LUT University

Report on

SUSTAIN-ABILITY 2023

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Contents

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Publisher: LUT University, 2024

Rector's foreword

GROWING OUR HANDPRINT

and fostering our sense of community

If we genuinely wish to solve the world's wicked problems, we need to look beyond the Finnish borders and strengthen multidisciplinary research and education. In 2023, LUT started to provide social sciences education and deepened its international university collaboration.

LUT's social scientists are solving problems of the future and the sustainability crisis at the interface of people and technology. The degree programmes address the challenges and interconnectedness of critical systems such as energy, food production, water, natural resources, transport and mobility, which are crucial to society and people's well-being.

Also, LUT's international collaboration advanced in leaps and bounds when the EULiST alliance obtained four-year funding from the European Commission to establish a new joint European University in autumn 2023. Meanwhile, we have been developing increasingly wide-ranging collaboration between our university and industries. When cities, companies and researchers join forces, we can achieve great things.

Our research promotes sustainable business and supports the world's transition to carbon neutrality in all societal and industrial sectors. The switch from fossil to renewable energy and the increasing use of electricity as a power source serve the target of cutting greenhouse gas emissions and limiting the global temperature rise. As a university, we aim to become carbon neutral by the end of 2024 for our direct scope 1 and 2 emissions. We must also strive to reduce our indirect scope 3 emissions, which is a challenge.

Seeing the devastating war and tensions rising in the world in 2023, I am most grateful for our sense of community at LUT. It is especially valuable when different forces are trying to stir up trouble and undermine solidarity between individuals, communities and nations. In my opinion, our greatest accomplishment in 2023 was the fact that we have further improved our workplace well-being. According to studies, also our students are the most satisfied in Finland and praise the encouraging atmosphere and teaching.

We focus on clean energy, water and air. By educating environmentally conscious experts and decision-makers who specialise in these life-giving resources, we contribute to global, national and regional development and help society and businesses in their sustainable renewal. That is the handprint of LUT University.

Juha-Matti Saksa
Rector of LUT University

SUSTAINABILITY AT LUT

LUT is committed to environmental, economic and social responsibility in all of its activities: scientific research, academic education, societal interaction and supporting functions.

Taking sustainability and the environment into consideration guides LUT University's strategic choices, management and operations.

Sustainable development and responsibility are integrated into our educational content and our objectives for research impact. In addition, we strive for sustainability in operations that we can influence together with our stakeholders.

LUT contributes to the sustainable renewal of business and society in its three schools: LUT Business School, the School of Energy Systems and the School of Engineering Sciences that also incorporates social sciences.

LUT IN FIGURES 2023

1969
was the year LUT was founded

7 770
Bachelor's, Master's and doctoral students

57
doctoral degrees

933
master's degrees

477
bachelor's degrees

621
students in continuing education

701
students in open university instruction

98
nationalities on two campuses

97%
of Master's graduates employed one year after graduation

1 084
scientific publications

1 380
staff members

118.7
million euros in funding: Ministry of Education € 56.3 million, supplementary funding € 50.7 million

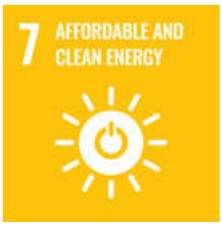
Sustainable Development Goals

The education, research and work at LUT promotes all the 17 Sustainable Development Goals on the United Nations' 2030 Agenda. Through our strategy and research, we particularly pursue the following Sustainable Development Goals.

SDG 6: Ensure availability and sustainable management of water and sanitation for all.

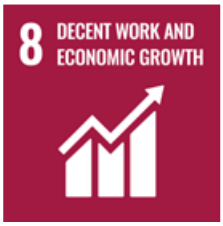
- At LUT, we respect water as a resource to be protected, cleaned and refined. We recover raw materials from wastewater and create new solutions for water treatment.
- We are an expert training and research community for water treatment and separation technology.
- We monitor **our own water consumption** and strive to reduce it.

SDG 7: Ensure access to affordable, reliable, sustainable and modern energy for all.



- We develop clean energy solutions with expertise in technology and economics. We utilise Power-to-X technologies and electrification. We are the trailblazers for an economically viable, global, carbon-neutral energy system.
- We consume clean energy and promote the energy efficiency of our facilities with the facility owners. In July 2022, we switched to certified green district heating on our Lappeenranta campus.
- We produce 4% of the electricity we consume with our own solar panels on the Lappeenranta campus.

SDG 8: Decent work and economic growth.



- Economically, socially and ecologically sustainable business is at the core of our scientific expertise. We promote innovative business models and entrepreneurial and network-like solutions.
- We educate future actors and decision-makers, who have the capacity to act responsibly in their own field.
- Our community's activities are guided by our equality and non-discrimination plan.
- Our investment strategy aims at profitable investments, taking responsibility into consideration.

SDG 9: Build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation.

- We promote the sustainability of society through circular economy and sustainable business models, data analytics, digitalisation, electrification, Power-to-X technologies and the hydrogen economy. We see emissions as raw materials creating new value. Green Campus Open supports turning our research into business.

SDG 12: Ensure sustainable consumption and production patterns.

- We promote the renewal of industrial production through digitalisation, the circular economy, new materials and enhanced processes. Our systemic perspective offers system-level solutions for such areas as waste management, urban planning and production management. We utilise economics and consumer research to develop sustainable business models.
- We consider environmental aspects and biodiversity in our procurements and campus activities.
- We publish our sustainability report annually.

SDG 13: Take urgent action to combat climate change and its impacts.

- We produce scientific knowledge and sustainable, system-based, technological, and business-related solutions to mitigate climate change.
- In line with worldwide efforts to limit global warming to 1.5°C, we aim to become carbon neutral by the end of 2024 for our GHG Protocol scope 1 and 2 emissions.
- We also strive to reduce our scope 3 emissions. We calculate and report our carbon footprint annually. In addition, we help other organisations to reduce their carbon footprint, thereby increasing our own carbon handprint.

SDG 17: Strengthen the means of implementation and revitalize the global partnership for sustainable development.

- We are committed to the UN Global Compact initiative. We promote the sustainable development goals through strong cooperation with our partner companies, campus cities and other stakeholders.
- We operate in several local, national and international sustainable development networks, including the Greenreality Network, ISCN and NSCN.
- The services provided by the campus property owners – including building service technology, waste management and maintenance of buildings and outdoor areas – form an essential part of **the sustainable development on our campuses**.

The foundations of sustainability at LUT

LUT University's **Strategy 2030: System Earth** seeks solutions for life-giving resources such as clean energy, water and air. Our current sustainability policy was adopted in 2021 to steer all our activities, and our **quality management system** includes sustainability management. The quality management system is externally audited by the Finnish Education Evaluation Centre (FINEEC), and it ensures systematic and transparent operations through the continuous evaluation and improvement of our activities.

The university's carbon footprint is calculated according to the Greenhouse Gas Protocol's (GHG Protocol) guidelines, and the ways to reduce emissions are outlined in the university's **Climate Action Plan**.

Our **code of conduct** describes the ethical and lawful courses of action that guide our activity and expectations and the ways we ensure ethical and responsible conduct in decision-making. In addition, we apply an **equality and non-discrimination plan** to prevent any discrimination at LUT and to make the university an equal work community where everyone is treated with respect.

We are committed to observing good scientific practice based on **openness and comparability**. We also adhere to **personal data protection** and the **accessibility of our web services**. Our **investment strategy** was updated in 2023.

LUT's investments comply with the UN's Principles for Responsible Investment (PRI) and apply conventional profit and risk indicators and environmental, social and governance (ESG) reporting. Income from investments enables us to pursue operations in line with our strategy. Effective financial management enables LUT as an employer to withstand changes in the operating environment.

LUT makes responsible investments in, for instance, funds that support renewable energy and solve global challenges. Up to 73% of LUT's investments have a Sustainalytics ESG rating. At the end of the year 2023, the responsibility risk (19.9) and carbon footprint (112.6) of LUT's investment portfolio were clearly lower than the reference index. The carbon footprint of the investment portfolio decreased roughly four per cent in a year. **Financial statement 31 December 2023**.

Commitment to other reporting schemes

LUT has been a member of the UN Global Compact since 2021. We **report on our actions to the UN Global Compact** in accordance with the requirements for non-business participants.

LUT Business School **reports on its activities in accordance with the UN's Principles for Responsible Management Education (PRME)**.

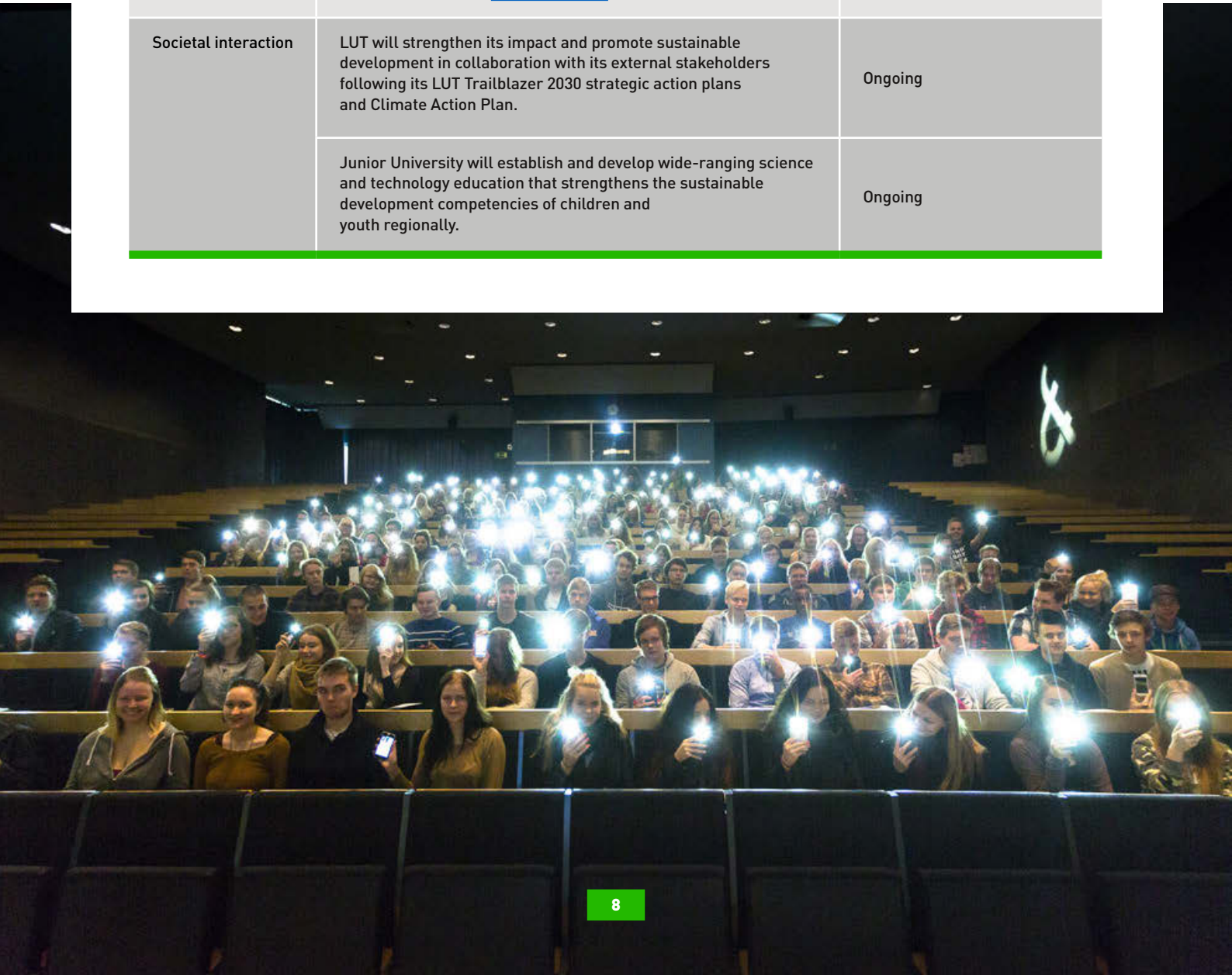
LUT is also committed to the

- SDG Accord, universities' collective response to global goals
- Race To Zero, universities' initiative for a zero-carbon world
- UNIFI's theses on sustainable development and responsibility for Finnish universities
- WWF Green Office certification.

Goals and performance in 2023

We report on the achievement of our sustainability goals. The goals are summarised in our sustainable development policy and action plan, which are the foundation for evaluating related progress. Our performance in the year 2023 is summarised in the table below.

ACTIVITY	GOAL	PERFORMANCE 2023
Scientific research	The number of scientific publications related to LUT's strategic SDGs (6, 7, 8, 9, 12, 13) will increase.	Achieved
Academic education	All of LUT's degree programmes will develop students' expertise in sustainable development.	Ongoing
	LUT will classify its courses based on the SDGs they deal with.	Ongoing
	LUT's bachelor's and master's graduates estimate that their sustainability competencies have developed more strongly than other university graduates in Finland on average.	Achieved
Sustainable campuses	LUT aims to be carbon-neutral in 2024 in accordance with its Climate Action Plan. Read more here.	Ongoing
Societal interaction	LUT will strengthen its impact and promote sustainable development in collaboration with its external stakeholders following its LUT Trailblazer 2030 strategic action plans and Climate Action Plan.	Ongoing
	Junior University will establish and develop wide-ranging science and technology education that strengthens the sustainable development competencies of children and youth regionally.	Ongoing



SUSTAINABILITY IN EDUCATION

The technology, business and social sciences education provided by LUT University focuses particularly on clean energy, water and air.

By educating environmentally conscious experts and decision-makers, LUT contributes to global, national and regional development and helps society and businesses in their sustainable renewal.

All the degree programmes at LUT are built to increase the graduates' competences in sustainability. At the beginning of studies, all new LUT students undergo an orientation into environmentally responsible thinking and research.

Based on the national bachelor's graduate survey of 2023, the sustainability skills of graduates from LUT are stronger than those of graduates from other universities in Finland (LUT shares the highest indicator value 3.7 with Hanken while the national average is 3.2). Based on the latest master's graduate surveys, the sustainability skills of LUT graduates in both business administration and technology are stronger than the average in reference universities nationally. (Source: TEK Graduate Survey 2023, SE Graduate Survey 2023.)

Examples of degree programmes promoting sustainability at LUT:

- Software Engineers for the Green Deal
- Sustainable Energy Systems
- Sustainable Manufacturing in Mechanical Engineering
- Circular Economy
- Sustainability Science and Solutions
- Environmental Technology

LUT started education in social sciences and communications

LUT was granted educational responsibilities in social sciences in 2022. The first degree programmes in the field started in autumn 2023. Social sciences complement LUT's education and research with a new kind of thinking and skillset. The first doctoral students in social and communications sciences also started at LUT last year.

LUT's social scientists are solving problems of the future and the sustainability crisis at the interface of people and technology. The degree programmes address the challenges and interconnectedness of critical systems such as energy, food production, water, natural resources, transport and mobility, which are crucial to society and people's well-being.

The first-year studies included the following courses, for example:

- Social sciences viewpoints on sustainability
- Environmental policy
- Natural resources and development of societies
- Food systems
- Climate change (Environmental Technology)

Two degree programmes in Finnish started in autumn 2023:

- Bachelor's Programme in Social Sciences
- Bachelor's Programme in Communications Sciences

Master's degree programmes in English will start in autumn 2024:

- Master's Programme in Sociotechnical Systems and Sustainability Transitions
- Master's Programme in Digital Social Science
- Master's Programme in Global Communications and Clean Air, Water and Energy

Sustainable development is a multi-disciplinary theme at LUT Business School

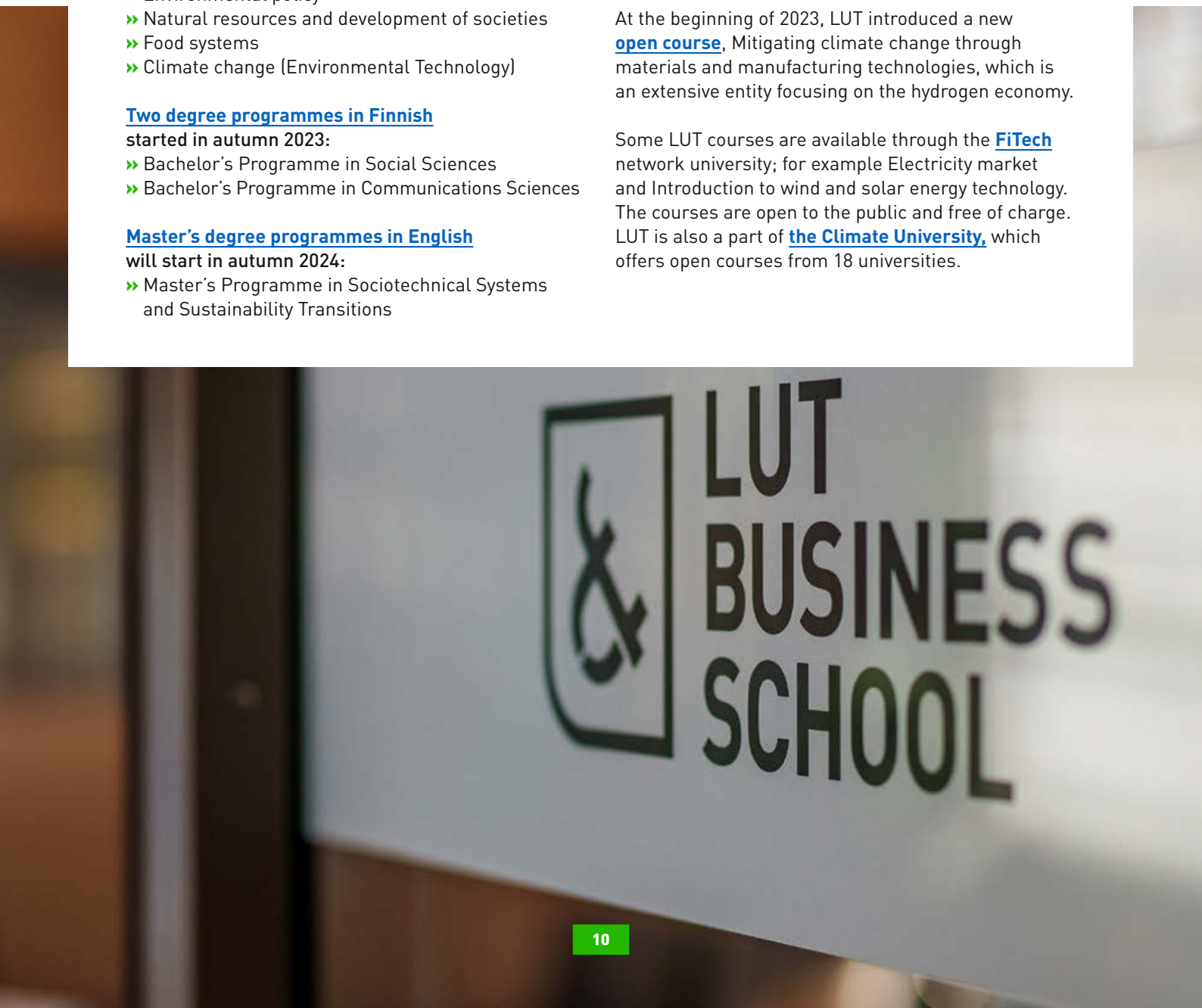
Introduction to corporate social responsibility and sustainability is a compulsory course for all bachelor's students at LUT Business School. Sustainable development is a cross-cutting theme in the programme portfolio, from bachelor's to doctoral degrees.

LUT Business School also launched a new degree programme, the Bachelor's Programme in Sustainable International Business, which will start in autumn 2024.

Open studies promoting sustainable development

At the beginning of 2023, LUT introduced a new **open course**, Mitigating climate change through materials and manufacturing technologies, which is an extensive entity focusing on the hydrogen economy.

Some LUT courses are available through the **FiTech** network university; for example Electricity market and Introduction to wind and solar energy technology. The courses are open to the public and free of charge. LUT is also a part of **the Climate University,** which offers open courses from 18 universities.



CASE

EULiST is establishing a new European university

EULiST stands for European Universities Linking Society and Technology. It is an alliance established by LUT and nine other universities aiming for a joint European university.

This great success allows EULiST to implement its joint and integrated approaches in social sciences, natural sciences and engineering to develop new sustainable solutions for challenges that we face today and in the future.

Jari Hämäläinen
Chair of the EULiST management board and LUT's vice rector for research and innovation

The venture took a significant step forward in summer 2023, when the European Commission awarded EULiST the title European University Alliance. This means the alliance will receive funding that amounts EUR 14.3 million over a four year period.

The activities officially started on 1 November 2023. The EULiST collaboration provides new possibilities for students and staff to connect with peers from across Europe, share best practices and collaborate on a wide variety of education, research and social initiatives. EULiST will:

- support inter- and transdisciplinary learning, research and outreach;
- issue, promote, and monitor sustainable policies;
- contribute to reaching SDGs across Europe and beyond;
- enable student and academic staff participation and interaction with society through the EULiST campus and Digital Knowledge Hub, Agora for Education, Research and Innovation Academy (ERIA) and Co-creation Cluster.

The EULiST members are highly specialised in research related to SDGs 6, 7, 9, 11, 12 and 13, but the research and education activities of the members address all the seventeen SDGs.

Highlights of education in 2023

SDG 4 aims for inclusive and equitable quality education and lifelong learning opportunities. The high quality of education at LUT is evident in its strong performance in international rankings and in a Finnish reputation survey.

SDG 4	According to the Reputation & Trust survey conducted by T-Media in February 2023, LUT is the most reputable among 14 universities in Finland and stands out as a modern and innovative institution.
SDG 4	LUT maintained its position in the 2023 THE Impact Rankings, which rate universities based on how well they promote the SDGs. LUT reached the top 101–200 out of the 1 591 universities listed. LUT placed 15th in sustainable consumption and production (SDG 12) and 26th in climate action (SDG 13).
SDG 4	LUT University's position in the QS World University ranking improved by 37 places. Among the Finnish universities ranked, LUT was first in terms of citations and second in the number of foreign students. One third of LUT's first-year master's students come from abroad.
SDG 4	LUT Business School is one of the world's top 150 business schools and the second in Finland in the THE World University Rankings 2023 by subject. The school also has AACSB accreditation, which is the most highly regarded business education accreditation in the world.
SDG 4	LUT's Lahti campus hosted the 2023 EUA-CDE Annual Meeting, which focused on the different dimensions of communication in doctoral education and on how doctoral candidates can better communicate their competencies to the broader public.
SDG 4	LUT expanded its water technology education in its regional unit in Mikkeli with a new master's programme. Also, the new master's programme in Food Processing Technology will start in the regional unit in Kouvola in autumn 2024.
SDG 4	LUT's open studies and continuing education promote lifelong learning opportunities for all. Several courses address sustainability and responsibility; for example the Sustainable strategy and business ethics online course.
SDG 4	LUT arranged a mentoring programme for the third time. In the programme, LUT's alumni help students to develop their transferable skills and recognise their competencies and strengths.
SDG 4	National surveys demonstrate that the sustainability skills of LUT graduates are stronger than those of graduates from other universities in Finland.
SDG 4	All the degree programmes at LUT are built to increase the graduates' competences in sustainability, and all the courses provided are classified based on the SDGs they deal with.

RESEARCH IMPACT

LUT University conducts and publishes high-level research that improves the state of the environment and is relevant to society and industries. Clean energy, water and air are life-giving resources for which we seek solutions with our expertise in technology and business.

LUT's environmental handprint refers to the positive impacts that the university's education and research have on society and companies. Scientific knowledge and innovations that we produce enable businesses and society to reduce emissions and curb climate change.

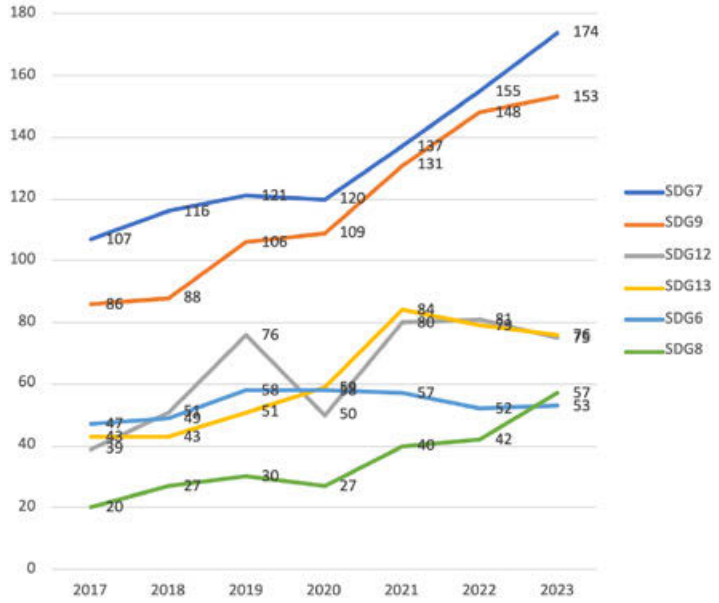
Our research promotes sustainable business and supports the world's transition to carbon neutrality in all societal and industrial sectors. The global energy sector is undergoing a major transition from a fossil fuel burning system to a carbon dioxide free system based on electricity. We solve air pollution problems and investigate how greenhouse gas emissions can be turned into valuable raw materials for industry in the future. In water treatment, our research helps to stop harmful chemicals from flowing into nature and recover and recycle nutrients from sewage.

Scientific publications in 2023

LUT is committed to promoting open science and research. The goal is that all scientific publications will be either originally published in an open forum or made available through LUTPub. The transparency of publications also helps to spread sustainable applications to the public.

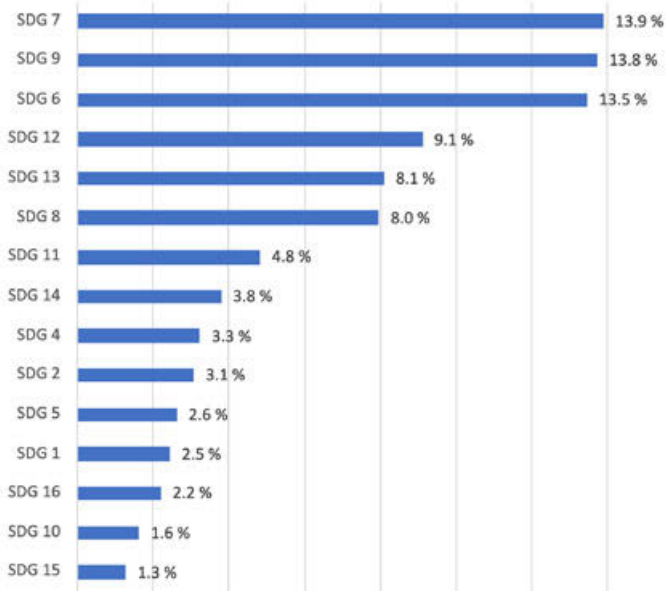
In 2023, LUT released 483 scientific publications in high-quality journals (Publication Forum rating 2–3). A total of 429 LUT's Scopus publications in 2023 dealt with at least one sustainable development goal. A year earlier, the respective numbers were 481 and 419.

Development of LUT's research publication volumes from 2017 to 2023 in six key SDGs.



Source: SciVal 03/2024

LUT's share of SDG-related scientific publications produced by Finnish universities and organisations (2023)



Source: SciVal 03/2024

Research platforms and selected SDGs

LUT runs interdisciplinary research platforms, which all focus on specific SDGs. Our strength lies in systemic understanding – addressing individual challenges as a part of an overall system. We emphasize an interdisciplinary approach and collaboration with our partners, companies and scientific networks.

GREENRENEW – Green Hydrogen and CO_2 for Industry Renewal creates cost-competitive solutions for key processes in the renewal of industry. The solutions are enabled by green hydrogen and turn CO_2 from a problem to a resource.

AMBI – Analytics-Based Management for Business and Manufacturing Industry focuses on smart technologies in the manufacturing industry, digital transformation and business analytics. AMBI aims to improve companies' competitiveness and create sustainable value in the digital economy.

INERCOM – Integrated Energy Conversion Machinery supports the transition to a carbon-neutral world by creating record-breaking, efficient solutions for energy conversion machinery.

MORE SIM – Modelling Reality through Simulation provides digital tools that will contribute to sustainable industrial growth.

SCI-MAT – Sustainable Circularity of Inorganic Materials examines the circular economy models of metals and industrial minerals by utilising municipal and electronic waste and side flows from mining and other industry as raw materials.

CASE

LUT and Kempower established a research centre to boost electric mobility

LUT University and Kempower launched extensive collaboration in the field of electric mobility in 2023. As a result, a new research centre was opened on LUT's campus in Lahti.

We need to build an energy infrastructure to serve transportation, establish a circular economy, ensure the adequacy of batteries, and increase the use of renewable energy. There's plenty of research and tasks to be done.

Ville Naumanen
The head of EMRC, Research Director

Kempower is one of the leading providers of fast charging solutions for electric vehicles. Electrification is key to the green transition of the energy system and thereby to the path towards climate neutrality. Addressing the related challenges requires interdisciplinary collaboration.

The **Electric Mobility Research Center (EMRC)** cuts across the boundaries of almost all of LUT's fields of specialisation – from technology and business to social and communication sciences. The LAB University of Applied Sciences is also strongly involved in the collaboration.

Highlights of research in 2023

In 2023, our research strongly focused on the green transition of the energy sector, sustainable industrial processes and innovations, and responsible consumption and production patterns. The switch from fossil to renewable energy and the increasing use of electricity as a power source serves the target of cutting greenhouse gas emissions and limiting the global temperature rise.

SDG 7, 9, 13	The emissions in the atmosphere may turn out to be an important industrial raw material down the line. LUT's researchers are exploring the use of carbon dioxide and other atmospheric gases in products that are important to humankind and save resources and energy; for example, steel, fuels, food, pharmaceuticals, ammonia in fertilizers, and xenon as a safe anaesthetic. GREENRENEW is LUT's research platform that aims to turn carbon dioxide from a problem to a resource.
SDG 7, 9, 13	LUT presented compelling new research results regarding the feasibility of green hydrogen production in Southeast Finland. Wind is the most cost-effective power source for the hydrogen economy in Southeast Finland. Based on LUT's investigations, the City of Lappeenranta, the regional development companies Cursor Oy, Kouvola Innovation Oy, Business Joensuu Oy, and Imatran Kehy Oy, and LUT jointly founded an organisation – the Finnish Hydrogen Valley Association – to promote the production potential and industrial opportunities around the hydrogen economy widely in Eastern and Southeast Finland.
SDG 7, 13	Solar energy generation has become a massive business globally and has great potential even in Finland. LUT's research on solar energy was highly visible in the global media during the year.
SDG 7, 13	LUT established a new electrical engineering professorship focusing on renewable energy in Lappeenranta.
SDG 7, 9, 11, 13	To replace fossil energy sources, LUT has studied nuclear power and small modular reactors, which are emerging as an option for powering district heating in Finnish cities. The research also incorporates social aspects, addressing societal engagement issues related to SMR technology adaptation in district heating especially from the municipalities' perspective and residents' gendered safety and risk expectations.
SDG 2	A dissertation at LUT found that due to climate change, farmers should favor a diverse range of crop species that adapt to different weather conditions. This would reduce yield fluctuations and the individual farmer's risks and improve global food security.
SDG 3	An award-winning dissertation at LUT used mathematical models and computational algorithms to solve inverse problems related to epidemiology and to research parameter identification and models for predicting the spread of diseases.
SDG 6, 7	A dissertation at LUT investigated the use of water in the global energy sector. The power sector could save a significant amount of water by decommissioning the old thermal power plant fleet. The plants should switch to renewable energy sources, which require less water.
SDG 6, 9, 11	Stormwater runoff picks up nutrients, microplastics and other pollutants and pushes them into rivers, lakes and seas. To reduce such pollution runoff and to simultaneously increase recycling, LUT is developing a new filtration system out of construction and demolition waste.
SDG 6, 11	A dissertation revealed that cellulose fibres derived from waste sources, such as waste cotton fabrics, are usable and valuable in the production of polymeric ultrafiltration membranes in water treatment. It is an upcycling procedure, contributing to a closed-loop economy.
SDG 7	LUT is a member of a European consortium working on creating a circular value chain for batteries, which promises to transform the life cycle of these products. The project called REINFORCE belongs to the interdisciplinary SCI-MAT research platform at LUT.
SDG 7	A dissertation at LUT showed that smart buildings can be harnessed to balance electricity consumption and production, which is increasingly important and serves the green transition of the energy system.
SDG 7	A dissertation at LUT defined a framework for the future standardisation of communication protocols that are crucial for the digital green transition of energy systems. The solution is a radio access network (RAN) slicing framework.

SDG 7	Renewable energy resources, storage systems and other energy networks can reshape the energy infrastructure. A dissertation at LUT examined how to reduce poverty with the help of the Energy Internet.
SDG 7, 13	Afforestation is a way to mitigate climate change, as growing trees remove carbon dioxide from the air. A study at LUT examined how afforestation could be expanded to the world's arid areas sustainably and at a reasonable cost, employing low-cost renewable electricity for the desalination of seawater.
SDG 8, 12	LUT investigates AI in cross-disciplinary studies, for example in the More Sim research platform, which develops simulation-based techniques for industry and design.
SDG 9	A dissertation at LUT suggests a new way to apply industrial 3D printing to the manufacturing of advanced metal structures. It has high potential to reduce environmental impacts in the chemical industry, such as in separation and purification technology applications.
SDG 9	A dissertation at LUT presented a revolutionary motor that could be a game-changer in the world of electrical motors. The synchronous reluctance motor (SynRM) with axially laminated anisotropic (ALA) rotor can significantly increase efficiency while reducing energy consumption and emissions.
SDG 9	LUT decided to establish a sustainable mechatronics professorship in Lahti. The aim is to develop new, practical solutions for improving the sustainability of machines such as energy-efficient industrial robots, electric non-road mobile machinery and vehicles, and systems where humans and robots interact.
SDG 9, 12	LUT works for the recycling of plastic waste from construction and demolition sites as part of a large circular economy project. The goal is to establish a sustainable circular economy of plastics in Finland by 2035.
SDG 9, 12	A study by LUT found that digital circular economy platforms enable the circular use of resources and materials. For example, digital platforms can help recycle construction waste and prevent food waste more efficiently.
SDG 12	LUT's research project Willatus develops new applications for sheep's wool fibres, lanolin and keratin to avoid valuable compounds from ending up as waste.
SDG 12	A study at LUT looked into corporate activism and CEOs, who take public stances on socio-political issues. The case of the Finnish textile company Finlayson demonstrates that even the boldest stances do not drive customers away.
SDG 12	A study at LUT investigated new clothing industry business models that are based on the reuse of clothing: second-hand, shared, or borrowed.
SDG 12	A dissertation suggests that AR technology lowers product return rates and fosters eco-friendly shopping, reducing the environmental impact of fashion e-commerce.
SDG 12, 13	A study at LUT examined the motivation and determinants of the engagement of supply chain partners in decarbonization, suggesting that companies should establish long-term relationships and increase supplier engagement in emission control and open emission disclosure to achieve better carbon management results.
SDG 12, 17	A dissertation at LUT examined how to measure the environmental handprint of products and services reliably. The study stands out as the world's first doctoral dissertation on positive environmental effects and their calculation. LUT has also studied environmental handprint and carbon handprint in several projects with VTT.
SDG 12, 17	Bio-based packaging films could replace the plastic films of cardboard packages. LUT and VTT are developing the new films from cellulose in the Films for Future (F3) research project.
SDG 12, 15, 17	LUT is involved in a strategic Finnish research consortium, BIODIFUL, which studies and supports leadership that respects biodiversity at the individual, organisational and societal levels. LUT develops and tests methods to calculate the biodiversity impacts of products or services. The aim is for businesses and consumers to take biodiversity better into consideration in decision-making.
SDG 4, 9, 17	LUT's professor of mechanical engineering **Aki Mikkola** was named Professor of the Year for 2023. The award was granted by the Finnish Union of University Professors for merits in Finnish engineering science and the technology industry and successful application of research data to higher education.

SOCIETAL INTERACTION

LUT is widely involved in societal interaction in international, national and local contexts and promotes sustainable development in collaboration with external stakeholders.

Parliamentary committees and various regional, national and international institutions often consult LUT's experts, especially regarding renewable energy and carbon neutrality. LUT is represented in the Euro-Case Executive Committee of European science academies and participates in the Science Advice Mechanism of the European Commission. LUT is an expert member of several international research, business and sustainability networks.

LUT is registered in the EU's Transparency Register. **Our memberships and affiliations** include, for example, the EUA, T.I.M.E., EERA, A.SPIRE, WaterEurope, and UniLiON.

Advising green transition in energy sector

LUT has contributed to the European Sustainable Energy Week (EUSEW) policy dialogue with research-based solutions since 2016. In June 2023, LUT hosted an EUSEW evening event in Brussels, focusing on the hydrogen economy, electric transportation and green electrification in the campus cities Lappeenranta and Lahti, which are both EU Green Cities. The Finnish Office of the European Parliament and LUT also organised **a discussion on the energy crisis** in Helsinki.

Based on the vast renewable energy potential in the Nordic countries, **the hydrogen economy is emerging as a pathway to the great European energy transition**. LUT has investigated the potential of wind power in several regions in Finland and its feasibility for green hydrogen production. LUT counsels **the Finnish Hydrogen Valley Association**, which promotes the hydrogen economy in Eastern and Southeast Finland. The region relies on heavy industry, and its future success and vitality depend highly on a cost-efficient, emission-free and resilient energy system.

Currently, LUT also chairs the **Hydrogen Cluster Finland**, which works towards the same goals on the national, European and global scale. LUT plays a role in informing governmental bodies and public administration, such as Business Finland, in matters involving green hydrogen and renewable energy.

Promoting sustainable value creation and entrepreneurship

Changing consumer behaviour and the demand for more environmentally friendly products and processes generate opportunities for new business. LUT is actively investigating and developing new business models based on responsibility, circularity and digitalisation. The rise of **artificial intelligence (AI) and its possibilities the in green transition** were particularly high on the agenda in 2023. AI was also the topic of LUT Business School's international doctoral summer school in Lappeenranta, one of the core activities of the European Media Management Association.

LUT's business ecosystem consists of research and education units, students, alumni and enterprise networks, the business accelerator **Green Campus Open** (GCO), the **J. Hyneman Center** (JHC) for rapid prototyping, the student-driven entrepreneurship society **LUTES**, and the cleantech seed investor Green Campus Innovations Ltd, which provides new opportunities for both start-ups and established industrial companies.

By 2023, LUT research has generated over fifty start-ups that have been operational for at least three years. Fifteen new inventions were reported in 2023.

Cooperation with campus cities and sustainability networks

At LUT, we also cooperate closely with our campus cities, Lappeenranta and Lahti. The focus of the cooperation is on education, district heating, waste, electricity and commuting.

The LUT campuses serve as a venue for diverse scientific and societal encounters. For example, in June 2023, the City of Lappeenranta and LUT jointly hosted a summit of the European Conservatives and Reformists Group in the European Committee of the Regions, focusing on **smart mobility and innovative and green solutions for a carbon-neutral Europe**.

Junior University (formerly known as LUT Junior University) incorporates LUT Universities' sustainability contents into the curricula of local primary schools in the cities of Lappeenranta, Imatra and Lahti. In 2023, for example, Junior University arranged a one-day campus festival for Lappeenranta fifth graders. Junior University also received funding from the Finnish Cultural Foundation for a mobile workshop that tours schools and events. Junior University promotes particularly SDGs 4, 12, 13 and 17.

LUT is also a member of Women in Tech Finland, a network that promotes diversity, equality and inclusion in the field of technology.

Before the **Finnish presidential elections**, LUT Universities offered the candidates the opportunity to discuss topics important to our university in interview sessions on the campuses.

CASE

LUT's professor invited to the Finnish Climate Change Panel

LUT University's professor of sustainability science **Risto Soukka** was appointed to the Finnish Climate Change Panel for the years 2024–2027. The panel provides reports and scientific data to support decision-making related to the climate.

The panel is a 15-member independent scientific advisory council that operates based on the national climate act. Reports and advice by the panel are used for policy- and decision-making related to the climate. The panel's members represent different fields of science related closely to mitigating and adapting to climate change, such as transportation, energy, agriculture, forestry, and land usage.

Professor Soukka's contribution to the panel includes expertise in the life cycle impacts of technical systems and the reduction of emissions by technological means.

"My membership in the panel provides an opportunity to convey knowledge produced at LUT to decision-makers and society. We study areas such as energy solutions and their effect on greenhouse gas emissions. We address technology-related challenges, compare alternatives, and make statements on steering mechanisms that can promote measures such as the adoption of renewable energy sources. The most important thing is to boost awareness of climate issues in all decision-making," Soukka describes.

Finland aims for climate neutrality by 2035. The goal is challenging but offers opportunities for Finnish industry and business and thus affects the larger society. As a result of the interaction between panel members from different research fields, the Finnish Climate Change Panel contributes to a more comprehensive understanding of climate change.

Photo: City of Lappeenranta

Highlights of societal interaction in 2023

LUT's experts contributed actively to public discussion in social media and the Finnish mass media, sharing the latest research results and insights into the energy system, industrial policy, mobility and communications and consumption trends, for example. LUT also hosted a number of scientific conferences and other events to facilitate stakeholder dialogue.

SDG 7, 12, 13	LUT's professor of software engineering Jari Porras received recognition for his pioneering role in promoting green information technology in Finland. He has been at the forefront of promoting sustainable development in the education of software engineers and spoken in favour of more energy-efficient IT and software development and paying attention to the emissions of the IT sector and how to curb them.
SDG 12	LUT's researchers and business influencers discussed sustainable consumption in a strategy seminar at LUT in May 2023.
SDG 7, 13	LUT hosted the International Conference on European Energy Markets (EEM) in Lappeenranta. The participants were experts in science, industry and policy making, and the conference focused on topics such as energy modelling, market design, regulatory policies and climate change.
SDG 6, 9, 12	The SCI-MAT platform's first seminar and the 19th Nordic Filtration Symposium, organised by LUT in partnership with the Centre for Separation Technology and the Xplorer network, convened experts and professionals from various fields to discuss circularity.
SDG 15	Jointly organised by LUT and the Kolli Foundation, the Metsä360 Award and the Metsä360 Competition for schools highlighted the value and significance of forests. The winner of the Metsä360 Award 2023 was Arbonaut, which provides forest reserve information. Accurate information on forests helps to improve the felling methods and create future business that safeguards biodiversity.
SDG 15	The Metsäsuhteet yhteiskunnallisessa muutoksessa research project received a national award for its achievements in promoting and renewing forest-related discourse in Finland.
SDG 8, 11, 17	LUT was one of the organisers of the international FINT Workshop 2023. The conference focused on trust within and between organisations, which is crucial for leadership but also for societies' ability to tackle serious challenges such as climate change.
SDG 16	LUT showcased the Unissued Diplomas exhibition on its Lahti and Lappeenranta campuses to honour the memory of Ukrainian students who lost their lives due to the Russian invasion.
SDG 4, 10, 17	LUT's professor collaborates with the UN agency WIPO in providing creativity and IP education. The programme aims to change school curricula in a way that inspires creativity and entrepreneurship and has reached countries such as Peru, Slovenia, Albania, Romania, Jordan, Switzerland and Egypt.
SDG 16, 17	LUT has been a member of the UN's Global Compact initiative since 2021. Read our latest Communication on Engagement report.
SDG 17	LUT cooperates closely with, for instance, its campus cities Lappeenranta and Lahti and the regional Greenreality network.
SDG 17	Several of LUT's professors regularly appear in public media, offering their expertise on energy saving and navigating the electricity market for everyday consumers.
SDG 17	An event arranged by LUT and ARVO helped establish networks and assess what socially impactful entrepreneurship is like in South Karelia. The event analysed cases such as Biovaaka, which aims to reduce food waste, and Goodwill, a chain of second-hand stores.

SOCIAL RESPONSIBILITY

LUT University is a highly international and growing higher education community. Our policy is to treat all our students and staff members equally.

The UN's Universal Declaration of Human Rights serves as the guiding principle for operation on our campuses. We emphasise our community's ability to promote sustainable development.

LUT has feedback channels where staff and students can submit feedback, initiatives, or reports in accordance with the whistleblower protection act. The **whistleblowing channel** on LUT's website was introduced in 2023 to enable people from outside the university community to safely report breaches. The reports are dealt with in accordance with the act's provisions.

Sustainable working culture

LUT's organisational structure – the board of directors, advisory board and university collegium – is presented transparently. Our students influence the university's decision-making and organise activities on the campuses through the Student Union of LUT University (**LTKY**).

LUT applies a human resource development plan, which defines how the employer promotes employee well-being and professional development. In 2023, LUT recruited **Finland's first HRD vice rector** **Truus Poels** (pictured) to further improve the work culture, leadership, and processes.

LUT has received the European Commission's HR Excellence in Research Award and strives to improve the working environment for researchers with the European Commission initiative HRS4R – Human Resources Strategy for Researchers.

LUT also provides a wide range of training and open university courses for staff. The amount and topics of online staff training continued to increase during 2023. The staff of LUT Universities was offered a webinar series about mental well-being in the workplace in English and Finnish.

Equality and inclusion

LUT is known for a relaxed, safe and responsible campus culture, where everyone is encouraged to engage in the community and its various activities. According to studies, **LUT's students are the most satisfied in Finland** and praise the encouraging atmosphere and teaching.

In 2023, LUT launched online equality training, which is targeted especially for new employees. The course material covers the following compulsory* and optional themes:

- equality at the university*
- discrimination and harassment*
- unconscious bias*
- equality in teaching
- equality in research
- equality in recruitment
- diverse work community

As the number of international employees has increased, LUT has increased courses in Finnish as a second language and English-language training. The student portal eLUT and the staff intranet are bilingual.

Accessibility is taken into account in the design of facilities and digital content. Teachers have access to language services, such as video subtitling.

The mental well-being and job satisfaction of LUT's staff are monitored regularly. LUT launched a new mood tracker tool in April 2023 for real-time feedback from staff. Employees receive a monthly email reminder of the survey, which is always open (except in July). The results are published once a month on the intranet, and they are visible to all employees through the survey tool. Teams and units also discuss their results in meetings.

Health and well-being

The latest workplace well-being survey at LUT was conducted in October 2023. The survey aims to identify university-level disability risks and develop new policies for managing disability risks. In addition, there are questions related to the employee net promoter score (eNPS), rewards, bonuses, equality and non-discrimination. LUT's overall index was higher than in the previous survey in 2021 and higher than the Finnish university norm.

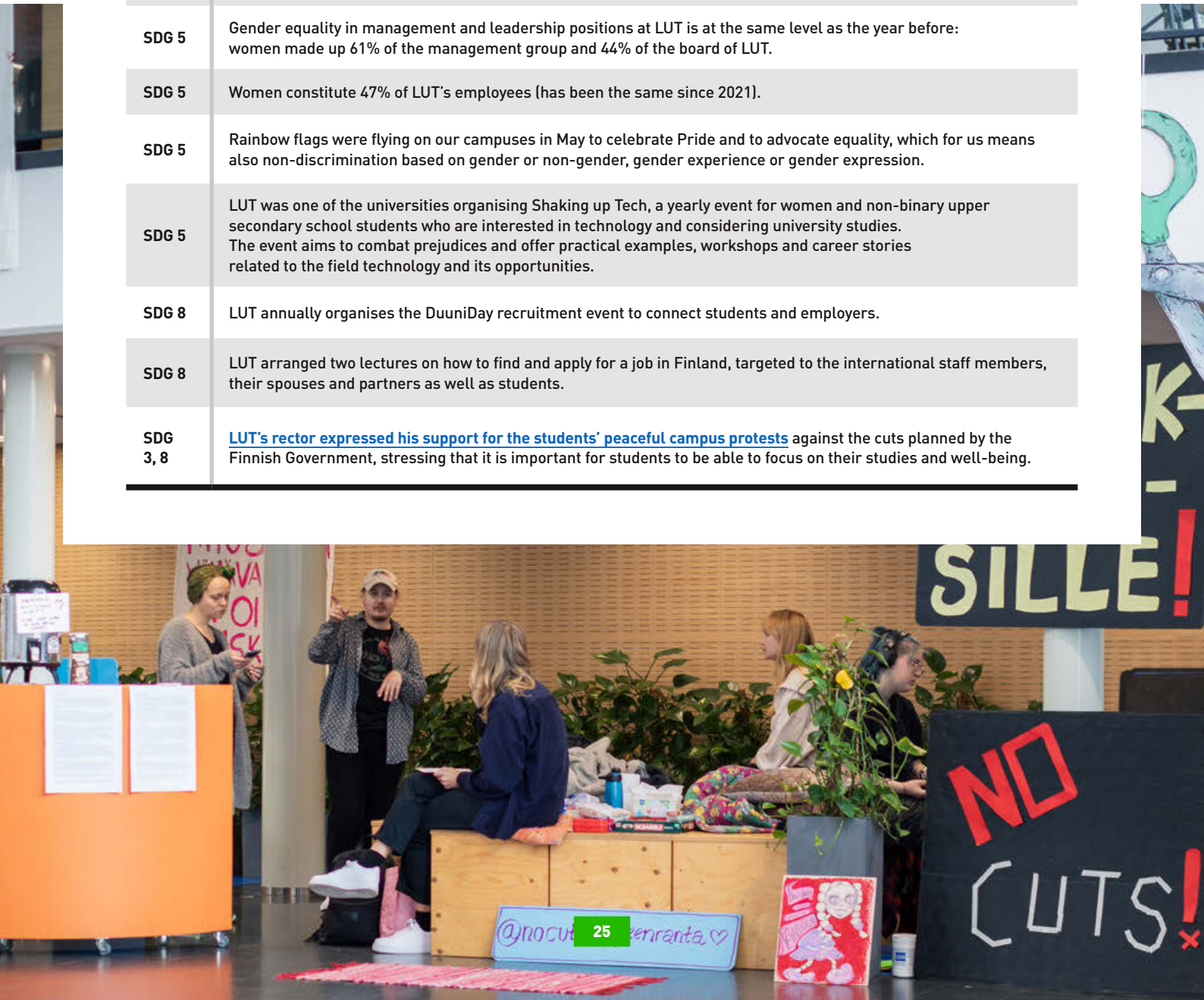
LUT's employees are insured against occupational accidents on campus and in remote work and entitled to preventive occupational health care, acute counselling and medical care, and the treatment and follow-up of long-term illnesses.

LUT offers a wide range of activities to boost physical, psychological and social well-being at work. Employees are also offered a bicycle benefit, and regional unit employees receive exercise vouchers. LUT's blended work model enables employees to alternate between working remotely and on-campus or at the office, offering flexibility for family reasons. Different work arrangements and substitutions ensure that absences due to family leave will not overburden the personnel at work.

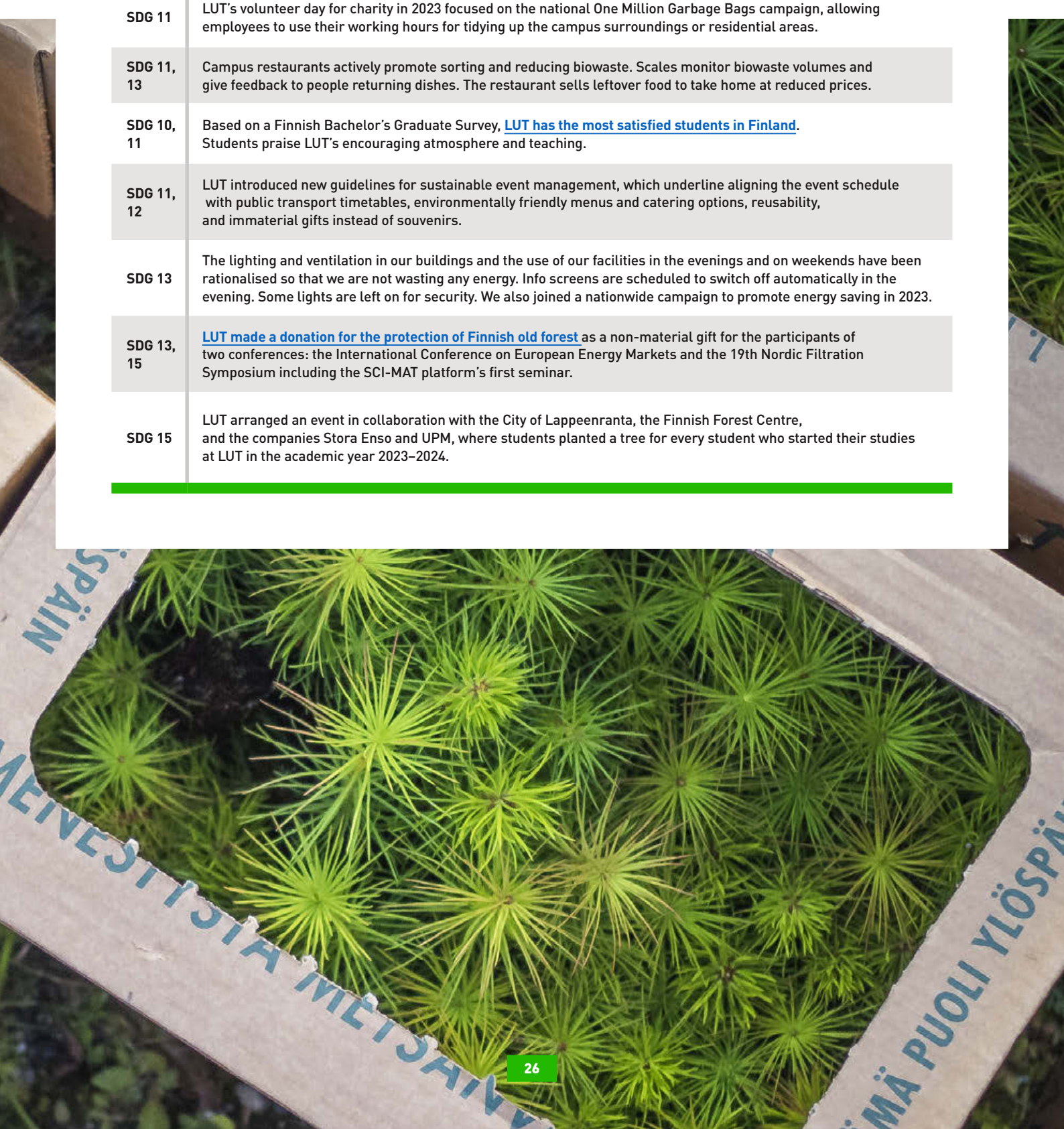
Students have access to health care services, and LUT's study counselling psychologist supports and counsels students in study-related issues. University chaplains are available to support all students regardless of their religion or denomination. Different hobby groups, leisure associations, affordable sports and well-being and mental health services also promote students' well-being.

Highlights of social responsibility in 2023

SDG 1	The employment rate of LUT graduates is 97% one year after graduation.
SDG 1	73% of LUT's employees (1 004 persons) are on contracts of at least 24 months.
SDG 3	A well-being week for LUT staff and students in March offered a hobby fair, sports demo classes, body composition measurements, ergonomic assessments, etc.
SDG 3	LUT's student sports club Parru raised 3 000 euros for the local cancer society.
SDG 3	LUT University and the LAB University of Applied Sciences jointly donated 10 000 euros to charity at Christmas. The amount was divided between Save the Children Finland to help children in Finland; the Red Cross's Disaster Relief Fund to supply those in need with food, water and shelter; and the Natural Heritage Foundation for the permanent protection of old forests in Finland.
SDG 3	LUT and LAB have jointly developed a model that encourages those at risk of marginalisation to participate in organising events.
SDG 5	LUT's TechnoTET project introduces primary and secondary school students to work in techology. The work experience project aims to expose especially young women and young immigrants to work in technology, where they are a minority.
SDG 5	Gender equality in management and leadership positions at LUT is at the same level as the year before: women made up 61% of the management group and 44% of the board of LUT.
SDG 5	Women constitute 47% of LUT's employees (has been the same since 2021).
SDG 5	Rainbow flags were flying on our campuses in May to celebrate Pride and to advocate equality, which for us means also non-discrimination based on gender or non-gender, gender experience or gender expression.
SDG 5	LUT was one of the universities organising Shaking up Tech, a yearly event for women and non-binary upper secondary school students who are interested in technology and considering university studies. The event aims to combat prejudices and offer practical examples, workshops and career stories related to the field technology and its opportunities.
SDG 8	LUT annually organises the DuuniDay recruitment event to connect students and employers.
SDG 8	LUT arranged two lectures on how to find and apply for a job in Finland, targeted to the international staff members, their spouses and partners as well as students.
SDG 3, 8	LUT's rector expressed his support for the students' peaceful campus protests against the cuts planned by the Finnish Government, stressing that it is important for students to be able to focus on their studies and well-being.



SDG 10	LUT's English-language degree programmes, early bird discounts for tuition-fee-paying students, and Finland Scholarships ensure that also talented students from lower income countries can study at LUT.
SDG 5, 8, 13, 15	LUT joined SDG Flag Day 2023 to show commitment to the UN's Sustainable Development Goals and the 2030 Agenda for Sustainable Development. Our message on SDG Flag Day was that the world needs the green transition, climate action, and biodiversity, and that we are committed to promoting equality and decent work.
SDG 11, 12, 13	Sustainability Days for students and staff were held on the Lappeenranta and Lahti campuses 5–6 October 2023. The event was jointly organised by the student unions KOE and LTKY in cooperation with LUT and its campus cities, local associations and companies. The event offered information on recycling and energy saving, a clothing repair workshop, a flea market, swapping and recycling points, and much more.
SDG 11	LUT's volunteer day for charity in 2023 focused on the national One Million Garbage Bags campaign, allowing employees to use their working hours for tidying up the campus surroundings or residential areas.
SDG 11, 13	Campus restaurants actively promote sorting and reducing biowaste. Scales monitor biowaste volumes and give feedback to people returning dishes. The restaurant sells leftover food to take home at reduced prices.
SDG 10, 11	Based on a Finnish Bachelor's Graduate Survey, **LUT has the most satisfied students in Finland**. Students praise LUT's encouraging atmosphere and teaching.
SDG 11, 12	LUT introduced new guidelines for sustainable event management, which underline aligning the event schedule with public transport timetables, environmentally friendly menus and catering options, reusability, and immaterial gifts instead of souvenirs.
SDG 13	The lighting and ventilation in our buildings and the use of our facilities in the evenings and on weekends have been rationalised so that we are not wasting any energy. Info screens are scheduled to switch off automatically in the evening. Some lights are left on for security. We also joined a nationwide campaign to promote energy saving in 2023.
SDG 13, 15	**LUT made a donation for the protection of Finnish old forest** as a non-material gift for the participants of two conferences: the International Conference on European Energy Markets and the 19th Nordic Filtration Symposium including the SCI-MAT platform's first seminar.
SDG 15	LUT arranged an event in collaboration with the City of Lappeenranta, the Finnish Forest Centre, and the companies Stora Enso and UPM, where students planted a tree for every student who started their studies at LUT in the academic year 2023–2024.



ENVIRONMENTAL PERFORMANCE

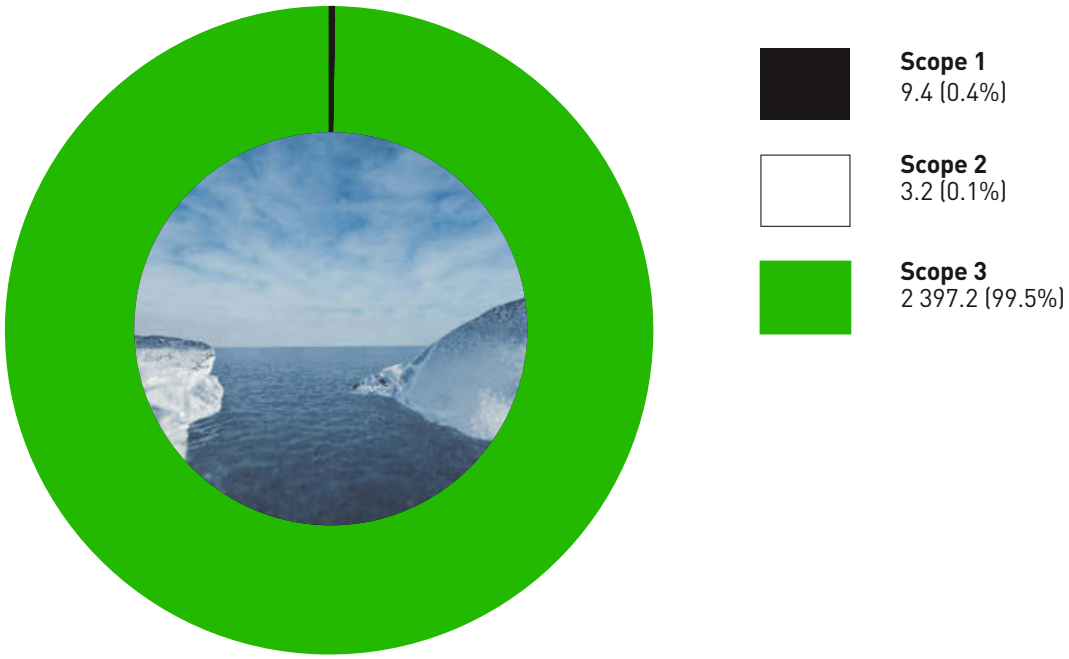
The monitoring and reporting of LUT's environmental performance includes electricity, heat and water consumption, waste streams, and a carbon footprint.

LUT's campus buildings and the land they are on are owned in Lappeenranta by the University Properties of Finland (SYK) and in Lahti by Isku Center. In addition, LUT has regional units in rented premises in Kouvola and Mikkeli. The services provided by the campus property owners related to building maintenance technology, energy efficiency, waste management, and facility upkeep and development compose an essential part of our sustainability.

By far the largest part of our carbon footprint consists of indirect emissions related to the university's activities – generated by service suppliers.

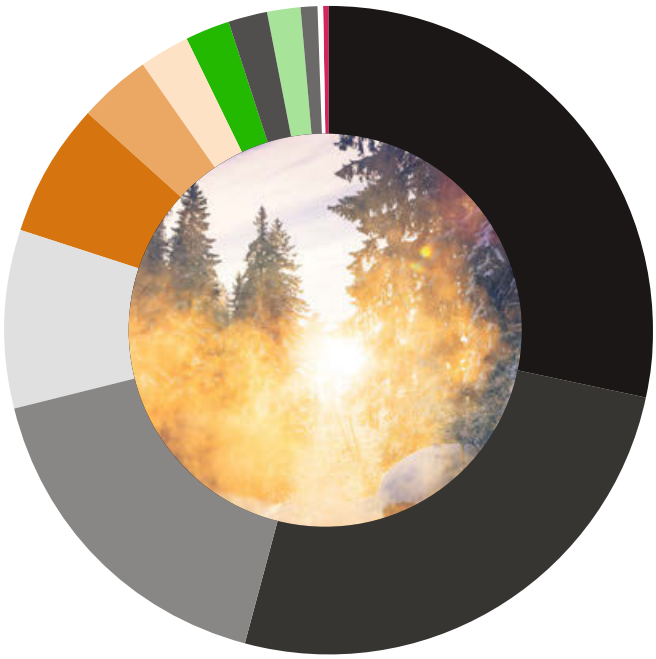
We require sustainable operations from our partners and cooperate with our staff, students and service providers to measure and reduce these emissions in accordance with our **Climate Action Plan**.

Greenhouse gas emission trends at LUT



LUT's emissions in the scopes 1, 2 and 3 (t CO_2 eq)

LUT's carbon footprint (t CO_2 eq) and emission sources



- Staff and student commuting 689.2 (28.6%)
- Business travel 621.7 (25.8%)
- Food service 405.9 (16.8%)
- Printed and electronic matter and printing service 212.5 (8.8%)
- Marketing and advertising 163.9 (6.8%)
- Research services 57.3 (2.4%)
- Educational services 88.5 (3.7%)
- Electricity (scope 3) 56.7 (2.4%)
- Waste 45.8 (1.9%)
- Water 36.7 (1.5%)
- District heating (scope 3) 19.0 (0.8%)
- LUT's fleet of cars 9.4 (0.4%)
- Electricity 3.2 (0.1%)

LUT's carbon footprint for the year 2023 totalled 2410 tons of carbon dioxide equivalent (CO_2 eq). The carbon footprint grew by 122 tons (5.3%) compared to the previous year. This is the first time also LUT's regional units are included in the calculation of the carbon footprint. The carbon footprint was calculated according to the **GHG Protocol**, which classifies emissions into three scopes. For complete details, see Appendix 1.

Scope 1 includes direct emissions that occur from sources owned or controlled by the organisation. At LUT, this means a fleet of six corporate cars, which accounts for merely 0.4% of the total carbon footprint. The emissions grew 15.5% compared to 2022 due to increased mileage.

Scope 2 includes purchased electricity. All of LUT's scope 2 emissions are generated by the Kouvola regional unit. In Lappeenranta, this scope is zero because the campus has used renewable and carbon-neutral electricity for years. Lahti and Mikkeli are not included in this scope since electricity there is included in the property rent and therefore belongs to scope 3.

Scope 3 includes indirect emissions related to the university's activities. This scope also includes district heating and electricity that are included in the property rent. Other major sources of indirect emissions are staff and student commuting, business travel, and campus food services.

These emissions grew 5.1% compared to 2022 due to reasons such as

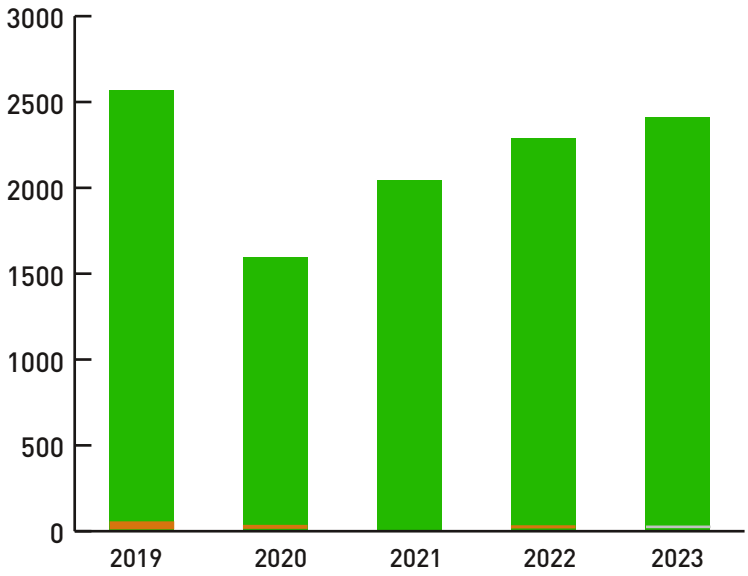
- the post-pandemic return to the campuses, which increased food service consumption and waste;
- a growing number of students;
- changing commuting habits;
- increased business travel and more comprehensive tracking of its emissions, now also including hotel stays and the use of private employee vehicles for business travel.

A notable improvement in scope 3 has been made regarding district heating on LUT's Lappeenranta campus. In July 2022, the campus switched to **certified green district heating**, making campus heating carbon neutral in 2023. In previous years, district heating emissions in Lappeenranta have been offset by the property owner SYK.

Discussion and next steps to reduce emissions

LUT's carbon footprint figures from the past five years are not fully comparable since we are continuously improving the carbon footprint calculation process, including data quality and data collection procedures. For example, new data sources and more categories have been added. The availability and accuracy of data also depends on the location and property owner – an aspect that requires further development.

LUT's carbon footprint 2019–2023 (t CO_2 eq)



	2019	2020	2021	2022	2023
Scope 1 | direct emissions	18.8	9.7	5.6	8.1	9.4
Scope 2 | energy, direct emissions	0.0	0.0	0.0	0.0	3.2
Scope 3 | other indirect emissions	2552.1	1583.7	2040.5	2279.9	2397.2
Total	2571	1593	2046	2288	2410

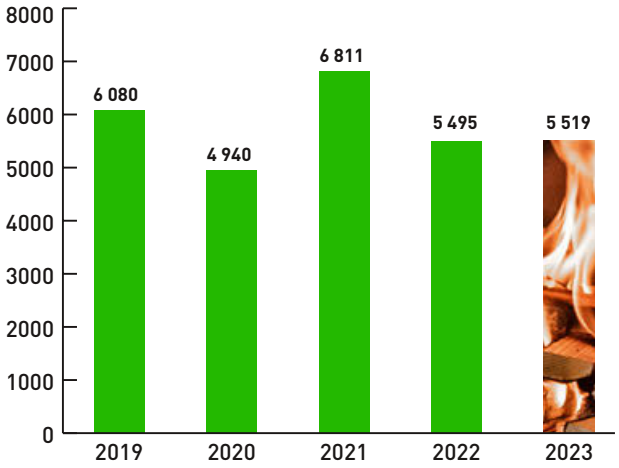
Tackling the unfavourable trend of growing direct emissions will require a range of actions detailed in the Climate Action Plan. Zero emissions in scope 2 requires the Kouvola regional unit to switch to electricity from renewable energy sources. LUT's goal is to become carbon neutral for scope 1 and 2 emissions by the end of 2024.

The Climate Action Plan also outlines our actions to continue reducing our scope 3 emissions in cooperation with our partners and service providers, such as campus restaurants, business travel services and campus property owners.

Consumption and waste management

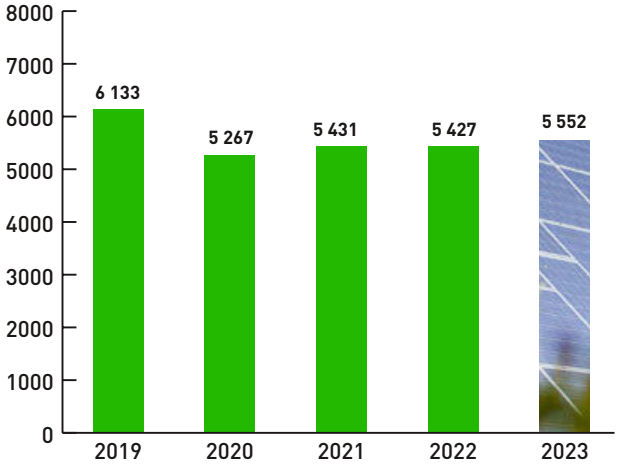
The waste streams and consumption of water, heat and electricity are reported from LUT's Lappeenranta campus as in the previous years.
The Lappeenranta campus uses certified green district heating. It means that the energy is produced from bio-based materials such as wood residues and chips.

Heat consumption [MWh]

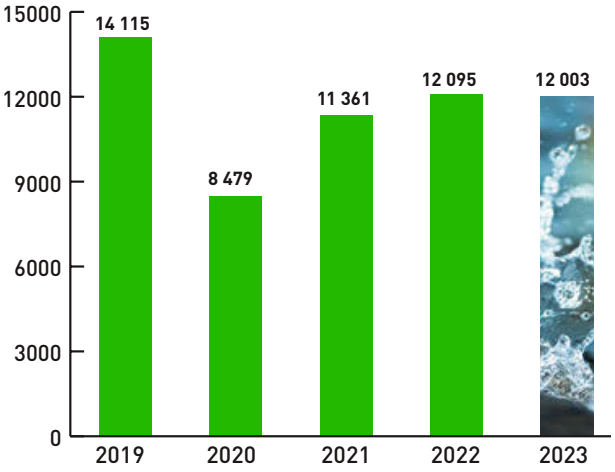


All purchased electricity on the Lappeenranta campus is renewable, produced by wind or solar power already for several years. The university has covered about four percent of its electricity consumption in Lappeenranta with its own solar panels for a decade.

Electricity consumption, total [MWh]



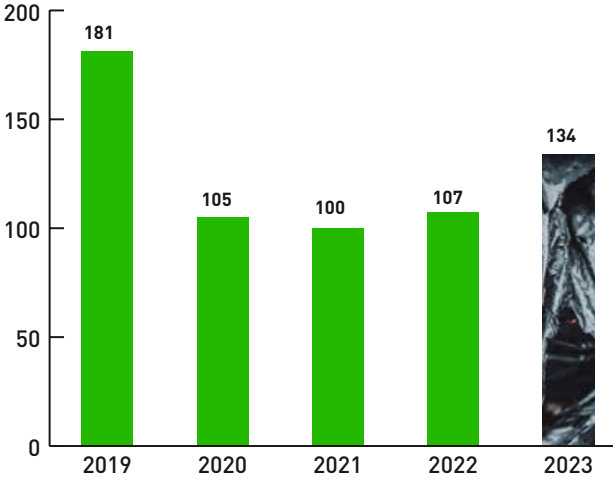
Volume of water used [m3]



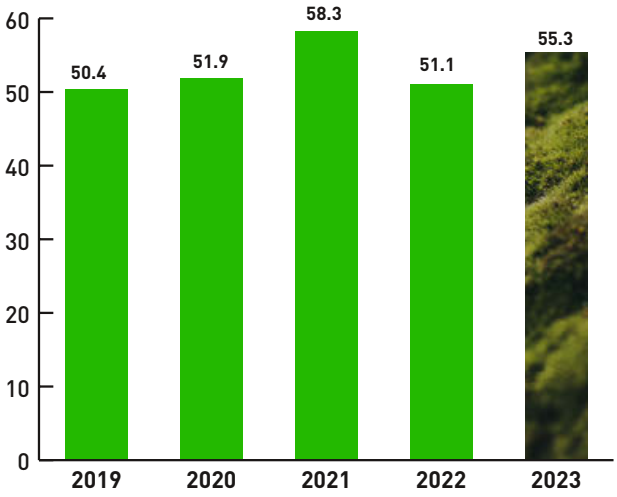
The abundant freshwater resources and good tap water supply in Finland are unique. Tap water is drinkable everywhere and freely available for all on LUT campuses. Tap water is commonly used for drinking, which means higher consumption. However, it is highly recommended, as it eliminates the need for bottled water, saving a great deal of resources and minimising waste.

Irrigation is neither used nor needed in campus outdoor areas. The campus is an ecologically noteworthy site that serves as a habitat for a wide range of organisms. The preservation of elements that increase biodiversity will be taken into consideration in the planning and maintenance of the area.

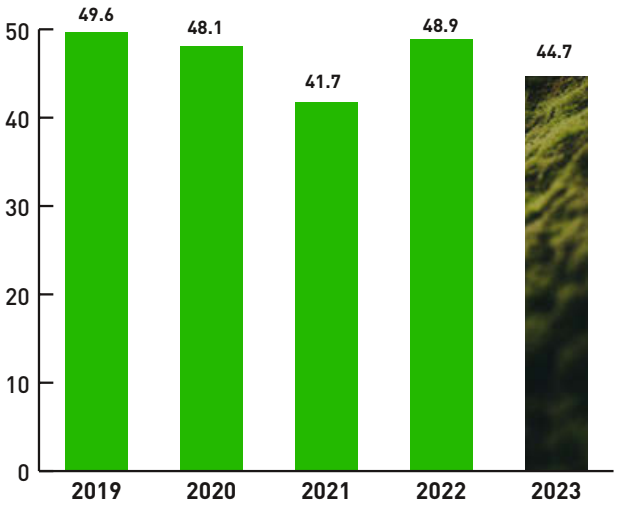
Amount of waste [t]



Proportion of waste recycled [%]



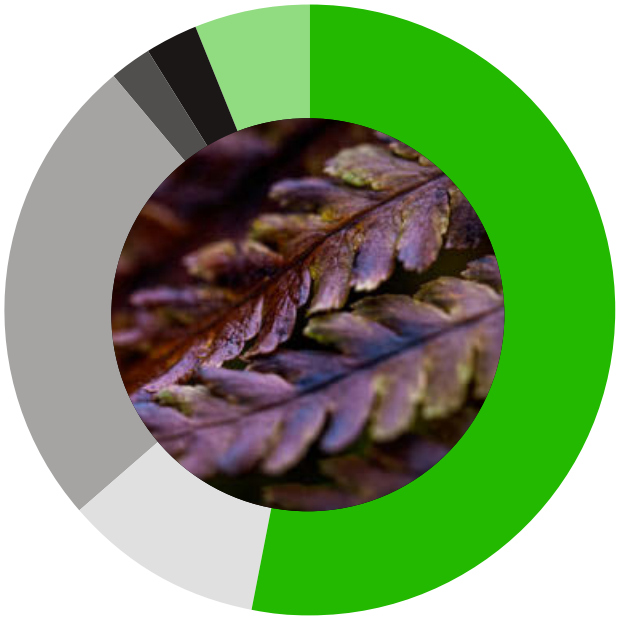
Proportion of waste to energy production [%]



The sorting of plastic packaging waste started on the campus in 2023. In general, the number of waste sorting containers has been increased, and their timely emptying is emphasised to increase the efficiency of waste management and recycling.

All collected fractions are directed to recycling and energy recovery processes, and nothing goes to a landfill. The recycled waste streams and amounts are shown below.

Proportion of waste recycled [t]

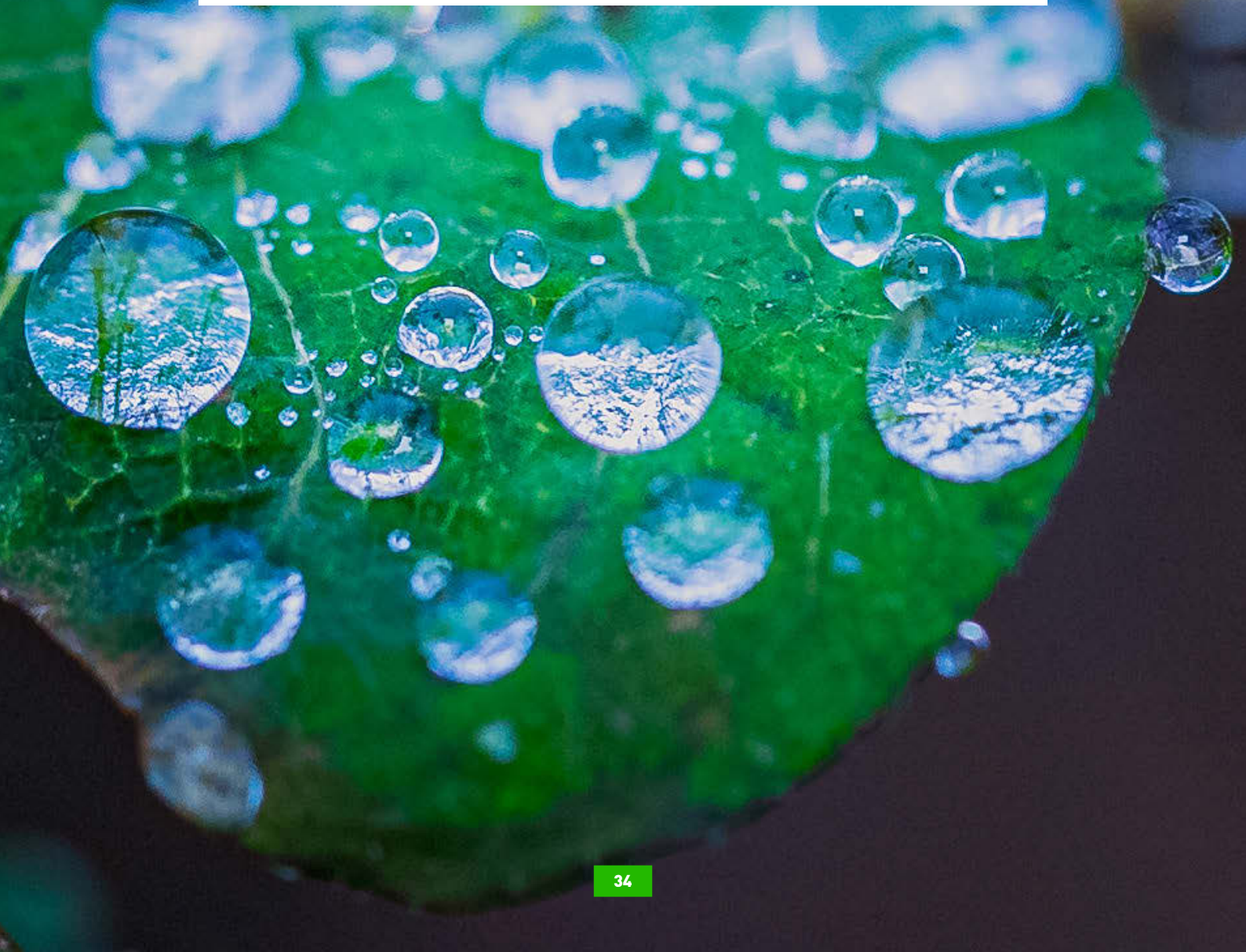


- Biowaste 39 560
- Paper 7 810
- Paperboard and cardboard 18 800
- Metal 1 680
- Glass packaging 1 920
- E-waste 103
- Plastic packaging 4 390

Focus on environmental handprint

LUT's climate impact is also assessed from the handprint perspective, which refers to the positive impacts that the university's education and research have on society and companies.
The handprint methodologies have been developed jointly by LUT and VTT in the Carbon Handprint (2016–2018) and Environmental Handprint (2018–2021) projects. The handprint approach is built on the principle that reducing one's own footprint does not constitute a handprint. Instead, the **carbon handprint** is achieved by improving the performance of another actor – by reducing their carbon footprint. The **environmental handprint** expands the methodology from carbon to other positive environmental impacts. The methodologies are in line with standardised life cycle assessment and footprint methods.

In June 2023, **LUT announced** that it will increasingly pay attention to its positive environmental handprint. LUT's board decided to offer funding for projects that either reduce the university's own carbon footprint or help other organisations to reduce their carbon footprint – and thereby increase LUT's carbon handprint. The call for applications was internally released in January 2024, and **the projects to be funded will thus enhance LUT's climate work** during the years 2024–2025.



Appendix 1

The details of LUT's carbon footprint calculation in 2023

Scope 1
In 2023 LUT University's fleet consisted of six cars (three plug-in hybrid, two diesel and one electric). Emissions were calculated based on the distance travelled and the car manufacturer's emission data. The factors provided by the manufacturers do not accurately represent the actual emissions of LUT's fleet, and the emissions are, in fact, underestimated. Fuel consumption declared by the manufacturers is believed to be lower than the fuel consumption of LUT's fleet. Driving patterns, particularly long distances driven by plug-in hybrid cars, cause higher fuel consumption than declared.

Improvements: Fuel/electricity consumption data would give a more accurate view of the actual emissions from the vehicles.

Scope 2
Scope 2 includes the emissions from purchased electricity in LUT's regional unit in Kouvola. The emissions were calculated based on electricity consumption (utility bills) and a market-based emission factor, which reflects the contractual arrangements. In addition, location-based emissions, reflecting the average emissions of the Finnish grid, were reported. In Kouvola, LUT only holds the contract with electricity supplier; the district heating contract is between the building owner and the district heating supplier. There is no available data on district heating consumption of the Kouvola unit. Emissions from purchased electricity and district heating on LUT's Lappeenranta and Lahti campuses and Mikkeli regional unit are not included in scope 2. Instead, they are included in scope 3 under category 8 Upstream leased assets, considering the operational control approach according to the GHG Protocol. LUT does not hold contracts with electricity and district heating providers in Lappeenranta, Mikkeli and Lahti.

Scope 3
Category 1: Purchased goods and services
Emissions from the LUT Buffet restaurant on the Lappeenranta campus. The emissions from food services were calculated based on the number of lunch portions sold at LUT Buffet and the emission factor representing the impact of a Finnish average lunch portion. The emission factor comes from a study titled "Carbon footprint of food – approaches from national input–output statistics and a LCA of a food portion" by Virtanen et al. (2011).

Category 5: Waste generated in operations
The emissions from waste streams were calculated based on the weight of waste generated on the Lappeenranta campus and the emission factors for corresponding waste streams. The emission factors come from the WWF Green Office Calculator.

Category 6: Business travel
The emissions from business travel include flights, rail travel and hotel stays booked via LUT's travel service provider, and business mileage driven on employee cars. It should be noted that other forms of business travel, such as ferries, buses, taxis, flights and train travel purchased through other channels are not currently included in LUT's carbon footprint, and so far, their share remains unknown.
There are some additions compared to the carbon footprint calculations for the year 2022; namely, hotel stays booked via LUT's travel service provider and business mileage driven on employee cars.

The emissions from air travel were taken from the travel service provider's annual report.

The emissions from rail travel were calculated based on the total kilometres travelled (passenger km) and the emission factor for Finnish rail transport.

The emissions from hotel stays were calculated based on the number of room nights and the emission factor for the specified country. The emission factor does not account for the number of travellers staying in the room. The emission factors come from the Hotel Footprinting Tool available online https://www.hotelfootprints.org/.

The emissions from business mileage driven on employee cars were calculated by multiplying the total kilometres travelled by the emission factor for certain types of cars. The types of LUT employees' vehicles are estimated based on the results of LUT's commuting survey carried out in February 2024. The cars owned by employees are 52% petrol, 23% diesel, 4% natural gas, 10% electric, 7% hybrid and 4% plug-in hybrid. The emission factors come from LIPASTO (petrol, diesel and natural gas cars) and DEFRA – UK Government GHG Conversion Factors for Company Reporting 2023 (hybrid and plug-in hybrid cars).

Category 7: Employee and student commuting
The emissions from students and staff commuting were estimated based on LUT's commuting survey results. The survey was carried out in February 2024 and concerned commuting patterns of LUT students and staff during 2023. Nearly 6% of students and 35% of staff responded to the questionnaire. The emissions from commuting were calculated by transportation mode (driving alone, carpool, bus, train, motorcycle, scooter/moped) based on the weekly distance travelled and the emission factor for the transportation mode. Students were assumed to commute during 32 weeks and staff 45 weeks in 2023.

The emission factor for train travel comes from VR Group Corporate responsibility report 2022. The emission factors for passenger vehicles, i.e. scooter, motorcycle, petrol, diesel and natural gas car and bus come from LIPASTO database. The emission factors for hybrid and plug-in hybrid car come from DEFRA – UK Government GHG Conversion Factors for Company Reporting 2023.

The emissions from commuting were much higher in 2023 compared to 2022. Several reasons explain the increase. The number of students included in the calculation in 2022 was 4 260, while the 2023 calculation is based on the total number of 7 272 attending students at LUT. The number of employees also increased – from 1 089 in 2022 to 1 371 in 2023. Additionally, the share of students and staff driving alone increased. Further, the commuting patterns used in emission estimates for 2022 are from a previous commuting survey, which was conducted in 2020. Since then, especially the number of students has increased and their commuting patterns have altered.

Category 8: Upstream leased assets
LUT reports the emissions from its electricity and district heating on the Lappeenranta and Lahti campuses and in the Mikkeli regional unit. LUT does not hold contracts with the electricity and district heating providers there and therefore does not have operational control, and thus reports the emissions under scope 3. The emissions were calculated based on electricity/district heating consumption and market-based emission factors, which reflect the contractual arrangements. Electricity purchased in Lappeenranta and Lahti as well as district heating in Lappeenranta are carbon neutral. In addition, location-based emissions, reflecting the average emissions of the Finnish grid, were reported.

There are no separate district heating meters for spaces rented by LUT on the Lahti campus and in the Mikkeli unit. Therefore, the district heat consumption was estimated based on the share of floor area rented by LUT in the building and the total district heating consumption by the building. Additionally, there is no electricity meter in Mikkeli (Lönnrotinkatu 7) for spaces rented by LUT. The electricity consumption was estimated based on the share of floor area rented by LUT in the building and the total electricity consumption by the building.

Financial investments
According to the GHG Protocol, the reporting of emissions from financial investments is primarily applicable to private financial institutions and public financial institutions. Financial investments are not included in LUT's carbon footprint, as the university is not a financial institution.