embedded within our activities. From both the perspective of how we design for battery safety as well as how our employees handle and work with batteries, we take a firm approach.

Designing for battery safety is also key for our customers and end-users. For this reason, during the development of cell products, a major investment of time and resources is directed towards validation of cells in terms of safety and robustness. This work is accomplished at dedicated validation facilities at Northvolt Labs, where alongside destructive testing, we simulate full life-cycles of cells to evaluate their safety and performance.

Where we do not have in-house testing capabilities – primarily for battery modules and systems – we work with certified third-parties to undertake product safety testing.

Beyond this, strict protocols are integrated into cell manufacturing processes to ensure that only safe cells of the highest quality leave our facilities. Through 2021, comprehensive end-of-line quality control checks have been in use at Northvolt Labs and we continue to refine these as we learn more.

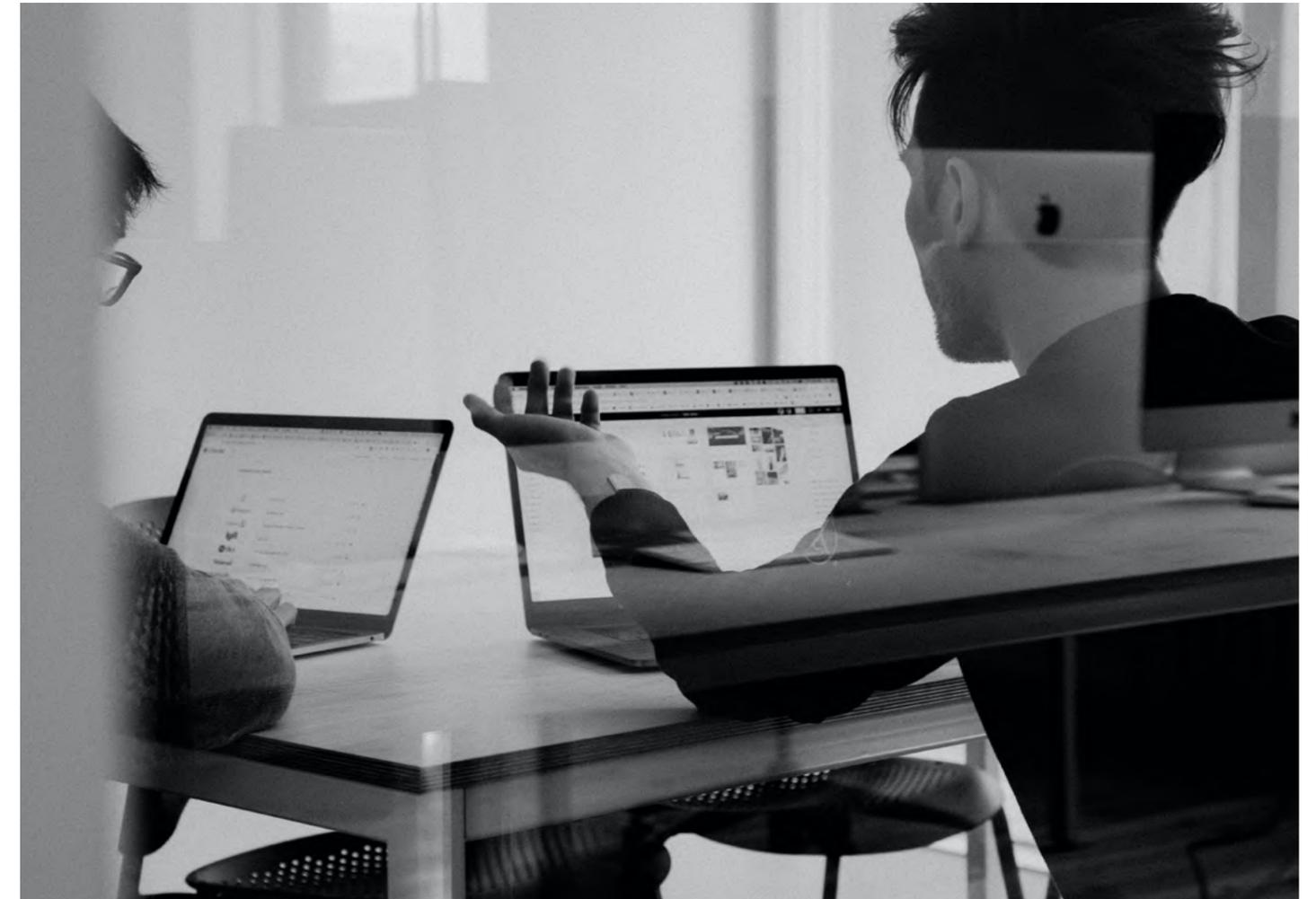
Covid-19 management

Despite extensive precautionary measures across our company, Covid-19 made its impacts felt across our workplaces in 2021.

Most affected was the construction of Northvolt Ett in Skellefteå. Facing serious circumstances and rising infection rates, in collaboration with the Regional Director of Infection Control in Västerbotten, in January we implemented a series of strict measures to complement the general precautions we had introduced in 2020.

Measures taken included:

- ✓ Restricting the number of contractors and our own employees in the workplace to a minimum.
- ✓ Adopting remote work wherever possible.
- ✓ Postponing less critical site work.
- ✓ Travel restrictions for contractors arriving from foreign countries, in accordance with the Swedish Public Health Agency's recommendations.



- ✓ Extensive Covid-19 testing on-site; testing twice per week for anyone who did not have antibodies or vaccination. Through 2021, some 60,000 Covid-tests were performed.

The measures taken had a positive effect in the first half of the year, and for many weeks no positive cases were noted. Through fall, infection rates began to rise again, mirroring European trends. Throughout the year, our procedures were revised to compensate to the greatest extent possible for

the risks of the pandemic.

Wellbeing during Covid

Few other events in recent history have shaken the status quo of the modern office quite like the Covid-19 pandemic. Our adoption of a policy of widespread remote working was necessary and effective in curbing infections, but we knew going into this period that it would bring its own health and wellbeing challenges.

While asked to work from home, our employees always had access to their offices should they be unable to work effectively from home.

When requested, we provided employees with office equipment to facilitate remote working. Additionally, we reminded employees of their access to wellbeing support channels, including psychological support and counselling services, which are provided as standard to all through our occupational healthcare provider.

Chemicals management

Chemicals management is one of the more challenging environmental areas for battery manufacturing.

For our battery production we require the use of several hazardous chemicals in high volumes. Through 2021 a major focus has surrounded compliance to enable commissioning and start of production at Northvolt Ett. As one of the first companies to commence industrial production of batteries in Europe, in several instances we have had to draft working procedures from scratch.

We have also worked to strengthen chemical compliance processes and competencies throughout the company. A key initiative now in place involves trainings for all relevant teams and employees designed to increase knowledge and strengthen chemicals management.

We have also completed two REACH registrations and two PPORD notifications during 2021, to allow for the manufacture and import of these substances.

Relevant to chemical management, through 2021 we revised and extended our guideline 'Northvolt list of declarable and restricted substances' – a list outlining chemicals which are restricted, prohibited or to avoided where possible within Northvolt operations. Our stakeholders are also expected to comply with this list, together with all relevant national/international legislations.



Chemical safety

Information about potentially lower Occupational Exposure Limits (OELs) for cobalt and cobalt compounds expected in the EU resulted in a major project for us during 2021.

The project focused on exposures to cobalt and investigated ways of proactively reducing the risk of exposures of workers to ensure exposure levels would be below OELs and applicable DNELs (Derived No-Effect Levels).

Process steps of active material production were reviewed and several investments were made to leverage opportunities for improvement. Our focus was on active material production as a large-scale chemical production involving particulate materials, liquids and gases.

Additionally, training material was prepared, focused on facility design principles to increase the designers' awareness of legal requirements related to low exposures to chemicals. Designing for low exposures from the beginning is easier and more cost-efficient than adding preventive measures later during the construction.



⑦ **Batteries** in the field

On the road

On the grid

Cleaner mines

In the air

To us, manufacturing batteries is a means to an end – we want to enable the future of energy.

The majority of Northvolt batteries will be delivered to the automotive industry, where they are destined for integration into electric vehicles. But batteries are inherently flexible and well-suited to powering many other kinds of solutions. Ultimately, we are incredibly excited to begin seeing Northvolt batteries powering a revolution by land, by sea and by air. Here we present a look at just some of the opportunities we are enabling.

On the road

Transportation accounts for almost a quarter of the EU's GHG emissions, with road-based transportation responsible for some 70% of that. To eliminate this major source of emissions, swift electrification, via battery-electric powertrains, is critical. But it matters how we enable electrification.

Through life-cycle assessment (LCA) we know a great deal about how the environmental footprint of an electric vehicle (EV) compares to that of an internal combustion engine (ICE) vehicle.

Leaving the factory, an EV carries a higher carbon footprint than an ICE and it is the battery which is responsible for this – contributing between 30-50% of an EV's GHG emissions. This average, however, assumes that a battery is produced using fossil-fuels, as is the dominant approach today. Producing batteries with fossil-free energy, as we do at Northvolt, is set to reduce this share to a single digit.

We intend to increase our pipeline of battery manufacturing capacity to ensure that as many EVs as possible launch with low-carbon batteries.



One of our earliest partners is Swedish manufacturer of trucks and buses, Scania.

Like us, Scania has invested heavily in evaluating the environmental impacts of its products and adopted LCA as a method by which to identify ways to improve.

Recently, we supported Scania in performing an LCA to determine implications of integrating Northvolt batteries into a Scania truck, comparing the vehicle to a conventional combustion engine truck.

The results indicate that the Northvolt battery-enabled electric Scania truck would exhibit around a 50% reduction in Global Warming Potential (GWP) over its entire life-cycle compared to a truck with an internal combustion engine, when charging with the average 2020 EU electricity mix. Importantly, if the battery is charged with 100% fossil-free energy, we see a 90% reduction in GWP.

As the share of renewable energy in European electricity grids increases, we look forward to these potential reductions in global warming potential being realized.

On the grid

Adoption of clean, renewable electricity is set to increase dramatically over the coming decades. However, as the share of renewables increases, electricity grids must evolve to address the dual challenges of intermittency of renewable energy and fluctuating peaks in demand, driven in part by increasing use of electricity, for instance with EV charging.

Battery energy storage systems (ESS) have a crucial role to play in the energy transition by providing a range of functionalities that tackle these challenges and thereby enable the wider adoption of renewable energy.

In the most basic sense, ESS enable us to make of renewably generated electricity when we need it, and how we need it. We cannot control when the wind blows or the sun shines, so we want to store as much energy as possible as we generate it, and then delay its use until we need it most.

But ESS can do much more. It can replace back-up power systems, often relying on diesel generators, such as those installed in commercial or industrial settings, or in emergency situations. And it can provide very specific functionalities, such as peak shaving or frequency control on the electricity grid

which is required to compensate for larger shares of renewable generating capacity on the grid.

We are especially excited to see how ESS is being used to facilitate distributed, off-grid power solutions which reduce our dependency on centralized power infrastructure and open up new avenues for electrification. Combined solar-PV and ESS installations are increasingly common, with the two technologies perfectly matched for meeting needs of a sustainable future. And many instances of EV charging can be enabled through introduction of ESS.

In 2021 we launched Voltpack Mobile System – an ESS built for rapid deployability to provide benefits of ESS to virtually any environment imaginable. Testament to its potential, the product received funding from the EU Innovation Fund. It is the first truly mobile 'plug and play' energy storage system and has since been deployed for field-trials across Europe powering everything from electric construction machines and EV charging, to film sets and Christmas markets.

Cleaner mines

Battery-driven electrification is bringing benefits far beyond passenger vehicles and highways. Industries of all kinds are looking to electrification to improve their environmental footprint and provide safer, healthier work environments. And we are happy to enable them.

One of our earliest partners, Swedish mining group Epiroc, is deeply invested in the electrification of its mining machines, including loaders, drilling rigs and trucks. Since 2017 we have been developing battery systems for integration into these machines.

Electrification of such large, power-hungry machines is challenging; doubly so considering the tough physical conditions of a mine. But it brings immense benefits. Epiroc estimates that battery-powered equipment will break even compared to convention ICE machines in terms of embodied emissions within three months of use and thereafter enable avoidance of fossil-fuels and direct emissions. With Northvolt's batteries, the breakeven point is expected to be earlier still.

Unique for underground mining, the greatest impact will be realized from energy savings related to mine ventilation. Mines require ventilation to ensure the safety of workers, and the need is profound when

heavy ICE vehicles are deployed. Powering ventilation represents the highest energy cost for a mine, but through electrifying mining equipment, these costs can often be cut by 70% to 80% in total.

The energy cost savings and carbon emission savings attached to this energy use are great. But on top of this, an electric mine provides workers with a safer working environment: one that is quiet and clean.

In the larger picture, we look forward to electric mining equipment becoming a widespread technology in the mining industry. As we know, the largest share of carbon emissions attached to Northvolt batteries is attributable to upstream raw materials sourcing. Through the use of electric mining machines, we expect to reduce these emissions considerably and take us further on our mission to bring sustainability to the battery industry.

“Most mines move more air than rock, ventilation is normally the single biggest energy cost for a mine”

Erik Svedlund, Head of Marketing – Electrification, Epiroc

[LEARN MORE](#)

[Northvolt-Epiroc partnership](#)

In the air

Northvolt's acquisition of Silicon Valley-based cell technology start-up Cuberg marks a new chapter for battery technology – one that lays a foundation for enabling the electrification of flight.

Folding one of the most promising technologies from the cutting-edge of cell R&D into the roadmap of a disruptive cell manufacturer with plans for delivering the world's most sustainable battery, the combination of Cuberg and Northvolt is ideal.

Cuberg's cell technology works in a comparable manner to a conventional lithium-ion cell, but with two significant changes in its build. First, where today's lithium-ion cell features a graphite anode, Cuberg's lithium metal cell features an anode composed of pure lithium metal. And second, enabling the use of pure lithium metal anode, the cell makes use of a novel electrolyte formulation.

Owing to its remarkable potential for energy density, lithium metal cell technology unlocks a new market for Northvolt: aviation. Cuberg has already attracted customers in the aviation segment, including Boeing, BETA Technologies, Ampaire and VoltAero.

[LEARN MORE](#)

[Cuberg's lithium metal cell technology](#)

Project ELIS

Through 2021, an ambitious project was launched at Skellefteå airport to demonstrate the possibility of battery electric-powered commuter aviation.

Project ELIS aims to commercialize electric aviation as soon as possible, and to do so by establishing Skellefteå as a demonstration hub for electric regional air transport solutions.

We already see some great possibilities of electric-powered commuter aviation. The towns of Kokkola and Jakobstad on the west coast of Finland are home to residents who commute weekly into Sweden. However, it is a 580 kilometer, seven-hour car journey to take the north passage around the sea to reach Skellefteå. If the commuters could make the commute by air, it would mean flying 200 kilometers directly across the water and cutting the travel time down to some 30 minutes in the process.

For our part, Northvolt will collaborate in Project ELIS to establish a dedicated test route between Skellefteå airport and Northvolt Ett gigafactory – replacing a 30-minute car ride with an eight-minute journey.

[LEARN MORE](#)

[Find the full picture of Project ELIS](#)





⑧ **Revolt**

Closing the loop
Recycling the Northvolt way
Hydrovolt

Closing the loop

Sustainable battery manufacturing begins with sustainable battery recycling.

To date, battery manufacturing has been a linear industry – raw inputs enter at one end and batteries reach end-of-life and are inefficiently disposed of at the other. This needs to change.

The global expansion of lithium-ion battery manufacturing presents us with the challenges of firstly assuring a sustainable supply of raw materials and secondly providing a sustainable solution for handling batteries at end-of-life.

We must be mindful that the energy transition implies a shift from dependence on fossil-fuels to dependence on metals.

Fortunately, through battery recycling we can address these challenges head on.

Through recycling we reduce our dependence on finite virgin raw materials, mitigate concerns over security of supply of those materials and limit our exposure to risks associated with their extraction, we improve the environmental footprint

of our products and deliver a circular solution for managing batteries retired from the market.

Here is how we are delivering this future with Revolt – our in-house program for battery recycling.

From concept to factory

As of 2020, we estimate that Europe could recycle an estimated 33,000 tons of batteries per year, but by 2030 the volume of batteries reaching end-of-life is expected to reach 250,000 tons per year.

Recognizing the importance of establishing a circular battery industry, we commenced our recycling activities several years ago.

Seeking first to develop and demonstrate an effective battery recycling process, a pilot recycling plant was brought online at Northvolt Labs in 2020. Through 2021, the plant was used to optimize our complete recycling process and to maximize its effectiveness, as measured by its yield of battery-grade materials through a novel hydrometallurgical technique.

In November 2021 we produced our first cathode material from 100% recycled nickel, manganese and cobalt, and validated its electrochemical performance in battery cells.

We are establishing industrial-scale recycling capacities in parallel to our ramp-up of battery manufacturing capacity.

We began with Hydrovolt – a Northvolt–Hydro joint venture positioned to establish a full-scale recycling plant in the country that needs it soonest: electric vehicle frontrunner Norway. Through 2021, the plant was constructed, equipped and entered commissioning with a planned start of operations in spring 2022 ([read more](#) on page 47).

Development of what will become Europe’s largest battery recycling plant has also commenced. Revolt Ett recycling plant will be built directly alongside Northvolt Ett, thereby providing our cathode production plant with an immediate feed of recycled raw materials. Fully built, Revolt Ett will recycle some 125,000 tons of battery materials per year – sufficient to provide at least 50% of the adjacent factory’s raw materials.

The benefits of recycling

During 2021 we evaluated the environmental impacts of using fresh raw materials in cell production compared to recycled materials through an LCA analysis.

In terms of direct emissions, mining fresh raw materials

Lithium



Cobalt



↑ **Benefits of recycling raw material** input requirements of 1 ton of battery-grade lithium and cobalt

of nickel, manganese, cobalt and lithium results in significantly higher greenhouse gas emissions than recovering these metals through recycling.

We estimate that at present, producing cathode active material with only recycled materials results in carbon footprint that is 78% lower than cathode produced with virgin raw material.

Together with practical experiences of our pilot recycling plant, our LCA analysis is informing not only our continued development of the recycling process itself, but also our other activities. For instance, we are seeing how challenges in

recycling, such as initial battery dismantling, may at least in part be approached through how we plan for more efficient recycling through the design of battery cells and systems.

Towards pan-European battery recycling

Moving forward, we intend to continue expanding our battery recycling capacity. In this endeavor, we need to be strategic in how and when we establish recycling plants. We aim to dovetail recycling capacity with regional availability in recyclable volumes and in parallel establish recycling capacity in strategic proximity to cathode production.

All of this is being done to secure not only our own targets, but also those of the EU. Proposed EU legislation states that by 2030 lithium-ion battery recycling processes should achieve 95% yields of cobalt, copper, and nickel, and a 70% yield for lithium. Additionally, by 2027 battery products must be labelled to indicate the proportion of recycled content used in their production.

[LEARN MORE](#)

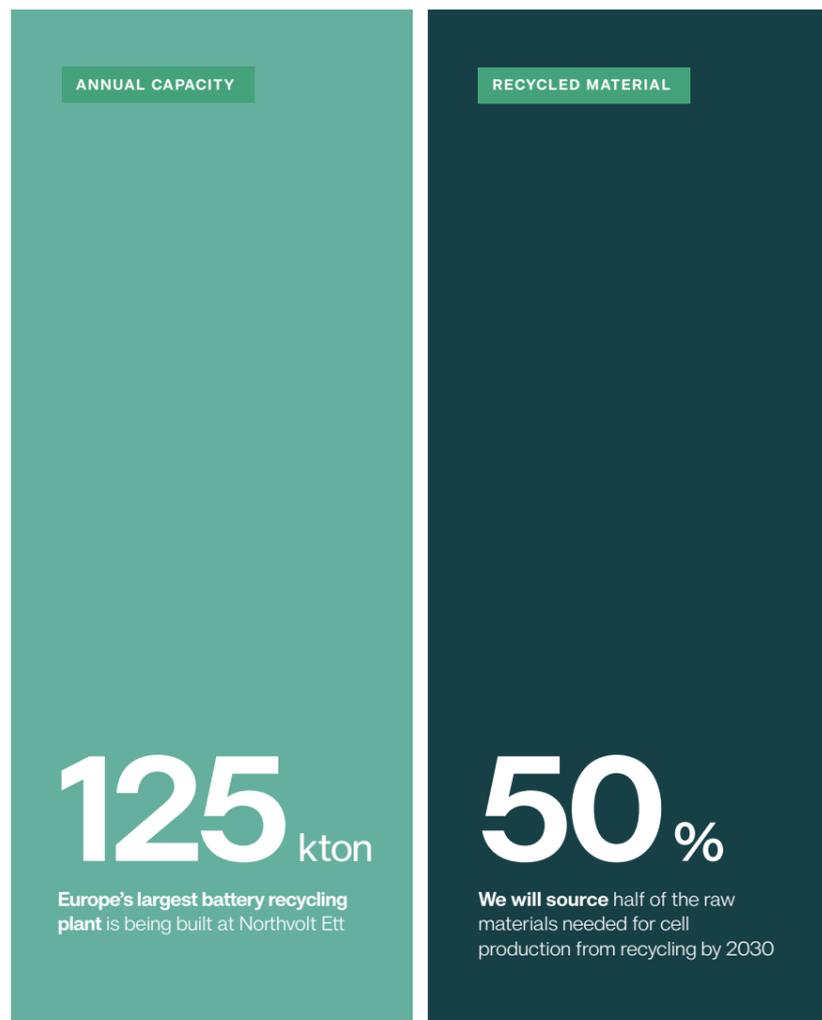
[European Battery Regulation](#)

Recycling the Northvolt way

The recycling process begins with discharging battery packs to remove residual energy and render batteries safe for recycling. The battery packs are then dismantled and modules removed.

Modules are then crushed, shredded and the remains sorted into material types using a variety of filtering methods. The copper goes one way, the aluminium another way, the plastic is isolated and so on. What we are left with is a fine black powder called black mass. It is this black mass which contains the valuable metals of nickel, manganese, cobalt and lithium.

Black mass is treated using a wet chemical hydrometallurgical technique which recovers battery-grade quality materials in the form of nickel, manganese, cobalt and lithium.



Hydrovolt

Together with Norwegian aluminum group Hydro, in 2020 we established battery recycling joint venture Hydrovolt in Norway.

A focus of the joint venture has been development of Hydrovolt's first recycling plant, which is located in the town of Fredrikstad. Construction commenced in early 2021 and installation began during the fall.

The 2,000 square meter plant hosts the mechanical stages of recycling, i.e., crushing and sorting, and recovers high yields of materials which can be delivered to offtake partners for upcycling. The majority of black mass recovered by Hydrovolt will be delivered to Revolt for hydrometallurgical treatment.

The plant has a capacity to process 12,000 tons of battery packs per year, which is roughly equivalent to 25,000 moderately sized electric vehicle batteries. With this capacity, the plant can recycle the entire volume of Norway's end-of-life batteries available today.

Looking ahead, activities during 2022 will involve Hydrovolt's plans for European expansion. The year will start off by a site selection process to locate a suitable site outside of Norwegian borders, to eventually enable treatment of larger volumes of end-of-life batteries and other battery materials.



Our structure



- Delivering an amazing talent experience
- Employee engagement
- Creating an inclusive and diverse workplace
- Gender equality
- Personal development
- Community engagement

⑨ Our people

Delivering an amazing talent experience

Northvolt represents a group of highly motivated individuals with a shared mission to create a more sustainable society.

We have built a high-performing company which is purpose driven, meritocratic, and ethical. We are moving fast and our capable employees have been key in achieving our accomplishments thus far.

municipalities, regions both national and European, as well as sectors of commerce, government, academia, research and other primary institutions.

Five years ago, we started out with only a handful of individuals. Our growth has necessitated structural changes and allowed for building an ever-growing organization, both in size and complexity. During 2021, we have continued to improve our systems and processes for recruiting, employee branding, relocation, training, evaluation, urban planning, community support and much more.

At the end of 2020, we welcomed our 1000th employee, and this year we have more than doubled our team, skyrocketing to more than 2,300 employees at the end of 2021. As we continue to grow, we maintain a focus on remaining a safe, diverse, and responsible employer by paying attention to employee feedback and continuously working on being better.

What has not changed is our values. They have become more important than ever and instrumental in fostering and building upon our common culture.

I have always maintained that the people at Northvolt are our greatest asset, strongest driver, and best guarantee that we will deliver on our vision.

Going forward, attracting and developing top talent will be the key to our success. A critical part in doing so will be making sure that necessary infrastructure such as housing, public transportation, schools, healthcare, and more are in place to get people onboard with our mission. Accordingly, we have worked closely with local

Peter Carlsson, CEO at Northvolt

NATIONALITIES

96

KICK-OFF

1000+

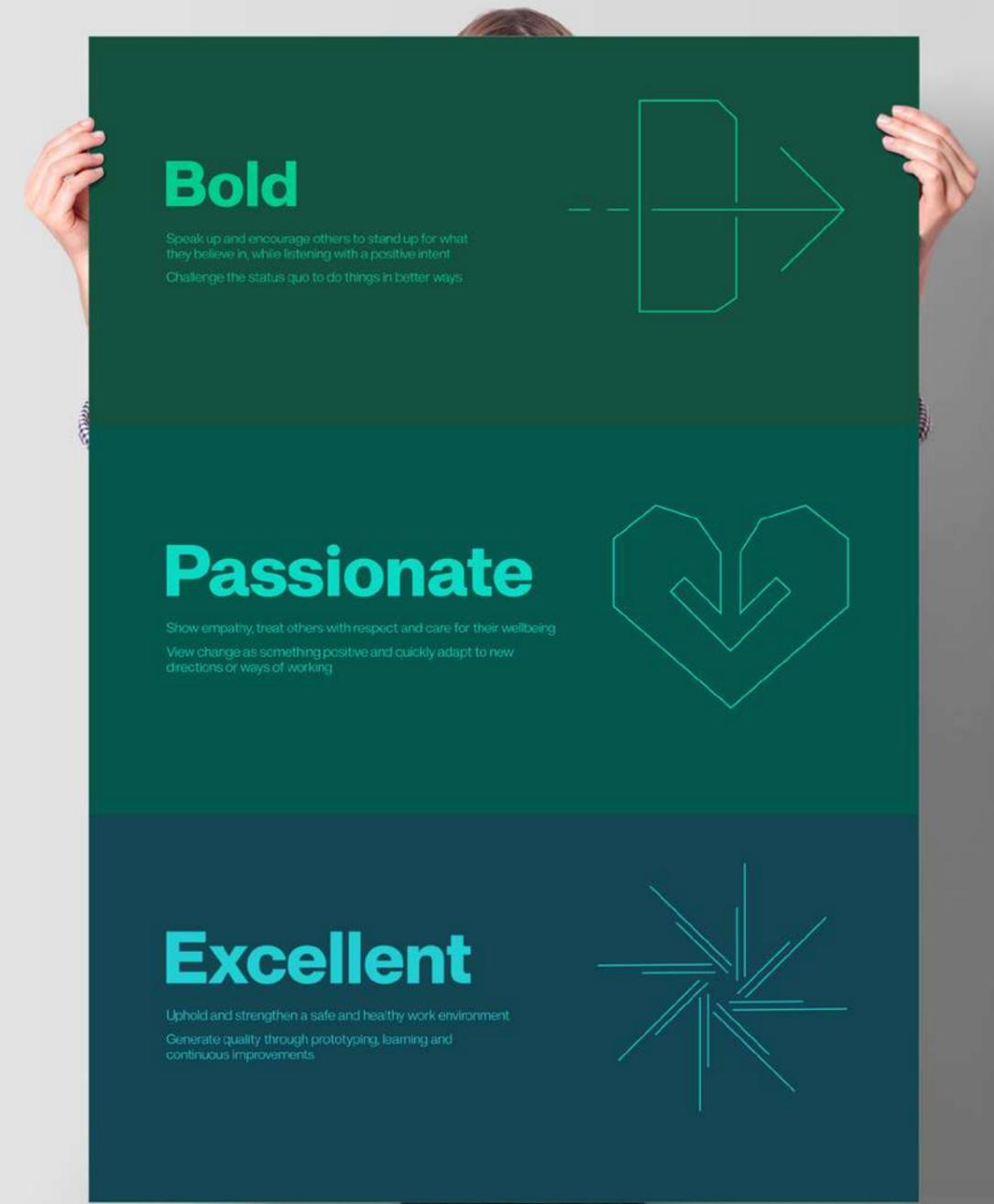
Northvolters gathered for our annual company kick-off event

EMPLOYEES

x2

Doubled headcount for the fifth year in a row

Our Talent Acquisition team won Best Talent Acquisition Team by the LinkedIn Talent Awards 2021



← Highlights 2021

→ Our values

Employee engagement

At Northvolt we want to make sure that everyone feels connected to our purpose and has a sense of pride in what they do.

Everyone who joins Northvolt takes part in our 'Charge' onboarding program, which outlines the basic principles and behaviors that contribute to making Northvolt an excellent workplace. An overarching aim of the program is to foster a sustainable culture within the company, one which motivates employees to lead by example and take an active part in nurturing wellbeing at our company.

We understand the importance of making sure our purpose is not diluted in the noise of day-to-day tasks. This aim is supported through a variety of internal news and story-telling initiatives which spotlight the work and accomplishments of our team members.

Northvolt conducts Vibe surveys twice a year as well as annual self-reflections which provide a window into each employee's individual experience within the organization. Our Vibe survey 2021 revealed that there are far too many employees who found their workload hard to manage. An action plan was put into place for low-scoring teams which included for example specific support from Human Resources and online training sessions in

stress management for both employees and managers.

Weekly or biweekly one-to-ones between managers and direct reports are promoted within the organization as a great way to check in with employees to discuss how they are feeling with their current workload and whether they need support.

At Northvolt, we work hard, but we also take the time to stop, reflect and celebrate our accomplishments. Employees are encouraged to take time away from their usual daily activities to gather in their teams, socialise and celebrate their wins, whether big or small.

Creating an inclusive & diverse workplace

A team representing over 96 nationalities, we understand the value of diversity.

A diverse team brings more diverse voices and opinions to the table. It means we have the ability to see a greater range of solutions to a problem, which is essential when dealing with complex challenges. We need innovative solutions, and a workforce that is not constrained by traditional solutions, roles and hierarchies.

Attracting the best possible candidates has been central to our development strategy since Northvolt's founding. This means looking far and wide with an open and curious mind when recruiting. A lot of extraordinary talent can be found outside Sweden and Europe, and outside the narrow confines of our industry. We will keep hiring with ethnic, gender and cultural diversity in mind and focus on attracting and retaining the world's best candidates for our business.

Gender equality

Our team gender split is currently 29% female to 71% male. This is not where we want to be. We are working hard to improve our gender representation on all levels.

Female attraction and recruitment

As a new company within a developing field, we have the unique opportunity to shape the work force of tomorrow. Traditional engineering roles tend to be male dominated, but in the emerging battery industry we can play a pivotal role by encouraging and bringing on more females to specialize in battery technology specific fields.

This starts with recruitment. A core focus for our talent pipeline is understanding where in the recruitment process we tend to lose female candidates. One identified area where female interest decreases is with our job ads when not handled with care. To address this, we have developed guidelines for gender decoding of job ads, to detect and replace wording and phrases which have proven to deter female applicants. Another focus area relates to our interface with candidates, where it is crucial that candidates meet a gender balanced and diverse interviewing panel.

In 2021 we joined a collaboration with the organization Female Technical Engineer (FTE) which aims to promote females in technical fields, and offer exclusive opportunities to visit and learn from big players in the industry they're interested in.

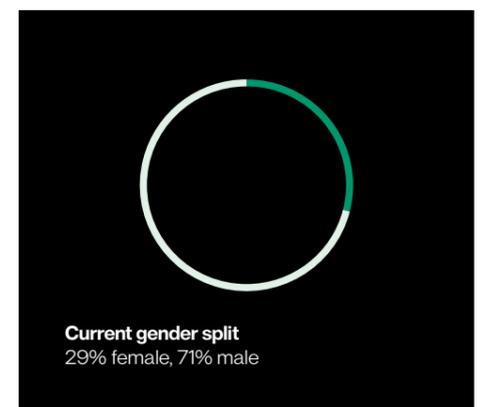
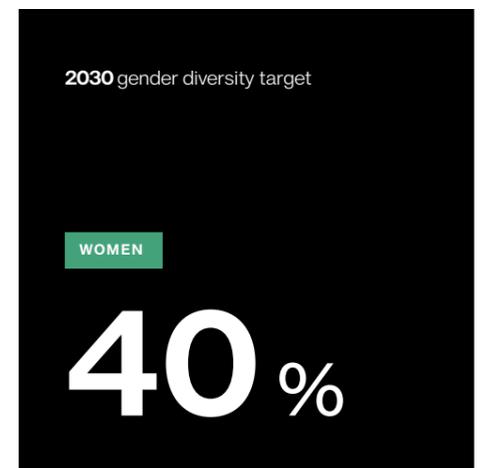
Once in the company, our next priority is ensuring that women are equally encouraged to seek promotion opportunities and are not directly or indirectly excluded from such opportunities. We will be closely monitoring our recruitment and internal performance management processes to understand where and why women tend to leave the process.

Setting up educational programs

Over the past year we have collaborated with Skellefteå municipality setting up adult education and vocational schooling, focusing on manufacturing roles such as technicians, automation operators, process operators, manufacturing technicians and logistics.

The first program to launch was the Automation Operator course early in 2021 which covers 20 weeks of in-depth teaching on industry and technical knowledge. Since its introduction, we have recruited over 60% of the graduating classes and look forward to developing this program, providing a great segue for future employees.

As Northvolt Ett continues to grow, along with Skellefteå and its manufacturing industry, this added pool of competence will be key to meet the associated demand for talent.



Personal development

Our company is growing, and we want our employees to grow with us.

We recognize that we need to encourage our employees to keep growing and developing with the company to ensure our long-term success and retaining our talent. To succeed, we have established a number of internal initiatives geared to enhancing our employees' sense of fulfillment and passion for their work.

This past year we have invested significantly into developing a formal learning and development division which is responsible for delivering programs around training and personal development.

At the start of the year, all employees are encouraged to set ambitious targets for themselves with the support of their manager, in line with our values. A 360° Yearly Reflection (feedback across levels, from managers, peers and direct reports) complements the target setting so that employees have a good understanding of what to work on during the year.

As a high-paced organization, we are aware that it can be hard to manage all tasks, and work can easily get overwhelming. Regardless of how employees are feeling or how they are handling their workload, we have occupational healthcare that is easily accessible and will escalate any critical matters quickly. We communicate all personal health and wellbeing benefits during onboarding of new employees as well as on our intranet.



Community engagement

Engaging with communities continues to be essential to our progress, because to succeed in our mission we need the support of the communities around us.

A close dialogue with Skellefteå municipality has been fundamental to enabling the swift development of Northvolt Ett and accommodating its secondary impacts in the surrounding region. This includes working together with communities to build up housing, schools, and public amenities.

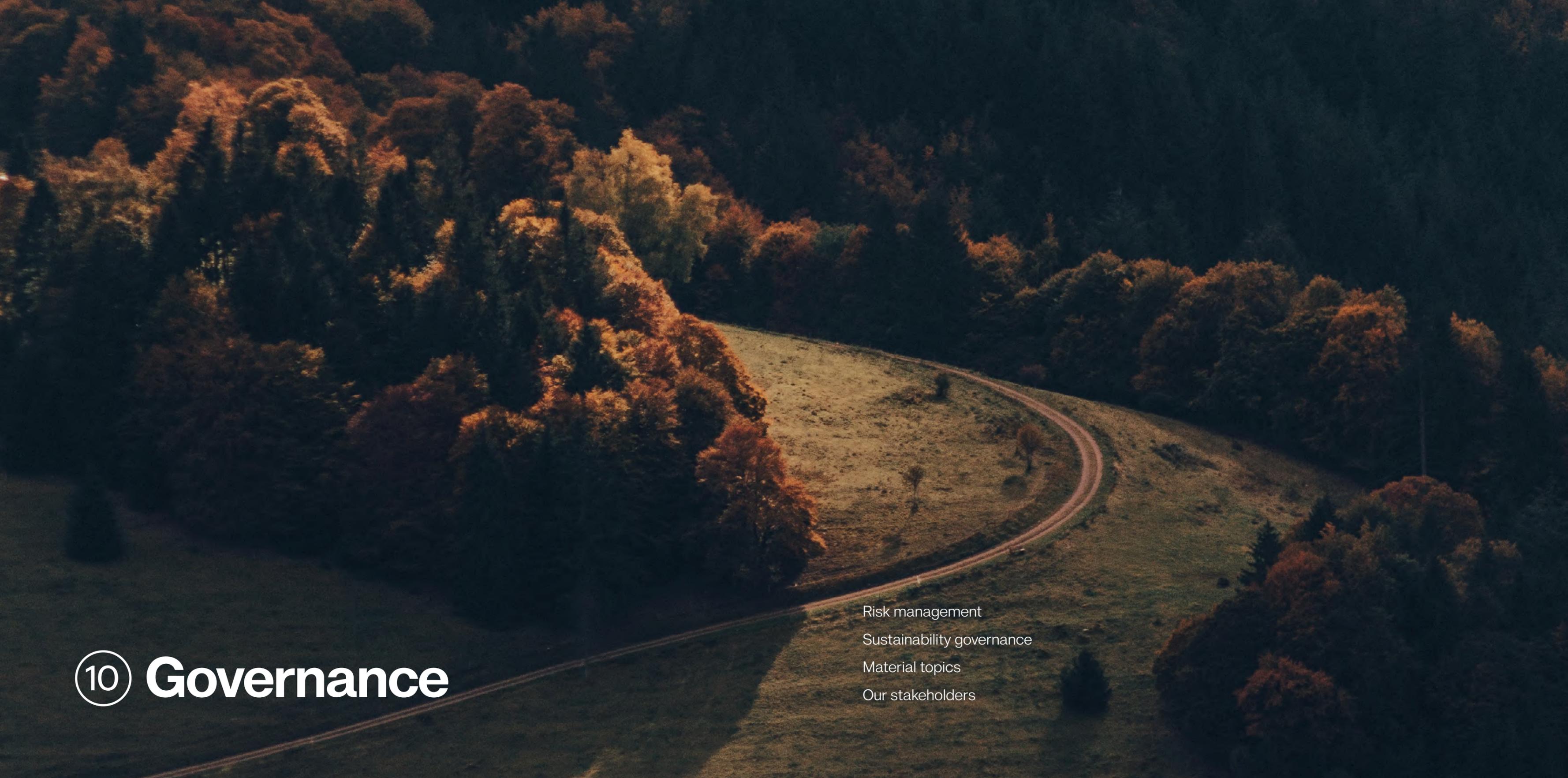
We are also heavily engaged in collaboration to find new ways of recruiting people to Skellefteå, and settling them into this up-and-coming city. A focus is placed on supporting the municipality with the integration of international employees who move to Skellefteå. Key initiatives here include providing Swedish lessons to our new international employees and their partners, and running activities to facilitate the integration of people in Skellefteå and Swedish culture.

We have also been a key player in advocating for a new International English school in Västerås.

The north of Sweden is also home to the indigenous Sámi population. Early on we engaged with the local Sami community, Mausjaur Sameby, for an open conversation around the location of Northvolt Ett, with the aim to provide them an opportunity to raise concerns and establish mutual understanding and agreement. We continue to proactively engage with Mausjaur Sameby to ensure we build on our relationship and address

any new or ongoing concerns.

To ensure we provide the community with the support they need, we have a whistleblowing service established to allow for local communities around our locations to raise formal complaints or issues with us. We also have a formal stakeholder engagement plan in place outlining how we engage with our stakeholders.



10 Governance

Risk management
Sustainability governance
Material topics
Our stakeholders

Risk management

The purpose of our risk management is to find proactive and preventive measures to balance risks and opportunities.

Our operations are exposed to internal and external risks, or uncertainty factors, that could impact our ability to achieve our objectives for sustainable growth and development of the company. A comprehensive approach to risk management has therefore been established, incorporating both top-down and bottom-up strategies. We define a risk as an uncertainty factor that may affect the company's ability to achieve our objectives.

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

Northvolt's Board of Directors is accountable for overseeing risk management and ensuring responsible and adequate risk management throughout the entire organization.

Northvolt's Audit and Risk Committee review the company's principles of risk assessment and follow up and report on how the Management team govern risk management.

Northvolt's Management team is ultimately responsible for risk management and for the implementation of the enterprise risk management program. Every Business Unit and Function is responsible for managing risk in their respective business operations and area of responsibility according to the risk management framework.

Top-down approach

The top-down risk management is performed yearly and consists individual risk interview with each member of the Management team to identify risks with their area of responsibility. As well as a joint workshop where the Management team analyze and assess risks.

A key outcome of this process is the collection of a comprehensive list of the most significant risks faced by the company. In addition to this, as part of our yearly budget and forecast process the Management team review identified risks twice per year and determine the need for any compensatory actions, additional risk or business decision which should be taken.

Bottom-up approach

The bottom-up risk management is performed on an ongoing basis by each Business Unit and

Function in order 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 at least three times a year .

We aim to build a company culture that is inherently resilient to risk. We believe that a key to achieving this is to empower our employees with a sense of the role they play in risk management within their area of work. To facilitate this, we are developing platforms to deliver training to our employees on risk assessments and mitigations relevant to their work areas.

Risks are classified into four areas: strategic, operational, financial and compliance. We use a risk universe to ensure these risks are captured in a consistent way.

✓ **STRATEGIC RISKS** Risks that can prevent the company from achieving the high-level goals that are aligned with and support the company's mission and long-term objectives.

✓ **OPERATIONAL RISKS** Risks associated to the effectiveness and efficiency of activities and use of resources.

✓ **FINANCIAL RISK** Risks associated with the reliability of the company's internal and external reporting of financial information, as well as the exposure towards financial risks such as interest, liquidity, credits and foreign exchange.

✓ **COMPLIANCE** Risks associated with conforming with laws and regulations applicable to the company. Compliance risks entail a risk of financial and legal penalties as a result of non-compliance with laws and regulations.

Assessment and management of sustainability risks, including climate change, are planned to be integrated parts of the Risk Management program.



Sustainability governance

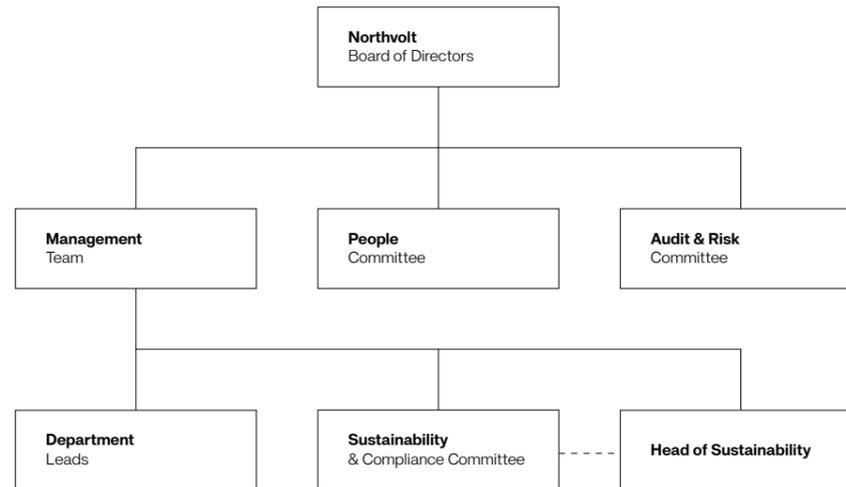
Architecture for a company that prioritizes sustainability.

Building a new company with sustainability at its heart requires investment in governance structures and programmes that support our ability to scale in a responsible manner.

We see corporate governance as an evolving core discipline that underpins our success. We have implemented key policies and procedures which work in concert with our governance structures to support effective business operations performed in line with our values.

Sustainability and compliance is overseen by several groups: the Board, the Management team, the Audit & Risk Committee, and the Sustainability and Compliance Committee.

The purpose of Northvolt's sustainability governance is to ensure the company upholds commitments to its stakeholders, including customers, employees, suppliers, investors, decision makers and representatives from society.



BOARD OF DIRECTORS The Board has overall responsibility for overseeing sustainability and compliance matters, including approval of key policies and goals, as well as approval of strategies related to sustainable development. The Board receives an in-depth formal update on sustainability performance once per year, but sustainability forms an integral part of all main topics discussed during the company's Board meetings.

AUDIT & RISK COMMITTEE The Audit & Risk Committee is a sub-committee of the Board, overseeing the identification, evaluation, and management of risks, including sustainability and compliance risks. The Audit & Risk Committee and Board of Directors also review and approve key contracts and review our whistleblowing system.

SUSTAINABILITY & COMPLIANCE COMMITTEE The Sustainability & Compliance Committee acts on behalf of the Management to oversee the effectiveness of our systems and processes for sustainable development and management, including due diligence and sustainable supply chain management (covering: health, safety, the security of people, environment, human rights, and anti-corruption). The Sustainability & Compliance Committee consists of the Chief Environment Officer, the General Counsel, the Director of Raw Material Sourcing, and the Head of Sustainability.

MANAGEMENT TEAM The Chief Environmental Officer in the Management team is responsible for overseeing and managing key sustainability initiatives of Northvolt, including Northvolt's recycling program, Revolt. The General Counsel is responsible for Northvolt's Governance and Compliance Program.

PEOPLE COMMITTEE The People Committee is a sub-committee of the Board responsible for aspects of remuneration within the company. The committee is responsible for monitoring and evaluating current remuneration structures and levels in the company, and preparing proposals surrounding remuneration which are directed to the CEO and Management team.

THE HEAD OF SUSTAINABILITY has the overall responsibility for proposing strategic content, goals and actions in order to manage our sustainability impact. The Head of Sustainability reports to the Chief Environment Officer.

Excerpt from our policy framework

MATERIAL TOPIC	POLICIES
RESPONSIBLE SOURCING	Supplier Code of Conduct including Environmental Requirements
	Sourcing and Procurement Policy
CLIMATE CHANGE & CLIMATE RISK MANAGEMENT PRODUCT SUSTAINABILITY & SAFETY	Environmental Policy
	Energy Policy
	Quality policy
ETHICS, ANTI-BRIBERY & CORRUPTION	Anti-Corruption Policy
	Trade Sanctions Policy
	Gifts Policy
	Confidentiality Policy
	Privacy Policy
	Trade Secrets Policy
	Whistleblowing system
OCCUPATIONAL HEALTH & SAFETY TALENT ATTRACTION & RETENTION	Work Environment Policy
	Code of Conduct
	Expense Policy
	IT Policy
	Travel Policy
	Insurance Policy

Responsible business conduct

At Northvolt, ways of working are governed by our values, as outlined in our Code of Conduct and disseminated in wider policy framework.

Amongst other matters, the Code of Conduct commits employees to incorporate sustainability into all aspects of our operations and ensure health and safety at our workplaces. All employees sign the Code of Conduct before joining. The Management team is responsible for implementing and ensuring compliance with the Code of Conduct.

Our compliance program

Our compliance program is a holistic approach to ensuring we are compliant with all laws and regulations applicable to our company. We began our compliance program in 2019. It has subsequently been externally reviewed by PwC. In 2022 we will continue to implement and strengthen the program, including continuing to extend the comprehensive training plan on the compliance program across the company.

Anti-bribery and corruption

Many of our suppliers and partners operate in parts of the world where there is a high risk of

bribery and corruption. We believe it is essential to make our position on the matter clear to all of our employees, contractors, suppliers and partners: Northvolt has zero tolerance for bribery and corruption.

This message is stated explicitly in our Code of Conduct and Supplier Code of Conduct. Our Anti-Corruption Policy and Gift Policy include procedures and processes to identify red flags, understand roles and responsibilities in the organization as well as relevant laws and processes for reporting concerns. All employees are required to read through and sign our Code of Conduct and accompanying Anti-Corruption and Gift Policies when joining Northvolt.

We assess any exposure and risks of bribery and corruption when working with suppliers and other partners. We also conduct on-site audits of key high-risk suppliers against our Supplier Code of Conduct, including bribery and corruption. Our supplier due diligence process is outlined in full in section 5 of this report.

Training

To ensure that our employees are kept up to date with anti-corruption knowledge, we introduced mandatory anticorruption and bribery training in

our Learning Management System (LMS) in 2021. The training covers the requirements set out in our policies, and provides practical examples of dos and don'ts for conducting business and avoiding bribery and corruption. By bringing this training onto our LMS, we can also track completion of this training, and automatically require follow up trainings for employees when required.

We have also provided anti-bribery and corruption training to our supplier base who are based in countries with higher risk of corruption occurring. This is to inform our suppliers of our anti-corruption policy and expectations of the suppliers when conducting business with us. We conducted trainings with a total of 6 suppliers. Attendees included individuals in sales, purchasing, quality, and often general management as well.

Due to the COVID-19 pandemic, we had to rethink our training program as we have been unable to visit sites and hold trainings in person. In addition, with our company growing quickly, we understand the importance in continuous training in order to maintain excellence in our work and are working on setting up more extensive online training.

Whistleblowing system

Northvolt AB strives to achieve transparency and

a high level of business ethics. We want to create a culture where our employees feel comfortable speaking up whenever they have a question or concern about what we do or perceive any signs of unethical behavior. The governance and outcomes of our whistleblowing system is reported to the Audit & Risk Committee and the Board of Directors.

In the first instance we encourage our employees to feel comfortable speaking to a manager or another senior member of their team about any immediate concerns. Where issues are sensitive, our independent, external whistleblowing service offers a possibility to alert the organization about suspicions of misconduct in confidence. It is an important tool for reducing risks and maintaining trust in our operations by enabling us to detect and act on possible misconduct at an early stage. Whistleblowing can be done openly or anonymously. Northvolt whistleblowing system is available on our external webpage.

Material topics

Materiality is the point at which a sustainability topic becomes relevant to our ability to create value.

We performed our first structured materiality assessment in 2021 to gain a holistic view of the relative significance of our impacts and associated risks and opportunities. The results of this assessment have informed our strategy development and target setting as well as our reporting focus areas.

We maintain an up-to-date understanding of our material topics through engagement and dialogue with internal and external stakeholders, as well as by monitoring our business, industry peers and the relevant trends and drivers. Based on these insights, we compiled a list of 20 focus topics covering environmental, social and governance matters which we asked a core group of stakeholders to opine on in an online survey.* Participating stakeholders included representatives from our customer and investor base, non-governmental organizations, academic institutions, authorities and unions.

Our material topics are subject to periodic review and validation by our internal experts and Management team. We aim to develop future iterations of the materiality assessment to include additional stakeholders in the dialogue.

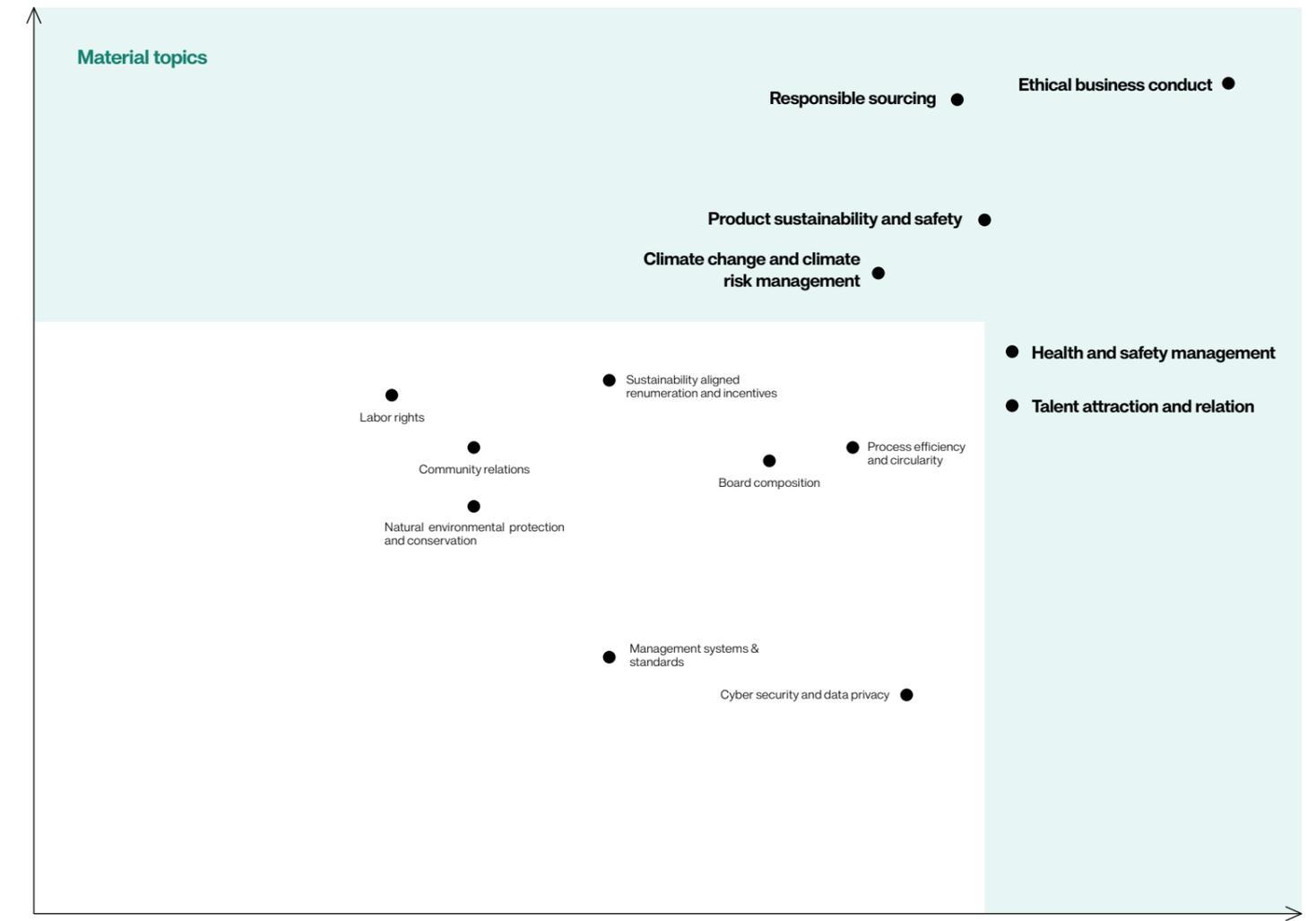
Our most material topics are issues which substantively:	<ul style="list-style-type: none"> ✓ Reflect our significant economic, environmental and social impacts ✓ Influence our ability to create lasting value, build trust and reduce risks ✓ Influence stakeholders' perception of our performance and ability to deliver value for them
Our stakeholder survey	<ul style="list-style-type: none"> ✓ 20 topics covered ✓ 20 contacted stakeholders ✓ 13 respondents (65% response rate) ✓ Respondents included representatives from customers, investors, NGOs, academia, authorities and labor unions ✓ Results scored and weighted to allow for comparability

↑ **Process for identifying** our most material topics and their boundaries

In the graphic presented, some topics have been grouped together for conciseness

Materiality matrix

IMPORTANCE TO THE STAKEHOLDERS



IMPORTANCE TO THE BUSINESS

Customers

Investors & Lenders

Employees

Labor Unions

Potential Candidates

Suppliers

Society

Our stakeholders

An ongoing dialogue with stakeholders helps us define and deliver on our promises and keep ahead of global developments.

Our stakeholders play many roles within and beyond the complex ecosystem of the battery industry. Listening to and acting on the views and expectations of our stakeholders is crucial to our operations and long-term commitments.

Genuine collaboration requires us to listen, to challenge and be challenged, and to openly share experiences. As part of our regular operations, we gather feedback from our stakeholders in a variety of ways – from project meetings, R&D meetings, supplier dialogues and engagement with civil society.

Our key stakeholders and their expectations

	APPROACH TO STAKEHOLDER ENGAGEMENT		KEY TOPICS AND CONCERNS RAISED	
Customers	Due diligence Management meetings Project meetings	Workshops Reporting	Sustainable battery production Sustainable supply chain	Compliance on legal and regulatory requirements
Investors & Lenders	Periodic Reporting Investor Advisory Board Regular bilateral communication	Sustainability report The Board of Directors & Board committees	Human rights along the value chain (including health and safety) Long-term stable economic performance	Climate impact and financial climate risk and opportunities management Compliance on legal and regulatory requirements
Employees, labor unions & potential candidates	Email, phone calls and meetings Human Relations interface Website, intranet and social media	Monthly all-hands for full work force Regular team meetings and one-on-ones with managers	Good terms of employment, fair wages and work life balance Environment, health and safety	Benefits, training and career opportunities Diversity & an inclusive workplace Compliance with laws & regulations
Suppliers	Policies and contracts Site visits and audits	Request for information (RFI) Email, phone calls and meetings	Strategic partnerships for increased sustainability performance Human rights, labor rights and conditions Community relations	Climate and local environmental impacts Health and safety Growth
Society	Steering groups and positions held in relevant committees Environmental permits Reporting and reviews	County administration Email, phone and meetings Advocacy	Climate impact Contribution to economic development Responsible business conduct, tax transparency Respect for biodiversity and landscapes	Effects on local communities (noise and emissions) Compliance with law and regulations Sustainable supply chain Collaborations



11 Sustainability performance

Energy

KPI	2021
Fuel consumption (MWh)	327
Electricity consumption (MWh)	64 007
District heating consumption (MWh)	12 299
District cooling consumption (MWh)	12 675
TOTAL	89 308
RENEWABLE ENERGY USE	
Energy use from renewable energy sources (MWh)	87 112
of which electricity (MWh)	63 710
Renewable energy use (%)	98

ENERGY
 Water data only includes Northvolt Labs (Västerås) and Northvolt Jeden (Gdańsk).
 Waste data only includes Northvolt Labs (Västerås), Northvolt Ett (Skellefteå), Cuberg (San Francisco), Volthouse (Stockholm) and Northvolt Jeden (Gdańsk), and excludes office waste.
 Weight of end of life material processed refers to processing of lithium-ion batteries in our Revolt pilot facility located in Northvolt Labs.

Production, water, waste & material

KPI	2021
Water consumption (m3)	15 373
Waste, non-hazardous (tonnes)	6 196
Waste, hazardous (tonnes)	270
Weight of end of life material processed (tonnes)	24

PRODUCTION, WATER, WASTE & MATERIAL
 Cell production refers to produced volumes at Northvolt Labs facility. Systems production refers to assembly of modules and packs in Northvolt's facilities in Sweden and Poland.

EMISSIONS (to the right)
 Refer to section How we report for details on inclusions.

Emissions

SCOPE	2021
SCOPE 1 (TCO ₂ E)	6 460
Fuels	58
Fugitive emissions	6 402
SCOPE 2 (TCO ₂ E)	
Market-based	546
Location-based	1 982
SCOPE 3 (TCO ₂ E)	47 767
Purchased goods and services	34 584
Capital goods	3 962
Upstream transportation & distribution	7 589
Business travel	1 632
Other air emissions, VOC (tonnes)	0.013

Management systems

ISO 9001 CERTIFIED ENTITIES	2021
Northvolt AB	
Northvolt Systems	
Northvolt Poland	
Northvolt Labs	
ISO 14001 CERTIFIED ENTITIES	
Northvolt AB	2021
Northvolt Systems	
Northvolt Poland	

ISO
 In early 2022, ISO 9001 certificate was additionally received for Northvolt Ett and Northvolt Revolt and ISO 14001 certificate was received for Northvolt Labs and Northvolt Revolt, all with 2021 as certification year.

Supplier environmental & social assessment

KPI	2021
Suppliers screened against environmental, social and governance criteria (#)	309
Sustainability site visits and audits conducted of raw material suppliers (#)	2
Share of contracted raw material suppliers with traceable feed (excluding graphite) (%)	89
Share of significant ¹ suppliers who have long-term climate targets in line with the Paris Agreement (%)	61
Share of significant ¹ suppliers who use more than 50% renewable energy in their operations (%)	25
Share of significant ¹ suppliers who have been accused of serious breaches to human rights in the past year (%)	0
Share of significant ¹ suppliers who have assessed more than 50% of their own suppliers for ESG risks (%)	67
Share of significant ¹ suppliers who have experienced serious injuries or fatalities in the past year (%)	8
Share of significant ¹ suppliers who have trained more than 50% of their employees on anti-bribery and corruption matters in the past year (%)	78

¹Prioritised suppliers are those suppliers selected to partake in our first annual ESG questionnaire. Selection is based on spend, size of contract, and strategic partnerships. A total of 50 suppliers were sent the questionnaire, we had a response rate of 68%. This covered both Direct purchasing (cell and raw materials, systems), and Indirect purchasing (equipment and construction)

Employment

2021	NEW EMPLOYEES (#)	TURNOVER RATE (%)	EMPLOYEES (#)	GENDER FEMALE / MALE (%)
TOTAL	1 337	11.6	2 345	29 / 71
NORTHVOLT AB	389	11.7	924	32 / 68
NORTHVOLT ETT	479	15.6	507	30 / 70
NORTHVOLT LABS	245	11.9	484	21 / 79
NORTHVOLT POLAND	45	n.a.	98	26 / 74
NORTHVOLT REVOLT	13	16.7	25	60 / 40
NORTHVOLT SYSTEMS	127	6.3	235	24 / 76
CUBERG	39	n.a.	72	35 / 65

Northvolt relies on workers who are not employees to perform work for us. Their work is controlled by Northvolt and the most common workers in this category is consultants and interns. By the end of the year Northvolt had 279 consultants contracted to perform work for us and 92 active interns.

Diversity & equal opportunity

KPI	2021
Gender diversity at all levels (% female)	29
Board level	13
Management level	21
middle management	26
Independent Board members (#)	2 (25%)
Nationalities (#)	96
Employees reporting parental leave (#)	200
Age distribution	
18 – 25	219
26 – 30	645
31 – 40	913
41 – 50	363
>50	124

Cuberg excluded from gender diversity at middle management level and age distribution. Cuberg and Northvolt Poland not included in number of employees reporting parental leave. / Age distribution: 9 people n.a.

Collective bargaining agreement

Everyone at Northvolt is insured. All types of employees (including non-permanent, consultants and interns) are covered by insurances established by the collective bargaining agreement. Additionally, Northvolt provides two additional types of insurance as a benefit to our employees, as well as the opportunity to join our management incentive program to buy warrants.

The Collective Bargaining Agreement (CBA) provides Northvolt employees with multiple benefits. We are connected to Teknikavtalet CBA, meaning that employees' work conditions and salaries are regulated and protected by the labor unions behind the agreement. In addition to this, the CBA provides employees with an occupational pension and various insurances.

KPI	2021
Share of permanent employees covered by collective bargaining agreement (%)	93

Training & education

KPI	2021
Share of employees participating in our anti-corruption training (%)	20
Number of suppliers provided anti-corruption and bribery training (#)	6
Share of employees that receive regular performance and career development reviews (%)	100
Share of employees that have agreed to our Code of Conduct (%)	100

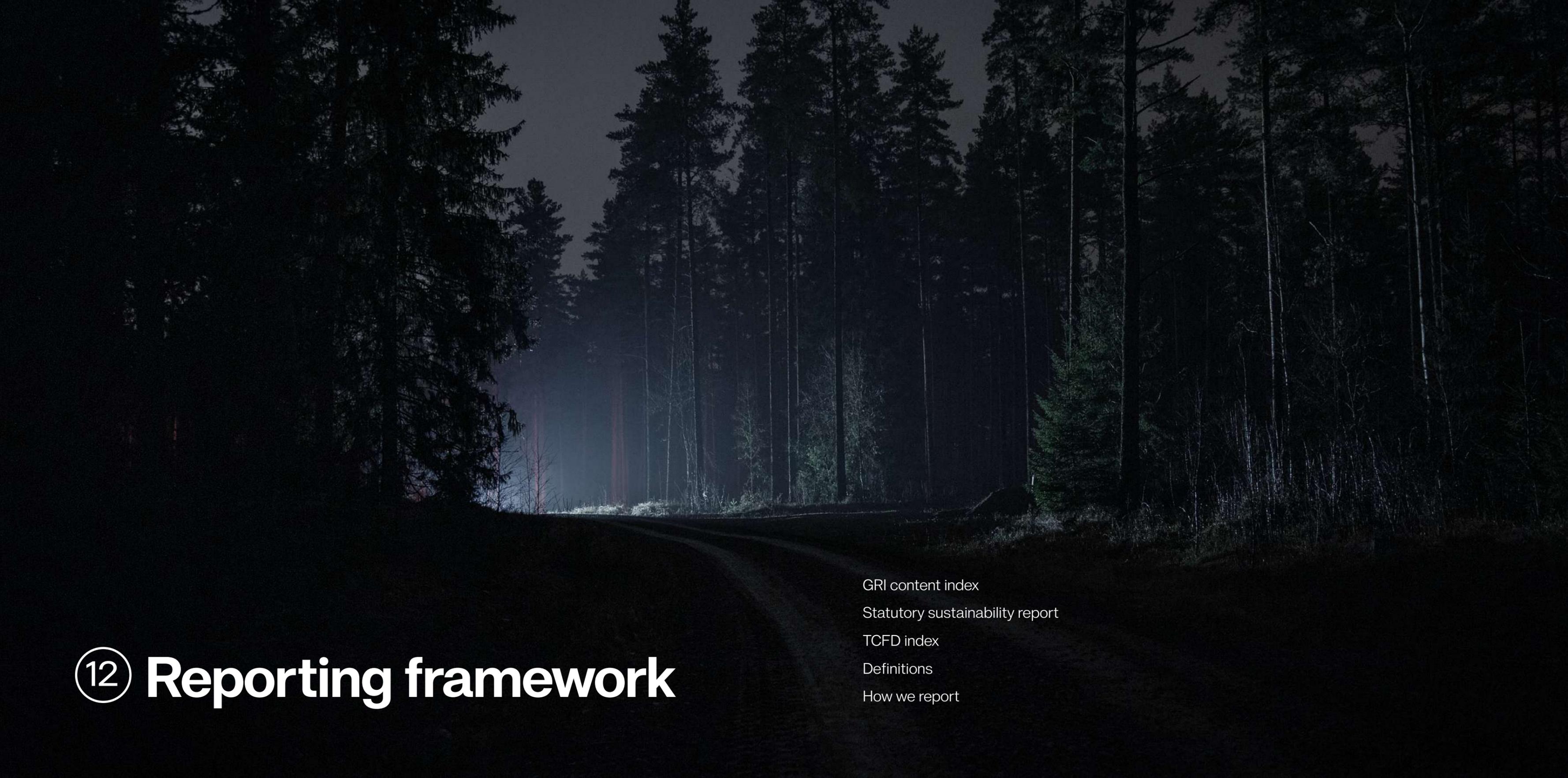
Occupational health & safety

KPI	2021
Lost Time Injury Frequency Rate (LTIFR)	1.8
Lost time injury (#)	13
Total recordable injuries (#)	32
Total Recordable Injury Frequency Rate (TRIFR)	4.4
Minor injuries and accidents (#)	151
Near misses (#)	434

Compliance with laws & regulations

Northvolt received no significant fines or directives from the environmental authorities in 2021. Northvolt had one case of leaking of wastewater from Northvolt Labs to the municipal wastewater treatment plant in Västerås during the year. An agreement was set to reimburse Mälarenergi with costs for analysis and field days for determine where the leak was.





12 Reporting framework

GRI content index

Statutory sustainability report

TCFD index

Definitions

How we report

GRI content index

 Statement of use: Northvolt has reported the information cited in this GRI content index for the period January 1 to December 31 2021 with reference to the GRI Standards.

GRI STANDARD	DISCLOSURE	PAGE
GRI 2	General disclosures 2021	
	The organization and its reporting practices	
2-1	Organizational details	69
2-2	Entities included in the organization's sustainability reporting (location AR)	69
2-3	Reporting period, frequency and contact point	69-70
2-4	Restatements of information	N/A FY2021
2-5	External assurance	N/A FY2021
	Activities and workers	
2-6	Activities, value chain and other business relationships	5, 13, 26
2-7	Employees	61
2-8	Workers who are not employees	61
	Governance	
2-9	Governance structure and composition	55

GRI STANDARD	DISCLOSURE	PAGE
GRI 2	General disclosures 2021	
2-10	Nomination and selection of the highest governance body	N/A FY2021
2-11	Chair of the highest governance body	N/A FY2021
2-12	Role of the highest governance body in overseeing the management of impacts	55
2-13	Delegation of responsibility for managing impacts	55
2-14	Role of the highest governance body in sustainability reporting	55, 69
2-15	Conflicts of interest	N/A FY2021
2-16	Communication of critical concerns	N/A FY2021
2-17	Collective knowledge of the highest governance body	N/A FY2021
2-18	Evaluation of the performance of the highest governance body	55
2-19	Remuneration policies	N/A FY2021
2-20	Process to determine remuneration	N/A FY2021
2-21	Annual total compensation ratio	N/A FY2021
	Strategy, policies and practices	
2-22	Statement on sustainable development strategy	8, 14
2-23	Policy commitments	55-56
2-24	Embedding policy commitments	55-56
2-25	Processes to remediate negative impacts	13, 26-30, 55-56
2-26	Mechanisms for seeking advice and raising concerns	56

GRI STANDARD	DISCLOSURE	PAGE	
GRI 2	General disclosures 2021	2-27 Compliance with laws and regulations	63
		2-28 Membership associations	67
	Stakeholder engagement		
	2-29 Approach to stakeholder engagement	58	
	2-30 Collective bargaining agreements	62	
GRI 3	Material topics 2021	3-1 Process to determine material topics	57
		3-2 List of material topics	14, 57
		3-3 Management of material topics	14
GRI 205	Anti-corruption 2016	205-2 Communication and training about anti-corruption policies and procedures	56
GRI 301	Materials 2016	301-2 Recycled input materials used	60
GRI 302	Energy 2016	302-1 Energy consumption within the organization	60
GRI 303	Water and Effluents 2018	303-5 Water consumption	60
GRI 305	Emissions 2016	305-1 Direct (Scope 1) GHG emissions	60
		305-2 Energy indirect (Scope 2) GHG emissions	60
		305-3 Other indirect (Scope 3) GHG emissions	60
GRI 306	Waste 2020	306-3 Waste generated	60
GRI 308	Supplier Environmental Assessment 2016	308-2 Negative environmental impacts in the supply chain and actions taken	26-30
GRI 401	Employment 2016	401-1 New employee hires and employee turnover	61-62

GRI STANDARD	DISCLOSURE	PAGE	
GRI 401	Employment 2016	401-2 Benefits provided to full-time employees that are not provided to temporary or part-time employees	51-52
GRI 403	Occupational Health and Safety 2018	403-5 Worker training on occupational health and safety	38
		403-6 Promotion of worker health	38, 63
		403-9 Work-related injured	63
GRI 404	Training and Education 2016	404-3 Percentage of employees receiving regular performance and career development reviews	62
GRI 405	Diversity and Equal Opportunity 2016	405-1 Diversity of governance bodies and employees	62
GRI 414	Supplier Social Assessment 2016	414-2 Negative social impacts in the supply chain and actions taken	61

ENVIRONMENTAL IMPACT CATEGORIES

1	Acidification terrestrial and freshwater	6	Eutrophication marine	12	Photochemical ozone formation – human health
2	Cancer human health effect	7	Eutrophication terrestrial	13	Resource use, energy carriers
3	Climate change	8	Ionising radiation – human health	14	Resource use, mineral and metal
4	Ecotoxicity freshwater	9	Land use	15	Respiratory inorganics
5	Eutrophication freshwater	10	Non-cancer human health effect	16	Water scarcity
6	Eutrophication marine	11	Ozone depletion		

Statutory sustainability report

🔍 The report includes requirements placed on sustainability reporting as stated in the Swedish Annual Accounts Act. Ernst & Young AB has provided an opinion on the statutory sustainability report.

GENERAL		PAGE
BUSINESS MODEL		13, 14
ENVIRONMENT	Policy	55-56
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	Target & outcomes	22-23, 60
SOCIAL CONDITIONS	Policy	55-56
	Risk & risk management	50-52, 54
	Target & outcomes	50-52, 61-62
RESPECT FOR HUMAN RIGHTS	Policy	55-56
	Risk & risk management	10-11, 26-30, 54
	Target & outcomes	26-30, 61
ANTI-CORRUPTION	Policy	55-56
	Risk & risk management	54
	Target & outcomes	56, 62

Membership associations

Northvolt is an active partner in several alliances and industry collaborations.

The company holds dialogues with industrial peers on issues relating to technology and innovation across relevant short- and long-term aspects relating to economic, governance, environmental and social dimensions. In Europe, Northvolt is member of the European Battery Alliance as well as the Platform for Electromobility, amongst other. In Sweden, Northvolt is member of the Association of Swedish Engineering Industries, the Confederation of Swedish Enterprise, the Electrification Commission and Fossil Free Sweden.

Northvolt maintains a central list of the organizations we are a member of, which is reviewed annually to ensure these are in line with our values and commitments.



TCFD index

TOPIC	DESCRIPTION	PAGE
GOVERNANCE	A Describe the Board's oversight of climate-related risks and opportunities.	24
	B Describe the Management's role in assessing and managing climate-related risks and opportunities.	24
STRATEGY	A Describe the climate-related risks and opportunities the organization has identified over the short, medium, and long term.	24
	B Describe the impact of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning.	24
	C Describe the resilience of the organization's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario.	24
RISK MANAGEMENT	A Describe the organization's processes for identifying and assessing climate-related risks.	24
	B Describe the organization's processes for managing climate-related risks.	24
	C Describe how processes for identifying, assessing and managing climate-related risks are integrated into the organization's overall risk management.	24
METRICS & TARGETS	A Disclose the metrics used by the organization to assess climate-related risks and opportunities in line with its strategy and risk management process.	22-24
	B Disclose Scope 1, Scope 2 and, if appropriate, Scope 3 GHG emissions, and the related risks.	22-24
	C Describe the targets used by the organization to manage climate-related risks and opportunities and performance against targets.	22-24

Definitions

DEFINITIONS	
ACTIVE MATERIAL	The active materials in a battery are those that participate in the electrochemical charge/discharge reaction
ANODE	The positively charged electrode through which the electrons leave an electrical device.
BATTERY PACK	Set of individual cells that are configured in a series
BLACK MASS (BM)	A metal powder resulting from early steps of the battery recycling process Northvolt is to adopt. Black mass contains valuable active material and is subject to hydromet processing.
CATHODE	The negatively charged electrode through which electrons enter an electrical device.
CYCLE LIFE	Number of cycles a battery can deliver
DOWNSTREAM	In the context of Northvolt, refers to manufacturing activities occurring after manufacturing of cathode active material
ELECTRODE	Conductive materials in a cell in which electrochemical reactions occurs
ENERGY DENSITY	Volumetric density, specifies the amount of energy a cell can hold in volume
HYDROMET	Hydrometallurgy ' <i>hydromet</i> ' is a chemical technique used for the extraction of metals from materials or solutions; applied within battery recycling process it is used to treat black mass to recover nickel, manganese, cobalt and lithium.
UPSTREAM	In the context of Northvolt, refers to chemical manufacturing of cathode active material
VERTICAL INTEGRATION	The act of consolidating distinct supply chain activities within the operations of a company, typically to facilitate cost-efficiency
VOLTPACK	A battery subpack developed by Northvolt
VOLTPACK MOBILE SYSTEM	A complete battery system developed by Northvolt for the mobile energy storage market

How we report

Northvolt Sustainability Report 2021 covers Northvolt AB and its subsidiaries, and has been prepared with reference to the GRI standard, guiding readers to information on relevant indicators.

Sustainability is our core business, and in this report, our first public sustainability report, we outline our impacts on the economy, environment and people, together with our priorities and response. The report covers fiscal year 2021 and was published on June 16th 2022.

In accordance with the Swedish Annual Accounts Act chapter 6, §11, Northvolt has chosen to establish its statutory Sustainability Report independent from its Annual Report. All required information as defined by the Swedish Annual Accounts Act is incorporated in this document.

Unless otherwise indicated, standard disclosures include all operations that can potentially affect Northvolt's performance, excluding joint ventures.

Data was collected through calendar year 2021, and the report covers 2 345 employees at year end, including both office and factory workers. 2021 represents our baseline year.

This report sets out the ways in which we are measuring progress and details our approach to managing sustainability risks. Based on our materiality assessment, the topics most relevant to Northvolt and our value chain are presented.

This report has been reviewed and approved by Northvolt Management and Board of Directors.

Frameworks

This report has been prepared with reference to the Global Reporting Initiative (GRI) Standard and with guidelines from Task Force on Climate-Related Financial Disclosures (TCFD).

Our emissions data

We work continuously to improve data quality and precision by using a combination of primary and secondary data. We will continue to be transparent on how we calculate, learn and adapt our approach as methods and data quality improve. Below we describe our approach for reporting Scope 1, 2 and 3 emissions within this report.

Scope 1 and 2 emissions

Environmental data pertains to Northvolt and its significant operating subsidiaries, excluding joint ventures and entities where we do not have operating control, as well as smaller offices with fewer than 10 employees. Emissions data from joint ventures will be collected once they become operational.

The following sites have therefore been included within the scope of emissions reporting for 2021:

- ✓ Northvolt Volthouse office in Stockholm

- ✓ Northvolt Tomtebodan in Stockholm

- ✓ Northvolt Liljeholmen in Stockholm

- ✓ Northvolt Labs in Västerås

- ✓ Northvolt Ett in Skellefteå

- ✓ Northvolt Jeden in Gdańsk

- ✓ Cuberg in San Francisco

Northvolt reports according to the operational control approach specified in the GHG protocol. Emissions under Scope 1 and 2 emissions are based on actual data derived from the following sources:

- Refrigerant top up data from service reports

- Natural gas, electricity, district heating and cooling consumption from invoices and supplier portals

Emissions factors used include DEFRA, supplier specific emission factor for electricity and district heating and cooling.

Scope 3 emissions

For 2021, Emissions data for Scope 3 was dependent upon data availability. Our reporting is based on the data which is available and where the quality of data was sufficient. We are continuously working to gather data of higher quality and expect improved emissions data under Scope 3 for future reports.

In 2021 we have reported emissions data for the following Scope 3 categories:

- Purchased goods and services

- Capital goods

- Upstream logistics and distribution

- Business travel

PURCHASED GOODS AND SERVICES Emissions from this category is based on total volume of purchased Cobalt, Nickel, Lithium, Manganese and Graphite for the year, as these are considered our most material purchases. Emission factors are a mix of Ecoinvent 3.7, academic literature and supplier specific factors. The data is based on purchases for our production at Northvolt Labs and Ett only.

CAPITAL GOODS Emissions from this category are emissions from our construction activities at Northvolt Ett only and consist of total volume of concrete and steel purchased for FY 2021. Emission factors used are Ecoinvent 3.7

UPSTREAM LOGISTICS AND DISTRIBUTION Northvolt calculates emissions within this Scope 3 category based on logistics data for Northvolt AB for the year. It excludes logistics for Cuberg. The emissions are calculated based on supplier specific emissions data, provided by logistics providers. Where this data has not been provided, DEFRA emission factors have been used.

BUSINESS TRAVEL Emissions data from business travel was gathered from Northvolt's external travel agencies. This data includes travel via rail

and flights. Hired cars are not included. The travel agencies apply for all Swedish assets. Poland and Cuberg are excluded

LCA calculation

We will conduct LCAs on all of our products and certify these according to the ISO 14040:2006 and 14044:2006 standards, using as much primary data as possible.

In addition to quantifying the current impacts of our products, we proactively use LCAs as tool for decision making and eco-design across the organization. By conducting LCAs, we identify hotspots and inefficiencies in our production processes where improvements can be made. From our work over the past year, integrating LCA as a decision-making tool within the organization means that employees have a greater buy-in into the advances required to produce green batteries. When we can understand how our decisions actively impact the overall environmental performance of the batteries, we feel empowered to make decisions with environmental performance in mind. It gives us a greater chance of reaching our goals and generating long-lasting change.

Occupational health and safety

Reported LTIFR and TRIFR includes both Northvolt employees and contracted entrepreneurs at site. At Northvolt Ett the reported numbers for incidents and injuries cover con-

tracted entrepreneurs. No serious injuries occurred to Northvolt employees during the year at Northvolt Ett. For Revolt all incidents and injuries were reported by Northvolt employees, and only relate to the Revolt Pilot operation in Västerås. For Northvolt Labs and Northvolt Jeden the reported incidents and injuries cover both Northvolt employees and contracted entrepreneurs.

EU Taxonomy

Through 2021 we commenced efforts to assess our business against the criteria in the EU Taxonomy; the European Commission framework for classifying economic activities as sustainable so as to guide financial sector investment decisions.

We value the EU Taxonomy as a tool to transition to a low carbon, resilient and resource-efficient economy, and we have determined that Northvolt's activities fall under the macro sector 'manufacture of batteries'.

While our company is not yet subject to mandatory disclosure requirements, in 2022 we will be developing systems to support ongoing assessment of our alignment with the EU Taxonomy in advance of reporting in our 2022 Sustainability Report. Our first assessment of eligibility is that we are 100% eligible under the EU taxonomy.

Statement from Ernst & Young AB

The auditor's report on the statutory sustainability report

To the general meeting of Northvolt AB, corporate identity number 559015-8894.

ENGAGEMENT AND RESPONSIBILITY It is the Board of Directors who is responsible for the statutory sustainability report for the year 2021 on page 67 and that it has been prepared in accordance with the Annual Accounts Act.

THE SCOPE OF THE AUDIT Our examination of the statutory sustainability report has been conducted in accordance with FAR 's auditing standard RevR 12 The auditor 's report on the statutory sustainability report. This means that our examination of the statutory sustainability report is different and substantially less in scope than an audit conducted in accordance with International Standards on Auditing and generally accepted auditing standards in Sweden. We believe that the examination has provided us with sufficient basis for our opinions.

OPINION A statutory sustainability report has been prepared.

Stockholm June 16, 2022
Ernst & Young AB

Hamish Mabon
Authorized Public Accountant

GET IN TOUCH

If you need more information about our sustainability work or this report, please contact: hi@northvolt.com

We appreciate your feedback ⚡