SINTEF

SUSTAINABLE DEVELOPMENT GOALS

SINTEF supports
the Sustainable Development Goals

# Integrated Annual Report 2023

Technology for a better society

# Letter from the CEO

## Research can help solve global crises...

...but the pace of development is not fast enough. The world faces profound challenges – from climate change and the destruction of nature to war and polarisation. At SINTEF, we want to help accelerate the transition necessary to solve these problems.

Photo: Karoline Ravndal Lorentzen/SINTEF

"In our opinion, SINTEF's expertise and our ability to bring together actors across value chains can help realise the transition the world needs," writes CEO Alexandra Bech Gjørv in her 2023 summary of SINTEF's year.

We updated SINTEF's strategy in 2023. This sets the direction for our approach to the major challenges. We confirm our commitment to contribute to realising the UN Sustainable Development Goals.

In particular, we are taking steps that will enable us to make even stronger contributions to:

- Zero emissions in the value chains
- Artificial intelligence and digitalisation
- Safeguarding planetary boundaries
- New approaches to health and safety
- Transition policy

It is pleasing to see that we have made progress in the past year.

SINTEF's research activities have almost kept pace with inflation, not least due to good results in the EU's framework programme for research, Horizon Europe, where SINTEF is by far the largest Norwegian participant. We work closely with Norwegian industry through EU projects. SINTEF is collaborating in no less than 39 percent of the volume of Norwegian industry's collaborative projects under Horizon Europe. The projects target many societal needs, including the removal of $CO_2$ from industrial processes (example on page 49) and seabed restoration (example on page 47).

The research activities are based on a strong laboratory infrastructure, which we invest in year on year. We invested a total of more than NOK 300 million in labs, equipment and buildings in 2023. SINTEF's newly opened 'Battery Lab' supports SINTEF's extensive research into more sustainable materials, and also gives Norwegian actors the chance to develop their own battery production solutions (see more on page 19).

The transition requires speed and solutions that are implemented for use. Therefore, it is important that SINTEF continues to commercialise our research results. In 2023, we managed to finance another new fund, SINTEF Venture VI, together with KLP, the Gjensidige Foundation and five other investors. The fund has NOK 285 million ready to be invested in research-based start-ups. The fund is a so-called 'Article 8 fund' under the EU Sustainable Finance Disclosure Regulation, which means that it is a fund that actively promotes environmental and social objectives in its management.

'Mia Health', one of our start-up companies, is a good example of what 'Article 8' is all about. The company has developed an 'activity app' that links personal activity to health data in a manner designed to provide motivation. The solution is based on a digital twin solution from SINTEF, research from NTNU and global health data, and

SINTEF has been a member of the UN Global Compact since 2009. This means that we are committed to contributing to a sustainable future by complying with the UN's 10 principles for responsible business conduct. These provide guidance designed to promote human and labour rights, protect the environment and combat corruption.

it aims to improve public health (example on page 35).

SINTEF impacts societal development by contributing knowledge for policymaking. In 2023, our specialists participated in the Electricity Price Committee, the Aquaculture Committee, the Nature Risk Committee and the committee that has assessed measures for strengthening national security interests through controlling investments. We also submitted a number of consultation responses. These included responses to reports from the Energy Commission, the Health Personnel Commission and the Total Emergency Preparedness Commission, as well as responses to a proposal regarding calls for proposals for offshore exploration blocks in the Barents Sea and for seabed minerals, as well as numerous responses in relation to research and innovation policies.

In our opinion, SINTEF's expertise and our ability to bring together actors across value chains can help realise the transition the world needs. We build networks through our many multi-client projects and centres of research and innovation, as well as by entering into different forms of alliances. In 2023, SINTEF became a member of Skift – Business Climate Leaders, a network for enterprises that want to play an active role in the climate issue.

If we are to strengthen our capacity to contribute to the transition, we need to build up trust and have the financial room for manoeuvre to act as an independent research foundation. SINTEF's operating profit for 2023 was NOK 102 million, compared with NOK 127 million for 2022. The results were lower than our long-term target of a 5 percent operating margin and were affected by, for example, the high cost of ensuring that the Norwegian Ocean Technology Centre meets our long-term needs and the cost of developing tomorrow's solutions for secure and innovation enhancing data sharing. Our cost base was also impacted by general inflation, as well as the additional employer's National Insurance contributions, which hit a highly skilled organisation like SINTEF hard.

In its report, the Board lays out how crucial public framework conditions are for SINTEF's activities. National schemes for funding research and helping to cover the costs associated with the institute sector's participation in the EU framework programmes have a direct impact on our activities. Indirectly, our activities are also affected by the dimensioning and alignment of public instruments designed to support industry R&D investments and by the extent to which, and how, industry cooperates with actors like us (read more in the Board of Directors' report for 2023 on page 77).

In our 2023 strategy update, we propose that SINTEF can do more to move society, as well as ourselves, in a more sustainable direction. Therefore, at the beginning of 2024, we launched a project that will specify our ambitions in relation to sustainability and identify further measures. The recognition that we need to do more to fulfil these ambitions also applies to reporting. We are making preparations to strengthen this in the coming years, in line with the new European requirements and standards, and our own ambitions.

Alexandra Bech Gjørv, CEO

# Contents

# About the report

This is SINTEF's Integrated Annual Report and was published in April 2024. The report covers 2023. The report presents our financial performance and our corporate governance. It highlights those aspects of our activities that we believe have the greatest impacts on society, both through our research and innovation in collaboration with clients and partners and through our own operations.

SINTEF has published an annual sustainability report since 2019. Last year we integrated the Integrated Annual Report. We take a systematic approach to improving our reporting based on our own ambitions, the external expectations of clients, partners and society at large, and future requirements and standards.

Throughout the report you will find links to episodes of SINTEF's podcast and descriptions of our expertise and disciplines on sintef.no. This is your chance to learn more about what SINTEF does and how we work.

All of the figures in the report are from 2023, unless otherwise stated. You can find more about the way forward for our Integrated Annual reporting here.

SINTEF is a member of the UN Global Compact and supports the UN Sustainable Development Goals. The contents of this report have not been presented to the UN for approval and do not reflect the views of the UN, its representatives or member states.

Photo: Geir Mogen/SINTEF

*We are one of the largest independent research institutes in Europe*

TURNOVER

NOK 4.2 billion

EMPLOYEES

2,200

PROJECTS

6,400

CLIENTS

3,300

INTERNATIONAL TURNOVER

NOK 808 million

NATIONALITIES

80

PUBLICATIONS (INCL. DISSEMINATION)

6,200

CLIENT SATISFACTION

4.6 out of 5

Photo: Geir Mogen/SINTEF

# Key metrics

| | 2023 | 2022 | Development |
|---|---|---|---|
| **IMPACT: Contribute to societal benefits and competitiveness by realising the UN Sustainable Development Goals (SDGs)** | | | |
| Proportion of SINTEF's gross operating income related to various SDGs[1)] | 96 % | 96 % | ● |
| Overall knowledge dissemination[2)] | 6,246 | 6,157 | ● |
| **CLIENTS: Co-create with clients and link their needs to the research front** | | | |
| Number of clients | 3,341 | 3,217 | ● |
| Client satisfaction (scale 1 to 5)[4)] | 4.62 | 4.56 | ● |
| **RESEARCH: Foster outstanding research environments and infrastructure and create new businesses** | | | |
| Scientific publications per research scientist per year | 0.80 | 0.75 | ● |
| Proportion of research scientists with a PhD | 61 % | 57 % | ● |
| Number of EU participations[5)] | 177 | 87 | ● |
| Annual investment in SINTEF spin-offs (NOKm)[3)] | 415 | 896 | ● |
| **PEOPLE: Develop SINTEF as an attractive, learning and efficient organisation** | | | |
| Number of employees | 2,170 | 2,185 | ● |
| Proportion of women (all employees) | 37 % | 36 % | ● |
| Proportion of employees proud to work at SINTEF[6)] | N/A | 82.9 % | – |
| **OPERATIONS: Build trust and financial flexibility as an independent research institute** | | | |
| Gross operating income (NOKm) | 4,205 | 4,050 | ● |
| Net operating income (NOKm) | 3,617 | 3,440 | ● |
| Equity ratio (%) | 47 % | 49 % | ● |
| Operating margin | 2.8 % | 3.7 % | ● |
| Result margin before tax | 6.8 % | 5.5 % | ● |
| Investments NOKm | 321 | 248 | ● |
| Total emissions ($tCO_2e$)[7)] | 24,627 | 23,572 | ● |

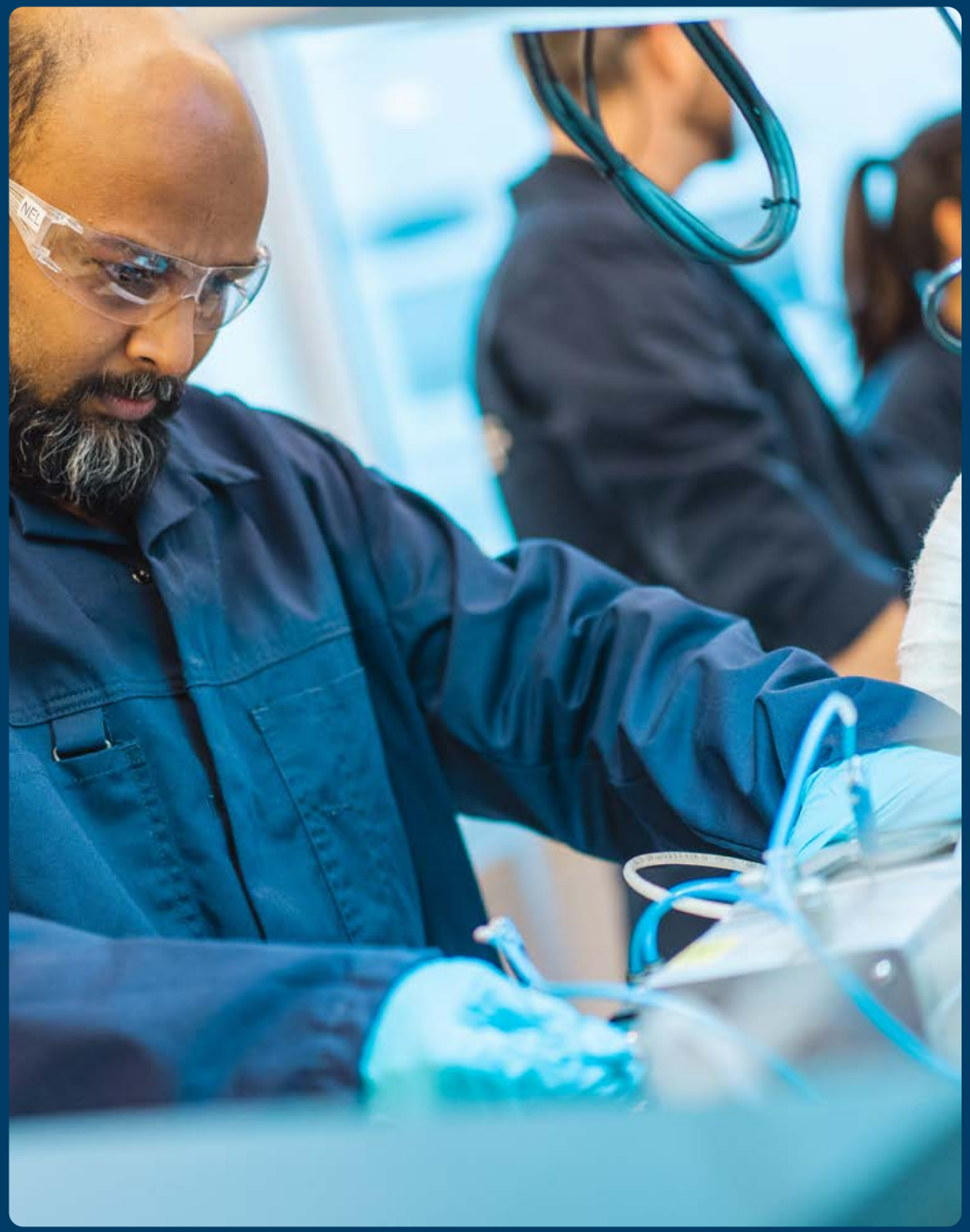
● Positive development ● Stable development ● Negative development

Sources: 4) Cordis, 6) SINTEF's working environment survey, 7) MoreScope

1) Proportion of gross operating income in research projects at SINTEF's six research institutes tagged with the various goals, with up to three goals tagged per project.
2) Overall knowledge dissemination includes all publications (including dissemination) via all channels.
3) In 2023, 15.7 percent came from SINTEF Venture and 84.3 percent from co-investors. The level of investment in 2022 was exceptionally high. The capital markets were demanding in 2023. Since this was a difficult year to raise funds, the development was still considered positive.
4) Client satisfaction only measures the satisfaction of national and international industry clients, and not of other forms of collaboration via the Research Council of Norway and the EU.
5) The number of EU participations shows the number of project allocations from the EU Framework Programme, Horizon Europe. Where multiple SINTEF research institutes have received an allocation for the same project, this is counted as multiple participations.
6) Percentage of SINTEF's employees who agreed or strongly agreed with the statement "you are proud to work at SINTEF". Not measured in 2023.
7) Total scope 1, 2 and 3 emissions.

# Chapter 1

# This is SINTEF



Hydrogen can be used as a climate-friendly fuel, industrial raw material and energy carrier in the power system. SINTEF, here represented by Kaushik Jayasayee, is conducting research into key areas of pure hydrogen's entire value chain, from production and transport to storage and end use.

Photo: Smidesang & Lyng/SINTEF

# 1.1 An independent research foundation

**We are the largest research foundation in Norway and one of the largest in Europe. SINTEF carries out research and innovation projects for and with industry in Norway and abroad, with an emphasis on applied research. Since 1950, our research has produced solutions and innovation for society and clients around the world.**

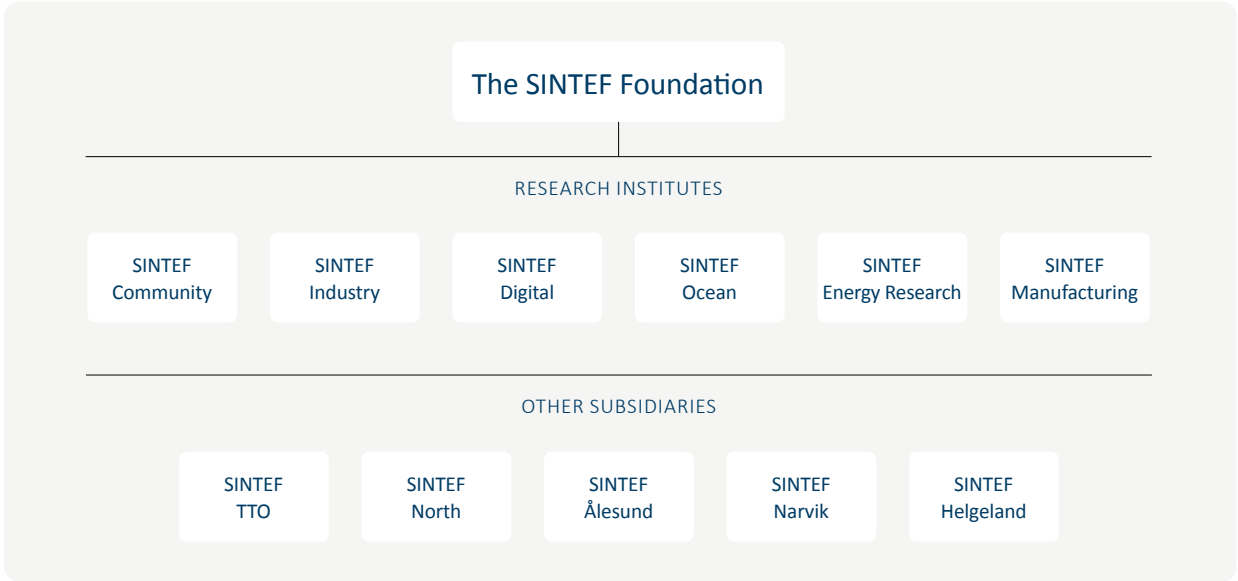
SINTEF is a not-for-profit foundation with no owners. We are organised as a group of six research institutes, as described in more detail on the following pages. In addition to these come, SINTEF Nord, SINTEF Ålesund, SINTEF Narvik and SINTEF Helgeland, as well as SINTEF TTO (Technology Transfer Office) which operates our commercialisation business and manages ownership in start-ups.

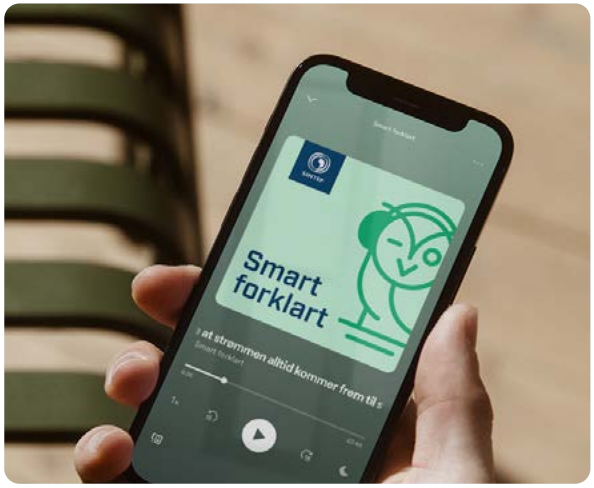
SINTEF carries out research as a partner of industry and the public sector and is one of the largest institutes for contract research in Europe. We are by far the largest Norwegian participant in EU research programmes.

Our head office is in Trondheim, where most of our employees are based. We also have substantial activities in Oslo and Raufoss, plus a presence across Norway and an office in Brussels. We work with a number of research partners, not least the Norwegian University of Science and Technology (NTNU).

SINTEF offers world-leading laboratory and testing facilities within a wide range of technology areas. In collaboration with clients and other partners, these are used for research, as well as projects involving technology verification, prototype development and damage assessments. The laboratories are also an important contribution to Norway's national research infrastructure.

SINTEF is a broad, multidisciplinary research institute with internationally leading expertise within natural sciences, technology (including construction and civil engineering disciplines), as well as health and social sciences, from the ocean space to outer space. Our research is intended to facilitate the transition to a sustainable society.




You can get teasers of SINTEF's current research by listening to our podcast 'Smart Forklart'. You risk becoming a little wiser – and gaining a little more faith in the future.

# Our institute structure ensures research strength and market relevance

Six research institutes carry out SINTEF's research activities and run our laboratories.
Three of the research institutes are organised as divisions of our wholly owned subsidiary, SINTEF AS.



## SINTEF Industry

SINTEF Industry facilitates the sustainable industry of the future. In collaboration with clients and partners, we develop solutions that have a major impact on society. We do this by performing outstanding science in which we combine our multidisciplinary knowledge base – with an emphasis on materials, chemistry, enabling technologies and geosciences – and advanced physical and digital laboratories. The result is new solutions within, for example: the circular economy; batteries; hydrogen; carbon capture, utilisation and storage (CCUS); materials, nano and process technology; nanomedicines; solar energy; wind energy; biotechnology; metal production; low emission energy production on the Norwegian continental shelf; and analyses of sustainability, economic and technical factors. This results in climate-neutral production in existing and new value chains for products and services that a sustainable society needs.

## SINTEF Digital

SINTEF Digital works on research and innovation within digital technologies, technology-oriented social sciences and health. We have delivered everything from the first Norwegian-built computer and early research on AI to groundbreaking sensor technology. We have national cybersecurity expertise and deliver world-leading 3D cameras for industry. Our research-based knowledge of digitalisation and the digital transition can strengthen industry and the public sector. Our research also contributes to the best solutions for ensuring that tomorrow's health sector is sustainable. Our multidisciplinary knowledge base is used across all sectors, and our aim is to help SINTEF's clients move into the digital green transition with both greater sustainability and competitiveness.

## SINTEF Community

SINTEF Community works on the sustainable development of buildings, infrastructure and mobility. We create value for our clients and society through research and development, research-based consulting, certification and knowledge dissemination. Both the SINTEF Building Research Design Guides (Byggforskserien) and the Wet Room Standard are important products for the construction industry. We have leading expertise in future mobility, climate change adaptation, energy and zero emission solutions for buildings and areas, architecture and area development, zero emission construction sites, construction materials, structures and water. We use this expertise to develop tomorrow's solutions for the built society in which people meet, live and work, and in which we travel as we move from one place to another. By tackling climate change, and through circular economy and digitalisation, we want to be at the forefront of the development of a sustainable society.

The other three research institutes are separate limited companies that also have owners other than SINTEF, but where owners cannot take out dividends. All surpluses, including from these, are reinvested in the activities.

## SINTEF Energy Research

SINTEF Energy Research is an applied research institute dedicated to creating innovative energy solutions. We offer leading research-based knowledge and infrastructure, nationally and internationally, in order to provide clients with solutions and services that add value and strengthen their competitiveness. Our research should contribute to energy solutions with a low carbon footprint and high security of supply, while also being efficient and profitable. SINTEF Energy Research is working on energy solutions that balance the need for energy and nature considerations. Our strategic priorities are smart grids, power transmission, integrated energy systems, offshore wind, energy efficiency, CCS, hydropower, bioenergy, hydrogen and zero emission transport.

## SINTEF Ocean

SINTEF Ocean develops research and innovation related to the ocean for national and international clients. Our main activities are industry-oriented projects along the entire biomarine and maritime value chain, as well as in the energy sector and climate/environment. Our ambition is to maintain Norway's leading position in marine technology and biomarine research. Together with industry and the authorities, we develop solutions for the sustainable utilisation of ocean spaces. This is how we contribute to transition in areas where Norway is a leader. At the same time, we are helping to solve important national and global challenges. The green transition is creating a huge demand for restructuring. This requires knowledge and innovative solutions in our market areas, which are food, energy, the environment and transport.

## SINTEF Manufacturing

SINTEF Manufacturing creates sustainable and competitive production solutions for the future in collaboration with our clients. Our ambition is to be a world leader in industry-oriented research in the area of manufacturing technology. We have leading expertise within advanced materials technology, robotics and automation, productivity and value chains, 3D printing, industry 4.0 and the circular economy in relation to industrial production. We create value for clients and society through research, research-based consulting and advanced laboratory and workshop services. We collaborate with clients in various industries and sectors in order to contribute to a digital green transition, and thereby support the Sustainable Development Goals.

# 1.2 Technology for a better society – our vision and strategy

SINTEF's vision is 'Technology for a better society'. Our ambition to contribute to sustainable solutions guides our activities. This is reflected in our updated strategy and in our strategic objectives, which describe where we want to go and what we want to achieve.

As a means of clarifying our vision, we have let the UN Sustainable Development Goals (SDGs) guide our activities since 2019. This expands the obligations we have had as a member of the UN Global Compact since 2009. The 17 SDGs specify what we and the global community have to achieve in order to improve society. The goals have 2030 as a time horizon. However, we realise that we need to look even further ahead when designing the solutions of the future.

Contributing to sustainable development is SINTEF's top strategic objective. We want to contribute to competitiveness and societal benefits. To achieve this, we need to produce results and value in collaboration with clients and build outstanding research environments, laboratories and start-ups. A strong organisation and good corporate governance are prerequisites for fulfilling this role.

***«Technology for a better society»***

*Deliver world-leading research for innovation*

**IMPACT:** Contribute to societal benefits and competitiveness by realising the UN Sustainable Development Goals

**CLIENTS:** Co-create with clients and link their needs to the research front

**RESEARCH:** Foster outstanding research environments and infrastructure and create new businesses

**PEOPLE:** Develop SINTEF as an attractive, learning and efficient organisation

**OPERATIONS:** Build trust and financial flexibility as an independent research institute

*As far as our efforts to create world-leading and innovative technologies in defence, the maritime industry and energy are concerned, it is crucial that we as an industrial group collaborate with the authorities, academia and research scientists. We are working closely with SINTEF on several high-tech projects, including industrial robotics, autonomy, automated processes, digital solutions and materials technology. I believe we need to excel in the digital future by continuing to invest in research. This will benefit not only the individual company, but also all of society.*

**Geir Håøy**
CEO of the Kongsberg Group

Photo: Killian Munch

We will achieve our vision through research that contributes to competitiveness and societal benefits. In this way we want to contribute to a sustainable transition and ensure that our clients achieve profitability and their goals.

Our activities focus on nine overarching priorities. Here we unite outstanding research environments with our clients through partnerships, as illustrated in the figure below.

The central column shows three perspectives that impact all areas of society: *Digitalisation*, *sustainability* and the need for *productivity*. We also deliver solutions for a number of domains and market areas: *energy*, *food*, *industry and construction*, *health*, *smart and secure communities,* and *mobility*. For Norway, as a major maritime nation, many solutions are relevant both at sea and on land.

Since 2017, we have boosted corporate initiatives in order to reinforce our contribution to the digital, green transition.

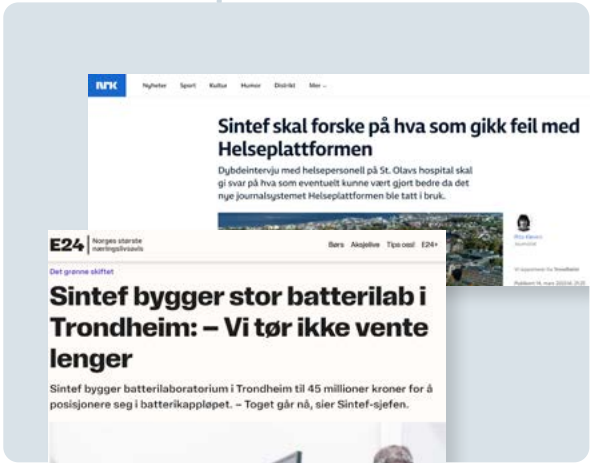
These initiatives invite collaboration across disciplines to meet complex societal and client needs, as well as to solve demanding sustainable development dilemmas (read more in section 2.4).

The portfolio is maturing over time. As we become aware of new or more pressing social and client needs, new initiatives are launched. As of April 2024, SINTEF has the following 17 corporate initiatives, all of which will contribute to sustainable development in their fields:

# Our main stakeholders

We are in regular contact with our stakeholders through formal and informal conversations and meetings, structured client and employee surveys, and formal reporting.

| | |
|---|---|
| **Clients** | Industry and public bodies (including county authorities and municipalities) in their capacity as contracting authorities for research projects, as well as partners in research projects or research centres. |
| **Partners** | Primarily research institutes and universities (NTNU, UiO) as well as organisations (especially the NHO). |
| **Research Council of Norway** | Central to the application of adopted policies and distribution of allocated research funds in Norway. |
| **EU research authorities** | Leading stakeholders and policy advisers for joint European research programmes. They play central roles in shaping policy and the direction of research. |
| **The authorities and politicians** | National authorities (government and ministries) and politicians, as well as regional and local authorities and politicians. In some cases, the authorities are also clients in their capacity as contracting authorities for, or partners in, research projects. |
| **Employees and potential employees** | Employees of SINTEF and those who can provide SINTEF with new skills and labour in the future. |

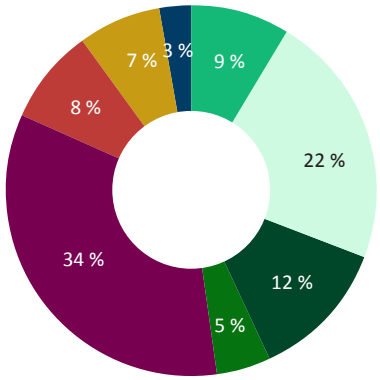



SINTEF has a high media profile, both in the form of news items about the research front and through contributions to the public debate in policy-making. This type of communication reaches all stakeholder groups.

# 1.3 Key figures 2023

## More than 90 percent of income is secured in open competitions

Sources of funding as a percentage of gross operating income

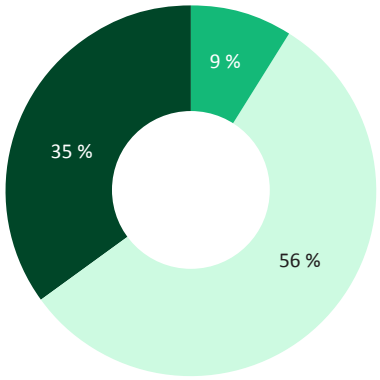



- Basic grant [8]
- Research Council of Norway
- EU
- Retur-EU
- Norwegian industry
- Norwegian public sector clients
- International clients
- Other

Source: SINTEF

## We have a balanced portfolio of collaborative research and contract research

Portfolio type

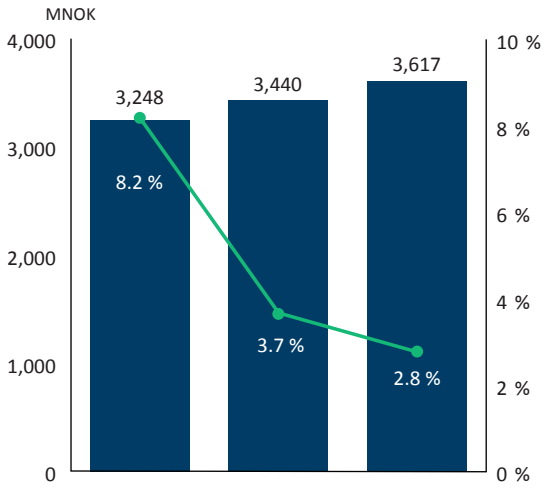



- Basic grant [8]
- Collaborative research
- Contract research

Source: SINTEF

## While our net operating income has grown well in recent years, operating margins have decreased in the last two years

Net operating income, net operating margin



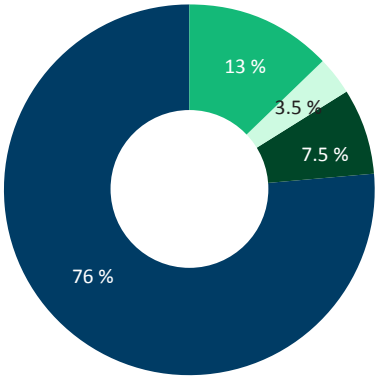

- Net operating income
- Net operating margin

Source: Financial statements SINTEF

8) The ordinary basic grant is 8 percent. Retur-EU is part of the Research Council of Norway. Norwegian industry includes policy instrument support for industry.

## Three out of four employees are scientific staff, of whom 61 percent have a PhD

Employees

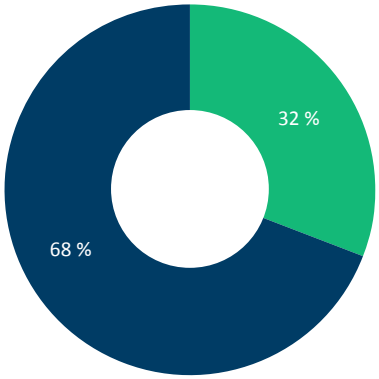



- Administration and management
- Technical personnel
- Engineers
- Scientific personnel [9]

Source: SINTEF

## 32 percent of SINTEF's employees are from abroad [10], from 80 different countries

International diversity

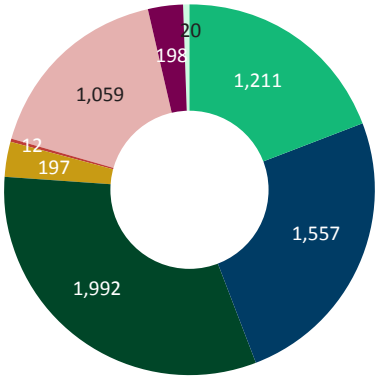



- International employees
- Norwegian employees

Source: SINTEF

## We contribute knowledge – more than 1,200 articles and 1,950 reports published

Publications and other dissemination




- Scientific article in journals, periodicals or anthologies
- Scientific lectures and posts
- Reports
- Popular science articles and lectures
- Textbooks, etc.
- Media contributions (interviews, opinion pieces and posts)
- Blogs and information material
- Multimedia products (podcasts and videos)

Source: Publications data; Cristin, other data (incl. publication data reports); SINTEF

9) Scientific personnel include research scientists, research managers and research directors.
10) "from abroad" = having a country of birth other than Norway.

# Chapter 2

# On the agenda 2023

Minister of Trade and Industry Jan Christian Vestre opens SINTEF's new battery laboratory in Trondheim. Here, Norwegian actors can develop their own battery production solutions. SINTEF Battery Lab is designed to provide Norway with competitive advantages in a global race.

Photo: Karoline Ravndal Lorentzen/SINTEF

# 2.1 A brief look back at SINTEF's year

## New laboratory to give Norway competitive advantages in the battery race

SINTEF's newly opened Battery Lab gives Norwegian actors the opportunity to develop their own battery production solutions – one of the green electric value chains in Norway with the greatest potential for value creation and jobs. The laboratory is one of the reasons why SINTEF, in collaboration with clients, is making an indelible mark in global research into more sustainable battery materials.

Read more

## The invisible properties of light reveal if you have cancer

Automated machines are now learning to identify cancer cells using manipulated light. This could lighten the workload of a healthcare system under pressure and shorten waiting times for anxious patients.

Read more

## We were again among the most attractive employers for young jobseekers

In an annual survey, students and recent graduates answer questions about their preferred employers and what attracts them to an employer. With its third place ranking, beaten only by Google and Microsoft, SINTEF was on the winners' podium for the second consecutive year.

Read more


## NOK 285 million in new seed fund

A new fund is ensuring new start-ups are established based on our research and innovation activities. The SINTEF Foundation plus the country's largest pension company KLP, the Gjensidige Foundation and five other investors have together added NOK 285 million to the newly established fund.

Read more

## This is how birds can live side by side with wind turbines

We are in the process of developing wind turbines that can adapt the speed of their rotor blades to avoid collisions with birds. Numerical simulations of the method indicate that four out of five collisions can be avoided.

Read more

Photo: SINTEF, Shutterstock

### Actively regulating dams can mitigate damaging floods

Flood simulations of the Ila river basin in Trondheim show that it is possible to mitigate damaging floods by more than 50 percent by actively regulating dams.

Read more

### Rare earths from Norway will make Europe greener

With SINTEF as the coordinator, the EU wants to develop efficient and sustainable extraction and processing processes for rare earth minerals from the Fens Field in Telemark, which is probably Europe's largest deposit of light rare earths. The background for this is the EU's desire to increase its self-sufficiency in relation to the raw materials that, for example, the green transition needs.

Read more

### New knowledge will result in cheaper and greener train operation

New lubricants and new knowledge about how they should be applied to train wheels and rails can reduce Norwegian railway costs by amounts in the hundreds of millions over the next 10 years.

Read more

### Saving energy in buildings could become Norway's largest 'power plant'

Building energy efficiency could provide a 'triple benefit' for Norway, according to a report from SINTEF and the construction group, Skanska. 'The Cure' will significantly help avoid power deficits and high energy prices, and with achieving the adopted climate targets for 2030 and 2050.

Read more


### Green, everlasting concrete is no longer a distant dream

It is here. Concrete with a potentially infinite service lifetime that requires zero maintenance and emits 80 percent less $CO_2$ emissions than current concrete. It is the result of work done by a duo that has been awarded a prize by SINTEF.

Read more

### SINTEF's CEO named 'Quality Manager of the Year'

The 'Quality Manager of the Year 2023' award went to SINTEF's CEO Alexandra Bech Gjørv. This is presented by the professional network Quality & Risk Norway. The jury praises Gjørv for "setting the direction of an organisation with a clear sustainability focus and where the management is concerned with better preventive HSE management."

Read more

Photo: Trondheim Municipality, Samfoto/NTB, SINTEF

# 2.2 External analysis – world events influence SINTEF's direction

In 2023, we updated SINTEF's external analysis, which will shape our strategy and operations going forward. The result is a comprehensive presentation of the main trends that are expected to affect SINTEF and our clients and partners in the coming years:

## CLIMATE, NATURE AND SUSTAINABILITY

**Trend 1**

Circular zero-emissions revolution and climate adaptation

**Trend 2**

Nature protection and restoration. Social sustainability

**Trend 3**

Science based goals, transparency and data-based reporting

## DEMOGRAPHICS AND PRODUCTIVITY

**Trend 4**

Ageing population and need for new solutions for an overstretched health sector

**Trend 5**

Demographics and skill shift drive war for talent and need for increased productivity

**Trend 6**

Population growth, economic change and need for new solutions in the Global South

## GEOPOLITICS AND ECONOMIC PRESSURE

**Trend 7**

Polarisation and change in supply chains

**Trend 8**

War and destabilisation; new demands on society, companies and technology response

**Trend 11**

Tighter macroeconomics, complex research policies and pressure on research funding

Directly affects SINTEF

## TECHNOLOGY AND PACE CHANGE

**Trend 9**

AI, platform companies and start-ups provide new services, extreme productivity, fake news and changed power relations

**Trend 10**

Digitally integrated value chains, new materials and twin transition

**Trend 12**

Higher expectations regarding pace and flexibility from idea to effect in all research and innovation

Directly affects SINTEF

Photo: Getty Images, SINTEF

# 2.3 SINTEF's strategic beliefs

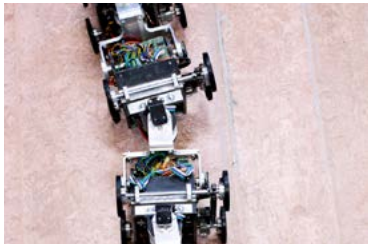
In the face of great uncertainty, war and crises around the world, and in order to create opportunities in a direction that we believe is the right one for SINTEF, we formulated five strategic beliefs in 2023. These will provide the basis for SINTEF's strategic choices going forward. As an independent research institute, we have a good basis for creating networks that can result in transitions throughout value chains and ecosystems in these important areas:


72. Artificial intelligence: An adventure or a nightmare?

## Zero emissions in the value chains

We believe in demand for zero emissions in all value chains and in solutions that safeguard both security of supply and biodiversity, and which can manage new market risks.

**SINTEF is relevant because** the market needs multidisciplinary solutions at technological, systemic and sociotechnical levels. We are also relevant because these solutions require research expertise and collaboration between many parties, and because we have extensive experience in building such teams with the support of public policy instruments.



## Artificial Intelligence and digitalisation

From a global perspective, we believe in increased automation, Artificial Intelligence and digital technologies across all industries. We therefore believe in strong demand for new, secure internet-of-things solutions and data-driven services.

**SINTEF is relevant because** we believe that trade and industry and authorities will demand integrative domain and technology expertise, and new supplier industries that can increase productivity and ensure competitiveness in all sectors.

## Planetary boundaries

We believe climate change adaptation and consideration of our planetary boundaries will require major changes related to lifestyle, food, mobility and the built environment. We also believe that limitations in resource consumption will affect living conditions.

**SINTEF is relevant because** the world around us will demand new solutions that are feasible and which the population and trade and industry can put into practice together. We also believe that more data and documentation will be needed.

## New approaches to health and security

We believe that society's costs for functions critical to societal security and public health will increase significantly. We also believe the authorities will realise that new technology and collaboration with trade and industry are necessary in order to increase productivity and quality. SINTEF will work to highlight how other ways of utilising the research communities can have a great impact on society.

**SINTEF is relevant because** the complexity indicates that there is a need for integrative actors who combine domain and technology expertise with independence and overview.

## Transition policy

We believe that economic pressure and the need for transitional pace will allow for a policy that both creates and regulates markets for sustainable solutions.

**SINTEF is relevant because** the authorities will recognize that applied research, access to advanced laboratories, interdisciplinary solutions, and open innovation through collaboration among stakeholders are necessary prerequisites for rapid transformation and competitiveness among our clients. Public contributions that stimulate private research investments and cooperation will therefore be prioritized and increased.

Photo: Gaute Stokkan, Lars Andreas Berg/SINTEF, Getty Images

# 2.4 Ethical sustainability dilemmas

SINTEF's research and innovation focuses to a great extent on areas that most people would recognise as sustainable. At the same time, it is clear that different sustainability goals can conflict with each other. One example of this is the expansion of renewable energy; a measure that is intended to help achieve climate goals. At the same time, such development projects can create challenges for life below water and on land. The planetary boundaries establish a clear framework for all of our activities. Our strategy is based on this. We must have more discussions about what role we as a research institute ought to play in the transition to more sustainable value chains.

SINTEF's role is to contribute to solving such dilemmas by coming up with solutions that reconcile seemingly irreconcilable objectives. Sustainability challenges and dilemmas are high on SINTEF's agenda. They are discussed in research groups and project teams, by the coffee machines and at the canteen tables in the organisation, as well as strategically by the group management team.

If something is a dilemma, it means that the answers are not a given. These are exciting questions for a research institute to address. We have established corporate initiatives in several areas where we face such dilemmas. In relation to this, we have also sought cooperation with institutions that have complementary knowledge. One example of this is the 'Biodiversity and area use' initiative where we are collaborating with the Norwegian Institute for Nature Research (NINA).

SINTEF's strategy aims to create societal impacts and sustainable development. At the same time, we can see that the world's green transition is moving too slowly. We have great expertise and emerging technologies that can contribute to the required transition and upscaling. We are surrounded by an ecosystem of knowledge-building organisations, industries, investors and authorities that share our external analysis and understanding of the needs. However, it is a paradox that the sum of the decisions is not capable of changing society quickly enough.

In our value chains, we are experiencing market failure that is delaying development. We are working to address this challenge through technological advances and a dialogue with society. We want to do everything possible to achieve results and effects *now*. That means that we also have to deal with the difficult choices of direction and dilemmas we face.

## In 2023, the group management team and organisation paid particular attention to the challenges below:

### Biodiversity and renewables

SINTEF works with all forms of renewable energy. All energy production entails some form of intervention in nature. We have long collaborated with clients and environmental institutes on the topic of sustainable hydropower production and coexisting with fish and fisheries interests. In the same way, we are now looking for sustainable coexistence solutions for offshore wind, marine life and the fishing industry. This is the focus of our work in, for example, the FME Northwind research centre.

### Biodiversity and mineral needs

Population growth and greater prosperity around the world have for a long time increased the need for mineral extraction. On top of this, the green transition requires special and, to some extent, rare minerals and materials, some of which are defined as critical raw materials. At the same time, there is a need to make supply chains less vulnerable to geopolitical conflicts. SINTEF is strongly committed to developing new technology and circular solutions that reduce the need for new mineral extraction. Despite more circular reuse, the supply of minerals needs to grow through extraction on land and, perhaps, from the seabed. Mining involves major interventions in nature and the associated risk of harmful environmental impacts. Therefore, every project will require thorough and multidisciplinary assessments.

In SINTEF's submission to the Ministry of Energy's environmental impact assessment for the exploration and potential extraction of seabed minerals on the Norwegian continental shelf, we contribute our professional insights. These focused on both the challenges and the opportunities associated with successfully extracting minerals from the seabed. We have initiated a corporate initiative that will look at the sustainable exploitation of minerals, a topic with a number of inherent dilemmas. These will be reflected in the initiative.


88. How can we expand green energy while safeguarding nature?

## Defence

The security policy situation for Norway and Europe has deteriorated sharply, not least due to the ongoing war in Ukraine. Democratic principles are under pressure around the world. A number of ethical trade-offs are associated with defence-related R&D. In SINTEF's opinion, robust defence that can safeguard peaceful societies and security in a troubled world must be a long-term goal. We have, therefore, established a new corporate initiative regarding total defence. This will contribute to greater civil-military cooperation in line with the advice of the Norwegian Total Preparedness Commission and the Norwegian Defence Commission. This will be one of SINTEF's contributions to SDG 16: Peace, Justice and Strong Institutions

Based on our expertise, plus our cooperation with the defence industry, the initiative will also contribute to sustainable transition within the defence sector. Several countries have formulated zero emission ambitions for military operations, although much work remains to be done in this area.

## Oil and gas

SINTEF has been working for a long time on dealing with the dilemmas inherent in our assistance to the oil and gas industry. Our policy is that SINTEF wants to contribute to the fastest possible transition to a zero emission society and an energy transition in which oil and gas production is reduced in line with the 1.5°C target, and that this production must at the same time be kept efficient and safe throughout this transition.

In line with this, we contribute SINTEF's research-based expertise in many policymaking and strategy formulation contexts. These include consultative rounds for new calls for proposals, highlighting the danger of intervening in particularly vulnerable ecosystems and the climate-related risk associated with new developments far away from existing infrastructure.

From time to time, dilemmas arise in our ongoing project activities. On the one hand, we are working to achieve sufficiently rapid cuts in emissions by limiting the development of new fields. On the other hand, and at the same time, we want to solve the problems that clients and the authorities come to us with; while generating enough income for us to maintain the expertise and infrastructure the industries of tomorrow will need. Through leadership and awareness in the organisation, we try to find the best solutions for society, clients and SINTEF.

## Cutting $CO_2$ through electrification and power needs in new and existing industries

Renewable electricity is the common denominator for many transition processes. SINTEF is helping many existing industrial actors, including in Grenland and on the Norwegian continental shelf, cut their $CO_2$ emissions by replacing traditional raw materials and fuels with electrified processes and alternatives. At the same time, the need for new power and new power transmission infrastructure for such initiatives is facing competition from several of our clients who are committed to establishing new power-intensive industries, such as battery factories and through the expansion of the defence industry. These in turn face competition from investments in digitalisation, represented, for example, by the establishment of Google's data centre in Skien and TikTok's investment in Innlandet County. The dilemma here is that currently there is not enough power to go around and that $CO_2$ emissions must be reduced at the same time.

Through research collaborations with power and grid companies, SINTEF is making a significant contribution to both the better utilisation of existing power grids and making new power and transmission capacity available. The greenest energy is the energy that we do not use. We are planning to address several considerations at the same time through technological advances that reduce the demand for power and heat in industry, buildings and digital processes, and through the reuse and storage of energy from data centres. Energy efficiency is a major research area at SINTEF that has a big impact on the sustainability accounts of all organisations.

Dilemmas related to power utilisation are, in essence, political issues. In some contexts, SINTEF's role is to provide a good basis for making political decisions, for example by contributing professional insights in consultation processes and committee work. For example, like when Inge Gran, CEO of SINTEF Energy Research, chaired the Electricity Price Committee in 2023. In other sectors of society, we also contribute studies, including ripple effects analyses and cross-discipline analyses, that can show the social impacts of different political priorities.

Chapter 3

# SINTEF's contribution to sustainability


How large is the real transmission capacity of the current power grid? Research at SINTEF is helping to clarify this. Here, Kristian Solheim Thinn is measuring thermal conductivity in soil, an important parameter when dimensioning new power cables and verifying existing cables.

Photo: Kristian Solheim Thinn/SINTEF

# Sustainability at SINTEF

Sustainability is at the core of SINTEF's activities. Ever since we were established in 1950, our ambition has been to contribute to competitiveness and societal benefits. In 2019, SINTEF's Board of Directors decided that our activities would be guided by the UN Sustainable Development Goals (SDGs) and that the SDGs would describe the impact needed to bring competetiveness and societal benefits.

We contribute to sustainable development through projects and research collaborations with companies and public bodies, nationally and internationally. Our projects benefit from our laboratories and other physical and digital infrastructure. Much of this research is based on SINTEF's in-depth expertise in many technologies and domains. At the same time, SINTEF also performs a wide range of societal research into sustainable innovation and transitioning.

We also contribute knowledge, ideas, and recommendations in public debates and policymaking. We do this by participating in committees, commissions and seminars, as well as through publications. In areas where no strong industry sector currently exists, we reap the commercial potential of our research results through licensing, technology sales and company start-ups.

Innovation will be required if the world is going to feed nine billion people by 2050. The Plankton Centre at SINTEF is working on solutions that could help address this challenge through its research into unexploited marine species. Photo: Sune Eriksen/Tinagent/Innovation Norway

*The Hurtigruten coastal express has sailed along the Norwegian coast for 130 years. This is our home. If we are going to continue sailing for another 130 years, we need to change the way we sail. We are incredibly proud of our collaboration with SINTEF on developing zero emission ships by 2030. SINTEF, in the role as project manager, contributes with analysis, research and development. Together, we want to create groundbreaking solutions within energy efficiency and battery power.*

**Hedda Felin**
CEO of Hurtigruten Norway

Photo: Espen Mills


92. Excess heat: energy that should not be wasted

# 3.1 We are working to realise the UN Sustainable Development Goals

SINTEF has tagged all new research projects in relation to the SDGs on an ongoing basis since 2019. Each project can be tagged with up to three SDGs. The intention is to illustrate that a single solution can help achieve multiple goals. In 2023, 96 percent of our gross turnover was linked to specific SDGs.

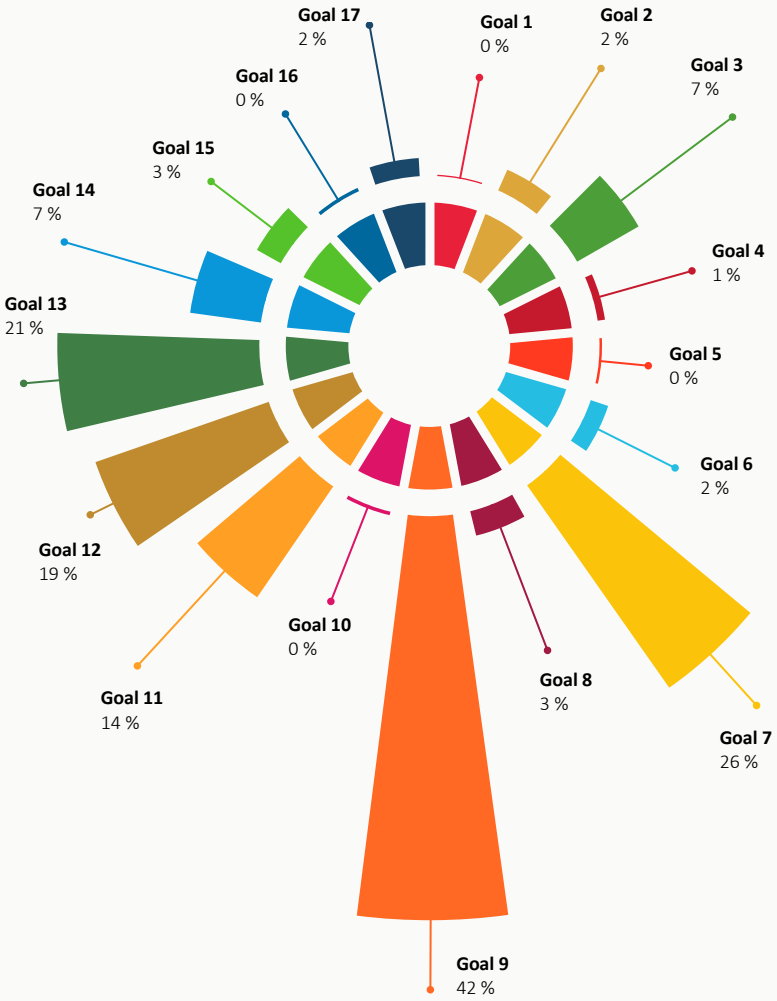
This is primarily a bottom-up process in which the quality of the results depends on the expertise, awareness and efforts of our research environments. We recognise that this model presents methodological challenges. For example, tagging practices in different parts of the organisation can vary. Uncertainty and different assessments may also have an impact on the tagging. Nevertheless, we believe that the analysis of the project portfolio based on this model provides a good picture of to which SDGs our projects contribute. The analysis also demonstrates a clear correlation between which goals have the greatest impact on our income and which ones are deemed the most material in the materiality analysis. These areas are specifically highlighted in chapter 4 of this report.

Information about projects that illustrate our contributions to sustainability in society is available to everyone via sintef.no, our popular science magazine, gemini.no, and free subscriptions to our newsletter.

The figure illustrates that in 2023 SINTEF had a significant number of activities aimed at the following SDGs, listed by how much of our turnover they are associated with: [11]

Goal 9 Industry, Innovation and Infrastructure
Goal 7 Affordable and Clean Energy
Goal 13 Climate Action
Goal 12 Responsible Consumption and Production
Goal 11 Sustainable Cities and Communities
Goal 14 Life Below Water
Goal 3 Good Health and Well-being
Goal 15 Life on Land

Gross turnover per SDG




Source: SINTEF

11) The model shows the proportion of gross turnover for research projects in SINTEF's six institutes in 2023 that contribute to the various SDGs, with up to three SDGs tagged per project. 'Other/outside' tags and projects that have not been tagged (4.4 per cent in total) are not included in the model.

# 3.2 Sustainability expertise – from ethics to good material choices

At SINTEF, we have expertise in assessing how choices concerning everything from materials and areas of use to logistics solutions and location impact the sustainability of technologies, processes, activities and value chains. We also have experts who are working on how sustainable transitions can be realised. For all of this, we make use of disciplines such as economics, natural sciences, industrial ecology and social sciences. We combine research and methods from these with expertise in technology, data analysis and knowledge of the SDGs.

## How we assess the impact on sustainability

In several projects, we systematically assess the impact various technologies, sectors and value chains have on sustainability. At a regional and global level, we analyse how these impact carbon and environmental footprints, land use, employment, gender equality and economics. The results can be used to evaluate the effects of possible industrial decisions, various policymaking processes and expected trends. These impacts can be linked to the SDGs, targets and selected indicators.

We are experts in the methods used for such assessments. Environmentally expanded, multi-regional cross-discipline analysis is one such method. This provides a good comprehensive picture of the macro effects. The method is based on national and international statistics on industries' deliveries to each other, and on data sets about what these mean for value creation, employment and emissions. To map processes and products more precisely, we use methods such as life cycle analysis (LCA) and material flow analysis (MFA). An LCA documents the carbon footprint. The method can be used to compare different solutions/products in areas such as carbon footprints, land use, nutrient pollution in ecosystems and social footprints in relation to human rights. Overall, these methods help illustrate the societal and environmental impacts systems have and the potential for improvement.

SINTEF's research on concrete strives to minimise the life cycle costs and environmental impact of buildings and infrastructure. Here, Senior Technician Henning Kleiv Karlsen examines a concrete sample. Photo: Smidesang & Lyng/SINTEF

## The EU Taxonomy – a transition tool

We also have expertise in the EU Taxonomy and provide advice on how organisations can adapt to the Taxonomy. The EU Taxonomy is a useful framework for the classification of sustainable economic activities. Given the industry code used by SINTEF, we expect to be able to link our activities to research, development and innovation that make material contributions to the six identified environmental objectives for, for example, the climate, circular economy and biodiversity. Because we are a closely integrated part of a number of clients' R&D work, our projects may also be eligible for other Taxonomy activities. We will continue to map this in 2024.

We believe that our greatest contribution to the Taxonomy lies in the research expertise our employees have and apply in collaboration with clients. It is clear to us that the knowledge we bring to projects regarding the Taxonomy's criteria helps shape clients' future business strategies. In turn, this will contribute to more sustainable products and more competitive business models. Over the last three years, we have developed an internal network of employees who work professionally with the Taxonomy criteria within projects, for example in projects for clients in the construction industry. This is a strategic area that we want to develop further. The Taxonomy Compass developed by the European Commission is a useful tool in our professional interaction with clients.

*SINTEF has been an important collaboration partner for us for many years, and is playing a key role in the development of circular value chains for our plastic products.*

**Runar Stenerud**
Marketing and Development Manager at Plasto

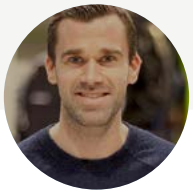


Photo: Plasto


68. Reusing construction materials can reduce waste and greenhouse gas

## We explore barriers, opportunities and ethical dilemmas

We have expertise in helping companies/sectors and public actors identify which of the SDGs and targets are relevant to them and assessing their status. Such measurements enable continuous improvement. We also have expertise in developing ethical frameworks. To this end, we have a process for identifying ethical dilemmas and considering different views when developing a basis for making a decision. Closely related to these activities, we use methods called responsible research and innovation (RRI) and stakeholder engagement. Common to them both is the fact that they are about transparent data and results; the societal impacts of research and innovation; reciprocal learning between research, industry, public decision-makers and the public; and involvement.

SINTEF has strong research environments within innovation and transition research. These use different quantitative and qualitative methods, often in collaboration with research scientists in more technology-intensive disciplines. This is how we improve our knowledge about drivers, barriers and opportunities for environmental innovation and sustainable transition. For example, we conduct scenario analyses related to climate goals and resource consumption. We also conduct in-depth studies of innovation processes in individual organisations, clusters or industries.

Within the area of the climate and environment, we have ecological and biological expertise on various types of pollution and their environmental impacts, plus experts in environmental measurements and monitoring and in nature restoration. We also provide advice on how organisations can adapt to climate-related and nature-related risks.

Photo: ABB

*SINTEF is an important partner for ABB Electrification Norway. Over the past decade, SINTEF has contributed to our research and development efforts within more climate-friendly products. We work well together, and the research institute's expertise in electrical power components will be important in the further development of our product portfolio.*

**Even Børhaug**
Technology Centre Manager at ABB Electrification Norway AS

The SINTEF Energy Lab, which houses this high voltage hall and other infrastructure, enables experiments using a far higher level of voltage than was previously possible. This enables the laboratory to meet the needs of today's power supply customers, both onshore and offshore. Photo: Karoline Ravndal Lorentzen/SINTEF


83. How can we improve the welfare of farmed salmon?

# 3.3 Infrastructure for research, testing and damage assessments

Our research infrastructure does not just consist of laboratories, it also includes testing and demonstration facilities and catapults. Some are highly specialised, although several of SINTEF's largest laboratories are used for many different purposes: from basic and applied research to prototype testing, damage assessments and small-scale production.

Access to outstanding infrastructure has a significant impact on how we carry out assignments for clients and develop outstanding research environments. We are further developing the infrastructure through our own investments, as well as through contributions from national and international infrastructure schemes, including from the Research Council of Norway and Innovation Norway. This helps ensure that our investments have a major impact with respect to triggering public funding for the development of research infrastructure. SINTEF has invested NOK 1.8 billion of its own funds in research infrastructure from its surplus in the last 10 years. We now have more than 100 laboratories.

Over the course of 2023, SINTEF invested NOK 321 million of its own funds in research infrastructure. We have also developed a joint project across the research institutes. This makes these important resources more accessible for our clients and society, and we benefit from the better overall management and development of our research infrastructure.

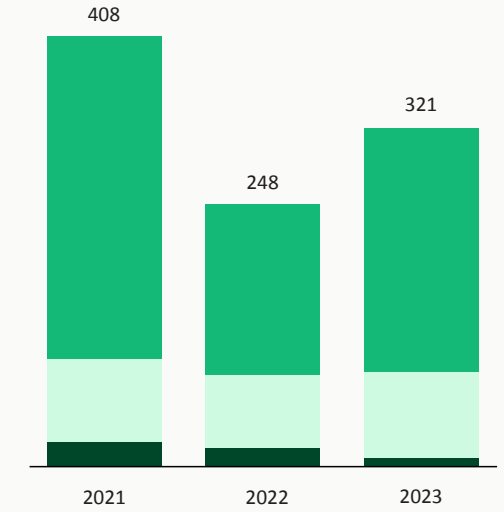
The Research Council of Norway's national infrastructure roadmap project commenced in 2022. In 2023, this work was closely followed up by SINTEF through participation in various thematic groups and consultative input. The roadmap has not been finalised yet and is part of the strategic development of Norwegian research. SINTEF believes that the roadmap will result in clearer infrastructure prioritisation aimed at sustainable solutions.


78. Growing mini organs on microchips

SINTEF has more than 25 years of experience in developing production processes based on enzymes and microorganisms. Such processes are used to produce a wide range of products, from medicines to food and feed.
Photo: Smidesang & Lyng/SINTEF

## We are investing in new laboratories, scientific equipment and other research production equipment

Annual investments in laboratories, scientific equipment and other research production equipment in NOKm



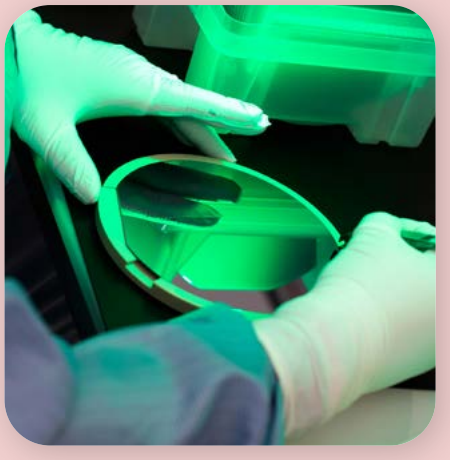

Source: SINTEF

# The laboratories are our cornerstones

SINTEF has more than 100 laboratories, and several of them are world leading. They provide the basis for our research. Together, they cover a wide range of technology areas. These are a few of them:

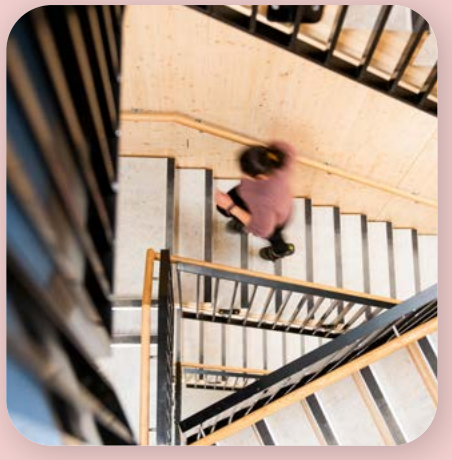
Sea pool

MiNaLab (microsystems and nanotechnology)



Fermentation

Zero emission building



$CO_2$ Lab

Full-scale aquaculture facility

Electrotechnical

Manufacturing processes

Photo: SINTEF

In 2022, SINTEF started investing in Norway's first laboratory for producing and testing battery cells. In 2023, the laboratory was completed and the infrastructure started to be used as part of a national infrastructure, NABLA, where the equipment is located at SINTEF, IFE, FFI, UiO and NTNU. The laboratory is now an important facility in the development of battery value chains. Here, Norwegian battery cell manufacturers can carry out the research, development and testing necessary before scaling up to factory production. The battery lab was partly funded by the Research Council of Norway via the infrastructure scheme.

In 2023, SINTEF and NTNU, with support from the Research Council of Norway and Equinor, established the OceanLab laboratories in Central Norway. OceanLab consists of four nodes for full-scale testing and research in the ocean environment. These are designed to meet the education, research and innovation requirements of the future. The four nodes include infrastructure for subsea activities, test areas for autonomous ships, aquaculture and an ocean observatory. The investments were completed in 2023, and the infrastructure will be fully operational from 2024.

We have put a lot of work into the further development of existing heavy research infrastructure, such as the Multi-Phase Laboratory in Tiller in Trondheim and MiNaLab in Oslo. One of the drivers behind the further development of SINTEF's Tiller facility, which turned 40 in 2023, is a change in the direction of the research portfolio. That is, a change from mainly oil and gas projects to green transition projects. One important factor behind MiNaLab's increased capacity is our greater focus on developing knowledge about microchips. This is being driven by the EU's European Chips Act. In 2023, we invested just under NOK 15 million in better cooling systems for MiNaLab. This could result in annual energy savings of up to one million kilowatt hours.

The Norwegian Ocean Technology Centre is particularly important infrastructure that we have been working on since 2005. Together with NTNU, we want to help make Norwegian ocean industries more sustainable and productive through the development of knowledge and technology, the establishment of world-leading educational environments, knowledge dissemination and restructuring industry. This major construction project started in 2022. The Storting had just approved the project, with a cost frame of NOK 8.2 billion. As a result of price rises, the cost frame was adjusted to NOK 10.3 billion in 2023.

The centre is entirely funded by the state. Its ownership is administered by NTNU, and it is designed to ensure value creation for Norway by increasing the competitiveness of Norwegian ocean industries. SINTEF will play a key role as the operator of the largest laboratories in the centre. The state funding was based on the ESA's decision prior to the Storting's decision. SINTEF is also contributing with its own investment of NOK 250 million for the facilitation of M-lab (maritime propulsion systems) and K-lab (maritime structures). The total project in Trondheim, Hitra/Frøya and Ålesund is scheduled for completion in 2028-2029, with the first full year of operation in 2030. The first laboratories were ready for use in 2023.

Photo: Memscap

*We have worked with SINTEF for many years, both on research activities and on further developing our core technology – advanced sensor technology. This collaboration means a huge amount to us – a relatively small, independent company that delivers high-tech products to very demanding markets within aviation and medicine. We rely on solid suppliers who are experts in their fields.*

**Roy Grelland**
CEO of Memscap


89. Microchips (1:3): The tiny helpers that are enormously important to us


90. Microchips (2:3): AI and sensors with the speed of light


91. Microchips (3:3): Providing precise answers about your health in record time

# 3.4 Commercialisation of research results – SINTEF TTO

Applied research for clients in industry and the public sector is SINTEF's traditional core activity. In addition, we contribute to start-up companies. These spin-offs also result in innovations that contribute to the common good and improve competitiveness.

Commercialising research results that are not exploited by clients is part of SINTEF's social responsibility. At the same time, the wave of digitalisation and sustainability is creating a need for technologies that will sustain the industries of tomorrow. Therefore, in our long-term research, which we finance with our own funds, we develop solutions that can produce completely new companies.

These spin-offs are highly competitive because their operations are based on expertise and leading technology. Together, these companies therefore represent a significant contribution to the renewal of Norwegian industry.

In our commercialisation activities, we mainly focus on the pre-seed phase and the seed phase. However, we follow up the companies closely in later phases as well. This activity helps to realise SINTEF's vision of 'Technology for a better society'.

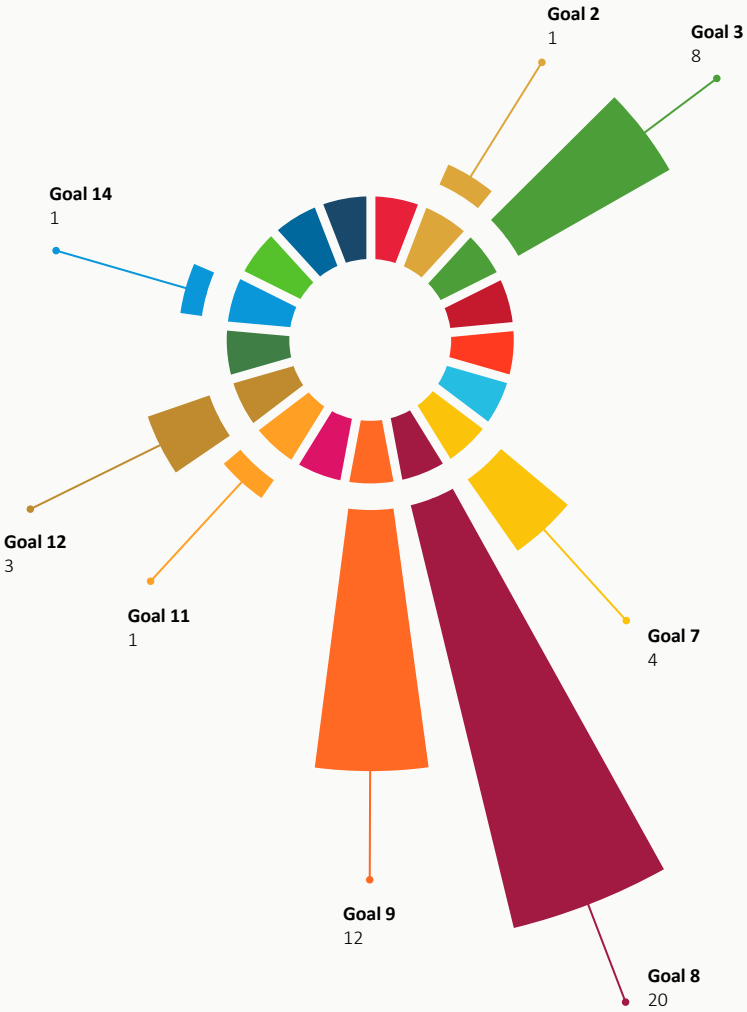
The potential return on investments in these phases is high, although so is the risk. Given this, SINTEF has developed a profitable and acknowledged model for commercialising research results.

Access to early-stage capital for start-ups is an important part of the commercialisation activity. In our investment funds, we have a strong group of long term and comitted investors, which provides us with the financial capacity to boost this work further. In 2023, we launched a new investment fund, SINTEF Venture VI. The fund helps us to realise our strategy, which is to commercialise technologies through start-up companies. We are proud of and humbled by the trust that investors demonstrate in SINTEF and our commercialisation concept by investing in the fund.

Our concept is based on close cooperation between SINTEF's research environments, our commercialisation company SINTEF TTO and competent partners. Our mission in this area is commercial value creation followed by exiting.

The proximity to our research environments' markets, previous commercialisation experience and outreach networking have afforded us good market penetration. We have started several new companies as a result of establishing the investment funds SINTEF Venture I and II (2002), SINTEF Venture III (2006), SINTEF Venture IV (2014), SINTEF Venture V (2018) and SINTEF Venture VI (2023).

Spin-offs per SDG




Source: SINTEF

Our sustainability profile is being strengthened by SINTEF's work on our portfolio of start-ups. When spin-offs are established, we require the companies to comply with, and be governed by, the same principles as SINTEF. In our experience, investors include sustainability in their investment criteria both because they want to contribute, but also because they want to assess and price risk.

Our commercialisation activities, which include investment funds and their management, are subject to the Sustainable Finance Disclosure Regulation (SFDR). This EU regulation was incorporated into the EEA Agreement through the Sustainable Finance Act, which came into force in January 2023. SINTEF's investment funds and start-ups are managed in line with SINTEF's ethical principles and policy on commercial activities. Both our funds and start-ups are based on the UN Global Compact. The aim of this is to ensure that the companies we contribute to operate responsibly within the areas of human rights, labour, the environment and anti-corruption. Our newest fund, SINTEF Venture VI, is an 'Article 8 fund' under the SFDR. More information about the fund's focus on sustainability can be found here.

We have mapped SINTEF's current portfolio of 20 start-ups in relation to their relevance to the 17 SDGs. The companies are all in an early phase where their commercial potential will be developed and realised over time. Assuming that the companies are successful and are scaled up, they will be in a position to contribute to the SDGs.

All of the companies satisfy goal 8 by contributing to 'Decent Work and Economic Growth'. Several of the companies use key technologies in IT, biotechnology and nanotechnology. They thus enable many different products, services and value chains for sustainable innovation and economic growth.

In recent years, we have contributed to a significant increase in start-ups targeting goals 9) Industry, innovation and Infrastructure, 3) Good Health and Well-being, 7) Affordable and Clean Energy and 12) Responsible Consumption and Production.

SINTEF has achieved good results from this commercialisation. The sale of start-ups has resulted in both returns for owners and the further development of the companies. The companies Nacre, GasSecure, Spermvital, Resman and CFEED are good examples of this.

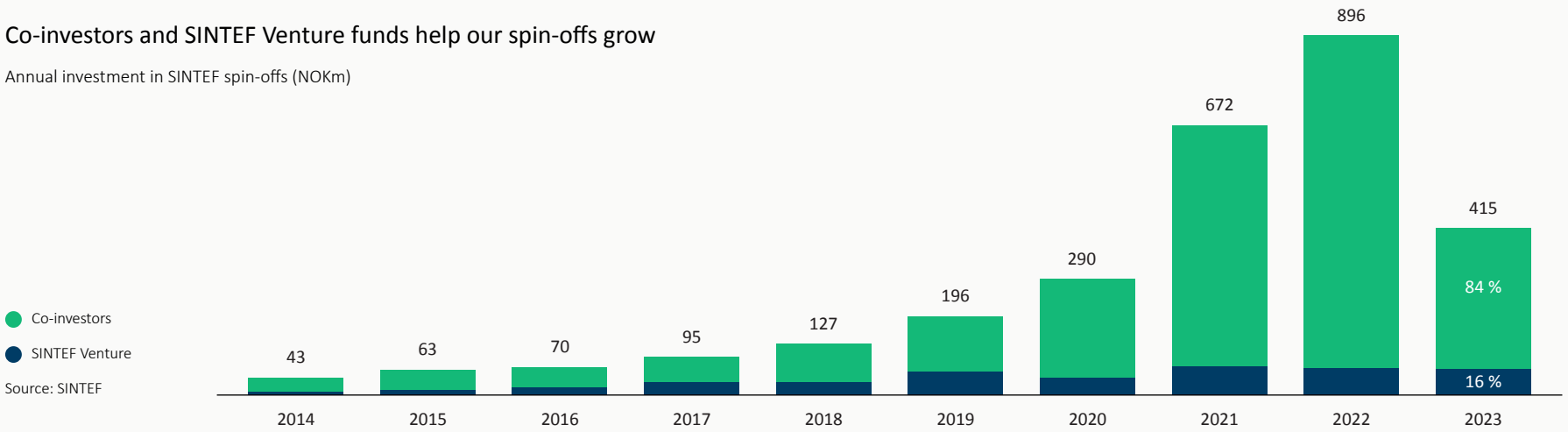
2023 was a year of turbulence and uncertainty in the capital markets. War, geopolitical uncertainty and higher inflation reduced access to capital, including for early-phase start-ups. Compared with 2022, which was a record year, companies found raising capital challenging.

Despite these challenging markets, NOK 415 million was invested in SINTEF's 20 start-ups in 2023, NOK 65 million of which came from SINTEF Venture funds. In the period 2014–2023, a total of NOK 2.8 billion has been invested in our start-ups, of which SINTEF Venture funds have invested NOK 405 million.

The next page provides examples of how our spin-offs contribute to sustainability.

## Co-investors and SINTEF Venture funds help our spin-offs grow

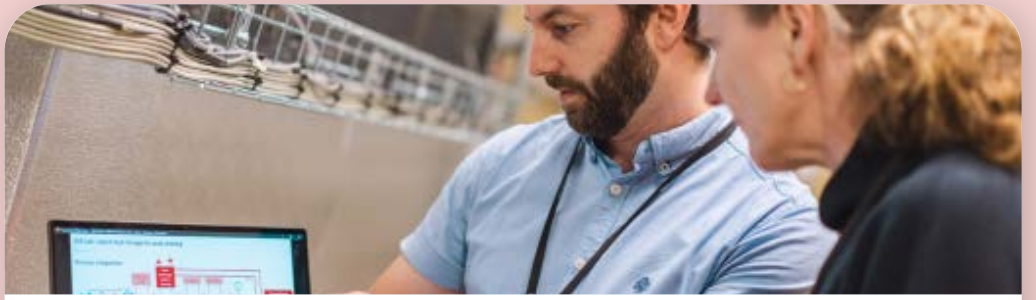
Annual investment in SINTEF spin-offs (NOKm)



## Algorithms designed to get us up off the sofa

Improving public health by helping people change their sedentary lifestyle – that is the business idea behind the company, Mia Health. The company has developed an app based on a digital twin solution from SINTEF, research on exercise at NTNU and data from HUNT, the world's largest health survey.

Based on your heart rate, it shows you a simple number that tells you how active you need to be to have a greater chance of living longer.



## 'Biobatteries' storing solar and wind energy

It used to be difficult to store energy generated by the sun shining and the wind blowing. However, a SINTEF spin-off, Cartesian, manages to do this in a completely green way using so-called phase change materials in combination with heat pumps.

The company's solution stores energy generated on sunny or windy days in biowax, which is a form of vegetable oil unsuitable for food, and delivers heat back on cold days.

## How green is the subcontractor's subcontractor?

New EU rules now apply to corporate sustainability reporting. A SINTEF spin-off, MoreScope, is helping industry with such reporting.

Large enterprises must keep carbon accounts for their entire value chain, national and international, through which products have passed. MoreScope calculates these using economic models and environmental data sets. The company now has many customers.

## Natural gas finding new, green paths to market

Based on licensed technology from SINTEF, a newly established Norwegian company, Hydrogen Mem-Tech, has developed a membrane that separates hydrogen from biogas and natural gas. At the same time, $CO_2$ is captured and can then be used or deposited.

The membrane also provides other benefits: It provides completely pure hydrogen, a requirement if the product is to become fuel. The technology is also easy to scale up and down because it is modular.

Photo: Getty Images, SINTEF

# 3.5 Removing greenhouse gases – SINTEF Global Climate Fund

**We established the SINTEF Global Climate Fund (the 'Climate Fund') in order to stimulate projects designed to remove greenhouse gases from the atmosphere. The market is producing too little technology designed to do this. At the same time, the expectations in relation to this type of initiative are high. There is a big gap between the global need for such solutions and the funds available for early research in this area.**

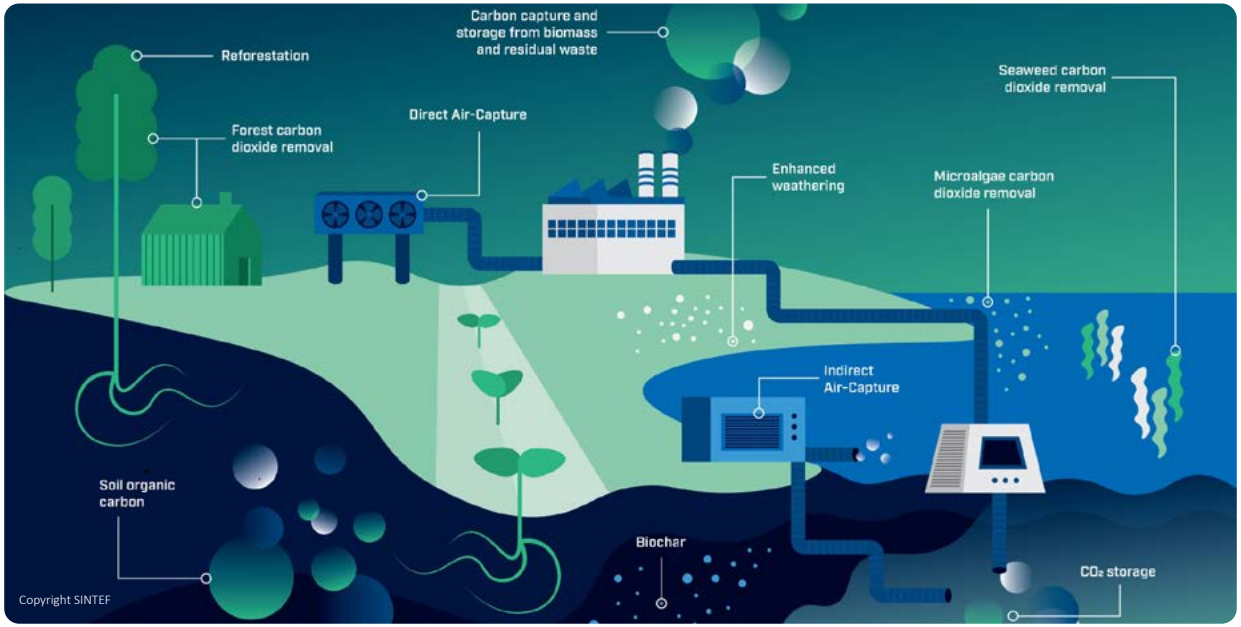
In its latest Assessment Report (2023), the Intergovernmental Panel on Climate Change (IPCC) calculated that all scenarios that limit global warming to 1.5°C and 2°C will require large and immediate cuts in emissions in all sectors and changes in patterns of demand. Solutions that can remove greenhouse gases are also required in order to compensate for residual emissions and historical emissions. Since global cuts in emissions are not happening fast enough, the need for greenhouse gas removal is growing.

The Climate Fund is intended to contribute to solutions that can remove greenhouse gases from air and water; solutions that can be scaled up and commercialised. The fund's project portfolio consists of research into both nature-based and technological solutions.

SINTEF has invested NOK 7 million in the fund each year in the period 2021–2023. We have since initiation viewed these contributions as a means of fulfilling our climate-related responsibilities, not least because we still generate emissions in connection with our own activities.

We firmly believe that these financial contributions will have a greater impact vis-à-vis the climate when invested in early research on greenhouse gas removal than they would if they were invested in more or less verifiable purchases of climate credits.

For more information see the Climate Fund's website.




Removal of greenhouse gases from air and water using nature-based and technological solutions.

Global Climate Fund

*We are developing a membrane that combines hydrogen production and carbon capture in a single step. SINTEF has been a key partner in our development from an idea in the laboratory to production on an industrial scale.*

**Christian Kjølseth**
Technology Director at CoorsTek Membrane Sciences

Photo: Christoffer Hals/University of Oslo

We have also opened the fund to external contributors. The aim is to grow the portfolio of research projects financed via the fund. SpareBank 1 SMN has been a partner since the fund's launch. The 12th Trondheim Conference on Carbon Capture, Transport and Storage also made a contribution in 2023.

Since its inception in 2021, the fund has funded five research projects. The projects can point to good results. The early funding has, not least, contributed to SINTEF now having a significant portfolio of other projects in this area, with funding through the ordinary range of instruments or industrial actors. More details can be found in the Climate Fund's annual report.

The first three-year period's projects are expected to be completed in the summer of 2024. During the course of the year, the Climate Fund, and the underlying SINTEF Sustainability Accelerator Fund, will consider how the activities can be developed further to strengthen our ambitions in the area of sustainability.

The Climate Fund was at the time of initiation assessed by CICERO Shades of Green, which provides an independent, research-based second opinion on sustainable financing. We achieved the best score, 'Dark Green'.

**7 NOKm**

SINTEF's contribution to the Climate Fund in 2023


36. How we can use the villain of climate change, $CO_2$, for something useful

The company Ava Ocean, founded in Ålesund in 2016, has developed new technology that enables the gentle yet efficient harvesting of seafood resources on the seabed. Photo: avaocean.no

*SINTEF is an important partner for Ava Ocean. We are a shipowner, with crew on the Arctic Pearl, and have developed unique technology designed to preserve biodiversity when harvesting renewable resources. Documentation is crucial when harvesting Iceland scallops in the northern regions around Svalbard and when replacing outdated technology on a global basis. SINTEF is contributing to the documentation/further development of technology and to the utilisation of valuable resources. We look forward to continued cooperation.*

**Øystein Tvedt**
CEO of Ava Ocean

Photo: Per Eide

# 3.6 National research centres – an ecosystem for innovation and value creation

Together with partners from universities, research institutes and industry, as well as public actors, we are building up capacity, expertise and innovation that address major societal challenges. Good examples of such systems include centres for research-driven innovation (SFIs) and centres for environment-friendly energy research (FMEs). These are spearheading Norway's efforts to develop sustainable solutions in key areas, from new processes for the metallurgical industry to $CO_2$ management and autonomous ships. Such centres are unique incubators for the development of new solutions and have a long-term perspective with industrial participation and collaboration. Here, R&D active companies and outstanding research environments are given the chance to collaborate on long-term research. This results in expertise that is important for innovation and value creation and that strengthens technology transfer, internationalisation and the training of research scientists.

The interaction between SINTEF and NTNU is important in these centres. We are building national teams in collaboration with other outstanding knowledge environments, both national and international.

SINTEF also heads the LowEmission centre, which receives its base funding from the Research Council of Norway. The centre is developing new knowledge and technology that by 2030 should have helped shrink greenhouse gas emissions from petroleum activities on the Norwegian continental shelf by 40 percent. We also participate in the Research Council funded centre, INTRANSIT. Here, we are helping to study how research and innovation policies can support a greener and smarter society.

### Centres for environment-friendly energy research (FMEs)

These work on long-term research aimed at renewable energy, improving energy efficiency, $CO_2$ management and social sciences. The research takes place in a close collaboration between research environments, industry and the public sector.

### Centres for research-driven innovation (SFIs)

These develop expertise that is important for innovation and value creation. Long-term research in a close collaboration between R&D active companies and outstanding research environments strengthens technology transfer, internationalisation and the training of research scientists.

*Together, we are building capacity, expertise and innovation that address major societal issues.*

**21 SFIs**

of which SINTEF led eight in 2023

**10 FMEs**

of which SINTEF led five in 2023

| Centres for research-driven innovation (SFIs) SINTEF leads or participates in | Duration | Lead |
|---|---|---|
| SFI Metal Production | 2015-2023 | NTNU |
| EXPOSED – Exposed Aquaculture Operations | 2015-2023 | SINTEF |
| SFI Climate 2050 – Reduction of societal risk associated with climate change in the built environment | 2015-2023 | SINTEF |
| CASA – Centre for Advanced Structural Analysis | 2015-2023 | NTNU |
| SFI Smart Maritime – Norwegian centre for improved energy efficiency and reduced harmful emissions from the maritime sector | 2015-2023 | SINTEF |
| Foods of Norway | 2015-2024 | NMBU |
| CIUS – Centre for Innovative Ultrasound Solutions | 2015-2024 | NTNU |
| SFI Manufacturing – sustainable innovation for automated multi-material product manufacturing | 2015-2024 | SINTEF |
| CIRFA – Centre for Integrated Remote Sensing and Forecasting for Arctic Operations | 2015-2024 | UiT |
| iCSI – Centre for Industrial Catalysis Science and Innovation | 2015-2024 | NTNU |
| MOVE – Marine Operations Centre | 2015-2024 | NTNU |
| SFI AutoShip – autonomous ships for safe and sustainable operations | 2020-2028 | NTNU |
| DigiFoods – Digital Food Quality | 2020-2028 | NOFIMA |
| SFI BLUES – the next generation of floating ocean structures | 2020-2028 | SINTEF |
| SFI IB – Centre for Industrial Biotechnology | 2020-2028 | SINTEF |
| SFI PhysMet – Centre for Sustainable and Competitive Metallurgical and Manufacturing Industry | 2020-2028 | NTNU |
| SWIPA – Centre for Subsurface Well Integrity, Plugging and Abandonment | 2020-2028 | SINTEF |
| SFI Harvest – Technologies for sustainable biomarine value creation | 2020-2028 | SINTEF |
| NorwAI – Norwegian Research Centre for AI Innovation | 2020-2028 | NTNU |
| SFI Dsolve – biodegradable plastic for marine applications | 2020-2028 | UiT |
| NORCICS – Norwegian Centre for Cybersecurity in Critical Sectors | 2020-2028 | NTNU |

| Centres for environment-friendly energy research (FMEs) SINTEF leads or participates in | Duration | Lead |
|---|---|---|
| NCCS – Norwegian CCS Research Centre – Industry-driven innovation for fast-track CCS deployment | 2016-2024 | SINTEF |
| CINELDI – Centre for Intelligent Electricity Distribution | 2016-2024 | SINTEF |
| HighEFF – Centre for an Energy Efficient and Competitive Industry for the Future | 2016-2024 | SINTEF |
| ZEN – Research Centre on Zero Emission Neighbourhoods in Smart Cities | 2016-2024 | NTNU |
| MoZEES – Mobility Zero Emission Energy Systems | 2017-2024 | IFE |
| Bio4Fuels – Norwegian Centre for Sustainable Bio-based Fuels and Energy | 2017-2025 | NMBU |
| SuSolTech – Research Centre for Sustainable Solar Cell Technology | 2017-2025 | IFE |
| NTRANS – Norwegian Centre for Energy Transition Strategies | 2019-2027 | NTNU |
| NorthWind – Norwegian Research Centre on Wind Energy | 2021-2029 | SINTEF |
| HYDROGENi – Norwegian centre for hydrogen and ammonia research and innovation | 2022-2030 | SINTEF |

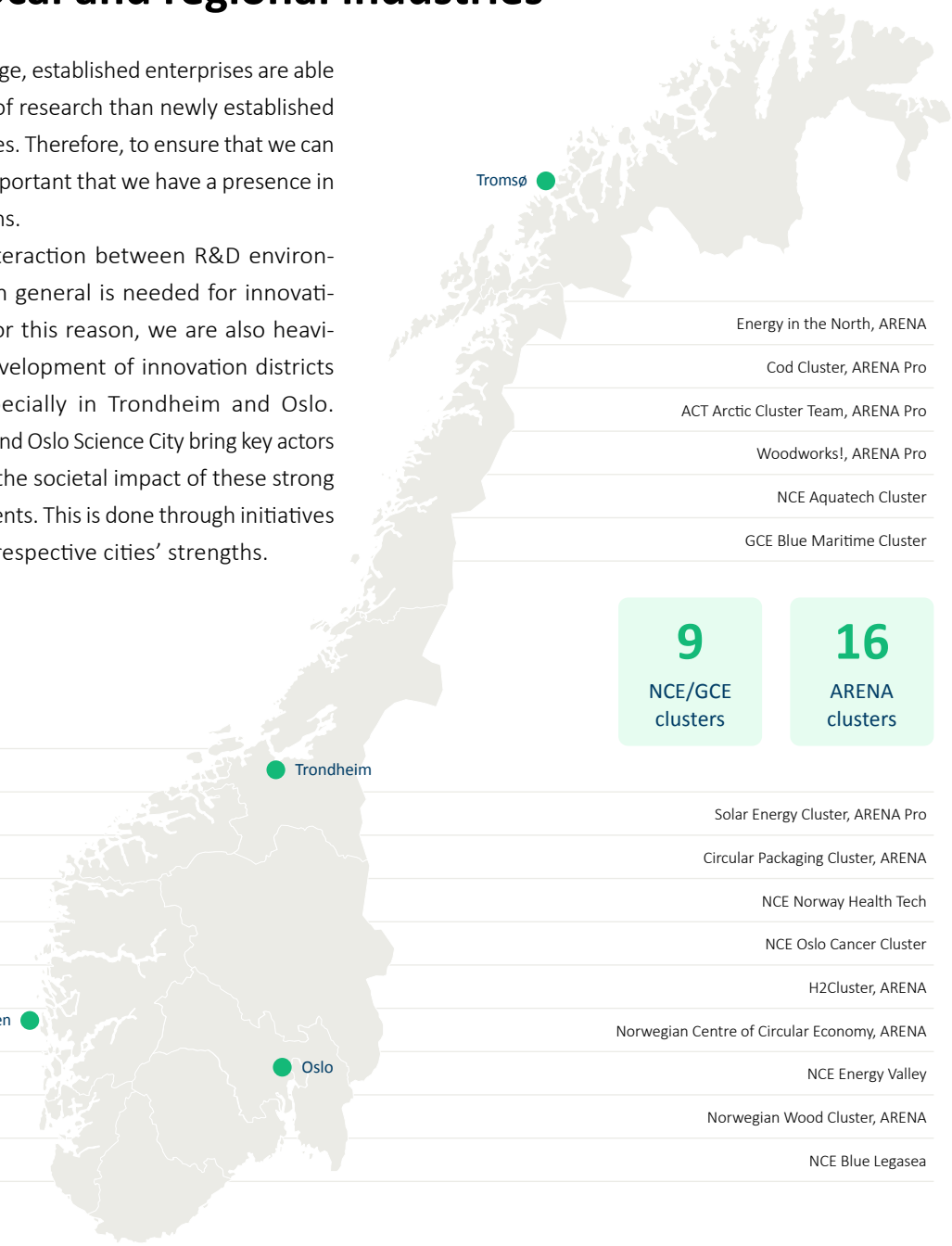
# 3.7 Industry clusters keep us close to local and regional industries

The digital green transition that the whole of society is undergoing requires a lot of applied research, as well as new constellations and partnerships. SINTEF is not just an important part of the national innovation system in Norway, we also contribute to expertise that is important for local and regional industry. That is why SINTEF collaborates with a large number of clusters – also beyond the places where we have offices, such as Raufoss, Mo, Porsgrunn, Ålesund, Bergen and Tromsø.

SINTEF is a partner in a number of cluster initiatives in various sectors across the country (see figure). We are also a member of several other clusters that were not part of Innovation Norway's cluster programme in 2023, including Kongsberg Technology Cluster, NCE Manufacturing and the Rørosklyngen.

It is clear to us that large, established enterprises are able to make greater use of research than newly established and smaller enterprises. Therefore, to ensure that we can support SMEs, it is important that we have a presence in rural areas and regions.

Even closer interaction between R&D environments and society in general is needed for innovation and transition. For this reason, we are also heavily involved in the development of innovation districts in major cities, especially in Trondheim and Oslo. Trondheim Tech Port and Oslo Science City bring key actors together to increase the societal impact of these strong knowledge environments. This is done through initiatives centred around the respective cities' strengths.




**9** NCE/GCE clusters

**16** ARENA clusters

## SINTEF participates in the following industry clusters:

- Ocean Hyway Cluster, ARENA Pro
- NCE Maritime CleanTech
- NCE Seafood Innovation
- Energy Transition Norway, ARENA Pro
- Nordic Edge, ARENA Pro
- Norwegian Smart Care Cluster, ARENA Pro
- Stiim Aquacluster, ARENA Pro
- Norwegian Offshore Wind, ARENA Pro
- Vital Infrastructure Arena, ARENA Pro
- NCE Eyde
- Energy in the North, ARENA
- Cod Cluster, ARENA Pro
- ACT Arctic Cluster Team, ARENA Pro
- Woodworks!, ARENA Pro
- NCE Aquatech Cluster
- GCE Blue Maritime Cluster
- Solar Energy Cluster, ARENA Pro
- Circular Packaging Cluster, ARENA
- NCE Norway Health Tech
- NCE Oslo Cancer Cluster
- H2Cluster, ARENA
- Norwegian Centre of Circular Economy, ARENA
- NCE Energy Valley
- Norwegian Wood Cluster, ARENA
- NCE Blue Legasea

# 3.8 World-leading research – our participation in EU research programmes

Transition needs created by global challenges require us to work locally, regionally, on a European level and globally with research-based technology development, problem-solving and innovation. The EU programmes are central to this work. Participation in these is crucial when it comes to SINTEF's ambition to conduct world-leading research and maintain competitiveness.

Norway's participation in these programmes is important for our ability to link partners from industry and the public sector to the international research front. Collaborating with us in the EU's industry-oriented research projects gives Norwegian companies access to expertise, networks and funding that accelerates their transition in a greener, more digital and more sustainable direction. This increases their competitiveness.

## Participating in the development of Europe

The policies and regulations proposed by the European Commission are based on research results and impact analyses. The Horizon Europe programme thus contributes directly to the development of research and innovation policies and to strengthening cooperation across borders, sectors and disciplines. Therefore, active participation in the EU's research projects gives Norwegian actors a chance to participate in the development of Europe.

European technology platforms and partnerships linked to the EU programmes are an important arena for strategic research influence. Our extensive participation in these protects Norwegian interests in this field.

Horizon Europe is the world's largest research programme, with a budget of around EUR 96 billion for the period 2021-2027. SINTEF is the largest Norwegian participant, with EUR 137.5 million in funding. This represents 14 percent of the funds brought home to Norway. Most of our participation in Horizon Europe takes place through collaborative projects with Norwegian actors and involves solving global challenges and building competitive businesses.


SINTEF is the largest Norwegian participant in Horizon Europe, the world's largest research programme. The funding we have received from this represents 14 percent of the funds that have been brought home to Norway from the programme.
Photo: Smidesang & Lyng/SINTEF

**1,019 EURm**

Total funding for research and innovation in the EU projects Norway is participating in

## High success rate

The total funding for research and innovation in the EU projects Norway is participating in amounts to EUR 1,019 million. However, the value of the R&D that Norway has access to is ten times greater than the funding awarded to Norway and SINTEF since we gain access to the research of the other partners in our collaborative projects.

Since the start of Horizon Europe, we have been successful with almost one in every three applications. Our success rate was 29 percent as of 14 December 2023, while the average success rate for applicants in Europe is 17 percent. Our success rate is even higher in our primary area, Pillar II – Global Challenges and European Industrial Competitiveness. The projects we have won funding for involve 135 other Norwegian project participants. This means that we are involved in 39 percent of the collaborative projects in which Norwegian enterprises are participating (see figure). This is how we are building international competitiveness within Norwegian industry.

## We need predictable framework conditions

Our goal is to double our turnover from the EU (from the level in 2019) up to the end of Horizon Europe in 2027. This assumes that the national framework conditions for our participation will improve and not deteriorate. We are already well on our way to doing this, although to achieve the goal, we need predictable framework conditions. Horizon Europe is growing and taking an increasingly stronger global position. Canada and New Zealand are already associated with the programme, and further expansions are in sight. This provides Norway with a springboard for realising the green and digital transition in a global context.

## Next generation defence systems

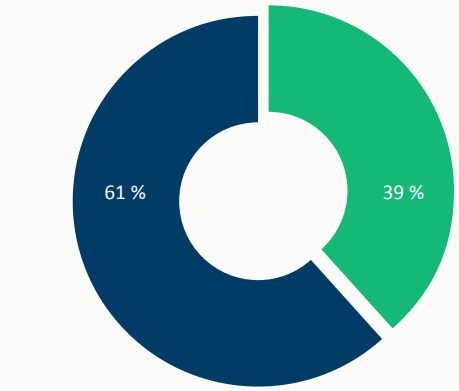
The war in Ukraine is influencing research programmes in the EU. Synergies between civilian and military technology and knowledge development have become an important topic. We contribute to research into defence technology in Norway and the EU. In the European Defence Fund, we have helped to win projects where the total contribution from the Defence Fund is EUR 115.3 million. Our share of this is EUR 5.5 million. Here we collaborate closely with the Norwegian defence industry on the next generation of European defence systems. The other Norwegian participants receive EUR 12.1 million. In total, this means EUR 17.6 million for Norway. This is important for Norwegian actors' access to the European defence market.

## Contributing to greater European self-sufficiency

Strategic autonomy and the establishment of solid European value chains will be strengthened through initiatives such as the EU's Green Deal Industrial Plan, Net Zero Industry Act, Critical Raw Materials Act, European Chips Act and AI Act. This is Europe's response to the growing geopolitical turmoil. The strategy is to stop activities moving out of the EU, as well as to support the green transition and strengthen security of supply through legislation and cooperation with friendly countries. This includes by facilitating the faster establishment of industrial partnerships, more public support for technology companies and research, development and innovation.

As part of this, in 2023 the EU and Norway signed a bilateral agreement, the 'Green Alliance', a planned green industry collaboration. Creativity, innovation and research are cornerstones of this agreement.

SINTEF is participating in 39 percent of the volume of Norwegian industry's collaborative projects under the EU programme, Horizon Europe. [12)]




Source: eCorda. December 2023

**5.5 EURm**

The value of our contribution won from the European Defence Fund

12) The graph shows the project volume for Norwegian industry's collaborative projects under the EU's Horizon Europe programme in 2023, with and without SINTEF cooperation. These are EU projects with two or more Norwegian partners, i.e. exclusive of mono contracts and projects in which Norwegian industry or SINTEF is the sole Norwegian participant. The proportions reported in SINTEF's Sustainability Report 2021 were accumulated for Horizon 2020, while the reporting for 2023 shows proportions for Horizon Europe. eCorda is the official source for EU reporting.

# 3.9 Global aid projects can combat both poverty and environmental problems

In the past five years, SINTEF has had 38 projects that involve low and middle-income countries (LMICs). The projects cover a wide range of topics and SDGs, as shown in the figure.

LMICs have a pressing need to combat the global crises, which are a greater threat to them than to the rest of us. In other words, challenges related to the climate, nature, poverty, health and food security, which the UN summit discussed in 2023. If we are to succeed with the green transition and at the same time take into account nature and fairness, every country has to be involved.

This was the backdrop for establishing the sustainable global development corporate initiative. SINTEF has broad expertise and motivated research scientists within important transition-related topics. The goal is to raise awareness internally about these issues and at least double our portfolio of collaborative projects with LMICs within five years.

We are seeking project funding via existing actors such as Norad, the UN system and Horizon Europe. At the same time, we have initiated a dialogue with the Ministry of Foreign Affairs and Norad on the development of models for innovation partnerships devoted to transition/building green value chains with selected countries.

Applied research, teaching and market introduction are the building blocks for the comprehensive innovation expertise required to get the necessary global transition underway. To achieve good interaction between the teaching and research components of this 'triangle', the corporate initiative established the Gemini Centre Global Impact together with NTNU.

One of our Norad projects, OPTOCE, is all about establishing circular supply chains for plastics that would otherwise end up in the ocean. Thanks to the project, we have helped reduce the flow of plastic pollution into the world's oceans by collecting and using plastics as a factor input in the cement industry.


75. Global health: teaching surgery in record time

38 projects involving low and middle-income (LMIC) countries

Innovation and job creation

Waste management and circular economy

Food and nutrition safety

Stakeholder involvement and policy development

Digitalisation of public services

Renewable energy

Clean water

Sustainable oceans

Access to education and health services

People with disabilities and assistive technologies

Chapter 4

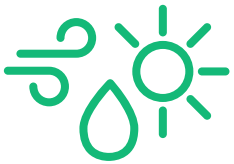
# Where SINTEF's research has the greatest sustainability impacts


Without carbon capture and storage (CCS) it would be impossible to achieve zero emission production of, for example, cement, artificial fertiliser and waste-based energy. Here represented by research scientist Jacob Stang, SINTEF conducts research into all parts of the CCS value chain.

Photo: Geir Mogen/SINTEF

# These are the areas where SINTEF's research has the greatest sustainability impacts

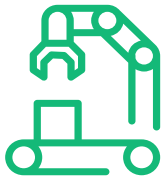
Our main contributions to society are the research and innovation we carry out in collaboration with our clients and partners. A materiality analysis was conducted in 2021. The group management team was heavily involved in it. The analysis resulted in six research areas being highlighted as areas where SINTEF can make particularly large contributions to clients and society in general. These continued to guide our contributions in 2023.



**Clean energy and climate action**
(goals 7, 9 and 13)

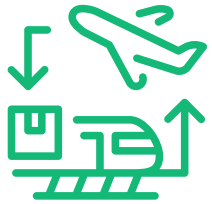
**Life below water and on land**
(goals 14 and 15)

**Circular economy**
(goal 12)



**Green innovation, responsible consumption and production**
(goals 9 and 12)

**Health**
(goal 3)



**Infrastructure and mobility**
(goals 9 and 11)


### Helping to cut $CO_2$ in European industry

The EU ACCSESS project aims to contribute to drastic cuts in industrial $CO_2$ emissions and the net removal of $CO_2$ from the atmosphere (CDR). The project is aimed at sectors such as the paper and cement industries, waste incineration and biorefining.

SINTEF is leading the project, which includes developing and pilot testing two innovations: an environmentally friendly enzyme-based solvent for carbon capture and a more compact technology for carbon absorption (sequestration).

We are also assessing the financial, environmental, legal and regulatory aspects. The project will demonstrate and improve technologies and supply chains for $CO_2$ management, which is important for industry and society in Europe.

## 4.1 Clean energy and climate action

### Challenge

Achieving net zero emissions by 2050 will require massive cuts in emissions, large-scale expansions of renewable energy, new energy efficiency solutions, CCS and new energy carriers. The war in Ukraine underscores the need for a rapid transition within energy and a robust energy system. At the same time, biodiversity and land use have emerged as important considerations in the green transition.

### SINTEF's expertise and contribution

SINTEF is promoting a greener future by developing emission cutting technology and energy solutions with a low carbon footprint and high security of supply. Below are two examples of technologies that we have developed in collaboration with industry:

In the EU CHEERS project, we have been involved in building the world's largest green incinerator (4 MW). It uses chemical circulatory combustion (CLC). Carbon capture is included as part of the incineration process and is therefore almost 70 percent cheaper than other carbon capture methods. The solution is very suitable for handling waste and biofuels and may become an important means of removing $CO_2$ from the atmosphere.

We are looking at different methods for calculating how heavy loads underground electricity cables can withstand. Our research into this has resulted in new software, GrøftDesign, which has been adopted by Norwegian grid and consulting companies. The research could increase the capacity of the cable network by 5-20 percent. This is equivalent to NOK 0.5–2 billion in value.

In order to coordinate the efforts within important strategic areas, SINTEF has corporate initiatives within hydrogen, solar and wind energy, new climate-positive measures and batteries. We also have a corporate initiative within biodiversity and land use.


Project turnover
1,104
NOKm

Spin-offs
4


Project turnover
1,804
NOKm

Spin-offs
12


Project turnover
902
NOKm

Spin-offs
0

Photo: NTB

### We make tools for repairing nature

Marine ecosystems are threatened by direct and indirect anthropogenic pressures, which in turn result in losses of biodiversity and ecosystem functions. Ecological restoration is required to restore degraded and destroyed marine ecosystems.

This is the backdrop for the CLIMAREST research project. In this we are developing and demonstrating restoration tools and activities at five demonstration sites across Europe, from Svalbard in the north to Madeira in the south.

Smart forklart

87. Saving coastal marine ecosystems

The project is funded by the EU, and 18 partners along Europe's coastline are taking part. The project belongs to the EU Mission Restore our Ocean and Waters and is a member of the Lighthouse for the Arctic and Atlantic Basin.

## 4.2 Life below water and on land

### Challenge

These SDGs are about preserving and using ecosystems in a sustainable manner. It is important for Norway to address national challenges in this area. Our land resources can be utilised more, and nature-related considerations should be afforded more weight. Ocean industries are developing rapidly and ecosystems in some areas can be sensitive to the impacts from harvesting and greater activity in sectors such as offshore wind power and aquaculture.

### SINTEF's expertise and contribution

SINTEF's corporate initiative within biodiversity and land use includes the interaction between industrial development and life below water and on land. The initiative's efforts are aimed at the following main areas: circular bioeconomy, energy efficiency, smart production and packaging. We are helping Norwegian agriculture and forestry to develop, especially within processing and the total utilisation of raw materials. We are also heavily involved in ocean industries. In cooperation with governments and industry, we are contributing to the future-oriented development of fisheries, based on the SDGs. We participate in environmental research and important work on restoring ecosystems through national and international partnerships.

Ocean industries will play a key role in Norway's transition. Future industrial development will largely be based on our ocean resources and expertise. SINTEF contributes to this by developing:

- Offshore renewable energy resources
- New biomarine value chains
- The maritime transport systems of the future
- New technological environmental monitoring solutions
- The growth potential of today's seafood industry

The UN Sustainable Development Goals provide direction for this work. We participate in international networks and consortia where the purpose is to share knowledge and best practice across borders.


Project turnover

319

NOKm

Spin-offs

1


Project turnover

122

NOKm

Spin-offs

0

Smart forklart

76. Sustainable fish feed

Photo: Susi Schaefer, ARDITIskrāMARE-Maderia

## New circular opportunities for Norwegian aluminium

Aluminium has many uses. It can be recycled without its properties being degraded. The Green Platform AluGreen project will create new circular opportunities for the Norwegian aluminium industry and explore, develop and test circular aluminium products. The goal is to cut greenhouse gas emissions by 50-80 percent $CO_2e$, increase the export value of aluminium products by NOK 7 million per year and create at least 1,500 sustainable jobs.

During the project period, pilots will commence within road and energy infrastructure, electric motors, battery safety systems and concrete reinforcement. These are intended to demonstrate that circular solutions that have less impact on the environment can be developed for aluminium products.

# 4.3 The circular economy

### Challenge

Sustainable consumption and production are about producing more with less. According to the UN, if everyone in the world was to use the same quantity of resources as Europe, we would need 2.8 earths to meet this consumption. The core idea behind the circular economy is ensuring that the earth's resources are used in the best possible way to ensure sustainability and value creation in the long term as well. Transitioning to a circular economy will be crucial for economic growth and waste and resource management in the coming decades.

### SINTEF's expertise and contribution

SINTEF contributes comprehensive research expertise on the circular economy, from strategies, business models and environmental and economic analyses to specific technological solutions. The framework for our development of expertise in this field is the EU Taxonomy for sustainable activities. The Taxonomy contributes standardised criteria that are fundamental for the development of new and more sustainable activities. We use and analyse these criteria in both established projects and project development.

In the corporate initiative on the *circular economy,* we are bringing together expertise from across SINTEF to strengthen the transition to a circular economy in Norway. The initiative is also contributing to effective value creation in collaboration with clients. The circular economy will determine how industry and business are run in the future. We have a broad portfolio of projects that contribute to better resource utilisation both on land and in water.

We coordinate the EU REEPRODUCE project, which is developing a flexible and complete European rare earth elements (REE) recovery value chain for the disassembly and recovery of rare earth metals from end products.
In the SIRKLand project we are exploring new solutions for collecting agricultural plastic. SINTEF analyses and designs solutions that are intended to maintain the quality of the plastic and avoid pollution in the value chain.


Project turnover

819

NOKm

Spin-offs

3


93. Circular value chains: plastic waste from farming may become a resource

Photo: SINTEF


### The world's first smelter with carbon capture

Managing $CO_2$ through carbon capture and storage or reuse is critical for achieving climate-neutral production and thus achieving global targets for cuts in greenhouse gas emissions. SINTEF has been researching this since the 1980s and has been collaborating with Aker on developing systems for capturing industrial emissions since 2008.

On 20 January 2023, the CEOs of SINTEF, Aker Carbon Capture, Elkem, SMA Minerals, Mo Industrial Park and Gassnova opened the world's first pilot system for carbon capture in smelters, together with State Secretary Amund Vik. The industrial actors represented in the project together emit 2 million $tCO_2e$ per year. The aim is to remove these emissions when the pilot plant is scaled up.

## 4.4 Green innovation, responsible consumption and production

### Challenge

Sustainable production consumes less resources and has a smaller carbon footprint. Such solutions require changes to production methods and new ways of putting together value chains. Raw materials must be extracted and recovered in short, circular cycles consisting of product production, use, recovery or reuse. Based on new methods, energy solutions and processes, we must develop new production methods that are more environmentally friendly and that extend the lifetime of products.

### SINTEF's expertise and contribution

We work on both gradual improvements and fundamental changes throughout value chains. We help Norwegian and European industry build competitiveness from the possibilities that arise through both the green and digital transition they are currently undergoing. We develop generic expertise, enabling technologies and multidisciplinary solutions for a broad range of market areas in close cooperation with our clients and partners. We meet the knowledge needs of many industries. To ensure that we realize our full potential for impact, we work together in multidisciplinary corporate initiatives. Our ambition is to make net zero emissions by 2050 possible.

Advanced laboratories and digital tools are important foundations for our research. For example, the Multiphase Laboratory, was one of the incubators for a solution that was named the most important Norwegian invention since 1980 by the major newspaper Aftenposten. Multiphase technology allows oil and gas to be transported in the same pipe. Its first purpose was to significantly reduce the need for investment in fossil fuel extraction. Now, the infrastructure is also used to improve climate technologies such as carbon capture, transport and storage, transport of hydrogen, and to develop new technologies for the process industry.


Project turnover

1,804

NOKm

Spin-offs

12


Project turnover

819

NOKm

Spin-offs

3

Smart forklart

71. 3D printing: a revolutionary manufacturing method

Photo: Mo Industrial Park, Benjamin Strøm Bøen

## Sustainable health services for rural areas

The AI POCUS AAA project aims to improve healthcare in rural areas. The goal is to support healthcare professionals at doctor's surgeries, nursing homes, accident sites or ambulances by combining AI and ultrasound. Family doctors will be guided by AI algorithms when performing ultrasound examinations that are usually carried out by specialist health services.

Collating knowledge about the practical opportunities and challenges in rural areas is enabling us to develop the technology that has the best prerequisites for success. This is being done in collaboration with the Health Innovation Centre, specialist health services and a number of municipalities.

# 4.5 Health

### Challenge

The Norwegian health service is among the best in the world. Maintaining good and sustainable health and care services requires constant innovation. We need new digital services and technological solutions that ease the workload of healthcare professionals and improve treatment efficiency. The health industry and institutes could play key roles in this work, if it was made easier for actors outside the health sector to contribute.

### SINTEF's expertise and contribution

Health is a multidisciplinary research activity in SINTEF. Nearly 200 research scientists work on topics ranging from developing new anticancer nanomedicines to research on initiatives that free up nurses' time for more patient-oriented work. We contribute to the development of medical technology and digital solutions for public health, the health sector and the health industry.

The areas we focus on include ultrasound technology, AI in specialist health services, personalised digital home care services for an aging population, prevention, occupational health, better healthcare for children under the supervision of child welfare services and mental health work in municipalities. We are also working on future medicine production, including cancer medicines and antibiotics.

2023 was the year that artificial intelligence (AI) left the research labs and became public property. This is also true when it comes to health. We expect even greater demand for knowledge about the capabilities and limitations of AI in the years to come.

We have also made a significant contribution to the work on making health a priority export initiative in the Norwegian Export Council. The government's Roadmap – The health industry also points to the Norwegian health industry as important for the transition in the health sector.

3 GOOD HEALTH AND WELL-BEING

Project turnover

316

NOKm

Spin-offs

8

Smart forklart

73. Cardiac examination: how artificial intelligence can help save lives

Photo: SINTEF

### Are driverless freight vehicles next?

The EU MODI project will pave the way for automated freight vehicles without drivers who can take over.

The project includes five demonstrations on the Rotterdam-Oslo route. The purpose is to identify technological and societal barriers. The project is looking at the interaction between infrastructure and vehicles for automated transport. SINTEF is responsible for:

- Demonstrating automated solutions, including for border crossings, driving through Svinesund Customs Station and on some stretches of motorway.
- Data collection in relation to mapping how ready the Oslo-Rotterdam route is for such vehicles.

Smart forklart

We are also responsible for bringing together the partners in the project such that they can solve challenges together.

74. Driverless freight vehicles

Photo: Einride

## 4.6 Infrastructure and mobility

### Challenge

Good infrastructure and efficient, safe transport services are crucial for both people and industry. But infrastructure development and mobility also present challenges in terms of to $CO_2$ emissions, biodiversity and costs. Therefore, the current infrastructure and vehicles need to be utilised better. At the same time, green transport will require new energy infrastructure. We also need to make this infrastructure last longer. This will save $CO_2$ emissions, nature and costs.

### SINTEF's expertise and contribution

We are designing the infrastructure of the future and contributing to better, cheaper and more sustainable mobility solutions. Our multidisciplinary commitment to mobility includes zero emission mobility, automated transport, infrastructure, hub and mobility data and AI. We have a number of projects with clear goals in this area, including:

- CAPTAIN : new knowledge about solutions that will reduce the demand for transport and energy in transport.
- MEGACHARGE : a complete value chain for developing charging infrastructure for electric heavy transport.
- Sustainable roadbuilding. Green value chain and material use in roadbuilding.
- WILDETECT : technology that reduces roadkill numbers.
- The HE-ART clean aviation project: an electric drive train for aircraft.
- INTERPORT : analysis models designed to ensure the efficient utilisation and integration of energy systems in ports.
- Assistance for the company ENTUR: travel planner that links energy consumption and $CO_2$ emissions to different travel options.

We are trying to improve the framework conditions in application-oriented research, development and innovation. This is important because technology is developing very fast, the sector is very important for society and there is a great need to reduce the uncertainty. In 2023, we took part in the Input Seminar for the next National Transport Plan and were active during Arendal Week on this topic.

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

Project turnover
1,804
NOKm

Spin-offs
12

11 SUSTAINABLE CITIES AND COMMUNITIES

Project turnover
600
NOKm

Spin-offs
1

Chapter 5

# Safeguarding sustainability in our internal operations

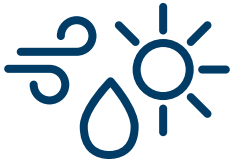
Research Scientist Deni Ribicic in action in SINTEF's plankton centre. Here, we help develop new knowledge about plankton production and harvesting, as well as what processing these organisms need for further use. Plankton are low down in the food chain. They can be used both for food and feed and as an ingredient in medicines and health foods.

Photo: Karoline Ravndal Lorentzen/SINTEF

# Six areas are particularly important for sustainability in our internal operations

Our internal sustainability work encompasses many topics. Everything from our systematic work on safeguarding employees to cutting emissions in our own operations.

**HSE**



**Climate, nature and environment**

**Equality and diversity**

**Labour rights and human rights**

**Ethics and integrity**

**General compliance with laws and rules**

# 5.1 HSE is a top priority

HSE is a top priority at SINTEF. We take a systematic approach to safeguarding our employees' safety and working environment. SINTEF's HSE standard must correspond with its strategies, policies and objectives. Our HSE Policy was revised in 2023 in order to clarify roles and responsibilities.

Parts of SINTEF's operations involve research activities. These take place in demanding conditions and depend on a lot of technical equipment. This increases the risk of accidents and other adverse incidents. We are, therefore, strongly committed to risk mitigation and putting good barriers in place. In 2023, we also established a project dedicated to improving technical safety.

Learning from incidents and sharing experiences are important elements of improvement work. All HSE incidents are reported to the group management team on a weekly basis. Tertiary HSE reports are shared with the group management team, the Board and all employees. These report the status of KPIs and measures within preventive HSE work. They also describe personal injuries and critical incidents.

HSE one-pagers are produced for some incidents to ensure that important experience and lessons are shared. We prepare 'positive' one-pagers to share best-practice from assessments of risky activites.

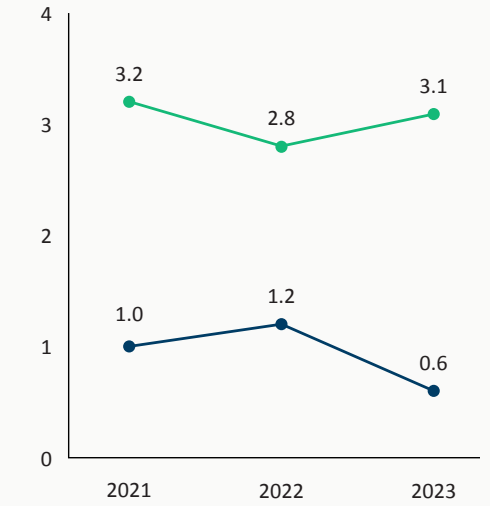
Incidents with high risk potential are reviewed with regard to conducting an investigation. A number of investigations and internal incident reviews were conducted in 2023. The recommendations from these are thoroughly followed up.

Of the approximately 500 reports in 2023, 36 were accidents and 50 were near accidents. There was a total of 24 personal injuries in 2023. Of these, 14 required first aid. 10 employees required medical treatment. Two incidents resulted in absence. This results in an LTI of 0.6 and a TRIF of 3.1 for 2023.

All employees have a responsibility to contribute to a good working environment. Strong employee involvement is crucial for the success of HSE work. Safety representatives, trade unions and working environment committees play important roles. These work with management to ensure good physical and psychosocial working environments.

Working environment committees (WEC) have been established for each research company, with research institute working environment committees as subcommittees under SINTEF AS (see the overview of the research institutes in Chapter 1.1). This ensures local anchoring. The limited research companies have their own main

Personal injury frequency (LTIR and TRIF rates)




- Total recordable injury frequency (TRIF rate): Number of personal injuries per million hours worked (excluding first aid injuries)
- Lost time injuries (LTI rate): Number of personal injuries resulting in absence per million hours of work

Source: SINTEF

safety representatives, and the institutes in SINTEF AS also have institute safety representatives. The job of WECs is to work for a fully satisfactory working environment and to act as an arena for the planning and development of HSE work.

SINTEF believes good HSE training is important. The training is designed to help ensure that employees have the skills they need to work safely. Part of the training is mandatory for all employees, while some is specific to their roles and duties. The institutes provide local training that supplements these core courses. Employees who perform particularly risky tasks have to take special courses.

Over the course of a year, the group management team discusses selected topics within preventive HSE work. Important topics in 2023 were HSE coordination agreements and the follow-up of investigations.

SINTEF's occupational health service (OHS) is provided by an external supplier, which has a presence at all of SINTEF's locations in Norway. The OHS conducts targeted occupational health interviews with employees whose work involves risk factors that could impact health. Employees in this target group are followed up every three years, or more often if the work and risk factors indicate this is necessary. The OHS also offers occupational medical assistance, ergonomic workplace assessments, occupational hygiene measurements and follow-up in the psychosocial working environment from psychologists and counsellors.

Parts of SINTEF's activity are linked to laboratory experiments. These take place under demanding conditions. We are therefore very concerned with reducing risk and implementing effective safety barriers. Photo: SINTEF/Geir Mogen


70. Psychosocial working environment: how to thrive better at work.

# 5.2 Safeguarding our employees and their rights

## Our workforce

At the end of 2023, SINTEF had 2,170 permanent employees (corresponding to 2,040 full-time equivalents). The majority of our employees are scientific personnel (76 percent), including research managers and research directors, and 61 percent of our scientific personnel have a PhD. It is fairly rare for SINTEF to offer temporary positions. In 2023, only 2.1 percent of personnel were temporary employees. The most common reasons for temporary employment are the establishment of temporary positions or special expertise being brought in for specific projects. Having a high proportion of permanent positions is a competitive advantage compared with the university and university college sector.

Both attracting and retaining the right expertise are crucial to SINTEF's success. The number of employees has increased in the past few years, and the supply of qualified applicants is good in most fields. At the same time, we view it as positive and part of our societal mission, that, through their work, SINTEF's employees develop insights and skills that are attractive competencies for industry and other organisations. This is how they become a resource that helps strengthen these organisations.

## Working environment

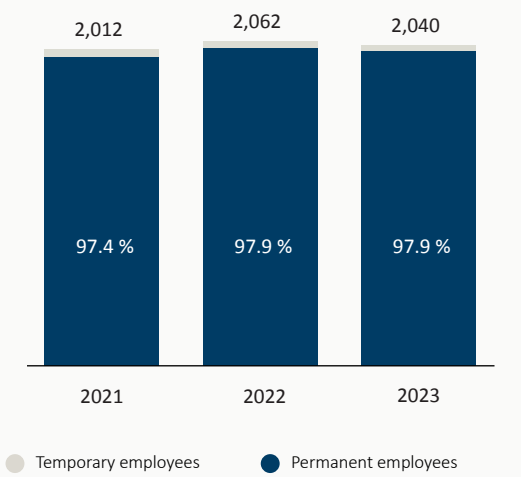
According to SINTEF's code of conduct, we must strive to achieve a good working environment characterised by equality and opportunities. SINTEF's working environment surveys are a good indicator of whether we are achieving this goal. The survey's response rate is usually high. In January 2023, it was 93 percent. We want SINTEF to be an attractive place to work with unique development opportunities, which the working environment survey indicates it is. This is a result of the good work SINTEF has done over time on developing our working environment. The survey also found that more employees feel that their work is contributing to sustainable development.

## Facilitation and flexibility

Because of the high degree of diversity, we are aware that our employees have different needs. SINTEF, therefore, facilitates flexible solutions to meet the needs of individuals. Wherever possible, we make adaptations for employees who develop or have disabilities. When recruiting, we focus on competencies, not limitations due to a disability.

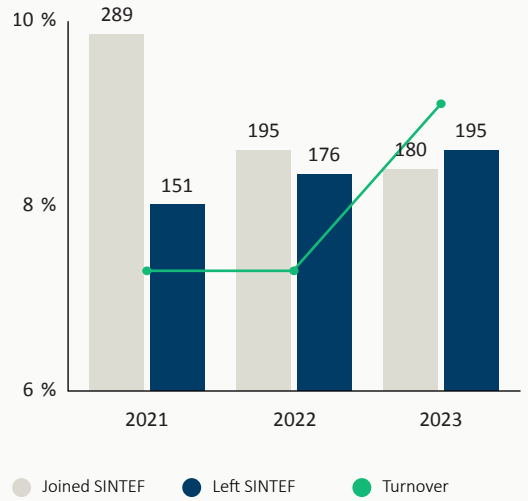
Another important area requiring facilitation is employees with children. In practice, all employees have flexible working hours, with the core hours being between 09:00 and 15:00. During the core hours, employees are expected to be present, with flexitime periods between 07:00-09:00 and 15:00-17:00. This is practised liberally.

FTEs




Source: SINTEF

Employees and turnover




Source: SINTEF

Most employees are able to make use of flexitime within core hours as well. Employees also have the option of working from home following agreement with their manager.

## Sickness absence

In 2023, the sickness absence rate at SINTEF was 4.2 percent, while the work-related sickness absence rate was 0.4 percent. The trend in the sickness absence rate mirrors the general trend in sickness absence in Norway. All sickness absence is followed up systematically throughout the organisation. This follow-up involves managers staying in close contact with the person on sick leave and preventing sickness absence through the proper exercise of management principles.

## Parental leave

Employees who have been on parental leave for more than three months in the last year receive at least an average pay rise. This may only be deviated from with reasonable cause, which cannot be the parental leave. There are some differences between the genders in the length of parental leave at SINTEF. Further details can be found in SINTEF's gender equality report.

## Trade unions and liaison

SINTEF has a good and regulated relationship with the trade unions. We have full freedom of association, on par with other Norwegian companies. A trade union representative attends all courses for new employees, both Norwegian and international. These representatives inform them about trade union work, what it involves and why it is important. In 2023, 74 percent of our employees were members of a union. SINTEF treats all employees equally, regardless of whether they are members of a trade union or not.

## Upskilling/training

The SINTEF Academy is a strategically important tool for developing employees and the organisation. Our overarching goal is to provide employees and managers with the knowledge they need to be successful in their work and for SINTEF to achieve its strategic objectives. The SINTEF Academy is an important forum in the organisation. Employees from all over SINTEF meet here and develop networks across organisational boundaries. This is how we develop a common culture, understanding and practices.

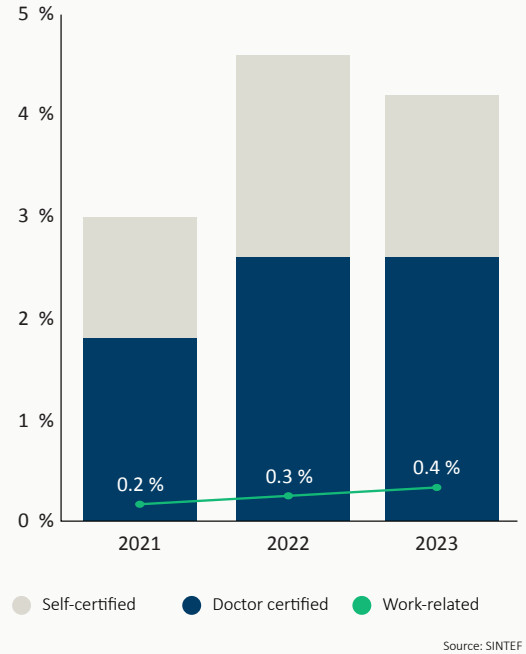
In 2023, a total of 358 employees took our mandatory classroom courses. Of these, 174 were new employees who took the two-day 'Welcome to SINTEF' course. Other key elements of our learning provision are management programmes, project management training, and our digital academy with introductions to, and detailed training in, machine learning, optimisation and digital systems. These programmes/courses help our employees acquire important skills beyond their professional expertise.

Digital training is also an important element of the training we offer, which includes mandatory e-learning courses within HSE, IT security, privacy and export controls. In 2023, a total of 9,022 unique digital courses were completed in SINTEF Academy.

## Attractive workplace/employer

In 2023, SINTEF did well in surveys of where employees think it would be attractive to work. In Academic Works' Young Professional Attraction Index (YPAI), we were ranked third, the highest ranking achieved by a company in Norway. According to Universum's surveys, national master's degree students ranked us number five, while we earned a third place from students with high grades. In another survey of working engineers conducted by Universum, SINTEF ranked sixth and remained the second choice for women. These results show that we enjoy a strong position in a competitive labour market.

### Sickness absence

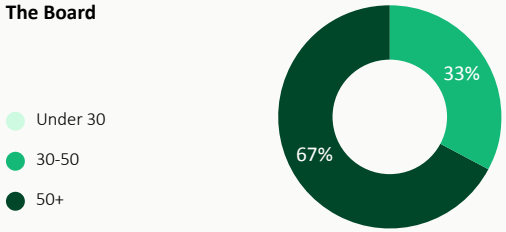



Source: SINTEF

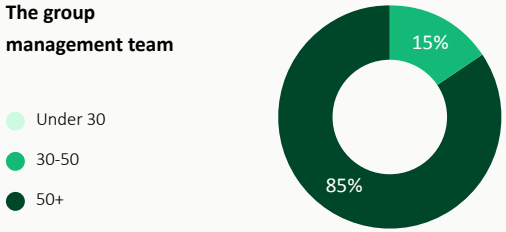
# 5.3 Striving for equality and diversity

AGE:

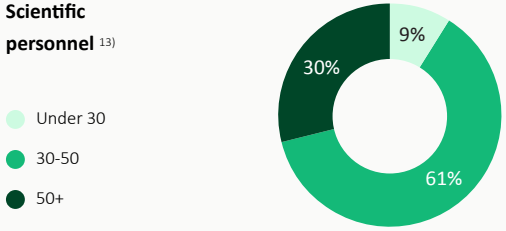
**The Board**



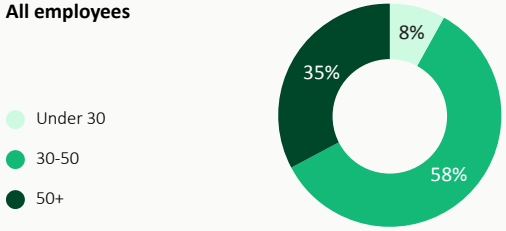

**The group management team**




**Scientific personnel** [13]

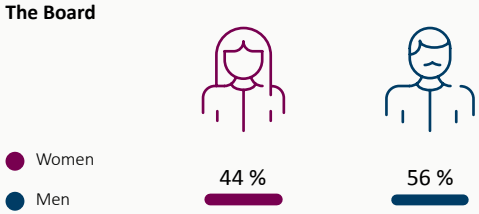



**All employees**

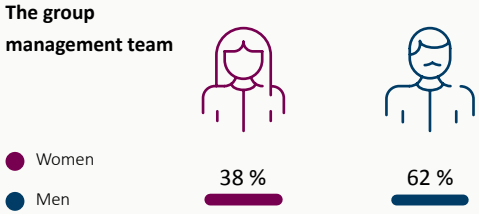



GENDER:

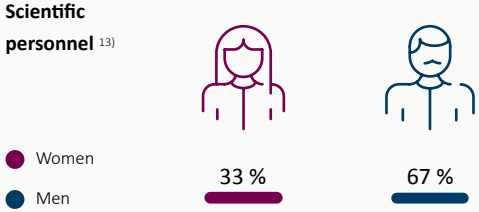
**The Board**



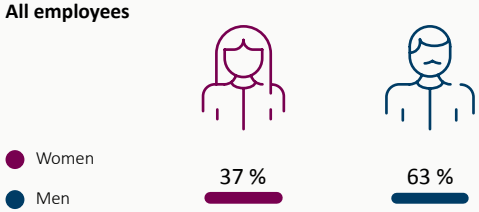

**The group management team**




**Scientific personnel** [13]




**All employees**




## Gender balance

SINTEF's goal is to increase the proportion of women among our research scientists and managers. SINTEF's CEO is a woman. Half of the heads of the research institutes are women, and the proportion of women in the group management team is 38 percent. SINTEF strives to recruit women when hiring and to develop female managers and research scientists from within our own ranks. Nevertheless, the structural biases that exist between research environments in educational institutions continue to be reflected in SINTEF's recruitment base.

SINTEF has approved a Gender Balance Plan in line with the requirements of the EU and the Research Council of Norway. The plan will provide a basis for the further development of gender balance and diversity in the organisation. One of the goals is that there should be no differences in pay between genders. SINTEF has produced its own gender equality report in line with its activity and reporting obligations. The report provides detailed overviews of the gender balance in various employee categories. The gender equality report for 2021 provides a detailed overview of pay and gender. This will be updated for 2023 in the first quarter of 2024

## International diversity

In order for a research institute to successfully deliver on major societal challenges, a diverse range of experience, approaches and perspectives are required. SINTEF's strategy for 'people' states that diversity and a good

Source: SINTEF

13) Scientific personnel include research scientists, research managers and research directors.

gender balance are important. We achieve this by having a diverse workforce in terms of their scientific expertise, gender, age, nationality, cultural background and personal attributes.

Our diversity work is anchored in SINTEF's Board and the group management team. SINTEF's managers are responsible for building up, developing and using the resources that diversity and gender balance represent within their respective areas. Managers are also given responsibility for allocating pay, development opportunities and other benefits in a manner that ensures equality between men and women.

Diversity leadership is an important theme in the SINTEF Academy's management development programme. SINTEF's strategy for *people* also states that all employees are expected to contribute their own qualities and appreciate the specific contributions and expertise of others, as well as to comply with SINTEF's core values, honesty, generosity, courage and solidarity, in their everyday work.

International employees provide SINTEF with valuable scientific and cultural expertise. In 2023, 32 percent of all SINTEF employees were born in countries other than Norway. They are from a total of 80 different countries. Most come from Germany, Italy, France, and Sweden.

SINTEF has established an integration programme for international employees and their families to ensure international employees are properly looked after. The programme offers expat services, free Norwegian language courses and teaching in English in the SINTEF Academy. The annual working environment survey shows that international employees enjoy working at SINTEF.

Russia's war in Ukraine has led to an increase in risks associated with intelligence operations and illegal knowledge transfers. This is affecting the work on protecting SINTEF's assets and increases the risk of our employees being put in situations where they are vulnerable to extortion and threats. In 2023, SINTEF again did a lot of work on complying with export control regulations and on ensuring our employees are well taken care of.

## Discrimination

SINTEF promotes gender equality and strives to counter discrimination. The work is performed in accordance with section 26 of the Equality and Anti-Discrimination Act. It has been reported on in SINTEF's gender equality report.

*As an industry actor and supplier of retention roofs, i.e. roofs that delay rainwater ending up in the streets, we took part in the Climate 2050 innovation centre headed by SINTEF. These years of experimental tests have been very useful in our product development, and we have been able to document the performance of our solutions.*

**Rune Egeland**
CEO of Skjæveland

Photo: Skjæveland

# 5.4 Climate, nature and environment

## SINTEF aims to reduce its operational emissions

SINTEF owns and operates a large number of buildings that consume energy and water and generate waste. We also have projects that require travel. Our operations largely comprise research activities that take place in laboratories and other infrastructure. Purchased products and materials are used here, both in the experiments and in the further development of the laboratories.

Over the years, we have systematically worked to reduce our environmental impact and act in line with our decision to be guided by the UN Sustainable Development Goals. At the same time, we have wanted to live up to the expectations of our employees, clients and society in general. Our environmental policy provides direction for how we operate our buildings and conduct our research activities.

At the same time, we acknowledge in our recently updated SINTEF strategy that we need to do more in relation to sustainability. Especially when it comes to our carbon footprint. Based on our ambitions and greater external expectations and demands in this area, we will strengthen our commitments. We will set more ambitious goals and take further steps to reduce the overall impact our operations have on the climate, environment and nature.

The group management team has decided that we want to set quantitative, science-based climate targets. So far, we have established that we want to cut emissions and have then implemented associated measures. We have been reluctant to quantify our targets and to indicate how rapidly they will be achieved before we have performed sufficient analyses of our current footprint and potential further measures.

Going forward we have much to do when it comes to looking at our current situation. Specifically, we need to assess and look at how we can best cut our current emissions and those that will be generated, directly and indirectly, from our operations in the period up to achieving a zero emission society. This is the only way in which we can put ourselves in a position where we can set goals and strengthen initiatives designed to reduce our overall impact on the climate, environment and nature. We are collaborating with MoreScope on this. Based on data and technology originally developed through research at SINTEF, this start-up company provides carbon accounting and other sustainability services to a number of companies. SINTEF Venture VI is an investor in the company.

The carbon accounts are mainly calculated based on our financial transactions and provide us with estimates, including per supplier. This can help us identify, and put in place, measures that can result in further reductions in emissions. The purchasing department also contacts individual suppliers to request specified emissions data and map opportunities for cutting emissions.

SINTEF's carbon accounts convert all of our purchases into emissions in line with the Greenhouse Gas Protocol (GHG Protocol). We use both materials and financial data as a basis for calculating greenhouse gas emissions. Scope 3 emissions are indirect emissions related to purchased goods or services. Scope 2 emissions are particularly related to the consumption of electricity and district heating. Scope 1 emissions mainly come from the purchase and consumption of gas.

The pandemic years taught us that we could significantly reduce our travel activities. Photo: Jon Ingemundsen/Stavanger Aftenblad/NTB

Total emissions increased by 4.5 percent from 2022 to 2023. Scope 3 emissions are the most significant for SINTEF and account for the largest increase in emissions. In addition to the emissions associated with flights taken by employees, emissions generated by investments are increasing the most. In the last few years, major contributors to these have been the large projects involving the rehabilitation of office and laboratory buildings in Forskningsveien 1 in Oslo and the expansion of office and laboratory buildings for SINTEF Energy Research at Gløshaugen in Trondheim.

## Carbon accounts 2023

| Category * | 2023 emissions | Proportion of total emissions | Trend 2022–2023** |
|---|---|---|---|
| | $tCO_2e$ | % | |
| **Scope 1** [14] | **77** | **0.3 %** | ● |
| Fuel, cars and boats (actual consumption) | 32 | 0.1 % | ● |
| Fuel, cars and boats (financial transactions) | 0.3 | 0.0 % | ● |
| Gas (actual consumption) | 25 | 0.1 % | ● |
| Gas (financial transactions) | 20 | 0.1 % | ● |
| **Scope 2** [15] | **415** | **1.7 %** | ● |
| Electricity (location-based consumption) | 302 | 1.2 % | ● |
| District heating (actual consumption) | 113 | 0.5 % | ● |
| **Scope 3 – Upstream** | **24,062** | **98.0 %** | ● |
| 1. Purchased goods and services (financial transactions) | 14,453 | 58.9 % | ● |
| 2. Capital goods (financial transactions) | 7,048 | 28.7 % | ● |
| 3. Fuel and energy-related activities (not included in Scope 1 or Scope 2) [16] | 110 | 0.4 % | – |
| 4. Upstream transport and distribution (financial transactions) | 277 | 1.1 % | ● |
| 5. Waste from operations (financial transactions) | 71 | 0.3 % | ● |
| 6. Business travel [17] (95 % actual consumption) | 2,128 | 8.6 % | ● |
| 7. Employee commuting [18] | N/A | N/A | N/A |
| 8. Upstream leased assets (95 % from financial transactions) | 48 | 0.2 % | ● |
| **Total** [18] | **24,627** | | ● |

● Positive trend ● Negative trend

Source: MoreScope

* We use two main calculation methods for our carbon accounts Where we have access to material consumption figures (gas and fuel), we have used these (actual consumption). Where we do not, the calculations are based on financial transactions.

** Emission factors tell you how much is emitted when you consume a given amount of different energy products. A number of emission factors used to calculate individual emissions changed from 2022 to 2023 (source: Defra, 2023). Therefore, we show how the change in emissions has developed and not the actual change in percentage since the figures are not comparable because the calculation method has changed. The emissions figures for 2021 and 2022 can be found in SINTEF's Integrated Annual Report 2022.

14) Actual and estimated fuel consumption for SINTEF's owned company vehicles plus one boat, as well as purchased gas. The difference in total emissions in this category from 2022 to 2023 is due to the difference in the R290 emission factors used for 2022 and 2023: 2022 emission factor = 3.3 $kgCO_2e$ per kWh (source: Defra, 2021); 2023 emission factor = 0.06 $kgCO_2e$ per kWh (source: Defra, 2023). Therefore, while the volume of R290 purchased is higher in 2023 (246 tonnes) than in 2022 (189 tonnes), emissions in 2023 were still lower due to the lower emission factor.

15) Emission calculations use the GHG intensity factor in the Norwegian energy mix, i.e. location-based calculation. Energy emissions related to the ~40 percent of building space not owned but used by SINTEF are calculated included as lease costs from providers of real property management services. In 2022, district heating was calculated based on emissions figures from the two largest suppliers in Trondheim and Oslo. The difference in total emissions in this category from 2022 to 2023 is due to the difference in the emission factors used for 2022 and 2023: 2022 emission factor = 7.6 $gCO_2e$ per kWh (source: AIB, 2020); 2023 emission factor = 19 $gCO_2e$ per kWh (source: NVE, 2022).

16) SINTEF began calculating this category in 2023. MoreScope has developed automated calculations for category 3.3 based on data records for scopes 1 and 2 and WTT emission factors, meaning that these are emissions calculated from the bottom up.

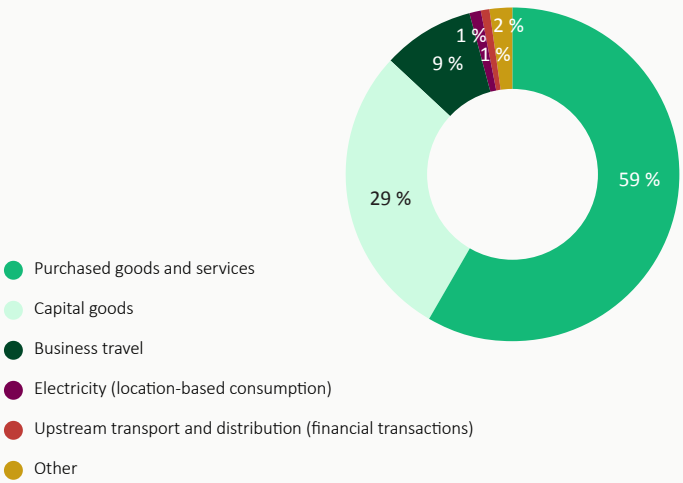
17) This category includes emissions from flights booked via a travel agent that administers business trips (97 percent), as well as other business travel included in the purchases data as direct costs (3 percent). Other employee travel expenses are not included. The travel agent uses the ICAO Carbon Emissions Calculator to calculate greenhouse gas emissions from air travel.

18) No data on greenhouse gas emissions from employee commuting was available for the report.

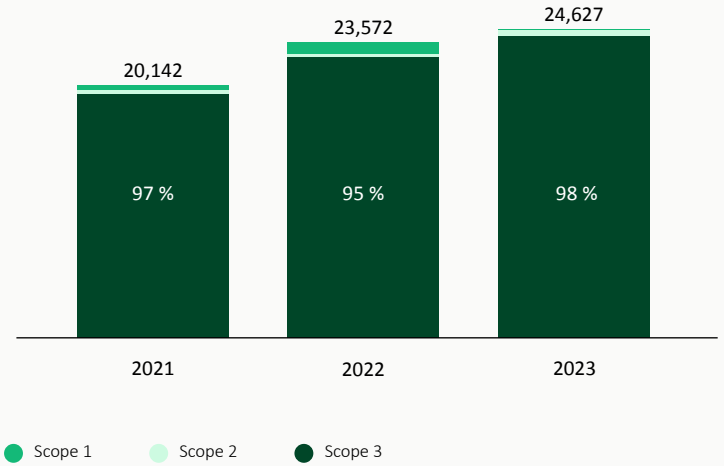
The rehabilitation project in Oslo involves modernising a 70-year-old building in a way that preserves the bulk of the building and helps to significantly improve its energy efficiency. The expansion of SINTEF Energy's building will create space for growth within energy and digital research. The entire building is being upgraded to meet the BREEAM 'Excellent' standard. However, a generally higher level of activity increases emissions in several scope 3 categories.

One particular gas that has yet to be included in our carbon accounts is $SF_6$, which is used in the production of semiconductors in our MiNaLab laboratory. The process results in microchips that make sensor technology and digitalisation possible, which are important for the green transition. Meanwhile, $SF_6$ is a very potent greenhouse gas, even when used in small quantities, like we do. When $SF_6$ is used in production in SINTEF's laboratory it is converted into new compounds with a much lower carbon footprint. However, an unknown quantity of the gas remains as $SF_6$ after usage. The emitted volumes of these new compounds and the residual $SF_6$ have not yet been calculated. We have investigated how we can measure, report and hopefully depollute these residual emissions in the future. This will require investment in depollution equipment, which must be seen in the context of the special tax on our purchases of $SF_6$ that came into effect on 1 January 2023. We welcome the tax as a means of reducing national emissions of this potent greenhouse gas. We will apply to the Norwegian Tax Administration for exemption from the tax based on documentation that parts of the gas are not emitted from our processes and our plan for depolluting the residual gas.

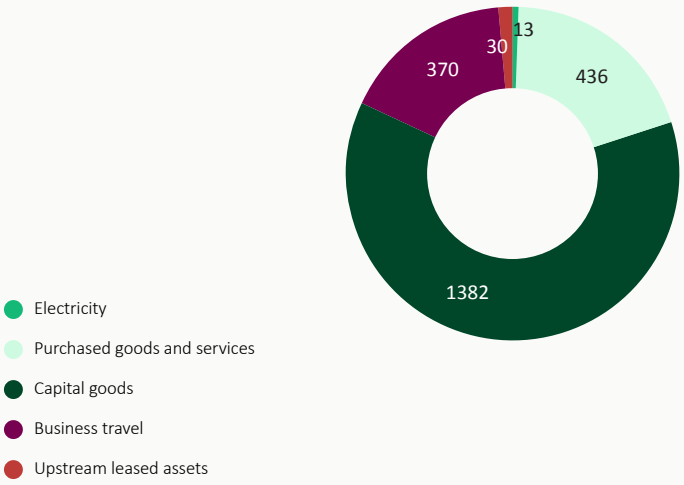
## The largest sources of emissions in 2023




## Emissions last three years in $tCO_2e$ [19)]

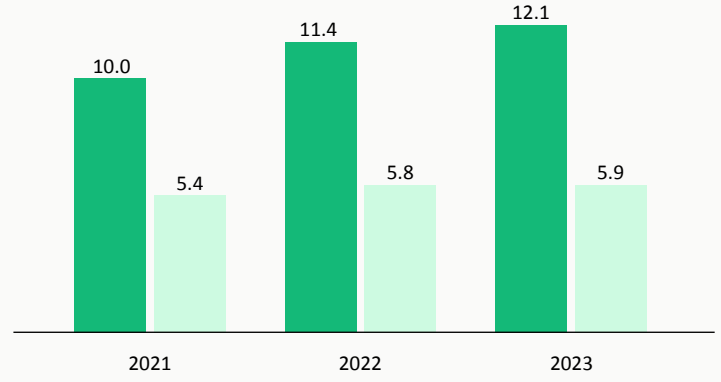



## Increase in emissions in $tCO_2e$ [20)]




Source: MoreScope

## Emissions relative to FTEs and turnover




Sources: Total emissions, MoreScope, FTEs and turnover, SINTEF

19) Scope 1 primarily comes from purchased gas. Scope 2 only includes energy used in buildings owned by the SINTEF Foundation (approximately 60 percent of the areas used). Scope 3 is calculated on the basis of all of SINTEF's purchases. See the notes on page 61 for more details on calculating emissions.

20) Sources of emissions that contribute more than 1 percent of total emissions and have experienced a negative trend from 2022 to 2023.

## Energy and water consumption, properties and waste

The SINTEF Foundation owns and manages buildings with a combined floor space of 108 000 m². This amounts to almost 60 percent of the total area used by SINTEF in our day-to-day operations. The remaining premises are owned by other SINTEF companies or leased by NTNU and others. This chapter covers the buildings owned and managed by the SINTEF Foundation.

In addition to ordinary office space, a large proportion of our owned buildings house laboratories with special requirements for round-the-clock operation and special ventilation needs. SINTEF Ocean also has several large research pools that hold huge volumes of water. Therefore, it is difficult to compare energy consumption, water consumption and waste volumes with what is normal for ordinary office buildings.

SINTEF is constantly working to identify and implement measures that reduce energy and water consumption, as well as waste generation, in all of its buildings. SINTEF Property Management is responsible for managing the buildings owned by SINTEF. We have also established in-house 'green teams' at an institute and corporate level. These are working groups that focus on the green transition and environmentally-friendly operations. The teams propose measures that can, for example, reduce energy consumption and the number of flights or increase waste source separation.

In 2023, we reduced energy consumption (kWh/m²) by a further 2.5 percent from 2022. It is now 27 percent lower than five years ago (2017). Our target was a 15 percent reduction in kWh/m² from 2017 to 2021. We achieved this by a wide margin. We are currently developing a new target, which will use 2022 as its baseline. Further reductions will require a new form of energy management. We considered ISO 50001 but, in collaboration with our energy adviser Tempero AS, we determined that BREEAM 'In-Use' is a better solution for our type of business, because ISO 50001 is intended for processing industries and not for offices/laboratories.

Examples of measures that were implemented in 2023, some of which will be continued in 2024, include:

- Follow-up and measures after the modernisation of Forskningsveien 1. These include balancing the ventilation, the use and commissioning of heat pumps and reviewing and quality assuring the building's central operational control and energy monitoring system.
- Designing and implementing free cooling in connection with replacement of the refrigerating machine in MiNaLab, a building with cleanroom laboratories that require year-round cooling. The building is SINTEF's most energy-intensive property.
- Evaluating the potential installation of solar panels on all our of roofs.
- Using heat pumps more widely in buildings.
- Establishing energy wells in existing buildings.

### Energy, water and waste [21]

| External environment | 2023 | 2022 | 2021 |
|---|---|---|---|
| Total energy GWh | 23.6 | 24.2 | 25.8 |
| Reduction (from 2017) in energy consumption kWh/m² | 27 % | 23.1 % | 20.7 % |
| Source separation rate Trondheim and Oslo | 43 | 36 | 41 |
| Mains water consumption in millions of litres | 32 | 30 | 26 |
| Consumption of non-renewable energy (gas in GWh) | 0.89 | 1.28 | 1.28 |
| Consumption of electricity (GWh) | 15.90 | 15.21 | 16.01 |
| Consumption of district heating (GWh) | 6.80 | 7.70 | 8.36 |
| Energy consumption per square metre (kWh/m²) | 272 | 279 | 297 |

Source: SINTEF


84. Improving your indoor climate


86. Data-driven heating of buildings

21) The SINTEF Foundation took over a building in 2021 that increased its total m² by 10,200 m². The table only shows data for buildings owned by the SINTEF Foundation (approximately 60 percent of total areas).

As far as waste is concerned, the source separation rate increased in 2023 compared with previous years. We are taking a number of steps to achieve our goal of a 60 percent source separation rate. Waste stations with fractions for residual, plastic, food and paper waste are available in suitable locations in buildings owned by SINTEF. Local involvement is important when determining the location of waste stations.

- Spot check analyses of residual waste are carried out at the waste reception sites we use in order to determine where we have potential for improvement.
- All of our refuse rooms must have posted instructions specifying what must be done with the different fractions. The aim is to make the task simpler for employees. We will speak to the owners of our leased locations about making similar labelling improvements.
- A scheme in which food waste is source separated as a specific fraction will be introduced in our office spaces, more specifically in the kitchenettes in the various departments. Such source separation is already carried out in our canteens.

## Air travel

Our ambition to be a world-leading research institute means that travel activity is necessary. There are two reasons for this. Firstly, career development for scientists still requires that they meet, discuss, develop networks and learn from each other. Secondly, SINTEF is a geographically dispersed organisation with clients and partners across Norway and abroad. At the same time, it is important that we are aware of the climate footprint our travel leaves and that we prioritise what journeys should be made.

During the pandemic years we learned that we could significantly reduce our travel activity. 2023 is the first normal year after the pandemic. We can see that $CO_2$ emissions from air travel have increased compared with 2022, although they have been cut by 29 percent compared with 2019, the last normal year before the pandemic. This is despite the fact that our employee numbers have increased.

Travel activity is assessed on a monthly basis. More thorough analyses are carried out every four months. For awareness purposes, we provide the organisation with statistics on our travel activity and assessments of it. In line with our ambitions in the area of sustainability and our desire to set quantitative climate targets, in 2024, we will assess what other measures will help ensure that SINTEF's employees travel in an environmentally responsible manner.

## Other purchased goods and services

SINTEF uses all of our purchase data for the full year as a basis for calculating annual greenhouse gas emissions. The results show that emissions from purchased goods and services account for the largest proportion of our total emissions. In 2023, this category accounted for 59 percent of SINTEF's emissions.

During 2023, we focused on obtaining more detailed insights into the emissions data in collaboration with the company MoreScope, which calculates SINTEF's greenhouse gas emissions. Such insights are helpful when prioritising and quantifying measures designed to cut emissions in the supply chain. We are also working on collating, including and distributing this reporting together with other ongoing operational reporting at SINTEF.

As an example of how insights into emissions data can be used, we have worked on following up the environment and sustainability at suppliers in relation to chemicals, because such products generate $CO_2$ emissions in SINTEF. Together with our coffee supplier, we have tried to find coffee types and a maintenance regime that

*SINTEF is an important strategic R&D partner within digitalised operation of the electricity grid. The collaboration between our specialists, SINTEF and the CINELDI research centre, which is headed by SINTEF, ensures that we are the leading technology provider in this area.*

**Jørgen Festervoll**
CEO of Heimdall Power

Emissions from air travel were cut by 29 percent from 2019 to 2023

reduce emissions and protect human rights. We consume six tonnes of coffee every year at SINTEF.

The current methods for measuring greenhouse gas emissions using financial transactions present challenges with respect to quantifying and highlighting measures that cut greenhouse gas emissions. We are trying to solve this in collaboration with MoreScope.

Read more about responsible purchasing in SINTEF in chapter 5.5.

## Climate-related and nature-related risk

All business and industrial activities can have an adverse impact on both nature and the climate. At the same time, many industries are dependent on the climate not changing too much, nature preserving its biodiversity and ecosystems surviving. The term climate-related and nature-related risk refers to how we address and understand the risks associated with the climate and nature. It is important for us to work on this together with clients and partners.

SINTEF has highlighted planetary boundaries and the transition to a zero emission society as two of the five strategic beliefs for our future work. While we can see the limitations and risks we and society face in these areas, we can also see how SINTEF can contribute to the green transition. Much of our research and innovation is precisely associated with climate technology and producing clean energy. We are also creating circular economy solutions and solutions that will protect life below water and on land (see chapter 4).


63. Biodiversity: the stacked tower that should not be toppled

From a financial standpoint, climate-related and nature-related risk have been assessed regularly as part of SINTEF's risk management, including in 2023. The Board and the group management team assess the risk based on our own activities and the value chains in which we operate. They also look at how industry impacts the climate and nature. The World Economic Forum's Global Risk Report (2024) highlights extreme weather and pollution as serious short-term threats. From the perspective of a decade, the risk is largely expected to be environment-related and include biodiversity loss and ecosystem collapse.

SINTEF's research and innovation should support solutions to environmental issues that are developed by industry and the public sector. SINTEF's expertise is also used in the assessment and management of climate-related and nature-related risk by other parties (see, for example, section 3.2). Research Scientist Atle Harby participated in the expert committee that assessed how Norwegian society, sectors and industries depend on nature and can be impacted by the loss of nature, as well as how nature-related risk can be managed. This applies to the entire value chain and includes both physical nature-related risk and nature-related transition risk. Transition risk refers to risks related to changes in laws, regulations and framework conditions. The head of our biodiversity and area use corporate initiative, Chief Research Scientist Rachel Tiller, will play an important role as review editor for the research paper that the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) is producing on industry and biodiversity.

## Climate compensation

SINTEF will continue to generate emissions from our operations for the foreseeable future. However, we intend to take an even more systematic approach to emission-cutting measures and goals. We have previously considered purchasing carbon credits in the voluntary market to achieve climate neutrality, but we wanted to contribute more actively to climate-positive solutions. We can see that there are climate challenges that require new solutions. At the same time, there is not enough funding for early research in these areas. In 2021, we therefore established the SINTEF Global Climate Fund (the 'Climate Fund'), as discussed in section 3.5. The fund finances early-phase research into solutions that remove greenhouse gases from air and water.

Our annual contributions to the Climate Fund cannot be used to offset our emissions in the carbon accounts or to support a claim of climate neutrality. Nevertheless, we believe that our contributions have a greater climate impact than would be achieved by purchasing voluntary credits for avoided or reduced emissions.

In line with our plans to clarify SINTEF's sustainability strategy in 2024, we will also consider how the Climate Fund and the underlying company, SINTEF Sustainability Accelerator Fund, can best be developed to strengthen our ambitions for sustainability in the future.

# 5.5 Ethics and integrity

## Ethics, anti-corruption, and good management are prerequisites for our activities

Ethics are an integral part of SINTEF's strategy and apply to all employees. The group management team frequently discusses ethical dilemmas (see also section 2.4). Internal meetings must always start with a review of HSE, safety and ethics.

Our management system includes a requirement regarding the proper management of ethics and social responsibility. This is reflected in our code of conduct, the 'Ethics Compass', and in the 15 overarching policy documents available on our intranet. We require ethics to be considered in all project phases, from sale to completion.

In 2023, the SINTEF Academy arranged five courses on ethics, which were taken by 174 new employees and 139 new project managers. Five research scientists received ethics training on courses in research methodology.

Our management development programmes include an ethics and management course module.

Our research ethics are based on the policies issued by national research ethics committees, the principles promoted by the European Group of Ethics in Science and New Technologies, and international conventions and Norwegian law. Our business conduct, relationship ethics and research ethics are well aligned with SINTEF's vision, values, goals, and societal mission.

We established an Integrity Committee for the area of research ethics in 2021. The committee meets at least once a year and if suspected irregularities are reported. The committee supports the Ethics Committee in other matters to do with ethics as required. No urgent cases were submitted to the committee in 2023.

As before, the Ethics Committee received various concerns and questions about ethics from employees and managers. Recurrent topics are research ethics, including publication rules, line manager and project manager responsibilities and describing ethics in EU proposals. These are cases where questioners need advice or confirmation of their own assessments.

Some cases concern role expectations/descriptions and uncertainties about the work situation. Such uncertainties can have different roots. The effects of unrest in the world, especially for some non-Norwegian employees, and uncertainty related to the physical and psychological working environment, were noticeable topics in 2023. Many people are experiencing more stress and indicating that this is affecting their family and leisure time.

The Ethics Committee contributed to departmental meetings, management meetings and meetings of the group management team in which ethics were discussed. Our code of conduct, which is available on the intranet, encourages people to report unacceptable situations. The routines describe what is meant by wrongdoing, the whistleblowing procedure and the administrative procedure for whistleblowing cases, as well as how whistleblowers are protected and how whistleblowing cases are followed up.

A number of whistleblowing cases/cases of concern were reported in 2023. Cases of concern are resolved in the line organisation. Whistleblowing reports are dealt with by the whistleblowing committee. Some cases of concern stem from manager-employee relationships. Thus, they are HR cases where the Ethics Committee mediates the contact between the manager, employee and HR, and possibly HSE personnel.

Weaknesses in the whistleblowing procedures were identified in 2023. Personnel are unsure about what the procedures are and how to apply them. These must be revised in 2024, to ensure that employees understand the procedures and that the reporting mechanism is functioning correctly and as intended by the Working Environment Act.

*SINTEF is important to us when it comes to developing new knowledge about circular solutions for aluminium for different industries.*

**Trond Furu**
Research Manager at Norsk Hydro

Photo: Norsk Hydro ASA

## Responsible procurement

Sustainability is an important element in all purchases made by SINTEF. Our purchasing policy supports this, evidenced by the fact that our code of conduct and sustainability are the first main points in it. The policy states that sustainability must always be taken into account when making purchases. Other governing documents also underscore that we must focus on sustainability in purchases. For example, our purchasing procedure. Sustainability is the first award criterion when we request quotations.

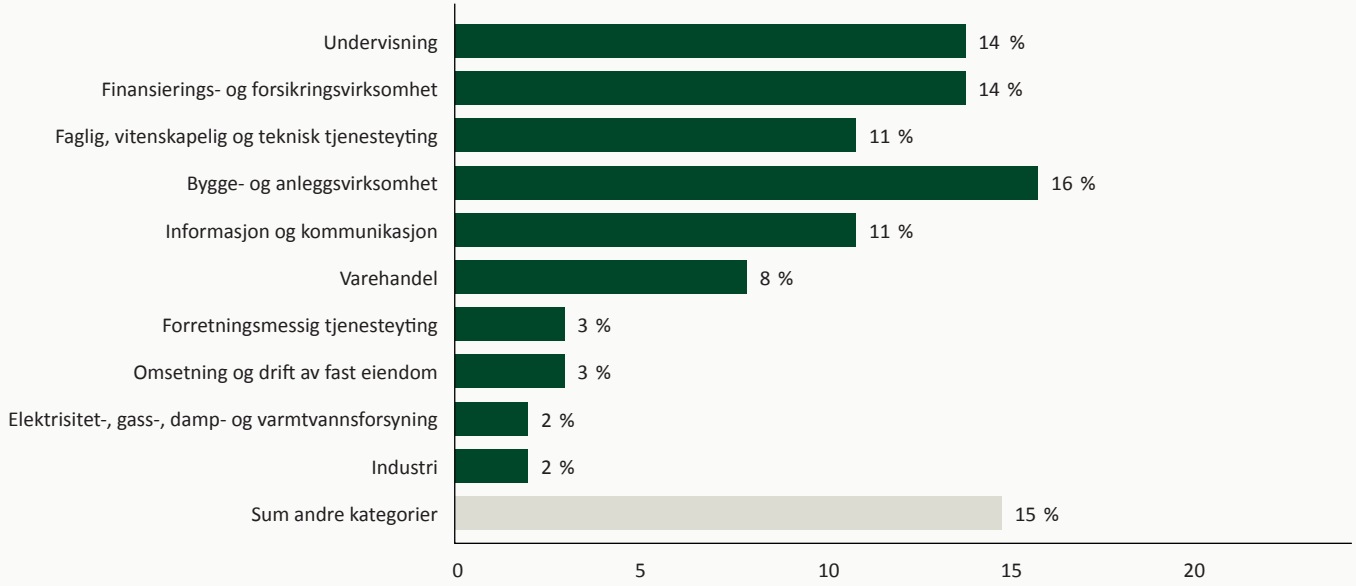
Sustainability is a key topic throughout agreement periods with suppliers. We hold status meetings with our contractual partners. Sustainability and the environment are topics that are discussed and followed up in these. The measures and follow-up will vary depending on what sort of supplier it is. For example, we are following up on the choice of coffee type to ensure labour rights and sustainability. In status meetings with product suppliers, we follow up on quality and sustainability goals, as well as packaging, transport and shipping. SINTEF has signed an agreement to ensure that the shipping is sustainable. This involves, for example, paying for sustainable fuels. As far as providers of canteen services are concerned, we will focus on the proportion of plant-based food, local produce and less food waste.

More than 90 percent of SINTEF's purchases come from Norwegian suppliers. SINTEF does not make purchases for its own production. Purchases at SINTEF involve indirect purchases of goods and services for support and day-to-day operations. The graph below shows that the largest category of purchases is 'teaching'. This refers to services purchased from our research partners at universities, in projects where SINTEF is the contractor in relation to the client.

SINTEF registers all invoicing from abroad. In 2023, our purchases from abroad amounted to NOK 197 million. A large proportion of this was spent on purchases from partners in academia, although it also includes other suppliers.

### SINTEF's suppliers grouped by industry [22)]

Proportion of net purchases from Norwegian suppliers




Source: SINTEF

22) SINTEF's net purchases from Norwegian suppliers in 2023 by industry. The graph shows the top 10 purchasing categories and their respective proportions of total net purchases.

SINTEF's activities are exposed to geopolitical risk. We try to identify this risk, including through background checks using the Global Regulatory Information Database carried out by Regulatory DataCorp, entries on the government's sanctions lists, Finanstilsynet's geographical risk overview of money laundering and terrorist financing, the Norwegian Agency for Public and Financial Management and PST's annual updates.

Of the purchases from abroad, purchases from what these sources define as 'high-risk countries' amounted to NOK 8.2 million. This represents 0.4 percent of SINTEF's total purchases in 2023.

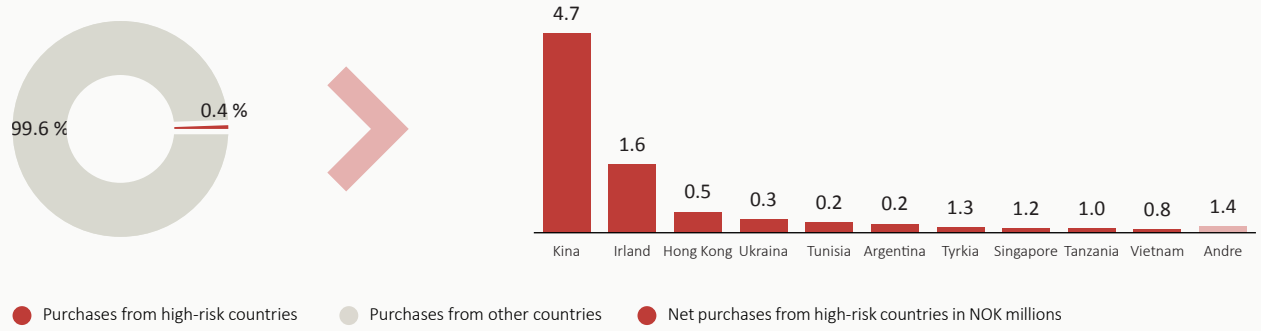
We conduct a quality audit that involves mapping all of these suppliers and purchases in order to identify learning points and improve SINTEF's due diligence methods and knowledge.

### Purchases from abroad accounted for only 9.7 percent of our purchases

Total net purchases in 2023 (Norway and abroad)


### Purchases from high-risk countries account for just 0.4 percent of our purchases

Total net purchases in 2023 (Norway and abroad)



# 5.6 Compliance with laws and regulations

Transparency, audits and internal audits are a priority for SINTEF. We carry out advance checks on foreign companies in line with the compliance procedures. In other words, we check whether a company has previously been found guilty of corruption or other irregularities such as bribery, price fixing or child labour. Such checks must be carried out before any collaboration starts. In 2023, these assessments involved a Compliance Task Force reviewing enquiries from around 15 foreign clients. In addition to the advance checks, the legal and ethical aspects of potential client projects are assessed. Ownership constellations are also assessed before any collaboration starts.

We use Transparency International's corruption index database, as well as the accompanying social analysis for each country. Information from the Ministry of Foreign Affairs and the Norwegian Police Security Service (PST) are also important sources.

SINTEF is a member of Transparency International. SINTEF attends its annual conference and receives information on corruption and ongoing anti-corruption work. Together with other institutes, we participate in the Norwegian National Research Ethics Committees. The institutes share ethical assessments rather than shielding them.

The wars in Europe and the Middle East have made us especially aware of the fact that employees with unique knowledge and/or various backgrounds could be subject to unwanted pressure. Our policy for defence-related R&D is an important factor here. This describes our attitudes and principles in relation to the dilemmas inherent in such research.

There were no cases of corruption among employees.

## Compliance with the Transparency Act

The Act relating to enterprises' transparency and work on fundamental human rights and decent working conditions (the Transparency Act) entered force on 1 July 2022.

SINTEF is working on identifying and assessing possible adverse impacts on fundamental human rights and labour rights in the Group's supply chain. Our suppliers must complete a supplier evaluation survey when a contract is for more than NOK 250,000. As part of our efforts to identify any adverse impacts, we also carry out background checks. If an adverse impact is identified, we open a dialogue with the supplier to remedy this and determine measures that are proportionate to the significance and extent of the adverse impact.

SINTEF's suppliers and individual clients are subject to risk-based due diligence processes. Information concerning business conduct and social responsibility is appended to all agreements. Due diligence assessments must be updated at least once a year.

We did extensive work on updating templates and documents in 2022 and the first half of 2023. We provided the organisation with information and training on the changes. Nevertheless, our internal audits indicate that there is potential for improvement in this area.

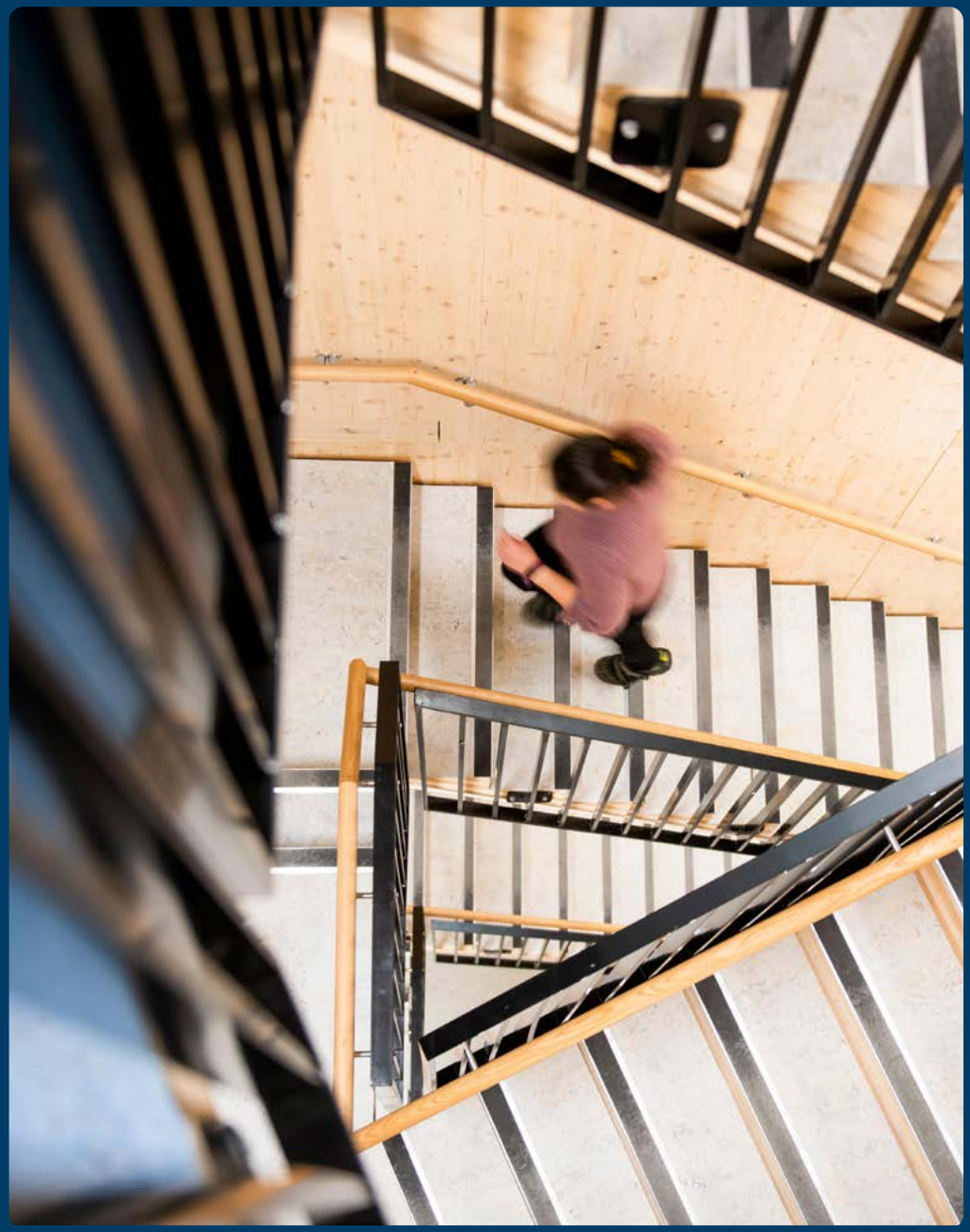
We now have concrete plans in place for the implementation of digital solutions for documenting and checking compliance with our purchasing requirements. A decision was made in December 2023 and the project started in January 2024.

SINTEF did not identify any irregularities in its due diligence in 2023. To reduce the risk of future irregularities, we will, wherever possible, make purchases via framework agreements. Purchases from high-risk countries will be assessed on an ongoing basis and attempts made to reduce them. Implementing digital support tools for purchases will contribute to this.

Questions for SINTEF regarding its duty of disclosure and the Transparency Act can be submitted via email to: transparency@sintef.no. A report on the Transparency Act will be posted on our website by 30 June 2024.

Chapter 6

# How SINTEF is managed and our results for 2023



From SINTEF's ZEB laboratory. As its name suggests, this is a zero emission building, and it has also undergone climate adaptations. The building is a living laboratory. It is used both as a normal office building and for educational purposes.

Photo: Berre/SINTEF

# 6.1 Corporate governance

**The SINTEF Foundation is a not–for-profit foundation with no owners, although it is subject to public supervision by the Norwegian Gambling and Foundation Authority pursuant to the Norwegian Foundations Act. The SINTEF Foundation is SINTEF's parent institution.**

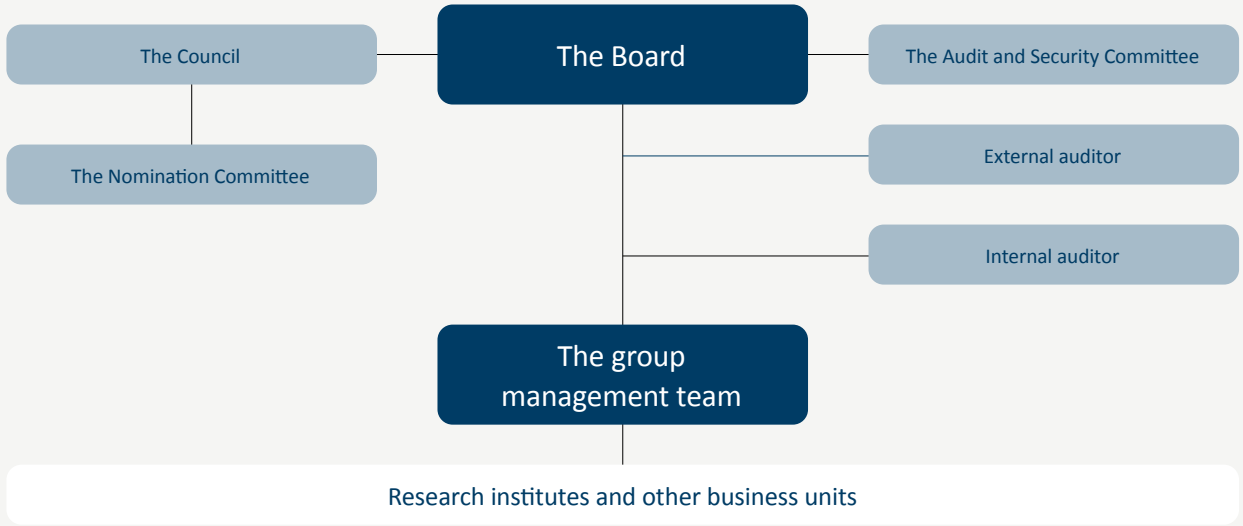
SINTEF's activities are also supervised by the Foundation's highest bodies, SINTEF's Board of Directors and SINTEF's Council, as well as our external auditors. The activities are regulated by the Articles of Association, shareholder agreements in part-owned subsidiaries, group agreements and the Instructions for the Board.

SINTEF's CEO is also the managing director of the SINTEF Foundation and SINTEF AS, as well as the chair of the boards of SINTEF Energy Research AS, SINTEF Ocean AS and SINTEF Manufacturing AS. SINTEF's group management team is responsible for the strategic management of our overall activities.

One key goal of our corporate governance is to safeguard SINTEF's independence and integrity so that we can fulfil our purpose. At the same time, we have to ensure that we are regarded as having a high degree of legitimacy, by our stakeholders, national and international authorities and society as a whole.

No dividends are distributed. The entire surplus is used to strengthen SINTEF's solvency and capacity for research and innovation through upskilling, investing in research infrastructure and strategic initiatives.

SINTEF's governance structure



SINTEF's goal is to generate an operating margin in excess of 5 percent over the business cycle, as a basis for fulfilling its purpose in both the short and the long term.

SINTEF's work is based on formal certifications. We must always strive to meet the requirements and expectations of our clients and other partners. Therefore, we have a management system designed to ensure that we deliver products and services of the agreed quality, take account of the external environment, and work systematically on our working environment and safety. The requirements in the management system apply to all employees and contract personnel who carry out work under the auspices of SINTEF. More detailed information about certifications can be found in section 6.2.

## The Board's responsibilities and composition

The Board is the Foundation's highest responsible body. It exercises the Foundation's ownership in wholly and part-owned subsidiaries and is responsible for ensuring that the activities of the SINTEF Foundation and the SINTEF Group are prudently organised and managed. The Board's responsibilities and obligations are set out in the Foundations Act, Private Limited Liability Companies Act, the Articles of Association and the Instructions for the Board.

The Board shall:

- Supervise the day-to-day management and general activities of the Foundation
- Ensure – at a board level – that SINTEF is achieving its goals
- Strengthen, support and challenge the group management team
- Balance priorities and contribute to the improvement work
- Act as a sparring partner for the group management team

The Board holds eight ordinary meetings a year, and otherwise meets as required. The Board consists of nine members with the following composition:

- Two members and one deputy member are appointed by the Norwegian University of Science and Technology (NTNU) from among people in senior positions at NTNU.
- Four members and two deputies must come from industry or the public sector. They are appointed by SINTEF's Council.
- Three members must be permanent employees of SINTEF AS and be elected in line with the provisions for employee board representation in the Private Limited Liability Companies Act.

Photo: Joakim Hóltan

*The Norwegian Ferroalloy Producers Research Association (FFF) has worked closely with SINTEF and NTNU for 35 years. This has helped ensure that today the industry is one of the world's most sustainable, resource-efficient and climate-friendly producers of silicon and ferroalloys.*

**Viktor Myrvågnes**
Chair of the Board of the FFF and Associate Professor at NTNU

SINTEF's metallurgical research helps to improve processes, which streamlines resource and energy consumption in the metals industry. Photo: Thor Nielsen/SINTEF

## As of 31 December 2023, SINTEF's Board of Directors consists of:

| Members |
|---|
| Chair Tore Ulstein, Chair of the boards of the Ulstein Group and others |
| Deputy Chair Øyvind Weiby Gregersen, Dean of the Faculty of Natural Sciences, NTNU |
| Lars Christian Dahle, CEO, Vnnor AS |
| Hanne Refsholt, Chair of the boards of NMBU and others |
| Siri Forsmo, Dean of the Faculty of Medicine and Health Sciences, NTNU |
| Kristin Misund, SVP R&D and Business development, Borregaard |
| Bård Myhre, Senior Research Scientist, SINTEF Digital |
| Bendik Sægrov-Sorte, Senior Engineer, SINTEF Industry |
| Malin Sletnes, Senior Research Scientist, SINTEF Community |

| Deputy members |
|---|
| Aslaug Hagestad Nag, CEO, Future Materials |
| Ingelin Steinsland, Professor, Vice Dean of the Faculty of Information Technology and Electrical |
| Erlend Skagseth, Senior partner, Sarsia Seed Management AS |
| Øystein Wiggen, Senior Research Scientist, SINTEF Digital |
| Kjerstin Ellingsen, Research Manager, SINTEF Industry |
| Maria Gellein, Senior Technician, SINTEF Industry |

CEO Alexandra Bech Gjørv (left) and SINTEF's Board of Directors. From the left: Kristin Misund, Ingelin Steinsland (deputy member), Hanne Refsholt, Bendik Sægrov-Sorte, Bård Myhre, Lars Christian Dahle, Tore Ulstein, Øyvind Weiby Gregersen and Malin Sletnes. Siri Forsmo was not present when the photo was taken. Photo: Ingrid Lundestad/SINTEF

**5 %**

SINTEF's target is a minimum 5 percent operating margin over a business cycle

**44 %**

Women on the Board of SINTEF

The Chair and Deputy Chair of the Board are appointed by SINTEF's Council. All elections are valid for two years, with the possibility of re-election twice. This rule can be waived for one additional re-election for the Chair of the Board. No term limits apply to employee-elected board members. The Instructions for the Nomination Committee stipulate that weight must be afforded to the gender composition and age distribution of proposed board members. The current gender composition and age distribution of the Board are described in section 5.3. The Board analyses its own expertise and provides input to the Nomination Committee. The Board evaluates its own work on an annual basis, which it also did in 2023. The board members' remuneration is set by the Council.

## The Council

SINTEF's Council is tasked with supervising that the Foundation's purpose is furthered in line with the Articles of Association and the Council's own decisions. The Council is also an advisory body to the Board. The Council meets at least twice a year, although it can meet more frequently if necessary or desired. The Council consists of 28 members. 25 of these are appointed by NTNU's board of directors, the organisations Tekna, NHO, LO, and UiO, and the Board of SINTEF, respectively. Three council members are elected from among the employees of SINTEF's research companies.

NTNU's rector chairs the Council. Otherwise, the Council consists of businesspeople, experts from NTNU and UiO, employer organisations, trade unions, and people with a background from the public sector. Council members thus have close links to key groups of stakeholders.

The appointing bodies must take gender balance and diversity into account when appointing members and deputies to the Council. Members of the Council serve terms of four years. Re-election is permitted, although a term limit of eight consecutive years in office applies. This rule does not apply where the rector has been a member of the Council in some other capacity. A complete overview of the Council's members, appointment rules and duties can be found in SINTEF's annual report on corporate governance.

## Other bodies

The Foundation's Nomination Committee has three members who are appointed by and from SINTEF's Council. The chair of the Council serves as the chair of the Nomination Committee. Members of the Nomination Committee are elected by the Council for terms of two years, although these terms are limited by their term of office on the Council. Members can be re-elected twice. The Nomination Committee's job is to propose the four candidates to SINTEF's Board that must be appointed by the Council in line with the Articles of Association.

In 2021, the Board decided to establish a board subcommittee, the Audit and Security Committee, to strengthen the Board's work within finance and particularly within security and information security. A specific mandate has been established regarding the committee's roles, responsibilities and tasks. The committee reports to the Board and holds three ordinary meetings a year.

SINTEF has an external auditor, elected by the Council, and an external internal auditor, elected by the Board. SINTEF is audited in relation to the ISO certification of our management systems for quality, the external environment, the working environment and security.

*Thanks to our joint research with SINTEF, we now have full control over the curing process for poured-in-place concrete structures. This helps ensure resources are used efficiently, which is crucial when it comes to us meeting critical deadlines. The results thus benefit both the construction clients and the contractor.*

**Andreas Sjaastad**
Concrete Technologist at Veidekke

Photo: Veidekke

# 6.2 Risk management and internal control

Risk management and internal control are an integral component of SINTEF's corporate governance and cover strategic, market and operational factors.

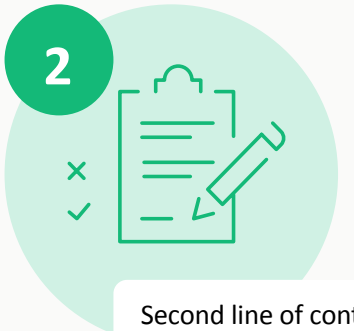
## Responsibilities

SINTEF's Board of Directors has overall responsibility for ensuring that the Group has good risk management and internal control procedures. SINTEF's Audit and Security Committee was established as a preparatory body for the Board. The committee supervises the Group's internal audit and exercise of risk management and internal control, as well as security and emergency preparedness. The group management team is responsible for operationalising the Group's risk management and internal control. The corporate staff responsible for quality are responsible for facilitating risk management and internal control, including frameworks and appropriate tools. This is done in close cooperation with other corporate staff areas.

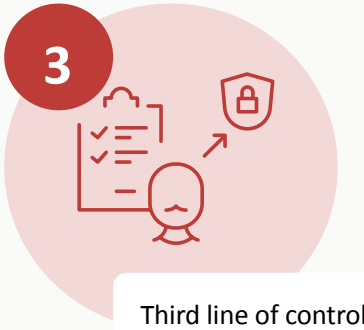
SINTEF has also established a barrier model with four barriers to ensure that our activities are conducted in compliance with laws, regulations, internal policies and our business model.

These four barriers are designed to ensure that our activities comply with laws, regulations, internal policies and our business model

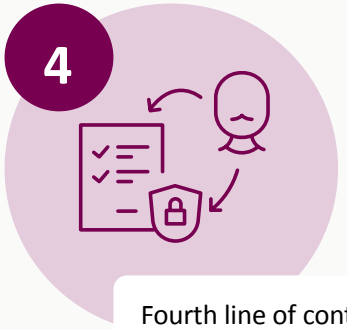

**First line of control**
Managers and employees in the line and in project groups




**Second line of control**
Control activities and corporate staff functions




**Third line of control**
Internal auditor (Deloitte)




**Fourth line of control**
External auditor (KMPG), external audits of certification bodies and supervisory authorities

## Framework and implementation

Risk management and internal control are based on the framework provided by the Committee of Sponsoring Organisations of the Treadway Commission (COSO) and the risk management guidelines set out in ISO 31000. SINTEF is also certified in line with the requirements of Quality Management Systems (ISO 9001), Environmental Management Systems (ISO 14001) and Occupational Health and Safety Management Systems (ISO 45001). Risk management and internal control are described in specific processes in the Group's management system.

The risk picture is discussed by the management and board of each of the research institutes, as well as by the group management team and the Board of Directors. Risk mitigation measures are defined and implemented on an ongoing basis. The group management team and the Board review the risk picture every four months. An annual internal audit report is prepared for the group management team and the Board.

In 2023, SINTEF further developed the framework for risk management and internal control. This should help ensure compliance with internal and external requirements, efficient operations and reliable reporting. Among other things, we focused on risks in work processes and establishing key controls for risk management. Further development and implementation are part of the Group's continuous improvement work and will be continued in 2024.

Internal audit conducted a number of audits in 2023. These included an audit of how we handle chemicals. This resulted in recommendations concerning further improvements in the next few years. The system for access control procedures was also audited. This resulted in a number of points requiring follow-up designed to raise awareness, implement improvements and enhance access control. Specific internal audits were also conducted that looked at state aid regulations and procurements. These resulted in good and improved controls for SINTEF's compliance with state aid regulations. Both audits made recommendations concerning possible improvements.

*The Act relating to enterprises' transparency and work on fundamental human rights and decent working conditions (Transparency Act)* was passed by the Storting (Norwegian parliament) and entered into force on 1 July 2022. Transparency should help to ensure that industry respects human rights and basic labour rights.

To date, SINTEF has adapted its governing documents and procedures to ensure compliance with the Transparency Act. A new procedure is being implemented via information on the intranet. At the same time, a guide on how to carry out due diligence has been prepared. Our suppliers are assessed using a risk-based approach. This allows us to assess on an ongoing basis whether or not follow-up is required to reduce purchases from high-risk countries and suppliers.

SINTEF is working on developing processes and procedures for appointments and vulnerability interviews. A system for complying with export controls is a priority.

**SINTEF is exposed to both external and internal risks and works proactively to manage situations that may threaten the Group's goal attainment:**

Identify risks and risk owners

Manage critical risks via specific action plans

Ensure measures for managing risk are followed up regularly

Create basis for effective communication

Monitor the overall risk picture

# 6.3 Board of Directors' report for 2023

SINTEF is an independent, non-profit research foundation with wide-ranging expertise. We develop knowledge that benefits society and creates competitiveness through the realisation of the UN Sustainable Development Goals. Our vision is 'Technology for a better society'.

We deliver independent world-leading research in close collaboration with industry, public bodies and research organisations. We create value with our clients by linking their needs to the research front, building outstanding research environments and infrastructure, and by creating new industries.

SINTEF is organised as a foundation with wholly and part-owned subsidiaries. Dividends cannot be paid out. The organisation retains all of the surplus. Our head office is in Trondheim, where the largest group of our employees work. We also have significant activities in Oslo and Raufoss. SINTEF also has a presence in Tromsø, Narvik, Mo i Rana, Steinkjer, Verdal, Frøya, Ålesund, Molde, Bergen, Kongsberg, Horten, Grenland and Arendal. We also have an office in Brussels. SINTEF disposed of our business in Hirtshals in 2023.

SINTEF works closely with NTNU with which it has a strategic operational partnership. We also work closely with the University of Oslo (UiO) and with a number of other universities and research institutions, nationally and internationally.

SINTEF has considerable assets at its disposal, partly thanks to our investments and partly thanks to hosting important publicly funded infrastructure, which we use in connection with our activities. Developed and undeveloped leasehold sites around the universities in Trondheim and Oslo account for a large proportion of the assets on the Foundation's balance sheet. The fact that the reserach groups in SINTEF and the universities share premises is an important factor in successful scientific collaboration and innovation.

## Strategy

Recent years have seen significant changes to, and uncertainty surrounding, the global picture, with a pandemic, wars in Ukraine and the Middle East, changed supply chains, higher inflation and interest rates, a strong focus on safety and the rapid development of AI. At the same time, efforts to cut greenhouse gas emissions, halt the depletion of nature and digitalise society have to continue at full strength. Digital technologies can accelerate solutions to the climate issue, although they also entail more energy consumption.

The Board is particularly interested in understanding SINTEF's risk situation, both to balance the organisation's vulnerability and to analyse how SINTEF can vigorously contribute to the required transition. At the same time, the Board believes that it is important to ensure that the large and heavy investments SINTEF makes in infrastructure, knowledge development and organisational development result in verifiable societal impacts and industrial competitiveness. Given this starting point, in 2022 the Board commenced a process designed to update our corporate strategy, where the main question was: How can we increase our impact?

The strategy was approved by the Board in March 2024 following a thorough process with a high degree of participation in the organisation. Throughout 2022 and 2023, the Board, together with the group management team, considered several key issues and areas of opportunity for SINTEF. The Board also closely supervised the group management team's strategy work through frequent status updates. The scope of opportunity was discussed at the joint strategy meeting of the Board and the group management team in June 2023. As part of this, important improvement measures and measures for further development were also identified.

The updated corporate strategy assumes that rapid transition will be the main driver for SINTEF's goals and ambitions in the coming years. Based on the external analysis, the strategy describes five strategic beliefs on which we should base our overall efforts in order to best contribute to societal development and competitiveness. These are areas where SINTEF has special prerequisites – thanks to our strength and because we are a unique organisation: value chain decarbonisation, AI and digitalisation, planetary boundaries,

new approaches to health and safety, and transition policy.

The strategy also describes our vision and how SINTEF will implement strategic measures for clients, disciplines, people and good operations, such that the organisation as a whole is able to deliver in line with the ambitions set out in the strategy.

## Framework conditions

Norway has chosen a model in which technical-industrial research institutes receive a far lower public basic grants than institutes in other European countries. This model makes Norwegian institutes dependent on calls for proposals that they can apply for funding together with their partners. In 2022 and 2023, the Research Council of Norway introduced cuts designed to make significant savings. This impacted calls for proposals for research funding. Public funding is also a major factor in triggering private investment in research. The Research Council fully or partly funds around 70 percent of SINTEF's income. This multiplier effect means that small cuts in budgets or postponements on the part of the public sector can have a major impact on SINTEF's income base, including from the private sector. A significant increase in the taxes triggered by Norwegian ownership is also having an adverse impact on the private sector.

Thanks largely to a change in direction for state investments in R&D, the research institutes experienced a sharp decrease in the proportion of R&D in Norway from 24.4 percent in 2010 to 20.1 percent in 2021. Public grants channelled through the Research Council that trigger investment in research by industry and collaborations between companies and research environments have not grown in real terms since 2012, with the exception of extraordinary pandemic measures. Cuts to these grants mean that, relatively speaking, the opportunities for research institutes to contribute to the digital and green transition have shrunk. Industry's main research partner has therefore been weakened. The Board is concerned about this development, and it must be clearly addressed in the government's upcoming review of the Norwegian research system and strategy for increasing industry's focus on R&D. This is necessary to boost industry-oriented research and schemes that promote collaborations between industry and research environments.

Participating in EU research and innovation programmes is very important, and SINTEF does very well in these competitions. The Norwegian governmental Retur-EU scheme is essential when it comes to ensuring that research institutes can contribute to the success Norway has enjoyed in EU research and innovation programmes. SINTEF is pleased that the scheme was protected in the national budget for 2023 and will be continued at the same level in 2024. It is very important that in future budgets the framework for this scheme is tailored to the institutes' success rate. This is necessary to ensure predictability, long-termism and a high level of activity in the EU arena, with a high return rate for Norway, including in the years to come.

Construction of the Norwegian Ocean Technology Centre is on schedule after the Storting protected its funding in the national budgets for 2023 and 2024. In the revised national budget for 2023, the extraordinary rise in construction costs was compensated for by just under NOK 600 million, meaning that the project's overall price-adjusted cost framework at the start of 2024 was NOK 10.3 billion. Compensation for the extraordinary rise in the price of equipment has yet to be clarified.

## HSE, sustainability and ethics

SINTEF is a complex organisation and operates unique infrastructure with the potential to cause injuries. HSE is a top priority at SINTEF, and we take a systematic approach to safeguarding our employees' safety and working environment. Safety is included with HSE and ethics as the first item on meeting agendas.

In 2023, two injuries resulted in absence and ten injuries (not including injuries requiring first aid) did not result in absence. This results in an LTI of 0.6 and a TRIF of 3.1 for 2023. In 2022, the LTI was 1.2 and TRIF was 2.8.

The Board strives to ensure that a continuous effort is made to avoid personal injuries, with preventive measures and learning from incidents. In 2023, the Board adopted a policy that more clearly describes the HSE responsibilities associated with various roles. An investigation was conducted in 2023 into incidents related to odours that gave rise to suspicions that laboratory emissions were being wrongly vented in Forskningsveien 1, and SINTEF Ocean's overall safety management was assessed. Attention was paid to safety improvements

and avoiding transition risks when changing providers of safety and emergency services. Deloitte conducted an internal audit of the chemicals value chain. This concluded that our chemical management is satisfactory, although there were some minor findings that are being followed up.

The Board is committed to intensifying SINTEF's sustainability efforts through our research and innovation, through how we operate and through our reporting on our social contribution and footprint.

In line with the Board's recommendations, the group management team is planning to carry out a comprehensive process with regard to SINTEF's sustainability strategy in 2024. The aim is to set an even clearer direction for our work and clarify dilemmas and the choice of direction for the organisation.

Our main contributions to sustainability are the impacts that our research and innovation contribute to public utility and greater competitiveness. The climate, renewable energy, nature/land use and other areas of research related to sustainability account for a significant part of SINTEF's research. This is being followed up through several corporate initiatives, including on the circular economy, minerals, global sustainable development, biodiversity and land, as well as radical new climate positive solutions.

We also maintain a constant focus on improving the sustainability of our own activities.

SINTEF takes a systematic approach to the environment and sustainability in its property activities, which include managing its properties, leasing from external parties and property development. Result-oriented efforts are being made to identify and implement measures that reduce energy and water consumption, as well as waste, in our buildings. In 2023, our energy consumption was reduced by 2 percent compared with 2022. Our total energy consumption has been cut by 27 percent since 2018. The building project SINTEF Energy Horizon was started in Gløshaugen in 2022. The building is certified as 'Excellent' in line with BREAAM-NOR, Norway's foremost system for environmental certifying buildings. Together with NTNU and Statsbygg, SINTEF has committed to trying to help the educational building Professor Mørchs Hus in the Norwegian Ocean Technology Centre achieve BREEAM-NOR 'Outstanding' certification. It would be the first in this sector in Norway.

This is what SINTEF Energy's new premises will look like in Gløshaugen in Trondheim. The current office building is being remodelled. The new building, SINTEF Horizon, has been certified as 'Excellent' in line with BREEAM-NOR, Norway's foremost system for environmental certifying buildings. Illustration: PKA Arkitekter

As part of the work on SINTEF's sustainability strategy, we are planning to set clearer goals for the development of our property activities.

During the pandemic years we learned that we could significantly reduce our travel activity. At the same time, we also found that being able to meet and discuss are important elements of the research and innovation process. 2023 was the first normal year after the pandemic. We can see that $CO_2$ emissions from air travel have increased compared with 2022, but they have been cut by 29 percent compared with the last normal year before the pandemic, which was 2019.

Our work on HSE, sustainability, the external environment and ethics is described in chapters 3-5 in this year's Integrated Annual Report.

SINTEF has a clear ethical platform. The main areas for our work on ethics are research ethics, business conduct and relationship ethics. SINTEF's employees receive training in connection with onboarding, project mana-

**102 NOKm**

operating profit in 2023, compared with 127 NOKm in 2022

**321 NOKm**

invested in research infrastructure and other research production equipment

gement and management development. The ethics ombudsman receives and considers enquiries. Most of these result in a requirement for advice on business, research and interpersonal relationships.

We take a proactive approach to identifying and assessing possible adverse impacts on fundamental human rights and labour rights in the Group's supply chain, in line with the Transparency Act. A report on our follow-up of the Act is published as part of the reporting on sustainability in the annual report and on SINTEF's website.

## Financial results

SINTEF's operating profit for 2023 was NOK 102 million, compared with NOK 127 million for 2022. The financial result before tax was NOK 142 million, compared with NOK 62 million for 2022. Profit before tax was NOK 243 million, compared with NOK 190 million for 2022.

There are significant differences between the institutes, with particularly good results in SINTEF Industry and SINTEF Energy Research. SINTEF Digital has completed a restructuring process designed to reduce costs.

The liquidity situation at the end of 2023 remained good. SINTEF has established a system within the Group for the placement of liquidity reserves. At the end of 2023, we had NOK 440 million under management, compared with NOK 421 million in 2022. The return was 4.6 percent in 2023. The Board approves the annual 'Rules for financial management at SINTEF'.

SINTEF's financial surplus is invested in new research, upskilling, buildings, research infrastructure and start-ups. In 2023, SINTEF invested NOK 321 million in research infrastructure and other research production equipment. The corresponding figure for 2022 was NOK 248 million. The largest investments were made in buildings and laboratories linked to the Norwegian Ocean Technology Centre in Torgardsvegen 12 and SINTEF Energy's new Horizon building in Gløshaugen. In 2023, the investments amounted to NOK 36 million and NOK 173 million, respectively.

SINTEF enjoys a robust financial position. As of 31 December 2023, SINTEF had equity of NOK 3,405 million (NOK 3,216 million in 2022), which represents 47 percent of total assets (49 percent in 2022). The corresponding figure for the SINTEF Foundation is NOK 3,024 million (NOK 2,858 million in 2022), which represents 97 percent of total assets (97 percent in 2022).

The SINTEF Foundation's annual surplus amounted to NOK 166 million. The corresponding figure for 2022 was NOK 128 million.

Equity and operational factors, combined with satisfactory orders on hand, provide a good basis for continued operation. The boards of the subsidiaries have conducted similar assessments, all of which conclude that there is a basis for continued operation. The Board is not aware of any material circumstances that have arisen since the end of the financial year that affect the assessment of the Foundation's or the Group's financial position. Given this, the financial statements have been prepared based on the assumption that SINTEF is a going concern.

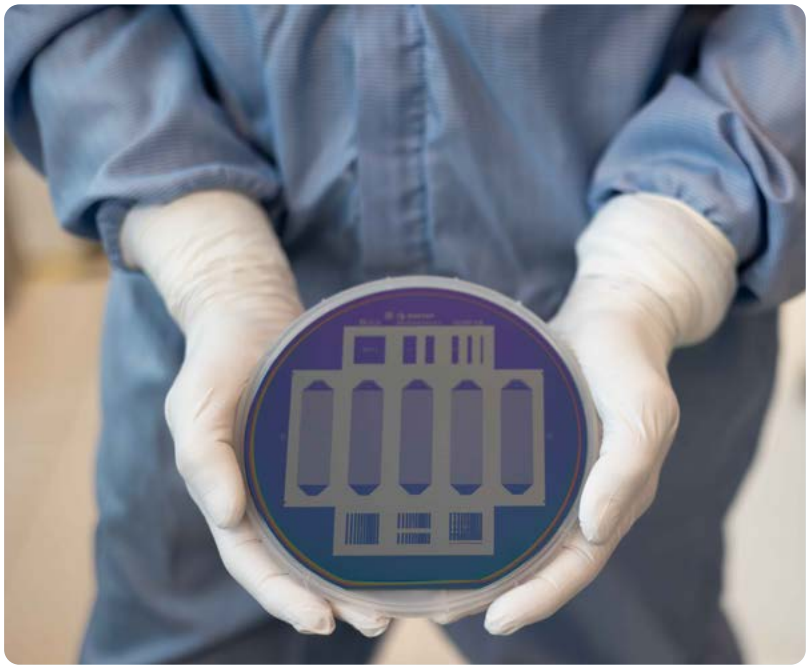
SINTEF's commercialisation activities have developed positively. At the end of 2023, SINTEF had 20 start-ups in its portfolio. Three of these were added in 2023. A total of NOK 409 million was invested in the companies by investors over the course of the year, of which NOK 63 million came from the SINTEF Venture funds. In June, a first round with external investors was closed in our newest fund, SINTEF Venture VI AS. KLP, Gjensidigestiftelsen, Sparebankstiftelsen DNB, SpareBank 1 SMN, Reitan Kapital and Koteng entered the fund. With additional contributions from SINTEF, the capital base in SINTEF Venture VI AS is now NOK 285 million. A second round is underway. This will close in the first half of 2024.

## Clients

In 2023, SINTEF carried out 6,371 projects for 3,341 clients, large and small. This includes projects for both private and public clients.

SINTEF conducts client satisfaction surveys after projects are completed. The average score in 2023 was 4.62 on a scale of 1 to 5, up from 4.56 in 2022. Detailed results are available to managers on an ongoing basis and are reported every four months to the group management team and followed up locally.

The group management team prioritises meetings with the senior management of large enterprises. In these meetings, strategic choices of direction and framework conditions that promote industry-oriented research and research-based innovation are discussed. A new function has been added to the group management team, the Executive Vice President, Customers and Markets. The aim is to strengthen our capacity for coordinated strategic client dialogue that links clients' needs to the research front and supports 'One SINTEF'.



The EU wants to double Europe's production capacity for advanced microchips and sensors via the European Chips Act. SINTEF MiNaLab in Oslo conducts world-leading research in this field and also develops and produces advanced sensor and microchip based solutions.
Photo: Marit Aftret Mørtvedt/SINTEF

Participation in large, long-term research centres that are partly financed by the government based on open tenders provides considerable opportunities to create innovation through research, in interaction with Norwegian and international clients. SINTEF is part of 10 centres for research-driven innovation (SFIs) that will run until 2028, and 10 centres for environment-friendly energy research (FMEs) that will run until 2024/2025 and 2029/2030. In 2024, the Research Council of Norway will call for proposals for funding for new SFIs.

SINTEF achieved very good results in relation to the Green Platform scheme by participating in seven out of nine awarded projects in 2023. The scheme develops a lot of good collaborations with companies and across institutes.

One important task is to develop international networks and globally competitive solutions that provide our clients with up-to-date knowledge. Access to participation in EU research programmes is of paramount importance. SINTEF is by far the largest Norwegian participant in the EU's research and innovation programmes. The results in the Horizon Europe framework programme, which was launched at the start of 2021, have been very good. As of December 2023, SINTEF had been granted funding for 158 projects, with income for SINTEF of NOK 1,500 million at today's exchange rate. This represents 14.2 percent of the signed off funds brought home to Norway.

Two of the projects in which SINTEF is participating were awarded by the European Defence Fund in 2023. The total framework is NOK 500 million, of which SINTEF's share is NOK 19 million.

International turnover amounted to NOK 808 million in 2023 (NOK 660 million in 2022). This amounts to 19 percent of SINTEF's total turnover. EU projects account for 64 percent of our international projects. We delivered projects for clients in 65 countries.

## Research

SINTEF's capacity for scientific renewal requires a good balance between scientific publication and contract research. The most important dissemination of our research results takes place through new technology and new solutions being adopted by clients and society, although great importance is also attached to scientific publication.

The aim is to publish at least one peer reviewed scientific publication per research scientist per year. In 2023, the figure was estimated to be 0.80, compared with 0.75 in 2022. The proportion of internationally co-authored publications was 47 percent.

The development of artificial intelligence (AI) and increasingly advanced digital language models are impacting all parts of society and industry globally. According to social economic analysis, AI could create NOK 2,000 billion in value in Norway in the period up to 2040. However, there are also significant challenges associated with the technology. There is a great deal of potential for AI in operational and industrial applications, and SINTEF works closely with clients in industry and public administration on the development of good new solutions. In September, the government announced that it will increase its research investments within AI by at least NOK 1 billion in the next five years. SINTEF is pleased that the authorities have decided to announce four to six interdisciplinary and cross-sectoral five-year AI centres. Based on our experience, such centres have the potential to trigger innovative collaborations and changes in and across entire supply chains.

The EU plans to mobilise EUR 43 billion through the European Chips Act. The ambition is to double the EU's production capacity for advanced microchips and sensors. Norway should play a larger role in further developing the underlying technology behind AI. SINTEF MiNaLab in Oslo conducts world-leading research and also develops and produces advanced sensor and microchip based solutions. SINTEF is working to ensure that the upgrading of MiNaLab becomes an important element of a national boost in research, innovation and infrastructure for the development of specialised microchips and sensors.

Laboratory investments are crucial if Norway is to develop further as a knowledge nation, assert itself in a competitive global arena and attract the best students and research scientists. In the past 10 years, SINTEF has invested NOK 1.8 billion in laboratories, scientific equipment and buildings.

Extensive construction work has been carried out as part of realising the Norwegian Ocean Technology Centre. The construction is being funded by the state and is crucial if SINTEF and NTNU is to maintain their position as a world-leading research environment for ocean industries. In 2023, work was carried out on the construction of Professor Mørchs Hus (education and office premises) and groundwork was carried out for the Bassengbygget pool building in Tyholt. Work on adapting and developing the property SINTEF owns in Torgarden for mechanical and construction laboratories continued throughout the year. These laboratories will be a part of the Norwegian Ocean Technology Centre at the start of 2024.

A new national hydrogen research laboratory, SMART-H, was opened in June 2023. The laboratory is a collaboration between NTNU and SINTEF and is the only one of its kind in Europe. It will be used to investigate how hydrogen atoms affect the structure of various materials over time, and to obtain knowledge that will be crucial for Norway's ability to export hydrogen in the future.

The SINTEF Battery Lab was opened by the Norwegian Minister of Trade and Industry in February 2023. This laboratory is very important for SINTEF's position as a leading European research community in the battery value chain, and for the Norwegian battery industry's development opportunities. In addition to housing research activities, it and other laboratories contribute to our clients' innovation work. SINTEF has, on behalf of Elinor Batteries AS, already used the laboratory for trialling the production of battery cells.

The development of NTNU's campus in Gløshaugen is complicated, and is also of great significance for SINTEF. A good dialogue between NTNU and SINTEF is necessary to ensure good future-oriented solutions.

SINTEF participates in international scientific collaborations. Together with NTNU, we have strategic collaborations with leading research environments in Japan and the US within areas such as energy, materials and ocean. A great deal of importance is attached to the collaborations in the European

Energy Research Alliance (EERA) and the European Association of Research and Technology Organisations (EARTO). Both of these collaborations play important strategic roles in European research. The collaboration with our largest sister institutes in Europe, under the auspices of Eurotech, is also of great value to SINTEF.

## People

As of 31 December 2023, SINTEF had a total of 2,170 permanent employees, 15 fewer than at the beginning of the previous year. 61 percent of scientific personnel hold a PhD. 32 percent of SINTEF's employees come from a total of 80 countries other than Norway. The largest percentage comes from Germany, followed by Italy and France.

SINTEF is successful in the competition for skilled employees. We consistently score well in surveys in which students rank the attractiveness of places to work. In 2023, SINTEF recruited 171 new employees. Some 91 of these come from 35 countries other than Norway.

Every summer, SINTEF recruits summer research interns; students who get a summer job in one of the institutes. The offer is very popular, with more than a thousand applicants for 123 summer internships in 2023. Summer research interns can participate in research projects, and the initiative is an important element of SINTEF's recruitment strategy for talented students.

86 percent of our workforce are full-time employees. SINTEF has no employees who work part-time on an involuntary basis. At the end of the year, 1.6 percent were employed on a temporary basis.

The sickness absence rate for 2023 was 4.2 percent. In 2022, the sickness absence rate was 4.6 percent, although it was affected by Covid-19 to some extent. The work-related sickness absence rate was 0.4 percent. Sickness absence is systematically followed up in the institutes.

SINTEF conducts a working environment survey at the start of each year. A decision has been made to change the system for these surveys, which will simplify both their conduct and their follow-up. The latest survey from January 2023 shows that SINTEF has a good, stable working environment, with some variation between the institutes.

The proportion of women in SINTEF is rising. At the end of the year, 37 percent of our scientific personnel were women. Photo: Sune Eriksen/Tinagent/Innovation Norway

In connection with the restructuring of SINTEF Digital, a decision was made to cut the costs by around NOK 27 million. Following discussions with the trade unions, organisational changes were made and cuts amounting to 13 FTEs were implemented in selected professional groups.

## Gender equality and family policies

Gender equality efforts are anchored in the Board and group management team. SINTEF has adopted a gender balance plan in accordance with the requirements of the EU and the Research Council of Norway, which specify that we must increase SINTEF's proportion of women from 33 percent, the requirement in 2021, to at least 40 percent in 2031. The plan sets out specific targets that lay the groundwork for a systematic and binding development of gender balance and gender equality in the organisation.

The proportion of women in SINTEF is rising. At the end of the year,

37 percent of our scientific personnel were women. Today, we have achieved gender balance at the lowest rung of the research scientist ladder, although the further up the ladder one looks the greater the imbalance becomes. The gender balance among senior research scientists has improved. There is gender balance at the top level of the line management. At other levels, the gender balance is weaker. The lowest proportion of women is found at the levels of research directors and heads of department. The working environment survey shows no significant differences in how men and women perceive their work situation.

SINTEF has established an integration programme for international employees and their families to ensure international employees are properly looked after.

SINTEF's work on its activity and reporting obligations is discussed further here.

A specific threat assessment was prepared for SINTEF at the beginning of 2023. The starting point is the most relevant threats and vulnerabilities in the government's public threat assessments, as well as the dialogue with the Norwegian Police Security Service and the Norwegian National Security Authority. Photo: Getty Images

## Risk management and internal control

SINTEF is certified according to ISO 9001, ISO 14001 and ISO 45001 through certification processes under the auspices of DNV. In November 2023, DNV conducted a periodic audit of SINTEF Energy Research and SINTEF Community, as well as corporate staff and the group management team. Suggestions concerning improvements were followed up, although no serious nonconformance was identified. The certificates were thus renewed.

SINTEF has a system for reporting risk every four months with an update on the overall picture. The risk picture is discussed by the management and boards of each of the research institutes, as well as by the group management team and the Board of Directors. Risk mitigation measures are defined and implemented on an ongoing basis. Important topics that are constantly being worked on include state aid rules, the General Data Protection Regulation (GDPR), money laundering rules, the Export Control Act, information security and exposure to technological intelligence gathering. These are factors that have become more demanding to deal with in recent years.

A specific threat assessment was prepared for SINTEF at the beginning of 2023. The starting point is the most relevant threats and vulnerabilities in the government's public threat assessments, as well as the dialogue with the Norwegian Police Security Service and the Norwegian National Security Authority.

At the same time, business-related risk is high on the agenda due to the uncertainty regarding the global economy. Framework conditions top the risk picture for SINTEF due to a negative and uncertain trend in the government's focus on industry-oriented research. Given the low operating margins, a continued negative trend in the framework conditions for research institutes in Norway will bring with it considerable financial risk.

SINTEF is exposed to currency fluctuations because some of its project income is in foreign currency, while all or most of the project costs are in Norwegian kroner. Forward contracts are used to hedge currency risk. Surplus liquidity is invested in accordance with the 'Rules for financial management at SINTEF'. The Board receives monthly reports on financial performance.


In 2023, SINTEF recruited 171 new employees. Some 91 of these come from 35 countries other than Norway. Photo: Sune Eriksen/Tinagent/Innovation Norway

The Board established a three-member Audit and Security Committee in 2021 to strengthen the work on security and information security in particular. Reports are prepared for all internal audits. An annual internal audit report specifying the implementation status of recommendations is submitted to the group management team and the Board. An annual data protection report is produced with an action plan for the group management team and the Board. An annual corporate governance report is produced in line with the Norwegian Code of Practice for Corporate Governance (NUES). The annual report on corporate governance is published together with SINTEF's annual report.

Insurance has been taken out for board members and the CEO that covers the personal liability they could incur for damage to assets in connection with the exercise of their office (directors and officers liability insurance). The insurance has been taken out with an insurance company with a solid rating. The insurance covers the insured's personal legal liability for damage to assets caused by a board member/deputy board member or the CEO of the organisation named on the insurance certificate. The insurance does not cover liability for personal injury or property damage, including financial loss as a result of such damage. The insured are defined as any natural person who has been, is or becomes the CEO of the Group, a board member of the Group, a member of the group management team or a member of an equivalent governing body in the Group. The same applies to any former, current or future employee of the Group who may take on independent management responsibilities.

SINTEF's CEO was named 'Quality Manager of the Year 2023' by 'Quality and Risk Norway'. This award aims to recognise and promote good results in the area of quality and risk management. The Board regards the award as recognition of the quality work done throughout SINTEF.

## Future opportunities and challenges

The world must successfully radically change energy and food supply, logistics and consumption patterns, if global climate change is to be mitigated and biodiversity is to be safeguarded. At the same time, defence and the defence industry are being strengthened in Norway and many other countries. The crises of recent years have shown that the world needs smart and secure societies, circular economies, digitalisation, user-adapted services and sustainable solutions for health and mobility in the face of demographic changes and geopolitical tensions.

At the start of our 75th year, SINTEF is, in the Board's experience, a very attractive partner for industry and the public sector, which are now working on solving these challenges.

At the start of 2024, SINTEF's research institutes have good orders on hand for the coming year. The organisation is well positioned, with our very high level of expertise, our professional networks, our world-class infrastructure,

excellent client relations and our attractiveness for employees at a time when institutes are fighting for talented staff. Nevertheless, the Board is concerned about how the situation will develop over the next few years at a time of pressure on framework conditions and significant uncertainty. Demanding conditions are affecting the scope of opportunity for our clients to engage in research and innovation.

SINTEF's success in the strong competition for European research funds continued in 2023. This demonstrates that the organisation is highly competitive from an international perspective. In the Board's experience, industry and the public sector are very interested in collaborating with SINTEF. However, the Norwegian research model means that public calls for proposals, including for national funding for EU programmes, determine the amount of research-based transition work to which the institutes can contribute. Therefore, the Board believes that the review of the Norwegian research funding system that the government has initiated will be of great importance for our future prospects.

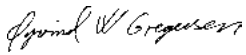
Ensuring that SINTEF contributes knowledge and analyses for good policymaking that can in turn trigger an increase in industry's investment in R&D is a top priority for the Board and group management team. This will improve the ability of companies to implement a digital, circular and green transition and contribute to more sustainable public services. It will also help the Board for SINTEF to fulfil its vision: *Technology for a better society*.

## Thanks

The Board would like to thank all of our employees and partners for their efforts and teamwork in 2023. We would also like to thank all of the co-owners of subsidiaries and all 77 representatives from business and civil society who sit on SINTEF's many boards and committees.

Trondheim, 21 March 2024

Tore Ulstein
**Board Chair**



Øyvind Weiby Gregersen
Deputy Chair

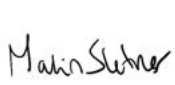
Lars Christian Dahle
Board member

Bård Myhre
Board member

Hanne Refsholt
Board member

Kristin Misund
Board member

Siri Forsmo
Board member



Malin Sletnes
Board member

Bendik Sægrov-Sorte
Board member

Alexandra Bech Gjørv
CEO

# 6.4 Key financial figures

Amounts in NOK millions

| Income and expenses | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| Gross operating income | 3,483 | 3,399 | 3,744 | 4,050 | 4,205 |
| Net operating income | 2,864 | 2,974 | 3,248 | 3,440 | 3,617 |
| **Operating profit** | **153** | **158** | **268** | **127** | **102** |
| Financial income | 50 | 62 | 71 | 89 | 164 |
| Financial expenses | 8 | 46 | 11 | 27 | 22 |
| Profit before tax | 195 | 174 | 329 | 190 | 243 |
| **Net income** | **161** | **145** | **262** | **144** | **189** |

| Balance sheet | | | | | |
|---|---|---|---|---|---|
| Non-current assets | 1,250 | 1,215 | 1,457 | 1,550 | 1,865 |
| Current assets | 3,358 | 3,912 | 4,178 | 5,039 | 5,306 |
| **Total assets** | **4,608** | **5,127** | **5,635** | **6,588** | **7,170** |
| Equity | 2,667 | 2,812 | 3,074 | 3,216 | 3,405 |
| Non-current liabilities | 44 | 34 | 104 | 100 | 95 |
| Current liabilities | 1,897 | 2,282 | 2,457 | 3,272 | 3,670 |
| **Total equity and liabilities** | **4,608** | **5,127** | **5,635** | **6,588** | **7,170** |

| Profitability | | | | | |
|---|---|---|---|---|---|
| Operating margin ( %) | 5.4 % | 5.3 % | 8.2 % | 3.7 % | 2.8 % |
| Profit margin % | 5.6 % | 4.9 % | 8.1 % | 4.2 % | 5.2 % |
| Return on total assets ( %) | 4.6 % | 4.5 % | 6.3 % | 3.5 % | 3.9 % |
| Return on equity ( %) | 7.5 % | 6.4 % | 11.2 % | 6.0 % | 7.4 % |
| **Liquidity** | | | | | |
| Net cash flow from operating activities | 466 | 653 | 448 | 897 | 614 |
| Current ratio | 1.8 | 1.7 | 1.7 | 1.5 | 1.4 |
| **Solvency** | | | | | |
| Equity ratio ( %) | 58 % | 55 % | 55 % | 49 % | 47 % |
| Working capital | 1,461 | 1,631 | 1,721 | 1,766 | 1,635 |

# 6.5 Financial statements 2023

## Income statement

Amounts in NOK thousands

| The SINTEF Foundation | | | SINTEF | |
|---|---|---|---|---|
| **2022** | **2023** | **Operating income and expenses** | **2023** | **2022** |
| 0 | 0 | Income from external projects | 3,733,356 | 3,598,697 |
| 0 | 0 | Basic grant funding from the Research Council of Norway | 373,036 | 339,771 |
| 341,163 | 364,551 | Other operating income | 98,125 | 111,381 |
| **341,163** | **364,551** | **Gross operating income** | **4,204,517** | **4,049,848** |
| 0 | 0 | Direct project expenses | 587,070 | 609,487 |
| **341,163** | **364,551** | **Net operating income** | **3,617,447** | **3,440,361** |
| 75,466 | 75,265 | Personnel expenses | 2,595,064 | 2,431,840 |
| 31,498 | 29,816 | Depreciation and amortisation | 144,469 | 141,611 |
| 216,725 | 234,060 | Other operating expenses | 776,162 | 739,485 |
| **323,690** | **339,141** | **Total operating expenses** | **3,515,695** | **3,312,936** |
| **17,473** | **25,410** | **Operating profit** | **101,752** | **127,426** |

| The SINTEF Foundation | | | SINTEF | |
|---|---|---|---|---|
| **2022** | **2023** | **Financial income and expenses** | **2023** | **2022** |
| 114,733 | 120,235 | Income from subsidiaries and associated companies | -5,867 | -2,385 |
| 1,604 | 17,961 | Other interest income | 125,443 | 65,124 |
| 7,947 | 13,085 | Interest received from group companies | 0 | 0 |
| 438 | 17 | Other financial income | 10,455 | 24,101 |
| -5,185 | 8,469 | Changes in fair value of financial current assets | 27,842 | -12,913 |
| -472 | -737 | Other interest expenses | -8,602 | -2,873 |
| -1,016 | -881 | Other financial expenses | -7,668 | -9,003 |
| **118,050** | **158,149** | **Net financial income** | **141,604** | **62,221** |
| **135,523** | **183,559** | **Profit before tax** | **243,355** | **189,647** |
| 8,022 | 17,700 | Income tax | 54,762 | 45,303 |
| **127,502** | **165,859** | **NET INCOME** | **188,593** | **144,343** |
| | | **Attributable to minority interests** | **22,942** | **17,468** |
| | | **Attributable to controlling interests** | **165,651** | **126,875** |
| | | **Allocations:** | | |
| 104,228 | 139,864 | Transferred to fund for valuation differences | | |
| 23,274 | 25,994 | Allocated to other equity | | |
| **127,502** | **165,859** | **Total allocations** | | |

# Balance sheet

Amounts in NOK thousands

| The SINTEF Foundation | | | SINTEF | |
|---|---|---|---|---|
| **2022** | **2023** | **ASSETS** | **2023** | **2022** |
| | | **Non-current assets** | | |
| | | **Intangible assets** | | |
| 0 | 0 | Development | 60,210 | 2,301 |
| 0 | 0 | Concessions, patents, licence, trademarks, etc. | 7,168 | 15,454 |
| 98,502 | 103,495 | Deferred tax asset | 229,053 | 217,474 |
| 0 | 0 | Goodwill/(badwill) | 8,607 | 9,947 |
| **98,502** | **103,495** | **Total intangible assets** | **305,037** | **245,176** |
| | | **Tangible fixed assets** | | |
| 413,464 | 392,033 | Plots, buildings and other real estate | 791,297 | 790,707 |
| 1,059 | 308 | Facilities under construction | 300,575 | 164,483 |
| 0 | 0 | Scientific equipment | 237,675 | 181,054 |
| 1,394 | 646 | Equipment and other movables | 23,150 | 30,001 |
| **415,917** | **392,987** | **Total tangible fixed assets** | **1,352,698** | **1,166,245** |
| | | **Financial assets** | | |
| 1,596,721 | 1,716,956 | Investments in subsidiaries | 0 | 0 |
| 234,671 | 274,671 | Loans to group companies | 0 | 0 |
| 0 | 0 | Investments in associated companies and joint ventures | 109,974 | 87,183 |
| 0 | 0 | Loans to joint ventures | 304 | 0 |
| 137 | 137 | Investments in shares | 11,304 | 12,799 |
| 0 | 0 | Pension funds | 0 | 3,114 |
| 32,645 | 30,512 | Other non-current receivables | 85,387 | 35,383 |
| **1,864,174** | **2,022,275** | **Total financial assets** | **206,968** | **138,478** |
| **2,378,594** | **2,518,757** | **Total non-current assets** | **1,864,704** | **1,549,899** |

| The SINTEF Foundation | | | SINTEF | |
|---|---|---|---|---|
| **2022** | **2023** | **ASSETS** | **2023** | **2022** |
| | | **Current assets** | | |
| | | **Inventories** | | |
| 0 | 0 | Inventories of finished goods | 17,773 | 17,448 |
| 0 | 0 | Work in progress | 630,628 | 622,283 |
| **0** | **0** | **Total inventories** | **648,400** | **639,732** |
| | | **Receivables** | | |
| 5,289 | 4,964 | Accounts receivable | 606,242 | 594,749 |
| 50,075 | 37,847 | Group current receivables | 0 | 0 |
| 15,768 | 17,587 | Other current receivables | 179,204 | 151,405 |
| **71,132** | **60,398** | **Total receivables** | **785,446** | **746,154** |
| | | **Investments** | | |
| 174,260 | 182,286 | Market-based bonds and other securities | 439,870 | 420,503 |
| 0 | 0 | Other financial instruments | 18,755 | 22,734 |
| **174,260** | **182,286** | **Total investments** | **458,625** | **443,237** |
| **311,485** | **348,844** | **Cash and cash equivalents** | **3,413,074** | **3,209,395** |
| **556,877** | **591,528** | **Total current assets** | **5,305,544** | **5,038,518** |
| **2,935,470** | **3,110,286** | **TOTAL ASSETS** | **7,170,248** | **6,588,416** |

# Balance sheet

Amounts in NOK thousands

| The SINTEF Foundation | | | SINTEF | |
|---|---|---|---|---|
| **2022** | **2023** | **EQUITY AND LIABILITIES** | **2023** | **2022** |
| | | **Equity** | | |
| | | **Paid-in equity** | | |
| 71,350 | 71,350 | Foundation's capital | 71,350 | 71,350 |
| **71,350** | **71,350** | **Total paid-in equity** | **71,350** | **71,350** |
| | | **Retained earnings** | | |
| 1,330,743 | 1,470,608 | Fund for valuation differences | 0 | 0 |
| 1,456,120 | 1,482,114 | Other equity | 2,951,718 | 2,786,066 |
| **2,786,863** | **2,952,722** | **Total retained earnings** | **2,951,718** | **2,786,066** |
| | | Minority interests | 381,840 | 358,898 |
| **2,378,594** | **3,024,072** | **Total equity** | **3,404,907** | **3,216,314** |

| The SINTEF Foundation | | | SINTEF | |
|---|---|---|---|---|
| **2022** | **2023** | **EQUITY AND LIABILITIES** | **2023** | **2022** |
| | | **Liabilities** | | |
| | | **Provisions** | | |
| 0 | 0 | Pension liabilities | 21,122 | 22,582 |
| 0 | 0 | Other provisions | 18,895 | 17,732 |
| **0** | **0** | **Total provisions** | **40,017** | **40,314** |
| | | **Other non-current liabilities** | | |
| 0 | 0 | Liabilities to credit institutions | 55,000 | 59,499 |
| **0** | **0** | **Total other non-current liabilities** | **55,000** | **59,499** |
| | | **Current liabilities** | | |
| 27,118 | 38,970 | Accounts payable | 333,474 | 291,728 |
| 13,895 | 19,343 | Tax payable | 63,497 | 56,993 |
| 4,589 | 4,561 | Tax deducted and other public duties | 243,759 | 238,252 |
| 0 | 0 | Advance payments from clients | 1,149,924 | 1,148,144 |
| 11,463 | 510 | Group current liabilities | 0 | 0 |
| 20,192 | 22,830 | Other current liabilities | 1,879,670 | 1,537,172 |
| **77,257** | **86,214** | **Total current liabilities** | **3,670,324** | **3,272,289** |
| **77,257** | **86,214** | **Total liabilities** | **3,765,341** | **3,372,102** |
| **2,935,470** | **3,110,286** | **TOTAL EQUITY AND LIABILITIES** | **7,170,248** | **6,588,416** |

# Statement of cash flows

Amounts in NOK thousands

| The SINTEF Foundation | | | SINTEF | |
|---|---|---|---|---|
| **2022** | **2023** | | **2023** | **2022** |
| | | **Cash flow from operating activities:** | | |
| 135,523 | 183,559 | Profit before tax | 243,355 | 189,647 |
| -114,733 | -120,235 | Share of profit from associated companies, less distributions | 6,374 | 19,309 |
| -2,281 | -13,681 | Income taxes paid | -56,774 | -50,885 |
| 31,498 | 29,816 | Ordinary depreciation and amortisation | 144,468 | 141,611 |
| 0 | 0 | Recognition of badwill | -440 | -438 |
| 20 | 0 | Write-downs of property, plant and equipment | 254 | 1,580 |
| 0 | 0 | Pension expenses with no cash flow effect | 1,654 | -1,898 |
| 0 | 0 | Net loss/(-)gain sale assets | 3,021 | -18,312 |
| 5,625 | -8,026 | Net change in value of financial current assets | -21,002 | 13,574 |
| 0 | 0 | Change in inventories of finished goods | -325 | -2,408 |
| 0 | 0 | Change in work in progress | -8,345 | -84,357 |
| -2,205 | 325 | Change in accounts receivable and advance payments | -9,713 | 69,703 |
| -1,823 | 11,852 | Change in accounts payable | 41,755 | 67,229 |
| -19,209 | 1,275 | Change in intragroup balances | 0 | 0 |
| 2,430 | -2,773 | Net change in other accruals | 269,431 | 552,434 |
| **34,846** | **82,113** | **Net cash flow from operating activities** | **613,713** | **896,789** |

| The SINTEF Foundation | | | SINTEF | |
|---|---|---|---|---|
| **2022** | **2023** | | **2023** | **2022** |
| | | **Cash flow from investing activities:** | | |
| 0 | 324 | Proceeds from sales of tangible fixed assets | 21 | 898 |
| -41,863 | -7,210 | Purchases of tangible fixed assets | -320,623 | -247,760 |
| 0 | 0 | Purchases of intangible assets | -59,432 | -1,038 |
| 0 | -40,000 | Payments on loans to Group companies | 0 | 0 |
| 0 | 0 | Proceeds from sale of financial assets | 15 | 41,460 |
| 0 | 0 | Purchases of financial assets | -21,705 | -24,599 |
| **-41,863** | **-46,886** | **Net cash flow from investing activities** | **-401,724** | **-231,039** |
| | | **Cash flow from financing activities:** | | |
| 0 | 0 | Payments on non-current liabilities to credit institutions | -4,499 | -3,334 |
| 1,499 | 2,133 | Proceeds from non-current receivables | 2,133 | 1,499 |
| 0 | 0 | Buyout of minority interests | 0 | -2,000 |
| **1,499** | **2,133** | **Net cash flow from financing activities** | **-2,366** | **-3,835** |
| -5,518 | 37,360 | Net change in cash and cash equivalents | 209,623 | 661,915 |
| 0 | 0 | Effect of revised ownership interest from subsidiaries to associated companies | -5,944 | 0 |
| 317,003 | 311,485 | Cash and cash equivalents as of 1 January | 3,209,395 | 2,547,480 |
| **311,485** | **348,844** | **Cash and cash equivalents as of 31 December** | **3,413,074** | **3,209,395** |

# 6.6 Results per institute

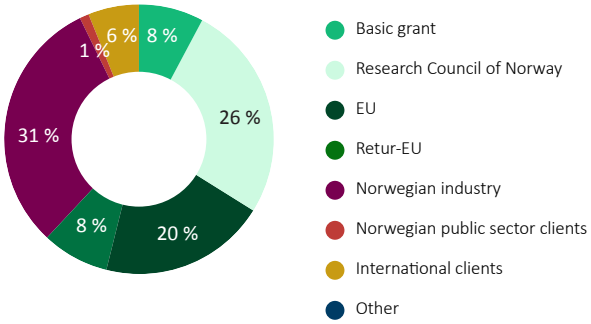

SINTEF, here represented by one of our 2,170 employees, Research Scientist Astrid Hyldbakk, has six research institutes, which are described in more detail on the next few pages.

Photo: Berre/SINTEF

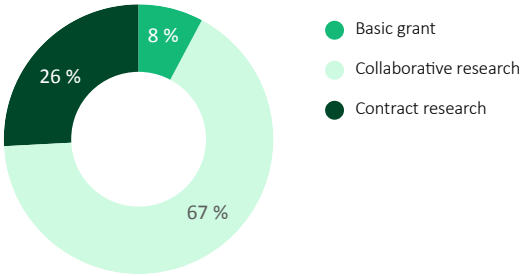
# SINTEF Industry

## Funding sources

% of gross operating income




## Portfolio type

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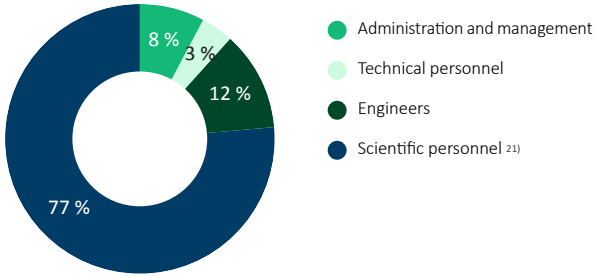


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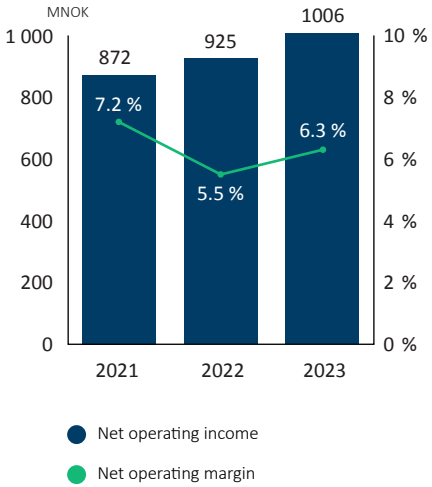
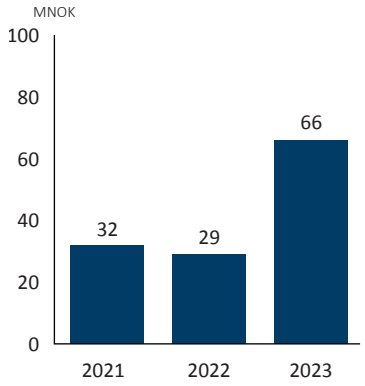
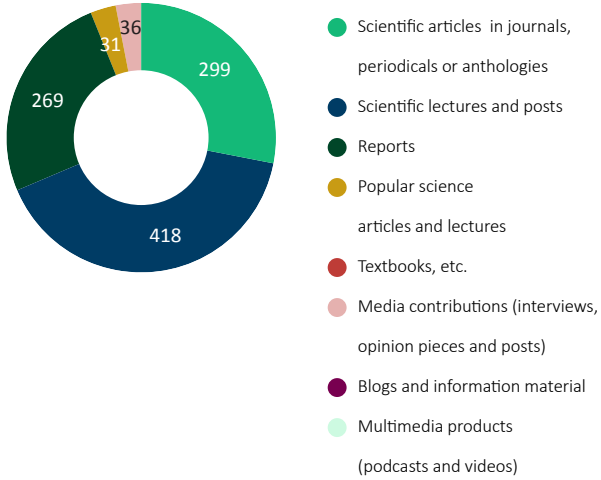



## Investments in laboratories, scientific equipment and other research production equipment




## Publications and other dissemination



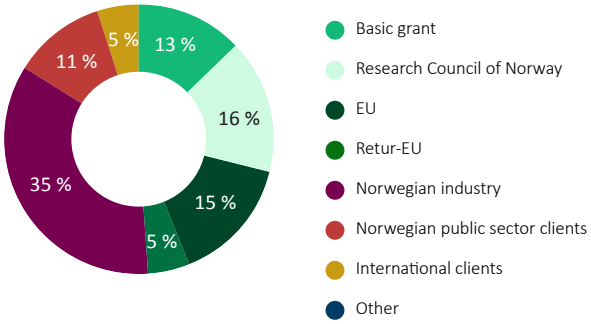

Sources: Publications; Cristin, other data (incl. publication data reports); SINTEF.

21) Scientific personnel include research scientists, research managers and research directors.

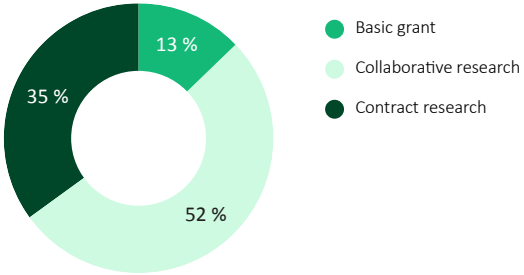
# SINTEF Digital

## Funding sources

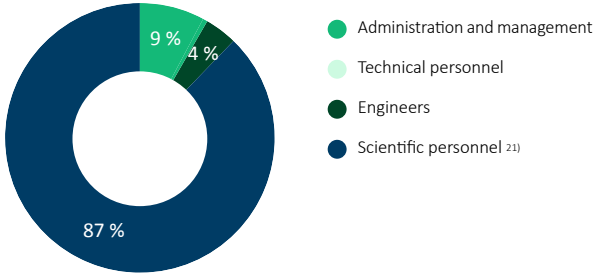
% of gross operating income



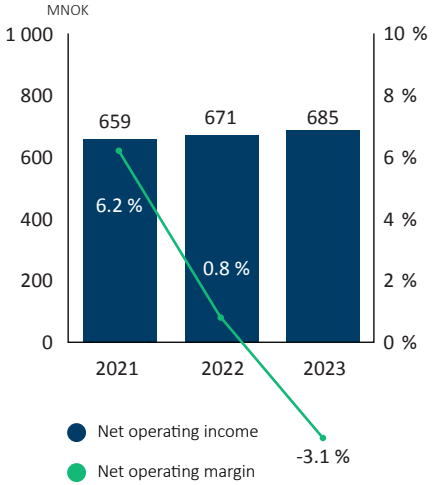

## Portfolio type



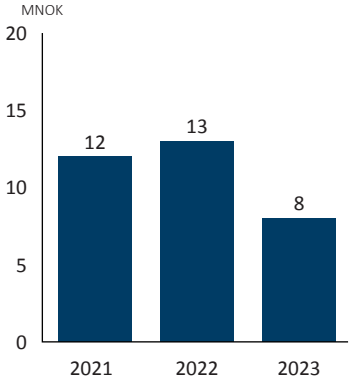

## Employees



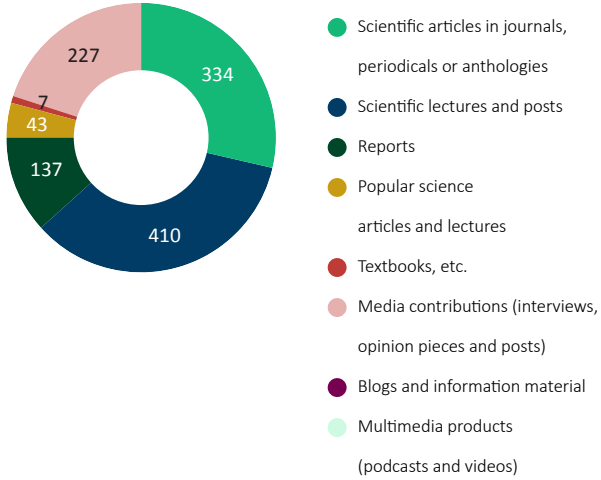

## Net operating income, net operating margin




## Investments in laboratories, scientific equipment and other research production equipment




## Publications and other dissemination



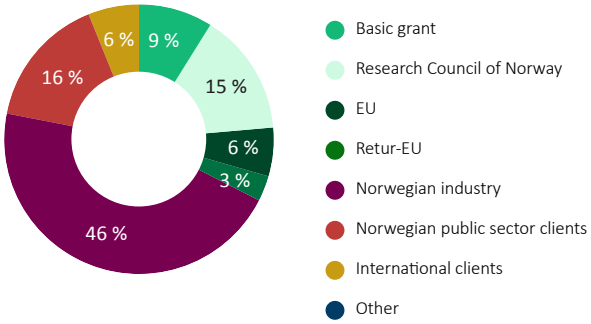

Sources: Publications; Cristin, other data (incl. publication data reports); SINTEF.

21) Scientific personnel include research scientists, research managers and research directors.

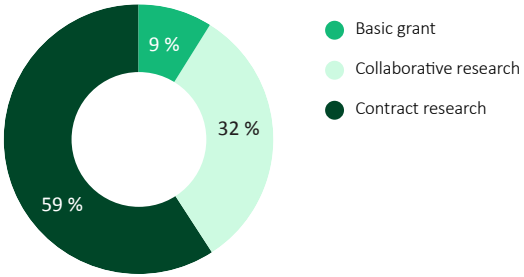
# SINTEF Community

## Funding sources

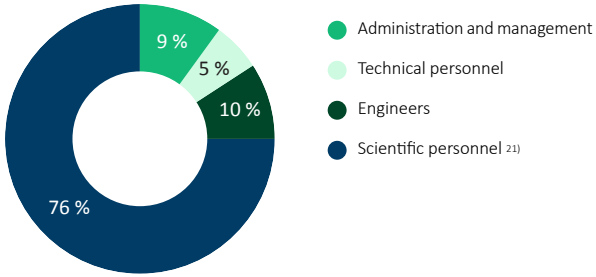
% of gross operating income



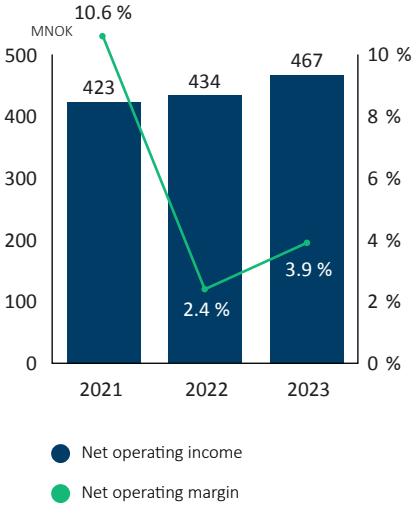

## Portfolio type



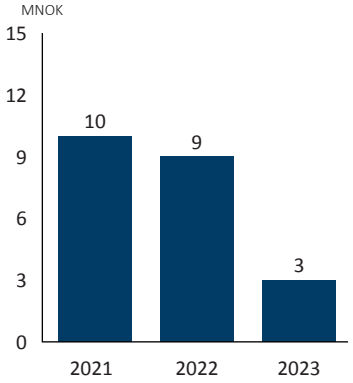

## Employees



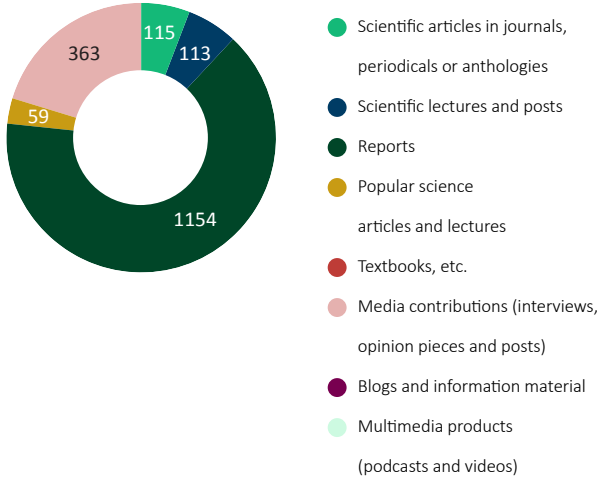

## Net operating income, net operating margin




## Investments in laboratories, scientific equipment and other research production equipment




## Publications and other dissemination



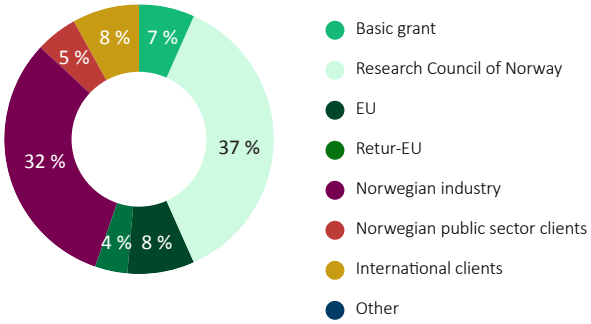

Sources: Publications; Cristin, other data (incl. publication data reports); SINTEF.

21) Scientific personnel include research scientists, research managers and research directors.

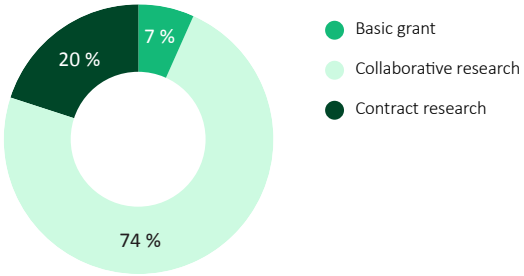
# SINTEF Energy Research AS

## Funding sources

% of gross operating income




## Portfolio type

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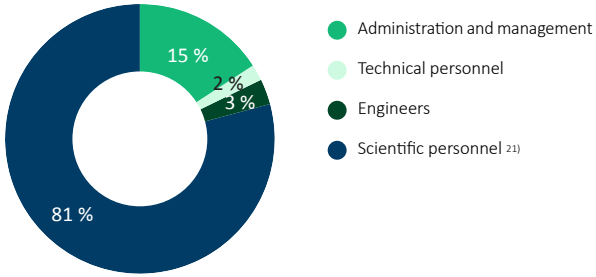
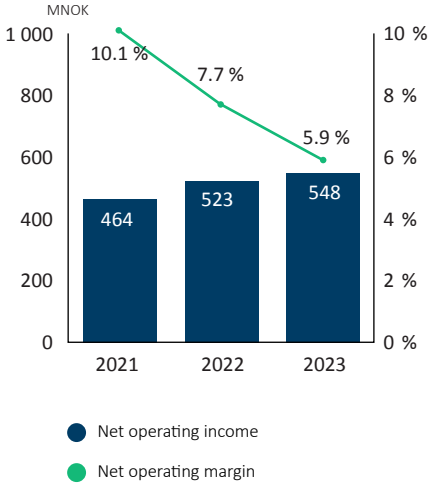
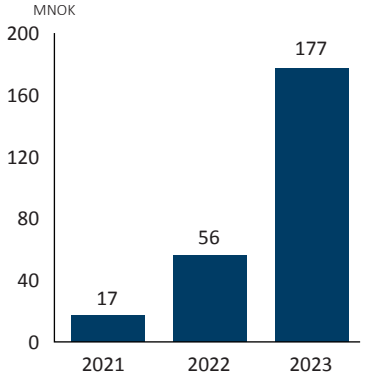


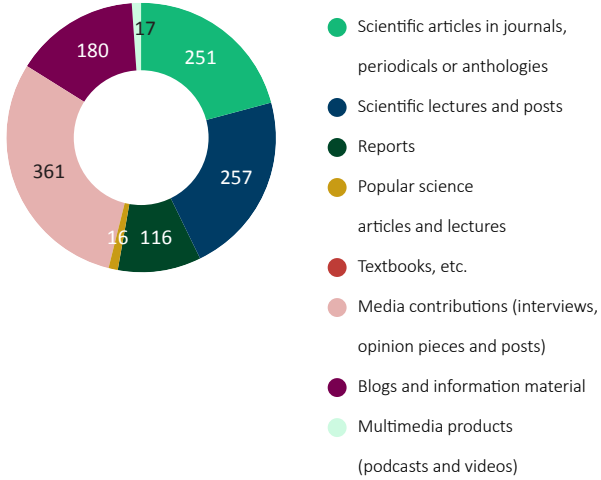

## Net operating income, net operating margin




## Investments in laboratories, scientific equipment and other research production equipment




## Publications and other dissemination



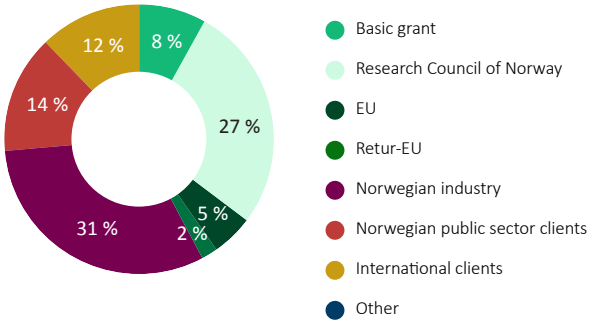

Sources: Publications; Cristin, other data (incl. publication data reports); SINTEF.

21) Scientific personnel include research scientists, research managers and research directors.

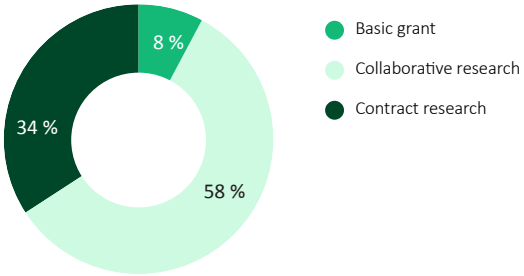
# SINTEF Ocean AS

## Funding sources

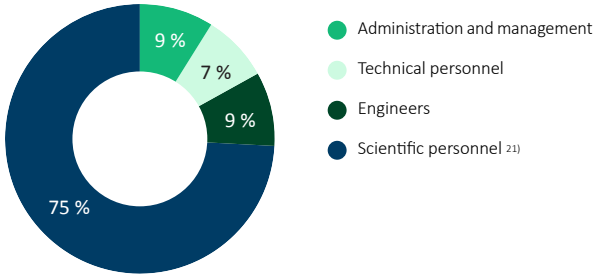
% of gross operating income



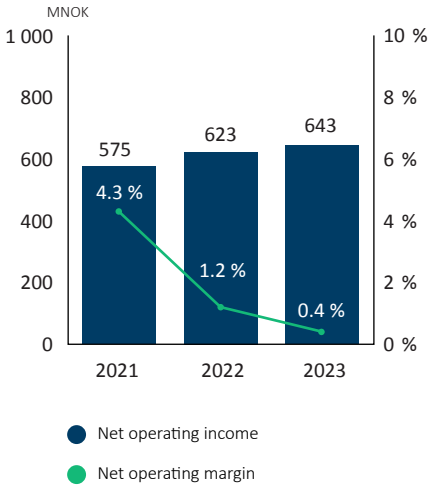

## Portfolio type



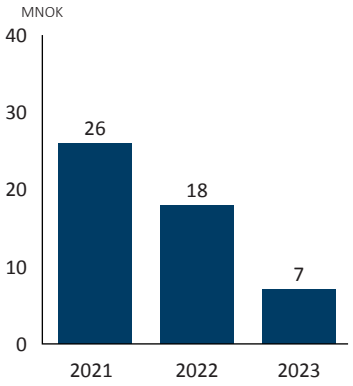

## Employees



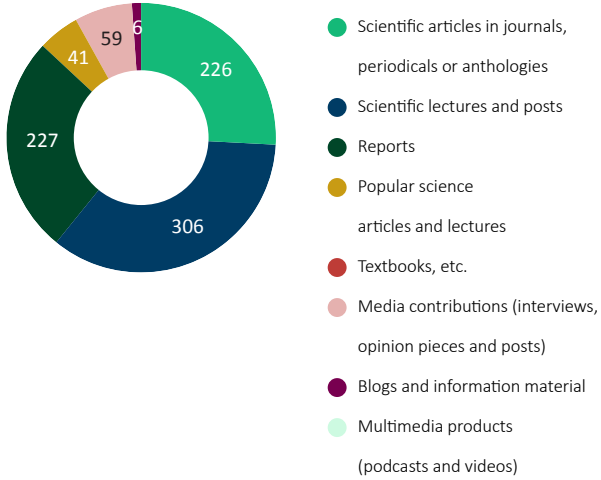

## Net operating income, net operating margin




## Investments in laboratories, scientific equipment and other research production equipment




## Publications and other dissemination



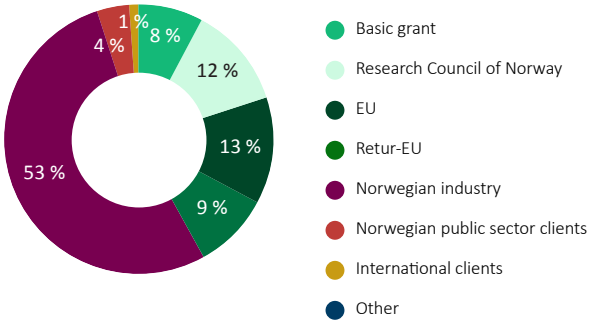

Sources: Publications; Cristin, other data (incl. publication data reports); SINTEF.

21) Scientific personnel include research scientists, research managers and research directors.

# SINTEF Manufacturing AS

## Funding sources

% of gross operating income

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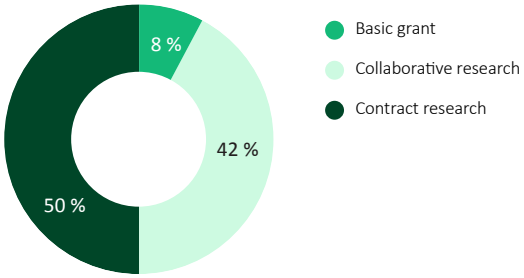
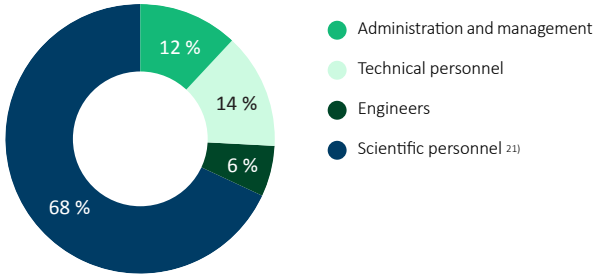
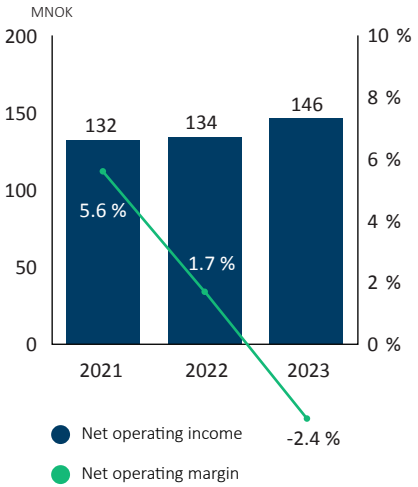


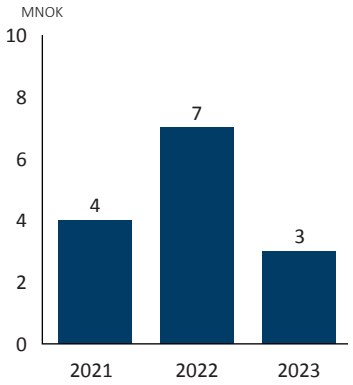

## Employees



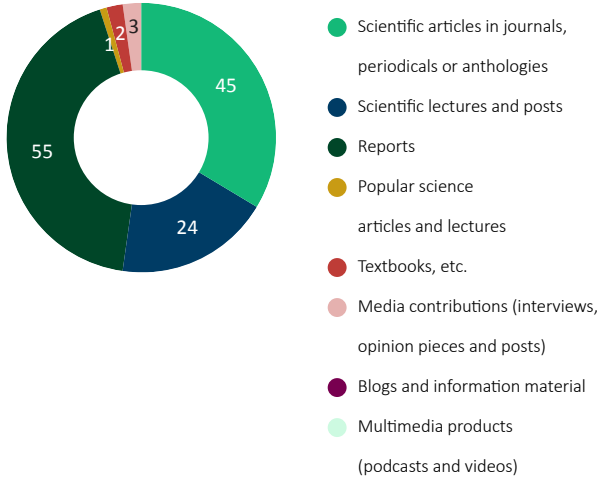

## Net operating income, net operating margin




## Investments in laboratories, scientific equipment and other research production equipment




## Publications and other dissemination




Sources: Publications; Cristin, other data (incl. publication data reports); SINTEF.

21) Scientific personnel include research scientists, research managers and research directors.

# Chapter 7

# The way forward

# The way forward for SINTEF's integrated annual report

This is SINTEF's second integrated annual report. We report on our financial performance, significant factors related to our research and innovation, and our operations. Like last year, the report provides references to the Global Reporting Initiative (GRI). We believe reporting can contribute to systematic improvement process and we are preparing for even more structured reporting in the years to come.

**The work on strengthening our non-financial reporting is driven by factors such as stricter requirements and standards for this**, not least due to the EU's Corporate Sustainability Reporting Directive (CSRD). The EU is establishing clear standards (European Sustainability Reporting Standards (ESRS)) that will help structure European companies' sustainability reporting. Even though the proposal for implementing the directive in Norwegian law states that foundations, such as SINTEF, are exempt from the obligation to report in line with the CSRD, it is clear to us that the standards will have such a broad area of impact, not least for our clients, that we nevertheless want to reflect the new standards in our reporting.

**Stronger reporting is also very much in line with our own sustainability ambitions**, which are underscored in SINTEF's updated strategy.

This deals with our vision of 'Technology for a better society', our commitment to the UN Sustainable Development Goals, and our own external analysis. In the world today, the initiatives necessary to solve the major crises are not materialising. Research and innovation are important components of the solutions, across the value chains. A greater effort and faster pace are needed, and we need to set a course and take measures that enable SINTEF to deliver an even greater impact, together with clients and partners.

Our sustainability ambitions must also set the direction for our operations. We are working to analyse the current situation as part of setting overall goals. The goals must be followed up with plans for appropriate measures related to the environment, social conditions and governance.

As sustainability characterises how we manage SINTEF and guides our strategy, we are currently planning to conduct a so-called 'double materiality analysis'. In this, we will, on the one hand, assess how sustainability factors impact us in terms of financial risks and opportunities, and on the other hand, assess how we impact our surroundings. Such an analysis plays a central role in the CSRD. A double materiality analysis will provide guidance on the material topics we should work and report on going forward.

# Chapter 8

# GRI Index

# GRI Index for 2023

The information in the GRI Index concerns the SINTEF Foundation during the period 1 January-31 December 2023 and refers to the current GRI standards. This report complies with the reporting principles in GRI 1: Foundation 2021.

| No. | Title | Response |
|---|---|---|
| | **GRI 2: General Disclosures** | |
| **1.** | **The organisation and its reporting practices** | |
| 2-1 | Organisational details | SINTEF<br>Foundation<br>Head office: Strindvegen 4, 7034 Trondheim<br>Norway |
| 2-2 | Entities included in the organisation's sustainability reporting | The following companies are included in the financial figures we report in the Integrated Annual Report:<br>The SINTEF Foundation and the following subsidiaries:<br>• SINTEF AS and the following subsidiaries: SINTEF Flowtech AS, SINTEF Narvik AS and SINTEF Helgeland AS.<br>• SINTEF Energi AS.<br>• SINTEF Ocean AS and the following subsidiaries: SINTEF Nord AS and SINTEF Ålesund AS.<br>• SINTEF Manufacturing AS.<br>• SINTEF Holding AS and the following subsidiaries: SINTEF TTO AS and SINTEF Venture AS (and the subsidiary SINTEF Venture III AS).<br>• SINTEF Eiendom Holding AS and the following subsidiary: Torgardsveien 12 AS.<br>• SINTEF Sustainability Accelerator Fund AS.<br>This applies to both the accounting figures themselves, but also to, for example, portfolio analyses, investments, carbon accounting, etc. The figures for energy and water consumption, properties and waste cover the buildings owned and managed by the SINTEF Foundation and SINTEF AS. Information on the proportion of gross turnover for research projects that contribute to the various SDGs comes from SINTEF's six research institutes (Industry, Digital, Ocean, Energy, Community and Manufacturing). |
| 2-3 | Reporting period, frequency and contact point | About the report<br>Contact person for the report: Ingrid Lundestad (ingrid.lundestad@sintef.no) |
| 2-4 | Restatements of information | 5.4 Climate, nature and environment/Carbon accounts 2023 61<br>The carbon accounts for 2023 use new calculation methods due to changes to the emissions factors for some emissions since 2022. |

| | | | |
|---|---|---|---|
| 2-5 | External assurance | The sustainability disclosures for 2023 have not been certified by an external auditor, although we are considering strengthening our reporting with external certification in the future. | |
| **2.** | **Activities and workers** | | |
| 2-6 | Activities, value chain and other business relationships | 1.1 An independent research foundation/Our institute structure ensures research strength and market relevance | 10–11 |
| 2-7 | Employees | 5.2 Safeguarding our employees and their rights/Our workforce | 57 |
| **3.** | **Governance** | | |
| 2-9 | Governance structure and composition | 6.1 Corporate governance | 71 |
| 2-10 | Nomination and selection of the highest governance body | 6.1 Corporate governance/The Board's responsibilities and composition | 72–74 |
| 2-11 | Chair of the highest governance body | 6.1 Corporate governance/The Board's responsibilities and composition | 72–74 |
| 2-12 | Role of the highest governance body in overseeing the management of impacts | 6.1 Corporate governance | 71 |
| | | 6.2 Risk management and internal control/Responsibilities | 75 |
| | | 6.3 Board of Directors' report for 2023/Strategy | 77 |
| 2-13 | Delegation of responsibility for managing impacts | 6.2 Risk management and internal control/Responsibilities | 75 |
| | | 6.3 Board of Directors' report for 2023/Strategy | 77 |
| 2-14 | Role of the highest governance body in sustainability reporting | The Board approves the Board of Directors' report for 2023, which describes SINTEF's strategy and sustainability work. | 79 |
| 2-15 | Conflicts of interest | 6.1 Corporate governance | 71 |
| 2-16 | Communication of critical concerns | 5.5 Ethics and integrity/Ethics, anti-corruption and good governance are operational prerequisites | 66 |
| 2-17 | Collective knowledge of the highest governance body | 6.3 Board of Directors' report for 2023/HSE, sustainability and ethics | 78–80 |
| 2-18 | Evaluation of the performance of the highest governance body | 6.1 Corporate governance/Other bodies | 74 |
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| 2-20 | Process to determine remuneration | 6.1 Corporate governance/The Board's responsibilities and composition | 74 |
| **4.** | **Strategy, policies and practices** | | |
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| | | 2.2 External analysis – world events influence SINTEF's direction | 21 |
| | | 2.3 SINTEF's strategic beliefs | 22 |
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| | | 6.2 Risk management and internal control/Framework and implementation | 76 |
| | | 6.3 Board of Directors' report for 2023/Risk management and internal control | 84 |
| 2-24 | Embedding policy commitments | 5.6 Compliance with laws and regulations | 69 |
| | | 6.2 Risk management and internal control | 75–76 |

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|---|---|---|---|
| 2-25 | Processes to remediate negative impacts | 5.5 Ethics and integrity/Ethics, anti-corruption and good governance are operational prerequisites | 66 |
| 2-26 | Mechanisms for seeking advice and raising concerns | 5.5 Ethics and integrity/Ethics, anti-corruption and good governance are operational prerequisites | 66 |
| 2-27 | Compliance with laws and regulations | 5.6 Compliance with laws and regulations | 69 |
| | | 6.2 Risk management and internal control | 75–76 |
| 2-28 | Membership associations | Skift | 3 |
| | | UN Global Compact | 12 |
| | | Confederation of Norwegian Enterprise (NHO) | 15 |
| | | Transparency International | 69 |
| | | European Energy Research Alliance (EERA) | 83 |
| | | European Association of Research and Technology Organisations (EARTO) | 83 |
| **5.** | **Stakeholder engagement** | | |
| 2-29 | Approach to stakeholder engagement | 1.2 Technology for a better society – our vision and strategy/Our main stakeholders | 15 |
| | | 3.2 Sustainability expertise – from ethics to good material choices | 29 |
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| | **GRI 3: Material Topics 2021** | | |
| 3-1 | Process to determine material topics | 4 SINTEF's research areas with the greatest sustainability impacts | 45 |
| | | 7 The way forward/The way forward for SINTEF's Integrated Annual reporting | 99 |
| 3-2 | List of material topics | 4 SINTEF's research areas with the greatest sustainability impacts | 45 |
| | | 5 Safeguarding sustainability in our internal operations | 53 |
| 3-3 | Management of material topics | 4 SINTEF's research areas with the greatest sustainability impacts | 46–51 |
| | **GRI 201: Economic Performance 2016** | | |
| 201-1 | Direct economic value generated and distributed | 6.5 Financial statements 2023 | 88–91 |
| 201-2 | Financial implications and other risks and opportunities due to climate change | 2.3 SINTEF's strategic beliefs | 22 |
| 201-4 | Financial assistance received from government | 6.5 Financial statements 2023 | 88 |
| | **GRI 205: Anti-corruption 2016** | | |
| 205-1 | Operations assessed for risks related to corruption | 5.5 Ethics and integrity/Responsible procurement | 67 |
| | | 5.6 Compliance with laws and regulations | 69 |
| | | 6.2 Risk management and internal control | 75–76 |
| 205-2 | Communication and training about anti-corruption policies and procedures | 5.6 Compliance with laws and regulations | 69 |
| | | 6.2 Risk management and internal control | 75–76 |
| 205-3 | Confirmed incidents of corruption and actions taken | 5.6 Compliance with laws and regulations | 69 |

| | | | |
|---|---|---|---|
| | **GRI 302: Energy 2016** | | |
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| 302-3 | Energy intensity | 5.4 Climate, nature and environment/Energy and water consumption, properties and waste | 63 |
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| | **GRI 305: Emissions 2016** | | |
| 305-1 | Direct (Scope 1) GHG emissions | 5.4 Climate, nature and environment/SINTEF cutting its operational emissions | 60–62 |
| 305-2 | Energy indirect (Scope 2) GHG emissions | 5.4 Climate, nature and environment/SINTEF cutting its operational emissions | 60–62 |
| 305-3 | Other indirect (Scope 3) GHG emissions | 5.4 Climate, nature and environment/SINTEF cutting its operational emissions | 60–62 |
| 305-4 | GHG emissions intensity | 5.4 Climate, nature and environment/SINTEF cutting its operational emissions | 60–62 |
| 305-5 | Reduction of GHG emissions | 5.4 Climate, nature and environment/SINTEF cutting its operational emissions | 60–62 |
| | **GRI 401: Employment 2016** | | |
| 401-1 | New employee hires and employee turnover | 5.2 Safeguarding our employees and their rights/Our workforce | 56 |
| 401-3 | Parental leave | 5.2 Safeguarding our employees and their rights/Parental leave | 57 |
| | **GRI 403: Occupational Health and Safety 2018** | | |
| 403-1 | Occupational health and safety management system | 5.1 HSE is a top priority | 55 |
| 403-2 | Hazard identification, risk assessment, and incident investigation | 5.1 HSE is a top priority | 55 |
| 403-3 | Occupational health services | 5.1 HSE is a top priority | 55 |
| 403-4 | Worker participation, consultation, and communication on occupational health and safety | 5.1 HSE is a top priority | 55 |
| 403-5 | Worker training on occupational health and safety | 5.1 HSE is a top priority | 55 |
| 403-6 | Promotion of worker health | 5.1 HSE is a top priority | 55 |
| 403-9 | Work-related injuries | 5.1 HSE is a top priority | 55 |
| 403-10 | Work-related ill health | 5.2 Safeguarding our employees and their rights/Sickness absence | 57 |
| | **GRI 404: Training and Education 2016** | | |
| 404-2 | Programmes for upgrading employee skills and transition assistance programmes | 5.2 Safeguarding our employees and their rights/Upskilling/training | 57 |

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| | **GRI 405: Diversity and Equal Opportunity 2016** | | |
| 405-1 | Diversity of governance bodies and employees | 5.3 Striving for equality and diversity | 58–59 |
| 405-2 | Ratio of basic salary and remuneration of women to men | 5.3 Striving for equality and diversity/Gender balance | 58 |
| | | SINTEF's gender equality report | |
| | **GRI 414: Supplier Social Assessment 2016** | | |
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