



BUSINESS OVERVIEW 2018

Enabling
modern life

Metso's Annual Report 2018

Information about Metso's Annual Report 2018

Metso enables modern life. Business opportunities arise when we collaborate closely with our customers in developing sustainable solutions for their business challenges. By growing and improving profitability we create value for all our stakeholders. By demanding sustainability from ourselves and our partners alike, we contribute to the building of trust.

Metso's Annual Report 2018 consists of four report sections: Business Overview, Financial Review, Corporate Governance and GRI Supplement. In this Annual Report we apply integrated reporting elements.

More information

The following symbols guide you to more information on our website or in this report:

 [Read more on our website \(clickable\)](#)

 [Read more in this report](#)

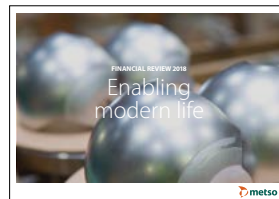
Metso's channels

- [metso.com](#)
- [twitter.com/metsogroup](#)
- [facebook.com/metsoworld](#)
- [youtube.com/metsoworld](#)
- [instagram.com/metsoworld](#)



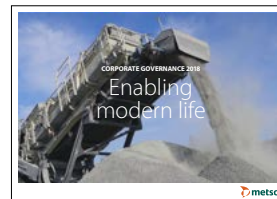
1. Business Overview

Strategy, value creation, sustainability and risk management



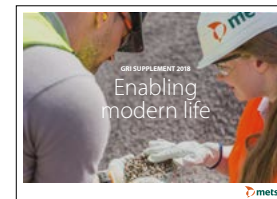
2. Financial Review

Board of Directors' Report, Financial Statements and investor information



3. Corporate Governance

Corporate Governance Statement including remuneration



4. GRI Supplement

Externally assured sustainability information compliant with the GRI Standards

All Annual Report sections are available in English and in Finnish. They are downloadable on our Annual Report website at www.metso.com/2018.

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About this section / Metso’s Annual Report 2018 consists of four report sections. This is the Business Overview, including Metso’s strategy, value creation, sustainability and risk management.



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Metso in brief

Our vision is to be the best choice for sustainable processing and flow of natural resources.

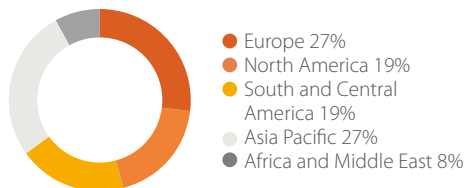


Responsible and trusted partner

A responsible and trusted partnership creates the foundation for a strong brand and profitable growth. We create trust by ensuring the sustainability of our own operations and the operations of our business partners.

Our global presence ensures we meet our customers needs globally and locally.

Sales by market area



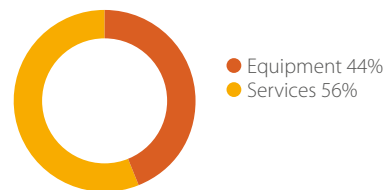
Sales by customer industry



Sales by segment



Sales by type



Sustainable productivity

Metso enables modern life. With our knowledge and technologically advanced offering, we help our customers improve their operational efficiency, reduce risks and increase profitability.

Customers use our industry-leading solutions to process various raw materials.

Our offering for sustainable productivity

In mines to process minerals	In quarries to produce aggregates
In petrochemical plants to control the flow of materials and fluids	In pulp and paper mills to control the flow of pulp and other liquid media
In the demolition and recycling of asphalt and construction materials	In scrapyards and recycling facilities to process metal scrap and waste

We offer a full scope of services

Consumables	Services	
	Spare parts	Field service and repairs
	Refurbishments and upgrades	Life Cycle Services

Our diverse people

We work together to win with our customers

13,150
Employees

2,569
New employees

We are a global team

52 Countries 176 Locations 90 Nationalities

Engagement survey engagement index
88%

We feel strongly engaged

Engagement survey response rate
87%



3,946
Participants in Leadership Development programs

243
Participants in Sales Excellence program

We develop professional capabilities



From the CEO

Year 2018 was a year of growth and improved profitability for Metso. We grew together with our customers and successfully focused on improving their productivity in a sustainable way. For me as the new President and CEO of the company, this positive outcome provides a very good starting point.

All our businesses grew during the year, gaining momentum from the favorable market development in our customer industries. Metso's orders received reached 3.5 billion euros, our sales grew by 18% to 3.2 billion euros, and our profitability significantly improved. To respond to the healthy market demand by our customers, we improved our supply chain and delivery capabilities especially towards the second half of the year. Excellent performance, and I want to thank our customers for their trust, all Metso employees for excellent work and Eeva Sipilä, the interim CEO, for successfully steering Metso in 2018.

Drive for growth

The strong results demonstrate that our profitable growth plans are yielding results and the improvements we have implemented to fulfil the growth in demand have been successful. During the year, we made three acquisitions in India, Sweden and the UK to complement our offering and competences, and made growth investments in aggregates equipment, foundry and wear castings manufacturing capacity and rubber-based consumables. Organic growth is the priority, but strategic acquisitions will also remain a growth option.

New ambition level

Metso's organization was realigned at the beginning of 2018. Three business areas were divided into seven, each with their specific action plans to enable faster execution of growth initiatives. This change has proven itself as the organization is delivering good results. In 2019, we will review Metso's strategy and redefine our ambition level to ensure that we have a clear long-term strategy and direction.

One key component of growth is renewal. Our R&D spend increased in 2018 and we put considerable effort into our digital program. In 2019, our R&D investment will further increase to strengthen our offering further to support the future needs of our customers. Metso Metrics, our cloud-based remote monitoring solution for mining, aggregates and recycling customers that was launched in 2018 demonstrates our drive to improve the efficiency and productivity of our customers' operations with digital solutions. We have also shipped our first valves with 3D printed components and will deliver more in 2019.

Customer centricity is one of our strategic fundamentals; it is critical for our success and a cornerstone of our culture. It is important that our customers get a consistent experience from all Metso employees, regardless of which part of Metso they do business with. We continue seeking regular feedback from our customers to ensure focus on what is most important for them

and take quick corrective action when needed. Similarly, we measure our employees' engagement to get first-hand feedback. In the 2018 employee survey, the overall engagement score of Metso's employees was as high as 88%, an excellent enabler as we continue to develop Metso further.

Sustainability agenda revised

In 2018, we updated our sustainability agenda to validate our approach and to ensure that it is reflecting our dialogue with our varied stakeholders, including customers and shareholders. Metso's executive team arranged several workshops in which the most material themes and objectives were defined. The result was a new agenda with two focus areas: Responsible and trusted partner and Sustainable productivity.

As Metso's customers operate in industries that include mining, aggregates, recycling and oil and gas, we are directly influenced by the big global trends like climate change, urbanization, scarcity of natural resources and circular economy. We strive to be the responsible and trusted partner for our customers, offering ways to improve their productivity in a sustainable manner. This can mean considerable process improvements resulting in higher availability, but at the same time reduced emissions or lower energy and water consumption.

Due to the nature of our business, safety is an area where lapses are not allowed. In 2018, the development of our long-term incident frequency index stalled, which calls for a reset of our safety work.

We are in a very good shape to enter 2019 and this is thanks to the Metso people, our customers and business partners. In Metso, we understand our role as the enabler of modern life, which, to develop, requires more metals, minerals and other raw materials recycled or produced with less strain to the environment. Metso has deep industry knowledge and insight into all our customer industries gathered during our 150 years in the business. We want to help our customers find more sustainable ways to thrive.

Pekka Vauramo
President and CEO

In 2019, we will review Metso's strategy and redefine our ambition level to ensure a clear direction ahead.

Highlights of 2018

<p>Good volume growth and improved performance across the businesses</p>	<p>Orders received MEUR 3,499 +17% from 2017</p>	<p>Sales MEUR 3,173 +18% from 2017</p>	<p>EBIT MEUR 351 +61% from 2017</p>	<p>Earnings per share EUR 1.53</p>
<p>Profitable growth strategy implemented successfully</p>	<p>Employee engagement index 88%</p>	<p>Capital expenditure +76%</p>	<p>R&D expenditure +44%</p>	<p>Acquisitions 3</p>
<p>Productivity, safety and reliability for our customers all over the world</p>	<p>20% power savings 10% longer wear life at Bucim mine, with Metso's pumps</p>	<p>Increased production of manufactured sand Kuyng Boo quarry, South Korea</p>	<p>Efficient & safe shutdown in the Boliden Kevitsa mine</p>	
<p>New sustainability agenda</p>	<p>99 supplier sustainability audits</p>	<p>86% of the R&D projects had set sustainability targets</p>	<p>23,900 risk observations</p>	

Celebrating 150 years

For the past 150 years, Metso has been making and shaping history every day.



Where it all began

Our story began as a local ironworks in 1868

Metso's origins can be traced back to the aftermath of the Industrial Revolution. Groundbreaking technological advances paved way for urbanization and global social change. Before Metso's predecessors began operating at the end of the 19th century, in many places rock crushing was as primitive as breaking stones with a hammer.

Nordberg Manufacturing company in the United States developed some of the first modern crushing equipment almost simultaneously with Ateliers Bergeaud in Mâcon, France. Lokomo produced its first jaw crushers for rock crushing in Finland at the beginning of the 1920s. They and dozens of other companies with their industry-leading knowledge and solutions have amalgamated together during the years to form the core of today's Metso.

Building and re-building cities

Early in the 20th century, people began moving to towns and cities; the construction business was booming. In Central Europe, the first Bergeaud crushers were selling well. These machines were built on wheels, making them easy to move to wherever they were needed for crushing rock in the construction of roads and railways. Traditionally, crushing plants were located outside the cities, but this changed as cities began to expand.

Valves join the group

Our valve offering started to take shape when Rauma-Repola purchased Neles in Finland in 1982 and Jamesbury Inc. in the USA in 1988. The two companies merged to form Neles-Jamesbury, bringing Jamesbury's soft-sealed valves and the Neles™ metal valve portfolio under one roof.

Focus sharpens through mergers, demergers and acquisitions

Rauma Corporation and Valmet Corporation merged in 1999 to form Metso Corporation, a conglomerate with almost 23,500 employees. At the time of the merger, Rauma was known for its mining, aggregates, foundry, forest machinery and valve solutions.

In 2001, Metso's minerals processing offering was strengthened with the acquisition of Svedala; this laid the foundation for a full, industry-leading rock and minerals processing solution portfolio. The acquisition included also the Lindemann metal recycling solutions, which today form the basis for Metso's metal and waste recycling solutions.

In 2013, Metso was split into two independent listed entities, Metso Corporation and Valmet Corporation, with Metso concentrating on intelligent solutions and services for mining, aggregates, recycling, and on flow control solutions for the process industries. We began adding in more adjacent business acquisitions in 2017 to support our profitable growth strategy.

Celebrating our 150th anniversary

Celebrating with customers, employees and communities

Metso celebrated its 150th anniversary in 2018 with customers and partners all over the world at its customer events and trade fair booths. One of these celebrations was the get-together with our Chilean customers at the Finnish Embassy in Santiago de Chile, hosted by President and CEO Pekka Vauramo and Mika-Markus Leinonen, Finland's Ambassador to Chile.

We were globally present in social media, with stories and highlights of the celebrations and customer success stories throughout the year. On our social media channels, Throwback Thursday offered weekly insights into our history. In China, we organized a successful Metso history competition in WeChat. We also collaborated with industry specialists and customers on blog stories. In addition, the history section on our website was renewed to highlight our footprint in enabling the modern life in light of our historical background.

Educating children about rocks and minerals

In Finland we joined forces with Geological Survey of Finland and created an easy-to-use webtool called Kivikone ('rock machine') to help people identify the most common Finnish rocks and minerals and learn about their end uses. In connection, educational materials were produced for schools. Teachers ordered approximately 1,000 Kivikone support material packages to help

them plan lessons around the importance of rocks and minerals for the modern world. This material is designed to be used in biology, geography and social study lessons.

Sharing our story on the sustainable use of raw materials in an anniversary exhibition

The anniversary year culminated with a Metso history exhibition organized in Helsinki's Sanomatalo building, in Finland, in September 2018. CFO Eeva Sipilä opened two-week-long public exhibition. It presented our history through stories and images and also offered insights on the sustainable use of raw materials. We also organized a rock-themed photo competition on our social media channels. Out of the several hundreds of photos that were entered in the competition, the four best were awarded.

Next is now – Enabling modern life

Metso's focus for the future is clear: We focus on providing sustainable solutions for the processing and flow of natural resources also in the future. Digitalization plays an important role.

Highly digitalized and autonomous processes and plants will become more common, as mines, quarries, chemical plants and recycling facilities are usually located in remote or critical places and have challenging operating conditions. Automation and digitalization of these processes enable people to monitor and run the processes safely and efficiently from more convenient locations.

Today, connected processes and a data-driven way of working are an integral part of our daily business. We use our customers' process data, for example, to optimize raw material, energy and production efficiency at their plants. Internally, we use real-world data to improve our products and to shorten our product development cycles. Our customers can benefit already now from innovations like the Metso Metrics predictive maintenance and optimization solution for mining equipment, the Experture PlantTriage™ software that monitors process plant efficiency, modern on-line order channels and advanced project data exchange platforms.

Our whole Metso team of over 13,000 industry experts drives this development forward together with our customers and partners. To ensure that we stay ahead of the game, we have complemented our existing innovation processes with an annual Metso Award Innovation Challenge and a Digital Garage for fast experimentation and prototyping of new digital ideas to benefit the mining, aggregates, recycling and process industries.



Photo exhibition at Sanomatalo



Kivikone webtool for learning about rocks and minerals



Celebrating 150 years with customers all over the world



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Enabling modern life and creating value

Metso enables modern life. People, technological know-how and global presence are our most important assets to drive innovations and sustainable productivity across our customer industries. Profitable growth creates value for our stakeholders.

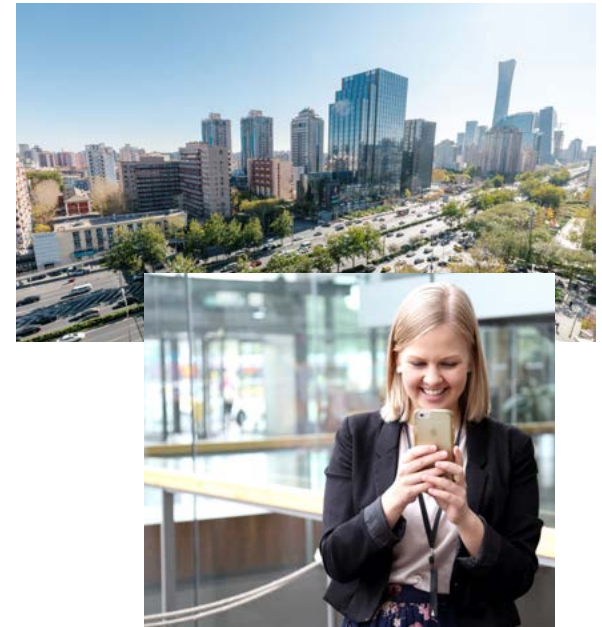
We serve industries that face challenges like the depletion and degradation of ore grades, water and energy scarcity, dust, high-pressure flow-handling, and safe and efficient recycling processes. Mines, quarries and chemical plants supply raw materials for our daily lives and the world around us.

This is where Metso's technology and expertise come in: our solutions cover rock and minerals processing, metal and waste recycling, and process industry flow control solutions. Helping our customers solve their global challenges gives rise to new business opportunities. We create value for all our stakeholders.

Without the use of rocks and minerals, the modern world as we know it could not exist. Copper has been used for at least 7,000 years, making it the oldest man-made metal. Today, the minerals obtained by mining are used in virtually all man-made products and their use has doubled globally in the last 30 years.

Globalization, urbanization, population growth and the rise of the middle class have resulted in the acceleration of construction and consumption. The importance of rocks and minerals is increasing with the growing demand and development of new innovations and applications that support our modern digital lifestyle. Our world with computers, electric cars and mobile devices is here to stay.

We are a world leader in mining comminution technology. The digitalization of comminution circuit design and process optimization is opening up exciting, new opportunities to save energy and water in minerals processing, which today uses 3–5% of the world's energy.



Where there is flow, there is a need for valves. We help ensure the reliable and safe flow of oil, gas, pulp and more by manufacturing some 400,000 valves every year for different process industries. As an example, more than 40% of the world's polyolefins and 70% of industrial gases flow through Metso valves, and sustainability is enhanced by enabling water to be reused 15 times in a modern paper mill, which saves significant volumes of water.

The world's population produces 1.3 billion metric tons of municipal solid waste per year. This number is expected to double within the next seven years. To tackle the recycling

challenge, we need to close the gap between primary and secondary raw material use. We have developed a range of advanced solutions for handling virtually any type of waste and scrap metal, and we also provide shredders and services for waste-to-energy and waste-to-fuel facilities.

In addition to efficient customer processes, we can find new ways of doing things through circular economy. Extracting metals from landfills, old machines, mobile phones and other waste products will have a role in the future. Cost-effective and energy-efficient ways of retrieving metals, closing loops and extending the life-cycle of equipment are also important.

Our competent and committed people are at the heart of Metso's results-driven and respectful culture. We are a global workplace where teams work in close collaboration to generate results for our customers. Good leadership is a key success factor in making this happen, and employee engagement drives performance.

Metso is present in everyday life in various ways



One kilometer of railway track bed requires 9,000 tons of aggregates, and up to

30,000 tons of aggregates for one kilometer of motorway.



Approximately

100 tons

of aggregates are needed for an apartment and 3–4 times more for a house.

42

types of minerals are used in a smart phone. Every hybrid car contains 30 kilograms of rare metals.

The EU target is to recycle

55%

of municipal waste by 2025.



Steel is the most recycled material on earth. About

90%

is recycled.

There are approximately

1,500

valves in a process that produces board for food and drink containers.

Aligning sustainability with business strategy

Our sustainability agenda was updated in 2018. The agenda consists of Metso's most material sustainability topics based on a thorough materiality analysis. This materiality analysis was developed in stakeholder meetings and interviews, internal discussions with various Metso functions and in a workshop with the Metso Executive Team.

Our sustainability agenda is divided into two focus areas: responsible and trusted partner, and sustainable productivity. Both of the focus areas consist of the most material topics, including actions and goals with respective KPIs. Goal-setting, particularly for the sustainable productivity category, will continue during 2019.

Responsible and trusted partner

By ensuring the sustainability of our own operations, we create trust. We must comply with legal requirements, meet the expectations of different stakeholder groups, and serve as an example in the communities where we operate. A responsible and trusted partnership creates the foundation for a strong brand and profitable business.

 [Read more about the topics, targets and progress on pages 28–34.](#)

Sustainable productivity

We improve our customers' productivity by bringing them solutions that are more sustainable, more efficient and safer. The importance of environmental efficiency is constantly growing, and our customers are looking for solutions that offer them productivity, efficiency and usage of fewer natural resources. We need to understand our customers' expectations and to see the level of our performance from their point of view.

 [Read more about the topics, targets and progress on pages 35–40.](#)

Sustainability agenda

Key sustainability areas for our business and our stakeholders



UN Sustainable Development Goals



Metso's sustainability agenda and related action plans and targets are aligned with the UN Sustainable Development Goals (SDGs). We have mapped the SDGs most relevant to each of the topics in our sustainability agenda.

 We have linked the SDGs with our sustainability agenda topics and targets on pages 34 and 40.

How we create value

Megatrends: urbanization, growth of middle class, scarcity of natural resources, climate change, circular economy, digitalization

Vision: the best choice for sustainable processing and flow of natural resources

CAPITALS



WHAT WE DO

We drive profitable growth and sustainable productivity across our customer industries to create value for our customers, shareholders and other stakeholders



OUR IMPACT: SUSTAINABLE PRODUCTIVITY

OUTPUTS

Direct

- Equipment, services, spare parts and consumables for mining and aggregates processing and waste and metal recycling
- Industrial valves, controllers and related services

Indirect

- Solutions to solve global environmental challenges
- Contributions for modern consumables
- Promoting recycling

BENEFITS

Customers

- Sustainable and efficient access to processing and recycling of key materials
- Innovations for productivity, energy-efficiency and safety
- Lower risk, increased production output and reduced operating costs

End-customers

- Commodities for modern living
- Infrastructure for growing population
- Solutions for stricter legislation and waste challenge
- Efficient flow of liquids

Economic value created *

Society EUR **92** million

Shareholders EUR **157** million

Employees EUR **638** million

Suppliers EUR **1,859** million

Customers EUR **3,173** million

Environmental impact

733,700 tons

CO₂ emissions avoided through Metso's technology

137,198 tons

CO₂ emissions from Metso's own operations

Social impact

88%

employee engagement

23,922

risk observations

EUR 550,000

for donations and sponsorships

* Calculated according to GRI standards

Our role in responding to the megatrends

Mining, aggregates, recycling and other process industries make today's modern lifestyle possible. However, growth in consumption combined with forces like urbanization and climate change pose challenges to societies, which requires intelligent and sustainable decisions.

Depletion and degradation of mineral grades requires more processing to produce as many end products as before. With environmental requirements tightening, solutions for energy or water conservation as well as for waste handling are critical for all process industries.

We have identified the megatrends and industry drivers that have the greatest impact on us and our customers. Metso's technology and expertise can help our customers find the right solutions to these challenges.

Urbanization and growth of the middle class

An increasing share of the world's population lives in cities instead of rural areas, and these hubs continue to attract more people. Urbanization will keep driving infrastructure spending and global demand for minerals. Construction in urban

environments sets requirements for reducing the impacts on people and the environment.

Metso has the expertise to tackle the growing need to operate in densely populated environments like city centers, significantly reducing noise and dust levels during the operation of processing equipment.

Growth of the middle class and rising living standards are also increasing the importance of our customer industries globally. Higher copper, lithium and cobalt demand is driven by technology advances and the increasing need for electronics and electric cars. We work closely with our customers to respond to their varying minerals processing needs.

 [Read more about our solutions for urbanization and growth of the middle class on pages 36–40.](#)





Upper:

Recycled asphalt is now routinely accepted in asphalt paving mixtures as an aggregate substitute. Metso's technology has made it possible to recycle 90–100 percent of the recycled asphalt product in hot mix.

Lower:

Optimization of the existing assets and processes is now the key to driving productivity at mine sites. With innovative tools like Metso Metrics, processing plants can make the most of the assets they already have in place.

Climate change and scarcity of natural resources

Scarcity of natural resources leads to processing of harder ores and bigger overall volumes. This increases the demand for wear and spare parts and for new equipment solutions that offer higher productivity. Policies to combat climate change are shifting demand towards solutions that are based on more energy-efficient technologies.

With Metso's advanced technologies, customers who typically manage very energy- and water-intensive processes are able to achieve significant savings in energy and water consumption and in operational efficiency. These process-related benefits have vast potential globally also in the future.

 [Read more about our solutions for climate change and scarcity of natural resources on pages 36–40.](#)

Circular economy

The 'from waste to value' concept is an expanding trend, with recycling becoming more and more important for consumers and businesses alike. For our customer industries, there is a growing demand for water efficiency and closed loops.

Traditional barriers between primary raw materials and waste are gradually disappearing, as process waste and by-products are being considered as secondary raw materials. We offer equipment solutions for metal and waste recycling and the recycling of aggregates. In addition, Metso's services business helps customers improve their performance and extend the life span of their existing equipment.

 [Read more about our solutions for circular economy on pages 37–38.](#)

Digitalization

Digitalization is changing the way industries operate and creating new opportunities, especially related to performance improvement and better interaction with customers.

Metso's Digital Office works closely with customers and distributors to fully embrace the possibilities of digital solutions for our customers' businesses. We already have a wide portfolio of technologies to collect, analyze and act on data, including expert systems, flow sheet simulation tools and advanced instrumentation. Further, we are expanding our capabilities to better remotely support customers in their process optimization.

 [Read more about our digital solutions on pages 25–26.](#)

Megatrends in China

China is one of the booming economies of the world, with a growing population and a need for considerable infrastructure investments. The younger generations are also more aware of climate change and circular economy thinking.

Growth drivers in China are many. There are fewer small quarries and a lot of consolidation in the aggregates business. In addition, quarry licenses are being extended which creates investment appetite among the quarry owners and supports their confidence for the future growth. Motorways that are today built mostly out of concrete, will have to be replaced with asphalt in the future. In addition, China has banned the use of river sand, which is the most common construction material. Today all sand used must be manufactured sand. All this supports the aggregates business to an extent in the coming years.

 [Read more about our solutions for aggregates production on pages 36–40.](#)

Operating environment and customer industries

Customer industry	Mining	Aggregates	Recycling	Other process industries
Sales as % of total sales	51%	26%	4%	19%
Industry characteristics	<p>Mining is driven by global prices and demand for metals and minerals. The mining equipment market is, thus, cyclical in nature. The mining services market also follows the cycle, though to a lesser extent, due to ongoing need for parts and services for production at existing mines. Further drivers are expansion projects, both green and brownfield, and economic growth.</p> <p>The customer base consists of large global miners, major and mid-size regional operators and also junior miners. Miners' priorities are safety, availability, productivity and environmental footprint.</p> <p>The global mining equipment market is highly competitive with a few large global players and several smaller, lower-cost ones who are typically focused on specific products and geographical regions.</p>	<p>Demand for aggregates machinery is largely driven by the overall level of construction activity, particularly in projects related to infrastructure development.</p> <p>The main customer segments served are aggregates and cement producers, quarries, and construction companies. The majority of customers are small- and medium-sized companies, as well as contractors. There are only a few major aggregates producers in the market globally.</p> <p>The global aggregates equipment market is currently composed of some large international players, and a constellation of smaller, more localized ones.</p>	<p>Metal recycling demand drivers include scrap prices, steel demand and the cost of alternative steel production methods. Waste generation rate is the key demand driver in the waste recycling industry. The overall recycling equipment demand is also affected by government regulations.</p> <p>The customer base for the recycling business is mixed and includes the automotive industry, scrap yards, steel mills, waste handlers, plant builders and the cement industry.</p> <p>In both metal and waste recycling, the competitor landscape is fragmented with many small, local competitors and a few large players focusing mainly on their domestic market.</p>	<p>Valves are used across a wide variety of process industries worldwide, which makes the industry less sensitive to industry-specific fluctuations. End product prices, production capacity, new projects, and energy markets are the main demand drivers in the process industries.</p> <p>Customers have an increasing focus on efficiency and reliability as well as on effective maintenance to avoid disruptions in the production process.</p> <p>Process industry flow control markets are highly fragmented and competitive with a few large global players who are present in most markets, as well as a big number of smaller, local ones.</p>
Our offering	Crushers, screens and feeders, grinding mills, hydrocyclones, flotations, pyro processing, materials handling equipment, slurry pumps, spare and wear parts, and services	Crushers, screens and feeders, portable plants, Lokotracks, spare and wear parts, and services.	Crushers, metal shredders and shears, stationary and mobile units, metal balers and briquetters, N series for the scrap industry, and services .	Standard and severe service control valves, emergency shutdown valves, ball and butterfly valves, automated on-off valves, intelligent valve controllers, and services.
Operating environment in 2018	<p>The global mining market continued to improve</p> <p>Miners' investments continued to recover and the majority of investments were replacements and brownfield projects. Greenfield projects were still fairly limited.</p> <p>Miners showed increasing interest in the opportunities of digitalization and new technologies. However, they still remained cautious on new investments and placed focus on cost containment and productivity improvements.</p>	<p>Global construction market activity continued to grow.</p> <p>Development was especially good in the United States and India, especially due to large infrastructure investments. In China, the market was also growing.</p>	<p>In waste recycling, the market grew along with the increasing solid waste generation rates. In metal recycling, scrap availability continued to rise.</p>	<p>Oil and gas downstream project activity recovered, while aftermarket spending, upgrade and turnaround activity remained healthy despite the political instability and trade disputes impacting the oil price in the last quarter of the year.</p> <p>Demand in the chemical market remained favorable, driven by China and the rest of Asia. Chemical project activity also picked up.</p> <p>In pulp and paper, increasing demand for packaging board drove project activity, which increased especially in China.</p>



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Our profitable growth strategy

Metso drives profitable growth and sustainable productivity to create value for its stakeholders. We have a leading position in the markets and industries we serve.

Our vision and focus

We want to be the best choice for the sustainable processing and flow of natural resources for our customers in the mining, aggregates, recycling and various other process industries. Our focus is on organic growth, complemented with acquisitions. Our strategy implementation is centered around five strategic fundamentals: customer centricity, service leadership, innovation, operational excellence, and people and leadership.

Organizational structure

Growing profitably requires a lean and agile organization that actively seeks growth and responds to changes in the operating environment.

Our organizational structure was renewed in the second half of 2017, and the change became effective on January 1, 2018. Metso has seven business areas: Mining Equipment, Aggregates Equipment, Minerals Services, Minerals Consumables, Recycling, Valves and Pumps, and they are externally reported under two segments: Minerals and Flow Control. The business areas are accountable for their own performance in terms of orders and sales, operating profit and cost of capital, and each contributes to the profitable growth strategy through their own initiatives.

The objective of the new structure is to improve strategy execution. The accountability of each business area has increased to enable faster implementation of growth and profitability initiatives and an agile response to market changes. Additionally, Metso has increased its focus on digitalization and on research and technology development to produce innovative new solutions for our customers.

The organizational changes have proven to support our strategy implementation. Results can be seen in strong volume growth and improved profitability across our businesses in 2018.

Our equipment and services offering

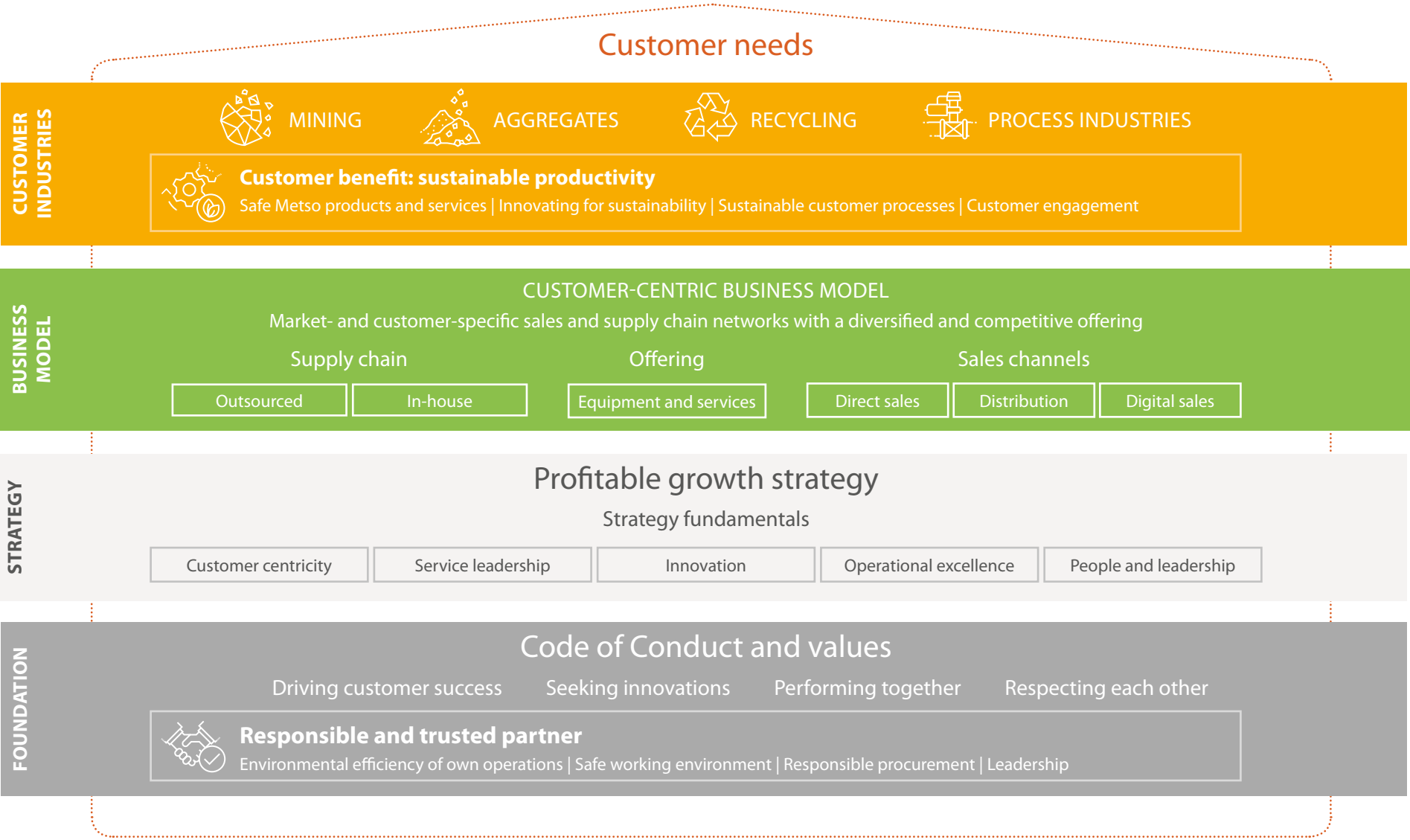
In addition to business areas, Metso has a market-specific sales and marketing organization that integrates business area offerings and supports close collaboration with our customers. To enable efficient customer service, we have some 80 service centers around the world. The global operations are further supported by around 30 production sites and around 40 distribution centers globally. To a large extent, our businesses operate under an operating model with outsourced supplier and distributor networks.

 [Read more about our digital solutions on pages 25–26.](#)

 [Read more about our offering for sustainable productivity on pages 35–40.](#)

Customer industry	Mining	Aggregates	Recycling	Process industries
Equipment	Mining equipment	Aggregates equipment	Metal and waste recycling equipment, spare parts and services solutions	Valves, valve controls and related services
Spare parts and services solutions	Mining spare parts, refurbishments and services solutions	Aggregates spare parts and services solutions		
Wear parts	Minerals consumables			

Agile business model for strategy execution



Our customer-centric approach

We have a customer-centric business model that helps us best serve our customers globally. Our wide equipment and services offering sets heavy requirements on our supply chain.

We work together with our customers to improve their productivity by bringing sustainable solutions for more efficient and safer operations, equipment and services. Many of our customers operate in remote locations and we want to serve them wherever they are. Market areas are at the forefront of managing the customer relationships.

We have optimized what we manufacture in-house and what we trust our suppliers to provide. This provides us the flexibility needed in a cyclical business. Continuous development of our supply chain and quality are at the focus of optimizing our operations to the changing needs of our customers.

Our sales channels are tailored to serve customers in various ways. We have our own direct sales teams and experts in both equipment and services that provide our customers deep competence in technology and processes. In many areas we work with distributors to jointly offer the local presence required by our customers. Increasingly digital sales channels are a way to reach our customers and we look to develop our sales channels with an omnichannel mindset.

Market- and customer-specific sales and supply chain network

	Mining and recycling	Aggregates		Process industries	
Sales	Direct sales	Direct sales	Distributors	Direct sales	Distributors
Original equipment manufacturing	Mostly outsourced	In-house	Outsourced	In-house	Outsourced
Spare parts	Mostly outsourced	Mostly outsourced		In-house	Outsourced
Wear parts	Mostly in-house	In-house	Outsourced		
Professional services	Strong in-house field service and repair center capabilities	Majority of field service and repair center work through authorized distributors		Strong in-house field service and repair center capabilities	

Strategy fundamentals for growth

Our five strategic fundamentals support the execution of our profitable growth strategy.

Customer centricity

Customers are at the core of our strategy. We engage with them to understand their current and future needs. We have implemented a unified approach to measuring customer satisfaction – Program Engage – to provide feedback and insight into what our customers expect from us, how we are serving them at the moment and how we can improve the customer experience in the future.

 [Read more about our customer engagement program on pages 35–36.](#)

Creating value for customers

In 2018, we helped our customers excel in many ways. A few examples are featured here. We regularly publish customer references and results stories in our Results Showroom.

In 2018, we were recognized for the fifth time as a leader among suppliers of the Chilean mining industry. We were the best in the “Grinding performance” and “Plant maintenance services” categories, and we were awarded for the “Most recognized international mining supplier” and the “Most innovative international supplier”. The mining Suppliers’ Ranking by Phibrand is a globally unique survey in the mining industry, providing an outlook on how the suppliers are positioned in the market.

Reducing downtime at Tharisa mine

In 2018, Tharisa Mine in South Africa reached out to Metso, as they wanted to reduce their plant’s downtime. The full process of replacing linings in the primary ball mill takes around 48 hours to accomplish, and as the mill is capable of processing 250 tons of ore an hour on every day of the week, the downtime amounts to a significant disruption in production.

We helped Tharisa achieve a drastic reduction in downtime with the Metso Megaliner mill lining concept. The mill was originally equipped with 180 liners that had to be removed individually, which was very time-consuming. During the project, the liners were replaced with just 30 modules. In addition to improving profitability, the switch also meant a significant improvement in operator safety, as the Megaliner eliminates the need to have people in the ‘danger-zone’ inside the mill.

 [Read more about customer successes in our Results Showroom](#)



Upper:

We have been establishing a strong presence in Chile since 1970 and currently have five locations with around 1,100 employees.

Lower:

Tharisa is the first South African mine to adopt the Megaliner, thanks to the relationship that has developed between the two companies over the years.



Upper:

Suzano already had efficiently maintained operations in place, but opportunities for improvement could be identified e.g. regarding corrosive environments and equipment subjected to greater vibrations.

Lower:

Our focus is on equipment full lifecycle; this means that development initiatives are performed collaboratively between the business areas.

Service leadership

We can offer our customers a full global presence and a service offering that covers solutions for the whole equipment lifecycle.

Increasing our level of service

In the Minerals Services and in the Minerals Consumables business areas we aim at broadening our offering and services concepts with the help of digitalization and innovative technologies. Metso's own extensive installed base also offers growth opportunities.

However, our growth is not limited to our own installed base. In 2018 we increased our level of service and managed to gain market share. We have applied a customer-centric model, which helps us comprehensively solve customers' problems at mine sites.

In 2018, the Aggregates Equipment business has managed several development initiatives. The LT106 Lokotrack™ has been used as a showcase product in which all new product lifecycle management capabilities have been introduced first. These capabilities are then applied to all new products by default and scaled to the existing product offering when beneficial to the customer.

Predictive maintenance with on-off valves

In 2018, we helped Suzano Group, a Latin American pulp and paper producer, with a valves solution that predicts faults in highly critical processes and reduces production downtime. The old conventional valve models were replaced with advanced diagnostics-equipped devices, enabling access to online features, in the company's most advanced facility in Brazil.

Innovation

Continuous renewal and innovation are critical for our competitiveness. We secure sustaining differentiation with targeted investments, based on business- or product-specific roadmaps. In 2018 we accelerated our R&D activities, clearly increasing the spend to EUR 39 million.

Digitalization is providing opportunities for growth, and the role and importance of technology will continue to increase. Our customers are looking for business benefits especially from data-driven process improvements.

 [Read more about our digital solutions on pages 25–26.](#)

Operational excellence

To maintain our leading market position, we seek excellence in the way we operate as well as in quality and safety. Ownership and accountability were given higher priority in the business areas in 2018. Our way of working has also changed and some metrics were changed to further enable profitable growth.

Significant improvement potential

In 2018, we concentrated on incremental improvements in operational excellence to improve profitability across our businesses. The strategic objectives include project execution, efficiency in our own assembly and field service operations as well as sales terms and conditions.

In 2018, our deliveries in the Aggregates business area increased 25% in total and 20% organically. This was possible thanks to several internal efficiency improvements, such as changing our ways of working and strengthening the organization to support operational excellence.

Even though orders have grown significantly in 2018, we have managed to increase our production and delivery levels respectively. For example, in our Tampere plant, in Finland, we improved our on-time-delivery compared to 2017. At the Alwar Plant in India, production growth has been significant thanks to operational improvements and production capacity investments.

People and leadership

Metso is a global workplace where teams work in close collaboration to generate results for our customers.

Our results-driven and respectful culture is made up of competent and dedicated people. We seek and share ideas, knowledge and better ways of working together. Our people strategy focuses on attracting and retaining the right people in the right places and engaging them to perform together.

We motivate and engage our employees


In 2018, we conducted an employee engagement survey and the results were excellent. The total engagement index increased from 85% to 88%, indicating high employee commitment.

During the year, we hired more than 2,500 new employees to strengthen our local operations; successful acquisitions also contributed to our workforce, e.g. in India around 300 people joined Metso.

The Leadership Development Portfolio of training with locally delivered solutions had 3,946 participants in 2018, and

243 people in total participated in our Sales Excellence program. We also started a program to further develop project management competences in mining; this gives project managers more in-depth knowledge of processes and procedures as well as risk management, finance and leadership. The program has been running in five countries with approximately 80 participants, and it will continue in 2019. We also focused on employee training on compliance, data privacy and information security.

In addition, we implemented a renewed Performance and Development Discussion process to ensure that whenever needs arise, our managers and employees have the possibility to reflect on their targets, achievements and development, and to give and receive timely feedback.

 [Read more about people and leadership on pages 4 and 33–34.](#)



Our culture is at the core of attracting and retaining people. Metso's employer brand is summarized in the #MetsoLife concept. In 2018, #MetsoLife visibility was used internally and externally in different channels.



Digital innovations

Listening to our customers and creating innovative solutions for them with the help of digitalization is key for us going forward.

New predictive maintenance solution for mining industry

In 2018 we expanded our digital Metso Metrics offering with the launch of a new predictive maintenance solution for mining equipment, to help maximize the uptime and performance of comminution circuits. Metso Metrics is designed to provide global mining customers with improved visibility and new insights into their equipment and processes with analytics, condition monitoring and predictive maintenance, backed up by expert support from Metso.

The combination of advanced technology and expertise brings our services closer to customers by improving collaboration, asset reliability and solutions' optimization. Metso Metrics can increase asset uptime and availability in the comminution circuit, achieving higher energy efficiency and more stable product quality, lowering overall maintenance costs for miners and moving from unplanned towards well planned and safer shutdowns.

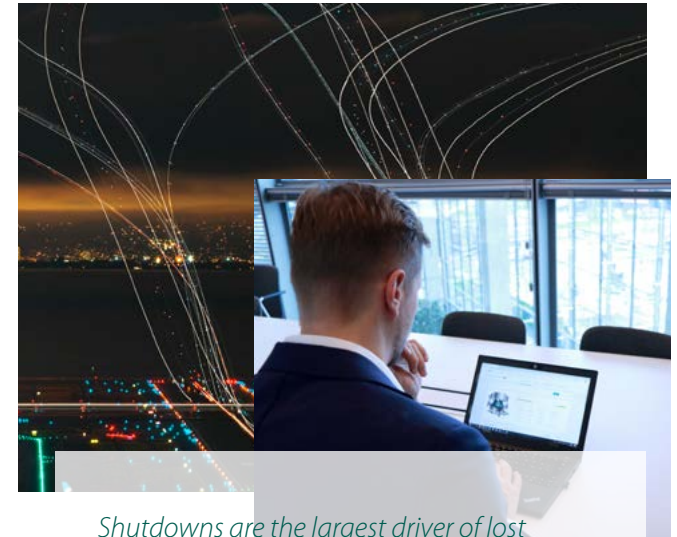
This new mining solution is the latest addition to our digital services. It covers our primary gyratory crushers, cone crushers and vibrating screens. Eventually, it will also cover other types of minerals processing equipment, such as mills. The first generation of Metso Metrics tools was launched in 2017 to help optimize aggregates production in quarries and at contractor sites. We have also developed a similar solution for waste recycling equipment.

3D printing of valves

In valves, 3D printing is seen as a viable emerging technology of the future. The first Metso valves with 3D printed components were delivered to a customer at the end of 2018.

In product development, we 3D print prototypes in order to verify designs in, e.g., eccentric butterfly valves. With the help of 3D printing we can also visualize our designs and even collect early feedback from our customers. 3D prints of valve components are also used for demo and training purposes.

3D printing does not require production tooling, such as casting patterns. This makes production of individual components economically feasible and enables us to customize valve features for each valve individual and customer. As an example, noise attenuation can be maximized for a certain opening angle of a valve used by the customer.



Shutdowns are the largest driver of lost production. Unplanned downtime and seemingly unpredictable breakages are something that can be addressed with new digital tools. This is where digitalization coupled with expert support really comes into play - connecting the right data with the right people.



Upper:

A new project digitalization tool for valves was taken into test use in mid-November, and we have already created quotes for over 1,000 valves for different types of complex projects and EPCs.

Lower:

The next generation e-commerce platform my.metso.com makes it easy for our distributors around the world to order original spare and wear parts.

Project digitalization in valves business

Since more than 20% of the valves business revenue comes from the project business, we started rolling out a new project digitalization tool in 2018 that offers a significant competitive edge. It simplifies and speeds up the valves quotation process by systematic, reliable digitalized process to help produce accurate quotations.

A digital data exchange between is an important step towards creating more efficiency in large complex projects. The feedback from EPCs on the tool's opportunities and advantages has been positive. Some of them have also expressed a wish to learn from us to speed up their own digitalization development. We are on the right track with our initiative to significantly improve customer satisfaction.

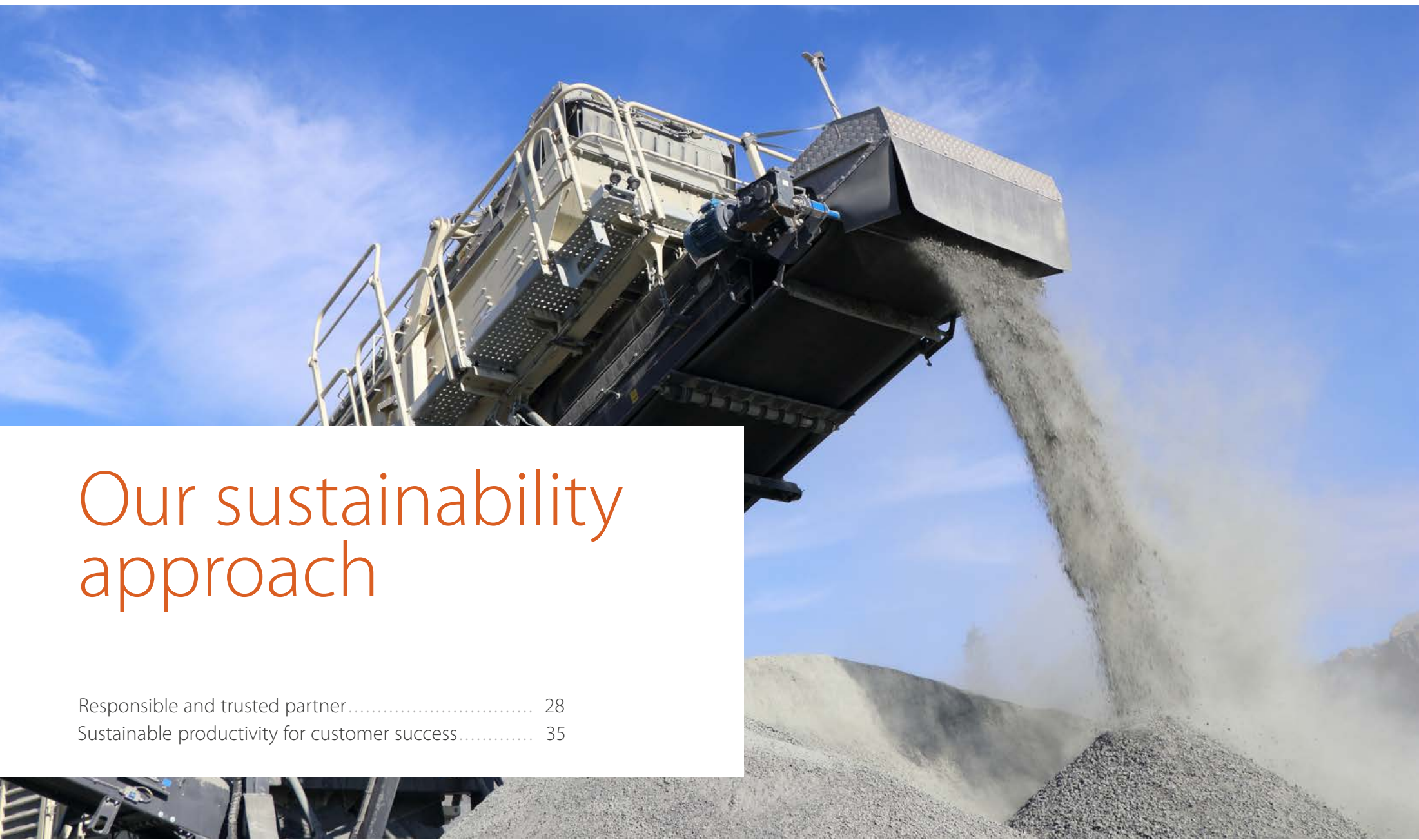
Experimental mindset with Digital Garage

In June 2018 we launched Digital Garage to promote agile and experimental mindset. Digital Garage works with the business and market areas to create digital business development ideas with the aim to deliver rapid prototypes. We screen ideas for their potential to substantially improve the customer experience, and we try to focus on a maximum of ten ideas per year. Prototypes that draw positive feedback from customers and key stakeholders are qualified for further investments.

Digital Garage delivered three prototypes in 2018. One of them was an immersive Virtual Reality training to simplify and speed up the learning experiences for our frontline sales. Metso equipment are highly specialized to cater to a variety of customer needs. It is important that frontline sales are well versed in the complex details of our equipment in order to convey the key value proposition to our customers.

My.metso.com

During 2018 we also continued to expand our online offering and functionalities to help distributors and our own sales people better serve our customers with our e-commerce platform, my.metso.com. This parts store is equipped with spares and wears for aggregates, pumps and waste recycling. Since its launch in January 2018, it has rapidly achieved the level of expectations of our distributors. The store for aggregates and mining equipment will soon be online as well.



Our sustainability approach

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Responsible and trusted partner

A responsible and trusted partnership creates the foundation for a strong brand and profitable growth. By demanding sustainability from ourselves and our partners alike, we build trust.

Code of Conduct

Metso's Code of Conduct is our key corporate standard that everyone must follow. We respect all applicable laws and regulations and aim to share regulatory best practices and be a good corporate citizen wherever we operate. We demand in our third-party agreements that our suppliers, business partners and other stakeholders also follow standards that align with our Code of Conduct.

We train all our employees on the Code of Conduct every second year, and the next training will take place during 2019. In addition, Code of Conduct training is a part of the onboarding process for new employees. As an example, after a successful-business acquisition in India, almost 300 new employees were trained on the Code of Conduct within four weeks.

 [Read more about Metso's Code of Conduct in the Corporate Governance on page 9 and in the Financial Review on page 11.](#)

Human rights in the value chain

We respect human rights and support the execution of related global initiatives and policies. We also review human rights-related topics regularly and all our employees are entitled to be treated with respect, and no form of discrimination, harassment, or illegal threat is tolerated. We do not accept the use of compulsory, forced or child labor, nor do we tolerate slavery or human trafficking.

We monitor our global supplier network with established processes and tools to ensure that human rights are respected in our suppliers' operations and that they also follow standards similar to those stated in our Code of Conduct.

Managing human rights issues is incorporated into our employment practices and processes globally. Our Health, Safety and Environment (HSE) Policy defines our commitment to responsible management of HSE in our own operations and in dealings with third parties. All Metso employees have signed employment contracts that cover salaries and other terms of employment.

We continuously follow changes in local regulations and agreements, e.g. with regards to working hours and overtime. We regularly review external salary benchmarks and follow changes



in local regulations to create global salary range references and ensure appropriate salary levels.

In 2018 we assessed how human rights are taken into consideration by external workforces at Metso's units and sites. We seek to ensure that external workers have written and signed contracts, age certificates are verified and working hours and overtime is tracked.

Training on human rights policies and procedures takes place through Metso's Code of Conduct training. The plan is for the 2019 training to have a special focus on human rights.

 [Read more about human rights and supplier audits on page 32 of this report and in the the Financial Review on pages 9–11.](#)

Safe working environment

Our aim is to provide a safe and healthy working environment for all our employees. In 2018, we failed to improve our safety performance and regrettably had one fatal incident. We ended the year with an LTIF of 2.8. (in 2017: 2.6). While our production volume has increased, our safety management processes and the level of commitment have not sufficiently improved.

We conduct special safety excellence training for the employees whose work is related to services and production. The training aims at explaining both the business and personal aspects to safety and helps in finding concrete ways to improve safety in everyday work. The target is to ensure a thorough understanding of our safety requirements and stronger employee engagement throughout the organization. In addition, our target is to provide eight hours of health and safety-related training per employee annually, regardless of their position. This training consists of both localized and common content in a classroom or e-learning format.

Human rights and compliance topics, target and progress

Topic	Targets 2018–2020	Progress in 2018
Code of Conduct	Code of Conduct training for all employees	Next training for all employees is in 2019.
	New employee Code of Conduct trainings	All of new employees from the acquired company in India received Code of Conduct training.
Human rights in the value chain	Human rights reviews in own operations	Annual human rights review and external workforce assessment conducted.
	Supplier audits including human rights reviews	99 sustainability supplier audits conducted.
Zero tolerance for corruption	Code of Conduct training for all employees	Next training for all employees is in 2019.
	E-learning and classroom training for employees	Over 20 classroom trainings for different functions globally.
	E-learning development for Metso representatives in 2019	Classroom trainings for Metso representatives in China, covering about 100 persons. Representative workshop to develop content e-learning.

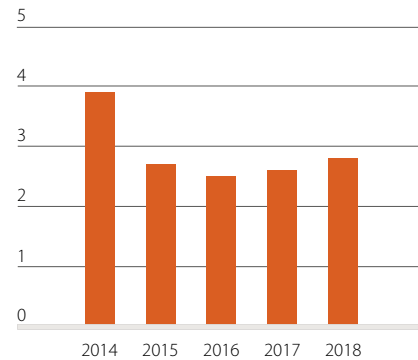
 [Read more about human rights in the Financial Review on page 10 and in the GRI Supplement on page 11.](#)

Safety topics, targets and progress

Topic	Targets 2018–2020	Progress in 2018
Zero accidents	LTIF (lost-time incident frequency) <1	LTIF was 2.8 (in 2017: 2.6)
	Individual HSE target of 2 risk observations per employee	23,922 risk observations
Training and awareness	8 hours of HSE training per employee	185,000 training hours
	Global Safety Excellence training program	Around 3,000 participants in Global Safety Excellence training

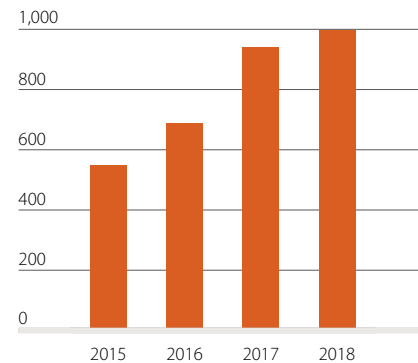
 [More safety figures available in the GRI Supplement on pages 9–10.](#)

LTIF*



* Lost-time incident frequency reflects the number of incidents resulting in an absence of at least one workday per million hours worked.

Risk observation frequency *



* Risk observation frequency reflects the number of risk observations per million hours worked.

To improve our safety performance, we have several processes in place. Our internal HSE audit function bi-annually audits the hidden hazards at all major locations and plans the corrective actions. In 2018, HSE audits were carried out at 19 locations. In addition, we launched a new reporting tool and an application for reporting HSE data more transparently and accurately. During 2018, we also initiated a gap analysis relating to minimum safety standards. These form the baseline for our common work procedures.

We encourage all employees to discuss safety-related matters and to pay attention to potential hazards. Face-to-face safety conversations are a part of every manager's individual targets and all employees are expected to actively report risk observations. In 2018, a total of 23,922 (19,895 in 2017) risk observations were reported.



We regularly audit the environmental safety of our own operations. In 2018, internal HSE audits focused on improving environmental efficiency. Based on the internal and external HSE audit findings, we have made corrective actions and will follow their implementation in 2019. In 2018, for example, we further improved the chemical leakage protection in our units based on a finding made in an HSE audit the previous year.

Environmental efficiency of our own operations

Most significant environmental impacts arise from customer processes when our equipment is in use. For example, over 90 percent of energy use takes place in the rock crushing phase, not during the manufacturing of the crusher. However, to ensure the environmental efficiency of our own operations, we have also set internal environmental targets.

Topics, targets and progress for the environmental efficiency of our own operations

Topic	Targets 2018–2020	Progress in 2018
CO₂ emissions and energy	Energy saving and CO ₂ -emissions reduction target of 20% in total by 2020	A total of 76,600 MWh (15%) of energy has been saved since 2010. These actions have reduced CO ₂ emissions by 23,300 tCO ₂ .
Water	15% for water usage efficiency target in our own operations in water-stressed areas by 2020	2,000 m ³ (2.4%) of water was saved in 2018. Since 2014, a total of 7,500 m ³ (8.6%) of water has been saved.
Waste	Percentage of total waste sent to landfill reduction target of 15% by 2020 from 2014 level	Target was reached already in 2017. Landfill per total waste generated was reduced by 1% in 2018.

 More environmental figures available in the GRI Supplement on pages 5–7.



Water, waste and energy efficiency of our own operations

We emphasize water efficiency especially in water-scarce areas. That's why we have identified our most water-intensive units and new, unit-specific targets have been set to decrease their water usage. The water savings both during 2018 and since 2014 resulted from actions like recycling water when possible, utilizing rain and surface water, updating the sanitary facilities and taps, and regularly checking for leaks. We also save water through water maintenance programs, better work method trainings, changes in water processes and storage, and installation of wastewater treatment equipment and rain water collection.

In regards to waste, in 2018, we continued to further improve our performance. The targets have been reached, thanks to actions such as improved sorting and the re-use of received packing materials and pallets.

In 2018 we improved our energy efficiency by e.g. switching to LED lighting at several plants. We also installed timers to reduce excessive ventilation and improved the efficiency of

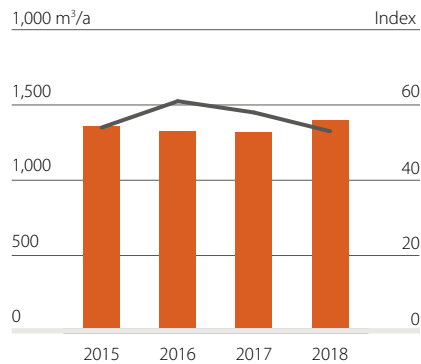
heat treatment processes. In addition we revised our unit-level investment plans regarding energy savings and updated our internal plant energy targets for 2019.

Environmental hazards

Our target is zero environmental accidents. During 2018 we had zero material spills or other environmental accidents. Proactive actions, such as risk observations, are vital for taking corrective actions in advance.

We started a chemical substitution project already in 2017. As a result, some hazardous chemicals have been removed from use or replaced with a safer options. The new chemical management system initiated in 2017 was implemented in more locations during 2018.

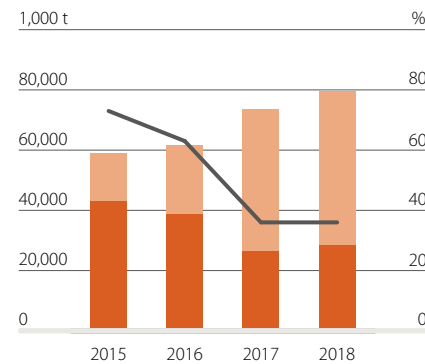
Water consumption



● Total water consumption, 1,000m³
— Index*

* The index is proportioned to Metso's sales. For comparison, the reference year is 2014 = 100 index value

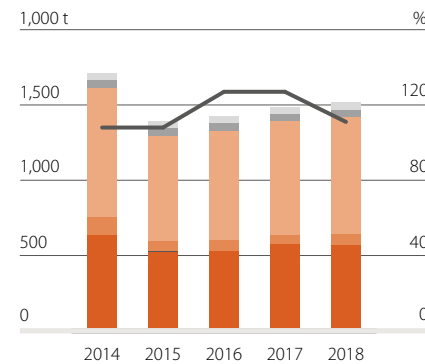
Landfill waste



● Landfill
● Other waste*
— Landfill per total per total waste generated, %
— Index*

* Recovery, Incinerated, Recycled, Composted, On-site storage

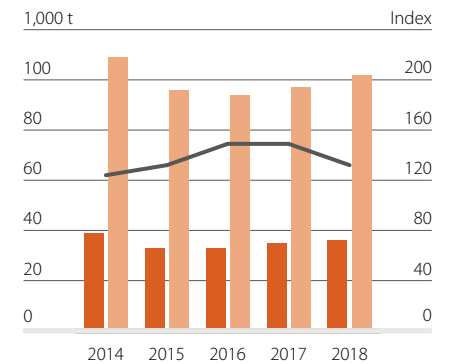
Energy consumption



● Coal
● Natural gas
● Oil
● District heat
● Electricity
● Steam
● Other
— Index*

* The index is proportioned to Metso's sales. For comparison, the reference year is 2009 = 100 index value

CO₂ emissions



● Direct emissions
● Indirect emissions
— Index*

* The index is proportioned to Metso's sales. For comparison, the reference year is 2009 = 100 index value



Procurement topics, targets and progress

Topic	Targets 2018–2020	Progress in 2018
Supplier assessments and audits	65 sustainability supplier audits per year conducted in higher-risk areas	99 sustainability supplier audits conducted.
Minimum supplier criteria that new suppliers must fulfill	All new suppliers in higher-risk areas screened on sustainability issues.	Improved supplier onboarding process that included e.g. acceptance of sustainability supplier criteria; sustainability self-assessments and audits for new suppliers.

Responsible procurement

Metso's Code of Conduct and Sustainable development criteria for suppliers set the standards that we expect our suppliers to follow, and they are the starting point of any new or existing business relationship. Our supply chain management monitors that the standards are followed. To ensure quality and sustainability in the supply chain, we have developed processes covering the whole supplier network.

The direct procurement spend in 2018 was a total of EUR 1,547 million. As a global company, Metso has over 7,000 suppliers in more than 70 countries. The most significant procurement countries in 2018 were USA, Finland, India, China, Brazil, Sweden and France.

Supplier assessment and audits

We conduct third-party sustainability supplier audits together with external auditing partners in higher-risk countries, such as South Africa, India, China, Turkey and Brazil. In addition, our procurement and quality assurance teams conduct internal sustainability supplier audits that include site visits.

As a starting point, we carry out sustainability-related risk mapping within our existing suppliers to determine the potential high-risk suppliers to be audited each year. By defining the risk levels, we can focus on the suppliers with the highest risk potential in their operations.

We utilize a human rights dataset for mapping and identifying human security, labor rights and protection, civil and political

rights, access to remedy and environmental risks. In addition, we consider the supplier category and the spend volume.

The screening of new suppliers is included in our procurement processes, and our target is to evaluate all new suppliers in higher-risk countries against our supplier sustainability criteria. Based on the sustainability risk assessment of the new supplier, procurement decides on the need for an in-depth audit and/or further actions.

To improve the sustainability performance of our suppliers, we agree on corrective action plans together with the supplier after each sustainability audit. Suppliers are required to provide evidence of the corrective actions that have been implemented and are subject to a re-audit, where necessary. By the end of 2018, 73 percent of the corrective actions from years 2017–2018 had been implemented.

Future development

We are continuing with our internal and third-party sustainability audits for our higher-risk suppliers and are targeting at least 65 sustainability supplier audits also in 2019. In addition, we aim to further develop our processes in tracking the corrective actions. Our 2020 target is that all new direct suppliers in higher-risk areas are screened on sustainability issues.

We aim to initiate sustainability training for our procurement and supplier quality assurance teams annually. Based on the needs in different market areas, we will also organize more in-depth training on sustainability supplier auditing.

Leadership

Competent and committed people enable Metso's results-driven and respectful culture. Good leadership is a key success factor in making this happen. Employee engagement drives both employee performance and customer success.

Metso as an employer

In 2018, we reinforced Metso's employer brand that is summarized in the #MetsoLife concept. We strive to strengthen the internal working culture and increase our employees' pride in their own and their teams' work as well as in their workplace. #MetsoLife highlights for potential new employees what it's like to work at Metso, and what the working culture is.

At the core of our employer brand are the themes that describe Metso as a place to work:

- World-leading solutions driving customer success
- Global workplace where teams work closely together
- Results-driven and respectful culture

These themes are based on internal research across the organization globally. The 2018 PeoplePulse employee engagement survey results reflect our #MetsoLife themes.

 [Read more about #MetsoLife](#)

Metso leadership principles



Show the way
forward

Build
engagement
and inspiration

Drive
results



Lead
yourself

Leadership topics, targets and progress

Topic	Targets 2018–2020	Progress 2018
Employee engagement	Employee engagement survey	Global survey conducted in 2018. Engagement index 88% with 87% response rate.
Leadership development	Global leadership development portfolio of trainings available for managers	3,946 participants.
Diverse expertise	Valuing and promoting a diverse workforce and providing equal opportunities.	Metso-wide learning and training community established, global learning platform to be introduced in early 2019. Share of women in expert and leadership positions: 18%.

 [More employee figures available in the GRI Supplement on pages 4 and 8–11.](#)

PeoplePulse employee engagement survey

In 2018, we conducted the PeoplePulse employee engagement survey with excellent results and an 87 percent response rate (2016: 85%). Based on the results, 88 percent (in 2016: 85%) of our employees feel strongly engaged in their own work and committed to Metso as an organization. The experience about Metso as an employer has developed favorably, and the survey results show that Metso employees feel highly empowered to do their work.

Our employer image as perceived by our own people is strong, and 81 percent (in 2016: 76%) would recommend Metso as an employer. These are valuable strengths to build on.

The PeoplePulse survey is most of all a development tool to help teams understand their current situation and to further develop the way they work together. As a result of the survey, the teams discuss their results, identify development areas and integrate development actions into their daily work.

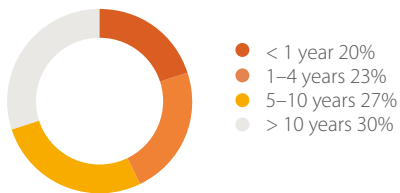
Leadership development

Our strategy, values and leadership principles create the foundation for developing our current and future leaders. Leadership is key to our performance culture, and we put special emphasis on working together. Leaders have a key role in enabling individuals and teams to grow and in empowering them to give their best and reach their full potential.

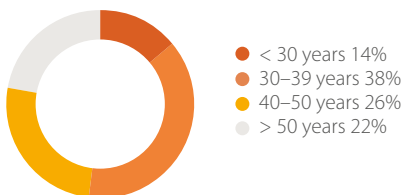
In addition to PeoplePulse, we have several other tools that leaders can use to support good collaboration and communication within their teams:

- Performance and Development Discussions, i.e. performance review, target setting and development discussions. The renewed process introduced in 2018 aims at ensuring a continuous dialogue: Whenever needs arise, our managers and employees have the possibility to reflect on their targets, achievements and development, and to give and receive timely feedback. (The target-setting completion rate is 90 percent.)
- Global Leadership Development Portfolio of training, including global programs and locally delivered solutions.
- Team development tools to recognize and fully leverage team strengths.
- A cloud-based people data tool that includes all global people data and processes for the employee lifecycle.

Personnel by length of service



Personnel by age group



Diverse expertise

The diverse expertise of our organization ensures a foundation for our success – we value diversity and provide equal opportunities.

Metso is diverse in many ways: Our employees represent 90 nationalities, operating in over 50 countries and in 176 locations. The combination of different backgrounds, wide range of service years and ages ensures diverse capabilities. To embrace this, we encourage our diverse expert community to learn and share knowledge together, as this makes us stronger and more agile in terms of renewal and innovation.

Currently, we measure gender diversity in leadership and expert positions. In 2018, 18 percent of the leadership and expert positions were filled by women. We take gender diversity into consideration in, for example, recruitment-related decisions.



88% of our employees feel strongly engaged in their own work and committed to Metso as an organization

Nationalities TOP 10

1. Finnish	13.7%
2. Indian	10.3%
3. US citizen	10.3%
4. Brazilian	9.1%
5. Chinese	8.5%
6. Chilean	8.1%
7. Swedish	5.9%
8. South African	5.7%
9. Australian	4.0%
10. French	3.0%

Read more about people and leadership on page 24.

Read more about our diverse people on page 4.

Read more about employee related figures in the GRI Supplement on pages 4 and 8–11.



UN Sustainable Development Goals

The SDGs most relevant to responsible and trusted partner.

Sustainable productivity for customer success

Metso's products and services help our customers to operate safely and at higher productivity and profitability while reducing their resource intensity.

The biggest threats and opportunities related to Metso and the environment and climate change are present at our customers' sites. With tightening legislation and scarcity of natural resources, our customers value the environmentally efficient and safe technology that we can provide.

In Minerals, we work to improve our customers' efficiency through reduced energy and water consumption, improved utilization of raw materials, as well as reduced emissions, noise and dust. In addition, safety is an overall priority for us and our customers.

Improved reliability, safety and minimizing emissions are the key sustainable productivity focus areas in Flow Control. Our customers value especially our efficient shutdown planning with on-time startup, which contributes to high plant reliability, availability and safety until the next planned shutdown.

Customer engagement

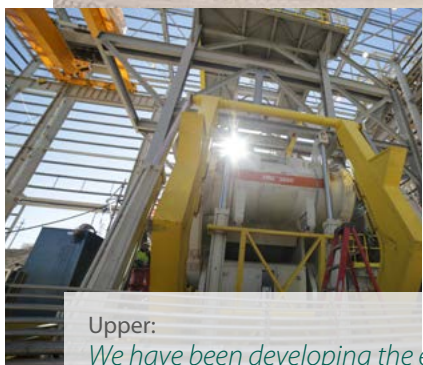
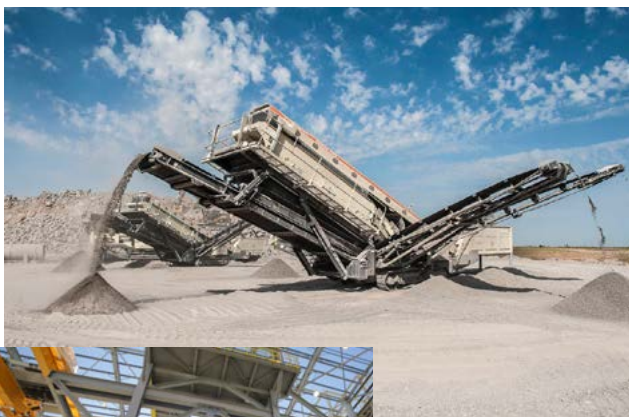
We listen to our customers' needs to be able to help them with their challenges.

Based on customer engagement and dialogue on sustainability, our customers value safety, resource efficiency, productivity and supply chain responsibility the most. A comprehensive understanding of customer needs enables us to solve their challenges with tailored solutions and provide them with improved performance and processes.

Our target is to develop our customer engagement and dialogue on sustainability issues through more proactive every day communication and marketing. In addition, to better understand the challenges our customers are facing, more structured annual discussions on their sustainability expectations are also needed.

In the last quarter of 2018, we conducted our customer satisfaction survey. In total, 4,700 customers from all industries responded. Their feedback was reviewed early in 2019 and the implementation of necessary improvement actions started immediately after.





Upper:

We have been developing the energy efficiency of our Lokotrack™ family for years. Based on calculations from our installed base, Metso Lokotracks™ have saved our customers 30,506,000 liters of fuel and 81,700 tonnes of CO₂ emissions in 2018.

Lower:

HRC™ technology can reduce the customer's energy consumption by 10 percent.

Continuous improvement for better customer satisfaction

To map out the customer experience, we utilize the Net Promoter Score (NPS) methodology in our annual global customer satisfaction survey. We gather and document our customers' feedback and analyze it both locally and globally to drive improvement actions and best practices. We also communicate with our customers about these improvement actions.

Our survey results reveal that customers very much appreciate our technical expertise and the quality of our products and services. They request proactive communication and agility especially with quotes, deliveries and services. We have several actions on-going to improve these processes and to allow more for transparent and proactive communication.

Innovating for sustainability

Metso's research and development (R&D) activities focus on solving customer challenges, such as global availability and cost of energy, water and raw materials. Our R&D projects have sustainability targets that are related to e.g. environmental efficiency, including energy and water savings, waste, material efficiency, reduction of CO₂ emissions and safety.

Our aim is to define sustainability targets for each new R&D project. Achievement of the targets is monitored. Our R&D expenditure in 2018 was EUR 39 million (EUR 27 million in 2017).

Innovating for more efficient solutions

The mining industry faces increasing energy costs, declining water resources, stringent environmental legislation, and lower grade ore bodies. Innovating for more energy-efficient solutions is one of the key drivers in the mining industry because the comminution process, including crushing and grinding, is the most energy-intensive and energy-inefficient stage of mineral production. Improvements in comminution efficiency can result in significant energy savings and have a large impact on the operating cost of a plant as well as conserve natural resources and reduce greenhouse gas emissions.

Of the new R&D projects started in 2018, 86 percent had set environmental efficiency and/or product safety innovation targets.

Energy savings with Metso Vertimill

Vertimills® are globally recognized as some of the most energy efficient grinding machines. They have been proven to grind more efficiently than horizontal ball mills, with a typical energy savings of 25–35 percent, and in some cases even 50 percent. In addition to grinding efficiency, reduced media consumption, lower installation cost, reduced maintenance, and reduced liner wear make the Metso Vertimill® the lowest total cost of ownership option in many applications.

Based on a review of the Vertimills® currently in operation and a comparison of their efficiency and media consumption relative to a ball mill, approximately 1,482,000 MWh of energy was saved and 652,000 tonnes of CO₂ emissions were reduced in 2018 (in 2017: 924,000 and 547,000 respectively).

More efficiency with high-pressure grinding roll technology

High-pressure grinding roll technology is another competitive grinding technology that we have been developing for years. It lowers specific energy consumption in comparison to conventional fine crushing and AG/SAG mills. Metso Hydraulic Roll Crushers (HRC™) are based on a design that provides a significant improvement over existing, well-proven HPGR technology. HRC™ technology is a flexible choice for customers and a leading solution that offers energy efficiency for crushing hard rock with relatively low moisture content and superior results in the size reduction of a variety of minerals in the comminution process.

In 2018, we launched Lokotrack LT200HP™, a crushing plant that can deliver fuel consumption savings of at least 15% compared to hydraulic-driven cone crushers.

Fuel consumption savings with Metso Lokotrack

Our customers who have secondary and tertiary crushing operations, such as producing aggregates for railway ballast, road construction, asphalt and concrete fractions, value fuel consumption and efficiency.

In addition to being more efficient, our new Lokotrack™ models features several safety and maintenance improvements, such as elevated service platforms to ensure safe and easy access to service and maintenance points as well as improvements that make daily maintenance quicker and easier. Furthermore, Lokotrack™ complies with European Stage V emission regulations.

 [Read more about Metso's Lokotrack solutions](#)

Future of innovations

The future focus in sustainable innovations is on increasing the competitiveness of our offering through sustainable productivity and digitalization. Digitalization enables new means to improve the sustainability of products and services. For example, remote monitoring will increase process efficiency, availability and safety.

 [Read more about our digital solutions on pages 25–26.](#)

Innovating for a circular economy

Tackling the recycling challenge

Aspects of a circular economy are embedded in Metso's offering in the form of waste and metal recycling equipment as well as asphalt, construction and demolition waste crushing technologies. The recycling of metal and waste uses much less energy than producing something for the first time.

Municipal solid waste contains various valuable materials that can be sorted and sold or made use of, for example in energy production. The quicker and more efficient the processing phase is, the more valuable the municipal solid waste is as a raw material. One of the advantages of the Metso metal recycling equipment stems from the density and quality of the scrap bales it produces.

Recycling of building materials

The recycling of building materials, such as crushed stone and asphalt, also makes a difference in materials use. Due to continuous renovations, massive amounts of construction and demolition waste, a rich source of raw materials, are generated around the world. A large part of this waste is not yet utilized efficiently, but instead dumped in landfills.

Construction and demolition waste, however, comprises a variety of economically valuable materials – such as concrete, bricks, wood and metals – that can be used in the manufacturing of new products, construction materials, roads, or in energy production.

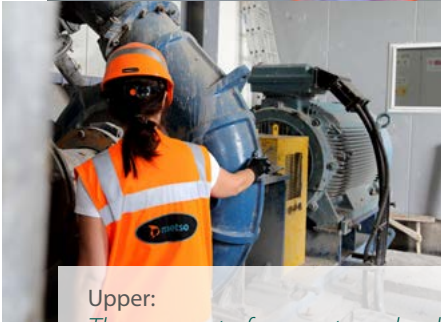
We are forerunners in manufactured sand

The depletion of easily available natural sand deposits is a major issue for quarry owners. As the availability of natural sand decreases, regulations relating to its use become stricter and demand has started to shift to manufactured sand. Special equipment is needed to produce high-quality sand and Metso is one of the forerunners in manufactured sand solutions. We have helped design dozens of manufactured sand processes for our customers around the world.



Upper:
Producing steel from recycled steel scrap saves more than 60 percent in energy costs. Metso has been providing equipment and services for the recycling industry for over a century.

Lower:
Performance and serviceability are the primary reasons that customers choose the Metso Lokotrack™ for their recycling applications. Lokotracks™ also reduce energy consumption and emissions.



Upper:




The amount of cement can be decreased by up to 15 percent when using Metso's advanced manufactured sand solution.

Lower:

Bucim, the largest open-pit copper mine in Macedonia, replaced their existing pump with Metso's solution and was rewarded with a 20 percent savings in power, 0.5 percent higher metal recovery rate and 10 percent longer pump wear life.

The rapid pace of urbanization makes the change to manufactured sand even more significant. To accommodate growing populations, more houses, parks, roads, and subways, among others, are needed – and they all need sand in one form or another as a basic building component.

We have developed a unique industrial process to reduce the amount of cement needed in the concrete mix. The production cost of the concrete mix can be significantly decreased when the cement is replaced with high-quality manufactured sand. As a raw material, industrially produced sand costs much less, thereby further decreasing the production cost of the concrete.

-  [Read more about manufactured sand and Metso's solutions](#)
-  [Read more about how Metso helped Boliden at Kevitsa](#)
-  [Read more about Metso and Bucim's long and successful cooperation](#)

Sustainable customer processes


Metso's customer industries are often resource intensive. They use a lot of energy and water, and produce emissions, dust, noise and waste. Resources and environmental constraints need to be taken into account in the overall optimization of the customer's process efficiency. We offer services and solutions to mitigate these challenges.

In addition to new innovations, process improvements in existing plants make a huge difference for our customers. Mining and other processes often have bottlenecks that prevent them

Using Metso equipment, Kyung Boo, one of the largest producers of aggregates and manufactured sand in South Korea, increased its production of manufactured sand and managed to establish a stronger foothold in the growing market.

from performing at full capacity with high efficiency. By identifying these bottlenecks and solving the related challenges, our customers can achieve significant improvements in productivity and efficiency.

Parts with a higher wear resistance and a longer life-cycle have several positive customer benefits. They reduce waste and noise, and bring energy savings. Performance is improved through higher equipment availability. In addition, they bring improved safety in maintenance operations.

-  [Read more about energy-efficient comminution](#)
 - [Part one](#)
 - [Part two](#)
 - [Part three](#)
 - [Part four](#)
-  [Read more about our performance services](#)

Improved efficiency and safety for customers

Increased production and improved efficiency can be achieved through process optimization, maximizing reliability, optimizing wear parts, renewing machinery or parts of it, or by implementing solutions such as Metso Advanced Process Control or Metso Metrics as an example of more efficient resource management. As an example of more efficient resource management:

Optimizing the production process minimizes the customer's specific energy consumption per ton of ore produced. With equipment settings and wear parts optimized, our customers are more likely to reach their energy reduction goals. This helps them to improve their resource recovery process by minimizing the energy required to get the ore from the minerals.

In 2018 we assisted with carefully planned, safe and efficient maintenance shutdown at Boliden Kevitsa mine, in Sodankylä, Finland. We spent a considerable amount of time and resources on risk assessments which increased safety at the site. Moreover, we actively monitored operations to detect any dangerous situations and responded to deviations immediately.

Efficient shutdown planning

In valves especially, the importance of installed base data is continually growing. Shutdown planning and execution need to be based on actual data and correct field devices to ensure long-term plant reliability.

In many cases, plants find it challenging to keep track of their installed base, and data gets corrupted in their maintenance systems over the years. The key to a successful shutdown lies in comprehensive installed base management: collecting data, analyzing it and making decisions based on device life-cycle status.

Metso has been implementing a new valve field service management system in its service centers around the world. Every time a device is maintained or modified, all data is entered into the system. This means that when a shutdown is being planned, we have the up-to-date data of each customer's installed base, showing the life-cycle status of each device. This data enables us to inform the customer which devices should be maintained, upgraded or replaced to minimize reliability risks. With the correct installed base information and a systematic upgrade plan, it is an opportunity to gradually renew the installed base, resulting in higher capacity, product quality as well as plant reliability and availability.



Above:

Kevitsa mine has eight maintenance breaks a year, lasting for around 16 hours. In addition there is a six-day shutdown every year. This adds up to a considerable amount of downtime. Thanks to good planning and new tools, the shutdown work has been completed more rapidly each time.

Below:

In 2018, we participated in over 150 shutdowns and turnarounds in the process industry globally. The sites included refineries, petrochemical, natural gas and biofuel plants as well as pulp mills.



Safe Metso products and services

Metso's products are designed to meet all the relevant standards, norms and directives. They are delivered with the appropriate information and instructions to ensure safe operation, services and maintenance. In addition, we offer a wide range of life cycle services to ensure that all the products in use will continue to meet existing and future requirements throughout their life cycle.

Safety of Metso's products is one of the key drivers in our research and development work. Product safety principles consider all aspects relevant to safe installation and operation, servicing and maintaining products in all conditions as well as training customers on the safe use of our equipment.

Promoting safety is the key

Megaliner is a new, innovative mill liner concept, dramatically improving worker safety and maximizing mill availability. Each shell or head liner covers a large area, has few attachment components and a unique attachment system which gives a safer working environment for the installation crew. The system is patented.

In mining, the safety of employees is a priority. At Tharisa Mine in South-Africa, the use of Megaliner resulted in safety improvements and an increase in production in 2018.

In 2018 Anglo American awarded Metso for an excellent outcome in promoting safety. The latest award, "Major Commitment to Safety" award honors the company that promotes projects and activities that significantly improve the safety performance of the operation.

Last year we also worked with Glencore to eliminate the risks associated with hitting a demolition screwdriver with a hammer during screen maintenance activities. The development of this new, safer, screen media fixing system is the product of a strong partnership.

 [Read more about how safety was improved in Tharisa Mine in South-Africa after replacing 180 liners with Metso Megaliner](#)

 [Read more about the Anglo American award](#)

 [Read more about our partnership with Glencore towards safer working environment](#)

UN Sustainable Development Goals

The most relevant SDGs to sustainable productivity.





Risks and risk management

Managing risks..... 42

Managing risks

Risk management supports the achievement of our strategic targets and business objectives. It ensures the continuity of operations also in changing circumstances. The ability to take risks and manage them effectively is a vital element of business success and shareholder value creation.

Risks are uncertainties, which, if materialized, can either positively or negatively impact the likelihood of us achieving our targets. Risks are either opportunities or threats or a combination of these. The significance of a risk is assessed by combining the probability and estimated impact of the occurrence. Our emphasis is in systematic anticipation of risks and proactive actions. In 2018 we evaluated the new risk management versions of ISO 31000 and COSO ERM; based on the study, ISO 31000 is still considered the most suitable for Metso.

Risk management focus areas in 2018

The new operating model and organization put into effect on January 1, 2018, was well received and Group Risk management has continued to support all business areas with continuous risk assessments, training and measuring actions in 2018.

Work with quality improvement projects based on LEAN principles continued with good results in 2018. Significant advances were made in improving the quality of daily management, processes and products, and the personnel resources health, safety, environment and quality were strengthened in different business areas.

Importance of corporate security

Corporate security is a matter that continues to grow in importance. According to our risk management audits, our information security competence level has clearly improved as a result of a comprehensive information security training program. Phishing continues to be one of the most-used initial cyber-attack vectors and a therefore significant risk to Metso. In 2018, we introduced a direct reporting functionality for all employees with access to email. Metso's project to meet the needed compliance with GDPR was completed in summer 2018. Further improvements in processes and practices are being developed to secure personal and other important data.

A global-level Safety excellence training program was started in 2017 and continued in 2018. The target is to ensure a thorough understanding of our safety requirements and stronger engagement throughout the organization. Training explains both business and personal aspects of safety and helps our managers and employees find concrete ways in their everyday work to improve our safety.

Evaluating risk management in focus

Logistic procurement's primary focus in 2018 was on increasing on-time delivery performance to ensure better operational excellence.

A logistics council was set up to involve all business areas and to ensure Metso-level synergies in logistic matters.

Significant changes were made to the logistics audit program by focusing on all logistics areas, including inbound, warehousing, packaging, outbound and customs, and by reviewing contractual, management, guidelines as well as ways of working aspects. Audits not only reveal the biggest challenges, but also the best practices that can be utilized as Metso-level guidelines.

Attention was paid to meeting the requirements of the new ISO 45001 occupational health and safety management standard as well as the revised ISO 9001 quality management and ISO 14001 environmental management standards. The most significant new requirement in all standards is to embed risk management in to the management of operations; we still have room for improvement in this area.

During 2018, we conducted an insurance benchmarking exercise. Based on this exercise, we can continue and fine-tune the existing insurance programs. They support our business, but the terms and conditions are subject to constant evaluation.

Altogether, 6 risk management evaluations, 10 property damage and business interruption risk engineering audits, 13 logistics audits, 19 HSE audits and 99 supplier sustainability audits were carried out during the year.

We coordinate and conduct Risk Management Evaluations to monitor the risk management performance of our units globally. Audits support our units in finding the best ways to manage risks and provide a forum for sharing best practices in all our risk categories: strategic, financial, operational and hazard risks.

Most significant threats and opportunities

In our annual risk assessment, we systematically assess the significance and development of various risks.

In the risk assessment for the strategic period of 2019–2021, the most significant factors creating threats and opportunities for Metso were concluded to be the following:

1. Company's competitive position
2. Services business profitability risk
3. Capital business profitability risks

The biggest changes in risk positions from the previous year were in project management capabilities, project operations-related risks and logistics risks.

Goals for 2019

The annual risk assessment determines the areas to pay careful attention to. We continue to focus on proactive measures, securing our operations, limiting adverse impacts and leveraging opportunities.

Risk management platform



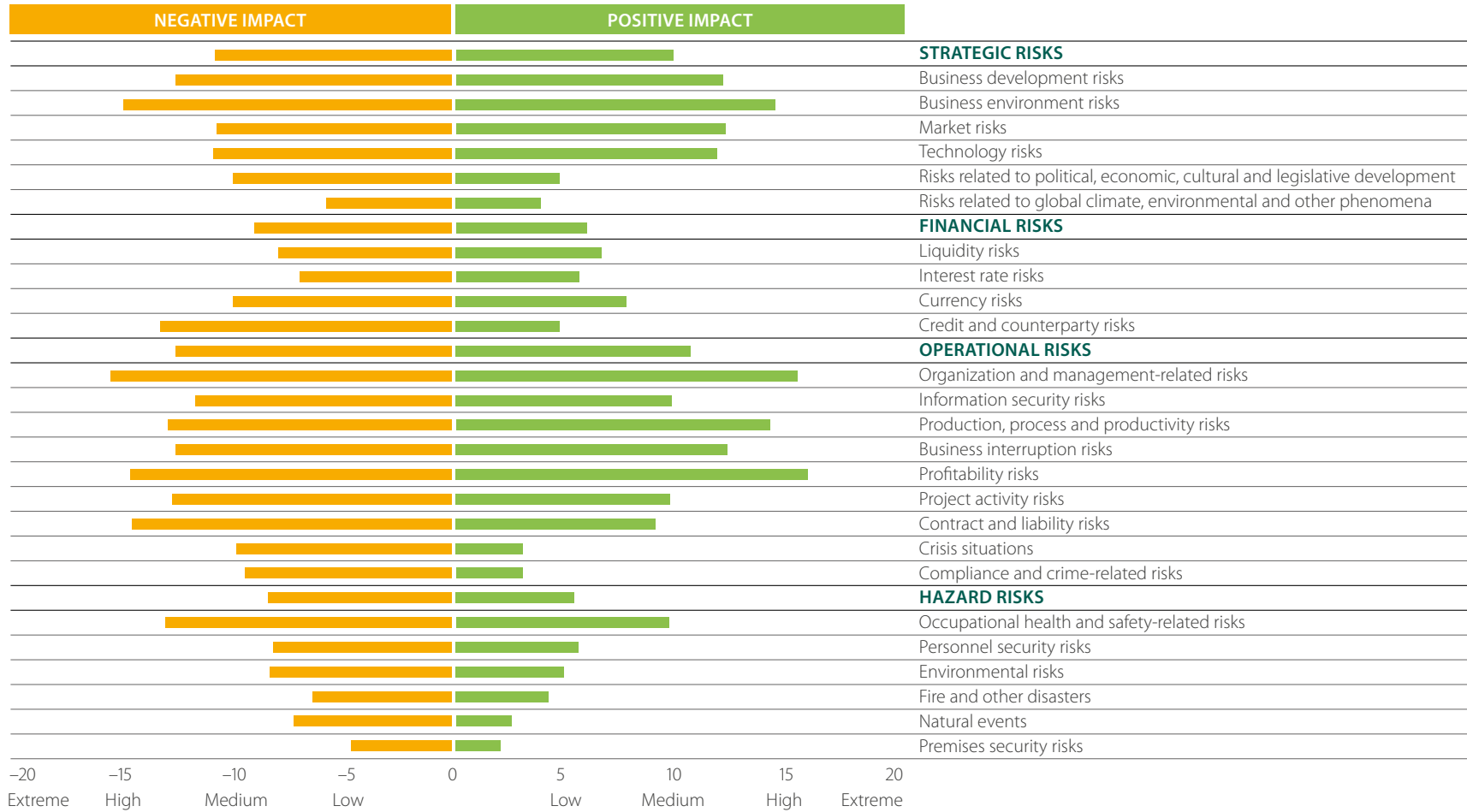
The focus areas of our risk management work in 2019 will include the following:

- Assessing supply chain risks and business continuity
- Supporting locations with risk management control processes
- Continue pushing basic safety practices to fill missing gaps and to reach a solid stepping stone for the next level
- Continue implementing LEAN principles and the ISO 45001 occupational health and safety management standard's requirements
- Expanding the information security end-user training
- Analyzing the role of emerging technologies in Metso and in risk management

 Read more about risks and risk management in the Financial Review on page 10 and in the Corporate Governance on pages 10–11.

Risk management

Average impact risk number



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