

# The future of transportation and infrastructure

The world is changing. In many aspects it is becoming a better place to live in with a global decrease in poverty, increase in life expectancy and declining cost for renewable energy. But there are also challenges. The need to drive sustainable development and to grow within the planetary boundaries is greater than ever.

## One global agenda for 2030

In our work, we have established three main areas where our business can contribute to sustainable development:

**Climate** – reducing emissions from our own operations and value chain as well as from the use of our products.

**Resources** – utilizing transports and material in the most resource-efficient ways possible.

**People** – because safety and human rights make up the foundation for prosperity.

The Sustainable Development Goals (SDGs) were set in 2015 by the United Nations General Assembly and signed by all member states and they are therefore referred to as one global agenda for 2030. The Volvo

Group's commitment to achieving development without exceeding the planetary boundaries includes all 17 SDGs. Several topics, such as equality and fighting corruption are universal for all enterprises. Beyond these universal responsibilities, we identify closer connections and impacts from our business and operations in a number of goals.

This global agenda for 2030 impacts the technological and regulatory development as well as expectations from customers, investors, employees and other stakeholders where we operate. We highlight some of our activities and their main connections to the SDGs on pages 26–43.

In addition, in the Sustainability Notes on pages 152–179, we further connect detailed disclosures to specific targets in the UN's sustainability agenda.

## An increasingly urban and connected planet

The world's population is growing quickly and the world is becoming more urbanized. By 2030, it is expected that two thirds of the global population will be living in cities. Urbanization is a global megatrend – with many different faces and implications for transportation and infrastructure. Projections show that urbanization combined with the overall growth of the world population could add another 2.5 billion people to the urban community by 2050, equivalent to today's combined population of China and India. This development will have both environmental and social implications. Going forward, we believe that sustainability is a prerequisite for doing business. People shop online and more and more people prefer using services rather than owning products. More power will shift from producers to consumers and expectations on user experience are extremely high. Companies use data to provide seamless and individualized services and products.

### Factors expected to drive change

In 2030:

- 30% of all European vehicle sales are expected to be electric.
- 8.6 billion people share the planet, with 70% living in cities.
- 4 out of 5 economic superpowers are found in Asia, with China the world's largest economy.
- 90% of all people have access to the internet.
- Effects from climate change are clearly visible.
- Consumer power is increasing and consumers are getting used to seamless and customized solutions in digital channels.

### What will this mean for business?

- Increased demand for transport and infrastructure solutions.
- Being sustainable is a must.
- An increasing number of consumers prefer utilizing services as opposed to owning products.
- Companies owning customer interfaces and relevant data thrive as they can provide seamless and individualized services and products.
- More power resides with the buyer. B2B (business-to-business) and B2C (business-to-consumer) have merged into B2P (business-to-people).

Driving prosperity

# Creating value and building a new society

Our mission is to drive prosperity through transport and infrastructure solutions. The work we do every day should ultimately contribute to us becoming the most desired and successful transport and infrastructure solution provider in the world.

## Bold mission

The world does not stand still, nor does the Volvo Group. The Volvo Group's mission to drive prosperity through transport and infrastructure solutions is our way of shaping the world we want to live in. Our solutions to global challenges have people at its core and build upon a history of innovation. We improve the everyday life of our customers and society at large. The health, safety and wellbeing of people is our main priority. A growing population creates a need for more transports of people and goods. Our ambition is to contribute by offering leading transport and infrastructure solutions enabling societies to prosper in a sustainable way.

## Everything starts with the customer

We are in a people business, even though we operate in a business-to-business market. Therefore, trust and relations are as important as the complete offer. By bringing together the best of offers and relations, our vision is to become the most desired and successful transport and infrastructure solution provider in the world. We offer total solutions and easy to integrate products and

services, tailored towards specific customer needs, through multiple sales channels.

Our aspirations guide us on our journey, and we lead by example. We are a trusted partner to our customers – their needs drive everything we do. Our culture is built around care for people. We are purpose-driven and build engagement through inclusiveness, diversity and the ability for teams and individuals to grow. Strong performance enables us to invest in the future and thereby owning our own destiny.

Our values support our decision making at all levels every day. Everything we do starts with our customers and their needs and we see change as a positive force to succeed. We create a high performing culture by focusing on results and helping each other to succeed. We have a business mindset, and we lead with passion. We build trust by consistently doing business with integrity and following our Code of Conduct.

Our strategy guides us when shaping the future society through the Volvo Group's transport and infrastructure solutions.

## Moving into the golden age of logistics

An increasing global population, booming e-commerce and a growing, connected middle class contribute to rising demand for construction and transportation in the future. Climate change, congested cities, hazardous road and working conditions call for future transportation technology and systems solutions that are safer, cleaner and more efficient. The increased need for transport and new infrastructure combined with the rapid development of new technologies provide great opportunities for our industry, which we believe is moving into a golden age of logistics. Looking ahead, we foresee that a new transport landscape will emerge. New technologies and new business models will result in safer, more sustainable and more efficient ways to move goods, material and people.

### Factors expected to drive change

In 2030:

- Electromobility requires total solutions.
- Autonomous solutions give radical efficiency potential.
- Digitalization and connectivity enable optimization.
- Sustainability equals profitability.

### What will this mean for our industry?

- Electromobility and autonomous solutions will be driven by large customers and their customers.
- First mover advantage will be massive.
- From standardized products to sustainable and tailor-made end-to-end solutions.
- Different eco-systems delivering customer value.



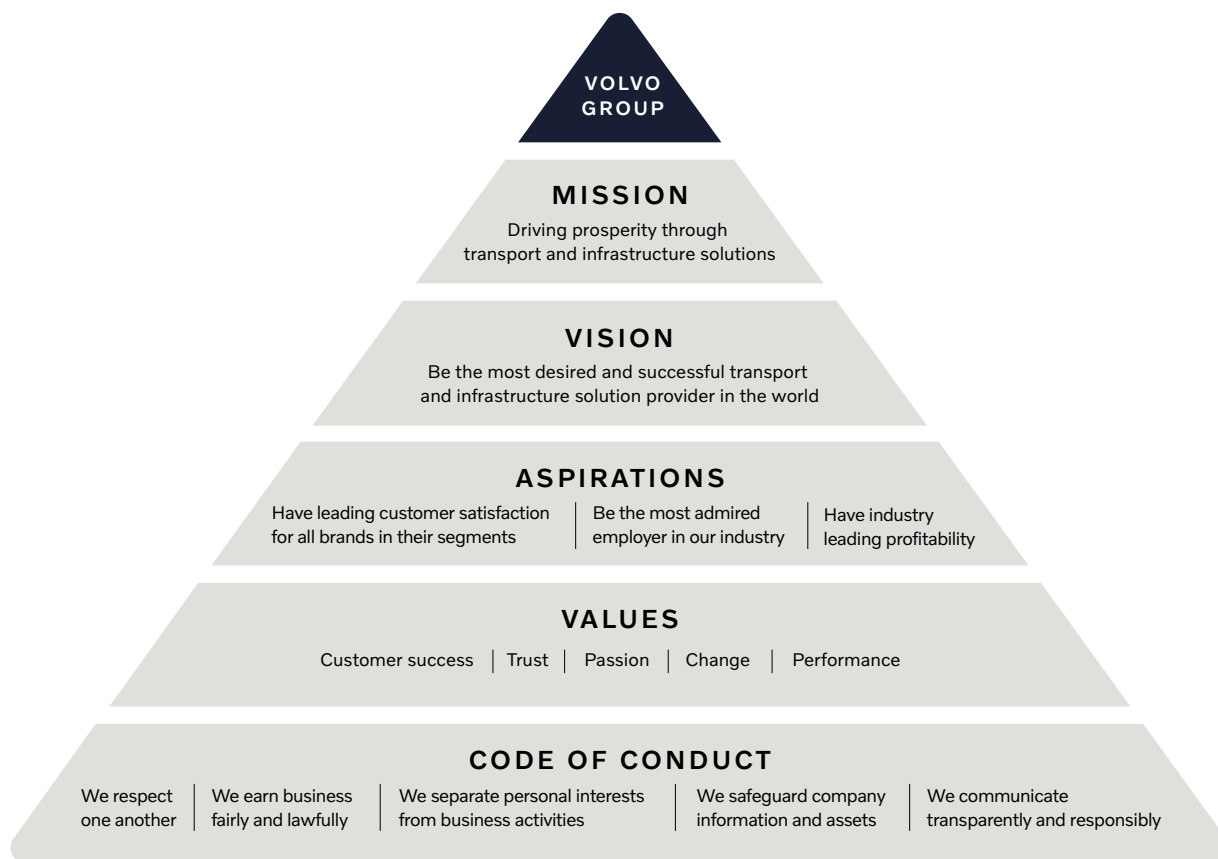
#### Polarized customer structure



#### Tailor made end-to-end solutions



#### Eco-systems delivering customer value



## The Volvo Group journey continues

The Volvo Group's strategy is a continuation of a journey the Group has been on for the last two decades. During 1999 to 2011 the Volvo Group's strategy was primarily targeted at growth, not least through acquisitions, while at the same time focusing the business on commercial vehicles.

In 2012 to 2015 the Volvo Group underwent a transformation program aimed at reorganizing the company to take out overlaps, reduce structural costs and increase efficiency and profitability after the period of acquisition-driven growth. During this period, there was one major acquisition – 45% of Dongfeng Commercial Vehicles (DFCV) in China in 2015.

The period between 2016 and 2018 was characterized by reinforcement of the performance culture evidenced by a

more decentralized organization and a regionalized value-chain approach. The improved performance, with increased profitability and further customer focus developed into the current focus – Perform and Transform.

Perform and Transform are not sequential events, they need to be run in parallel. To stay relevant and profitable, driving both current business performance and the transformation to meet future demands are our key focus areas going forward.

The continuous streamlining of the Group's business portfolio has also included the divestment of Volvo Cars (1999), Volvo Aero (2012), Volvo Rents (2014), 75.1% of Wireless Car (2019) and UD Trucks (2021).

### 1999–2011

#### ACQUISITION-DRIVEN GROWTH

Scale, synergies and geographical expansion.

#### MAJOR ACQUISITIONS

**2001**

Renault Trucks and Mack Trucks

**2007**

Nissan Diesel (UD Trucks)

**2007**

70% of Lingong (SDLG)

**2007**

Ingersoll Rand Road Development

**2008**

VECV (joint venture with Eicher)

## Strategic priorities

# Setting the direction

In addition to the mission, vision, aspirations, values and Code of Conduct we have decided on seven strategic priorities for the Volvo Group.

The strategic priorities provide us with the direction and result in action but should not be seen as a detailed action plan in itself. By understanding our customer's priorities and challenges, we are able to provide products, services and solutions that grow our customers' revenues, decrease their costs and at the same time benefits society. This is the basis for our strategic direction. The order in which the priorities are presented does not reflect relative importance.

**1 Transform the Volvo Group** to become a leading end-to-end integrator as well as offering easy to integrate products and services through strong brands. An overview of our strong position on a global market is found on page 5. Read more about our business model and how we create value for customers starting on page 18.

**2 Grow the service business** and target selected industry verticals offering a portfolio of tailor-made solutions. Sales of services grew by 9% in 2021 and accounted for 21% of Group revenues. Read more about how we support our customers with different solutions to increase their uptime and profitability and taking into account what type of transport applications they are performing on page 19.

**3 Secure a desirable sustainable product and service portfolio** with the right quality, leveraging new and well-known technologies, CAST, partnerships and digital innovation – accelerating electromobility solutions. Read about our partnerships and our modular CAST system on page 24. More information about the rollout of electric trucks and machines and our journey towards carbon-neutral transport and infrastructure solutions begins on page 27.

**4 Grow in Asia and the US:** In Asia through JVs, alliances and by strengthening the Volvo Group footprint in China. In the US by significantly improving the Group's market position. We have formed a strategic alliance with Isuzu Motors (page 24) and agreed to acquire a heavy-duty truck manufacturing operation in China (page 58).

In the US we are rolling out electric trucks and more customers are getting onboard (page 30). Information about the development in North America can also be found on page 56.

**5 Develop robust profitability** throughout the decentralized regional value chains by leveraging global scale, digitalization, a purpose-fit footprint and continuous improvement using Volvo Production System. Read more about how we are driving synergies through having the same truck platform and manufacturing the trucks in the same plant regardless of driveline on page 35.

**6 Selectively capture, accelerate and scale-up new businesses** and develop competencies and capabilities needed. We have created cellcentric, a fuel cell joint venture, with Daimler Truck (page 34), the new business area Volvo Energy to support the Group's electrification journey (page 34) and intend to install and operate a high-performance public charging network for battery electric, heavy-duty long-haul trucks and coaches across Europe in a joint venture with Daimler Truck and Traton Group (page 35).

**7 Reinforce value-based leadership and ways of working** where all colleagues are empowered to take action and are accountable for the results. Read more about how we create an inclusive, safe and engaging workplace on page 42 and further about employee development on page 164.

2012–2015

**CLOSING THE GAP**

Product renewal, restructuring and cost efficiency.



2016–2018

**IMPROVED PERFORMANCE**

Customer focus, simplicity, speed, continuous improvement and organic growth.



2019–

**PERFORM AND TRANSFORM**

Customer-centricity, continuous performance improvement, accelerate solutions and partnerships for sustainability.



## Perform

# Our everyday work secures our future

The everyday performance is the foundation for our business, here and now as well as in the future.

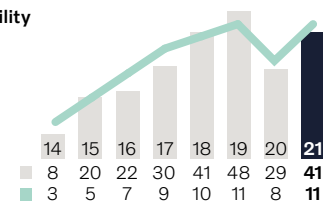
We need to be agile and flexible in terms of production volumes, when using our common architecture and shared technology (CAST) wherever possible, and by having continuous introductions instead of major launch projects. Our quality work is crucial to achieve customer satisfaction and the work of regionalizing our value chain is necessary to give our people the right prerequisites to serve our customers and to mitigate potential supply chain disturbances.

The performance of the Volvo Group has improved substantially during the last couple of years. Our focus has been on a gradual and consistent earnings improvement, reduced volatility in earnings and cash flow as well as allocating capital in a disciplined way. We have great assets in our people, products and services as well as production sites and well-established dealer networks. We are in a good position to support our customers. To keep this position and to be able to invest further in new technologies, our focus is on excelling on the basics as well as building resilience.

Building resilience is key to our long-term profitability. There are approximately 2.8 million trucks, buses and machines, produced by the Volvo Group, operating on or off-road. Of those, 1.2 million are connected. With this as a base we can extend our service offer and defend or capture market share. Increasing uptime benefits our customers, and a larger service business also improves our resilience throughout the business cycle.

## Perform – Improved profitability

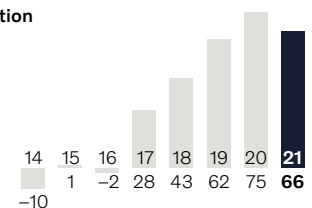
Adjusted operating income SEK bn  
Adjusted operating margin %



Profitability has improved in recent years. In 2021, the adjusted operating margin amounted to 11.0% (8.4), despite a negative impact from shortages in the supply chain causing stoppages in production. In 2017–2021 the average adjusted operating margin was 9.9%.

## Perform – Strong financial position

Net financial position excl. post-employment benefits and lease liabilities Industrial Operations SEK bn



The Group's financial position is also strong with a net cash position in the Industrial Operations of SEK 66.2 billion excluding post-employment benefits and lease liabilities at year-end 2021.

## Improve current performance and invest for the future

Gradual and consistent earnings improvement

Reduced volatility in earnings and cash flow

Discipline in capital allocation/ investments

Continuous investments in new business models by innovation and new technologies

## Transform

# Leading the way to sustainable transport

We are driving the transformation of our industry to shape the world we want to live in. We have made great progress in improving performance in recent years. Going forward, the speed of transformation will increase.

Our ambitions are clear:

- More than 50% of Group revenues should come from services and solutions by 2030
- More than 35% of our vehicle sales should be electric by 2030
- We will lead by example with a world-class, sustainable in-house logistics system by 2025
- We will implement at least 100 transport and infrastructure solutions together with our customers by 2025.

## Transform to provide value

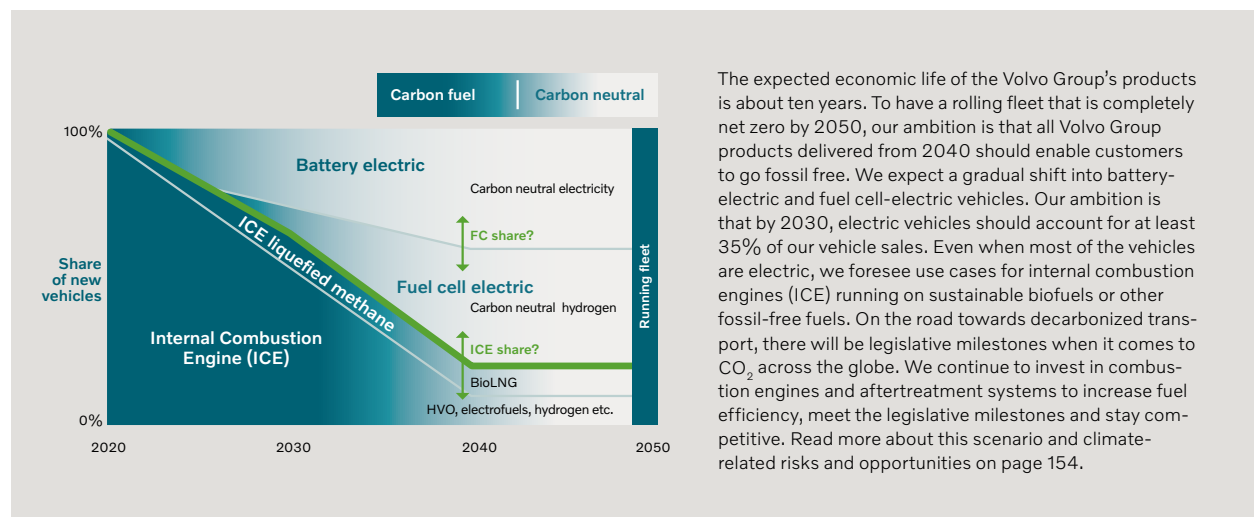
The need for transportation is increasing and the drivers of transformation within our industry are clear. We transform our business to provide even greater value to our customers and respond to the need for sustainable transport solutions that are safe, fossil free and more productive. Today's trucks are not used to their full

capacity due to congestion, insufficient route planning and low fill rates. A fully loaded truck operating on diesel is one of the most energy-efficient ways of transporting goods on our roads with current infrastructure. It is clear, however, that electromobility and alternative fuels are here to stay and are solutions for the future. These offers will be further developed to meet upcoming stringent CO<sub>2</sub> regulations and to provide our customers with even more sustainable alternatives.

When it comes to safety aspects, it is a fact that people die in traffic and human error is by far the main reason. It is also a fact that people and goods spend a lot of time in congestion. Our daily life pattern and non-optimized infrastructure and logistics models result both in temporary congestions and at other times heavily unutilized road networks. The last couple of years we have continuously invested in new business models and new technologies to be able to offer safer, more sustainable and more productive solutions to our customers. Another advantage is that our industrial footprint is easily adapted to manufacture vehicles with different drivelines on existing assembly lines.

The Volvo Group has a good position in the electric vehicle market and the focus is on accelerating the commercialization of new technologies and business models to get traction and impact. This is when the real change happens.

## Transforming towards carbon-neutrality



## Financial targets

# Fulfilling our ambitions

The current financial targets were decided on by the Board of Directors in 2017.

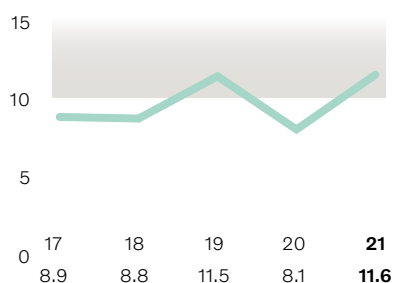
The Volvo Group has in recent years gone through a substantial restructuring process in order to reduce structural costs and increase efficiency and is currently in a phase where focus is on organic growth and improved profitability through continuous improvement and innovation.

A clear and straightforward operating margin target supports the efforts to drive performance across the Group through the business

cycle. The target also aligns with the way the Group and its business areas are challenged and measured internally.

A debt-free industrial balance sheet, excluding pension and lease liabilities, enables the Volvo Group to better manage cyclical-ity in a capital-intensive industry and to secure competitive cost of funds for the Financial Services' operation.

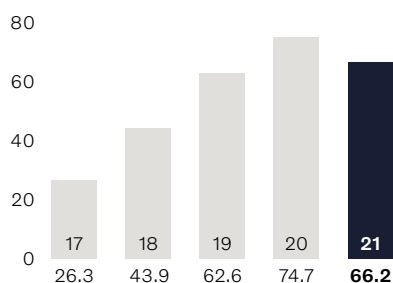
Operating margin for the Volvo Group, %



**Target:** The Volvo Group's operating margin shall exceed 10% measured over a business cycle.

**Outcome:** In 2021, the operating margin amounted to 11,6% (8.1). In 2017-2021 the average operating margin was 9.8%. In 2021, the adjusted operating margin amounted to 11.0% (8.4). In 2017-2021 the average adjusted operating margin was 9.9%. For more information on adjusted operating margin, please see Key Ratios on page 204.

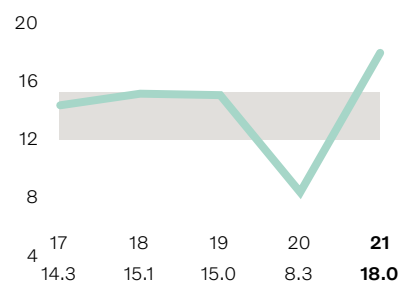
Net financial position excl. post-employment benefits and lease liabilities Industrial Operations, SEK bn



**Target:** The Industrial Operations shall under normal conditions have no net financial indebtedness excluding provisions for post-employment benefits and lease liabilities.

**Outcome:** At the end of 2021, the Industrial Operations had a net financial asset position of SEK 66.2 billion.

Return on equity in Financial Services, %



**Target:** Financial Services' target is a return on equity of 12–15% at an equity ratio above 8%.

**Outcome:** In 2021, return on equity amounted to 18.0% at an equity ratio of 8.0%.



# Climate and resources

## Main connections to UN Sustainable Development Goals



Double the rate of energy efficiency (7.3)



Sustainable transport systems (11.3)



Awareness and capacity on climate change mitigation and impact reduction (13.3)



# Towards net-zero

Climate change is the challenge of our generation, and it is the Volvo Group's long-term ambition to lead our industry towards net-zero emissions. Climate change, population growth and increasing urbanization are changing the landscape and expectations on transport and infrastructure.

The Volvo Group has committed to the Science-Based Targets initiative (SBTi) call for action campaign Business Ambition for 1.5°C. The campaign requires greenhouse gas emissions to be net zero across the value chain by 2050 at the very latest, but we have committed to reach this already by 2040. The pace of change is particularly important, and we have set ambitious milestone targets along the way.

The transport and infrastructure industries have started their journey towards net-zero emissions, with buses having been in front of the development. For trucks and construction equipment the transition is in an early stage, but it is expected to accelerate with battery-electric vehicles, lower emission fuels used in combustion engines and, later in this decade, fuel cell-electric vehicles. The Volvo Group is at the forefront of this development and is eager to drive change but also aware of the challenges. In 2021, the

Group delivered 942 fully-electric vehicles, mainly in Europe and North America. Order intake for fully-electric vehicles was 1,683 units. In Europe Volvo Trucks had a 42.2% market share in fully-electric heavy-duty trucks and Renault Trucks 19.4% in 2021.

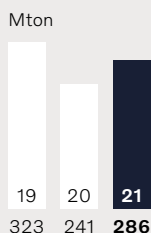
Government incentives, investments in charging infrastructure and other measures are needed to continue the acceleration. The International Energy Agency's scenario for net-zero 2050 estimates a gradual adoption of fully-electric commercial vehicles and that by 2035, 50% of the new trucks sold globally needs to have zero tailpipe emissions. This development also relies on rapidly increased supply of renewable energy. The Volvo Group's approach is to use our modular product development, production and assembly system (CAST) to quickly adapt to customer needs and demands. This enables flexible production and thereby limits investment needs.

## Progress total greenhouse gas emissions

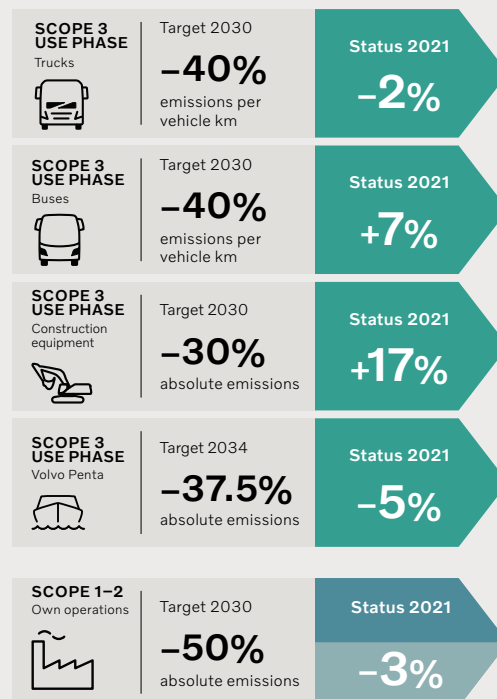
The transition towards lower emissions is at an early stage but is expected to accelerate as sales of electric vehicles and fuel efficiency increase. The Volvo Group measures a range of metrics related to greenhouse gas. One metric is total emissions from scope 1, 2 and scope 3 – category 11 use of sold products, where the use of sold products represent approximately 96% of the total emission footprint according to the GHG inventory analysis. In 2021, the total calculated emissions amounted to 286 million tons compared with 323 million tons in 2019.

The Volvo Group has introduced a range of solutions with improved energy and fuel efficiency, but so far, the main reason for the reduction of emissions is related to lower sales volumes of trucks compared with the baseline in 2019. As use phase emissions make up the vast majority of the emission footprint, annual sales volumes will have a significant impact on results from one year to the next. The Volvo Group is operating in cyclical industries, which are linked to economic activity, and consequently sales volumes and utilization of the rolling fleet of products vary over time.

See further details on the result on page 160. Also read more about the method, additional metrics, targets and results in the Sustainability Notes on page 152–162.



## SBTi approved targets, from baseline 2019



## ROLLOUT OF ELECTRIC TRUCKS

Electromobility plays a key role on the road to fossil-free transports. Our electric trucks, based on Volvo Group technology, are already rolling on the streets in real operations. The electrified transport solutions are helping transport operators to significantly reduce emissions and noise. We are determined to continue leading our industry towards a sustainable future.

We believe that the transformation to electric vehicles will happen segment by segment, market by market and region by region. It has already started in public transport, distribution, waste and recycling and certain construction segments in some markets. And in 2021, Volvo Trucks started selling three new heavy-duty all-electric models, believing that the time is right for a rapid upswing in electrification of heavy road transport. Production is planned to begin in the second half of 2022, see next page.

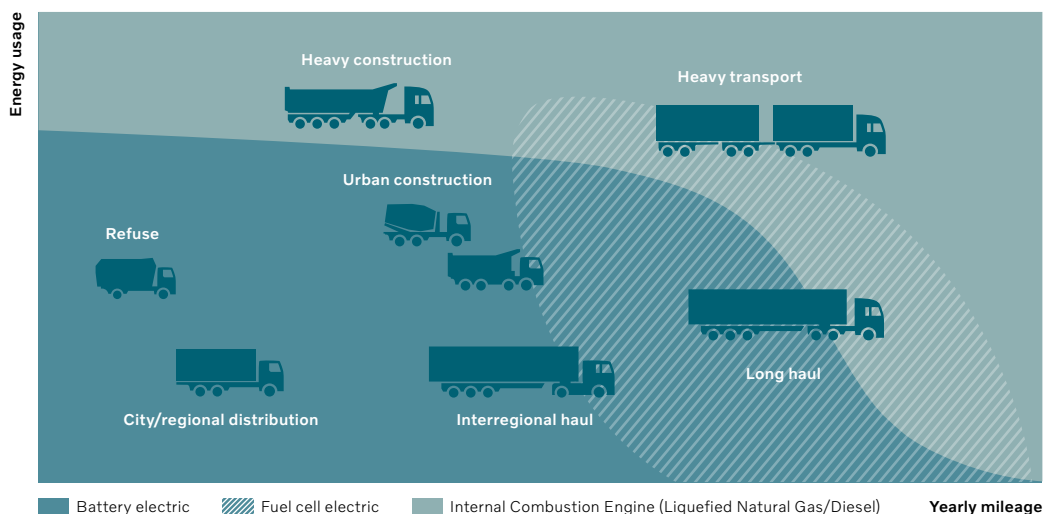
When total cost of ownership is outweighed by the opportunity to provide fossil-free transportation and necessary conditions such as charging infrastructure is in place, we believe that the shift to electric vehicles will be quick. The Volvo Group has deep customer knowledge and application expertise within many segments and this will remain a decisive factor in providing customer value also when it comes to electric vehicles.

Check out our videos on Youtube.



Because of different characteristics and requirements, such as load, energy usage and yearly mileage, there will be a mix of low carbon or zero emission vehicles products in 2030 – battery electric, fuel cell electric and internal combustion engines that can run on liquefied natural gas (LNG), biogas or other sustainable biofuels.

## A MIX OF PRODUCTS WILL BE REQUIRED



## VOLVO TRUCKS READY TO ELECTRIFY LARGE PART OF TRANSPORTS

With the sales start in 2021 of three new heavy-duty all-electric models, Volvo Trucks believes the time is right for a rapid upswing in electrification of heavy road transport. This positive outlook is based on the ability of Volvo's electric trucks to meet a broad variety of transport needs. In the EU for example, almost half of all truck transports could be electrified in the near future.

With the sales start of the new electric Volvo FH and Volvo FM models, electrified transport is now possible not only for urban areas but also for regional traffic between cities. In addition, the new electric Volvo FMX model is creating new ways to make construction transport operations both quieter and cleaner. Production of the new electric models for Europe is planned to start in the second half of 2022. They join the Volvo FL Electric and Volvo FE Electric for city distribution and refuse handling that have been in serial production since 2019 for the same market.

In North America, sales of the Volvo VNR Electric started in December 2020.

With the sales start of the new truck models, Volvo Trucks now has a lineup of six medium and heavy duty electric trucks, which makes it the most complete commercial electric truck range in the industry.

### Can cover nearly half of EU transport needs

With the addition of the new products with higher load capacities, more powerful drivelines and range of up to 300 km, Volvo Trucks' electric portfolio could cover around 45% of all goods transported in Europe today (According to Eurostat statistics "Road Freight Transport by distance" 2018, 45% of all goods transported on road in Europe travelled less than 300 km). This makes it possible to make an important contribution to lower the climate impact from road freight, which according to official statistics account for about 6% of total CO<sub>2</sub> emissions in the EU.



## RENAULT TRUCKS ENHANCES ITS RANGE OF ELECTRIC TRUCKS

Renault Trucks is developing its range of electric trucks to adapt to the wide variety of urban distribution activities and meet the needs of its customers. A 19-ton D Wide Z.E. has been added to the 16- and 26-ton Renault Trucks D Z.E. and D Wide Z.E. models, which have been in production since 2020. Renault Trucks is also offering a wider range of wheelbases and special connectivity for refrigerated bodies.

Equipped with a two-axle chassis for improved maneuverability, the 19-ton Renault Trucks D Wide Z.E. is a great vehicle for temperature-controlled distribution, with an optimized payload. In addition, Renault Trucks has designed a new system to increase the energy efficiency of all-electric trucks equipped with a refrigerated body. Renault Trucks D and D Wide Z.E. 16, 19 and 26 ton trucks are now available with a fridge-connection option, which supplies the energy required for the refrigeration system directly from the vehicle's 600 V traction batteries.





Volvo VNR Electric



Mack LR Electric refuse



Volvo FM Electric

Renault  
Trucks D Z.E

## CUSTOMERS GETTING ONBOARD

The shift towards electrification is taking place across the transportation industry. More and more companies are taking their first steps on this journey together with the Volvo Group. Here are some examples:

During 2021, Volvo Trucks received an order for 100 Volvo FM Electric trucks from DFDS, Northern Europe's largest shipping and logistics company. The deal was the largest commercial order to date for Volvo electric trucks, and one of the largest ever for heavy electric trucks worldwide. In January 2022, DFDS ordered another 25 trucks.

Urby, a subsidiary of La Poste Group and Banque des Territoires specializing in first and last mile logistics, is investing in a zero-emission fleet. It has ordered 20 electric Renault Trucks D Z.E. vehicles, dedicated to urban distribution, which will be deployed in 15 French cities from 2022.

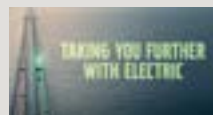
In North America, Volvo Trucks' customer Performance Team, A Maersk Company, placed an order for 16 Volvo VNR Electric models – the largest commercial order of the North American zero-tailpipe emission model to date.

Manhattan Beer Distributors, a major New York City-based beer and beverage distributor, placed an order for

five Volvo VNR Electric trucks — the first zero tailpipe emission, battery-electric trucks to be deployed in Manhattan Beer Distributors' fleet of more than 400 delivery trucks.

In June, Mack Trucks announced that the New York City Department of Sanitation (DSNY) planned to purchase seven Mack LR Electric refuse models, which will operate in each of the city's boroughs.

### Check out our videos on Youtube.



Next generation of Volvo VNR Electric



Inside the new revolutionary heavy-duty electric driveline



## TRANSFORMATIONAL INVESTMENTS

During the year, Volvo Group acquired 60% of Designwerk Technologies AG, an engineering company in Switzerland, that develops and sells electromobility products and engineering services within electromobility eco-systems. Designwerk Technologies offer customized electric trucks under the brand Futuricum, mobile rapid chargers and high voltage battery systems.

Volvo Group Venture Capital made minority investments in FourKites, Driivz and Fortellix. The role of Volvo Group Venture Capital is to make investments that drive transformation by facilitating the creation of new services and solutions and to support collaborations between start-ups and the Volvo Group.

FourKites is one of the leading global real-time transportation visibility platforms having pioneered real-time supply chain visibility in 2014. Since then, they have built the world's largest platform that aim to help leading brands to reduce their operating costs, improve on-time performance and create better customer relationships. The company tracks over one million shipments daily across 176 countries, with over 120% year-over-year growth.

Driivz Ltd. is a leading global electric vehicle charging software company that has developed a platform for managing large charging networks from end-to-end. The Driivz



platform functions as an operating system for electric vehicle charging networks and is used by operators of charging points, electric vehicle fleets and other key players in the ecosystem. The platform is scalable and modular, which makes it highly flexible and allows it to be customized to customers' needs. The company has a large and growing number of customers in the utility, oil and gas, and automotive industries and among charging network operators.

Fortellix is a leading company in the field of measurable safety for driver assistance and autonomous vehicles. In addition to the Volvo Group Venture Capital investment, Volvo Autonomous Solutions formed a closer partnership with Fortellix earlier in the year with the aim of jointly creating a coverage-driven verification solution for autonomous driving that operates both on public roads and in restricted areas.

## VOLVO CE POWERS A SUSTAINABLE FUTURE WITH GROWING RANGE OF ELECTRIC MACHINES

With three new electric compact machines – one wheel loader and two excavators – Volvo Construction Equipment (Volvo CE) is showcasing its commitment to build the world we want to live in by offering a growing range of electric machines. In total customers now have five electric models to choose from.

The three new models were available to reserve online in twelve European markets from October 2021 for delivery in 2022. The offer will also expand to other markets. Demonstrating once again that sustainable solutions are

not just a promise for tomorrow, but a real innovation for today, Volvo CE's growing range of electric machines are providing customers with a cleaner, more silent and more comfortable work environment – but now with an even wider range of choice to best suit their needs.

These latest innovations are the next step forward in Volvo CE's ambition to reach net zero value chain greenhouse gas emissions by 2040 – alongside development of hydrogen fuel cell solutions and more sustainable internal combustion engine products.





## VOLVO BUSES LAUNCHED NEW GLOBAL ELECTROMOBILITY OFFER

Volvo Buses expanded its electromobility offer worldwide. With the launch of a new Volvo BZL Electric chassis, Volvo Buses provides a solid platform for sustainable and efficient public transport in cities around the world, along with reliable and profitable operations for customers.

Global demand for electromobility solutions in the public transport sector is rising and Volvo Buses expects a rapid increase in the coming years. With the new Volvo BZL Electric, Volvo Buses offers a global platform for clean, silent, and energy-efficient public transport to meet the rising demand on important markets that are ready for the shift to electromobility.

Volvo Buses has years of experience of electromobility solutions from working closely together with operators all over the world. The new Volvo BZL Electric is designed for both single and double decker applications with multiple options for bodybuilders.

## VOLVO FOUNDING MEMBER OF FIRST MOVERS COALITION TO DRIVE DEMAND FOR LOW CARBON TECH

Roughly half of the emission reductions needed to reach the 2050 climate goals rely on technologies in early development, demonstration or prototype phases. Accelerating innovation in this decade is critical to bring these technologies to market and make them cost-competitive.

To jumpstart this effort, the World Economic Forum, in partnership with US Special Presidential Envoy for Climate John Kerry, announced the First Movers Coalition at the UN Climate Change Conference (COP26) in Glasgow,

Scotland. The Coalition is a new platform for companies to make purchasing commitments that create market demand for low carbon technologies. Volvo Group joined the Coalition as founding member.

The commitments aim to be collectively significant enough to commercialize emerging decarbonization technologies. These commitments target new technologies and aim to create a market by 2030 that can be ramped up to achieve decarbonization in 2050.



## FUEL SAVINGS WITH NEW GENERATION OF RENAULT TRUCKS ENGINES

Electric trucks is key in reducing the CO<sub>2</sub> footprint from our products, but it is also about improving current engines. Following major updates with improved fuel efficiency on Volvo Trucks the last two years, Renault Trucks in 2021 made major changes to its T, T High, C and K ranges in terms of design, driving comfort and on-board comfort. They continued this evolution with the arrival of new 11- and 13-liter Euro VI Step E engines which, combined with the integration of new technologies and dedicated services, provide fuel savings of up to 10% compared to the previous generation of Renault Trucks engines.

# 10%



## WORLD'S FIRST VEHICLE USING FOSSIL-FREE STEEL

In 2021, Volvo Group proudly revealed the world's first vehicle made of fossil-free steel. The vehicle was made in Volvo Construction Equipment's facility in Braås, Sweden using fossil-free steel from SSAB. More vehicles will follow in 2022 in what will be a series of concept vehicles and components using fossil-free steel.

The machine, a load carrier for use in mining and quarrying, was unveiled at a Green steel collaboration event in October. Volvo CE's ambition is to have fossil-free steel used across all its products, with a step-by-step approach.

A move toward green steel is an important step for Volvo Group, as well as for the transport and infrastructure industries as a whole, particularly considering that around 70% of a truck's weight comes from steel and cast iron, with the figure for Volvo CE's machines even higher. This first concept machine is just the start, with smaller-scale series production planned by 2022 and mass production set to follow.

Further to creating the world's first, fossil-free vehicle with SSAB, the Green steel collaboration is also about making use of surplus fossil-free hydrogen from steel-maker Ovako to power the Volvo Group's fuel-cell vehicles.

Volvo Group launches world's first vehicle using fossil-free steel



Check out our videos on Youtube.



Volvo Group launches world's first vehicle using fossil-free steel



## LAUNCH OF FUEL CELL JOINT VENTURE CELLCENTRIC

Volvo Group and Daimler Truck AG have officially outlined the roadmap for the new fuel-cell joint venture cellcentric, as part of an industry-first commitment to accelerate the use of hydrogen-based fuel cells for long-haul trucks and beyond. With the ambition of becoming a leading global manufacturer of fuel-cell systems, cellcentric will build one of Europe's largest planned series production of fuel-cell systems, with operation planned to commence in 2025. The joint venture can draw on decades of expertise and development work from both Volvo Group and Daimler Truck AG.



### About cellcentric

On March 1, 2021, Volvo Group and Daimler Truck AG formed cellcentric. To that end, Volvo Group acquired 50% of the partnership interests in the existing Daimler Truck Fuel Cell GmbH & Co. KG for approximately EUR 0.6 billion on a cash and debt-free basis. More than 300 highly specialized experts work for cellcentric in inter-disciplinary teams at locations in Nabern and Stuttgart, Germany and Burnaby, Canada. Around 700 individual patents have been issued so far, underlining the leading role played by the company when it comes to technological development.



The Volvo Group believes

that purely battery-electric and hydrogen-based fuel-cell trucks will complement each other depending on the individual customer use case. Battery power will be used for lower cargo weights and for shorter distances, while fuel-cell

power will tend to be the preferred option for heavier loads and longer distances. The major truck manufacturers in Europe, also backed by Volvo Group and Daimler Truck AG, are therefore calling for the setup of around 300 high-performance hydrogen refueling stations suitable for heavy-duty vehicles by 2025 and of around 1,000 hydrogen refueling stations no later than 2030 in Europe. This joint initiative, using hydrogen as a carrier of green electricity to power electric trucks in long-haul operations, is one important part of decarbonizing road transport.

Volvo Group's goal is to start with customer tests of fuel-cell trucks in about three years and to be in series production of fuel-cell trucks during the second half of this decade. All vehicle-related activities are carried out independently from each other, as both companies remain competitors in all vehicle and product ranges, and particularly in fuel-cell integration solutions for all products.



## VOLVO ENERGY – DEDICATED TO ACCELERATING ELECTRIFICATION

In February 2021, the Volvo Group decided to create a new business area, Volvo Energy. The business area will support the electrification journey of the Group by securing charging infrastructure and other related electromobility services as well as manage the Volvo Group's business flow of batteries over the lifecycle. On the latter, the environmental impact from electric and hybrid electric commercial vehicles and machines will be reduced by giving used batteries a second life in different applications.

Joachim Rosenberg, member of the Volvo Group Executive Board and previously Chairman of UD Trucks, heads the new business area.

"There is a strong and growing interest for electric vehicles and machines among our customers. This is of course very positive as it accelerates the transition towards more sustainable transport solutions. Our ambition is to offer our customers the most competitive solutions when it comes to electrification, including batteries and charging infrastructure. With Volvo Energy, we are taking a holistic view of the entire life cycle, which benefits both our customers' business and society as a whole", says Martin Lundstedt, President and CEO.



## JOINT VENTURE FOR A EUROPEAN HIGH-PERFORMANCE CHARGING NETWORK

In December 2021, Volvo Group, Daimler Truck and the Traton Group signed a binding agreement to create a joint venture (JV) to install and operate a high-performance public charging network for battery-electric, heavy-duty long-haul trucks and coaches across Europe. The parties are committed to initiating and accelerating the necessary build-up of charging infrastructure for the increasing number of customers of electric vehicles in Europe and contribute to net-zero transportation in Europe by 2050. The JV creation is subject to regulatory approvals.

The planned JV, to be equally owned by the three parties, is scheduled to start operations in 2022. The parties are together committing to invest 500 million euros, which is assumed to be by far the largest charging infrastructure investment in the European heavy-duty truck industry to date. The plan is to install and operate at least 1,700 high-performance green energy charging points on and close to highways as well as at logistics and destination points within five years of the establishment of the JV. The number of charging points is with time intended to be increased significantly by seeking additional partners as



well as public funding. The forthcoming JV is planned to operate under its own corporate identity and be based in Amsterdam, Netherlands. The JV will be able to build on the broad experience and knowledge of its heavy-duty trucking founding partners.

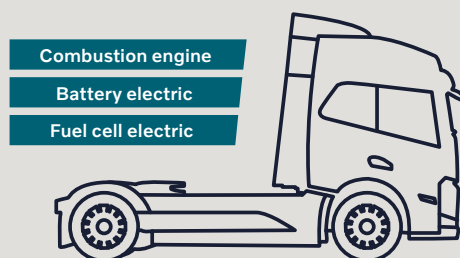
The JV will offer both high-performance charging and overnight charging. The starting point for the high-performance charging is the current CCS standard of 350 kW. As soon as it is feasible, newer standards with higher output will be adopted wherever possible to enable and prioritize the 45-minute charge use case, which is typically expected to be around 750 kW. Overnight charging will be 50–100 kW.

## DRIVING SYNERGIES THROUGH SAME PLATFORM AND SAME PLANT

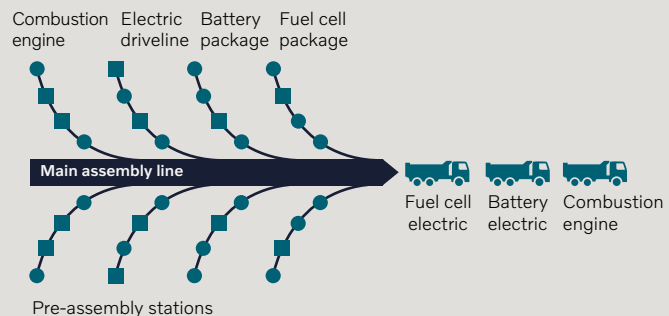
The Volvo Group's modular vehicle architecture creates advantages in both the development and the manufacturing phase. The architecture allows us to put either an internal combustion engine or an electric driveline in the same chassis. In this way, we reduce development time, costs and can

bring new offers to the market faster. In addition, we can manufacture the different variants on the same assembly line, which again reduces costs and enables us to scale up volumes quickly when conditions are right.

### SAME VEHICLE PLATFORM



### SAME PLANT



# Towards circularity and resource efficiency

The world's natural resources are limited and economic activity is rapidly increasing. This means that there are large incentives for rethinking existing production and transportation patterns.

In order to use resources efficiently, waste and pollution need to be designed out to the extent possible and products and materials kept in the use phase for a longer period of time. At the same time, the transport industry as a whole can make significant improvements in productivity. Today, some estimates show that the average truck in the industry is only using 40–50% of total load capacity. Sharing economy

## Main connections to UN Sustainable Development Goals



Double the rate of energy efficiency (7.3)  
Resource efficiency and reduced CO<sub>2</sub> per value added (9.4)  
Efficient use of natural resources (12.2)

business models, artificial intelligence and machine learning can optimize goods flow and lead to a reduction in transport needs and save valuable natural resources.

The Volvo Group wants to lead by example. We are aiming for our own transport system to be world class. What we learn, we will also offer our customers to contribute to significantly increase efficiency in their transport systems. This means taking advantage of a wide range of opportunities that will result in reduced logistics costs, emissions and wasted resources.

As we focus even more on services, our aim is to increase the sales of total transport solutions. While the traditional transactional sales will remain, we offer different business model setups for different customers depending on their needs. More information on different business models is available on page 20.

## RESOURCE-EFFICIENT TECHNOLOGY AND CIRCULAR FUEL OPPORTUNITY

The bio-gas powered Volvo FH and FM with I-See are the most fuel-efficient gas trucks we have ever built. The gas driveline plays an important role to reduce fossil emissions here and now. The technology has been developed for fuel economy as well as the opportunity to reduce emissions on today's long haul transports, where electric trucks are not yet efficient. With natural gas, the saving is up to 20% tank-to-wheel. With liquified bio-gas (bio-LNG), the fossil emissions are close to zero.

Bio-LNG brings several benefits. Lower climate impact is critical and in the EU, bio-LNG has the potential to replace around 20% of today's diesel-based transports. The technology is also a key enabler for circularity in organic waste management. In the process of producing bio-LNG from agricultural or other biodegradable waste and using it for combustion, a significant part of the methane emissions from the waste are avoided and what is left can be used as fertilizer.



## INCREASE EFFICIENCY IN TRANSPORT SYSTEMS

Increasing transport efficiency offers opportunities to add sustainable value beyond fuel consumption and electrification. According to Volvo Group estimates, trucks, buses and construction equipment are on average used 30% of their life cycles, and the average truck on the road carries 40–50% of its total capacity. Theoretically up to 50% of the transport is available for more cargo. With this in mind, and the fact that 5–10% of the world's total fuel is consumed to move goods and materials the climate and cost efficiency potential for transports is significant, which can lead to a rapid transformation of the business.



Assets used ~30% of their life cycles



Up to 50% of total payload theoretically available for more cargo



5–10% of total fuel consumed is used to move goods and materials

## VOLVO AND HOLCIM IN A PROJECT TO USE AUTONOMOUS ELECTRIC HAULERS

Volvo Autonomous Solutions and Holcim Switzerland have entered a collaboration to jointly test and further develop the use of autonomous electric haulers in a limestone quarry. The two companies are dedicated to seeking infrastructure and transport solutions that are safe, efficient, innovative and sustainable.

Holcim's quarry Gabenchopf in Siggenthal has been chosen as the site for this project. The battery-electric haulers currently being tested mark a groundbreaking step in the industry: not only are they quieter and more sustainable than conventional haulers, they are also safer while being a part of a CE-certified electric, autonomous transport solution for the quarry and cement industries.

"This project showcases a sustainable transport solution that is commercially viable and combines the technology shifts of connectivity, automation and electrification," says Nils Jaeger, President of Volvo Autonomous Solutions.



The testing and likely deployment of electric haulers in the quarry is part of Holcim's digitization initiative "Plants of Tomorrow". As part of the initiative, Holcim is testing automation technologies, robotics and artificial intelligence throughout the entire production process in order to develop innovative solutions for a safer, more efficient and more sustainable cement production.

## PROTOTYPE OF LONG-HAUL AUTONOMOUS TRUCK FOR NORTH AMERICA

Volvo Autonomous Solutions and Aurora achieved the next milestone in their partnership to jointly develop on-highway autonomous trucks in the U.S. In September, a prototype of Volvo Trucks' flagship, long-haul VNL model, integrated with the Aurora Driver technology, was revealed, representing an important step towards launching fully autonomous heavy-duty trucks commercially in North America.

While the transformation to autonomous trucking will not happen overnight, Volvo Autonomous Solutions will continue to further increase the speed of development to support customers' changing needs across many segments and markets and ultimately bring the benefits of autonomous transport solutions to the public with safer, more efficient and more sustainable commercial transport of goods across the U.S.



## REMANUFACTURING RENAULT TRUCKS

The business case for circularity is developing rapidly to handle resource scarcity. Volvo Group has a strong position within refurbishment and remanufacturing of both components and vehicles. Renault Trucks has during the year scaled up its facility for remanufactured and refurbished trucks. In 2021, around 500 used trucks were converted in Renault Trucks' used truck centers.

The centers focus on a range of business solutions to increase circularity by extending operating life. Vehicles used up to four years are regenerated and upgraded with hardware and software and returned to their owners for full capacity and operating beyond the one-million-kilometer mark.

Trucks used for a specific application or route are taken back and transformed for a new purpose. For example a long-haulage tractor is turned into a rigid, or a retrofitting of a traditional driveline to a biofuel driveline.

Parts and components are remanufactured to the same or higher quality as a new. Renault Trucks mainly remanufactures engines, gearboxes, injectors and particle filters.

Read more on [renault-trucks.com](https://renault-trucks.com)



# Climate and environment

## GOVERNANCE, STRATEGY, OPPORTUNITIES AND RISKS

### Connection to Agenda 2030 and reporting standards



#### Main connections to the UN SDGs and targets

- 7.3** Double energy efficiency
- 11.2** Sustainable transport systems
- 12.2** Sustainable management of natural resources
- 13.3** Knowledge and capacity building to meet climate change



#### Referenced reporting standards

GRI 201 – Economic performance  
TCFD recommendations

The Volvo Group supports the TCFD. The below is the second time the Volvo Group is reporting having regard to TCFD and this report sets forth the Group's disclosures on its overall governance, strategy and management of climate related risks and opportunities, including relevant climate related metrics and targets. The Volvo Group recognizes that there continues to be more work to be done in developing the disclosures to align with each of the 11 recommendations of the TCFD and to take account of new guidance on metrics, targets and transition plans published in October 2021. A number of climate-related projects and activities planned for 2022 will assist to further develop these disclosures.

### Governance

The AB Volvo Board of Directors and the Executive Board are ultimately responsible for the oversight of the Volvo Group's climate-related risks and opportunities and are responsible for setting the strategic direction of the Group, as further detailed on page 180–195 in the Corporate Governance Report.

A number of cross-functional working groups consolidates and prepares information for consideration in strategic decision-making at the Board of Director and Executive Board level. Two such groups with representation from executive management have met regularly during year, focusing on the Group's climate goals and on sustainability disclosures, respectively. This work has included, among other things, reviewing the Group's climate targets on a regular basis and reporting to the Board of Directors and Executive Board on progress against these targets.

### Strategy

The Volvo Group supports the ambitions of the Paris Agreement – to keep the increase of the global average temperature to well below 2 °C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5 °C. The Volvo Group welcomes the conclusion of the Glasgow Climate Pact at COP26 in November 2021 which saw the parties reaffirm this commitment. While the Group recognizes the challenges this repre-

sents, in light of recent estimates that an increase between 1.8 °C and 2.4 °C is more likely, the Group has committed to the SBTi Business Ambition for 1.5 °C and set ambitious science-based targets in relation to its Scope 3 emissions in pursuit of its own net-zero targets.

To achieve ambitions of the Paris Agreement, emissions need to decline rapidly across all of society's main sectors, including buildings, industry, transport and energy, and in the transport sector, there is an increasing need for products with lower emissions of GHGs and for solutions using technologies that increase resource efficiency. The ongoing transition of the transport sector towards new technologies and new service-based business models bring significant business opportunities as well as transitional risks for the Volvo Group. It has been important for the Group therefore to integrate climate-related risks and opportunities into the overall Volvo Group strategy and business and operating model.

#### Climate-related risks

As part of this integration, through the Group's Enterprise Risk Management process (see page 70) the Volvo Group has identified a number of climate-related risks, as set out below. These can be divided into two categories, transitional climate risks and physical climate risks. Transitional climate risks include for instance technology-related risks, policy- and legal-related risks, market risks and reputational risks. Physical climate risks include both acute physical risks, such as extreme weather events, and chronic physical risks, for instance those arising due to changing weather patterns, rising mean temperature and rising sea levels.

#### Transitional climate risks

The Volvo Group has identified a number of climate-related transitional risks, which are incorporated into the Volvo Group Enterprise Risk Management process. Transitional risks may be material for the Volvo Group in the short, medium and long term. These risks, including their potential impact, are described in more detail on page 70–75 under the following risk categories:

- Regulations, page 71
- Transformation risk, page 71
- New business models, page 72
- Reliance on suppliers and scarce materials, page 72
- Climate risk, page 73.

#### Physical risks

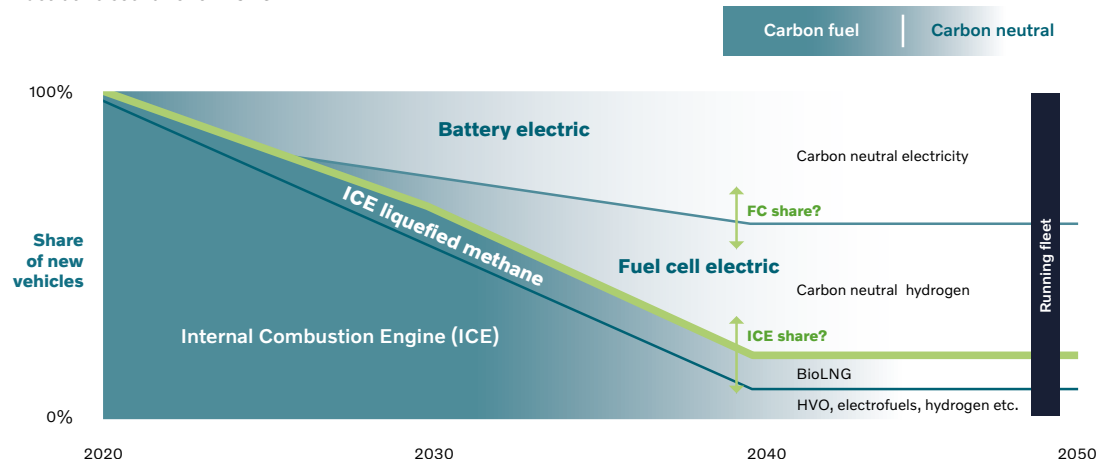
Based on the main scenario outlined in the Volvo Group's strategy – a 1.5 °C scenario – the physical risks are not identified as material in the short- to medium-term perspective. Climate-related acute physical risks, such as extreme weather events, as well as chronic physical risks are likely to increase in the long-term if the global warming significantly exceeds a 1.5 °C scenario. Physical risks will be closely monitored, reviewed and reported on if they emerge as material from a Group perspective.

#### Climate-related opportunities for the Volvo Group

The transition of the transport sector offers significant challenges for the Volvo Group, but alongside that it also offers a number of business opportunities. The Volvo Group strives to lead the development of new technologies and is continuing to develop an extensive portfolio of products and services using new technologies. The ambition is to continue to provide high quality products and services to our customers, while at the same time enabling our customers to reduce their environmental impact.



## Illustrative scenario for 1.5 °C



The illustration describes a pathway to reach the ambitions of the Paris Agreement and to achieve net-zero greenhouse gas emissions. Since it takes approximately ten years to renew a running fleet, the aim is to by 2040 offer products propelled by low GHG energy sources. The exact future product mix cannot be foreseen but, in this scenario, the running fleets in the transportation sector are likely to include different technolo-

gies that can be powered by renewable energy. These solutions can be battery-electric, fuel cell-electric or vehicles propelled with low GHG intensity energy sources for combustion engine drivelines. In order to reach the ambitions of the Paris Agreement, this shift needs to happen on a global scale.

The Volvo Group is broadening its offer of products that can be powered by renewable energy through the introduction of electric vehicles as described on page 28–32. The Group also invests in fuel cell technology with the ambition to have a heavy-duty hydrogen offer available during the second half of this decade. In parallel, the Volvo Group continues to offer products that can be powered by renewable liquid and gaseous fuels like HVO (hydrogenated vegetable oil) and biogas, see page 36. In addition to new technology products, the Volvo Group has developed a range of service solutions that help to reduce the number of transports needed by optimizing fill rates, consolidating transports and choosing the most effective routing.

Customer demand for products and solutions with lower environmental impact is increasing, although the transition pace differs between business areas and regions. When using electricity as main power source in transport operations, the operational cost are reduced. At the same time, the capital cost increases. The transition to electrification also depends on external factors such as the existence of a functioning charging infrastructure and access to renewable energy sources to power battery electric and fuel cell electric products. Customer demand in different markets is dependent on factors such as availability of the necessary infrastructure and energy, governmental incentives for green technologies and the removal of fossil-fuel subsidies. The Volvo Group strives to have products and solutions available in pace with customer demand using a highly flexible production system.

The Volvo Group has issued a Green Financial Framework to enable access to additional capital for the development and production of sustainable technologies for the transport sector.

#### Scenario analysis

In order to help understand the risk posed by climate change and their potential impacts on the Volvo Group, the Group has begun work on its climate change scenario analysis. This includes exploring climate scenarios from the IEA and IPCC, as well as secondary sources interpreting those

scenarios specifically in relation to the transport sector. At this stage, this exercise is still in early stages, with further work planned for 2022. At present, the main scenarios are the “well below 2 °C scenario”, and “1.5 °C scenario”, as set out below.

#### Climate scenarios

As part of setting the target levels in SBTi for the Volvo Group Business Areas, analyzes have been performed in order to understand the level of emission reductions needed in order to adopt to the emission reduction pathways aligned with the ambitions in the Paris agreement on well below 2 °C and 1.5 °C ambitions. This has covered usage of the target models developed by the SBTi including climate scenarios from the IEA and IPCC. The analyzes provide inputs on important factors such as modelling customer demand, regulatory requirements, infrastructure roll-out, access to renewable energy and governmental incentives for clean technologies which in turn are essential inputs to the respective Business Areas’ plans.

Potential pathways to a 1.5 °C or a well below 2 °C scenario include a successful decarbonization of the transport sector as well as the energy sector. The transition to electrification depends not only on the product and service offering, but also on external factors such as the existence of a functioning infrastructure and access to renewable energy sources to power battery electric and fuel cell electric products. Recognizing the need for collaboration on a system-wide basis, the Volvo Group has taken part in a number of multi-stakeholder initiatives, including the WWF Climate Savers programme as part of which we 2015–2020 drove 14 initiatives to promote energy efficiency, reduced carbon emissions and positively influence the value chain. The Volvo Group looks forward to continuing such collaboration, including on a cross-sector basis, in the future.

As part of our analysis, the Volvo Group has performed GHG emission reduction scenarios based on the composition of the annual volume and GHG emissions of products forecasted to be put on different markets

over time. The Business Areas and Truck Divisions have undertaken scenario analyses, including modelling customer demand, regulatory requirements, infrastructure roll-out, access to renewable energy, governmental incentives for clean technologies, etc. The analysis showed that, without action, the scenario presented risks to us. However, while these would need to be managed, some of these changes also present material opportunities. The results of the analysis have since been fed into the relevant Business Area and Truck Division business strategies to support development and offering of the right mix of products for each respective market over time. This may include electrified products as well as conventional combustion engine products powered by renewable liquid and gaseous fuels.

### Financial planning

The Volvo Group's investment plan includes a technology roadmap to increase zero-emission vehicles or low-emission vehicles that can enable net-zero transport solutions. These include solutions based on electric and hydrogen drivelines as well as sustainable biofuels.

Investments in property, plant and equipment will increase in connection with the Group building up capacity for battery-electric and fuel cell-electric vehicles. However, thanks to the Group's modular product architecture both electric trucks and trucks with combustion engines can be produced on the same assembly lines, thus limiting the investments needed for this transition in the industrial system.

Many plants that are currently producing components for combustion engines will gradually introduce production of components for electric vehicles. Investments in research and development are accelerated to help customers switch to more sustainable solutions. A substantial part of the investments is already today directed towards products and services based on zero-exhaust emission technology, and we expect this share to increase gradually. However, the actual outcome will depend on several factors, such as technology and infrastructure development, emission regulations, government incentives and customer demand. Read more about sustainable finance on pages 162–163.

### Risk management

The Volvo Group works with a Group-wide Enterprise Risk Management (ERM) process, which is a systematic and structured process to consolidate and analyze risks and mitigations as well as to follow up on the risks that might impact the Group's business.

In accordance with the decentralized Volvo Group governance model, each Business Area and Truck Division is accountable for its own risk management. For more information on risk identification and management, see page 70. Once risks have been identified, Truck Divisions, Business Areas and Group functions report them in the ERM process using an integrated multi-disciplinary approach. The ERM process includes all types of risks for the Volvo Group, so the processes for identifying, assessing and managing climate and other sustainability related risks are fully integrated into the Volvo Group's wider risk management.

The risks identified in the ERM process undergo a materiality analysis. The Group recognizes that some externalities impact the business in several ways and climate change is a good example of this as it poses both long-term strategic risks, for instance as a result of technology shifts and increasing government regulations, and short to medium term risks, for example in relation to customer satisfaction, physical disruptions of the production system and requirements of environmental regulation. The materiality analysis is conducted with internal and external stakeholders, and the risks that are classified as material are risks which can, separately or in combination, have a material adverse effect on the Group's business, strategy, financial performance, cash flow, shareholder value or reputation. These risks are considered to be the most prominent risk factors for the Volvo Group, see page 70.

### Metrics and targets

Recognizing that climate change is one of the biggest challenges of our time, the Volvo Group has set ambitious science-based targets. The cornerstone of these targets is the Group's ambition to achieve net-zero greenhouse gas emissions by 2040, a key element of which will require the Group to develop ranges that help reduce our customers' emissions. Developing products and solutions that reduce the GHG footprint of our customers is thus the priority in the Volvo Group climate strategy. In this transition work, the Volvo Group has established several metrics and targets to assess and manage climate-related and environmental risks and opportunities in relation to its products and operations.

#### *Focus on scope 3 – use of sold products*

The most significant part of product life-cycle emissions – over 95% – occurs during the use of sold products, when the end-users drive or operate vehicles and machines. Electric vehicle sales and research and development metrics are directly linked to reducing use phase GHG-emissions.

#### *Focus on scope 1 and 2 emissions from own production and operations*

Emissions from our own operations and from purchased energy. Targets and ambitions are set to increase energy efficiency for operations and to reduce the carbon intensity of the energy used.

#### *Focus on other scope 3 emissions, risks or opportunities*

Emissions from own transportation and distribution make up a smaller part of the life-cycle impact but is strategically important due to the sector served by the Volvo Group. The Volvo Group works with third party logistics providers to increase the use of efficient transport modes and to reduce unnecessary transports by e.g., increasing fill rates and more efficient routing.

Related information on public policy advocacy is also found on page 178.

**METRICS AND TARGETS OVERVIEW**

Metrics	Ambition or target
<b>Overall</b> • Scope 1, scope 2, and scope 3 emissions	• Net-zero by 2040
<b>Focus on scope 3 – use of sold products</b> • Scope 3 emissions during use of sold products per segment or industry • Sales volumes from electric vehicles • Research and development expenses to zero tailpipe emission technology and other GHG reducing technologies	• Interim targets by business segment <b>SBTi validated – see next page for details</b> • 35% electric sales by 2030 • Long-term, net-zero value chain GHG emissions by 2040
<b>Focus on own production and operations</b> • Scope 1 and 2 emissions • Energy saving initiatives GWh	• Reduce scope 1 and 2 emission by 50% 2030 <b>SBTi validated – see next page for details</b> • Energy saving initiatives of 150 GWh implemented 2021–2025
<b>Focus on other risks / opportunities</b> • Freight CO <sub>2</sub> emissions per produced unit	• Reduce freight CO <sub>2</sub> emissions per produced unit by 30% 2025 compared to 2018

In addition, the Group also constantly considers the environmental footprint from its own operations. Additional metrics are listed on the next pages. See Energy and Emissions on page 158 and Waste, Water and Environmental Compliance on page 161.

Index of TCFD recommended disclosures		Page reference
<b>Governance</b> The organizations governance around climate-related issues and opportunities	The Board's oversight of climate-related risks and opportunities.	154, 183
	The Management's role in assessing and managing climate-related risks and opportunities.	154, 190
<b>Strategy</b> Actual and potential impacts of climate-related risks and opportunities on the organization's business, strategy and financial planning where such information is material	The climate-related risks and opportunities the organization has identified over the short, medium and long term.	154–156
	The impact of climate-related risks and opportunities on the organization's businesses, strategy and financial planning.	155
	The resilience of the organization's strategy taking into consideration different climate-related scenarios, including a 2 °C or lower scenario.	155–156
<b>Risk Management</b> Actual and potential impacts of climate-related risks and opportunities on the organization's business, strategy and financial planning where such information is material	The company's processes for identifying and assessing climate-related risks.	70, 156
	The organization's processes for managing climate-related risks.	70, 156
	The processes for identifying, assessing and managing climate-related risks are integrated into the organization's overall risk management.	70, 156
<b>Metrics and targets</b> Actual and potential impacts of climate-related risks and opportunities on the organization's business, strategy and financial planning where such information is material	The metrics used by the organization to assess climate-related risks and opportunities in line with its strategy and risk management process.	156–157
	The Scope 1, Scope 2 and, if appropriate, Scope 3 GHG emissions and the related risks.	156–160
	The targets used by the organization to manage climate-related risks and opportunities and performance against targets.	155–160

## ENERGY AND EMISSIONS

## Connection to Agenda 2030 and reporting standards



## Main connections to the UN SDGs and targets

- 7.3** Double rate of energy efficiency  
**8.4** Resource efficiency in production  
**11.2** Sustainable transport systems  
**12.2** Sustainable management of natural resources



## Referenced reporting standards

GRI 302 – Energy  
 GRI 305 – Emissions  
 TCFD recommendations

The Volvo Group's Environmental Policy is the steering document addressing risks and opportunities in areas such as emissions, resource use, chemicals and residuals. Strategic priorities related to environment and climate are based on product life cycle assessments and aim to reduce emissions and other climate-related risks where they make the most impact.

Emission metrics, targets and disclosures are based on the Greenhouse Gas (GHG) Protocol corporate standard. Within scope 3, category 11 use of sold products is currently disclosed as being identified as the material category in the baseline GHG inventory representing over 95% of the total emission footprint. When nothing else is stated, GHG emissions are adjusted for acquisitions and divestments according to the accounting principles of the GHG protocol. The Volvo Group has reported climate-related information, targets and results since the beginning of the 2000s. The approach of managing climate-related risks has served the Volvo Group well, both in terms of reducing emissions in line with targets set and in terms of developing new technologies and business plans to meet the transition towards fossil-free transports.

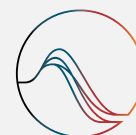
## Science-based targets for Scope 1, 2 and 3 emissions

The Volvo Group committed to the Science-Based Targets initiative (SBTi) "Business Ambition for 1.5 °C" in 2020 and had validated targets set in June 2021. The Volvo Group is targeting a net-zero value chain offer by 2040. Given that the average life-time of the Group's products is approximately 10 years, this should allow the Group to achieve net-zero value chain greenhouse gas emissions by 2050. The pace of change is particularly important, and the Group has set ambitious milestone targets along the way.

The targets are set in different ways for the Group's different businesses. What they have in common is that they are all contributing to the ambitions of the Paris agreement.

Part of value chain	Scope 1, 2 or 3	Approximate share based on baseline GHG inventory	2021	2020	2019
<i>Mton</i>					
Production, technical centers, warehouses and dealerships	<b>Scope 1</b> Direct emissions	<0.5%	0.245	0.205	0.245
	<b>Scope 2</b> Indirect emissions from purchased energy	<0.5%	0.114	0.121	0.124
Use of sold products	<b>Scope 3 use phase<sup>1</sup></b> Indirect emissions from use of sold products	~95%	286	241	323
1. The reported data is in six months arrear for emissions from use of sold products for trucks and buses to obtain logged usage data.					
Other indirect emissions	<b>Other Scope 3</b>	Approximately 4% of the greenhouse gas inventory are related to purchased goods and services, transportation and distribution, waste generated in operations business travel, employee commuting etc.			

Volvo Group's Science Based Targets are set to reach net-zero value chain GHG emissions by mid-century at the latest. The ambition is to reach this already by 2040.



SCIENCE  
BASED  
TARGETS

DRIVING AMBITIOUS CORPORATE CLIMATE ACTION

These other indirect emission are not yet included in the report. However, internal targets exists for certain areas such as transportation.



## Methods and data collection

### Scope 1 and 2 emissions method and data collection

Environmental impacts and greenhouse gas inventory are established according to the Greenhouse Gas Protocol's Corporate Accounting and Reporting Standard, which is a standardized framework for quantifying and reporting GHG emissions in CO<sub>2</sub>-equivalents (CO<sub>2</sub>e).

Less than 1% of life cycle emissions are connected to scope 1 and 2, including production plants, engineering centers, offices and dealerships. These are under the Volvo Group's direct management and higher level of control.

### Scope 3 use phase emissions method and data collection

Scope 3 emission results are reported to indicate the progress toward the net-zero SBTi targets for the Volvo Group products. The methodology for calculating emissions from use of sold products has been designed to meet the requirements provided in the relevant standards of the GHG Protocol; namely the GHG Protocol Corporate Standard, the GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard, and Technical Guidance for Calculating Scope 3 Emissions, which includes expected lifetime emissions from all applicable products sold in the reporting period.

The target methodology and boundaries are following the SBTi Transport Science Based Target setting guidance and the target setting requirements and tools from the SBTi. The methodology is based on activity data on product annual usage, years in service, energy consumption and associated well to wheel GHG emission factors for the different energy sources utilized (diesel, electricity etc.).

In absence of a normalized test procedure for Trucks, manufacturers are invited to present and justify their own estimates or simulations based on fuel consumption and specific activity data. The applied expected activity data and other parameters are associated with a level of uncertainty and may be subject to change due to implementation of regulations or global, regional, or national policy changes, or improved data quality. From a sensitivity analysis perspective, changes in any of the parameters will impact outcome, but changes of assumptions of products' years in service currently have more significant impact on calculated results.

Furthermore, the calculations do not take into account all aspects of e.g. the efficiency improvements in increased load in tones per vehicle km which is an important measure to increase the efficiency in the transport sector and reduce emissions of GHG. Since the calculation methodology is being developed, and e.g. different sources for emission factors and methods may be used for determining the activity data (annual usage, distance travelled etc.), the Volvo Group's emission data may not be fully comparable to that of other entities. We also expect that the Group's method to calculate the emission footprint may be developed further over time, and this may well alter results and, to ensure proper comparison, the baseline. If the calculation method is developed or assumptions used are adjusted in any material way, we intend to report on that in a transparent manner. As matters currently stand, the data is directionally useful but is subject to the limitations expressed above.

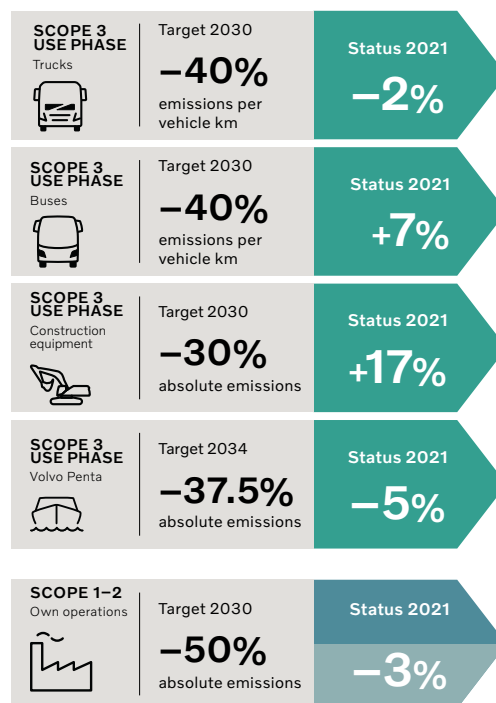
### Other scope 3 emissions

The remaining part of indirect emissions account for approximately 4% of emissions in scope. These are included in the work for net-zero value chain greenhouse gas emissions, but they are not yet subject to validated science-based targets. For some areas, targets are already existing, for example freight transports.

### Targets and results 2021

Calculated GHG emissions from use of sold products have been reduced from approximately 323 million tons in 2019 to 286 million tons in 2021. The Volvo Group has introduced a range of solutions with improved energy and fuel efficiency, but the main effect so far comes from lower sales volumes of trucks compared with the baseline in 2019.

### SBTi approved targets, from baseline 2019



#### Trucks

Within the trucks segment calculated GHG-emissions per vehicle kilometer have been reduced by 2% in 2019–2021. This is mainly due to fuel consumption improvements. See pages 28–37 for examples of fuels efficiency and electrification.

#### Buses

For buses, the result of emission per vehicle-kilometer was 7% higher 2021 compared with 2019. The increase in relative emissions is mainly the result of the sales mix with a higher proportion of city buses compared to coaches. The driving pattern of city buses with stop and go results in higher emissions per vehicle-kilometer than coaches.

#### Construction equipment

Sales of machines have increased significantly, especially in Asia, which has resulted in calculated scope 3 GHG emissions increasing by 17% from the baseline 2019. Over the longer term, the plan is that electrified and more energy-efficient products will enable reduced total emissions.

#### Volvo Penta

Total calculated GHG emissions were 5% lower than compared to 2019. The result is mainly an effect of sales volumes.

#### Own operations

In the Volvo Group's own scope 1 and 2 emissions were 3% lower 2021 compared to 2019. Investments to reduce energy consumption by 15 GWh has been implemented during 2021. Although some of these initiatives are relatively small compared to the total energy usage, all energy-conservation activities implemented today save energy over many years. Supply chain disruptions have during the year led to certain irregularities in manufactur-

ing scheduling which have reduced the effectiveness and results of the work done to reduce energy consumption and associated emissions of greenhouse gas.

Overall, as the Volvo Group is operating in cyclical industries which are linked to economic activity, such as the GDP development, sales volumes and utilization of the rolling fleet of products can vary considerably from one year to the next. Consequently, the overall GHG-emissions will in the short term depend on where we are in the business cycle. Also, since the Group is selling its products in more than 190 markets, shifts in the regional and market mix can also have a significant impact on the GHG emissions due to different carbon intensity in the energy mix. Product mix also is another factor which may have a significant impact. For example, in 2021 the strong

volume growth in China for Volvo Construction Equipment contributed to an increase of the absolute GHG emissions for this business area.

The actual development will also depend on a number of external factors, such as our customers' access to low-carbon electricity, low-carbon fuels such as liquefied biogas, charging stations and in the longer-term hydrogen as a low-emission alternative etc.

The Volvo Group has already launched several electric vehicles and machines. However, a broader range of electric products is still to be launched, which is expected to accelerate the reduction of the Group's GHG emissions. Customer adoption of these electric vehicles and machines and their access to low-carbon electricity will be key to reach our ambition of a net-zero GHG emissions by 2040.

### Detailed energy and emission performance

The reporting scope has been expanded in 2021 to align with SBTi requirements. A new baseline is set to 2019. Results for 2020 and 2019 are restated and are not comparable to previous reports. The main changes are that approximately 300 dealership locations have been added and UD Trucks has been divested.

#### Calculated scope 3 emissions, category 11, use of sold products

Metric tons x1,000,000 CO <sub>2</sub> e	2021	2020	2019
Trucks total	180	143	219
Buses total	5	8	14
Construction Equipment	82	74	70
Volvo Penta	19	16	20
<b>Total use of sold product</b>	<b>286</b>	<b>241</b>	<b>323</b>

#### Scope 1 and 2 GHG emissions and sources of emissions

Metric tons x1,000 CO <sub>2</sub> e		2021	2020	2019
Natural gas	Scope 1	114	97	115
Diesel	Scope 1	81	71	82
Other	Scope 1	50	37	48
<b>Total scope 1</b>	<b>Scope 1</b>	<b>245</b>	<b>205</b>	<b>245</b>
Electricity	Scope 2	102	107	106
District heating	Scope 2	12	14	17
<b>Total scope 2, market based</b>	<b>Scope 2</b>	<b>114</b>	<b>121</b>	<b>124</b>
Total scope 2, location based	Scope 2	204	193	215
<b>Total Scope 1 and 2</b>		<b>359</b>	<b>326</b>	<b>369</b>

#### Scope 1, 2 GHG emissions intensity

Scope 1 and 2	2021	2020	2019
Net sales, Industrial operations, SEK M	361	326	418
Products delivered, (x1,000)	307	267	333
CO <sub>2</sub> (scope 1 and 2) by net sales	0.99	1.00	0.88
CO <sub>2</sub> (scope 1 and 2) by products delivered	1.17	1.22	1.12

#### Out of scope CO<sub>2</sub> emissions

Metric tons x1,000	2021	2020	2019
Biogenic CO <sub>2</sub>	10	5	6

#### Energy within and outside the organization (Connected to scope 1 and 2 emissions)

Energy GWh		2021	2020	2019
Natural gas	Scope 1	559	473	563
Diesel	Scope 1	314	271	311
Other	Scope 1	197	149	179
Electricity	Scope 2	1,099	952	1,086
District heating	Scope 2	255	197	216
<b>Total</b>		<b>2,423</b>	<b>2,043</b>	<b>2,355</b>
Whereof renewable energy %		40%	37%	35%
<b>Relative energy use</b>		<b>2021</b>	<b>2020</b>	<b>2019</b>
Net sales, Industrial operations,	SEK bn	361	326	418
Energy / net sales	MWh / SEK M	6.7	6.3	5.6

#### Executed energy saving initiatives

The target is to implement energy saving investments 2021–2025 that together save 150 GWh per year from 2025.

Accumulated GWh		2021	2020	2019
Annual implemented initiatives	GWh	15	37	40

#### Other emissions to air

Nitrogen oxides (NO<sub>x</sub>), sulphur oxides (SO<sub>x</sub>) and solvents

Metric tons		2021	2020	2019
NO <sub>x</sub>	tons	223	192	291
SO <sub>x</sub>	tons	5.0	3.7	8.5
Solvents (VOC)	tons	1,304	1,224	1,406

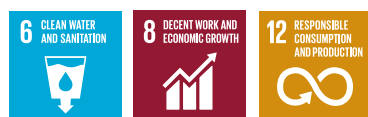
## WATER, WASTE AND ENVIRONMENTAL COMPLIANCE

## Connection to Agenda 2030 and reporting standards



## Main connections to the UN SDGs and targets

- 6.4 Increase water use efficiency
- 8.4 Improve resource efficiency in production
- 12.2 Sustainable management of natural resources
- 12.4 Responsible management of chemicals
- 12.5 Reduce waste generation



## Referenced reporting standards

GRI 307 – Environmental Compliance 2016

The Volvo Group's Environmental Policy is the steering document for managing risks in areas such as emissions, resource use, chemicals and residuals. It is based on the principles of life cycle management and continuous improvement.

The Group's ISO 14001 certified environmental management system covers approximately 95% of production facilities and 90% of distribution centers. The management system is used in a hierarchical way to deploy effective environmental work in the Group's divisions and business areas. This means that the Business Areas and Truck Divisions are all responsible for their environmental performance in the same way as for financial or other performance. Environmental management is also part of supplier assessments, read more on page 175–176.

Several data points below have been corrected from what was reported in 2020. Adjustments are not considered significant.

## Water

Risks of effluents are mitigated through active environmental management and control in the Group's operations.

Water use is included in this report due to specific interest and tracking from certain stakeholders.

## Water consumption in production

	2021	2020	2019
Total water consumption, Mega-liters	4,628	4,856	5,389
Relative water consumption, Cubic meters/SEK M net sales	12.8	14.9	12.9

At Group level, only total water consumption is available, not by source.

## Waste and recycling

Volvo Group's sites either have in place or are in the process of developing landfill-free objectives. This work is supported by a directive and guidelines setting out the criteria for when a Volvo Group site can be considered a landfill-free site.

## Waste by type and disposal method

Metric tons	2021	2020	2019
Recycling, metal scrap from operations	111,260	82,076	103,404
Recycling, other metal scrap	16,865	13,338	18,609
Recycling, non-metal	158,776	139,272	130,543
% recycling of total	86%	86%	75%
Composting	2,433	1,868	2,314
Incineration with energy recovery	23,269	18,171	29,165
% recycled, composted or energy recovery	94%	93%	85%
Incineration without energy recovery	2,027	1,634	2,150
Treatment by professional waste contractor	11,116	9,943	19,588
Landfill	5,858	6,043	26,792
Landfill, only inert material	470	691	2,546
<b>Total residuals</b>	<b>332,075</b>	<b>273,037</b>	<b>335,111</b>
<b>Whereof hazardous wastes</b>	<b>53,314</b>	<b>51,712</b>	<b>50,909</b>

## Materials of concern

Some of the materials used in Volvo Group's products come in scarce supply and some materials and substances are potentially hazardous. The Group works to reduce its dependency on such materials and substances with the aim to protect both people and the environment and to secure sustainable supply. In collaboration with partners, the Volvo Group proactively evaluates alternatives in the design and supply processes to minimize and eliminate use of scarce materials and substances of concern.

Scarce materials may lead to a variety of difficulties such as high prices and increased risk for corrupt behavior or adverse human rights impacts when sourced from high-risk areas. Volvo Group is implementing a dedicated supplier Sustainable Minerals Program, currently focusing on tin, tungsten, tantalum, gold and cobalt, to support sourcing of materials in a responsible way. The program is built on the five-step framework of the OECD due diligence guidance for responsible supply chains of minerals from conflict-affected and high-risk areas with respect to social and environmental topics, as well as on the tools of the Responsible Minerals Initiative, to which the Volvo Group is a member.

## Environmental compliance

No significant environmental incidents or spills were recorded during 2021. In 2021 the Volvo Group had 12 licensed facilities in Sweden. For some facilities the environmental permits are under review due to planned changes.

### Biodiversity

The Volvo Group strives to consider and manage both direct and indirect environmental impacts. Regarding biodiversity, the value chain perspective can be divided in three main areas – our own operations, supplied material and impact during use of sold products.

Within the own operations, risks are considered both for the establishment of new operations as well as for the ongoing operation. The Group has implemented minimum environmental requirements helping to prevent negative environmental impact from material environmental aspects. The requirements are applicable for all operations in absence of more stringent regulatory requirements.

Upstream in the value chain, Group supply chain partners are evaluated with similar requirements.

One of the biodiversity risks in the transport sector is the production of fuels. Biobased fuels continue to be important alternatives to conventional diesel in several markets to reduce fossil greenhouse gas emissions in the short term. However, the availability of sustainable biofuels does not meet demand in all areas.

## Sustainable finance

### EU TAXONOMY REGULATION DISCLOSURES

The EU Taxonomy is a classification system for sustainable economic activities. The Taxonomy disclosure requirements are new in this year's reporting. This disclosure is based on current understanding of the rules and may be amended in the future to align with new regulatory guidance provided and developing reporting practices, as knowledge of the Taxonomy requirements matures.

In this year's disclosure, information is based on the guidance provided under the draft Commission notice on the interpretation of certain legal provisions of the Disclosures Delegated Act under Article 8 of EU Taxonomy Regulation on the reporting of eligible economic activities and assets, dated February 2, 2022 (the 'Draft Commission Notice') with respect to the Taxonomy eligibility requirements. However, as alternative approaches to determining eligibility exist, additional Taxonomy-eligibility information have on a voluntary basis been included for transparency purposes.

The Volvo Group has identified that certain of its economic activities qualify as eligible to be considered "environmentally sustainable" under the Taxonomy Regulation ((EU) 2020/852) and its delegated acts (the "Taxonomy"). The Group manufactures low carbon technology for transport and

other low carbon technologies which are eligible pursuant to sections 3.3 Manufacture of low-carbon technologies for transport ('3.3 Activities') and 3.6 Manufacture of other low-carbon technologies ('3.6 Activities') of Annex 1 to Commission Delegated Regulation (EU) 2021/2139 (the "Delegated Climate Act"). The activities identified are defined as enabling activities in relation to the climate change mitigation objective.

Both the manufacture of low-carbon technologies for transport, and the manufacture of other low-carbon technologies are of strategic importance in the Volvo Group's transition towards a net-zero greenhouse gas emission value chain. See more on page 155.

None of the activities of, or Volvo Group investments in, joint ventures are included in this report.

So far, the Volvo Group considers its eligible activities pursuant only to the climate change mitigation objective, and 3.3 Activities and 3.6 Activities are conducted in different operating segments of the Group. No activities should hence have been double counted for purposes of calculating the Taxonomy KPIs presented.

The methodology applied for disclosure is described in the table below.

Table 1: Mandatory Taxonomy disclosure <sup>1</sup>						Table 2: Voluntary Taxonomy information <sup>2</sup>		
		Turnover	Operating expenses	Capital expenditure		Turnover	Operating expenses	Capital expenditure
<b>Group total (denominator)</b>	SEK M	372,216	15,537	13,051		372,216	15,537	13,051
Eligible activities	Code							
<i>Manufacture of low carbon technologies for transport</i>	3.3	%	53	76	78	53	76	78
<i>Manufacture of other low carbon technologies</i>	3.6	%	0.1	2	0.3	25	21	12
<b>Total share taxonomy eligible activities</b>		%	<b>53</b>	<b>78</b>	<b>79</b>	<b>78</b>	<b>97</b>	<b>90</b>
<i>Non eligible activities</i>		%	47	22	21	12	3	10

1 This mandatory disclosure is based on a broad interpretation of eligibility for 3.3 Activities and a stricter for 3.6 Activities, in accordance with the approach explained in the Draft Commission Notice. In relation to 3.3 Activities, the Draft Commission notice sets forth that the reference to "low carbon" should not be taken into account when determining Taxonomy-eligibility. This interpretation therefore considers that the vast majority of the Group's transport vehicles are Taxonomy-eligible. For 3.6 Activities, eligibility depends on the objective of the activity, which should be aimed at substantial life cycle greenhouse gas (GHG) emissions savings in other sectors of the economy.

2 This voluntary information is based on a broad interpretation of eligibility for both 3.3 Activities and 3.6 Activities, meaning that the vast majority of machinery could be eligible, in the same way as transport vehicles.



The NACE-code system is a statistical classification system of economic activities in the European Union, established by Regulation (EC) No 1893/2006 and referenced in the Taxonomy. This has been used as overall guidance to identify potentially eligible economic activities. Activities from spare parts, components, and products outside NACE-code C29.1 and C28 are not considered as eligible.

#### Qualitative information related to turnover

The Taxonomy disclosure in Table 1 on eligible turnover includes revenues from all new vehicles as well as repair and maintenance in 3.3 Activities, and revenues from new zero-emission machinery in the 3.6 Activities.

The voluntary Taxonomy information in Table 2 includes eligible revenues from all new vehicles and machinery, as well as repair and maintenance.

The total turnover reported covers the revenue recognized as explained in note 7, see page 94, and includes revenues from the Volvo Group's industrial operations as well as from financial and operating leases.

#### Qualitative information related to operating expenses

The Taxonomy disclosure in Table 1 on eligible operating expenses include non-capitalized research and development costs for new product development as well as maintenance on existing products. It includes expenses related to transport vehicles in Activity 3.3, and expenses related to low- and zero-emission machines in Activity 3.6.

The voluntary Taxonomy information in Table 2 includes eligible expenses as above, related to the vast majority of the both 3.3 and 3.6 Activities.

The operating expenses reported covers the non-capitalized research and development costs from the Volvo Group's industrial operations. These are the operating expenses so far estimated as material in relation to the disclosure requirements. As internal processes are enhanced and further guidance and advice on interpretation of the regulation is provided, the total relevant operating expenses as well as share of Taxonomy eligible operational expenses may be adjusted.

#### Qualitative information related to capital expenditures

The Taxonomy disclosure in Table 1 on eligible capital expenditures includes capitalized expenditures for product development and property, plant and equipment related to transport vehicles in 3.3 Activities, and capitalized expenditures for product development and property, plant and equipment related to low- and zero-emission machines in 3.6 Activities.

The voluntary Taxonomy information in Table 2 includes eligible capital expenditures for product development and property, plant and equipment related related to the vast majority of the both 3.3 and 3.6 Activities.

Capitalized product development and property, plant and equipment reported are included in the information provided, see notes 12-13 on pages 100-103 for details.

#### Volvo Group modular product architecture

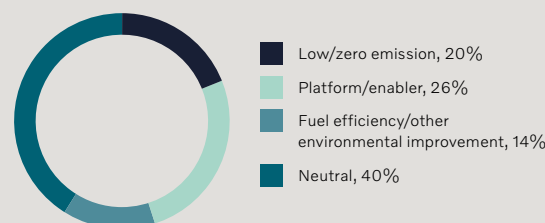
Many of the products developed, produced and sold are based on the Group's modular system CAST (Common Architecture and Shared Technology) to drive commonality and efficiency in the value chain. This enables low and zero-emission vehicles and conventional vehicles to be based on the same vehicle platform and produced on the same assembly lines. Consequently, expenses and tangible and intangible investments are rarely exclusive to one type of product, but common across products and sites.

## DISCLOSURES ON RESEARCH AND DEVELOPMENT INVESTMENTS

A significant part of the Volvo Group's research and development expenses are related to emission-reduction activities, such as improved fuel efficiency, enabling low-carbon fuels, electrification, as well as energy and transport efficiency. Volvo Group's research and development expenses have been divided into four main categories. This classification is new in this year's reporting. The classification of various research and development projects is continuously evaluated and may be amended in the future.

- **Low- and zero-emission projects** – directly associated with products with low or zero tailpipe emissions.
- **Platform and enabler projects** – to develop technology common for both conventional products as well as low or zero emission vehicles based on the Group's modular architecture (CAST). This includes development of technology such as common electrical architecture, cabs, aerodynamics, connectivity and safety features.
- **Fuel efficiency and other environmental improvement projects** – with the aim to improve environmental performance of internal combustion engine vehicles, e.g. fuel efficiency, emission reduction, bio-LNG and other low-carbon fuel projects.
- **Neutral projects** – projects in this category may result in environmental benefits but which have not been assessed as significant.

#### R&D expenses



In 2021, approximately 60% of the Volvo Group's gross R&D expenses<sup>1</sup> were considered either low and zero emission, fuel efficiency and pollution-prevention, or platform and enabler projects.

During the year, the Volvo Group also invested SEK 6.5 billion in the fuel cell joint venture cellcentric. Neither the investment, nor the expenses associated with cellcentric are included in the above figures.

<sup>1</sup> Excluding effects from capitalization and amortization.