SINTEF supports the Sustainable Development Goals

# Annual and Sustainability Report 2022

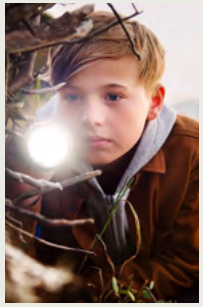
SINTEF

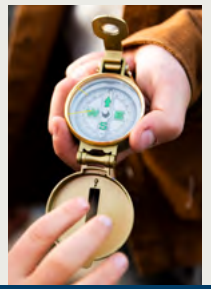













Technology for a better society

# Transition and sustainability research

Photo: Terje Trobe/SINTEF

**2022 will always be remembered as the year Russia brutally invaded Ukraine and inflicted great suffering on its people. The war has also had repercussions for energy supplies, commodity prices, value chains and security across large parts of the world. Given this, SINTEF has been particularly concerned with understanding the risk picture and, not least, identifying how we can help ensure the security of supply of important resources society needs, while being a driving force behind an even more aggressive digital and green transition.**

2022 was also a turbulent year in Norwegian research, although SINTEF managed to achieve an acceptable financial performance. I am pleased that this year, for the first time, we are publishing SINTEF's annual report and sustainability report as a single, combined report. This is a logical step since research, innovation, sustainability, economics and good corporate governance are closely intertwined. That is not just true in society in general, it is also true in SINTEF's strategy and day-to-day operations.

SINTEF's vision is 'Technology for a better society', and our strategy is based on the UN Sustainable Development Goals (SDGs). Our main missions are to work for the common good and develop competitiveness: partly by actively linking the international research front to client needs, partly by creating new businesses and partly by making a wide range of outstanding research environments and advanced laboratories available to meet the needs of our approximately 3,500 clients, large and small.

SINTEF's activities largely involve research and innovation, which we contribute in order to trigger a digital, green, circular and economically sustainable transition – together with clients from many sectors of society. This report shows that more than 95 per cent of our income in 2022 was linked to specific SDGs. This shows that sustainability is at the core of SINTEF's activities. Nevertheless, we have a long way to go before sustainability is an integral element of all of our projects.

This report also covers the results of our work aimed at improving the sustainability of our own activities. I am pleased that in 2022 we managed to both start and complete major investment projects that will reduce energy consumption, reuse old buildings, improve our indoor climate and, at the same time, take good care of the natural assets and cultural heritage sites around us.

This report sheds light on a number of dilemmas. Many of the clients we work with have operations that will require major changes in order to achieve sustainable development. For example, their production processes may involve substantial greenhouse gas emissions. In these circumstances, our job is to contribute to better processes and solutions, which will hopefully contribute to a faster transition.

We also face dilemmas where our research may contribute positively to one SDG, but risks having an adverse impact on sustainability elsewhere. Therefore, we often need to reflect on the impact our activities have from an ethical point of view and consider which solutions and technologies we should promote. This report describes examples of some of these dilemmas.

It is clear to us that research and innovation policies are now increasingly taking on geopolitical dimensions. The authorities in countries and regions such as the US and the EU are stepping up their efforts. Not only to stimulate a digital green transition and to protect critical value chains, but also to improve our competitiveness. This development, or race if you will, could have a positive impact on the global community's overall ability to solve the climate crisis.

The international change of pace in the digital green transition is a challenge for us in Norway. At the time of writing, I am concerned about whether the Norwegian authorities are organising their research investments in a way that triggers sufficient effort in the value chain from research to the adoption of innovative solutions. I believe that the funds can be spent more effectively, such that they make a difference in those areas where Norwegian industry and Norwegian expert environments can contribute sustainable solutions and develop more sustainable Norwegian industry in the future.

As an independent foundation that constantly needs to invest in order to renew itself, SINTEF has to be well run. SINTEF invests its entire surplus back into its activities. We invested NOK 248 million in laboratories, buildings and scientific equipment in 2022. One major milestone was starting construction of the Norwegian Ocean Technology Centre (formerly the Ocean Space Centre). Funded by the state and SINTEF's own investment, this will be one of the world's most advanced facilities for marine and maritime research and education.

Research into, and for, industry is an area in which Norway lags behind many other countries. I am pleased that the government has announced a review of the research system and a strategy for increasing industry's research efforts to 2 per cent of GDP. We need to boost schemes that promote collaborations between companies and research in order to achieve the necessary transition.

Alexandra Bech Gjørv, CEO

# Contents



About the report: This is SINTEF's first integrated annual and sustainability report and was published in May 2023. The report covers 2022. All of the figures in the report are from 2022, unless otherwise stated. The sustainability data has not been certified by an external auditor. 2022 is the first year we have reported in line with the Global Reporting Initiative (GRI) standard. The work on the report for 2022 has been used as a learning process. A decision will be made on whether we will continue to report in line with the GRI standard, as well as whether certification is required, as part of the reporting process for 2023.

# Key metrics

| | 2022 | 2021 | Development |
|---|---|---|---|
| **IMPACT: Contribute to the common good and competitiveness by realising the UN Sustainable Development Goals (SDGs)** | | | |
| Proportion of SINTEF's gross operating income related to various SDGs[1)] | 96% | 92% | ● |
| Overall knowledge dissemination[2)] | 6 157 | 6 128 | ● |
| Annual investment in SINTEF spin-offs (million NOK)[3)] | 896 | 672 | ● |
| **CLIENTS: Co-create with clients and link the research front to their needs** | | | |
| Number of clients | 3 217 | 3 220 | ● |
| Client satisfaction (scale 1 to 5)[4)] | 4.56 | 4.53 | ● |
| **RESEARCH: Drive forward outstanding research environments and infrastructure and create new industries** | | | |
| Scientific publications per research scientist per year | 0.75 | 0.88 | ● |
| Number of EU participations[5)] | 87 | 39 | ● |
| **PEOPLE: Develop SINTEF as an attractive, innovative and efficient organisation** | | | |
| Number of employees | 2 185 | 2 166 | ● |
| Proportion of women (all employees) | 36% | 37% | ● |
| Proportion of employees proud to work at SINTEF[6)] | 82.9% | 82.7% | ● |
| **WELL RUN: Build trust and financial room for manoeuvre** | | | |
| Gross operating income (million NOK) | 4 050 | 3 744 | ● |
| Net operating income (million NOK) | 3 440 | 3 248 | ● |
| Equity ratio (%) | 49% | 55% | ● |
| Operating margin | 3.7% | 8.2% | ● |
| Total emissions (tCO2e)[7)] | 23 572 | 20 142 | ● |

● Positive development

● Stable

● Negative development

Sources: Number of EU participations: Cordis, Proportion of employees proud to work at SINTEF: SINTEF Working Environment Survey, Total emissions: MoreScope. Other data: SINTEF.

1) Proportion of gross operating income in research projects at SINTEF's six institutes tagged with the various SDGs, with up to three SDGs tagged per project.
2) Overall knowledge dissemination includes all publications (including dissemination) via all channels.
3) In 2022, 7.5 per cent came from SINTEF Venture and 92.5 per cent from co-investors.
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. Where multiple SINTEF institutes have been awarded funding in the same project, this is counted as multiple participations. eCorda is the official source for EU reporting, and the Research Council of Norway uses an intermediate update of eCorda dated 5 December as a basis for its for its news. Because of the limited data available via eCorda for the full year 2022 at the time of reporting, Cordis has been used as a source. The Cordis figures were updated as of 31 December 2022.
6) Percentage of SINTEF's employees who agreed or strongly agreed with the statement "you are proud to work at SINTEF".
7) Total Scope 1, 2 and 3 emissions.

# Chapter 1

# This is SINTEF

Photo: Berre/SINTEF

# 1.1 An independent research foundation

**SINTEF is an independent, not-for-profit research foundation. SINTEF is the largest research foundation in Norway and one of the largest in Europe. SINTEF's institutes carry out research and innovation projects for, and with, industry in Norway and abroad, with an emphasis on applied research.**

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 North, SINTEF Ålesund, SINTEF Narvik and SINTEF Helgeland, as well as SINTEF TTO, which carry out commercialisation activities and manage the ownership of start-ups. SINTEF's head office is in Trondheim, where the largest group of its employees work. We also have substantial activities in Oslo and Raufoss, as well as a presence throughout Norway, a laboratory in Hirtshals and an office in Brussels.

SINTEF has a wide range of laboratories that are used by its research scientists, clients and other partners for research, testing and prototype and verification work. The laboratories are an important contribution to Norway's national research infrastructure.

SINTEF is a broad, multidisciplinary research foundation with internationally leading expertise in technology, the natural sciences and the social sciences. SINTEF carries out research as an R&D partner of industry and the public sector and is one of the largest organisations that carries out contract research in Europe. We are by far the largest Norwegian participant in EU research programmes.

Our research is intended to facilitate the transition to a sustainable society. You can get a taste of SINTEF's current research by listening to our podcast 'Smart forklart' – although you risk becoming a little wiser and having a little more faith in the future.

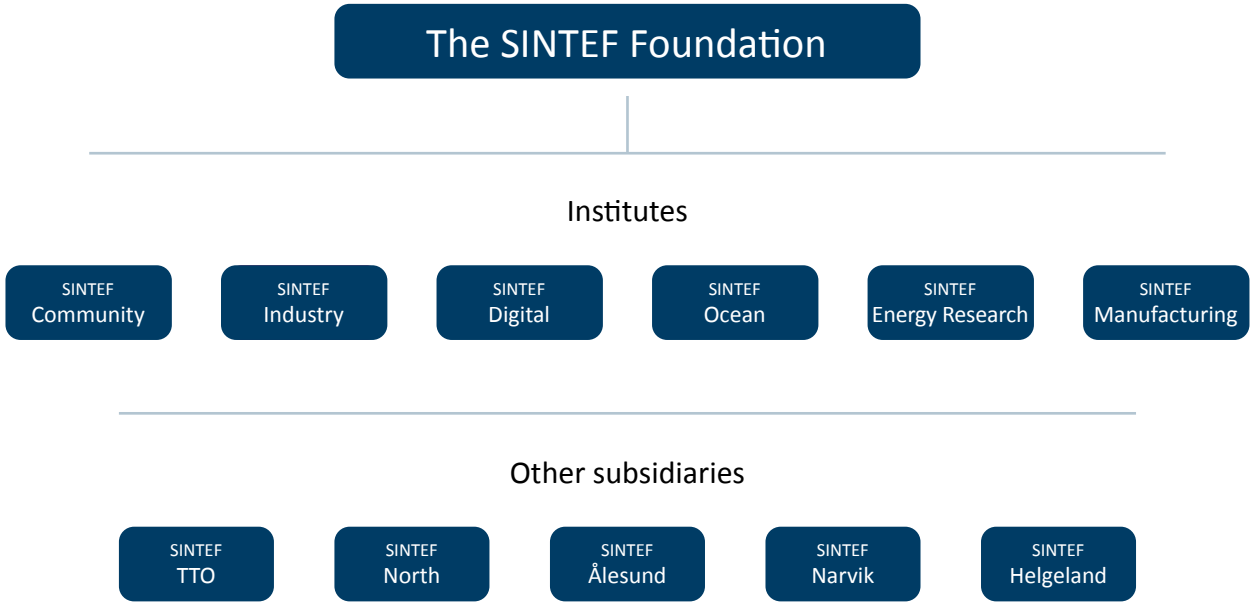




Photo: Karoline Ravndal Lorentzen/SINTEF

# SINTEF's institute structure ensures market relevance and research strength

## Energy Research

SINTEF Energy Research designs the innovative, sustainable energy solutions of the future. We offer leading research-based knowledge, nationally and internationally, in order to provide clients with solutions and services that add value. SINTEF Energy Research offers world-leading energy research and laboratories in order to support the SDGs. Our initiatives contribute to the transition to, and realisation of, the sustainable energy system of tomorrow: smart grids, transmission, integrated energy systems, offshore wind, energy efficiency, CCS, hydropower, bioenergy, hydrogen and zero emission transport.

## Manufacturing

SINTEF Manufacturing collaborates with clients on sustainable and competitive production solutions for the future. Our ambition is to be a world leader in industry-oriented research in the area of manufacturing technology. We have expertise in fields such as advanced materials technology, robotics and automation, productivity and value chains, additive manufacturing (3D printing), industry 4.0 and the circular economy in relation to industrial production. We contribute value to clients and society through research, research-based advice 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 SDGs.

## 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 artificial intelligence 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 the best solutions for ensuring 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.

## Ocean

SINTEF Ocean works on research and innovation in the ocean space for national and international industry. Our ambition is to maintain Norway's leading position in marine technology and biomarine research. Together with industry and the authorities, we develop future-oriented solutions for the sustainable utilisation of ocean space. The institute thereby plays an important role in supporting and contributing to the transition in areas where Norway enjoys a leading position, and in delivering solutions to challenges, nationally and globally. The green transition will require significant restructuring, which in turn will require knowledge and innovative solutions. Our market areas are food, energy, the environment and transport. The institute's main activities consist of industry-oriented projects throughout the biomarine and maritime value chain, as well as oil/gas and the climate/environment.

## Industry

SINTEF Industry is facilitating the sustainable industry of the future. With our multidisciplinary knowledge base, advanced laboratories and outstanding science in close co-creation with clients and partners, we develop multidisciplinary solutions that have a major impact on society across a wide range of commercial and research fields. These result in climate-neutral production in existing and new value chains for the products and services that a sustainable society needs. We do this by developing new solutions, including within the circular economy, batteries, hydrogen, CCUS, materials, nano and process technology, nanomedicine, solar, wind, biotechnology, metal production, low-emission energy production and sustainability analyses.

## Community

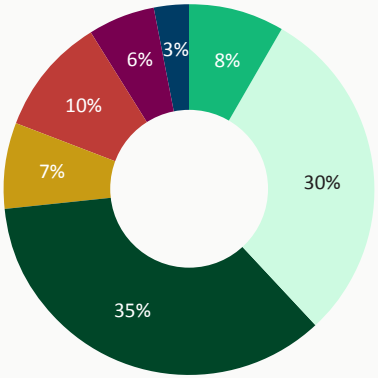
SINTEF Community works on the sustainable development of buildings, infrastructure and mobility. We create value for our clients and society through research and development, research-based consulting, certification and knowledge dissemination. We have expertise in fields such as architecture, buildings, materials, water and public transport, and work on future solutions for the built society in which people meet, live and work, and within which we move from one place to another. We aim to be a pioneer in the development of a sustainable society via climate change adaptation, the circular economy and digitalisation.

# 1.2 Key figures 2022


Photo: Berre/SINTEF

## 92% of income comes from open competitions

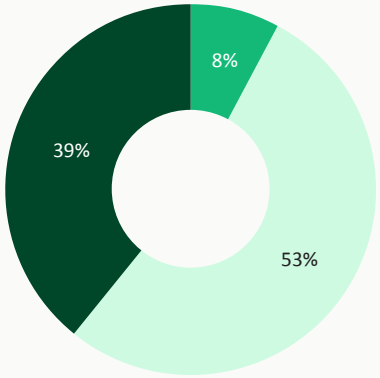
Funding sources as a percentage of gross operating income




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

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

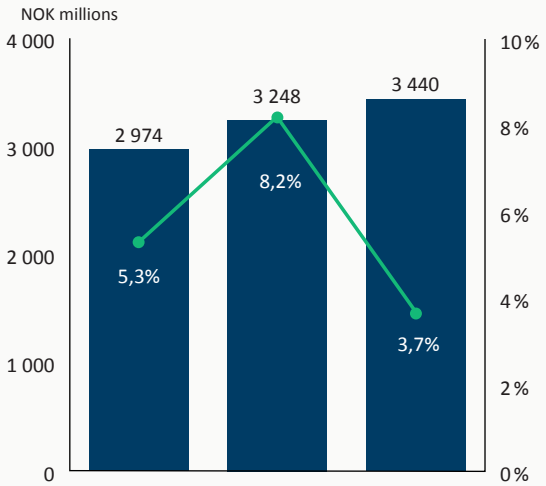
Portfolio type




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

## We have seen good growth in net operating income in recent years

Net operating income
Net operating margin



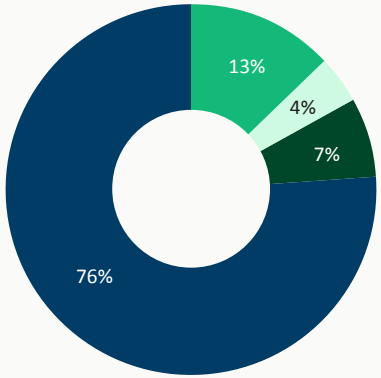

- Net operating income
- Net operating margin

Source: SINTEF

8) The ordinary basic grant is 8 per cent. 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 personnel – of these 61% have a PhD

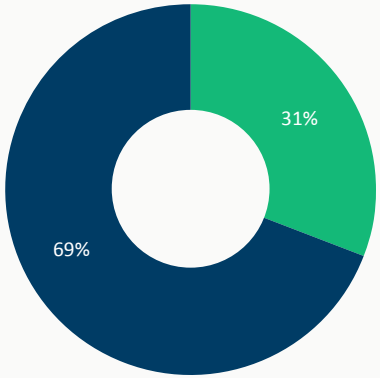
Employees




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

## 31% of SINTEF's employees are from abroad – from 81 different countries

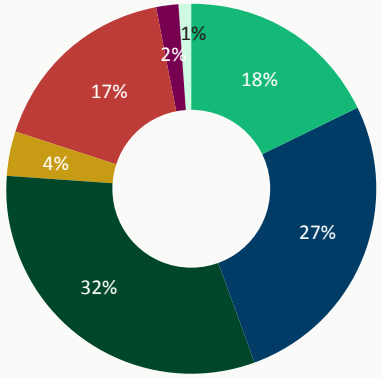
International diversity




- Foreign employees
- Norwegian employees

## We contribute with knowledge – more than 1 100 articles and 1 950 reports published

Publications and dissemination




- Scientific articles in journals, series or anthologies
- Scientific lectures or posts
- Reports
- Popular science articles and talks
- Media contributions (interviews, opinion pieces and contrib.)
- Blogs and information materials
- Multimedia products (podcasts and videos)

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

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

# Chapter 2

# How we work for the common good and develop competitiveness

Photo: Karoline Ravndal Lorentzen/SINTEF

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

Given the major changes that were taking place in the world in 2022, we started a process to update SINTEF's corporate strategy from 2019. This will be completed during the course of 2023.

Our corporate strategy is guided by the UN Sustainable Development Goals (SDGs). The SDGs clarify SINTEF's vision. This expands the obligations we have had as a member of the UN Global Compact since 2009.

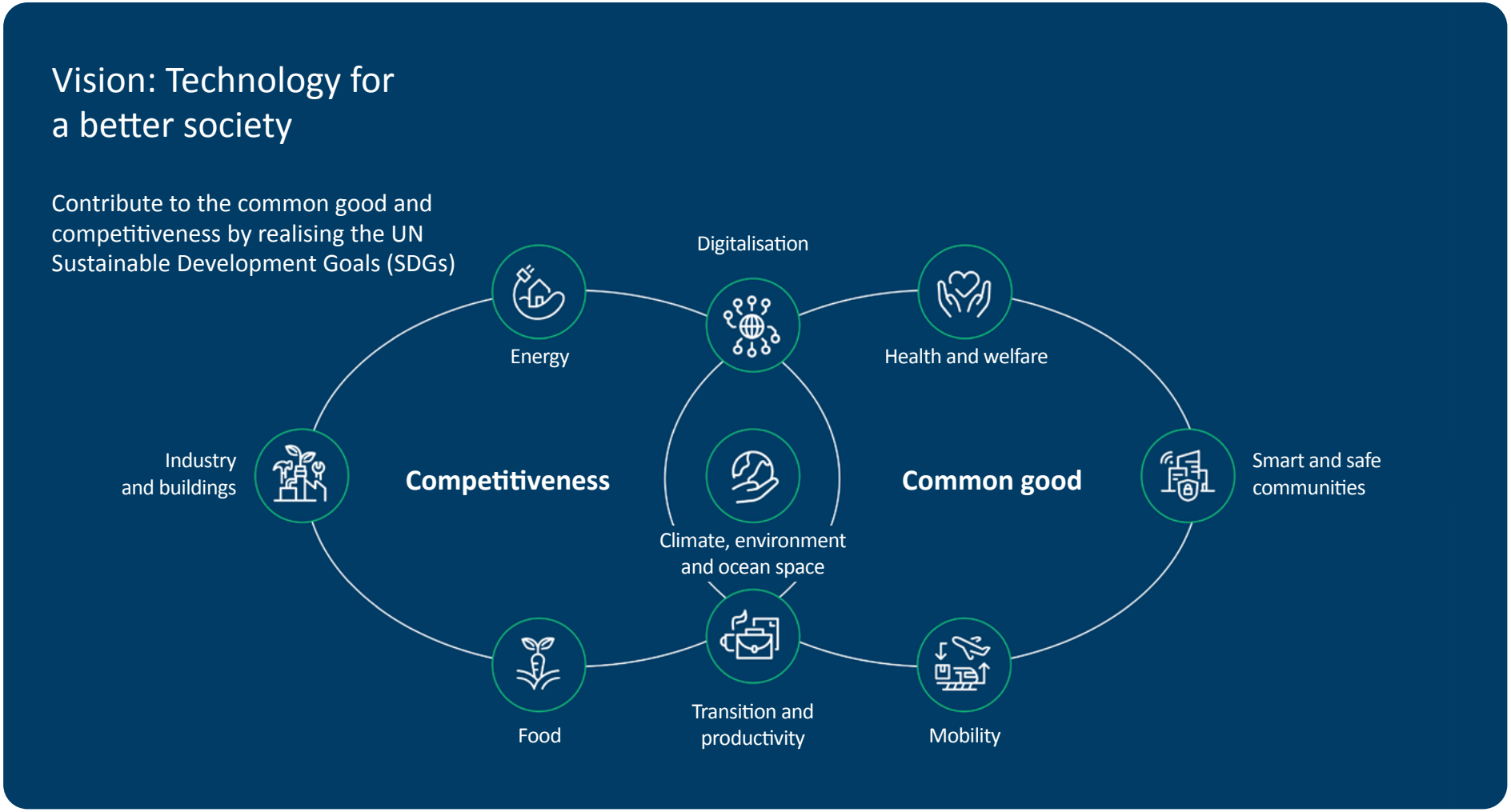
The seventeen SDGs specify what we and the world have to achieve in the work on creating a better society.

In our updated strategic vision, our top priority is our impact on the world around us: contributing to the common good and competitiveness by realising the SDGs. To achieve this, we need to co-create with clients and drive forward outstanding research environments, infrastructure and new activities. Our strong organisation and good corporate governance allow us to take on such a role.

### SINTEF's strategic vision

As a research foundation, SINTEF is involved in a very large number of value chains, sectors and areas of expertise, with an emphasis on sectors in which technological solutions play an important role. This breadth means that we want to deliver on the entire sustainability agenda, and we have in our corporate strategy committed ourselves to all seventeen SDGs. At the same time, SINTEF clearly delivers significantly more in relation to some SDGs than others, which is also partly a result of where research funds are targeted.

In our corporate strategy, we prioritise nine strategic areas where we can deliver 'Technology for a better society', as illustrated below. It is through these areas that we try to work for the common good and improve competitiveness.



We have also focused on specified areas where we believe SINTEF can play a major role in the digital green transition by collaborating across fields. These 15 corporate initiatives are: 'global sustainable development', 'circular economy', 'new climate-positive measures', 'wind and sun', 'batteries', 'hydrogen', 'food and agri', 'climate-neutral and smart cities', 'biodiversity', 'manufacturing', 'societal security, 'health and welfare', 'EU boost', 'mobility' and 'digitalisation'. The corporate initiative 'global sustainable development' was officially established at the start of 2023. The figure below illustrates SINTEF's portfolio of corporate initiatives as of May 2023.

Besides this, all six of SINTEF's institutes have priority research areas that hone our main contributions to society, clients and the world of research. Examples of these include 'offshore wind', 'energy efficiency', 'climate change adaptation', 'industrial cybersecurity', 'nanomedicine' and 'sustainable health services'.

## Corporate initiatives as of May 2023

We are carrying out these fifteen green digital initiatives because they allow for multidisciplinary boosts that provide fertile ground for innovation

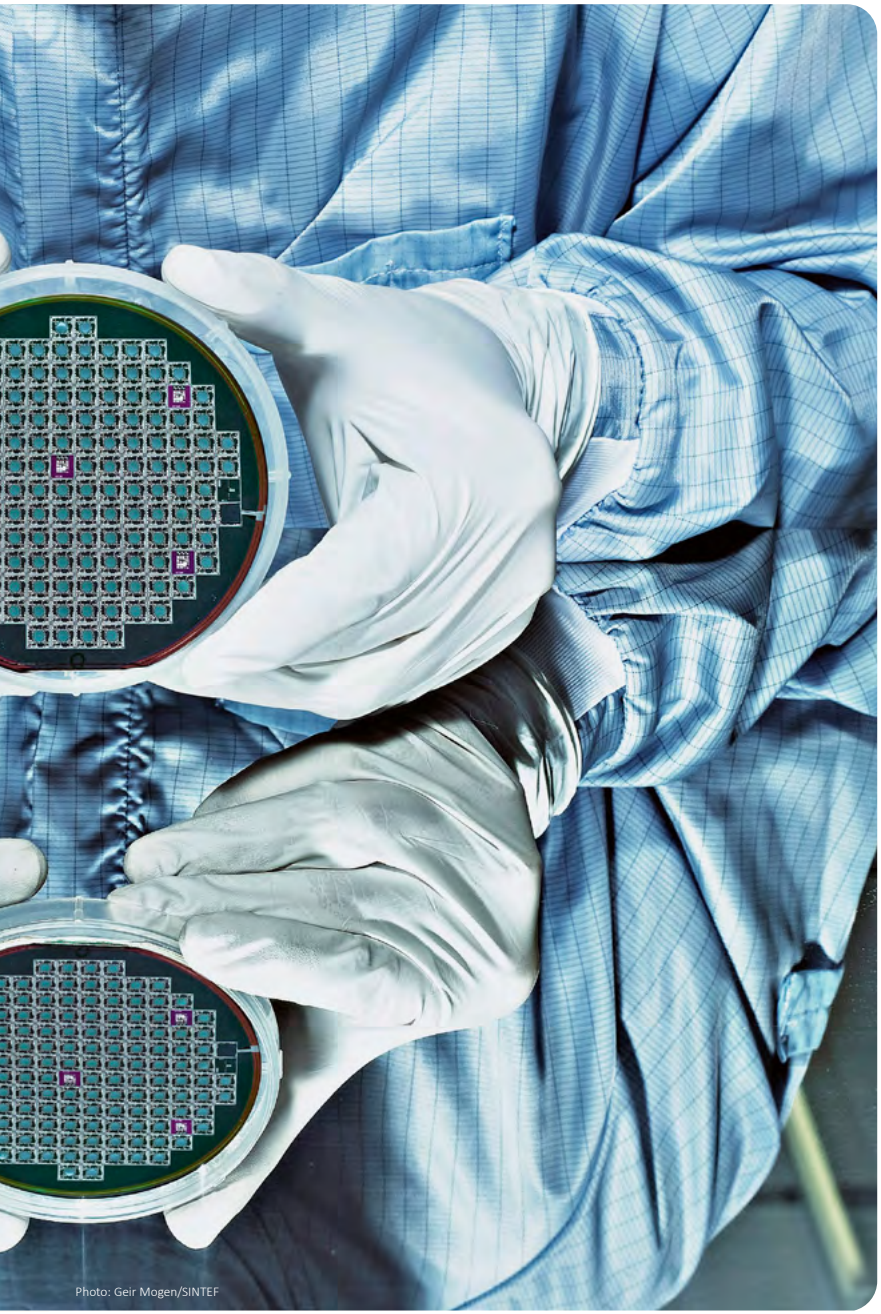


Photo: Geir Mogen/SINTEF

# 2.2 A brief look at SINTEF's 2022

## Solar cell waste becomes solar cells

A third of the silicon needed to produce solar cells is lost in the process as a black dust. However, this former waste is now being turned into new solar cell materials in SINTEF's lab.

## Nanomedicine to fight cancer

By encapsulating chemotherapy in nanoparticles, entrepreneurs from SINTEF aim to develop a more effective treatment for peritoneal cancer. The spin-off NaDeNo will complete the solution and take it to market. The entrepreneurs are backed by our commercialisation company SINTEF TTO.

## CO2 from flue gas captured by supermembrane

After almost six years of research, research scientists have succeeded in creating a membrane that can capture CO2 in an entirely new way. This resulted in a prestigious mention in the research magazine Science.

## Rebuilt ship 'handpicks' shells

Over the next few years, a selective water pumping system from Norway will prove that more of the food resources on the seabed can be harvested without harming vulnerable marine ecosystems.

## Algorithms reduce energy consumption

When we tested smart control algorithms in an office building in Trondheim last autumn, energy consumption from heating fell by 10-15 per cent, while users kept rooms at their desired temperature.

Photo: Berre/SINTEF

## Floating solar power next for the North Sea

Work is underway to develop a protective system that will make floating solar farms possible in harsh waters such as the North Sea.

## Making car production greener

Promising results for a new Norwegian technology pave the way for eliminating an entire step in car component production, making car production cheaper, faster and greener.

## Laboratory wins prestigious award

The Norwegian National Award for Outstanding Build Quality went to the Norwegian University of Science and Technology (NTNU) and SINTEF's ZEB Laboratory. The theme for this year's award was climate change adaptation. The winner is a climate-adapted zero emission building that demonstrates how buildings can free up energy for other uses.

## Young people see us as their dream employer

Young people think SINTEF is the most attractive employer in Norway according to a recent index from the recruitment agency Academic Work. These talented young Norwegians have only ever ranked a Norwegian employer the most attractive once before.

## Aquaculture plastic has long been unrecyclable

This puzzle has finally been solved. Design, materials and production specialists need to work together to ensure that used materials can be reincarnated as high-quality products.

## Ocean Technology Centre breaks surface

In autumn 2022, work started on the site of the Norwegian Ocean Technology Centre in Trondheim, which will secure Norway's position as a top maritime research nation.

# 2.3 How we create value for our clients

*SINTEF is a strategic research partner within both aluminium and the energy sector. We have had a solid, trusting partnership for many decades and benefit from SINTEF's broad and cutting-edge expertise as a supplement to our own research activities.*

Hans Erik Vatne
Chief Technology Officer, Norsk Hydro

*SINTEF Ocean's position as a world-leading research institute with laboratories and test facilities enables industry to develop new sustainable solutions that the world needs.*

Gard Ueland
President/CEO, Kongsberg Seatex


Photo: m.c.herzog/visuals-images

*SINTEF is a key research partner for us in developing world-class, sensor-based sorting solutions. We have worked with them for more than twenty years in an extremely successful way.*

Volker Rehrmann
Executive Vice President,
Head of Tomra Recycling

*SINTEF has been Elkem's most important R&D partner for many decades. We have traditionally collaborated on research into materials technology and metallurgy, although in the last ten years this has broadened in scope to include energy efficiency, sustainability and digitalisation. SINTEF will play an important role in Elkem's efforts to achieve carbon-neutral silicon alloy production by 2050.*

Asgeir Valderhaug
Research Director, Elkem ASA

*At the ZEB Laboratory in Trondheim, research scientists have developed acoustic flooring made of cross laminated timber and compact timber-framed roofs with smart vapour barriers in partnership with Veidekke, which was also the contractor on the project. Veidekke has used several of the solutions in new projects. It is always fun to bring partners here and show what can actually be achieved in buildings.*

Trygve Karlsen
Head of Department, Veidekke


*Torrential rain is becoming an ever increasing challenge, and permeable surfaces can be part of the solution. A research project with SINTEF and NTNU was the start of the innovation process at Vikaune Fabrikker. Asak Miljøstein and Snøhetta have developed a new product based on the knowledge gained from this project. The Asak Flyt concept provides a unique opportunity to create beautiful and innovative outdoor surfaces that can at the same time handle huge volumes of surface water.*

Ellen H. Schumann
Marketing Manager,
Asak Miljøstein

*SINTEF is our key research partner in our work on developing new products and effective solutions for the global and combined climate, environmental and resource crisis. At SINTEF, we find a wide range of highly skilled professionals with the experience and willingness to take new approaches, and with access to a crucial range of laboratories and modelling tools.*

Odd-Geir Lademo
CEO, Ocean GeoLoop

*SINTEF has contributed to a multidisciplinary Nordic Additive Manufacturing (NAM) team by qualifying production in additive manufacturing. The collaboration helped us master complex and innovative geometries for demanding clients in the oil/gas and maritime industries and enabled faster development than what NAM could have managed alone. This new expertise opens up new markets and increases the potential for a sustainable industry within additive manufacturing.*

Tor Henning Molstad
Executive Chair
Nordic Additive Manufacturing AS

*SINTEF Ocean has for many years been an important partner for us on our journey towards developing a new and sustainable Norwegian industry based on seaweed cultivation. Through our collaboration, we have increased our expertise in biology and production technology, expanded our network and established new collaborative projects and financing opportunities. We look forward to further good collaboration in order to develop this green, future-oriented industry.*

Ole Christian Norvik
CEO, Seaweed Solutions

*ABB Electrification Norway AS in Skien manufactures gas insulated switchgears for the global market. These have traditionally been based on SF6 gas. Because SF6 is an extremely intense greenhouse gas, a significant effort has been made to develop SF6-free switchgears in order to reduce the use of greenhouse gases. SINTEF Energy has over the last decade contributed to ABB's R&D efforts on switchgear technology. These projects have successfully contributed to technical solutions that are now being implemented in products by ABB.*

Elham Attar
R&D Team Leader, ABB Electrification Norway AS

Photo: Getty Images

*Tunable AS is a spin-off company that emerged from SINTEF's research into optics, micro-technology and nanotechnology. The company was established on the basis of optical micro-chips that 'see' molecules in a gaseous state. Its solutions control emissions to air and 'see' gases that contribute to global warming. Since the microchips are programmable, the product range is now expanding to see a range of the other gases around us – to ensure the use of cleaner energy, sustainable consumption and fresh air.*

Kristian Hovet
CEO, Tunable AS

*During our long-term collaboration with SINTEF in Plasto and Wonderland we have used their expertise/research within the companies' context and development. Knowledge and insights have enabled us to make better choices with regard to methods, processes and investments. By ensuring that we are up to date when we make decisions, we create safe, interesting and stimulating workplaces. The collaboration within the knowledge development process generates business opportunities that result in innovation and earnings.*

Lars Stenerud
CEO, Plasto AS and Wonderland AS

Photo: Wonderland


Photo: Thor Nielsen/SINTEF

# 2.4 News 2022: Energy and civil protection

## 2.4.1 Energy

The President of the European Commission, Ursula von der Leyen, put climate change at the top of the agenda when she took office in 2019. She immediately followed this up with the European Green Deal and a series of policy memos, which were in turn followed up with the 'Fit for 55' policy package. This is a plan for the revision of regulations, directives and a new Taxonomy for green investments, which will also apply to Norway via the EEA Agreement. It is accelerating major changes in the energy system, a topic that was high on the agenda of SINTEF's research scientists at the start of 2022. Since the cross-party agreement on climate policy in 2009, SINTEF has done extensive work on realising the green transition through leadership and participation in all of the research centres for eco-friendly energy and a large number of research projects in Norway and the EU.

Russia's invasion of Ukraine and its use of energy as a 'weapon' immediately made energy security an issue, as energy prices rose manyfold. The EU and NATO reacted in concert. The energy sector's response was a change of vision that accelerated the green transition because it improves energy security. The 'energy trilemma' became a priority. The term refers to the need to find a balance between energy affordability, sustainability and reliability,

The sustainability aspect was strengthened in 2022 due to the greater focus on access to resources for key/critical value chains, the circular economy and the conservation of biodiversity, in addition to the technological, systemic and social topics that were already on the agenda. SINTEF is heavily involved across the entire spectrum through projects in which we collaborate with industry in both Norway and the EU, and is a proactive, fact-based agenda-setter for what these stakeholders should focus on.

SINTEF's Director of Sustainability is president of the European Energy Research Alliance, and we are actively involved in several Horizon Europe partnerships. We participated in the COP27 climate summit and the COP15 nature summit. We are also an active, fact-based contributor to several government ministries and the strategies of the Confederation of Norwegian Enterprise (NHO) and the Norwegian Confederation of Trade Unions (LO).

Energy is a global policy area. The dialogue between the EU and the US has sharpened in this area, where the US has presented a controversial package of subsidies that also boosts research and technology through its Inflation Reduction Act. In response, the EU launched its Green Deal Industrial Plan and has also increased its investment in research through Horizon Europe. This is also adding to the competitive picture in relation to China and Japan.

These are shifts that will have a major impact, not only on Norwegian industry and competitiveness but also on research. In these circumstances, SINTEF believes that research efforts within energy, the climate and the environment should be boosted in the face of the energy trilemma, not weakened as we have seen over the past year and with the allocations in the last few national budgets.


Photo: Shutterstock

## 2.4.2 Societal protection

Societal protection has been a strategic priority for SINTEF since 2019. But, it is clear that the threats to Norway's interests and our allies are more complex than ever. Typically, such threats now impact multiple sectors and the line between civil and military sectors is being erased. In 2022, it became increasingly clear that all parts of society are vulnerable to force and pressure. Recent acts of sabotage demonstrate that power policy objectives can exploit the room for manoeuvre in the traditional boundaries between peace, crisis and armed conflict. Sabotage and hybrid threats are forcing us to rethink civil protection, emergency preparedness and total defence.

Energy supply is one of several areas within civil protection that is characterised by an increasing number of digitalised and automated processes. Cities depend on electricity, and electrification of the transport sector and Norwegian continental shelf will soon be a fact. This is creating an ever growing need for electricity. In the wake of this come vulnerabilities that cannot simply be addressed with off-the-shelf solutions. Off-the-shelf electronics components have long been an excuse for doing nothing. With the EU's Chips Act in mind, SINTEF has investigated how we can contribute to European self-sufficiency within selected components. Work on research problems within security of supply in several areas of society will continue in 2023, with an ever greater focus.

SINTEF possesses considerable expertise that is relevant to these new challenges. For example, our research scientists and laboratories played key roles in the development of technology and methods for repairing subsea oil and gas infrastructure. We also coordinate projects looking at how the power grid can be made more resilient and efficient with sensor-based monitoring and by using artificial intelligence (AI).

The characteristics that define a hybrid threat include the fact that they are coordinated and synchronised, and that they deliberately target the vulnerabilities of democratic states and institutions. The Norwegian National Security Authority (NSM), the Norwegian Police Security Service (PST) and the Norwegian Intelligence Service (NIS) have, for several years, expressed concern about influence campaigns and other convoluted techniques. Political and economic issues surrounding energy and sustainability are often controversial and can polarise public opinion. Energy prices and new energy technology are examples of issues that have different geographical impacts and can lead to social unrest.

We acknowledged this in 2022. Typical projects involve developing knowledge that discourages the recruitment of 'unconscious insiders'. SINTEF also signed up research scientists to EU-HYBNET – Empowering a Pan-European Network to Counter Hybrid Threats, which gives us good opportunities to meet future partners.

Together with partners in Norwegian industry, we have also contributed to the development of more defence-oriented technology through European Defence Fund projects. We view this European security cooperation arena as an important contribution to strengthening the defence industry, and thereby to giving the West a technological edge. We conduct ethical assessments of these projects to ensure that our activities comply with SINTEF's policy on defence-related R&D. SINTEF's expertise complements national security environments, and we believe that we could make a greater contribution to civil protection and total emergency preparedness than envisaged by the current regulatory framework.

# Chapter 3

# SINTEF's contribution to sustainability

At SINTEF, we work on different dimensions of sustainability. In this chapter we look in more detail at how we contribute to sustainability at our clients and partners through our research portfolio and our work on commercialising research results.

In chapter 4 we show how sustainability is an integral part of how we manage and run SINTEF.

Photo: Berre/SINTEF

## 3.1 Sustainability at SINTEF

**Sustainability is at the core of SINTEF's activities. Our ambition has been to contribute to competitiveness and the common good ever since our inception in 1950. In 2019, SINTEF's Board of Directors decided that our activities would be based on the UN Sustainable Development Goals (SDGs) and that the SDGs would be used as performance indicators in relation to competitiveness and the common good.**

Photo: Shutterstock

In practice, our contributions are delivered through our project activities and research collaborations with companies and public sector enterprises. We also contribute knowledge, ideas and recommendations to public debates and policy development by participating in commissions, committees and seminars, as well as through publications. In areas where no strong industry currently exists, we add commercial value to our research results through licensing, technology sales and company start-ups.

The need for a digital green transition to a sustainable society will require multidisciplinary solutions, to which we believe SINTEF is in a very good position to contribute. SINTEF already has a broad portfolio of projects providing what the EU calls 'twin transition'. We have fourteen major projects under the EU's dedicated call for 'twin transition' proposals (as of the end of 2022). Going forward, even stronger support for industry and the public sector in the transition and contributing our expertise in the dialogue on good framework conditions will be top priorities for SINTEF.

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 ten principles for responsible business conduct. The principles include guidelines on promoting human rights and labour rights, protecting the environment and working on anti-corruption.

We have also been a member of Transparency International for just as long. We attend the organisation's annual conference on corruption and receive information on corruption and ongoing anti-corruption work.

In 2022, SINTEF decided to become a member of Skift – Business Climate Leaders, a network for enterprises that want to play an active and forward-looking role in the climate issue. We believe that the climate and nature-related challenges we face are best solved in cooperation with others. We hope that our membership will further contribute to Skift's members, including us, both achieving more and increasing awareness of the climate issue in industry. We also hope to contribute to the quality of the work.

The importance of sustainability for SINTEF is also evident from the fact that since 2009 we have had a Director of Sustainability in the group management team (title changed from Director of Climate to Director of Sustainability in 2015), whose work is to a large degree externally oriented. More specifically, this involves formulating solution hypotheses and establishing strong consortia that, in collaboration with the authorities, can contribute to greater sustainability.

SINTEF has published a dedicated annual sustainability report since 2019. This year, for the first time, we are merging our annual and sustainability reports. We take a systematic approach to improving our reporting based on our own ambitions, the external expectations of clients, partners and society at large, as well as legal requirements. The Transparency Act came into force on 1 July 2022, and we have procedures in place to ensure that we are complying with the new requirements. More information about this work can be found in section 4.7.

In 2022, Deloitte, our internal auditor, conducted an analysis of the requirements and expectations concerning SINTEF's sustainability reporting. It recom-

mended focusing the contents and messages on the areas highlighted in the materiality analysis. This year's report will focus on the external and internal aspects of our activities that we believe have the greatest impact on sustainability at our clients, internally and in society in general. This does not change our strategy, which is to strengthen our sustainability and that of our clients by realising all of the SDGs.

We are well informed about upcoming legislative requirements designed to encourage capital markets and businesses to restructure for the green transition. This includes the EU Taxonomy and the EU's statutory reporting standards, the European Sustainability Reporting Standards (ESRS). We expect SINTEF to be subject to the requirements of the ESRS and the Taxonomy from the 2025 financial year onwards. As a step in the right direction, and as preparation for the new requirements, this year we are reporting with reference to the Global Reporting Initiative (GRI) framework. For more information about expected improvements in future reporting, see Chapter 6 The way forward.

Our sustainability profile is being strengthened in SINTEF's work on its portfolio of start-ups. When new companies are established, SINTEF requires them to organise and manage themselves in line with the same principles as SINTEF, with the UN Global Compact's principles acting as guidance. 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, will be subject to the Sustainable Finance Disclosure Regulation (SFDR). The SFDR has been incorporated into the EEA Agreement through the Norwegian Sustainable Finance Act, which entered into force in January 2023. In 2023, SINTEF will adopt and implement the SFDR requirements that are relevant to the investment activities we manage.

SINTEF has started assessing our activities in relation to the EU Taxonomy. Given the industry code used by SINTEF, we expect to be able to link our activities to research, development and innovation that make significant contributions to the environmental objective 'climate change mitigation'. Because we are a closely integrated part of some clients' R&D work, our projects may also be eligible for other Taxonomy activities. We will continue to map this in 2023.

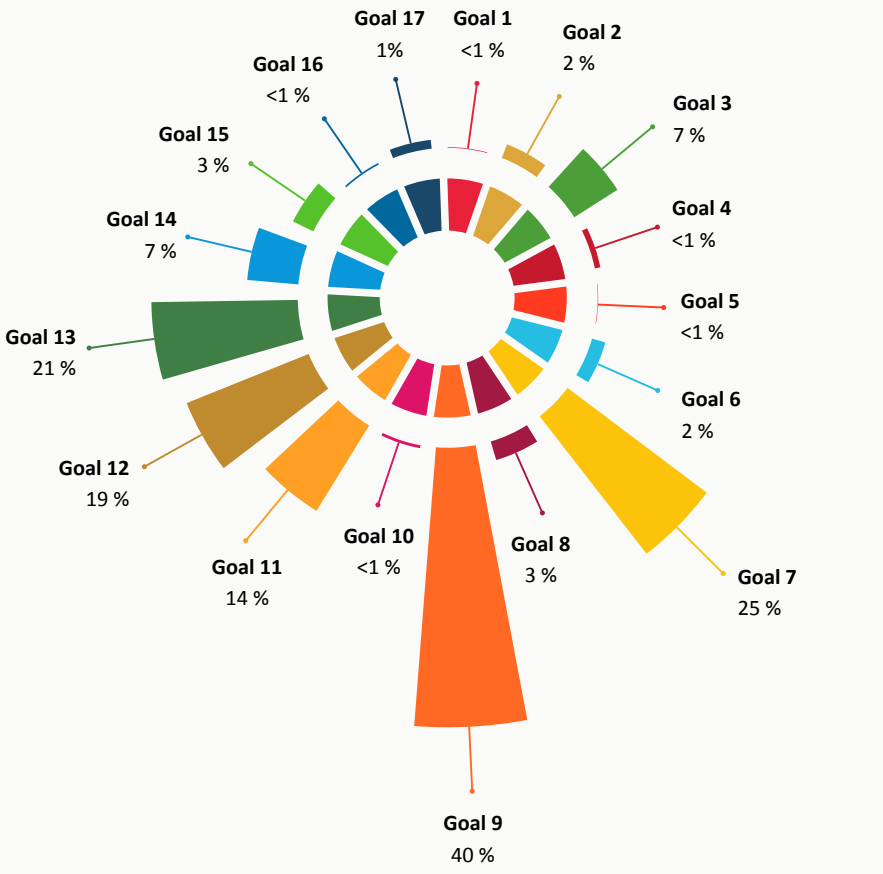
We believe that our greatest contribution to the Taxonomy lies in the research expertise our employees have and apply in collaboration with clients. It is clear to us that the knowledge we bring to projects regarding the Taxonomy's criteria helps shape clients' future business strategies. In turn, this will contribute to more sustainable products and more competitive business models for the future.

Over the last two 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.

SINTEF's work is based on formal certifications. SINTEF must always strive to ensure that the requirements and expectations of our clients and other partners are properly met. This means that we have a management system designed to ensure that SINTEF delivers products and services of the agreed quality, takes account of the external environment, and works systematically on its 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 4.2.

Photo: Berre/SINTEF

Gross turnover per SDG





Source: SINTEF

# 3.2 Stakeholder engagement and materiality analysis

## Our projects contribute to sustainable development

SINTEF has tagged all new projects in relation to the SDGs on an ongoing basis since 2019. Each project can be tagged with up to three SDGs to show how solutions can contribute to different SDGs. In 2022, more than 95 per cent of our gross turnover was linked to specific SDGs.

This is primarily a bottom-up process in which the quality of the outcomes depends on the expertise, awareness and efforts of our research environments. We recognise that this model presents methodological challenges. For example, different institutes may have different tagging practices. 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 the bulk of our projects contribute. The analysis also shows a clear correlation between the SDGs with the highest turnover and the areas highlighted as being the most important ones in the materiality analysis. We will particularly focus on these areas in this report.

The figure illustrates the fact that in 2022 SINTEF had significant activities related to the following SDGs, listed by the proportion of our turnover linked to each SDG in the project portfolio:[10)]

- 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

10) The model shows the proportion of gross turnover for research projects in SINTEF's six institutes in 2022 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.

These correlate well with our strengths and priority areas, as well as the material topics in SINTEF's sustainability reporting. These are described in more detail on the following page. We also have activities related to the other SDGs, although to a more limited extent.

## Stakeholder engagement

SINTEF has systematically reviewed our stakeholders, and the main ones are listed in the figure on the right. These are all stakeholders we have regular contact with through formal and informal conversations and meetings, structured client and employee surveys, and formal reporting.

SINTEF has a high media profile, both when it comes to specific news on the research front and when it comes to contributions to the public debate on policy development. This type of communication reaches all stakeholder groups.

## Our main stakeholders

| | |
|---|---|
| **Employees** | SINTEF's employees. |
| **Clients** | Industry and public bodies (including county authorities and municipalities) in their capacity as orderers of research/research projects, as well as partners in research projects/centres. |
| **Authorities** | National authorities (government and ministries) as well as regional and local authorities. In some cases, authorities are also clients in their capacity as orderers of, or partners in, research projects (see above). |
| **Research Council of Norway** | Central to the application of adopted policies and distribution of allocated research funds in Norway. |
| **EU** | Leading stakeholders and policy advisers for research programmes in the EU. Central in shaping policy and the direction of research. |
| **Partners** | Primarily research institutes and universities (NTNU, UiO) as well as organisations (especially the NHO). |

**The research areas in which SINTEF has the greatest impact on sustainability**

Clean energy and climate action
(goals 7 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)

**These are the most important sustainability topics in our internal operations**

HSE

Climate and environment internally

Equality and diversity

Labour rights and human rights

Ethics and integrity

General compliance with laws and rules

## Materiality analysis

SINTEF considers our most important contribution to society to be the research and innovation carried out in collaboration with clients and partners. A materiality analysis was conducted in 2021, with heavy involvement of the group management team. The analysis resulted in six research areas being highlighted as areas where SINTEF can make particularly large contributions to clients and society as a whole. In addition to these, six areas were identified that are considered to be the most material for sustainability in our internal operation of the Group. The six research areas are presented in section 3.3, and the material topics for our internal operations in chapter 4.

While in the last three years we have reported on our activities and contributions to all of the SDGs, this year we have focused on the most material areas. This is in line with the advice of our internal auditor. At the same time, we would like to emphasise that although our reporting focuses on these areas, in our experience SINTEF contributes to sustainable development in many fields, especially via our research portfolio. 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 a free subscription to our newsletter.

# 3.3 The areas in which SINTEF has the greatest impact on sustainability

Photo: Berre/SINTEF

3.3.1

# Clean energy and climate action

## The challenges

Achieving net zero emissions by 2050 will require society to undergo an unprecedented transition. This will include enormous cuts in emissions, a huge expansion of renewables, the development of energy efficiency solutions, CCS and new energy carriers.

The war in Ukraine underscores the need for a rapid energy transition and a resilient 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 designs the climate technologies and sustainable energy solutions of the future by developing technology that cuts emissions and new sustainable energy solutions. We offer world-leading laboratories and testing, digital solutions and software. Our research helps ensure that various energy solutions have a low carbon footprint and high security of supply, while being efficient and economical.

HYDROGENi started work in 2022 and is a research centre for environmentally-friendly energy (FME) devoted to research and innovation within hydrogen and ammonia. The goal is to help build a sustainable hydrogen value chain. HYDROGENi has a budget of approximately NOK 530 million and more than 50 partners from industry and academia. The centre is headed by SINTEF and will operate for eight years.

SINTEF has corporate initiatives within the topics of hydrogen, solar and wind energy, new climate-positive measures and batteries in order to coordinate efforts in important strategic areas. SINTEF also has a corporate initiative within biodiversity and land use. Climate-positive measures are a new area with little available research funding. SINTEF has therefore established the SINTEF Global Climate Fund, which finances research projects through private contributions.

In 2022, SINTEF attended important political arenas such as the UN Climate Summit, Arendal Week and other relevant arenas to highlight various technological solutions and provide advice to political leaders. SINTEF is also represented on Norway's Nature Risk Commission by research scientist Atle Harby.

Photo: NorthWind

NORTHWIND

### Smart solutions converting offshore wind

FME NorthWind is a wind power research centre that develops research and innovations aimed at cutting costs, ensuring sustainable development and contributing to a profitable Norwegian export industry within offshore wind. The centre is headed by SINTEF. The Norwegian University of Science and Technology (NTNU), the Norwegian Institute for Nature Research (NINA), the Norwegian Geotechnical Institute (NGI) and the University of Oslo (UiO) are all research partners, as are fifty industry and network partners. Kongsberg Digital, Hydro and Oceaneering joined their ranks in 2022 and became industry partners too.

Thirty innovations were identified within the research centre in 2022. One of them is acoustic emission monitoring. This solution has been adopted by Kongsberg Maritime. It detects faults in wind turbines at a very early stage and helps reduce costs.

→ Read more here.

7 AFFORDABLE AND CLEAN ENERGY

Project turnover

1 018

MILLION NOK

Spin-offs

3

13 CLIMATE ACTION

Project turnover

856

MILLION NOK

3.3.2

# Life below water and on land

## The challenges

The two SDGs address challenges related to conserving and using ecosystems in a sustainable manner. It is particularly important for Norway to address national challenges related to these. More Norwegian land resources can be utilised, and greater account of nature must be taken going forward. Ocean industries are developing rapidly, and the impact on ecosystems from harvesting and increased activity in fields such as offshore wind power and aquaculture in areas can be sensitive.

## SINTEF's expertise and contribution

SINTEF's corporate initiative for biodiversity and land use covers the interaction between industrial development and life on land and below water.

SINTEF contributes to the development of Norwegian agriculture and forestry, especially the processing and total utilisation of raw materials. We have consolidated our efforts into a specific corporate initiative with the following main areas: circular bioeconomy, energy efficiency, smart production and packaging.

We are particularly busy within ocean industries, and in the collaboration with authorities and industry, we contribute to the future-oriented development of fisheries based on the SDGs. We participate in environmental research and important work on restoring ecosystems through a wide range of 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

This development is based on the SDGs, and SINTEF participates in various international networks and consortia where the purpose is to share knowledge and best practice across multiple countries, especially EU member states.

Photo: Jorunn Skjermo/SINTEF Ocean

SEAWEED CARBON SOLUTIONS

### 'Seaweed graveyards' could become an important climate measure

Large-scale offshore seaweed cultivation is a sustainable means of removing carbon from the biosphere. The Seaweed Carbon Solutions project is financed by SINTEF, DNV, Equinor and Aker BP.

Its purpose is to develop technology and business models within nature-based solutions for carbon dioxide removal (CDR). This will be done by developing solutions that cut emissions through industrialised offshore seaweed cultivation and conversion to CDR products or solutions.

We are looking at how permanent CO2 removal can be achieved by passive biomass sedimentation in the cultivation phase and through active deposition, either of full-grown seaweed biomass on the deep ocean floor or seaweed biochar in topsoil.

→ Read more here.

14 LIFE BELOW WATER

Project turnover

300

MILLION NOK

Spin-offs

1

15 LIFE ON LAND

Project turnover

132

MILLION NOK

3.3.3

# The circular economy

## The challenges

Sustainable consumption and production are about producing more using 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 using the earth's resources in the best possible way to ensure sustainability and value creation in the long term too. Transitioning to a circular economy will be crucial for value creation, 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 EU Taxonomy for Sustainable Activities is a strategic framework for developing competence within the circular economy. The Taxonomy criteria contribute to technical standardisation, which is fundamental for implementation and innovation. SINTEF applies, and analyses, the technical criteria from March 2022, both in established projects and in project development.

The circular economy corporate initiative is a common platform where expertise from across SINTEF meets to contribute to the transition to a circular economy in Norway. It contributes to multidisciplinary interaction and effective co-creation with clients.

SINTEF believes that a 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 are coordinating 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.

The SIRKLAND project (a circular value chain for agricultural plastics) is exploring new solutions for collecting agricultural plastics. SINTEF analyses and designs solutions for circular behaviour in order to maintain the quality of the plastic and avoid pollution in the value chain.

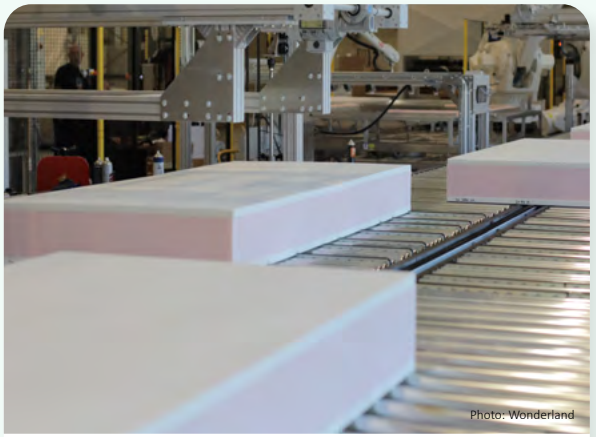


Photo: Wonderland

WONDREST

### You can now boost the circular economy while you sleep

10 per cent of the mass in landfills consists of old mattresses. The Wondrest innovation project aims to solve this problem by halving a bed's environmental footprint.

Wonderland, SINTEF, NTNU, Måndalen Trevare, Plasto, Recticel, Møbelringen and the waste management company J.O Moen are all collaborating on this project. SINTEF contributes expertise in environmental analyses, circular design and sustainable business models.

By the end of the project, Wonderland will have a bed whose environmental footprint has been halved, and a circular business model based on the results of the project that is profitable for all participants and that ensures that as much of the materials as possible are part of the circular economy.

→ Read more here.

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

Project turnover

769

MILLION NOK

Spin-offs

3

This project its funded by Horizon 2020

3.3.4

# Green innovation, responsible consumption and production

## The challenges

Sustainable production is about producing more using less resources. In order to achieve a lower carbon footprint, production methods and how value chains are put together must also change. Raw materials must be extracted and recovered in short and circular cycles centred around the production, use, recovery or reuse of products. Based on new methods, energy solutions and processes, we must find new production methods that are both more environmentally-friendly and extend the lifetime of products.

## SINTEF's expertise and contribution

SINTEF is working on both gradual improvements and fundamental changes throughout value chains. We are helping Norwegian and European industry with the digital green transition they are currently undergoing. We develop generic expertise, enabling technologies and multidisciplinary solutions for a broad spectrum range of market areas in close cooperation with our clients and partners. To optimise the effects of working on the knowledge needed by so many different sectors and industries with our institute structure, we meet in multidisciplinary corporate initiatives.

Batteries, hydrogen, wind and solar, the circular economy, manufacturing, climate-positive solutions and smart and climate-neutral cities are examples of initiatives that operate across the organisation. Our shared ambition is to make net zero emissions possible by 2050.

We develop and operate advanced laboratories and digital tools as an integral part of our research. Our multiphase laboratory is one of the locations that gave birth to the solution that the Norwegian newspaper Aftenposten named the most important Norwegian invention since 1980 – the multiphase flow technology that makes it possible to transport oil and gas in the same pipeline. Having saved Norway from having to make huge investments in fossil fuel extraction, the infrastructure will now be used to improve climate technologies such as the capture, transport and storage of CO2 and new technologies for the process industry.

Photo: Shutterstock

HYDRA

### Sustainability is the 'holy grail' for the next generation of electric vehicle batteries

The global electric vehicle market is expected to grow to 125 million units in the next decade. Sustainable battery cell production, including the reduction of critical feedstock content, use of green chemicals and environmentally-friendly production processes, is essential for building a competitive battery industry in Europe.

The HYDRA research project will promote the development of new, high energy density, cobalt-free batteries with a focus on sustainable material processing and pilot-scale production. Thanks to the heavy involvement of European industrial partners, HYDRA covers the entire battery value chain.

SINTEF is heading the project, which is funded through the EU Horizon 2020 programme.

→ Read more here.

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

Project turnover

1 634

MILLION NOK

Spin-offs

11

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

Project turnover

769

MILLION NOK

Spin-offs

3

This project its funded by Horizon 2020

3.3.5

# Health

## The challenges

The Norwegian health service is one of the best in the world, although it requires comprehensive measures and innovation to maintain a sustainable health and care service[11]. The health sector and the health industry need a boost, and new digital services and technological solutions are required. If this is to be done successfully, more interaction across sectors must be facilitated[12] since the institute sector and the industry can play key roles in meeting these challenges.

## SINTEF's expertise and contribution

'Health and welfare' is a broad, multidisciplinary activity at SINTEF, where almost two hundred research scientists work on topics ranging from the development of new nanomedicines for cancer to research on living conditions in low and middle-income countries. Our contributions to the development of medical technology and new digital solutions are attractive to both public and private stakeholders.

We work on topics ranging from the development of ultrasound technology and AI in the specialist health services to improving living conditions for disabled groups in low and middle-income countries. From adapted digital home-care services for an ageing population to better healthcare for children in child welfare. We are also working on future drug production within areas like cancer medicines and antibiotics.

In 2022, we signed collaboration agreements with, for example, Oslo University Hospital (OUS) and Sunnaas Hospital. We became a corporate member of the Norwegian Cancer Society and an active member of the Norwegian Cancer Mission Hub, renewed our agreement with Trondheim Municipality, signed a collaboration agreement with the City of Oslo and have become a key player in the work on a new health innovation arena in Trøndelag.

SINTEF also made a significant contribution to the work on making health a priority export initiative in the Norwegian Export Council. A report from Boston Consulting Group[13] points out that an active Norwegian health industry is important for the transition in the health sector.

Photo: Arne Eide/SINTEF

BETTEReHEALTH

### Digitalisation should provide better healthcare in the Global South

The EU BETTEReHEALTH project has helped African countries create good frameworks for the use of e-health: ICT designed to improve efficiency, quality and safety in the health and care sector. The goal is to help improve public health.

Regional hubs in four countries coordinated network activities with participants within e-health. The project specifically dealt with three factors that are critical to the successful introduction of e-health solutions: the human factor, the technological factor and the political factor.

BETTEReHEALTH established databases containing information about existing solutions. The research will contribute to better, more accessible and more efficient health and care services in low and middle-income countries in Africa.

→ Read more here.


Project turnover

299

MILLION NOK

Spin-offs

8

11) Health Personnel Commission's report: 'Tid for handling'.
12) The Long-term Plan for Research and Higher Education 2023–2032.
13) Building Norway's Life Science Industry, BOSTON CONSULTING GROUP (BCG).

3.3.6

# Infrastructure and mobility

## The challenges

Access to good infrastructure and efficient transport services are vital for people and industry in rural and urban areas. At the same time, mobility presents considerable challenges in terms of greenhouse gas emissions, protecting biodiversity, road safety and high costs.

Sustainable development will require us to become better at utilising available capacity rather than expanding it. We will also need to take better care of our existing infrastructure so that it lasts longer and there is less need for new construction.

Ports can play a crucial role in the transition to a zero-emission society by unifying stakeholders and connecting the energy and transport systems.

## SINTEF's expertise and contribution

SINTEF is designing the infrastructure of the future and contributing to the development of better, cheaper and more sustainable mobility solutions.

SINTEF's multidisciplinary efforts on mobility are focusing SINTEF's expertise on five research topics: zero-emission mobility, automated transport, smart operations and maintenance, hubs, ports and terminals, and transport data and digital twins.

SINTEF has a broad project portfolio within infrastructure and mobility. We are a partner in the EU MODI project, which aims to demonstrate automated heavy goods transport by road without a safety operator. The Autoport competence project aims to streamline Norwegian port logistics using optimisation technology and AI. The Green Platform's Zero Kyst project aims to decarbonise the seafood industry by transitioning to hydrogen-electric propulsion. We are also starting two Green Platform projects, one focusing on sustainable road construction and one focusing on the condition-based maintenance of infrastructure structures.

We are working to improve the framework conditions in application-oriented research, development and innovation in the transport and infrastructure sector. We believe that our efforts must be proportionate to the rapid technological development, the need to reduce uncertainty and the sector's huge importance for society. Therefore, we actively participate in political arenas in order to provide policy and professional advice.

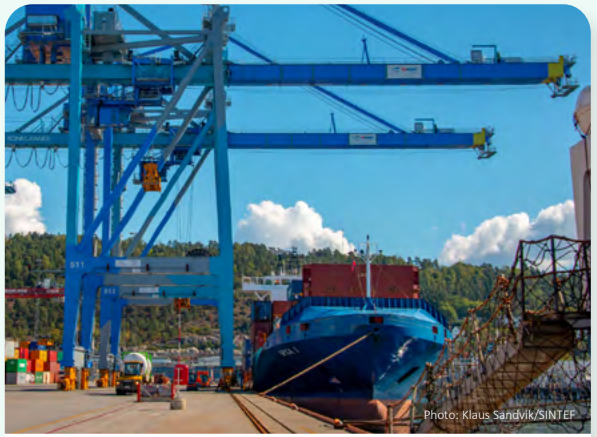


Photo: Klaus Sandvik/SINTEF

ACES

### Let ports become multi-tools for the green transition

ACES aims to facilitate and accelerate a cross-sectoral energy and sustainability transition in Norwegian ports.

It wants to do this by:

- boosting port-related energy transition as a political topic nationally by aiding the development of visions and strategies
- boosting transition capacity in individual ports via the interplay between transition agendas, visions and role development
- promoting exchanges between, and the coordination of, national and port-specific transition projects

The project has a number of public and private partners. It is funded by the Research Council of Norway and will end in 2025.

→ Read more here.


Project turnover

1 634

MILLION NOK

Spin-offs

11


Project turnover

586

MILLION NOK

Spin-offs

1

# 3.4 Our laboratories and expertise

In this section we highlight essential prerequisites, and contributions to sustainability, that provide the basis for SINTEF's activities.

## 3.4.1 Research infrastructure

Research infrastructure often refers to laboratories, but also includes testing and demonstration facilities and catapults. Some of these are highly specialised, although several of SINTEF's largest laboratories are used for a multitude of purposes, from basic and applied research to testing prototypes, damage assessments and small-scale production. Access to outstanding infrastructure has a significant impact on how we carry out assignments for clients and drive forward 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 is helping to leverage our investments. SINTEF has invested NOK 1.6 billion of its own funds in research infrastructure from its surplus in the last ten years. We now have more than 100 laboratories.

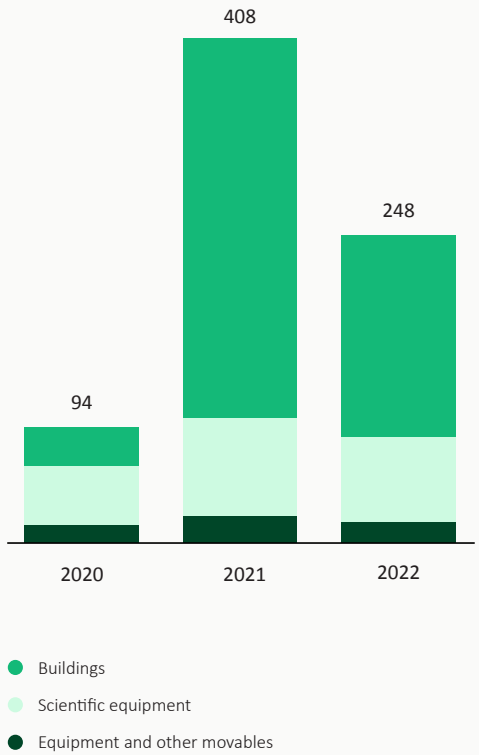
Over the course of 2022, SINTEF invested NOK 248 million of its own funds in research infrastructure. We also established a joint project across the institutes. This is designed to strengthen our ability to make these important resources more accessible to our clients and society, and to develop better integrated management and development of research infrastructure, particularly in light of new external requirements, including due to the rules on state aid.

The Research Council of Norway's national infrastructure roadmap project commenced in 2022. This work is being closely followed up by SINTEF through participation in various thematic groups and consultative input.

In 2022, SINTEF completed Norway's first laboratory for producing and testing battery cells. Here, as part of their development of battery value chains, Norwegian battery cell manufacturers can carry out all 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. This laboratory is part of a national infrastructure, NABLA, where the equipment is located at SINTEF, the Norwegian Institute for Energy Technology (IFE), the Norwegian Defence Research Establishment (FFI), the University of Oslo (UiO) and the Norwegian University of Science and Technology (NTNU).

We invest in new laboratories, scientific equipment and other research operating assets

Annual investment in scientific equipment and other operating assets in NOK millions




Source: SINTEF


Photo: Statsbygg/LINK Arkitektur

The Norwegian Ocean Technology Centre (formerly the Ocean Space 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. In this context, 2021 was a landmark year when the Storting (the Norwegian parliament) gave the project the go ahead, with a budget of approximately NOK 8.2 billion.

The Norwegian Ocean Technology Centre is fully financed by the state. Its ownership will be managed by NTNU, and it will ensure value creation for Norway through competitive Norwegian ocean industries. SINTEF will play a key role as the operator of the largest laboratories in the centre. The state funding has been secured via ESA notification. SINTEF is also contributing with its own investment of around 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. Construction work started in 2022, and the first laboratories will be ready for use in early 2023.

### 3.4.2 World-leading research – the EU's research programmes

Norway's participation in European research partnerships is important for SINTEF's ability to link partners from industry and the public sector to the international research front. By partnering on participation in EU industry-oriented research projects, Norwegian enterprises gain access to expertise, networks and funding that is accelerating their transition in a more digital and sustainable green direction. It is also contributing to their competitiveness. Given the very low basic funding Norwegian technical-industrial research institutes receive, EU research is also crucial when it comes to SINTEF's ambition to conduct world-leading research and maintain a leading research position and competitiveness.

The EU programmes are helping to solve global challenges that are largely linked to the sustainability agenda. The programmes are important contributors to the development of EU policies and regulations. European technology platforms and partnerships linked to the EU programmes are an important arena for strategic R&D influence. SINTEF's extensive participation here helps to safeguard Norwegian interests in the scientific and strategic development in the EU.

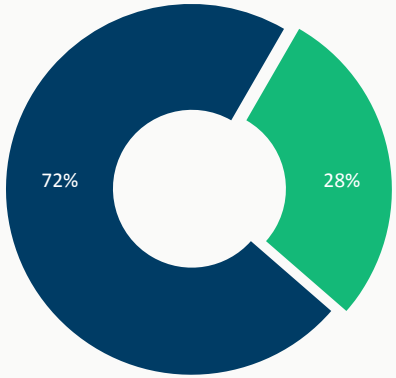
The Horizon Europe (HEU) research and innovation programme is the world's largest research programme, with a budget of around EUR 96 billion. HEU started in 2021. SINTEF is the largest Norwegian participant, with EUR 81 million in funding[14]. This represents 14.7 per cent of the funds brought home to Norway – an increase of 1.3 percentage points from the previous framework programme. 100 per cent of SINTEF's participation in HEU takes the form of collaborative projects in the programme's pillar for solving global challenges and building competitive industries. It is in the thematic initiatives in 'Cluster 4 – Digital, Industry and Space' and 'Cluster 5 – Climate, Energy and Mobility' that SINTEF participates most. Some 70 per cent of the funding is sourced from these. 6 per cent of the funding comes from the EU's 'mission projects' on the climate and oceans.

The total funding for research and innovation in projects in which SINTEF participates amounts to EUR 797 million. The value of the R&D to which Norway has access is thereby ten times greater than the funding allocated directly to SINTEF.

So far in HEU, SINTEF has won funding for more than one in four of its applications. Our success rate as of 5 December was 29 per cent. In comparison, the average success rate of applicants in Europe is 16 per cent. In the collaborative projects we have won so far, SINTEF has attracted 53 project participations from Norwegian companies. This means that SINTEF is participating in 28 per cent of Norwegian industry's collaborative projects, as illustrated in the figure on the right. We are, therefore, generating activity and increasing international competitiveness within Norwegian industry.

Europe is facing a security policy situation in which the use of military force is once again a reality. SINTEF is actively contributing to research into defence-related technology in Norway and the EU. In the European Defence Fund, we have won projects worth a total of EUR 81 million, of which SINTEF's share is EUR 4 million. In these projects, we are working closely with the Norwegian defence industry on developing the next generation of European defence systems and ensuring market access to the European defence market for Norwegian participants.

SINTEF is participating in 28% of Norwegian industry's partnership projects in the EU's Horizon Europe [15]




Source: Cordis, 31 December 2022

SINTEF's goal is to double turnover in relation to the EU (from the level in 2019) during the programme period, which runs until 2027. This assumes that the national framework conditions for our participation will improve and not deteriorate. It is also important that Norway grasps the opportunity to take advantage of synergies in an ever-broadening range of policy instruments in the EU and the interaction between the financial instruments.

In 2023, it will be particularly important for Norway to monitor developments in relation to the EU's Green Deal Industrial Plan, the Net Zero Industry Act and the Chips Act, which are Europe's equivalents

14) All figures in this section are from Cordis as of 31 December 2022, unless otherwise specified.

15) The graph shows the project volume for Norwegian industry's collaborative projects under the EU's Horizon Europe programme in 2022, 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 2022 shows proportions for Horizon Europe. eCorda is the official source for EU reporting. Due to limited data availability via eCorda for 2022 at the time of reporting, Cordis has been used as a source.

of the US Inflation Reduction Act and the US Chips Act. The strategy is to prevent activities moving out of EU countries, as well as to support the green transition and strengthen security of supply, including through legislation and cooperation with friendly countries. More specifically, by facilitating the faster establishment of industrial partnerships, more public support for technology companies and research, development and innovation, knowledge building in industry and increased trade. One important component in realising this plan will be a relaxation of state aid rules and use of the Important Projects of Common European Interest (IPCEI) instrument.

### 3.4.3 SINTEF's involvement in clusters and innovation districts

The digital green transition that the whole of society is undergoing requires a lot of new and applied research, as well as new constellations and partnerships in fertile ecosystems. It is clear to us that large, established enterprises are able to make greater use of research than newly established and smaller enterprises. That is why SINTEF collaborates with a large number of clusters throughout Norway.

Even closer interaction between universities and society in general is also vital for the future transition, which is why we are strongly involved in the development of innovation districts in our two main cities, Trondheim and Oslo. Trondheim Tech Port and Oslo Science City bring together key participants in both cities to increase the social impact from these strong knowledge environments, based on initiatives centred around the respective cities' areas of strength.

SINTEF is involved in many strong industry clusters

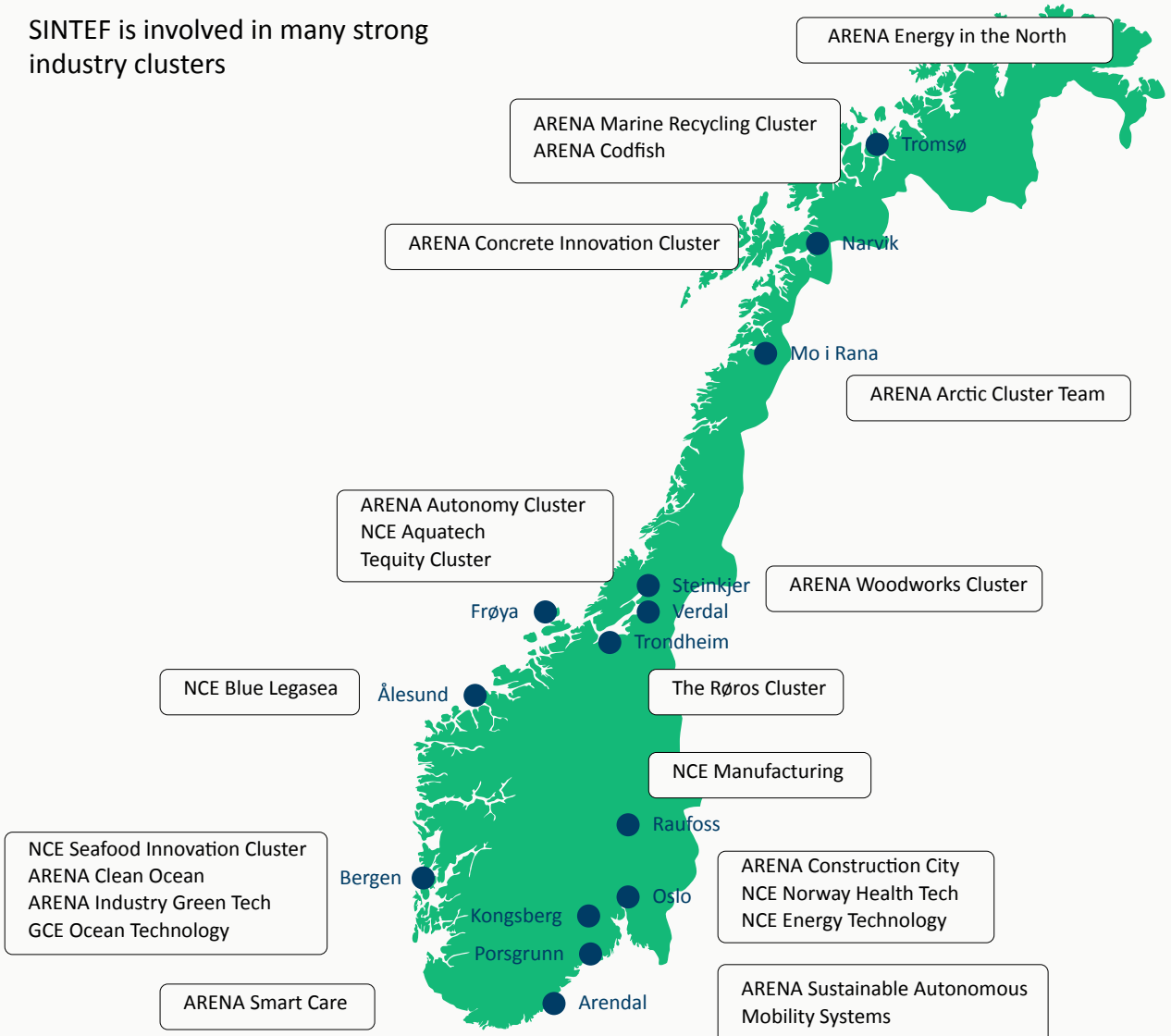


Photo: Smidesang&Lyng/SINTEF

### 3.4.4 Sustainability expertise

At SINTEF, we are experts in assessing how choices concerning materials and logistics solutions impact the sustainability of technologies, businesses and value chains, and in realising sustainable transitions. In both cases, we use disciplines like economics, environmental research, industrial ecology, the social sciences and innovation and transition research. We combine research and methods from these with expertise in technology, data analysis and knowledge of the SDGs.

We have several projects designed to systematically assess the impact of various technologies and value chains on sustainability. We analyse how value chains affect carbon footprints, job creation, gender equality and the economy, regionally and globally. The results are used to, for example, assess the effects of potential industrial decisions, different policy formulations and the 'predicted' characteristics of future scenarios.

In one project, we are modelling the scaling up of new technologies in order to see how these change global value chains. We will then analyse what the changes mean for the sustainability of the value chains. The effects will be measured using the seventeen SDGs and selected performance indicators.

One of the fruits of our sustainability research was the spin-off MoreScope, established in 2022. MoreScope calculates how a company's domestic and international subcontractors, and their suppliers, contribute to the company's carbon footprint (see page 44).

Other methods, like life cycle assessments (LCAs) and material flow analyses (MFAs) are used to accurately map processes and materials used during a product's life cycle. LCAs document carbon footprints and are used to compare different solutions/products. Both methods help to show the social and environmental problems of systems and indicate their improvement potential.

We also have expertise in helping enterprises and industries identify which of the SDGs are relevant for them. The effects on sustainability can be measured and followed up via the SDGs' targets for the purpose of continuous improvement. We are supporting a steadily increasing number of enterprises in this work.

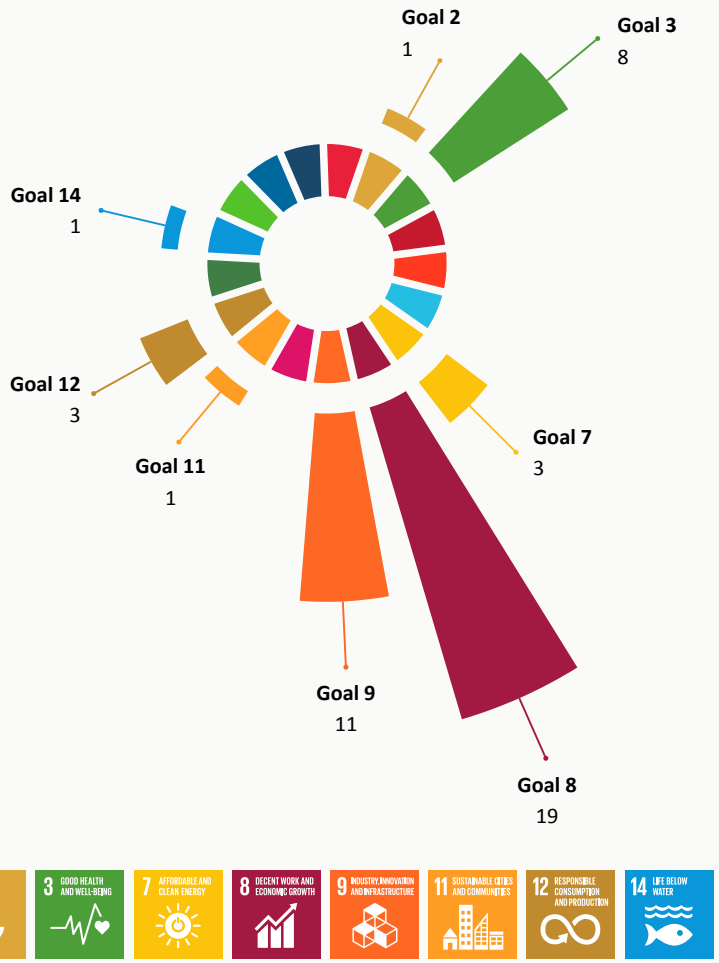
We are experts at developing ethical frameworks that identify ethical dilemmas/issues and weigh up differing views to provide a sound decision-making basis and prevent such challenges turning into serious problems.

Closely related to this, we use methods called responsible research and innovation (RRI) and stakeholder engagement. These methods were developed by the EU. Common to them both is the fact that they are about transparent data and results; the social impacts of research and innovation; reciprocal learning between research, industry, policymakers and the public; and the involvement of all stakeholders and everyone who has knowledge to contribute.

We are advising on the EU Taxonomy, adapting to it and incorporating it into our research and innovation areas.

If the SDGs are to be realised, considerable capacity building will be required for countries in the south. We have relevant experience, especially within health, energy and the circular economy. We have commenced a dialogue with the authorities and funding bodies about establishing a project model for long-term work on a green transition in these countries. We recently started a separate corporate initiative concerning 'global sustainable development', as discussed in section 2.1.

Spin-off per SDG




Source: SINTEF

# 3.5 Commercialisation of research results – Technology Transfer Office (TTO)

Carrying out research for clients in industry and the public sector is SINTEF's traditional core activity. However, the start-ups we contribute to also create innovations that benefit 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 are most energetic during the pre-seed and seed phases, although we continue to 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. SINTEF has developed a profitable and acknowledged model for commercialising research results.

Making early-stage capital available to start-ups is an important part of the commercialisation activity. Through our investment funds, we have a strong investor corps, which provides us with the financial capacity to boost this work further.

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) and SINTEF Venture V (2018).

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 all of the companies we contribute to operate responsibly within the areas of human rights, labour, the environment and anti-corruption.

SINTEF's current portfolio of nineteen start-up companies has been mapped in relation to their relevance to the seventeen 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.

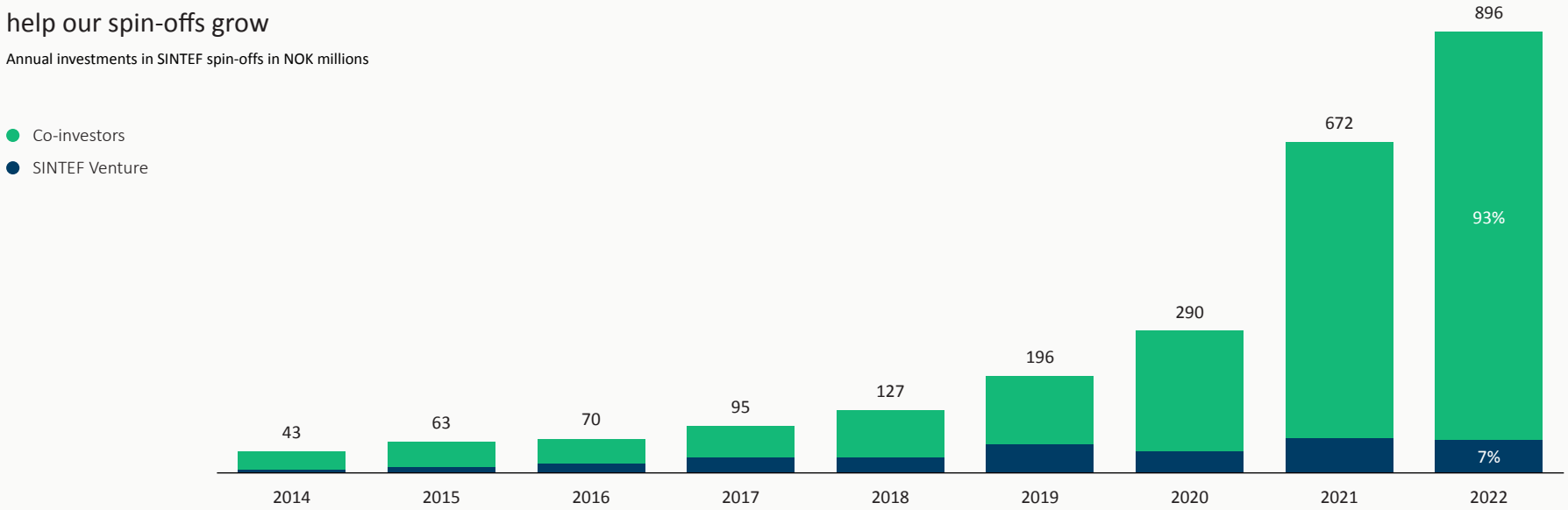
All of the companies are tagged with goal 8) Decent Work and Economic Growth. Several of the companies use key technologies in IT, biotechnology and nanotechnology. They thus enable many different products, services and value chains for sustainable innovation and economic growth.

In recent years, we have seen 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 the owners and the further de-

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

Annual investments in SINTEF spin-offs in NOK millions




Source: SINTEF

velopment of the companies. The companies Nacre, GasSecure, Spermvital, Resman and CFEED are good examples of this.

The level of investment activity in our portfolio companies was high in 2022, with great interest being shown by external investors. Several of the start-ups have entered scale-up and commercial growth phases. Many of them successfully raised substantial scale-up capital in 2022.

In total, NOK 896 million was invested in SINTEF's nineteen start-ups in 2022, of which NOK 67 million was invested from SINTEF Venture funds. In the period 2014-2022, a total of NOK 2.5 billion has been invested in our start-ups, of which SINTEF Venture funds have invested NOK 340 million.

Our start-ups also attract capital from international investors. Of the capital invested in 2022, 43 per cent came from foreign investors. Much of the capital was invested in the start-ups Hystar and Hydrogen MemTech, both of which are developing hydrogen production solutions.

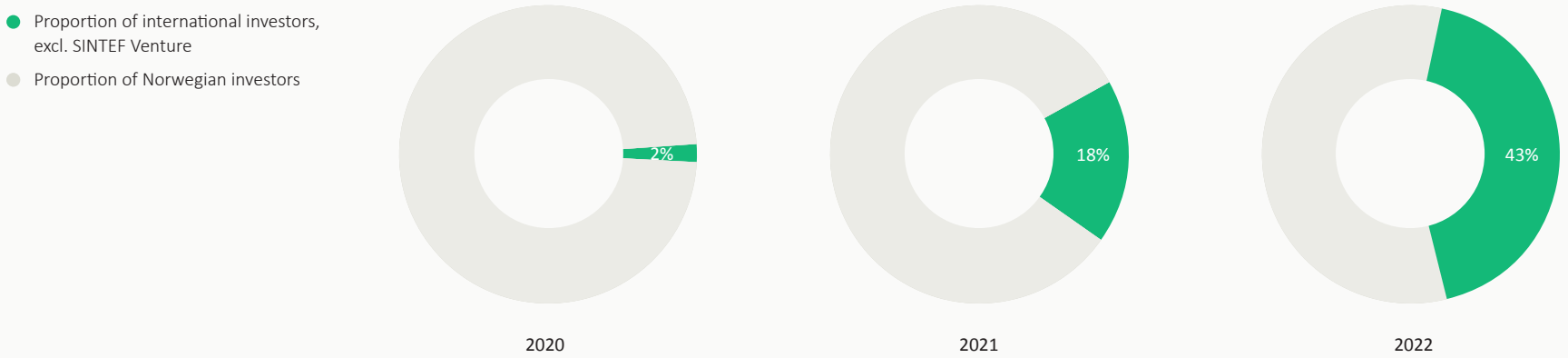
Good examples of companies that are contributing to the SDGs include two of our most recent start-ups – MoreScope AS and Hystar AS – which are described in more detail on the following page.

Other portfolio companies of ours also caught the attention of investors and the public in 2022. These include:

- SensiBel: named 'Innovator of the Year' by Dagens Næringsliv. Develops tiny super-sensitive microphones that can be used in noise cancelling headphones, smart speakers and mobile phones.
- Ocean Space Acoustics: has developed a location/ID/information system that provides a double benefit. The solution prevents 'ghost fishing' (lost fishing equipment that kills fish, seabirds and marine mammals), while also making fishing boats more efficient.
- Nomono: has developed a small but complete podcast studio that could make traditional studios superfluous.

## SINTEF spin-offs are increasingly attracting international investors

Annual investments in SINTEF spin-offs




Source: SINTEF


Photo: Scharfsinn86/iStock/Getty Images Plus

TECHNOLOGY FOR A GREENER WORLD

## Competitive green hydrogen on its way

Equipment has now been invented, based on patented technology from SINTEF, that reduces energy loss in the production of green hydrogen – perhaps even as much as halving the loss. The solution is being commercialised via the establishment of a spin-off company, **Hystar**, with SINTEF TTO as its assistant. Hystar is a new addition to a Norwegian showpiece: water electrolysis. In other words, splitting water using electricity. When renewable electricity is used, the zero-emission hydrogen fuel is produced completely emission-free.

If Hystar succeeds, water electrolysis could become cost-effective enough to make green hydrogen competitive with hydrogen produced using fossil sources. This would open up a huge market for the company's electrolysis equipment. Green hydrogen can be used for the large-scale storage of solar and wind power, and like all other hydrogen, can also be used as a fuel for heavy goods transport and as a factor input in industry.

→ Read more here.

Photo: Shutterstock

A SCIENTIFIC TOOL FOR CALCULATING YOUR IMPACT ON SUSTAINABLE DEVELOPMENT

## We can 'see' companies' indirect emissions

How do long lines of subcontractors affect companies' footprints? Norwegian knowledge can now provide the world with the answer. The EU is preparing a new Directive on sustainability reporting. In Norway, all state-owned enterprises now have to report their direct and indirect greenhouse gas emissions. This requires expertise in a new discipline: Keeping climate accounts for the entire value chain that culminates in the end products, across national borders.

SINTEF's spin-off **MoreScope**, which SINTEF TTO helped establish in 2022, assists industry with exactly this type of climate reporting, all with the help of highly praised economic models and associated environmental datasets. The impact on sustainability can be measured based on target 12.6 by counting the number of enterprises that decide based on this to incorporate data on their sustainability into their reporting routines.

→ Read more here.

# 3.6 Greenhouse gas removal – the SINTEF Global Climate Fund

**SINTEF established the SINTEF Global Climate Fund in 2021 to address the gap between the massive global need for new carbon removal solutions and the disproportionately limited funds available for early research in the field.**

In its latest Assessment Report (2022), 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, as well as changes in patterns of demand and carbon removal solutions to offset any remaining residual emissions. Carbon removal solutions are becoming increasingly relevant because global cuts in emissions are not happening fast enough.

More than 99 per cent of the limited amount of carbon removal currently taking place uses conventional methods of carbon sequestration in nature. Just 0.1 per cent uses new technological methods. No one solution or technology can meet the need for carbon removal on its own, and there is a pressing need for new solutions.

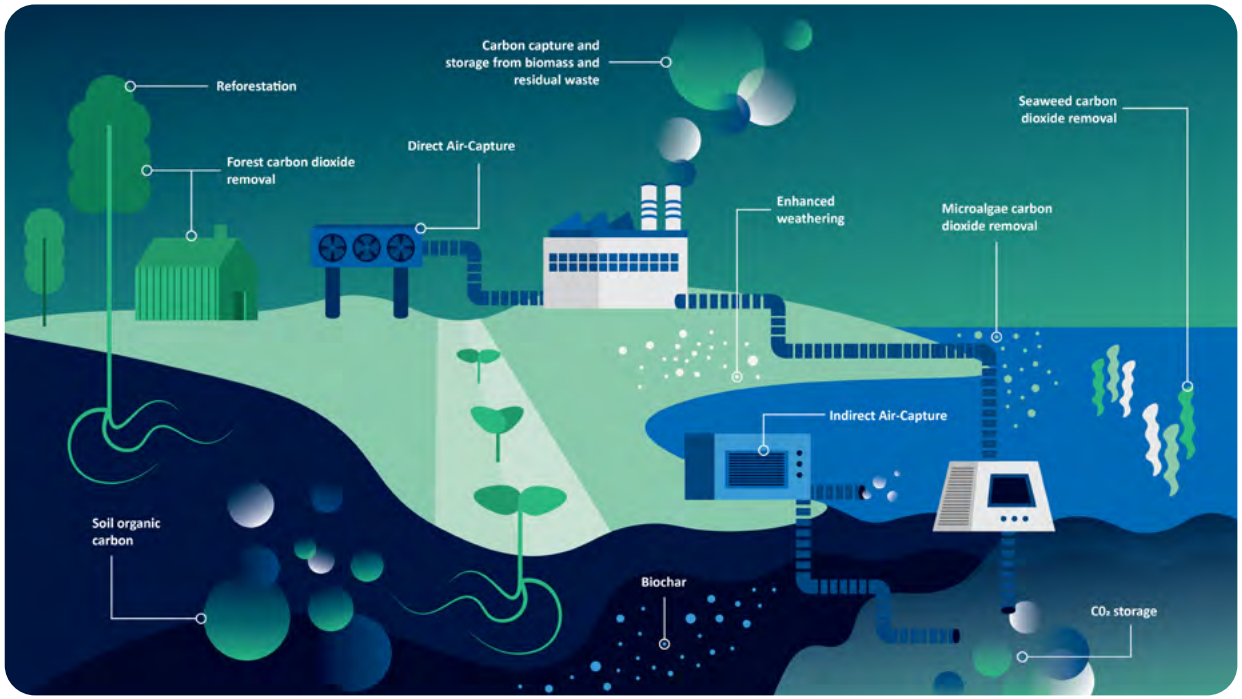
SINTEF established the Climate Fund to help find new carbon removal solutions that can be scaled up and commercialised. The Fund's project portfolio currently consists of research on both nature-based and technological solutions, and the Fund intends for the projects to cover a wide range of solutions.

Since its inception in 2021, the Fund has funded five research projects. 2022 was its first year of full operation. So far, the projects can point to good results – see the Climate Fund's Annual Report for more details. SINTEF will contribute NOK 7 million to the Fund each year in the period 2021-2023. The size of the contribution corresponds to the volume of emissions from our activities, which we are working to reduce but cannot eliminate in the short term.

It is our belief and intention that the financial contributions will have a greater climate impact when invested in early research on climate-positive technologies than were they to be used to purchase climate credits. We have also opened the Fund to external contributors. The aim is to grow the portfolio of research projects financed via the Fund. Upon its launch, SpareBank 1 SMN became our first external partner, and it remains a partner.

The Climate Fund has been assessed by CICERO Shades of Green, which provides an independent, research-based second opinion on sustainable financing. It achieved the best score, 'Dark Green'.

For more information see Climate Fund's website



# Chapter 4

# Managing SINTEF

Photo: Shutterstock

## 4.1 Corporate governance

**SINTEF 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.**

SINTEF's activities are also monitored by the Foundation 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.

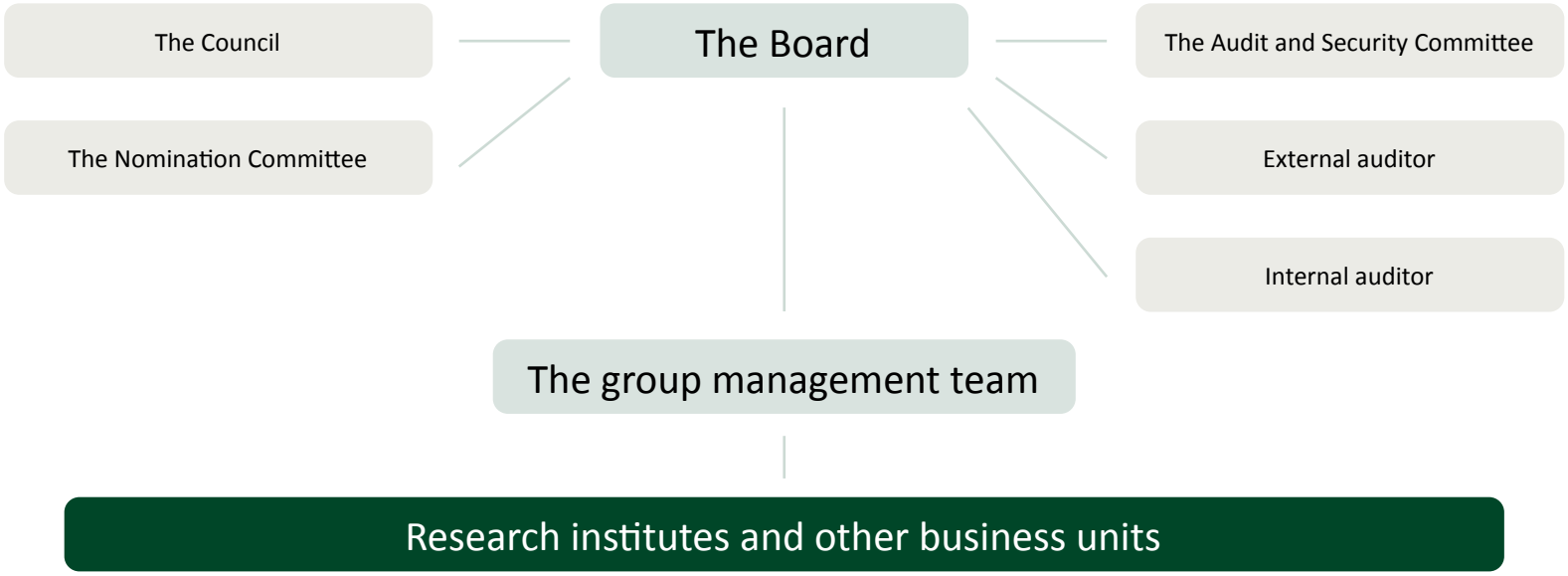
The SINTEF Foundation is the SINTEF Group's parent company and is the accountable body with respect to SINTEF's purpose and social mission, which is to conduct research within the natural sciences, technology and health and social sciences. Our vision, 'Technology for a better society', entails SINTEF being a driving force behind the transition and development of Norwegian society.

One key prerequisite in our corporate governance is ensuring that SINTEF's independence and integrity are safeguarded 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.

SINTEF's group management team is responsible for the strategic management of our overall activities. SINTEF's CEO, Alexandra Bech Gjørv, is also the administrative director of the SINTEF Foundation and SINTEF AS, as well as chair of the board in SINTEF Energy Research, SINTEF Ocean and SINTEF Manufacturing.

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

### SINTEF's governance structure



### 4.1.1 The composition and responsibilities of the Board

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 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 meetings a year. Meeting attendance in 2022 was as follows:

- Three board meetings were fully attended
- Four board meetings had one absent board member, although at three of the meetings a deputy attended
- One extraordinary board meeting, which was convened with an hour's notice, had two absent board members

## As of 31 December 2022, SINTEF's Board of Directors consists of:

| Members |
|---|
| Chair Tore Ulstein, Chair of the Board of the Ulstein Group and others |
| Deputy Chair Øyvind Weiby Gregersen, Dean of the Faculty of Natural Sciences, NTNU |
| Arne Birkeland, CEO, Mørenot Group |
| Hanne Refsholt, Chair of the Board, NMBU |
| Siri Forsmo, Dean of the Faculty of Medicine and Health Sciences, NTNU |
| Kristin Misund, SVP R&D, Borregaard |
| Bård Myhre, 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 Engineering, NTNU |
| Erlend Skagseth, partner, Sarsia Seed Management AS |
| Øystein Wiggen, Senior Research Scientist, SINTEF Digital |
| Kjerstin Ellingsen, Acting Research Manager, SINTEF Industry |
| Maria Gellein, Technician, SINTEF Industry |

SINTEF's Board of Directors. From the left: Arne Birkeland, Kristin Misund, Øyvind W. Gregersen, Hanne Refsholt, Bård Myhre, Siri Forsmo, Malin Sletnes, Bendik Sægrov-Sorte and Tore Ulstein. Photo: Birthe Midtun/SINTEF.

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.

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 4.4. 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 2022. The remuneration of board members is determined by the Council.

### 4.1.2 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 has twenty-eight members. Twenty-five must be appointed by NTNU's Board of Directors, the Norwegian Society of Graduate Technical and Scientific Professionals (Tekna), the Confederation of Norwegian Enterprise (NHO), the Norwegian Confederation of Trade Unions (LO), the University of Oslo (UiO) and SINTEF's Board, respectively. Three members are elected from among employees of the limited research companies in the SINTEF Group.

The Chair of the Council is NTNU's rector. 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.

### 4.1.3 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.

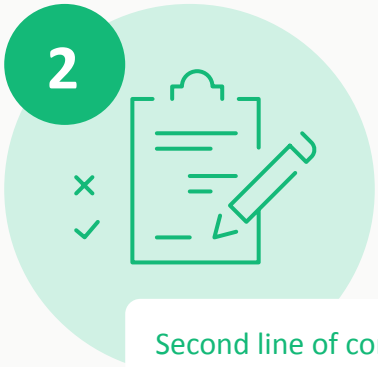
In 2021, the Board decided to establish a board subcommittee, the Audit and Security Committee, to strengthen the Board's work within finance and particularly within security and information security. The committee met twice in 2022. A specific mandate has been established regarding the committee's roles, responsibilities and tasks. The committee reports to the Board and is scheduled to meet three times a year.

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

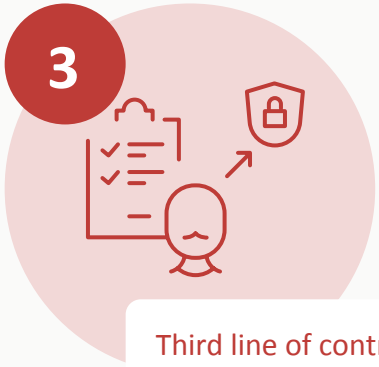
The Board of the SINTEF Foundation prepares an annual report in accordance with the Norwegian Code of Practice for Corporate Governance (NUES standard). The report is publicly available from our website.

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

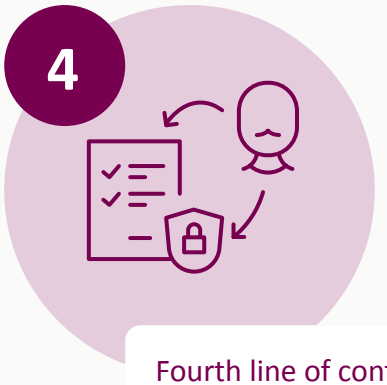

**First line of control**
Managers and employees in the line and in project organisations




**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

# 4.2 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 and 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.

## 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 mitigating measures are defined and implemented on an ongoing basis. The group management team and the Board review the risk picture every four months, and an annual report is produced by the internal audit for the group management team and the Board.

In 2022, 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. Part of this work focused on risk in work processes and the establishment of key controls for risk management. Further development and implementation are part of the Group's continuous improvement work and will be continued in 2023.

In 2022, the internal audit's work mainly involved advice in connection with the corporate 'Internal control and maturity in cash flows' project. Our sustainability reporting was also audited, which resulted in recommendations for further improvements over the next few years. Digital and physical penetration tests of SINTEF's digital infrastructure and buildings in Trondheim were also carried out. This testing was conducted by Netsecurity. It resulted in several findings regarding increased awareness that need to be followed up, as well as improvements and increased levels of security for our digital and technical infrastructure.

In 2019/2020, SINTEF Energy Research conducted a climate-related risk assessment for the institute. The goal was not only to acquire expertise on what climate-related risk means for its activities, it was also to understand what this means for clients, and how SINTEF can be a sparring partner in assessments of clients' climate-related risk. The project used methodologies sourced from CICERO and the Norwegian Climate Foundation that roughly sort climate-related risk into physical risk and transition risk. The latter, which includes the economic risk associated with the transition to a low-emission society, was in particular found to be highly relevant.

At the same time, climate-related risk presents considerable opportunities. The path to 2050 is dependent on new or enhanced technological developments, which are at the core of SINTEF's activities. SINTEF has not conducted a full climate-related risk analysis at a corporate level. But we will consider whether, and if so, how, this should be done.

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. This transparency is intended to promote respect for human rights and fundamental labour rights in industry.

SINTEF has so far adapted its governing documents and routines to ensure compliance with the Transparency Act. The new procedure will be implemented through information via the intranet, while a guide on carrying out due diligence has also been produced. The supplier base has been analysed based on a risk-based approach, and action plans and measures will be assessed on an ongoing basis 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.

The SINTEF Group 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

# 4.3 Ethics and compliance

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

Ethics are an integrated part of to SINTEF's strategy and apply to all employees. The group management team often discusses ethical dilemmas (see section 4.8). Internal meetings include a review of HSE, safety and ethics.

Our management system includes requirements for ethical management and social responsibility, as stated in our 'Ethics Compass' and the fifteen general policy documents all employees can access on our intranet. Ethics is assessed in all phases from sales to execution.

The SINTEF Academy arranged five ethics courses in 2022. One hundred and seventy-eight new employees and one hundred and sixty-five new project managers underwent the training, and ethics was added to seven research scientists' research methods courses.

A course module on ethics and management is included in the management development programmes 'The Management Platform' and 'Good Management at SINTEF' (thirty-nine participants in 2022).

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 social mission.

We established a research ethics Integrity Committee in 2021. The committee meets annually and when suspected irregularities are reported. The committee supports the Ethics Representative in related matters as required. No urgent cases were reported in 2022. Two cases concerning publication and ethics in relation to the use of own research funds were considered by the committee last year.

The Ethics Representative received various concerns and questions about ethics from employees and managers. Recurrent themes were research ethics, including publication rules, line manager and project manager responsibilities and describing ethics in EU proposals.

Some cases concern role expectations/descriptions and uncertainties about the work situation. Such uncertainties can have different roots. The effects of the turmoil in Europe, particularly for some of our non-Norwegian employees, and uncertainties related to the physical working environment were notable topics in 2022, where two incidents in particular, related to ventilation, were the subject of much attention.

The Ethics Representative contributed to departmental meetings, management meetings and group management meetings where ethics were discussed.

The ethics procedures are available on the intranet and encourage people to report wrongdoing. They describe what is meant by wrongdoing, the whistleblowing procedure and the related administrative procedures, as well as protections for whistleblowers and how whistleblowing cases are followed up.

A number of whistleblowing cases/cases of concern were reported in 2022. 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. In this sense, they are HR cases where the Ethics Representative mediates the contact between the manager, employee and HR, and perhaps HSE personnel.

Transparency, audits and internal audits are considered important. SINTEF conducts advance checks of foreign companies using the RDC due diligence database. This tells us 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 2022, we strengthened our assessment of foreign clients by having a 'Compliance Task Force' review requests from them (approximately fifteen cases). The legal and ethical aspects of potential client projects are considered in addition to carrying out the advance checks. Ownership constellations are also assessed before starting a collaboration.

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, attends its annual corruption conference and receives information on corruption and ongoing anti-corruption work. We participate in the Norwegian National Research Ethics Committees where share ethical assessments rather than shielding them.

The war in Europe has made us especially aware of the fact that employees with unique knowledge could be subject to unwanted pressure.

SINTEF's defence-related R&D policy is important in this context. It describes our attitudes and principles in relation to dilemmas inherent in such research.

There were no cases of corruption among employees.

# 4.4 People

## Our employees

At the end of 2022, SINTEF had 2 185 permanent employees (corresponding to 2 062 full-time equivalents). The majority of our employees are scientific personnel, including managers and research directors (76 per cent), of whom more than 61 per cent have a PhD. It is fairly rare for SINTEF to offer temporary positions. In 2022, only 2.1 per cent 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 there is a good supply of qualified applicants in most fields. At the same time, we view it as positive, and as part of our social mission, that, through their work, employees of SINTEF are developing insights and skills that are attractive competencies for industry and other enterprises and are thereby helping to strengthen these enterprises.

## Gender balance

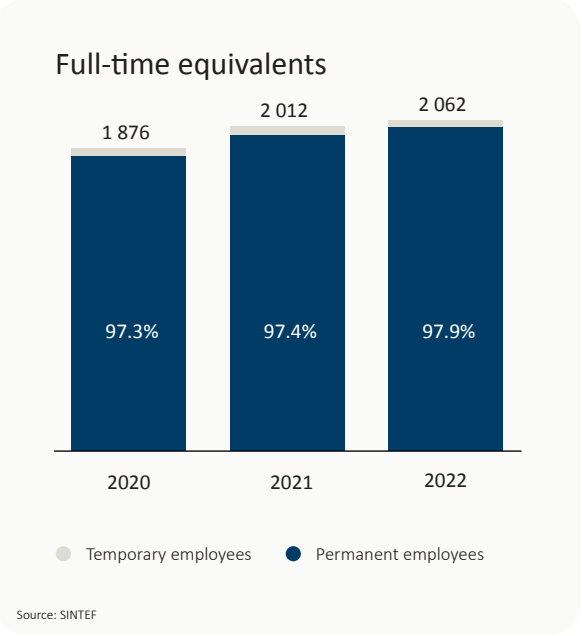
SINTEF's goal is to increase the proportion of women among our research scientists and managers. SINTEF's CEO is a woman, half of the heads of the institutes are women, and the proportion of women in the group management team is 38 per cent. SINTEF strives to recruit women when hiring and to develop female managers and research scientists from within our own ranks. Nevertheless, the structural biases that exist between fields 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 also includes a detailed overview of pay and gender. This will be updated for 2023 (in Q1 2024).

## 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 that requires facilitation is employees with children. In practice, all employees have flexible working hours, with core hours 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. 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.




Source: SINTEF


Source: SINTEF


## 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.

## International diversity

In order to successfully deliver on major social challenges, a research institute requires a diverse range of experience, approaches and perspectives. SINTEF's strategy for 'people' states that diversity and a good gender balance are important. We achieve these 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, developing, and using the resources that diversity and gender balance represent within their 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

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

valuable scientific and cultural expertise. In 2022, 31 per cent of all SINTEF employees were born in countries other than Norway. They come from a total of eighty-one different countries, with most coming from Germany, France, Italy 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.

The risks related to intelligence activities and illegal knowledge transfers have increased because of Russia's war in Ukraine. 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 2022, SINTEF did a lot of work on complying with export control regulations and on ensuring our employees are well taken care of.

MOST ATTRACTIVE: CEO Alexandra Bech Gjørv accepts visible proof that young people ranked SINTEF the most attractive employer this year. It is the first Norwegian enterprise to achieve first place. The prize was presented by Mats Furuland, CEO of Academic Work. Behind from the left: research scientists, Guillaume Bour and Henrik Strand, with employer brand manager, Jon Kjetil Brandt. Photo: Thor Nielsen/SINTEF

## Attractive workplace/employer

2022 was also a very good year for SINTEF's work on its employer branding and attractiveness as an employer. SINTEF became the first Norwegian enterprise to be named the winner of Academic Work's major Young Professional Attraction Index (YPAI) survey. Universum's two surveys also found very satisfactory results: nationally, students ranked us as number five, and if we ignore the results for students at UiO and NTNU, we were ranked second.

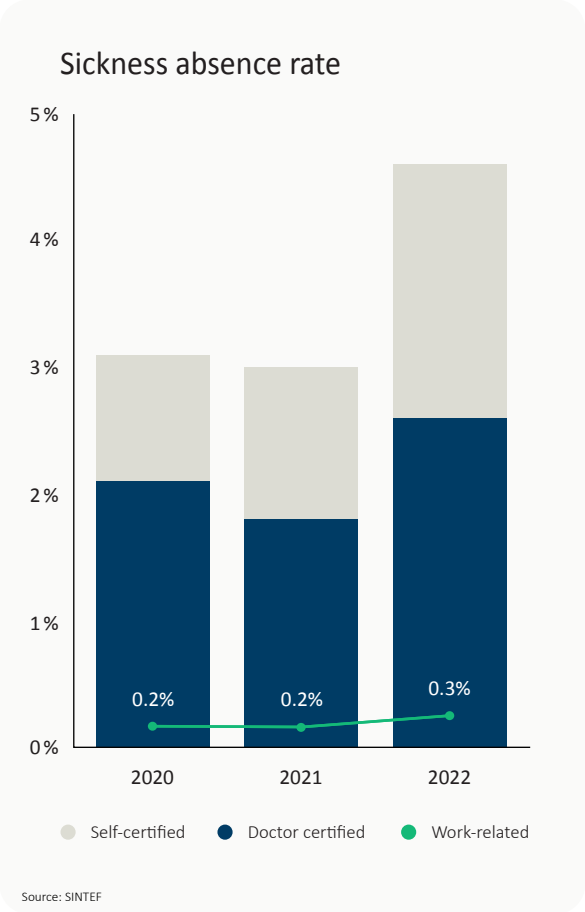
Furthermore, Universum's student survey found that SINTEF is the country's most attractive employer in the fields of biology, biotechnology, chemistry, materials technology, mathematics and physics. Some 2 493 students took part in the survey. In Universum's survey of working engineers, we were ranked fourth overall and second by women. Given the competitive situation in the labour market, we are also very pleased with this result.

## 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 response rate is usually high in the working environment survey. In January 2023, it was 93 per cent. 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 consequence of the good work we have done on developing SINTEF's working environment over time. This year's survey also found that more employees feel that their work is contributing to sustainable development.

## Sickness absence

In 2022, the sickness absence rate at SINTEF was 4.6 per cent, while the work-related sickness absence rate was 0.3 per cent. While this is a significant increase from 2021, it reflects the general trend for sickness




Source: SINTEF

Photo: Berre/SINTEF

absence in Norway from 2021 to 2022. All sickness absence is systematically followed up in the institutes. This follow-up involves managers staying in close contact with the person on sick leave and sickness absence being prevented through the proper exercise of management principles.

## 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. Furthermore, 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 common practices, cultures and understandings are developed.

In 2022, a total of three hundred and eighty-two employees took our mandatory classroom courses. Of these, one hundred and sixty-five 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 2022, a total of 12 756 unique digital courses were completed in SINTEF Academy.

## Trade unions and liaison

SINTEF has a good and regulated relationship with the trade unions. We have full freedom of association, on a par with other Norwegian companies. A trade union representative attends all courses for new employees of SINTEF, both Norwegian and international employees. The representative informs them about the work of the trade union, what it is and why it is important. More than 74 per cent of SINTEF's employees were members of a trade union in 2022. SINTEF treats all employees equally, regardless of whether they are members of a trade union or not.

## 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.

# 4.5 HSE

HSE is a top priority at SINTEF. We focus on protecting our employees' safety and working environment and our HSE standard must correspond with our strategies, policies and objectives. Some activities take place under demanding conditions, with a higher risk of accidents and other adverse incidents. Reducing risk and good barriers require a lot of attention.

Learning from incidents and sharing experiences are important factors in improvement work and the group management team is briefed on all HSE incidents on a weekly basis. Tertiary HSE reports are shared with the group management team, the Board and all employees. These describe the status of KPIs and personnel injuries and critical incidents.

One-page HSE reports are produced for some incidents to ensure that important experience and lessons are shared. Incidents where the potential risk was high are investigated. Several investigations were conducted in 2022, and considerable work is being done on following up on the recommendations from these.

Of the approximately five hundred reports in 2022, thirty-seven were accidents and forty-four were near accidents. There was a total of twenty-seven personal injuries in 2022. Of these, eighteen required first aid and eight staff members needed medical treatment. Three incidents resulted in absence. This results in an LTI of 1.2 and a TRIF of 2.8 for 2022.

A trend analysis found there has been a general decline in the number of accidents and near-accidents from 2015 to 2022. During the Covid pandemic, we saw a decrease in the total number of reports. However, the analyses show that we are now back to the same level we were at before the pandemic.

All employees must contribute to a good working environment. This is crucial for the successful HSE work. Safety representatives, trade unions and working environment committees (AMUs) play important roles. These have to work with management to ensure good physical and psychosocial working environments.

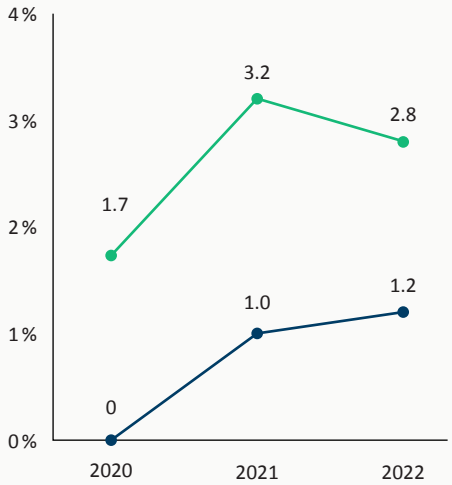
SINTEF's research companies and institutes have safety representatives, and each company has an AMU. SINTEF AS has an institute AMU, which is a subcommittee. This ensures local anchoring. AMUs work to ensure the working environment is fully satisfactory and act as HSE planning and development arenas.

SINTEF believes good HSE training is very important and that it helps to 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 whose work involves particularly high-risk factors, such as hydrofluoric acid, sources of radiation and activities at heights, have to take special courses.

The group management team discusses preventive HSE topics every year. In 2022, ventilation in laboratories and workshops was an important topic. Discussions with KL led to a better understanding of responsibilities and roles, as well as the importance of the good operator and user cooperation necessary to maintain ventilation as a barrier in laboratories and workshops.

SINTEF's occupational health service (OHS) is provided by an external supplier, with personell at each site in Norway. It carries out targeted employee health interviews of those whose work involves factors that could impact health. These employees are followed up every three years, or more often if this is indicated as necessary. The OHS also offers occupational medical aid, ergonomic workplace assessments, occupational hygiene surveys and psychosocial working environment follow-up from psychologists and counsellors.

Personal injuries frequency (LTI and TRIF)




Total Recordable Injuries Frequency (TRIF)
Number of personal injuries per million hours worked (excl. First aid injuries)

Lost time injuries (LTI) frequency
Number of personal injuries with absence per million hours worked

Source: SINTEF

# 4.6 Climate and environment

## SINTEF wants to cut emissions from its own activities.

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

We are systematically working to lessen our environmental impact, and we strive to comply with the Board's decision that our activities will be guided by the SDGs, while still seeking to satisfy the expectations of employees, clients and the rest of the world. Our environmental policy governs how we operate our buildings and conduct our research activities.

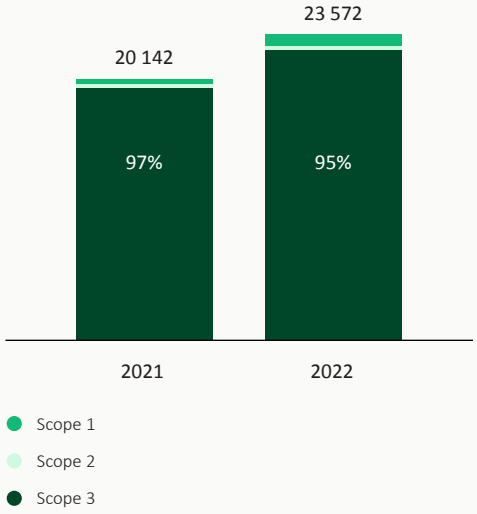
In our climate and environment work, we were, until 2021, most concerned with direct emissions related to our activities, so-called 'Scopes 1 and 2 emissions'. Last year, for the first time, we used technology developed by the company MoreScope in the preparation of our climate report for 2021. This means that we looked at SINTEF's overall carbon footprint, which includes the indirect emissions that stem from the entire value chain of which we are a part. We have chosen to do the same for 2022. The technology was developed by a SINTEF research environment, and MoreScope was established as a separate company in autumn 2022.

While for the years prior to 2021 we calculated emissions based on somewhat limited data on energy and water consumption, waste and air travel, MoreScope uses financial transactions as its basis for climate reporting. In 2022, around 84 per cent of emissions were based on financial transactions. The other emissions are based on material consumption.

All purchases in SINTEF are converted to emissions in accordance with the Greenhouse Gas Protocol (GHG Protocol). This provides us with far more comprehensive data for calculating Scope 3 emissions. In 2022, Scope 3 emissions accounted for as much as 95 per cent of SINTEF's total emissions. The calculation model was revised throughout the year. Some of the emission figures for 2021 have therefore been updated to ensure consistency in comparisons between 2021 and 2022. This applies in particular to the calculations for Scope 2 emissions.

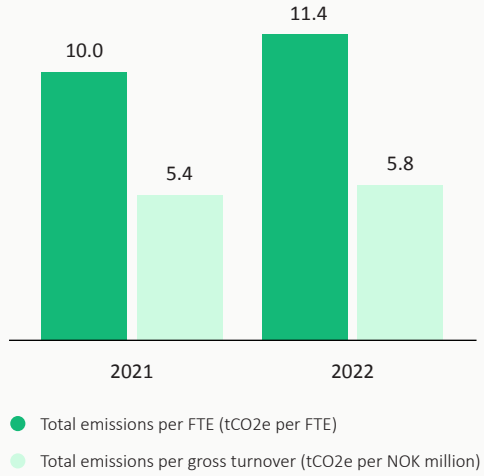
The climate report provides us with a picture of emissions in 2022, as well as a starting point for our continuous improvement work. The purchasing department uses the insights into emissions per supplier and product categories that this system provides. The department also contacts individual suppliers to request more accurate emissions data. When this is available, the system is updated, which will affect our reporting during the year. The figures in this climate report for 2022 are thus preliminary emission figures for 2022. We will gain a better insight into these over the course of 2023.

Emissions in last two years in tCO2e [17)]




Source: MoreScope

Emissions relative to FTEs and turnover




Sources: Total emissions; MoreScope, full-time equivalents and turnover; SINTEF

17) Scope 1 primarily comes from purchased gas. Scope 2 only includes energy used in buildings owned by the SINTEF Foundation (approximately 60 per cent of the areas used). Scope 3 is calculated on the basis of all of SINTEF's purchases.

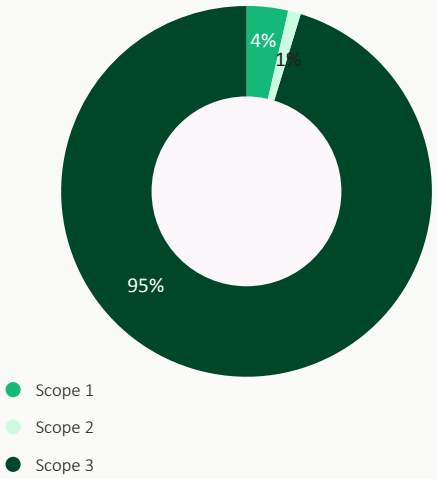
In the long term, the system will be able to show the impacts the choices we make have on emissions.

The climate report conforms to the GHG Protocol and divides emissions into direct emissions from operations (Scope 1), indirect emissions from energy consumption (Scope 2) and all indirect emissions upstream in the value chain (Scope 3). At the moment, we lack a method for calculating indirect emissions downstream. Such reporting would have a positive impact on SINTEF's carbon footprint. This is because a large proportion of our projects and research findings help to reduce or eliminate emissions at our clients' sites.

Total emissions increased by 17 per cent from 2021 to 2022. Any comparison with previous years could provide a skewed picture since both 2020 and 2021 were heavily affected by Covid. The figures for 2022 have naturally been affected by more people being in the offices and laboratories and a return to more normal travel levels in projects. For example, emissions from air travel have increased by more than 1 300 tCO2e since 2021, although they were significantly lower than in 2019, the last normal year before Covid. The increase in emissions from air travel alone accounts for 39 per cent of the total increase in 2022.

Scope 3 emissions account for the largest increase in emissions. In addition to air travel, emissions from 'property, plant and equipment' (fixed assets) and 'purchases of goods and services' have increased the most. The major rehabilitation project for the office and laboratory building at Forskningsveien 1 in Oslo and the expansion of SINTEF Energy Research's office and laboratory building in Gløshaugen in Trondheim have especially contributed to this, although generally higher activity levels have increased emissions in all Scope 3 categories.

Proportion of Scopes 1, 2 and 3 emissions in 2022 [18)]




Source: MoreScope

## Energy and water consumption, properties and waste

The SINTEF Foundation owns and manages buildings with a combined floor space of 108 000 $m^2$. This amounts to around 60 per cent of the total area used by SINTEF in its daily operations. The remaining premises are owned by other SINTEF companies or leased by NTNU and others. The information in this chapter covers the buildings owned and managed by the SINTEF Foundation.

A significant proportion of the owned buildings consists, in addition to ordinary office space, of a wide range of laboratories with special requirements for round-the-clock operation and special ventilation needs. We also have maritime research basins that hold enormous volumes of water. Therefore, it is difficult to compare energy and water consumption and waste volumes with what is normal for ordinary office buildings.

The new investments being made in real estate are very ambitious from an environmental perspective. The 'Modernisation of Forskningsveien 1' project in Oslo was completed in 2022. This almost seventy-year-old building now meets passive house standards and has energy solutions such as solar cells and heat pumps. Its modernisation halves its energy consumption and will save an estimated 4 000 tCO2e through the reduced use of materials.

We have started work on the development of SINTEF Horizon in Gløshaugen. This is a new office building that will solve SINTEF's capacity problems and facilitate digital collaboration in Gløshaugen. We are also heavy contributors to the state's investment in Professor Mørchs Hus in Tyholt, which is the office building linked to the Norwegian Ocean Technology Centre. Both projects will be certified in line with the BREEAM Nor-Excellent standard and are expected to be completed by the start of 2025.

SINTEF constantly works to identify and implement measures that will 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 and implement measures such as reducing energy consumption and the number of flights or increasing the source separation of waste.

18) Scope 1 primarily comes from purchased gas. Scope 2 only includes energy used in buildings owned by the SINTEF Foundation (approximately 60 per cent of the areas used). Scope 3 is calculated on the basis of all of SINTEF's purchases.

In 2022, we reduced energy consumption (kWh/m2) by a further 6 per cent from 2021. It is now 23 per cent lower than five years ago (2017). Our target was a 15 per cent reduction in kWh/m2 from 2017 to 2021. We achieved this by a wide margin. We are now developing a new target, which will use 2022 as its baseline. Further reductions will require us to implement a new form of energy management. We will consider whether ISO 50001 certification is right for us or whether we should look at other energy management methods.

Examples of measures that were implemented in 2022, some of which will be continued in 2023, 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.
- More extensive use of heat pumps in buildings.

As far as waste is concerned, the source separation rate was slightly lower in 2022 than in previous years. Several measures are being implemented to improve this situation. The aim is to achieve our target source separation rate of 60 per cent. The quantity of waste was slightly higher than in 2021. 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.

- A scheme in which food waste is source separated as a specific fraction will be deployed in our office areas, more specifically in the kitchenettes in the various departments. Such source separation is already carried out in our canteens.
- Our residual waste is currently being analysed 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 improvements regarding information.

## Energy, water and waste [19)]

| External environment | 2022 | 2021 | 2020 |
|---|---|---|---|
| Total energy GWh | 24.2 | 25.8 | 25.2 |
| Reduction (from 2017) in energy consumption kWh/m² | 23.1% | 20.7% | 11.9.% |
| Source separation rate Trondheim and Oslo | 36 | 41 | 39 |
| Mains water consumption in millions of litres | 30 | 26 | 29 |
| Consumption of non-renewable energy (gas in GWh) | 1.3 | 1.4 | 1.2 |
| Consumption of electricity (GWh) | 15.2 | 16.0 | 15.5 |
| Consumption of district heating (GWh) | 7.7 | 8.4 | 8.6 |
| Energy consumption per square metre (kWh/m²) | 279 | 297 | 329 |

Source: SINTEF

## Air travel

SINTEF's ambition is to be a world-leading research foundation. This means travel is a necessity since the Group, clients and partners are spread out 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 saw that it is possible to significantly reduce travel. At the same time, less

Emissions from air travel decreased by 43 per cent from 2019 to 2022

19) 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 per cent of total areas).

Photo: Berre/SINTEF

travel has also had some impact on our ability to develop strong research environments, which depend on contact. 2022 was an almost normal year. We can see that CO2 emissions from air travel decreased by 43 per cent compared with the last normal year, 2019, despite the higher number of employees. Travel is assessed on a monthly basis, while more thorough analyses are conducted every four months. Travel statistics and assessments of these, together with encouragement to continue facilitating digital participation in meetings and events, are shared with the organisation in order to raise awareness. It will also be important to remain focused on this going forward. This means ensuring that SINTEF employees travel in an environmentally responsible manner and thereby cut emissions from travel.

## Purchased goods and services

SINTEF used all of its purchasing data for the full year as a basis for calculating annual greenhouse gas emissions for the first time in 2021. It was quite apparent from this that emissions from purchased goods and services account for the largest proportion of our total emissions. For 2022, this category accounted for 95 per cent of SINTEF's emissions.

In 2022, we focused on obtaining more detailed insights into the emission data in collaboration with MoreScope, who calculate SINTEF's greenhouse gas emissions. From 2023, we will be able to quantify emissions per supplier and per purchasing category. This will provide information when we are prioritising and quantifying measures to cut emissions from the supply chain. We are also specifically working on collating, including and distributing this reporting together with other ongoing operational reporting at SINTEF.

One example of how insights into emission data can be used is SINTEF's work on a new coffee agreement in 2022. We consume about six tonnes of coffee every year at SINTEF. During the purchasing process, we focused on finding a supplier who has made conscious and well-thought-out choices when it comes to producers, transport, coffee machine maintenance and reporting – choices that all contribute to lower emissions. Our new supplier will reduce SINTEF's emissions from coffee consumption in the coming years.

## Climate compensation

SINTEF's activities will give rise to emissions for the foreseeable future. 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. It was clear to us that there are climate challenges that require new solutions, and that there is not enough funding for early research in these areas. In 2021, we established the SINTEF Global Climate Fund, which funds early phase research on carbon removal – solutions that remove greenhouse gases from air and water. We will invest NOK 7 million in the Fund each year in the period 2021-2023. We have also brought in SpareBank 1 SMN as an external contributor.

Our annual contributions to the Climate Fund cannot be used to offset our emissions in the climate report 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.

For further information on the Climate Fund, see section 3.6.

# Climate Report 2022

| Category | 2022 emissions | Proportion of total emissions (%) | 2021 emissions | Change 2021-2022 |
|---|---|---|---|---|
| | tCO2e | Per cent | tCO2e | tCO2e |
| **Scope 1[20)]** | **882** | **3.7%** | **375** | **134.9%** |
| Fuel, cars and boats (actual consumption) | 35 | 0.1% | 36 | -4.7% |
| Fuel, cars and boats (financial transactions)[21)] | 1 | 0.0% | 1 | 0 |
| Gas (actual consumption) | 652 | 2.8% | 232 | 181.1% |
| Gas (financial transactions) | 194 | 0.8% | 106 | 83.2% |
| **Scope 2[22)]** | **284** | **1.2%** | **304** | **-6.7%** |
| Electricity (location-based consumption) | 116 | 0.5% | 122 | -5.0% |
| District heating (actual consumption) | 168 | 0.7% | 182 | -7.8% |
| **Scope 3 – Upstream** | **22 406** | **95.1%** | **19 463** | **15.1%** |
| 1. Purchased goods and services (financial transactions) | 14 017 | 59.5% | 13 500 | 3.8% |
| 2. Capital goods (financial transactions) | 5 666 | 24.0% | 4 788 | 18.3% |
| 3. Fuel and energy-related activities (not included in Scope 1 or Scope 2) | 0 | 0.0% | 0 | 0 |
| 4. Upstream transport and distribution (financial transactions) | 794 | 3.4% | 627 | 26.7% |
| 5. Waste from operations (financial transactions) | 153 | 0.6% | 122 | 25.8% |
| 6. Business travel[23)] (95% actual consumption) | 1 758 | 7.5% | 415 | 323.8% |
| 7. Employee commuting[24)] | N/A | N/A | N/A | |
| 8. Upstream leased assets (95% from financial transactions) | 19 | 0.1% | 12 | 60.9% |
| **Total** | **23 572** | | **20 142** | **17.0%** |

Source: MoreScope

20) Actual and estimated fuel consumption for SINTEF's owned company vehicles plus one vessel, as well as purchased gas.

21) We distinguish between emissions calculated on the basis of actual consumption and emissions calculated on the basis of financial transactions. For financial transactions, average emission figures at an industry level in the supplier's country are used.

22) SINTEF used 24.2 GWh of energy in buildings owned by the SINTEF Foundation (equivalent to approximately 60 per cent of the total areas used). Emission calculations use the same factor as the Norwegian energy mix, i.e. location-based calculation. Were market-based calculation used, emissions from electricity would have increased by approximately 6 000 tCO2e in 2022. Energy emissions related to the approximately 40 per cent of building space not owned but used by SINTEF are calculated based on lease costs from providers of real property management services (Scope 3: purchased goods and services). The district heating consumed in 2022 was calculated using emission factors from the two largest suppliers in Trondheim and Oslo. For 2021, it was calculated using a common emissions factor for the Norwegian district heating industry (fjernkontrollen.no). The method used to calculate Scope 2 emissions was different to the one used in the previous year's report. The figures for 2021 have therefore been restated to ensure comparable figures.

23) Business travel is not included in SINTEF's purchasing data from SINTEF's accounting system. The travel agency that manages our business travel has estimated the greenhouse gas emissions from the total number of flights made by SINTEF employees. Other employee travel expenses are not included.

24) No data on greenhouse gas emissions from the employees' commuting was available for the report.

# 4.7 Purchasing

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 underpin the focus on sustainability in purchasing. For example, our purchasing procedure. When requesting quotations, sustainability is the first award criterion.

Due diligence must always be carried out. For purchases in excess of NOK 250 000, a specific supplier assessment must also be conducted. Purchases must be part of project risk assessments. Information concerning business conduct and social responsibility is appended to agreements.

We did extensive work on updating templates and documents in 2022. We provided the organisation with information and training on the changes.

We now have concrete plans in place for the implementation of digital solutions for documenting and checking compliance with our purchasing requirements.

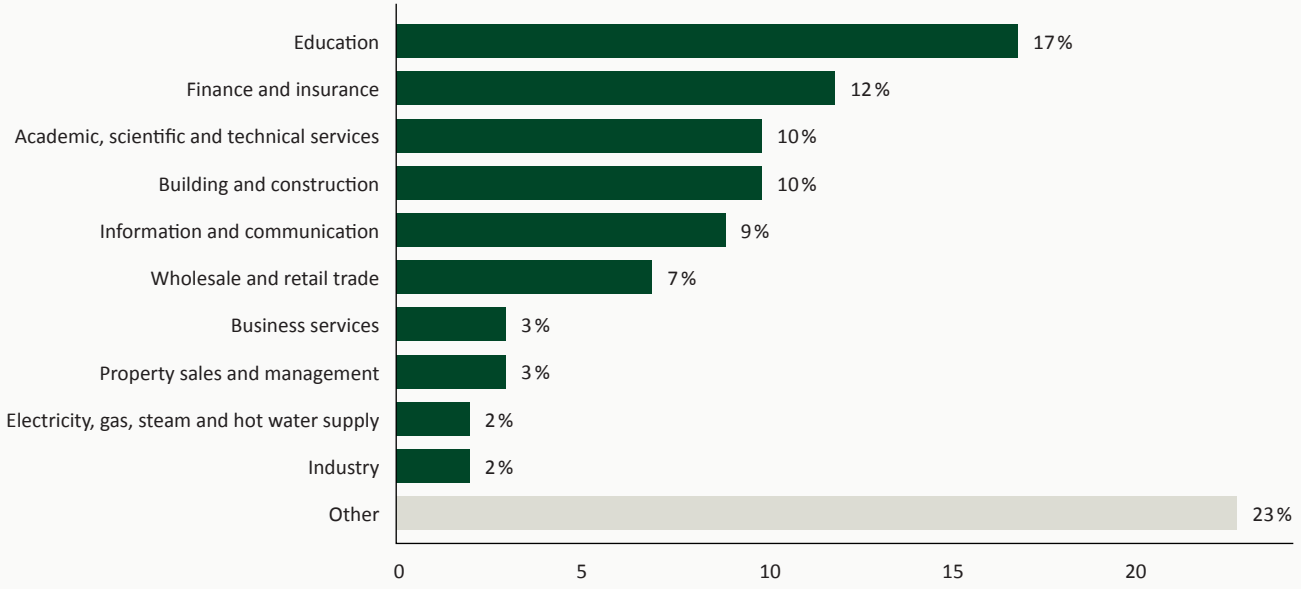
Sustainability is a key topic throughout agreement periods with suppliers. We hold status meetings with our contractual partners. Sustainability and the environment are topics that are discussed and followed up in these.

The measures and follow-up will vary depending on what sort of supplier it is. For example, when dealing with a supplier of chemicals we will follow up on quality and sustainability goals, as well as packaging, transport and shipping. When it comes to a supplier of canteen services, we will focus on the proportion of plant-based food, local produce and less food waste.

More than 90 per cent 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's suppliers grouped by sector [25)]

Proportion of net purchases from Norwegian suppliers




Source: SINTEF

25) SINTEF's net purchases from Norwegian suppliers in 2022 by industry. The graph shows the top ten purchasing categories and their respective proportions of total net purchases.

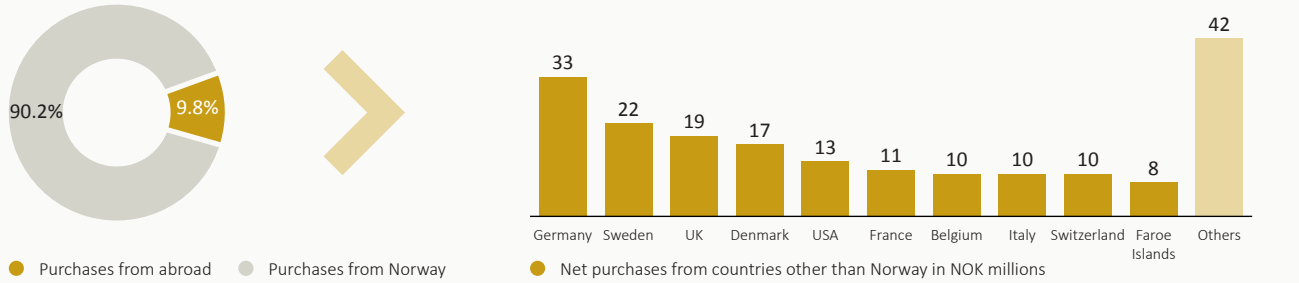
SINTEF registers all invoicing from abroad. In 2022, our purchases from abroad amounted to NOK 195 million. A large proportion of this was spent on purchases from partners in academia, although it also includes other suppliers.

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 8.5 million. This represents 0.4 per cent of SINTEF's total purchases in 2022.

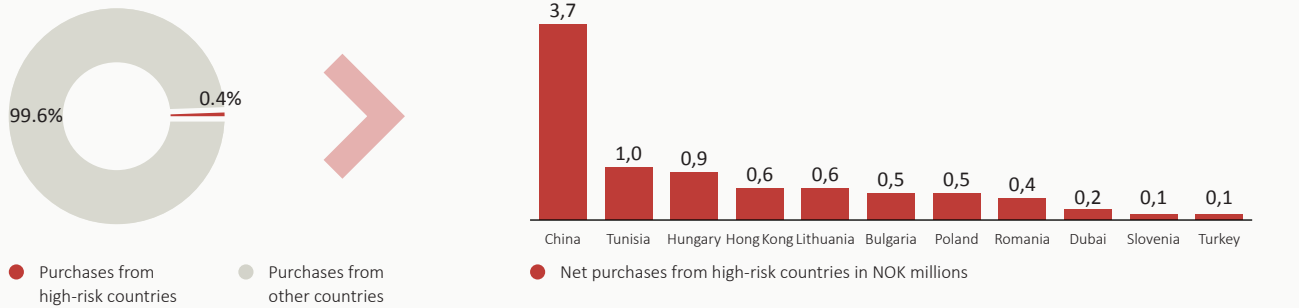
We conduct a quality audit involving mapping and background checks of all these suppliers and purchases in order to identify learning points and improve SINTEF's due diligence methods and knowledge.

## Purchases from abroad account for 10% of our purchases




Source: SINTEF

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




Source: SINTEF

## The Transparency Act

The Act relating to enterprises' transparency and work on fundamental human rights and decent working conditions (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 fill in a supplier assessment. We also carry out background checks to identify possible adverse impacts. 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.

Due diligence assessments of SINTEF's suppliers and individual clients are conducted using a risk-based approach. Due diligence assessments must be updated at least once a year.

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.

SINTEF did not identify any irregularities in its due diligence assessments in 2022. To reduce the risk of future irregularities, purchases will, wherever possible, be made via framework agreements. Purchases from high-risk countries will be assessed on an ongoing basis and attempts made to reduce them.

## 4.8 Ethical dilemmas related to sustainability

A great deal of SINTEF's research work focuses 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. An example of this is growth as it is expressed in goal 8) Decent Work and Economic Growth. Economic growth is regarded by many as contrary to protection of the climate and nature. Several such conflicts also arise in 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 seeking solutions that reconcile seemingly irreconcilable objectives. Sustainability-related dilemmas are high on SINTEF's agenda. They are discussed strategically by the management of SINTEF. Either on our own initiative or following input from the organisation in connection with research activities, or indeed at the behest of external stakeholders.

2022 was a special year in this regard, with war in Europe and the associated direct threat to security of supply, not only of energy but also of critical factor inputs. The reversed globalisation of markets is creating new dilemmas. It is also imposing restrictions on how one can and should share information, as well as within access to technology and infrastructure.

This goes right to the heart our activities, which are largely based on transparent innovation, extensive collaboration with universities and trust guided by the principle 'as open as possible and as closed as necessary'. The dilemmas discussed in the following sections represent a selection of the most important ethical issues the management worked on in 2022. SINTEF identified these early on and there is an ongoing and broad dialogue about them in the Group.

If something is a dilemma, it means that the answers are not a given. These are exciting questions to address for a research institute. Therefore, we have established corporate initiatives in several of these areas and sought collaborations with institutes with complementary knowledge. Examples of these include 'biodiversity and land use', 'new climate-positive solutions' (sustainable carbon cycles) and a grouping that has assessed oil and gas activity in relation to our strategy, which states that our activities must be guided by the SDGs.

Conflicts related to renewables and minerals (pressure on land use) are growing. Our sharing and acquisition of knowledge at COP15 (the UN Biodiversity Conference) in Montreal carried a clear message that safeguarding the rights of indigenous peoples is central to the use of nature and economic activity, including bioprospecting. These are highly relevant topics for goal 16) Peace, Justice and Strong Institutions and goal 17) Partnerships for the Goals.

Photo: Berre/SINTEF

# Sustainability dilemmas prioritised by management in 2022 included:

## Biodiversity and mineral needs

The green transition requires large amounts of different minerals. 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. Nevertheless, we see a need for increased access to minerals, through extraction on land or possibly from the seabed.

Every mining project, both onshore and offshore, involves major interventions in nature with the associated high sustainability risk and therefore requires thorough, multi-disciplinary assessments. In this consultation statement we contributed our scientific insights from many relevant fields that addressed both the dilemmas and possibility of successfully extracting minerals offshore in a sustainably acceptable manner.

## Biodiversity and renewables

SINTEF works with all kinds of renewables. All energy production requires some intervention in nature. We have long worked with clients and environmental institutes on sustainable hydropower and coexisting with fish and fisheries interests and are now looking for similar solutions for offshore wind, marine life and fishing, such as via the NorthWind research centre.

## Oil/gas and the climate

Since its inception, SINTEF has been an important contributor to the Norwegian oil industry's development. We have come a long way in the green restructuring of our own portfolio. At the same time, we consider it prudent to contribute research and innovation in the transition towards zero-emission energy in production and use, in line with a 1.5°C scenario.

Therefore, our policy is that SINTEF supports safe and energy-efficient oil and gas extraction in existing fields. We do not work on exploration, and our advice on policy seeks

Photo: Berre/SINTEF

to help ensure that no new oil provinces are opened on the Norwegian continental shelf.

Nevertheless, dilemmas exist that mean that in 2022, in collaboration with clients, we carried out activities that challenge this line. This concerns certain projects designed to protect marine life, a project to extract gas that directly displaces oil consumption and a project to replace gas volumes that have disappeared since the outbreak of war in Ukraine. We also understand that our obligations as a recipient of a state basic grant and our role as an operator of national infrastructure make it difficult not to contribute our expertise to the basis on which decisions are made in projects announced by the authorities and that will be decided on by the Storting.

## Sustainable carbon cycles

In addition to being a major research player in carbon capture and storage, we also have many research projects related to the capture and use of CO2 from various processes – so-called 'CCU'. This 'reuse' of CO2 can reduce CO2 emissions, have other positive sustainability impacts and, in some cases, contribute to the storage of CO2 in permanent structures. However, the processes involved in separating out CO2 and then bonding it to new molecules often require a lot of energy and many factor inputs. Such solutions may, therefore, prove to have more adverse than positive impacts. In 2022, SINTEF thus developed a knowledge base related to so-called 'sustainable carbon cycles'. We use this to understand the impact of our own ideas and projects, and those of our clients.

## Land use

Cars are getting bigger, but parking spaces are not. A 2022 SINTEF study showed that average car width has increased from 180 to 190 cm. So, if the number of parking spaces remains constant, car parks will have to be bigger. Since most are built of concrete, their climate footprint will grow. The dilemma is:

Should society build functional parking spaces for the future or retain the current standards and accept more dents and cramped parking spaces that the elderly and pregnant cannot use? Will the property development industry sell flats without parking spaces? And will the authorities accept poorer parking standards? Can we authorise new car parks that will not be usable in the long term? Payouts due to car damage increased by 13 per cent in 2022. This is also an important element of the environmental accounts.

# Chapter 5

# Report and results


Photo: Berre/SINTEF

# 5.1 Board of Directors' report for 2022

**SINTEF is an independent, non-profit research foundation with expertise in a wide range of disciplines. We develop knowledge that benefits society and increases competitiveness in close interaction with industry, the public sector and other research environments.**

Our vision is **Technology for a better society.**

SINTEF's main missions are to help connect the needs of clients to the international research front and to continuously develop outstanding research environments, laboratories and other infrastructure that are available to support the needs of industry and the public sector for research, innovation and industrialisation across the country. Another important mission is to exploit our research results to create new industries.

SINTEF is organised as a foundation with wholly and part-owned subsidiaries. Dividends cannot be paid out, so the entire surplus remains in the Group. Our head office and the bulk of our employees are based in Trondheim, and we have significant additional 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, Arendal and Hirtshals, as well as an office Brussels.

SINTEF and the Norwegian University of Science and Technology (NTNU) are partners and work together closely on a strategic and operational basis. SINTEF also works closely with the University of Oslo (UiO) and a number of other research institutes, nationally and internationally.

SINTEF has considerable assets at its disposal, partly thanks to our investments and partly thanks to our position as a host of important publicly funded infrastructure, which we use in connection with our activities. Developed and undeveloped leasehold sites around the universities of Trondheim and Oslo represent a large part of the Foundation's capitalised assets, and co-located scientific groups involving both SINTEF and the universities are an important success factor for its scientific collaborations and innovation.

In October, SINTEF took over the remaining shares in SINTEF Narvik after becoming the majority owner at the end of 2019. Our stake in the laboratory company Norlab was sold to Nemko in June. In February 2022, SINTEF opened an office in Kongsberg.

## Strategy and framework conditions

2022 was marked by the war in Ukraine and the subsequent increases in energy prices, inflation and interest rates, changed value chains and a greater focus on security. At the same time, efforts to reduce greenhouse gas emissions, halt the depletion of nature and digitalise society had to continue at full strength.

In these circumstances, the Board was particularly interested in understanding the risk situation for SINTEF, both in order to assess the enterprise's vulnerability and in order to analyse how SINTEF can contribute to the required transition even more strongly. Based on major changes in the 'local' environment, the Board started a process to update our corporate strategy. This work is well underway and will be completed in autumn 2023.

By the end of 2030, the SDGs are meant to have been achieved, greenhouse gas emissions in Norway and Europe are meant to have been cut by at least 55 per cent, and the world is meant to be on track for climate neutrality by 2050. The authorities in major regions and countries are encouraging a digital green transition and securing critical value chains, and research policy is increasingly taking on geopolitical dimensions. Both the EU and the US have announced major funding for research and innovation related to climate legislation; the Green Deal, the 'Fit for 55' plan and the European Chips Act in the EU, and the comprehensive legislative and stimulus package of the Inflation Reduction Act and the US Chips Act in the US. In Norway, the government launched the ambitious 'Roadmap – The green industrial initiative' in 2022. The roadmap has not been followed up to any great extent with funding for research, which is regrettable because much remains to be done to achieve the green transition ambitions.

The year was characterised by considerable uncertainty about the


framework conditions for industry-oriented research in Norway, both in relation to allocations from the Storting (the Norwegian parliament) and in relation to the Research Council of Norway's finances.

The national budget for 2023 contained significant cuts in industry-oriented research, including in the areas of energy, green platforms and ICT, and there were indications that research budgets will be tight in the coming years. At the same time, the Board is pleased that the Storting decided in the national budget to allocate NOK 500 million to the 'Retur-EU' programme, which is crucial if Norwegian research institutes are to be able to invest heavily in the EU's research arena. It is very important that this is followed up in subsequent budgets such that the institutes' costs are covered in a satisfactory and predictable manner in EU projects of great importance for Norwegian industry's transition.

Construction work on the Norwegian Ocean Technology Centre (formerly the Ocean Space Centre) started in August 2022 as originally planned. Some uncertainty about whether it would be built arose in connection with the revised national budget and fears of an extraordinary growth in costs. The Board is pleased that funding was secured for the construction work in 2023 in the national budget, in which the government stated that "the Ocean Space Centre is the government's main priority with respect to maritime research, education and innovation."

In 2022, the Government took steps in relation to the financial management of the Research Council of Norway and appointed a new board. This triggered a temporary halt in a number of allocations, reduced the flexibility in how research funding is handled, and resulted in significant cuts in staffing and administrative costs. Considerable uncertainty surrounding the future of the Research Council of Norway remains.

In autumn 2022, the government presented a revised Long-term Plan for Research and Higher Education (LTP), which announces a comprehensive review of the research system, a strategy aimed at increasing industry's R&D to 2 per cent of GDP, a review of the Research Council of Norway's roles and functions and other measures. SINTEF will monitor these processes closely, given the situation in which instruments that promote collaborations between industry and research have been weakened over several years.

## Sustainability, HSE and ethics

The SDGs are at the heart of SINTEF's corporate strategy. Our main contribution to sustainable development is ensuring that the impact of our research and innovation contributes to the common good and increases competitiveness. We also constantly strive to improve the sustainability of our own activities.

HSE is a top priority at SINTEF, and we take a systematic approach to safeguarding our employees' safety and working environment. In order to improve awareness and insights throughout the organisation, we included the item 'security' in the first topic on the agenda in meetings and produced a specific threat assessment based on SINTEF's situation.

In 2022, there were a total of nine personal injuries, including four that resulted in absence from work. This results in an LTI of 1.2 and a TRIF of 2.8 for 2022. The Board strives to ensure that a continuous effort is made to avoid personal injuries, with preventive measures and learning from incidents.

In November 2021, there was an incident involving a leak of phosphine gas from a material sample at SINTEF Industry. The incident could potentially have caused serious physical injury. In 2022, the group management team and the Board followed up the incident with an external investigation, a review of the working environment and by implementing measures.

In 2022, the laboratories and offices in Forskningsveien 1 in Oslo underwent comprehensive refurbishment. During the refurbishment, faults were discovered in the ventilation system, which resulted in odours in the premises and halted laboratory activities for about two weeks. The ventilation system has since been improved. Thorough risk assessments and work were carried out to ensure appropriate ventilation and warnings, and an investigation is being conducted.

SINTEF has a clear ethical platform, which is also set out in our Ethics Compass. This describes the main areas for our work on ethics, which are research ethics, business conduct and relationship ethics. SINTEF's employees take multiple courses on ethics as part of onboarding, project management and management development programmes. The Ethics Representative receives and deals with enquiries, most of which result in advice on commercial, research and interpersonal relationships.

The Act relating to enterprises' transparency and work on fundamental human rights and decent working conditions (Transparency Act) entered force on 1 July 2022. SINTEF is proactively working on identifying and assessing possible adverse impacts on fundamental human rights and labour rights in the Group's supply chain. 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.

SINTEF constantly works to identify and implement measures that will reduce energy and water consumption, as well as waste generation, in its buildings. In 2022, energy consumption was reduced by 6 per cent. In the last five years it has been reduced by a total of 23 per cent. The refurbishment of Forskningsveien 1 in Oslo was completed in 2022 This almost seventy-year-old building now meets passive house standards, and its energy consumption has been halved. It is estimated that its modernisation will save 4 000 tCO2e per year through the reduced use of materials.

During the pandemic years we saw that it is possible to significantly reduce travel. 2022 was an almost normal year, and CO2 emissions from air travel decreased by 43 per cent compared with the last normal year. Travel is assessed on a monthly basis, while more thorough analyses are conducted every four months.

Our work on sustainability, the external environment, ethics and HSE is described in detail in chapters 3 and 4 of the annual report.

## Financial room for manoeuvre

SINTEF's operating profit for 2022 was NOK 127 million, compared with NOK 268 million for 2021. Profit before tax was NOK 190 million, compared with NOK 329 million for 2021.

The liquidity situation at the end of 2022 was good. SINTEF has established a common system within the Group for the placement of liquidity reserves. At the end of 2022, we had NOK 421 million under management, compared with NOK 434 million in 2021. The return was-3 per cent in 2022 (8 per cent in 2021 and 3.9 per cent in 2020). The Board approves the annual 'Rules for financial management at SINTEF'.

SINTEF's financial surplus is invested in new research, upskilling, research infrastructure and start-ups. In 2022, SINTEF invested NOK 248 million in research infrastructure and other research production equipment. The corresponding figure for 2021 was NOK 408 million.

SINTEF enjoys a robust financial position. As of 31 December 2022, SINTEF had equity of NOK 3 216 million (NOK 3 074 million in 2021), which represents 49 per cent of total assets (55 per cent in 2021). The corresponding figure for the SINTEF Foundation is NOK 2 858 million (NOK 2 731

Photo: Emlyn John Davies/SINTEF

million in 2021), which represents 97 per cent of total assets (98 per cent in 2021).

The SINTEF Foundation's annual surplus amounted to NOK 128 million. The corresponding figure for 2021 was NOK 234 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 2022, SINTEF had nineteen start-ups in its portfolio. Three of these were added in 2022. The portfolio companies CFEED and Visavi were sold in 2022. A total of NOK 896 million was invested in the companies by investors over the course of the year, of which NOK 67 million came from the SINTEF Venture funds.

## Clients

In 2022, SINTEF carried out 6 772 projects for 3 217 clients, large and small. This includes projects for both private and public sector clients.

SINTEF conducts customer satisfaction surveys after projects are marked complete in the financial system. The average score in 2022 was 4.56 on a scale of one to five, up from 4.53 in 2021. 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 as needed.

The management prioritises meetings with the senior management of large enterprises, both to discuss strategic options at a time of major restructuring and to discuss framework conditions that promote industry-oriented research and research-based innovation.

Income from the Research Council of Norway accounts for 30 per cent of SINTEF's turnover. However, because research is largely funded through public/private collaborations, the Research Council of Norway's instruments trigger as much as 70 per cent of SINTEF's total income. This shows how important calls for proposals under the Research Council of Norway are for industry-oriented research, and the increasing risk associated with major changes to the Research Council of Norway's activities and organisation. The Board is monitoring this situation very closely.

Participation in the large, long-term research centres that are partly financed by the public sector based on open tenders provides considerable opportunities to create innovation through research, in interaction with Norwegian and international clients. SINTEF participates in fifteen centres for research-based innovation (SFI) and nine centres for environment-friendly energy research (FME). In 2022, the new FME HYDROGENi research centre opened. The centre is devoted to research and innovation within hydrogen and ammonia, is led by SINTEF and has more than fifty partners from industry and research.

In the allocations from the Green Platform scheme, SINTEF achieved very good results by participating in seven out of eleven projects. Most projects involve a lot of partners. One important task is to develop international networks and globally competitive solutions. This provides our clients with up-to-date knowledge. The opportunity to participate in EU research programmes is crucial if SINTEF is to be able to work with industry and the public sector in international research collaborations. The government's allocation for the 'Retur-EU' scheme, after a period of major uncertainty, was therefore very welcome.

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 so far. At the end of 2022, SINTEF had won funding for ninety projects, which means income of NOK 846 million for SINTEF. This represents 14.7 per cent of the funds brought home to Norway, an increase of 1.3 percentage points from the previous framework programme. The total funding for EU projects in which SINTEF participates is NOK 8.4 billion. This means that the value of the R&D to which Norway has access is ten times greater than the funding allocated directly to SINTEF.

In the European Defence Fund, SINTEF won projects with a combined

value of NOK 845 million, of which SINTEF's share amounts to NOK 42 million.

International turnover amounted to NOK 652 million in 2022 (538 million in 2021). This amounts to 16 per cent of SINTEF's total turnover. EU projects account for 64 per cent of our international projects. We delivered projects for clients in 62 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. In 2022, SINTEF approved an institutional rights strategy that ensures that all our scientific publications can be made openly available without restrictions from publishers.

The aim is to publish at least one peer reviewed scientific publication per research scientist per year. In 2022, the figure was estimated to be 0.84, compared with 0.88 in 2021 and 0.82 in 2020. The proportion of internationally co-authored publications is more than 48 per cent, and the trend is upwards.

Photo: Thor Nielsen/SINTEF

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 ten years, SINTEF has invested NOK 1.6 billion in laboratories, scientific equipment and buildings.

After seventeen years of planning, we were very pleased that the state decided to start work on constructing the Norwegian Ocean Technology Centre, which in the national budget for 2022 was estimated to represent an investment of NOK 8.2 billion. The centre's laboratories will be crucial for SINTEF's ability to maintain its position as a world-leading research environment for ocean industries in close cooperation with NTNU.

The largest investment of our own funds in 2022 was NOK 53 million for the adaptation of buildings for new machinery and construction laboratories at Torgard in Trondheim. SINTEF's acquisition of Torgardsvegen 12 for NOK 165 million in 2021 was the trigger, and the laboratories will be an important component of the Norwegian Ocean Technology Centre  The new machinery and construction laboratories will open in 2023. SINTEF's total investment in the buildings is expected to be NOK 250 million.

Other major projects in 2022 included the SINTEF Battery Lab in Trondheim, as well as the refurbishment of SINTEF's office and laboratory building at Forskningsvegen 1 in Oslo. The battery laboratory was opened in February 2023 and is part of the Norwegian Advanced Battery Laboratory (NABLA) research infrastructure, which includes several research partners and laboratories of great importance for SINTEF's position as a leading European research environment within the battery value chain, and for the development of the battery industry in Norway.

Construction of SINTEF Horizon also started in 2022. This project will upgrade and expand SINTEF Energy Research's laboratory and office building in Trondheim. The building has high environmental and energy standards and will be closely integrated with NTNU's campus in Gløshaugen. The total investment is budgeted at NOK 385 million, NOK 46 million of which was invested in 2022.

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 science and ocean spaces. 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), which perform important strategic roles in European research. The Eurotech collaboration with our largest sister institutes in Europe is also of great value to SINTEF.

## People

As of 31 December 2022, SINTEF had a total of 2 185 permanent employees, thirty-nine more than at the beginning of the year before. 61 per cent of scientific personnel hold a PhD. 31 per cent of SINTEF's employees come from a total of eighty-one countries other than Norway. The largest percentages come from Germany and France.

In 2022, SINTEF recruited one hundred and ninety-five new employees. One hundred and twelve of whom were born in Norway, while eighty-three come from thirty-three other countries. SINTEF does well in the competition for capable employees and consistently scores very highly in surveys in which students rank the attractiveness of places to work. In 2022, SINTEF was named Norway's most attractive employer for young people in Academic Work's Young Professional Attraction Index (YPAI).

85 per cent 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, 2.1 per cent were employed on a temporary basis.

The sickness absence rate for 2022 was 4.6 per cent and was heavily influenced by Covid. The work-related sickness absence rate was 0.3 per cent. Sickness absence is systematically followed up in the institutes.

SINTEF conducts a comprehensive working environment survey at the start of each year. ¢The survey from January 2023 shows that SINTEF has a good, stable working environment. There were few changes from the 2022 survey, although there were some differences between institutes. Stress remains a considerable challenge, although the stress level at SINTEF is no higher than in the rest of the institute sector. This year's survey also shows that a higher proportion of employees feel that their work is contributing to sustainable development and that HSE is taken very seriously.

## 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 per cent to at least 40 per cent 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.

SINTEF has twice as many men as women in its scientific staff. Today, we have gender balance at the lowest rung of the research ladder, although the further up the ladder we look the poorer the balance is. There is gender balance at the top level of line management, while the gender balance is poorer at the other levels, with the lowest proportion of women at management level three. 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 at www.sintef.no/arp.

## Risk management and internal control

In 2017, SINTEF was certified according to ISO 9001, ISO 14001 and OHAS 18001 through certification processes under the auspices of DNV. In November 2022, SINTEF was certified for a further three years.

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-mitigating 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 all issues that have become more demanding in recent years and that SINTEF is systematically working to address. At the same time, commercial risks are high on the agenda because of the great uncertainty related to the global economy, with the risk of recession and a period of

economic downturn. We have put developments in framework conditions at the top of the risk picture for SINTEF, due to an adverse trend in investment in industry-oriented research. With low operating margins in the region of 5 per cent over a business cycle, a continued negative trend in the framework conditions for research institutes in Norway would bring with it considerable financial risk. We have done a lot of work to secure satisfactory funding for the EU projects with positive clarification for 2023, although confirmation of funding from 2024 onwards is needed.

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. We have specifically assessed risk and our room for manoeuvre in the event of a scenario involving a major depreciation of the Norwegian krone.

At the end of the year, there was only one external loan commitment associated with the acquisition of Torgardsvegen 12 AS. The loan results in little risk with respect to the balance sheet total and serves as a benchmark for internal loans within the Group. Surplus liquidity is invested in accordance with the 'Rules for financial management at SINTEF'. The Board receives monthly reports on financial performance.

The Board established an Audit and Security Committee in 2021 with three members from the Board in order to strengthen the Board's work on security and information security in particular.

In 2021 and 2022, we conducted a two-year project to strengthen internal control. The project was carried out in close cooperation with our internal auditor, Deloitte, who has been SINTEF's internal auditor since 2017. Reports are produced for all internal audits and an annual internal audit report is submitted to the group management team and the Board, which specifies the implementation status of recommendations. An annual data protection report is produced with an action plan for the group management team and the Board.

In order to strengthen corporate governance, the Board of the SINTEF Foundation decided in 2016 to produce an annual report on corporate governance at SINTEF in accordance with the Norwegian Code of Practice for Corporate Governance (NUES standard). The annual report on corporate governance is published together with SINTEF's annual report.

## Future opportunities and challenges

The world must succeed in radically restructuring energy and food supplies, logistics and consumption patterns in order to curb global climate change and protect biodiversity. The crises of recent years have also demonstrated the necessity of a smart and secure society, with a circular economy, digitalisation, user-adapted services and sustainable solutions for health and mobility in the face of demographic changes and geopolitical tensions. It is clear to the Board that when it comes to finding solutions to these challenges SINTEF is highly sought after as a partner by industry and the public sector.

At the start of 2023, SINTEF's institutes have good orders on hand for the rest of the year, and the enterprise is well positioned with a very high level of expertise and scientific networks, world-class infrastructure, good client relations and a high rating for attractiveness to employees at a time of competition for talent.

Nevertheless, the Board is more concerned than usual about developments a little more than a year ahead at a time when the pressure on framework conditions and calls for proposals from the Research Council are strong, and considerable uncertainties exist about a demanding environment that affects our clients' room for manoeuvre with respect to engaging in research and innovation.

Photo: Berre/SINTEF

SINTEF's success in the fierce competition for European research funding is evidence that our activities are highly competitive internationally, and it is clear to the Board that industry and the public sector are very interested in collaborating with SINTEF. However, the Norwegian research model, with its very low basic grants for technical-industrial institutes, means that public calls for proposals, including for national funding for EU programmes, determine the amount of research-based transition work that the institutes can contribute to.

The development of research policy in recent years has not favoured a digital green transition in Norway, and thus not SINTEF's market prospects either. The Board is, therefore, of the opinion that the systemic review of Norwegian research funding announced in the Minister of Education and Research's presentation of the Long-term Plan for Research and Higher Education will be of great importance for SINTEF's future prospects.

In the year ahead, the Board and group management team will, therefore, make ensuring SINTEF contributes knowledge and analyses to good policy development that triggers an increase in industry's investment in R&D a top priority. This will strengthen the ability to implement a digital, circular and green transition and contribute to more sustainable public services. It will also help the Board help SINTEF 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 2022. We would also like to thank all of the co-owners of subsidiaries and all eighty representatives from industry and civil society who sit on SINTEF's many boards and committees.

Trondheim, 22 March 2023

Tore Ulstein
Board Chair

Øyvind Weiby Gregersen
Deputy Chair

Arne Birkeland
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

# 5.2 Key financial figures

Amounts in NOK millions

| Income and expenses | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|
| Gross operating income | 3 258 | 3 483 | 3 399 | 3 744 | 4 050 |
| Net operating income | 2 770 | 2 864 | 2 974 | 3 248 | 3 440 |
| **Operating profit** | **185** | **153** | **158** | **268** | **127** |
| Financial income | 39 | 50 | 62 | 71 | 89 |
| Financial expenses | 22 | 8 | 46 | 11 | 27 |
| Profit before tax | 201 | 195 | 174 | 329 | 190 |
| **Net income** | **143** | **161** | **145** | **262** | **144** |

| Balance sheet | | | | | |
|---|---|---|---|---|---|
| Non-current assets | 1 201 | 1 250 | 1 215 | 1 457 | 1 550 |
| Current assets | 3 052 | 3 358 | 3 912 | 4 178 | 5 039 |
| **Total assets** | **4 254** | **4 608** | **5 127** | **5 635** | **6 588** |
| Equity | 2 514 | 2 667 | 2 812 | 3 074 | 3 216 |
| Non-current liabilities | 47 | 44 | 34 | 104 | 100 |
| Current liabilities | 1 693 | 1 897 | 2 282 | 2 457 | 3 272 |
| **Total equity and liabilities** | **4 254** | **4 608** | **5 127** | **5 635** | **6 588** |

| Profitability | | | | | |
|---|---|---|---|---|---|
| Operating margin (%) | 6.7% | 5.4% | 5.3% | 8.2% | 3.7% |
| Return on total assets (%) | 5.3% | 4.6% | 4.5% | 6.3% | 3.5% |
| Return on equity (%) | 8.3% | 7.5% | 6.4% | 11.2% | 6.0% |

| Liquidity | | | | | |
|---|---|---|---|---|---|
| Net cash flow from operating activities | 356 | 466 | 653 | 448 | 897 |
| Current ratio | 1.8 | 1.8 | 1.7 | 1.7 | 1.5 |

| Solvency | | | | | |
|---|---|---|---|---|---|
| Equity ratio (%) | 59% | 58% | 55% | 55% | 49% |
| Working capital | 1 359 | 1 461 | 1 631 | 1 721 | 1 766 |

# 5.3 Financial statements 2022

## Income statement

Amounts in NOK thousands

| The SINTEF Foundation | | | SINTEF | |
|---|---|---|---|---|
| 2022 | 2021 | **OPERATING INCOME AND EXPENSES** | 2022 | 2021 |
| 0 | 0 | Income from external projects | 3 598 697 | 3 227 709 |
| 0 | 0 | Basic grant funding from the Research Council of Norway | 339 771 | 429 288 |
| 341 163 | 313 370 | Other operating income | 111 381 | 86 849 |
| **341 163** | **313 370** | **Gross operating income** | **4 049 848** | **3 743 846** |
| | | | | |
| 0 | 0 | Direct project expenses | 609 487 | 495 754 |
| **341 163** | **313 370** | **Net operating income** | **3 440 361** | **3 248 092** |
| | | | | |
| 75 466 | 77 593 | Personnel expenses | 2 431 840 | 2 233 853 |
| 31 498 | 31 390 | Depreciation and amortisation | 141 611 | 132 746 |
| 216 725 | 182 827 | Other operating expenses | 739 485 | 613 654 |
| **323 690** | **291 810** | **Total operating expenses** | **3 312 936** | **2 980 253** |
| | | | | |
| **17 473** | **21 561** | **Operating profit** | **127 426** | **267 839** |

| The SINTEF Foundation | | | SINTEF | |
|---|---|---|---|---|
| 2022 | 2021 | **FINANCIAL INCOME AND EXPENSES** | 2022 | 2021 |
| 114 733 | 194 980 | Income from subsidiaries and associated companies | -2 385 | 6 412 |
| 1 604 | 10 420 | Other interest income | 65 124 | 25 307 |
| 7 947 | 6 968 | Interest received from group companies | 0 | 0 |
| 438 | 0 | Other financial income | 24 101 | 7 494 |
| -5 185 | 13 285 | Changes in fair value of financial current assets | -12 913 | 32 053 |
| -472 | -2 473 | Other interest expenses | -2 873 | -3 381 |
| -1 016 | -1 154 | Other financial expenses | -9 003 | -7 223 |
| **118 050** | **222 026** | **Net financial income** | **62 221** | **60 661** |
| | | | | |
| **135 523** | **243 587** | **Profit before tax** | **189 647** | **328 500** |
| | | | | |
| 8 022 | 9 527 | Income tax | 45 303 | 66 155 |
| **127 502** | **234 059** | **NET INCOME** | **144 343** | **262 345** |
| | | | | |
| | | **Attributable to minority interests** | **17 468** | **28 821** |
| | | **Attributable to controlling interests** | **126 875** | **233 523** |
| | | | | |
| | | **Allocations:** | | |
| 104 228 | 190 102 | Transferred to fund for valuation differences | | |
| 23 274 | 43 957 | Allocated to other equity | | |
| **127 502** | **234 059** | **Total allocations** | | |

# Balance sheet

Amounts in NOK thousands

| The SINTEF Foundation | | | SINTEF | |
|---|---|---|---|---|
| 2022 | 2021 | ASSETS | 2022 | 2021 |
| | | **Non-current assets** | | |
| | | **Intangible assets** | | |
| 0 | 0 | Development | 2 301 | 2 550 |
| 0 | 0 | Concessions, patents, licence, trademarks, etc. | 15 454 | 28 935 |
| 98 502 | 92 637 | Deferred tax asset | 217 474 | 206 179 |
| 0 | 0 | Goodwill/(-badwill) | 9 947 | 10 158 |
| **98 502** | **92 637** | **Total intangible assets** | **245 176** | **247 822** |
| | | **Tangible fixed assets** | | |
| 413 464 | 307 650 | Plots, buildings and other real estate | 790 707 | 648 575 |
| 1 059 | 95 723 | Facilities under construction | 164 483 | 174 482 |
| 0 | 0 | Scientific equipment | 181 054 | 190 289 |
| 1 394 | 2 180 | Equipment and other movables | 30 001 | 32 232 |
| **415 917** | **405 553** | **Total tangible fixed assets** | **1 166 245** | **1 045 577** |
| | | **Financial assets** | | |
| 1 596 721 | 1 481 988 | Investments in subsidiaries | 0 | 0 |
| 234 671 | 234 671 | Loans to group companies | 0 | 0 |
| 0 | 0 | Investments in associated companies | 87 183 | 110 555 |
| 137 | 157 | Investments in shares | 12 799 | 12 491 |
| 0 | 0 | Pension funds | 3 114 | 3 415 |
| 32 645 | 34 144 | Other non-current receivables | 35 383 | 36 882 |
| **1 864 174** | **1 750 960** | **Total financial assets** | **138 478** | **163 342** |
| **2 378 594** | **2 249 150** | **Total non-current assets** | **1 549 899** | **1 456 741** |

| The SINTEF Foundation | | | SINTEF | |
|---|---|---|---|---|
| 2022 | 2021 | ASSETS | 2022 | 2021 |
| | | **Current assets** | | |
| | | **Inventories** | | |
| 0 | 0 | Inventories of finished goods | 17 448 | 15 040 |
| 0 | 0 | Work in progress | 622 283 | 537 926 |
| **0** | **0** | **Total inventories** | **639 732** | **552 966** |
| | | **Receivables** | | |
| 5 289 | 3 084 | Accounts receivable | 594 749 | 548 639 |
| 50 075 | 32 990 | Group current receivables | 0 | 0 |
| 15 768 | 15 717 | Other current receivables | 151 405 | 76 181 |
| **71 132** | **51 791** | **Total receivables** | **746 154** | **624 821** |
| | | **Investments** | | |
| 174 260 | 179 886 | Market-based bonds and other securities | 420 503 | 434 077 |
| 0 | 0 | Other financial instruments | 22 734 | 18 683 |
| **174 260** | **179 886** | **Total investments** | **443 237** | **452 761** |
| **311 485** | **317 003** | **Cash and cash equivalents** | **3 209 395** | **2 547 480** |
| **556 877** | **548 680** | **Total current assets** | **5 038 518** | **4 178 027** |
| **2 935 470** | **2 797 830** | **TOTAL ASSETS** | **6 588 416** | **5 634 769** |

| The SINTEF Foundation | | | SINTEF | |
|---|---|---|---|---|
| 2022 | 2021 | **EQUITY AND LIABILITIES** | 2022 | 2021 |
| | | **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 | 1 226 516 | Fund for valuation differences | 0 | 0 |
| 1 456 120 | 1 432 846 | Other equity | 2 786 066 | 2 658 242 |
| **2 786 863** | **2 659 361** | **Total retained earnings** | **2 786 066** | **2 658 242** |
| | | Minority interests | 358 898 | 344 384 |
| **2 858 213** | **2 730 711** | **Total equity** | **3 216 314** | **3 073 976** |
| | | **Liabilities** | | |
| | | **Provisions** | | |
| 0 | 0 | Pension liabilities | 22 582 | 24 781 |
| 0 | 0 | Other provisions | 17 732 | 16 136 |
| **0** | **0** | **Total provisions** | **40 314** | **40 917** |
| | | **Other non-current liabilities** | | |
| 0 | 0 | Liabilities to credit institutions | 59 499 | 62 833 |
| **0** | **0** | **Total other non-current liabilities** | **59 499** | **62 833** |
| | | **Current liabilities** | | |
| 27 118 | 28 941 | Accounts payable | 291 728 | 224 499 |
| 13 895 | 2 290 | Tax payable | 56 993 | 50 885 |
| 4 589 | 4 106 | Tax deducted and other public duties | 238 252 | 220 725 |
| 0 | 0 | Advance payments from clients | 1 148 144 | 1 032 331 |
| 11 463 | 13 588 | Group current liabilities | 0 | 0 |
| 20 192 | 18 194 | Other current liabilities | 1 537 172 | 928 603 |
| **77 257** | **67 118** | **Total current liabilities** | **3 272 289** | **2 457 043** |
| **77 257** | **67 118** | **Total liabilities** | **3 372 102** | **2 560 793** |
| **2 935 470** | **2 797 830** | **TOTAL EQUITY AND LIABILITIES** | **6 588 416** | **5 634 769** |

Trondheim, 22 March 2023

Tore Ulstein
Board Chair

Øyvind Weiby Gregersen
Deputy Chair

Arne Birkeland
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

# Statement of cash flows

Amounts in NOK thousands

| The SINTEF Foundation | | | SINTEF | |
|---|---|---|---|---|
| 2022 | 2021 | | 2022 | 2021 |
| | | **Cash flow from operating activities:** | | |
| 135 523 | 243 587 | Profit before tax | 189 647 | 328 500 |
| -114 733 | -194 980 | Net income from subsidiaries and associated companies | 19 309 | -6 412 |
| -2 281 | -345 | Income taxes paid | -50 885 | -32 162 |
| 31 498 | 31 390 | Depreciation and amortisation | 141 611 | 132 746 |
| 0 | 0 | Recognition of badwill | -438 | 0 |
| 20 | 0 | Write-downs of property, plant and equipment | 1 580 | 0 |
| 0 | 0 | Reversals of property, plant and equipment | 0 | 9 488 |
| 0 | 0 | Pension expenses with no cash flow effect | -1 898 | -1 047 |
| 0 | 0 | Net loss/(-)gain sale assets | -18 312 | 82 |
| 5 625 | -12 849 | Net change in value of financial current assets | 13 574 | -31 005 |
| 0 | 0 | Change in inventories of finished goods | -2 408 | -489 |
| 0 | 1 067 | Change in work in progress | -84 357 | -39 721 |
| -2 205 | 258 | Change in accounts receivable and advance payments from clients | 69 703 | -9 604 |
| -1 823 | 9 764 | Change in accounts payable | 67 229 | 28 502 |
| -19 209 | 56 756 | Change in intragroup balances | 0 | 0 |
| 2 430 | -7 204 | Net change in other accruals | 552 434 | 68 930 |
| **34 846** | **127 443** | **Net cash flow from operating activities** | **896 789** | **447 808** |

| The SINTEF Foundation | | | SINTEF | |
|---|---|---|---|---|
| 2022 | 2021 | | 2022 | 2021 |
| | | **Cash flow from investing activities:** | | |
| 0 | 0 | Proceeds from sales of tangible fixed assets | 898 | 3 059 |
| -41 863 | -99 854 | Purchases of tangible fixed assets | -247 760 | -363 419 |
| 0 | 0 | Purchases of intangible assets | -1 038 | -19 773 |
| 0 | 10 050 | Proceeds from loan to Group companies | 0 | 0 |
| 0 | -40 000 | Payments on loans to Group companies | 0 | 0 |
| 0 | 0 | Proceeds from sale of financial assets | 41 460 | 198 |
| 0 | -84 152 | Purchases of financial assets | -24 599 | -17 566 |
| **-41 863** | **-213 955** | **Net cash flow from investing activities** | **-231 039** | **-397 501** |
| | | **Cash flow from financing activities:** | | |
| 0 | 0 | Proceeds from non-current liabilities | 0 | 62 450 |
| 0 | 0 | Payments on non-current liabilities to credit institutions | -3 334 | -409 |
| 0 | 0 | Net change in overdraft facility | 0 | -773 |
| 1 499 | 1 680 | Proceeds from non-current receivables | 1 499 | 2 229 |
| 0 | 0 | Buyout of minority interests | -2 000 | 0 |
| **1 499** | **1 680** | **Net cash flow from financing activities** | **-3 835** | **63 497** |
| -5 518 | -84 833 | Net change in cash and cash equivalents | 661 915 | 113 804 |
| 317 003 | 401 835 | Cash and cash equivalents as of 1 January | 2 547 480 | 2 433 676 |
| **311 485** | **317 003** | **Cash and cash equivalents as of 31 December** | **3 209 395** | **2 547 480** |

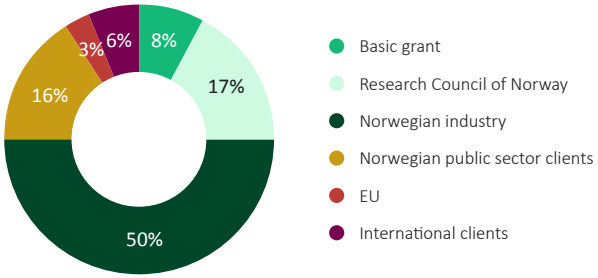
# 5.4 Results per institute

Photo: Berre/SINTEF

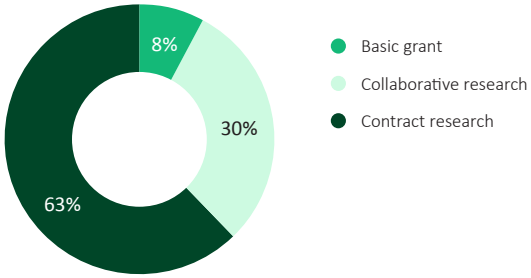
# SINTEF Community

## Funding sources

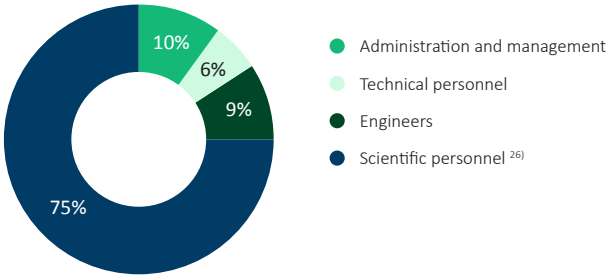
% of gross operating income



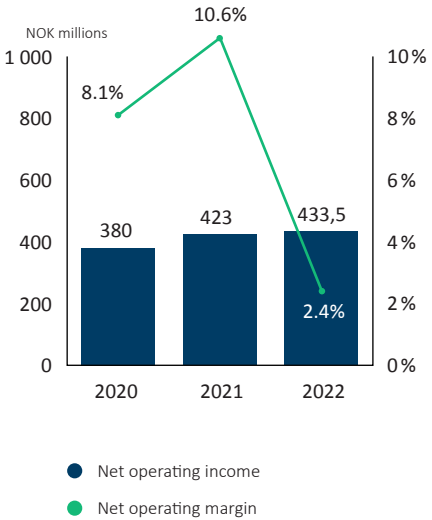

## Portfolio type



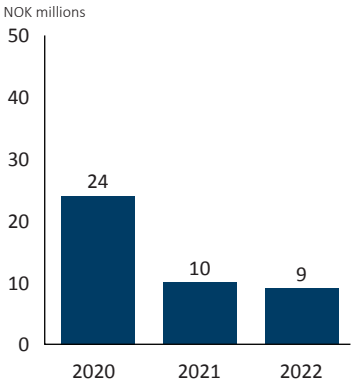

## Employees



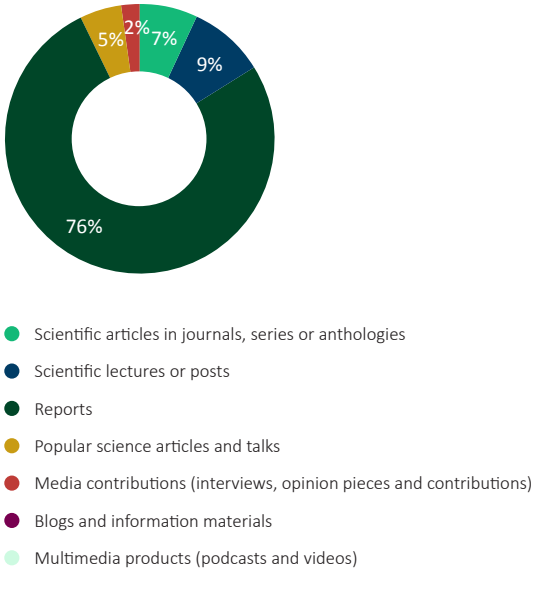

## Net operating income
## Net operating margin




## Investments in laboratories, scientific equipment and other operating assets




## Publications and dissemination



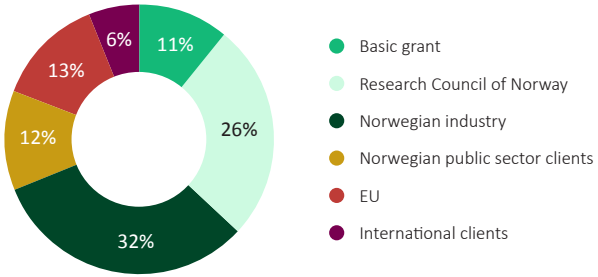

Sources: Publications; Cristin, other data (incl. publication data reports); SINTEF.

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

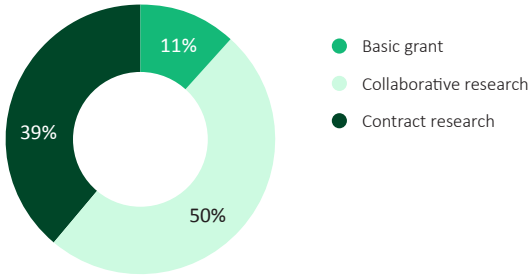
# SINTEF Digital

## Funding sources

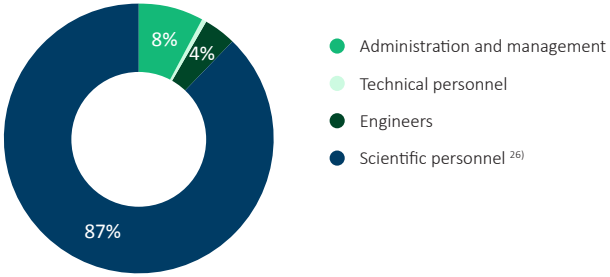
% of gross operating income



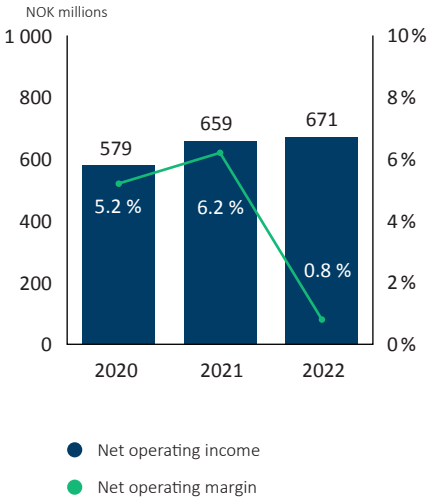

## Portfolio type



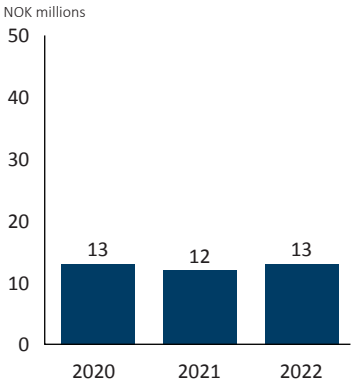

## Employees



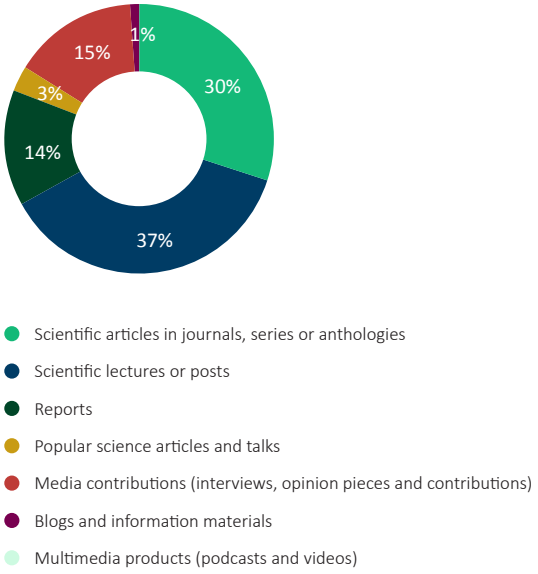

## Net operating income
## Net operating margin




## Investments in laboratories, scientific equipment and other operating assets




## Publications and dissemination



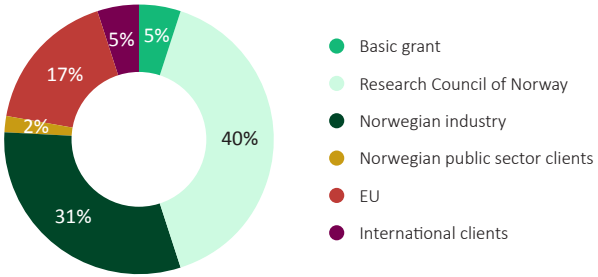

Sources: Publications; Cristin, other data (incl. publication data reports); SINTEF.

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

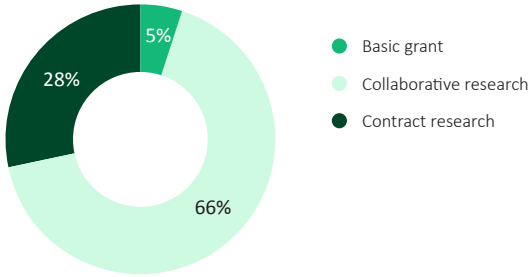
# SINTEF Industry

## Funding sources

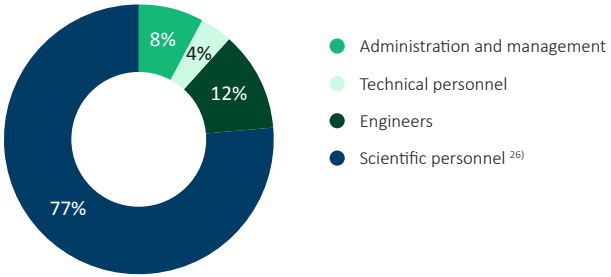
% of gross operating income



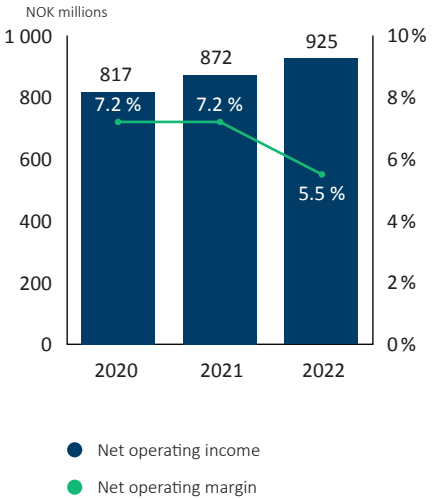

## Portfolio type



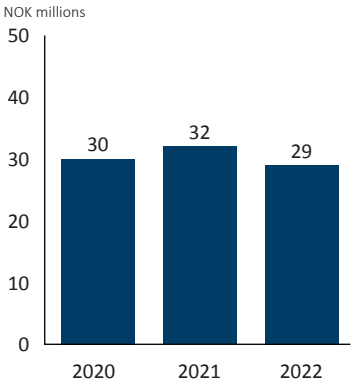

## Employees



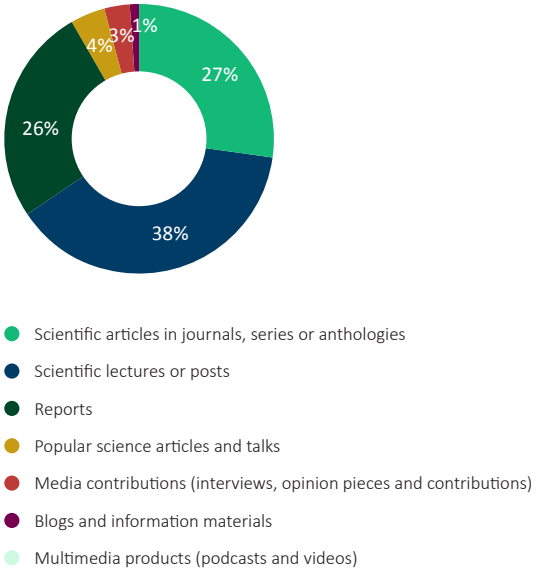

## Net operating income
## Net operating margin




## Investments in laboratories, scientific equipment and other operating assets




## Publications and dissemination



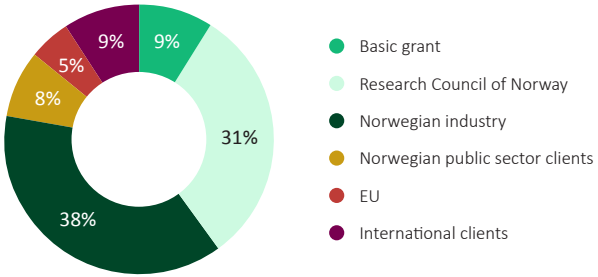

Sources: Publications; Cristin, other data (incl. publication data reports); SINTEF.

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

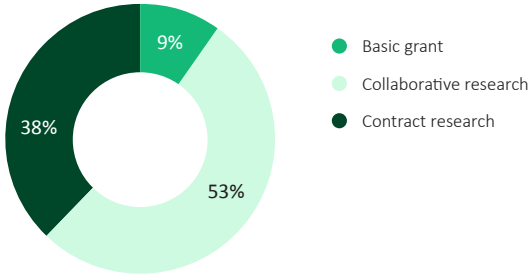
# SINTEF Ocean

## Funding sources

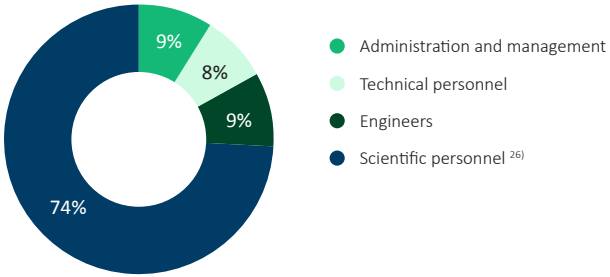
% of gross operating income



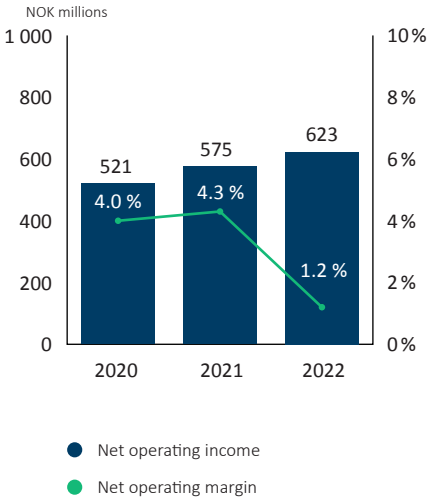

## Portfolio type



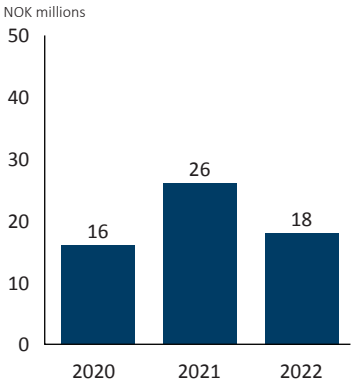

## Employees



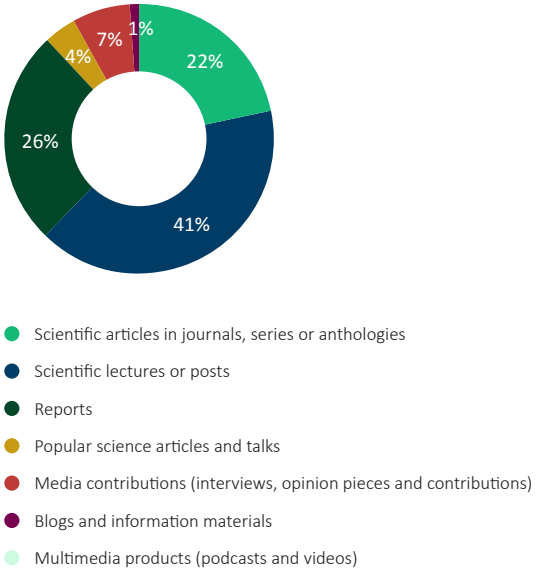

## Net operating income
## Net operating margin




## Investments in laboratories, scientific equipment and other operating assets




## Publications and dissemination



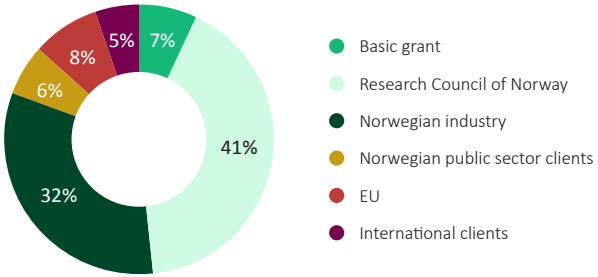

Sources: Publications; Cristin, other data (incl. publication data reports); SINTEF.

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

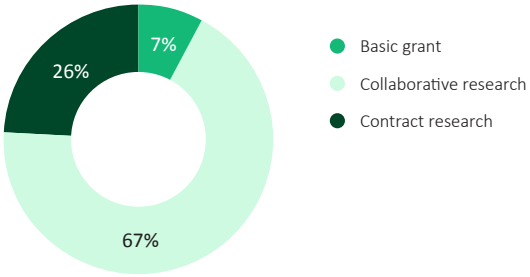
# SINTEF Energy Research

## Funding sources

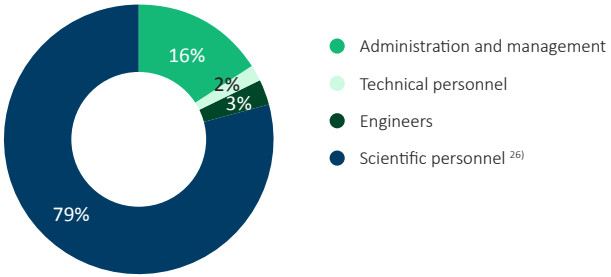
% of gross operating income



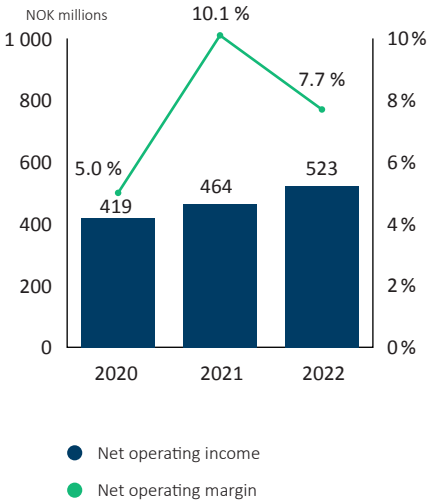

## Portfolio type



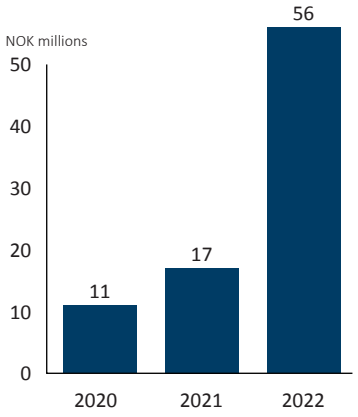

## Employees



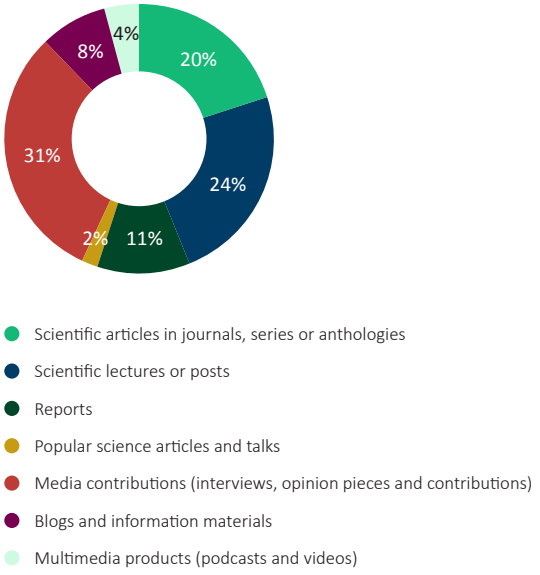

## Net operating income
## Net operating margin




## Investments in laboratories, scientific equipment and other operating assets




## Publications and dissemination



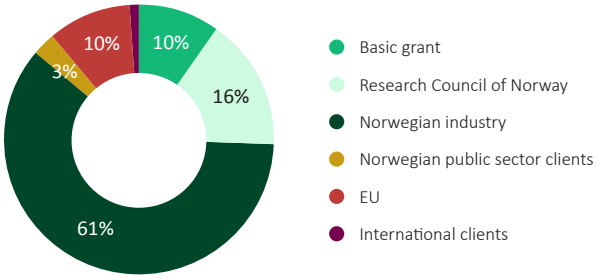

Sources: Publications; Cristin, other data (incl. publication data reports); SINTEF.

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

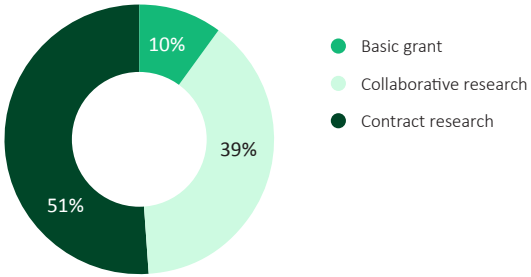
# SINTEF Manufacturing

## Funding sources

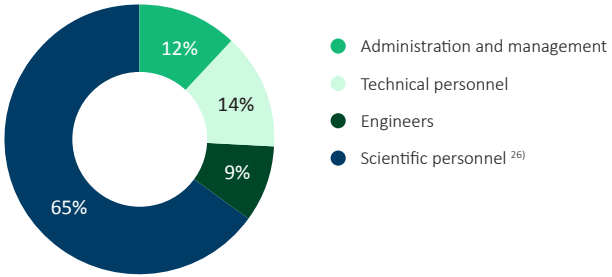
% of gross operating income



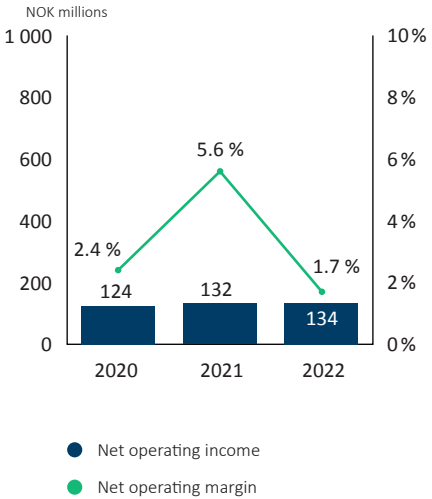

## Portfolio type



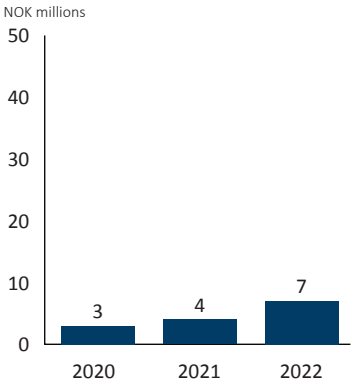

## Employees



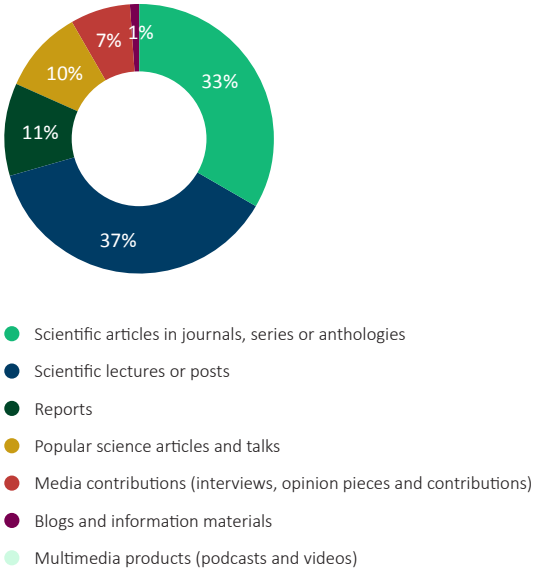

## Net operating income
## Net operating margin




## Investments in laboratories, scientific equipment and other operating assets




## Publications and dissemination




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

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

# Chapter 6

# The way forward

Photo: Berre/SINTEF

**In this report, SINTEF's first integrated annual and sustainability report, we have summarised the work done in 2022, as well as some trends in our activities. In 2022, we started updating our corporate strategy and will complete this work in autumn 2023. We will continue to work on sustainability as part of this, in line with our vision.**

As part of our 'reporting journey' towards meeting legal requirements that are expected to be enacted in the coming years, we took several steps in 2022 that are designed to improve our reporting For example, we have reported with reference to GRI in preparation for reporting in line with the ESRS in a few years' time.

We have moved away from reporting on all seventeen SDGs to instead basing our reporting on the main sustainability topics relevant to our current activities. This means that we have focused our sustainability reporting on the material topics where we see that SINTEF's role in society is, or is expected to have, a particularly major impact in the digital green transition. At the same time, there are important sustainability topics where we believe SINTEF's expertise is highly relevant, but where the framework conditions have not facilitated significant activity.

Efforts are being made, both in Norway and abroad, to achieve the target of a 55 per cent reduction in greenhouse gas emissions by 2030 and near zero emissions by 2050. SINTEF wants to contribute to this work as much as possible. Our main contribution will be the research and innovation we carry out with customers and partners. We also need to cut emissions from our own activities, and we are cognisant of the fact that we still have some work to do with regard to specifying what that journey will look like for SINTEF. Therefore, going forward, we will work on setting specific goals and targets for that journey in the periods up to 2030 and 2050.

We feel it is important that we work on improving our reporting, not least because of our strategy of trying to create effects in society, as well as society's ever-higher expectations and requirements regarding how industry and enterprises create and take account of sustainability through their activities. SINTEF will work on new improvement measures for our reporting for 2023 and beyond. The measures that need to be evaluated and enhanced include:

- Defining how sustainability should be internalised in our corporate strategy and specifying consequences for its operationalisation
- Fleshing out the sustainability ambitions of our organisation, including by defining clear goals, targets and KPIs
- Further developing SINTEF's climate report
- Addressing climate-related ristks and opportunities in our activities. Evaluating reporting under the framework of the Task Force on Climate-Related Financial Disclosures (TCFD) in preparation for the ESRS.
- Reporting in line with the GRI standard, in preparation for the ESRS, and conducting an external audit of non-financial information
- Addressing new legislative sustainability requirements that affect us, including the EU Taxonomy
- Considering mapping the portfolio in new ways given the challenges of mapping in relation to the SDGs, their time horizon of 2030, and the introduction of the EU Taxonomy as formative for enterprises
- Working on systematising and potentially mapping the impact of our research

Photo: Berre/SINTEF

**Given our vision of 'Technology for a better society' SINTEF is highly motivated for the future!**

# Chapter 7

# GRI Index

Photo: Berre/SINTEF

| STATEMENT OF USE | The information in this GRI index concerns the SINTEF Foundation during the period 1 January-31 December 2022 and refers to the current GRI standards. |
|---|---|
| GRI 1 USED | GRI 1: FOUNDATION 2021 |

| NO. | TITLE | RESPONSE | PAGE(S) |
|---|---|---|---|
| | **GRI 2: General Disclosures 2021** | | |
| 2-1 | Organisational details | 1.1 An independent research foundation | 7 |
| 2-2 | Entities included in the organisation's sustainability reporting | About the report | 4 |
| 2-3 | Reporting period, frequency and contact point | About the report | 4 |
| 2-4 | Restatements of information | The climate report for 2021 has been updated based on new calculation methods. The difference is greatest for Scope 2 emissions. Total emissions for 2021 are now 13 per cent lower than reported in the 2021 report | 58-60, 62 |
| 2-5 | External assurance | About the report/4.1.3 Other bodies | 4, 49 |
| 2-6 | Activities, value chain and other business relationships | 1.1 An independent research foundation/4.7 Purchasing | 8, 63-64 |
| 2-7 | Employees | 4.4 People | 53-56 |
| 2-8 | Workers who are not employees | 4.4 People | 53-56 |
| 2-9 | Governance structure and composition | 4.1 Corporate governance | 47-49 |
| 2-10 | Nomination and selection of the highest governance body | 4.1.1 The board's responsibilities and composition | 48-49 |
| 2-11 | Chair of the highest governance body | 4.1.1 The board's responsibilities and composition | 48-49 |
| 2-12 | Role of the highest governance body in overseeing the management of impacts | 4.1 Corporate governance | 47-49 |
| 2-13 | Delegation of responsibility for managing impacts | 4.1 Corporate governance | 47-49 |
| 2-17 | Collective knowledge of the highest governance body | 4.1.1 The board's responsibilities and composition | 48-49 |
| 2-18 | Evaluation of the performance of the highest governance body | 4.1.1 The board's responsibilities and composition | 48-49 |
| 2-22 | Statement on sustainable development strategy | Letter from the CEO/5.1 The Board of Directors' Report | 2, 70 |
| 2-23 | Policy commitments | 4.2 Risk management and internal control | 50-51 |
| 2-24 | Embedding policy commitments | 4.3 Ethics and compliance | 52 |
| 2-26 | Mechanisms for seeking advice and raising concerns | 4.3 Ethics and compliance | 52 |
| 2-27 | Compliance with laws and regulations | 4.3 Ethics and compliance | 52 |
| 2-28 | Membership associations | 3.1 Sustainability at SINTEF | 24 |
| 2-29 | Approach to stakeholder engagement | 3.2 Stakeholder engagement and materiality analysis | 27 |
| 2-30 | Collective bargaining agreements | 4.4 People/Trade unions and liaison | 56 |

| | | | |
|---|---|---|---|
| | **GRI 3: Material Topics 2021** | | |
| 3-1 | Process to determine material topics | 3.2 Stakeholder engagement and materiality analysis | 28 |
| 3-2 | List of material topics | 3.2 Stakeholder engagement and materiality analysis | 28 |
| 3-3 | Management of material topics | 3.3 The areas in which SINTEF has the greatest impact on sustainability/3.4 Our laboratories and expertise | 29-45 |
| | **GRI 201: Economic Performance 2016** | | |
| 201-1 | Direct economic value generated and distributed | 5.3 Financial statements 2022 | 78-81 |
| 201-2 | Financial implications and other risks and opportunities due to climate change | 4.2 Risk management and internal control | 51 |
| | **GRI 205: Anti-corruption 2016** | | |
| 205-1 | Operations assessed for risks related to corruption | 4.3 Ethics and compliance | 52 |
| 205-2 | Communication and training about anti-corruption policies and procedures | 4.3 Ethics and compliance | 52 |
| 205-3 | Confirmed incidents of corruption and actions taken | There were no cases of corruption among employees | |
| | **GRI 302: Energy 2016** | | |
| 302-1 | Energy consumption within the organisation | 4.6 Climate and environment | 60 |
| 302-3 | Energy intensity | 4.6 Climate and environment | 60 |
| 302-4 | Reduction of energy consumption | 4.6 Climate and environment | 60 |
| | **GRI 303: Water and effluents 2018** | | |
| 303-5 | Water consumption | 4.6 Climate and environment | 60 |
| | **GRI 305: Emissions 2016** | | |
| 305-1 | Direct (Scope 1) GHG emissions | 4.6 Climate and environment | 62 |
| 305-2 | Energy indirect (Scope 2) GHG emissions | 4.6 Climate and environment | 62 |
| 305-3 | Other indirect (Scope 3) GHG emissions | 4.6 Climate and environment | 62 |
| 305-4 | GHG emissions intensity | 4.6 Climate and environment | 58 |
| 305-5 | Reduction of GHG emissions | 4.6 Climate and environment | 62 |
| | **GRI 401: Employment 2016** | | |
| 401-1 | New employee hires and employee turnover | 4.4 People/Our employees | 53 |
| 401-3 | Parental leave | 4.4 People/Parental leave | 54 |

| | | | |
|---|---|---|---|
| | **GRI 403: Occupational Health and Safety 2018** | | |
| 403-1 | Occupational health and safety management system | 4.5 HSE | 57 |
| 403-2 | Hazard identification, risk assessment, and incident investigation | 4.5 HSE | 57 |
| 403-3 | Occupational health services | 4.5 HSE | 57 |
| 403-4 | Worker participation, consultation, and communication on occupational health and safety | 4.5 HSE | 57 |
| 403-5 | Worker training on occupational health and safety | 4.5 HSE | 57 |
| 403-6 | Promotion of worker health | 4.5 HSE | 57 |
| 403-9 | Work-related injuries | 4.5 HSE | 57 |
| 403-10 | Work-related ill health | 4.4 People/Sickness absence | 55 |
| | **GRI 404: Training and Education 2016** | | |
| 404-2 | Programmes for upgrading employee skills and transition assistance programmes | 4.4 People/Upskilling/training | 56 |
| | **GRI 405: Diversity and Equal Opportunity 2016** | | |
| 405-1 | Diversity of governance bodies and employees | 4.4 People/Gender balance | 53-54 |
| 405-2 | Ratio of basic salary and remuneration of women to men | 4.4 People/Gender balance | 53 |

Clarifications, image sources, and photo credits

Page 33 The HYDRA project received support from the EU's research and innovation programme Horizon 2020 under grant agreement no. 875527. SINTEF is solely responsible for the contents of this project description, and it does not necessarily reflect the EU's understanding.

Page 34 The BETTEReHEALTH project received funding from the EU''s research and innovation programme Horizon 2020 under grant agreement no. 101017450. SINTEF is solely responsible for the contents of this project description, and it does not necessarily reflect the EU's understanding.

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SINTEF

# Technology for a better society