DANISH TECHNOLOGICAL INSTITUTE

Insight and Perspectives

Danish Technological Institute 2023

We are problem solvers

39,000
Specific solutions

10,600
Satisfied customers

1,100
Specialized employees

4.7
High customer satisfaction

The rating is based on responses from 1,793 customers in 2023 and indicates customer satisfaction on a scale from 1-5.
Source: Institute's Customer Satisfaction Survey.

9th
Most attractive place to work

In 2023, the Institute was ranked as the 9th most attractive workplace in Universum's image survey. The survey is based on responses from 1,347 active professionals in engineering and natural sciences.

94 %
Employee satisfaction

In the Institute's employee satisfaction survey, 94 % agree or strongly agree with the statement "Overall, I am satisfied as an employee at Danish Technological Institute." The total survey was responded to by 825 employees.

Letter from the chairman and CEO

We succeed when the businesses and society succeed

The overshooting of planetary boundaries, the geopolitical situation, and the risk of recession. Particularly these three global challenges created a need for transformation in 2023, hence new opportunities for society and the business. The needs - and opportunities - are particularly within sustainable solutions, global cooperation, regional technological sovereignty, as well as resilience and security. Additionally, there is the opportunity to enhance the competitiveness and innovation of companies.

Mikael Bay Hansen
Chairman (L)

Juan Farré
President and CEO (R)

Denmark and Danish Technological Institute are in a privileged position to actively contribute to the transformation that follows these global challenges, and we look forward to translating the opportunities into solutions in the coming year. Society and each actor must now, more than ever, balance between international cooperation and national security, between collaborative innovation and competition, while simultaneously weighing both ESG objectives and resilience.

Danish Technological Institute complements the operations and scope of companies, accelerates the development of concrete services, and reduces development risks in individual companies. We provide knowledge, networks, and laboratories that create industry-ready concrete solutions that meet the needs of companies and the market.

The mission of Danish Technological Institute, in the words of our founder Gunnar Gregersen, is to "position ourselves where we sense that the Institute's help will be needed", i.e., where society and businesses have needed us and will continue to need us.

An indispensable part of the Danish innovation system

The mission requires that the Institute is constantly at the forefront, in continuous development, and in close collaboration with the business community, actors within the innovation and business development system, and authorities both nationally and internationally. This demands great agility, creativity, and focus on implementable, business-friendly solutions from the Institute. These are not only to solve a problem for a single company but also to pave the way for a brighter future for both the broad business community in Denmark and for global agendas.

It is the 1,100 employees of Danish Technological Institute who bear the zeal and daily resolve the socially beneficial role to perfection. Through their daily efforts, they guarantee a result-oriented behavior. Proactive efforts are being made to ensure that the Institute's operations are current and known among relevant actors within business interest organizations as well as the innovation and business development system.

Mikael Bay Hansen
Chairman

Juan Farré
President and CEO

> Look ahead, ahead! Look for the roads ahead that will pave the way for development, and then place yourselves where you suspect the Institute's help will be necessary. Do not wait until new lands are reached by the old, paved roads. The path will often take unknown routes and short-cuts, and detours cannot be avoided either, but it is better to take this risk than to be too cautious and only follow the familiar serpentine road forwards and upwards, only to find at the end of the road that you arrived too late.

Gunnar Gregersen, founder of Danish Technological Institute and director from 1906-1950

Danish Technological Institute is an independent and non-profit research and development institute, approved as a GTS-Institute by the Minister for Higher Education and Science.

Since 1906, the Institute has worked to promote the utilization of technological advances for the benefit of the businesses and society through development, consulting, and dissemination.

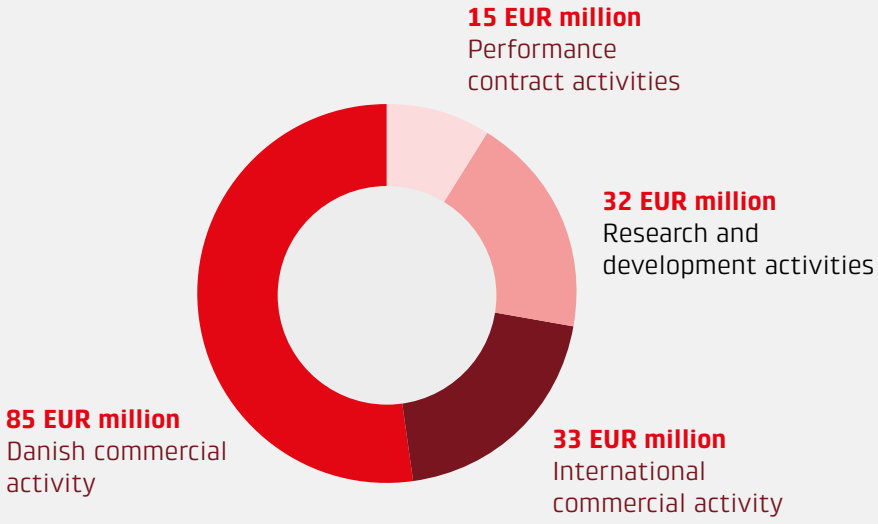
We fulfill this purpose by developing new knowledge through research and development activities, which are translated into technological services and made available on market terms.

Key figures

In 2023, Danish Technological Institute generated a 7 % growth in revenue. The commercial revenue from Danish business customers has increased, which indicates an even stronger collaboration with Danish companies.
The Institute has maintained its research and development revenue (R&D) despite a competitive market. In 2023, the Institute secured a record-high amount of R&D grants, ensuring a strong portfolio in the coming years.

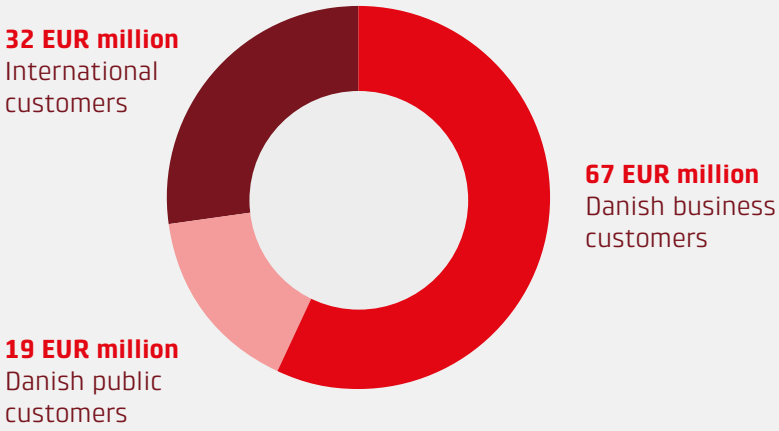
165 EUR million in revenue

Revenue distribution for the group in 2023.



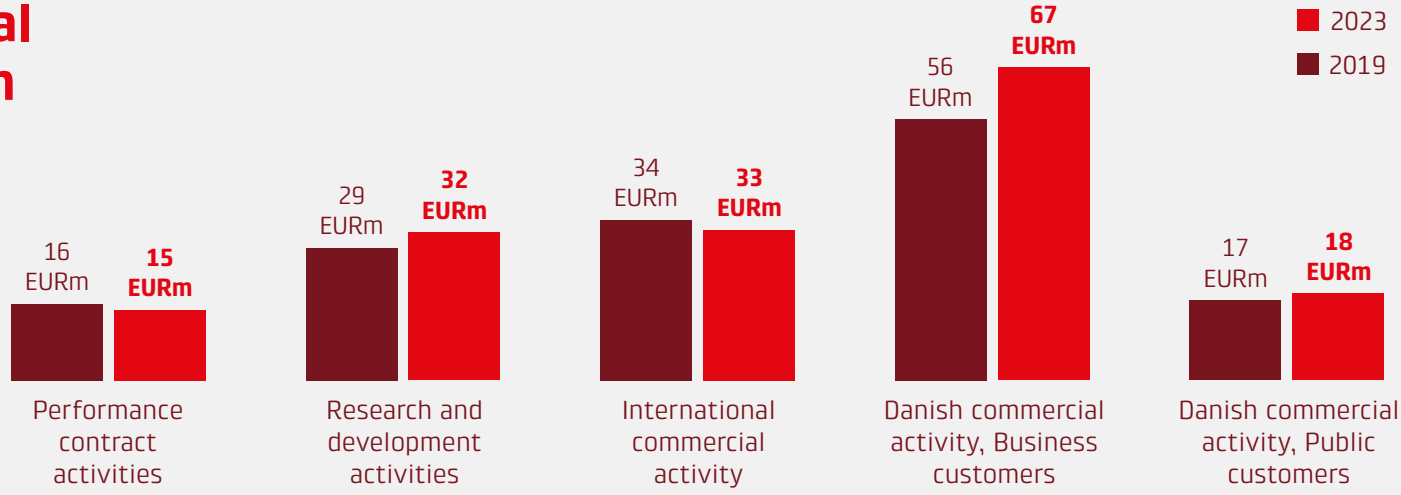
Revenue distribution by customer types

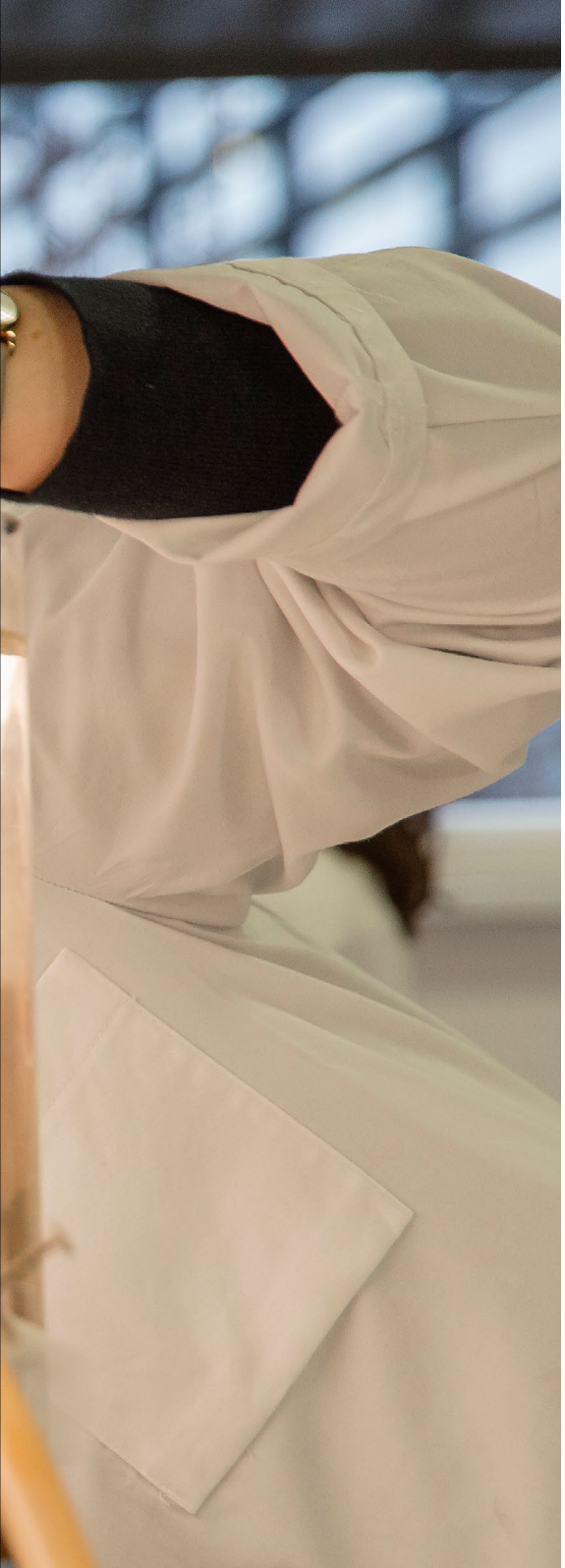
The group's commercial revenue distributed by customer types in 2023.



Increased commercial revenue from Danish business customers

Development in the distribution of the group's total revenue from 2019 to 2023. The decrease in international revenue is due to the divestiture of a Swedish subsidiary in 2020.





Content

Insight and Perspectives - Danish Technological Institute in 2023
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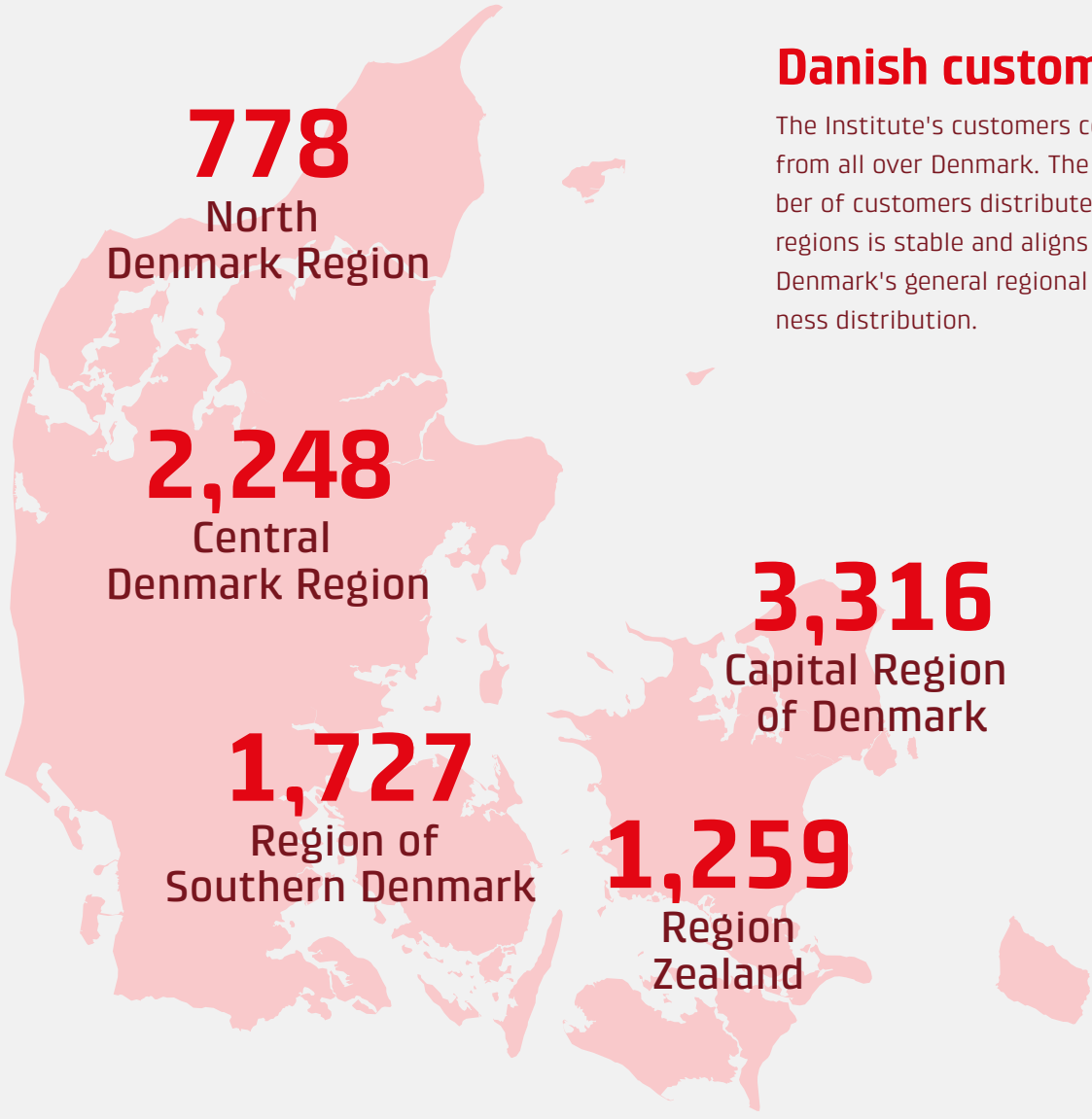
We succeed when companies succeed

Danish Technological Institute delivers 39,000 specific solutions annually to 10,600 satisfied customers. The Institute is relevant to Danish companies and has a broad collaboration with these companies, both in terms of regional distribution and company size.

1,250
International customers

9,350
Danish customers

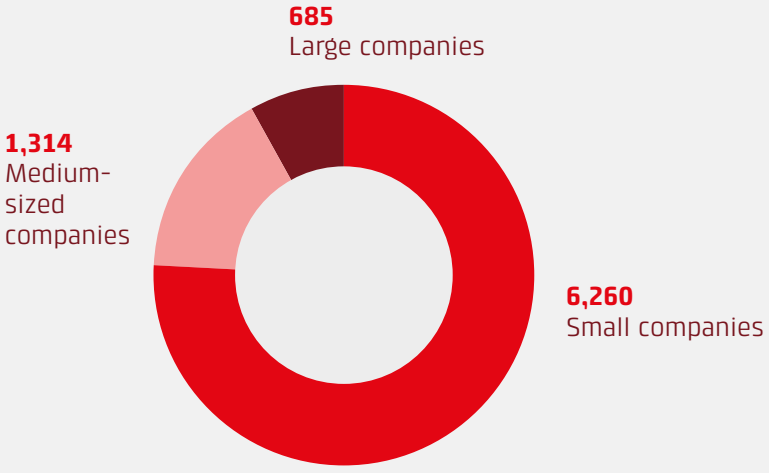


Danish customers

The Institute's customers come from all over Denmark. The number of customers distributed by regions is stable and aligns with Denmark's general regional business distribution.

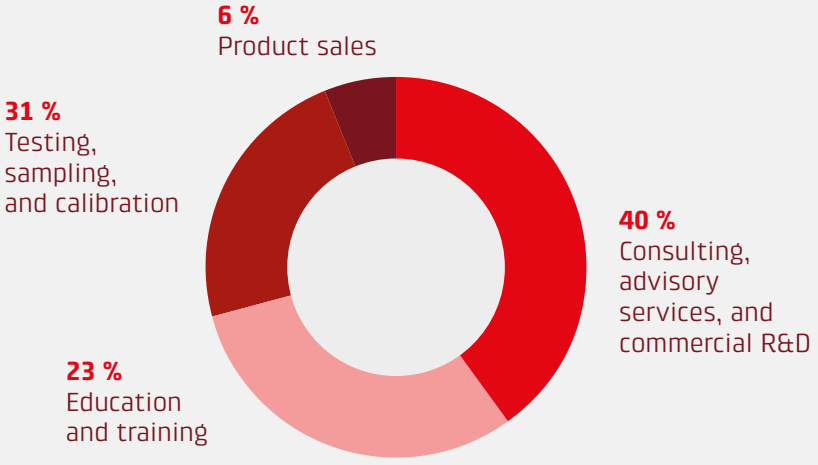
Danish business customers

The number of the group's Danish business customers in 2023 distributed by size.



Danish commercial revenue distributed by service types

The group's commercial revenue distributed by service types in 2023. The primary goods sales occur through the subsidiary Danfysik.



We ensure the development of relevant knowledge and technology

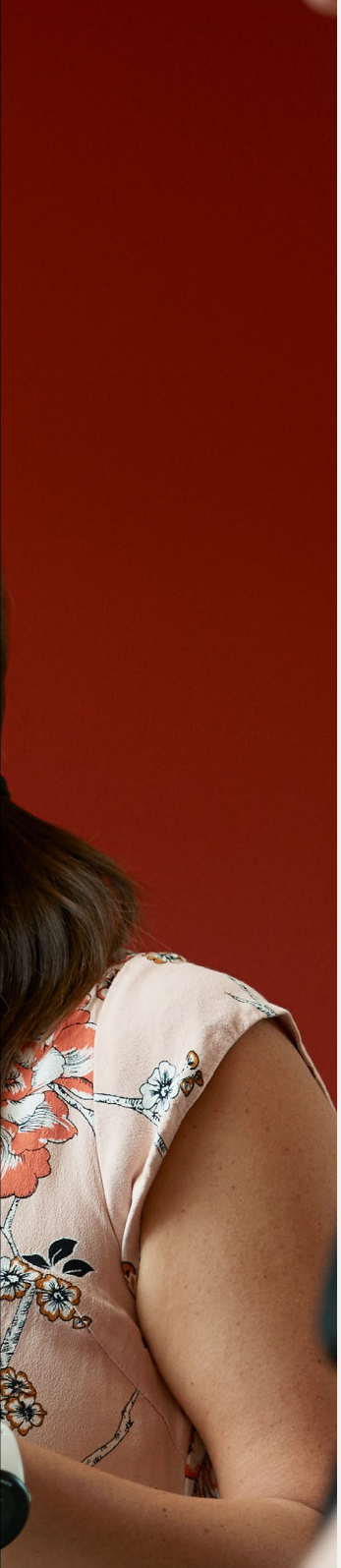
Despite significant competition for research and development funds (R&D), the Institute continues to secure market-relevant projects and establish R&D collaborations involving Danish companies. In 2023, the Institute secured a very high amount of funding from national and international grant providers, which ensures the development of relevant knowledge and technology that can be translated into specific solutions. For every one Danish krone of R&D funds the Institute secures, an additional three Danish kroner are secured for project partners.

396

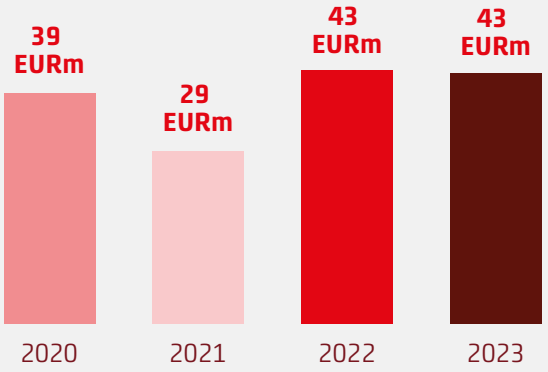
Research and development projects

63

EURm in R&D activity including self-financing

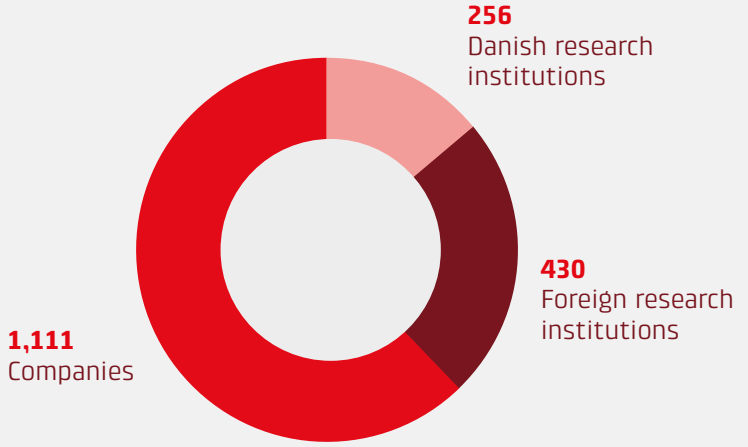


Continued high acquisition of R&D funds



Shows the external funding for Danish Technological Institute in ongoing R&D projects.

1,800 R&D collaboration relations



The group's R&D collaboration relations consisting of Danish and international research institutions in a formalized collaboration and companies involved in co-financed R&D projects.

18

Projects secured in Horizon Europe

35 %

Success rate for applied projects

Success rate refers to the projects the Institute applied for in 2023.

89

EURm total budget for Danish partners

The amount refers to the 18 projects the Institute secured from Horizon Europe in 2023.

Industry-ready facilities for testing, demonstration and development

In 2023, the Institute invested 12 EUR million in tangible fixed assets - primarily in equipment for the Institute's high-tech testing, demonstration, and development facilities (TDU facilities). Investments in equipment and facilities are crucial for the Institute's ability to conduct research and development activities and for individual companies' access to testing, demonstration, and development.

18,000

Laboratory tests and testing

70

Testing, demonstration, and development facilities

Facility

Industrial heat pumps - A key technology in the green transition

In 2023, the Institute opened a new laboratory for testing, demonstration, and development of high-temperature heat pumps, which can expand the industrial application of heat pumps for electrification of process heat above 100 °C.

The laboratory plays a significant role in the SuPrHeat project, aiming to develop and demonstrate three high-temperature heat pump technologies that use natural refrigerants.

In the laboratory, performance, efficiency, and operation are tested and documented by highly specialized staff before the heat pumps are tested at end-user sites.

The collaboration between the Institute and the partners contributes to accelerating the innovation and development of new energy-efficient solutions. Simultaneously, the development of these new technologies benefits an entire industry, where the electrification of fossil processes is crucial for the green transition.

The project 'SuPrHeat - Sustainable process heating with high-temperature heat pumps using natural refrigerants' is funded by EUDP and conducted in collaboration with 16 partners from Denmark, Germany, the UK, and Sweden.

> At Soft & Teknik, we see a great advantage in collaborating with Danish Technological Institute, where we can test systems before they reach the end-user. This means we can examine performance and optimize the system under unique conditions, where our systems can be tested under a wide range of operating conditions.

Mads Burmeister, Project Sales Manager,
Soft & Teknik, partner in SuPrHeat

Case

Testing provides security for supplier, advisor and end-user

Fenagy is a Danish company that produces industrial heat pumps primarily using CO_2 as a refrigerant. For a client project, Fenagy used the Institute's laboratory to conduct a factory acceptance test (FAT), which measures the heat pump's performance and efficiency at various operating points. As a manufacturer, Fenagy guarantees the heat output and efficiency at these points. Through the test in the laboratory, both the end-user and their advisor, NRGi, had the heat pump's performance verified, and they had the opportunity to see, hear, and feel the heat pump in operation before installation at the end-user's site.

> **At the Institute, we conducted a credible and professional FAT on the heat pump from Fenagy. This is significant for the end-user and energy advisor, as it provides an opportunity to test the heat pump for performance and efficiency.**
>
> **Michael Drejer Markussen,**
> **Chief Advisor, NRGi Rådgivning**

Case

Plate heat exchanger testing yielded useful results

Alfa Laval is a global supplier of plate heat exchangers for most industrial processes, including heat pumps and cooling systems. The company's Swedish and Italian departments used the Institute's new industrial CO_2 laboratory to test a heat exchanger. The tests were conducted to verify the heat exchanger's capacity with different coupling options on the water side and using different inserts on the CO_2 side.

Additionally, the measurement results are used to verify Alfa Laval's calculation programme for sizing the heat exchanger.

Attractive workplace: development and enthusiasm for work

The Institute's 1,100 employees daily translate their professional expertise into results for individual companies with a strong focus on how technology creates an impact for society. They are engaged, with a high degree of enthusiasm for work, and see in the Institute a workplace with an important mission, exciting professional challenges, and room for development.

Danish Technological Institute continuously pays attention to diversity and strives to be an inclusive and diverse workplace. This supports groundbreaking research, development, and innovation at the highest level.

The Institute has focused on attracting and enhancing visibility through a series of employer branding initiatives that have strengthened both recruitment and onboarding of many new employees.

1,100

World-class employees

199

New employees

94 %

Employee satisfaction

Employee Satisfaction In the Institute's employee satisfaction survey, 94 % agree or strongly agree with the statement "Overall, I am satisfied as an employee at Danish Technological Institute." The total survey was responded to by 825 employees.
Source: The Institute's Employee Satisfaction Survey.

9th

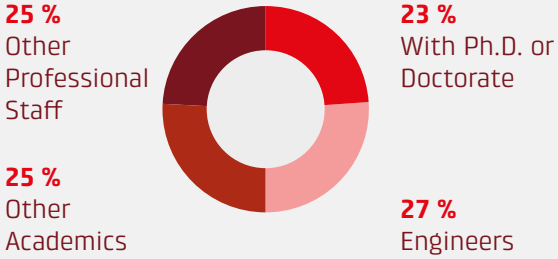
Most attractive place to work

In 2023, the Institute was ranked as the 9th most attractive workplace in Universum's image survey. The survey is based on responses from 1,347 active professionals in engineering and the natural sciences.

As a highly specialized knowledge enterprise, Danish Technological Institute constantly works to attract, retain, and develop the best talents.

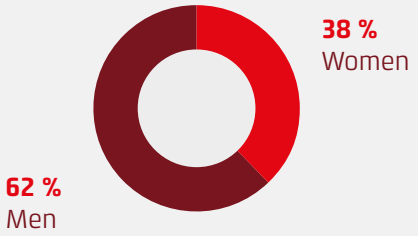
Employee composition

Employee composition for the Institute in 2023.



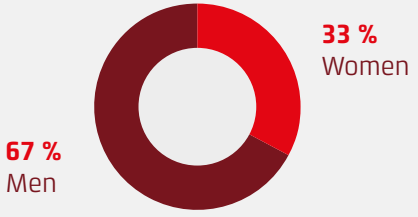
Distribution among employees

Indicates the gender distribution among employees at the Institute at the end of 2023.



Gender distribution in the management layer

Indicates the gender distribution in the management layer at the Institute at the end of 2023.

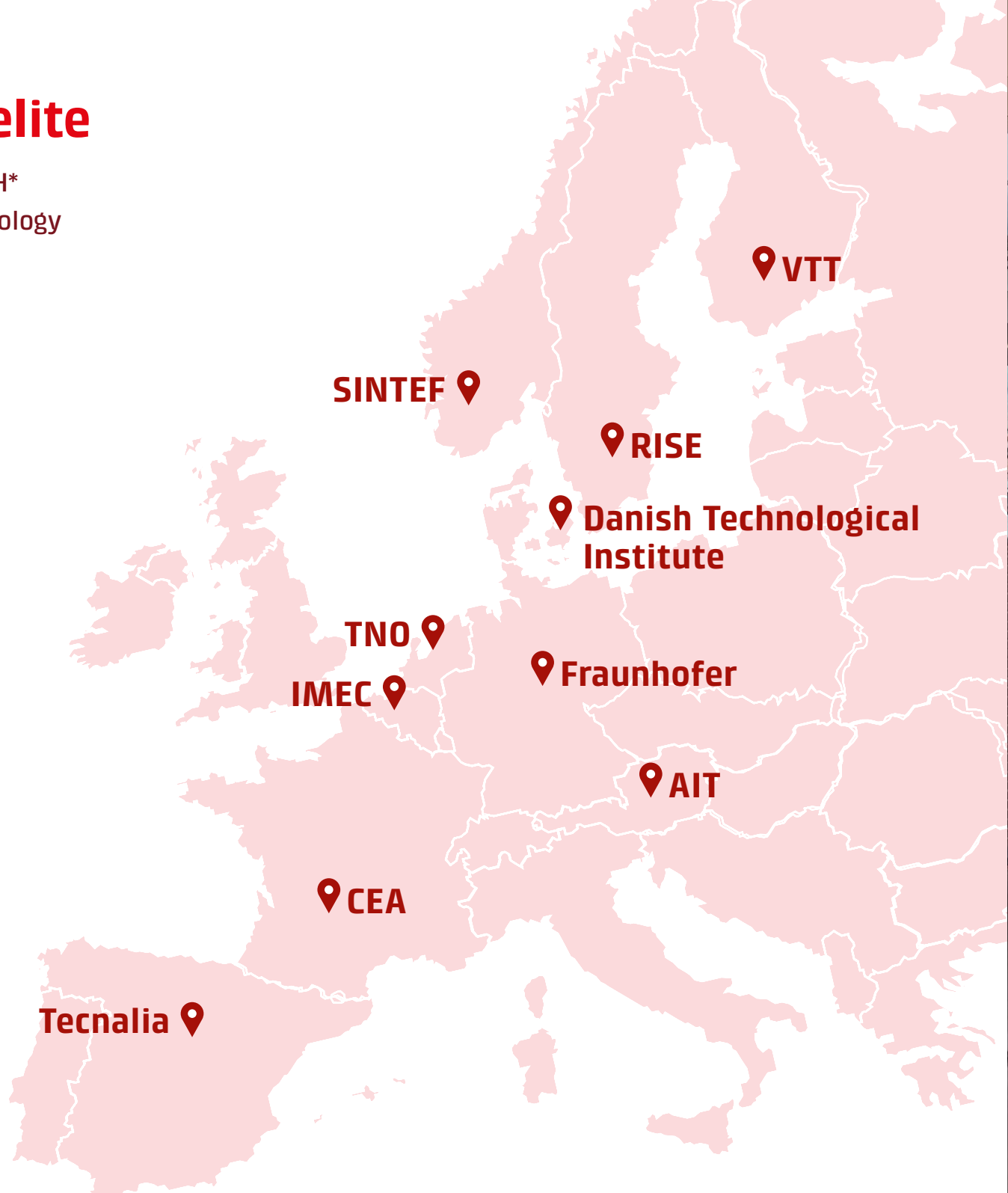


Among the international elite

Danish Technological Institute is part of EUROTECH* along with nine of the largest Research and Technology Organisations (RTOs) out of 350 in Europe:

- CEA
- Fraunhofer
- TNO
- VTT
- SINTEF
- RISE
- IMEC
- Tecnalia
- AIT
- Danish Technological Institute

*EUROTECH is an interest group originating from EARTO (the European Association of Research and Technology Organisations).



In November 2023, Danish Technological Institute hosted EUROTECH's autumn meeting. At the meeting, the top managements of the ten leading European RTOs gathered to discuss national, European, and global developments within research and education policy.

Together, we strive to achieve the greatest societal impact in areas such as the green transition, sustainability, digitalization and AI, as well as resilience.

Cases

In 2023, the Institute assisted 10,600 customers with industry-ready technological solutions for specific challenges they did not have the resources or knowledge to solve themselves.

When the Institute's employees solve one problem for one company, the Institute creates a new solution that potentially contributes to solving another problem for a different company.

Step by step, we contribute to a greener, more resilient, digital, and competitive business environment and society.

AI – The supercharger for businesses

AI holds significant potential for the business sector across industries, sizes, and whether the goal is to enhance competitiveness, support the green transition, or develop new business models.

Danish Technological Institute assists companies in implementing AI through specific business programs and by establishing facilities for testing and developing AI.

At the Institute, we work with domain-driven AI, combining our unique knowledge of data, technology, business, and domain into solutions that enhance companies' competitiveness.

Case

AI-based solution for classifying used computers

Tier1Asset A/S (T1A) is a Danish company aiming to extend the life of retired PCs rather than producing new ones.

We are assisting the company in developing an automatic solution that uses a camera system combined with artificial intelligence to classify a used computer in real-time. The solution could potentially reduce handling time by 30 percent. The hope is that, in the long term, it will be possible to repair twice as many computers as today, partly through the use of AI and automation.

The collaboration started as an AI Denmark initiative and then evolved into a commercial partnership.

AI Denmark – Cracking the Code to AI

Tier1Asset is just one of many companies that the Institute has helped to apply AI. The Institute conducts AI Denmark initiatives, which assist Danish companies in using artificial intelligence. The project was expanded in 2023, allowing an additional 250 Danish companies to receive help in implementing value-creating AI solutions. AI Denmark also serves as a portal for sharing knowledge, experiences, and networking regarding companies' use of artificial intelligence.

AI Denmark is funded by Industriens Fond. The partners are: Danish Technological Institute, Alexandra Institute, Aalborg University, Technical University of Denmark, University of Copenhagen, and IT University of Copenhagen.

> We have found the right partner in Danish Technological Institute, which has extensive knowledge in AI. It has been a swift process to move from the drawing board to some proof of concept solutions, which has enabled us to make decisions faster.
>
> Casper Gudmunthe Pedersen,
> Factory Manager at Tier1 Asset

Case

Automated quality check with AI cameras

MRN A/S, a company that produces packaging and palletizing robots and solutions, received assistance from the Institute in a MADE Demonstration project to explore whether cameras and artificial intelligence could automate checks for labels on products.

The demonstration project included checks on bags of onions and other challenges such as spotting valuable electronics in a pile of remote controls, batteries, etc., and sorting large items like washing machines.

> **The best part of the project has been the collaboration we have had with Danish Technological Institute. We have discovered new possibilities with cameras and artificial intelligence, which we have been able to use for existing customer groups, but also for new customer groups.**
>
> **Mogens Rosenvang, Director at MRN A/S**

With a MADE Demonstration project, small and medium-sized enterprises can receive assistance to test ideas and technologies and find solutions to specific challenges in their production. MADE projects are co-financed by the Danish Business Promotion Board and the European Regional Development Fund.

Project

On-location manufacturing and certification of 3D prints

Danish Technological Institute is the coordinator of the DILAPRO project, which aims to develop new software for quality assurance, optimization, and certification of 3D printed components.

Using machine learning, the system creates a digital twin of the manufactured component, serving as ongoing quality control. For instance, if an error occurs early in the process, production can be stopped, minimizing resource waste.

The software allows the user to adjust parameters, change the manufacturing method, and predict how the changes will affect the finished component. It will also help determine the ideal balance between quality, environmental footprint, and cost.

The system will also certify the printed component while it is being manufactured. This means that, in the long term, it will be possible to certify the printing of spare parts on location.

DILAPRO is supported by Horizon Europe and carried out in collaboration with 11 Danish and European partners.

Biosolutions – Paving the way from idea to market

Biosolutions is a crucial technology in the green transition. Companies that want to utilize biological byproducts or side streams face a long development process from identifying a gap in the market to reaching the market with a finished product.

Danish Technological Institute offers expertise and advanced equipment. Thus, we minimize the risk from idea to market and give companies the opportunity to develop, demonstrate, and test both products and production processes. This elevates individual companies and supports the construction of a strong ecosystem.

Facility

Biosolutions Technology Center – the linchpin in a strong ecosystem

The Institute established a Biosolutions Technology Center in 2023, as part of the lighthouse project Biosolutions Zealand.

The Biosolutions Technology Center consists of a pilot-scale biorefinery, a new fermentation plant, and equipment for purifying and preparing the products. The center offers development, testing, validation, and scaling of processes within biorefining, fermentation, and downstream processing, enabling the utilization of side streams from agriculture and food industries for foods, new ingredients, and materials.

By offering a unique interplay between advanced equipment and specialized competencies, the center will fill a gap in the market between development laboratories and full-scale production of biosolutions processes or products.

The Biosolutions Technology Center is established as part of the lighthouse project Biosolutions Zealand and with support from the Ministry of Education and Research in the performance contract effort "Development Center for Industrial Bioeconomy."

> With the Biosolutions Technology Center, we are an important step closer to building a stronger and more cohesive innovation ecosystem in Denmark. In practice, it can demonstrate how biosolutions can be accelerated and scaled through open and early innovation collaborations between knowledge institutions and companies.

Lars Visbech Sørensen,
CEO of Food & Bio Cluster Denmark (FBCD)

Project

Protein-rich microalgae reduce the environmental footprint of chicken production

Danish-produced microalgae and legumes could potentially replace imported soy protein in poultry feed manufacturing.

Proteins from microalgae contain an amino acid, which is crucial for the growth and health of chickens – this means that the same nutritional value is achieved with less feed. Additionally, the production of microalgae has the advantage that it can take place locally by capturing CO_2 from biogas plants and simultaneously utilizing a residual stream from grass.

At the Biosolutions Technology Center, we are working on developing the technology to cultivate the microalgae. Additionally, we are working on increasing the durability and digestibility of the microalgae using extrusion technology.

By using microalgae, transport-related CO_2 emissions from imported soy are reduced, and dependence on global supply chains is decreased. Simultaneously, local production is supported, promoting economic growth and utilizing local resources.

The project ProLocAL is part of the Organic RDD 7 programme, coordinated by ICROFS - International Centre for Research in Organic Food Systems in collaboration with GUDP - Green Development & Demonstration Program. It is partially funded by the Poultry Levy Fund. Project partners include Rokkedahl, Vestjyllands Andel, SEGES Innovation, Aarhus University, Department of Animal and Veterinary Sciences (project leader), Institute of Food Science, KU FOOD, and DTU - Technical University of Denmark.

Case

From CO_2 to biobased high-value products

The company ALGIECEL, founded in 2021, produces microalgae through photosynthesis with light and CO_2 uptake – and extracts natural ingredients for feed, food, and cosmetics. The company is developing a pilot-scale reactor for microalgae production, located at the Institute.

Here, Algiecel has access to laboratories, facilities, and competencies within the algae cultivation area. In addition to providing expert advice on their process optimization, we collaborate with Algiecel to optimize the purification of the microalgae biomass they produce.

> **We are developing our prototype at Danish Technological Institute, where we have daily access to expert knowledge and laboratory facilities. The close collaboration with Danish Technological Institute has resulted in us getting started quickly, minimizing risk, and soon being ready to test the technology on a full scale.**
>
> **Henrik Busch-Larsen,**
> **CEO and founder of Algiecel**

CCUS – Reducing CO_2 emissions to the atmosphere

CCUS, Carbon Capture Utilization and Storage, covers a range of technologies aimed at capturing CO_2 and either using it for purposes such as food and beverage production, chemicals and fuels, as well as building materials or storing it permanently underground.

Danish Technological Institute assists in developing, maturing, and implementing technologies within CCUS. We ensure a rapid deployment in Denmark – among other things, by increasing efficiency and scalability and reducing costs.

We connect the value chain by providing an overview of CCUS actors in Denmark, by leading and participating in partnerships, and by providing an overview of technology, market, and trends.

Facility

CO_2 capture – Maturing new technologies

Denmark has great ambitions to capture and store CO_2. One of the barriers to achieving this goal is the further development and maturing of the technology for CO_2 capture, so that it operates in a sufficiently energy-efficient manner.

The Carbon Capture Lab is Denmark's first modular laboratory dedicated to testing and improving technologies for CO_2 capture and purification. The laboratory is built from flexible modules, which makes it possible to test different technologies on several types of CO_2 sources from industries and power plants.

Specifically, companies can get help with further development of CO_2 capture technologies under industrial-like conditions and simultaneously have new carbon capture technologies tested and documented to see if they will work in practice.

A sandbox for small-scale testing

The energy company Ørsted will begin CO_2 capture at the Avedøre Plant and the Asnæs Plant in 2025 and will capture 430,000 tons of CO_2 per year from 2026. Ørsted has initiated several technological development projects within CO_2 capture to build knowledge and find optimization opportunities.

> **For Ørsted, CO_2 capture is a new technology, where we continue to want to build and expand our knowledge. Test facilities like Danish Technological Institute's can function as a kind of "sandbox," where different technologies and processes can be tried out on a small scale.**
>
> Kasper Stefan Frederiksen,
> Head of Plant Technology at Ørsted

Project

A step closer to CO_2-neutral cement production

In the Newcement project, we are creating, together with the cement industry, a new way to produce cement that can reduce the CO_2 footprint of the cement industry. The Institute is developing new technology where cement production occurs through combustion in pure oxygen instead of atmospheric air. The combustion in pure oxygen creates a high concentration of pure CO_2, which can be captured, deposited, or used for purposes such as producing new additives for cement or concrete, green fuels, or basic chemicals for plastics.

The technology is currently being demonstrated and validated in the Institute's laboratory. The goal is to implement a fully tested technology for demonstration in a production facility in the cement industry.

Danish Technological Institute leads the Newcement project, which includes participation from FLSmidth, DTU, and Lhois, which owns Faxe Kalk A/S. The project is supported by the Innovation Fund Denmark and is part of the INNO-CCUS partnership.

Technological Outlook

The Institute has mapped a commercial ecosystem in Denmark with over 200 actors ready to meet Denmark's ambitions to capture 34 million tons of CO_2 over the next 15 years. To achieve this goal, it will require initiatives that support the development of economically sustainable and attractive business models for CCUS actors, continued funding for research and development, access to knowledge and shared testing and demonstration facilities, and strengthened coordination in the CCUS ecosystem.
In our Technological Outlook on CCUS, we describe the latest developments and identify necessary areas of effort that can make CCUS
a Danish success story.

Read more about how Denmark is getting ready to capture, store, and utilize CO_2 (in Danish).

Main conclusions from the Technological Outlook

6 Danish CCUS research is number 6 in the OECD

5 Danish CCUS innovation is number 5 in the OECD.

6 Denmark is among the world's most ambitious countries in terms of CCS according to the Global CCS Institute.

75 % Three out of four actors point out that technology for capturing CO_2 is not yet used in practice.

0 % The goal is 3.2 million tons stored CO_2 by 2030. Of this, 0 % is stored today. Actors lack economic incentives and interaction with infrastructure lags.

Circular economy – We create circular solutions through partnerships

In 2023, the Institute contributed to the publication of the first Danish **Circularity Gap Report**, which shows that Denmark is only four percent circular. With a consumption of 24.5 tons of new materials per person, we are three times higher than the level of material consumption that the planet can handle and regenerate.

Danish Technological Institute translates specialized insights into technology, value chains, and business into specific solutions that accelerate the transition to a circular economy.

We create future-proof solutions by assembling consortia and partnerships that cross value chains and industries.

Project

Electronics designed for recycling and extended lifespan

Danish Technological Institute is leading the European initiative Sustain-a-Print, which supports the transition to a circular electronics industry.

We are developing electronic components that are produced with more environmentally friendly materials and methods and are designed to be either recyclable or biodegradable.

To extend the lifespan of electronics, Danish Technological Institute has set up climate chambers and pressure systems for accelerated aging tests, which can help standardize the lifespan.

One of the participating companies is Melsen Tech, which produces membrane keyboards used in everything from industrial control panels to household electronics.

Sustain-a-Print is supported by the EU and consists of a total of 11 partners from Europe, each contributing to the development of circular electronic components with a lower environmental impact.

> Danish Technological Institute also helps us explore opportunities to use digital printing techniques, recycle electronic materials, and extend the lifespan of our products. We aim to be at the forefront of the green transition and circular economy. This brings us a step closer to our goal of participating in Sustain-a-Print.

Marcus Holm,
CEO of Melsen Tech

Partnership

Circular clothing design

Denmark's first major textile project, ReSuit, has developed processes over three years that can transform polyester in textile waste into new raw materials and defined new standards for the future of circular clothing design.

In the project, researchers, design specialists, behavioral experts, and textile, fashion, and recycling companies collaborated across industries and disciplines to create more clothing designed for recycling and new technologies that can transform textile waste into new textiles.

> We believe it has been a great success. We have a solid research foundation from the project, which indicates that polyester-to-polyester recycling is feasible.
>
> Camilla Skjønning Jørgensen,
> Materials & Innovation Manager at BESTSELLER

ReSuit is supported by the Innovation Fund Denmark and is a collaboratwion between Aarhus University, Danish Technological Institute, Fraunhofer, Crossbridge Energy, BESTSELLER, Elis, Behave Green, and Design School Kolding.

Roadmap for circular economy encompasses the entire value chain

Construction accounts for 40 percent of Denmark's resource consumption and 30 percent of waste production. A transition to a circular economy in the construction sector would therefore mean significant environmental gains for society.
The Institute has developed a Roadmap for Circular Economy in construction, which provides a comprehensive overview of the efforts necessary on the path to a circular economy.

The Roadmap for Circular Economy is developed by Danish Technological Institute, WE BUILD DENMARK, and CLEAN for Realdania. The roadmap contains 28 initiatives divided into five areas of effort.

You can find the roadmap here (in Danish):

The main routes to a circular transition are:

Reduce
- Fewer square meters
- Square meters with minimal impact
- More shared buildings and communal areas

Preserve
- Renovation and transformation instead of new construction
- Extending the lifespan of products, buildings, and facilities
- Aesthetics and architecture adapted to a circular economy

Recycle
- Closed material loops through repair, reuse, and recycling
- Design for disassembly
- Avoidance of problematic substances in construction

Regenerate
- Construction with positive energy
- Production of clean water
- Increase in biodiversity

Technology for a Sustainable Society

At Danish Technological Institute, we believe that technology is crucial for creating solutions that are sustainable in terms of climate, society, and economic growth.

Since 2019, Danish Technological Institute has assessed how all of the Institute's research and development activities contribute to the UN's Sustainable Development Goals.

The figure shows the contribution of our R&D activities to the Sustainable Development Goals in 2023, based on the percentage distribution of R&D activities' revenue:

33 %	Industry, Innovation, and Infrastructure
25 %	Responsible Consumption and Production
10 %	Climate Action
10 %	Affordable and Clean Energy
8 %	Sustainable Cities and Communities
5 %	Decent Work and Economic Growth
3 %	Good Health and Well-being
2 %	Clean Water and Sanitation
1 %	Life on Land
1 %	Peace, Justice, and Strong Institutions
1 %	Partnerships for the Goals
1 %	Life Below Water


12 RESPONSIBLE CONSUMPTION AND PRODUCTION
13 CLIMATE ACTION
7 AFFORDABLE AND CLEAN ENERGY
11 SUSTAINABLE CITIES AND COMMUNITIES
8 DECENT WORK AND ECONOMIC GROWTH
15 LIFE ON LAND
17 PARTNERSHIPS FOR THE GOALS
14 LIFE BELOW WATER
16 PEACE, JUSTICE AND STRONG INSTITUTIONS
6 CLEAN WATER AND SANITATION
3 GOOD HEALTH AND WELL-BEING

Scientific Approach with Science Based Targets Initiative (SBTi)

At Danish Technological Institute, we want to ensure that our efforts in the ESG area make a measurable difference. Therefore, we have chosen to join the Science Based Targets initiative. This initiative leads an ambitious climate effort, where companies set science-based targets to reduce their emissions. By joining, we have committed to achieving the Net Zero target by 2050. Therefore, it is crucial that we now and towards 2030 implement a series of initiatives that limit our greenhouse gas emissions.

We are certified in environmental management - ISO 14001

At Danish Technological Institute, we aim to set a good example and carry out initiatives that ensure continuous environmental improvements. We operate with a systematic approach that ensures ongoing monitoring, evaluation, and improvement. That is why we are certified in environmental management according to the internationally recognized standard ISO 14001.

Our scope includes: Internal operations, service, and maintenance of infrastructure at all our locations.

A significant contribution to the green transition

Annually, the Institute makes a significant effort to advance companies' green transitions. Measured by revenue, 40 % directly relates to the green transition - for example, in areas like energy efficiency and CO_2-reduced materials. This figure rises to 80 % when including solutions such as automation and digitalization that broadly facilitate the green transition.

In 2023, targeted efforts were made to reduce the Institute's own climate impact.
The Institute follows a number of procedures in terms of minimizing electricity, water, and heating consumption. Additionally, the Institute continuously improves waste sorting, appropriate handling, and disposal of chemicals and obsolete IT equipment.

Foto: Better Energy

Renewable energy - New energy agreements

Danish Technological Institute aims to support the transition to renewable energy. By entering into two Power Purchase Agreements, the Institute has contributed to expanding the solar energy capacity in Denmark equivalent to 70 % of the Institute's consumption over 10 years, effective from October 1, 2024.

In March 2023, we were approached by our partner Better Energy with an offer to join a consortium for a solar park on Lolland. In the summer of 2023, the agreement with Better Energy for 4 GWh/year to Taastrup, effective from October 1st., 2023, was signed. This corresponds to about two-thirds of the annual consumption at the site. The agreement commits us for 10 years.

In the fall, we connected to a similar facility being built on Funen, which has a capacity of 81 GWh/year. The Institute has committed to taking 3.5 GWh annually, which is used for the Institute's activities in Odense and Aarhus. With effect from October 1, 2024, the Institute has collectively contributed to expanding the solar energy capacity in Denmark corresponding to 70 % of the Institute's consumption over 10 years.

ESG objectives

In 2023, we have continued to work on our three goals for our own direct emissions, aiming to minimize our impact on the environment and climate as much as possible. In the coming years, the Institute will work diligently to achieve the above goals both under the Science Based Targets initiative (SBTi) and in our property management, where we will increasingly focus on sustainable resource utilization, including already in the planning phase.

100 %

Renewable electricity in 2030

Objectives

Reduce consumption, which is at 10 GWh, by 20 % by 2025 and switch to renewable electricity. Our goal is 100 % renewable electricity by 2030.

Status

In 2023, with the commissioning of the first of two solar parks through PPA agreements, we secured the supply of new renewable energy to the community, corresponding to nearly 40 % of our current annual consumption. The facility became operational on October 1st., 2023. Despite an 8 % growth in the number of employees and business scope, Danish Technological Institute has avoided an increase in electricity consumption. Several initiatives have been launched to achieve an actual reduction.

10 %

Reduction of heat consumption by 2025

Objectives

Reduction of heat consumption by 10-15 % by 2025.

Status

In 2021 we used just over 9 GWh of district heating. In 2023, our consumption was reduced by over 10 %. Our goal is a reduction of 15 %.

80 %

Recycling of waste by 2030

Objectives

More of our waste should be recyclable. Our goal is 80 % recycling by 2030.

Status

About 60 % of our waste by weight was sent for recycling in 2023. To ensure significant improvement, new initiatives were launched and monitoring increased in the fall of 2023. Therefore, we expect an improvement in the assessment for 2024.

Highlights

January

AI Matters

Danish Technological Institute in Odense is the Danish spearhead in the major EU initiative AI MATTERS. The initiative aims to assist robotics and technology companies with testing and experimental facilities to implement AI in production. The goal is to make production in the EU more resilient, sustainable, and digital by using artificial intelligence.

March

European Robotics Forum

Europe's leading robotics experts gathered at the European Robotics Forum in Denmark. Juan Farré gave a speech at the opening event, which was attended by Digitalization Minister Marie Bjerre and HRH King Frederik. The Institute subsequently hosted the welcome reception and a visit to the Institute's facilities in Forskerparken in Odense.

June

The Pipe Center Days

The largest outdoor trade fair for the water and sewage industry in the Nordics, The Pipe Center Days 2023, was held at Danish Technological Institute. About 3,000 participants visited more than 100 exhibition stands and attended mini-conferences on climate adaptation and drainage systems.

August

Circularity Gap Report

The first Danish Circularity Gap Report on Denmark's circularity was published. The report was prepared by Circle Economy on behalf of Danish Technological Institute, the Confederation of Danish Industry, the Danish Society of Engineers, DTU Sustain, the Danish Design Center, and the Lifestyle & Design Cluster. The report provides a status on Denmark's circularity and offers recommendations for areas of action.

October

Advisory Board Summit

The Institute gathered members of the Institute's 19 Advisory Boards and other stakeholders for the second time at an event focused on major transitions. The event featured specific cases and perspectives within CCUS, Biosolutions, and Circular Economy.

November

Opening of Carbon Capture Lab

The Carbon Capture Lab is Denmark's first modular laboratory dedicated to testing and improving technologies for CO_2 capture and purification. The laboratory is built from flexible modules, making it possible to test different technologies on various types of CO_2 sources from industries and power plants.

Board of Representatives

The Board of Representatives consists of members appointed by the leading interest organisations in Denmark.

In 2023, the Board of Representatives' composition was:

Chairman
Mikael Bay Hansen

Head of Department, The Chairman's office, Danish Metal Worker's Union.

Appointed by
the Economic Council of the Labour Movement and the Danish Confederation of Trade Unions.

Deputy Chairman
Carsten Toft Boesen

CEO,
NIRAS.

Appointed by
the Confederation of Danish Industry.

Appointed by

The Economic Council of the Labour Movement and the Danish Confederation of Trade Unions

Fie Vestergaard, Head of department, The Danish Association of Professional Technicians.
Ejner K. Holst, Senior consultant, Danish Confederation of Trade Unions.
Kaj Andersen, Head of Secretariat, 3F - United Federation of Danish Workers.
Peter Jacques Jensen, Chairman, Union of Commercial and Clerical Employees in Denmark, IT, Media & Industry Metropolitan Branch.
Claus von Elling, Chairman, 3F - United Federation of Danish Workers.

Appointed by

The Danish Academy of Technical Sciences

Anders Bjarklev, President, Technical University of Denmark.
Lisbeth Thyge Frandsen.
Professional Board Member

Appointed by

The Confederation of Danish Industry

Claus Arberg, CEO, Hvidbjerg Vinduet A/S
Elly Kjems Hove, Industry Director, Confederation of Danish Industry.
Troels Blicher Danielsen, Managing Director, TEKNIQ.
Lisbeth Dalgaard, Chairman, Merchant, Confederation of Danish Employers.

Appointed by

The Danish Chamber of Commerce

Louise Riisgaard, Market Manager, the Danish Chamber of Commerce.

Appointed by

The Confederation of Danish Industry

Michael Lumholt, Founder and CEO, Lumholt Space Technologies
Clas Nylandsted Andersen, Director
Mette Kynne Frandsen, Managing director, Henning Larsen Group

Appointed by

The Danish Federation of Small and Medium-sized Enterprises

Niels Techen, Chairman, The Danish Federation of Small and Medium-sized Enterprises.
Thomas Krebs, Director, Managing, Danish Federation of Small and Medium-sized Enterprises.
Dorte Zacho, Owner, SMV360°

Appointed by

The Danish Society of Engineers, IDA

Claus Christian Torbøl, CEO, Guldager A/S

Appointed by

KL - Local Government Denmark

Sven Koefoed-Hansen, Director, Næstved Municipality.

Appointed by

Danish Agriculture & Food Council

Malika Buhr Pedersen, Head of Department, Research and Education, Danish Agriculture & Food Council.

Appointed by

The Danish Association of Managers

Bjarne Henning Jensen, Team Manager, Danish Association of Managers.

Appointed by

Danish Regions

Kim Johansen, Regional Council Member, Region of Southern Denmark.

Elected by

The Board of Representatives

Per Laursen, Senior Vice President, Pork Production, Danish Crown A/S.

The Institute's co-operative committee has appointed the following employee who take part in the Board of Representatives' meetings without the right to vote.

Søsser Schmidt, Service and Event Coordinator, Robot Technology, Danish Technological Institute. Elected by the Institute's co-operative committee.

Her Majesty Queen Margrethe II of Denmark has been the patron of Danish Technological Institute from 1972 to 2024.

Her Majesty the Queen took over the patronage from His Majesty King Frederik IX.

Board of Trustees

Per Laursen
Senior Vice President,
Pork Production, Danish
Crown

Mikael Bay Hansen
Chairman
Head of Department, The
Chairman's office, Danish
Metal Worker's Union

Carsten Toft Boesen
Deputy Chairman
CEO, NIRAS

Anders Bjarklev
President, Technical
University of Denmark

Claus von Elling
Chairman of 3F

Mette Kynne Frandsen
Managing Director,
Henning Larsen Group

Dorte Zacho
Owner, SMV360°

Lotte Bjerrum Friis-Holm
Employee-elected

Peter L. Frederiksen
Employee-elected

Management

Anne-Lise Høg Lejre
Executive Vice President
Food and Production

Juan Farré
President and CEO

Mikael Poulsen
Executive Vice President, Finance

Sune Dowler Nygaard
Executive Vice President
Environmental Technology

David Tveit
Executive Vice President
Energy and Climate

Mette Glavind
Executive Vice President
Building and Construction

Mikkel Agerbæk
Executive Vice President
Materials

Company Information

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Reg. No.: 56 97 61 16
Founded: 1906
Headquarters: Taastrup
Financial Year:
January 1 to December 31

Board Of Trustees:
Mikael Bay Hansen, Chairman
Carsten Toft Boesen, Deputy Chairman
Anders Bjarklev
Per Laursen
Mette Kynne Frandsen
Claus von Elling
Dorte Zacho
Lotte Bjerrum Friis-Holm
Peter L. Frederiksen

Executive management
Juan Farré, President and CEO

Audit
PricewaterhouseCoopers
Certified Public Accountants
Strandvejen 44
2900 Hellerup

Group Overview

Danish Technological Institute
Reg. No.: 56 97 61 16

Danish subsidiaries

DANCERT A/S (100 %)
Reg. No.: 29 51 20 94

DANFYSIK A/S (100 %)
Reg. No.: 31 93 48 26

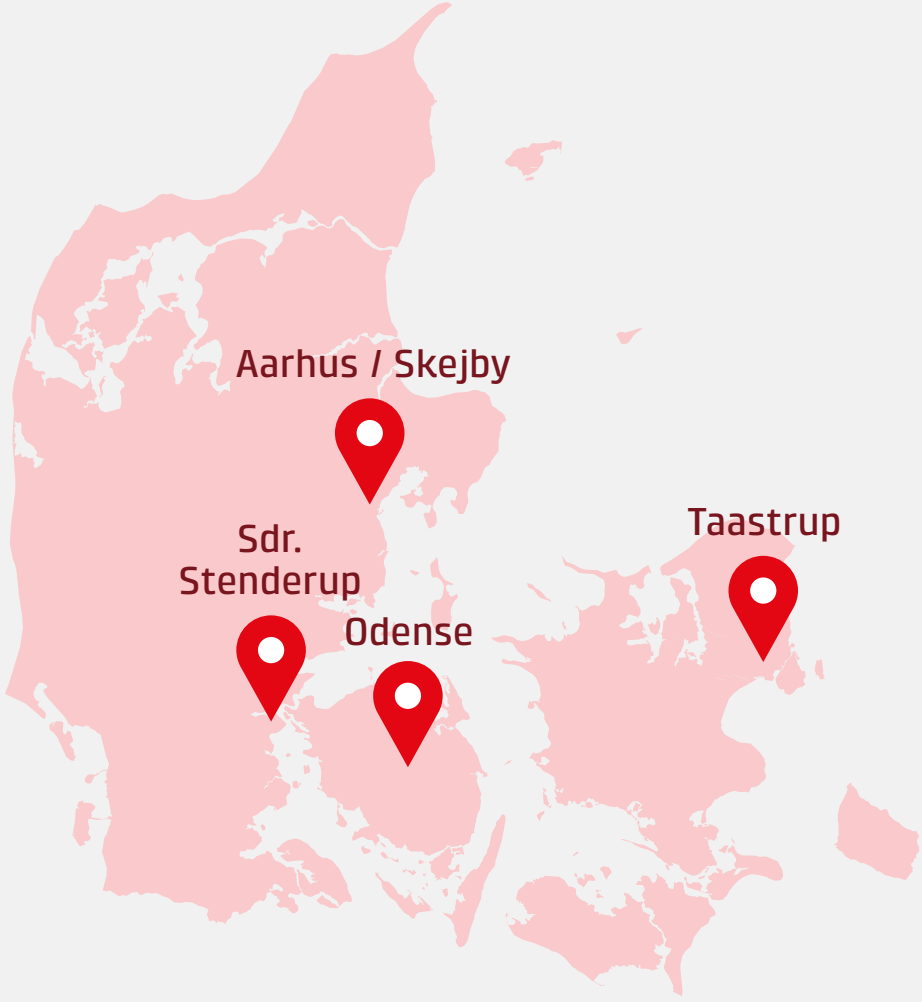
Teknologisk Innovation A/S (100 %)
Reg. No.: 20 66 65 45

Foreign subsidiary

by-nunaSolutions sl, Spain* (67 %)
Reg. No.: B-65573784

*The subsidiary changed its name in 2024.

Locations



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www.dti.dk

Presentation criteria for the Summary Financial Statements

Basis for the Summary Financial Statements

The financial information on pages 45 and 46 is extracted from Danish Technological Institute's annual report for 2023. Danish Technological Institute's annual report for 2023 is prepared in Danish kroner.

Danish Technological Institute's financial year runs from January 1 to December 31.

The annual report, which forms the basis for the financial summary, is prepared in accordance with the Danish Financial Statements Act. The Summary Financial Statements do not contain all the information required under the Danish Financial Statements Act and therefore cannot be read as a substitute for Danish Technological Institute's audited financial statements.

If you would like to see the Summary Financial Statements 2023, read more here:

Summary Financial Statements 2023

Income Statement

	Group		The Institute	
EUR million	**2023**	**2022**	**2023**	**2022**
Turnover				
Commerciel activities	118.4	110.9	99.8	93.5
Research and developement activities	31.8	29.3	31.8	29.3
Performance-related contract activities	15.2	15.2	15.2	15.2
Net turnover	**165.4**	**155.4**	**146.8**	**138.0**
Costs				
Project costs, excluding salaries	-31.9	-30.7	-23.1	-22.3
Other external costs	-27.9	-27.1	-27.2	-26.0
Personnel costs	-96.5	-87.8	-89.1	-80.8
Amrotisation & depreciation and impairment	-6.0	-6.0	-5.9	-5.9
Other operating income	0.2	0.3	0.9	0.9
Operating profit or loss	**3.3**	**4.1**	**2.4**	**3.9**
Net profit				
Operating profit or loss	3.3	4.1	2.4	3.9
Share of profit or loss after tax in subsidaries	0.0	0.0	0.6	0.1
Financial income	1.6	0.5	1.7	0.4
Financial cost	-0.3	-1.2	-0.3	-1.0
Profit og loss for the year before tax	**4.6**	**3.4**	**4.4**	**3.4**
Tax on profit or loss from ordinary activities	-0.2	0.0	0.0	0.0
Profit og loss for the year before minority interests	**4.4**	**3.4**	**4.4**	**3.4**
Minority interests' share of profit or loss in subsidaries	0.0	0.0	0.0	0.0
Net profit or loss for the year	**4.4**	**3.4**	**4.4**	**3.4**

Balance Sheet

Assets

EUR million	Group 2023	Group 2022	The Institute 2023	The Institute 2022
Fixed assets				
Intangible fixed assets	0.2	0.1	0.0	0.0
Proberty, plant and equipment	70.9	65.6	70.5	65.2
Financial fixed assets	27.5	31.6	33.3	37.0
Fixed assets in total	**98.6**	**97.3**	**103.8**	**102.2**
Current assets				
Inventories	7.0	6.3	0.7	0.5
Receivables	42.8	43.5	37.8	42.0
Cash	19.2	14.9	17.9	12.8
Current assets in total	**69.0**	**64.7**	**56.4**	**55.3**
Assets in total	**167.6**	**162.0**	**160.2**	**157.5**

Liabilities

EUR million	Group 2023	Group 2022	The Institute 2023	The Institute 2022
Equity				
Equity attributed to parent company	117.2	113.2	117.2	113.2
Minority interests	0.1	0.1	0.0	0.0
Equity in total	**117.3**	**113.3**	**117.2**	**113.2**
Provisions in total	1.3	1.3	0.6	0.6
Payables in total	49.0	47.4	42.4	43.7
Liabilities in total	**167.6**	**162.0**	**160.2**	**157.5**

Independent Auditor's Report on Summary Financial Statements

To the Board of Directors of Danish Technological Institute

Opinion

In our opinion, the financial information stated on pages 45 and 46 (the Summary Financial Statements), which comprise the summary balance sheet at 31 December 2023 as well as the summary income statement for the year then ended are consistent, in all material respects, with the Reporting criteria for the Summary Financial Statements on page 44.

The Summary Financial Statements are derived from the audited financial statements of Danish Technological Institute for the financial year 2023.

The Summary Financial Statements

The Summary Financial Statements do not contain all the disclosures required by the Danish Financial Statements Act applied in the preparation of the audited financial statements of Danish Technological Institute. Reading the Summary Financial Statements and the auditor's report associated with it is not a substitute for reading the audited financial statements and the auditor's report associated with them. The Summary Financial Statements and the audited financial statements do not reflect the effects of events that occurred subsequent to the date of our report on the audited financial statements.

The audited financial statements and our report thereon

We expressed an unmodified audit opinion in our report dated 12 March 2024 on the audited financial statements.

Management's responsibility for the Summary Financial Statements

Management is responsible for the preparation of the Summary Financial Statements in accordance with the Presentation criteria for the Summary Financial Statements on page 44.

Auditor's responsibility

Our responsibility is to express an opinion on whether the Summary Financial Statements are, consistent in all material respects, with the audited financial statements based on our procedures, which were conducted in accordance with International Standard on Auditing (ISA) 810 (Revised), Engagements to Report on Summary Financial Statements.

Hellerup, 15 May 2024
PricewaterhouseCoopers
Statsautoriseret Revisionspartnerselskab
CVR-nr. 33 77 12 31

Jacob F Christiansen
State Authorised Public Accountant
mne18628

Søren Alexander
State Authorised Public Accountant
mne42824

We are problem solvers

In 2023, the Institute has assisted 10,600 customers with industry-ready technological solutions for the specific challenges they do not have the resources or knowledge to solve themselves. Step by step, we contribute to a greener, more resilient, digital, competitive business environment and society. We create technology for a better future.

Learn more about Danish Technological Institute.

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