Aalto University Sustainability Report 2021

Aalto University

Aalto University's mission is to shape a sustainable future. We are building human wellbeing on a global scale, within planetary boundaries. Aalto is producing solutions that enable us to switch to a sustainable society in a way that is economically and socially stable.

To solve sustainability problems, we need a systemic, multidisciplinary approach. This, exactly, is Aalto University's strength.

Aalto is producing building blocks for a sustainable society and educating builders to build it. We are creating an optimistic, solution-oriented vision in collaboration with other game changers.

In this report, we provide an overview of Aalto University's sustainability operations in 2021 in the areas of research and teaching and on campus.

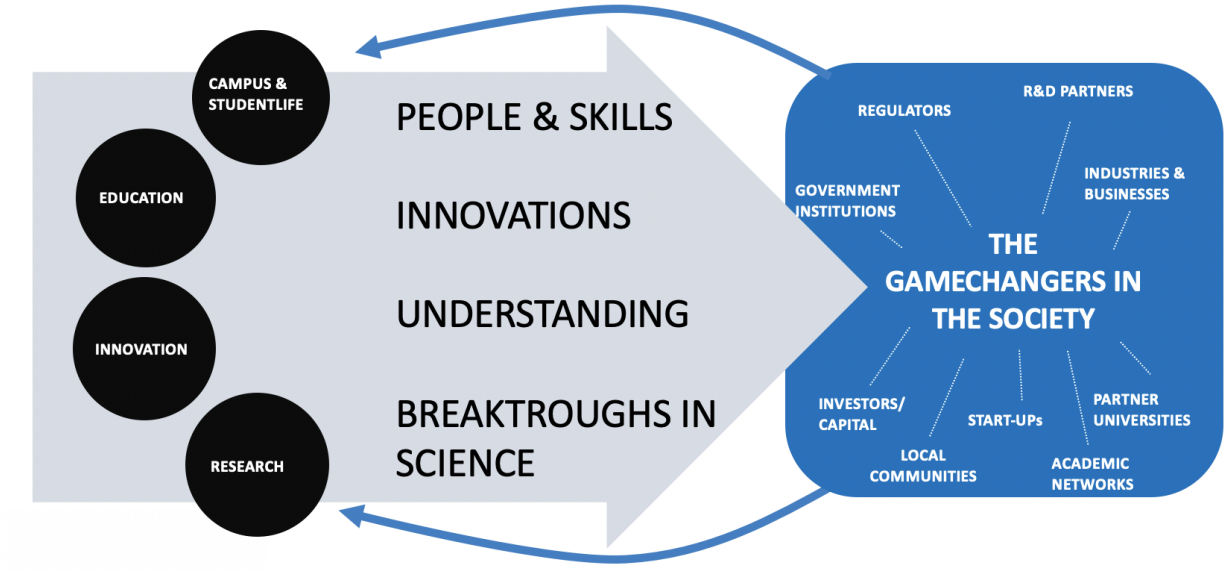


Figure 1: Aalto University's sustainability impact is based on strong multidisciplinary research expertise and interaction with other players in society.

Research

Aalto contributes to sustainable development through its strong research expertise. We conduct basic and applied research in several areas that are of key importance to a sustainable society, such as the energy sector, transport, consumption, housing and food production. Our research also results in innovations in these fields.

Furthermore, significant sustainability breakthroughs emerge from research whose impact is not self-evident at first glance. For example, the rapid development of quantum technology will result in remarkable increases in computational capacity in the near future. This will enable more accurate and complex modelling. We will be able to increase the overall efficiency of various systems and produce unforeseen technological and systemic solutions.

We also need significant breakthroughs in material technologies and the recycling of raw materials, breakthroughs grounded in expertise in basic sciences. Such breakthroughs will take us towards a sustainable society.

A sustainable society is not the outcome of scientific discoveries and technological innovations alone. We also need stability and a well-functioning economy. Innovations must be understandable and acceptable to ordinary people. They must generate new business for existing companies and also result in the founding of new growth companies. The fields of arts and design should not only create new innovations but also design them to be usable and acceptable.

Science and arts help us understand the complex world around us and challenge our ways of thinking. Together, they create new knowledge and perspectives which we need more than ever to solve complex global challenges.

Publications related to the UN Sustainable Development Goals (SDGs)

Aalto's SDG-related publications discuss the topics defined in the Sustainable Development Goals (SDGs) of the United Nations. The UN has set 17 global goals, addressing matters such as environmental and climate protection, ending poverty, equality, peace and a sustainable economy.

Some growth in the number of SDG-related publications can be attributed to changes in the way we keep statistics. The actual changes will become observable in future years after the same statistical procedure has been in use for a while. The number of SDG-related publications is currently calculated by an AI-based program on the grounds of keywords, and the numbers are checked manually. Publications that discuss technical or scientific matters in very close detail may not be included in our statistics even though their applications may significantly contribute to several SDGs.

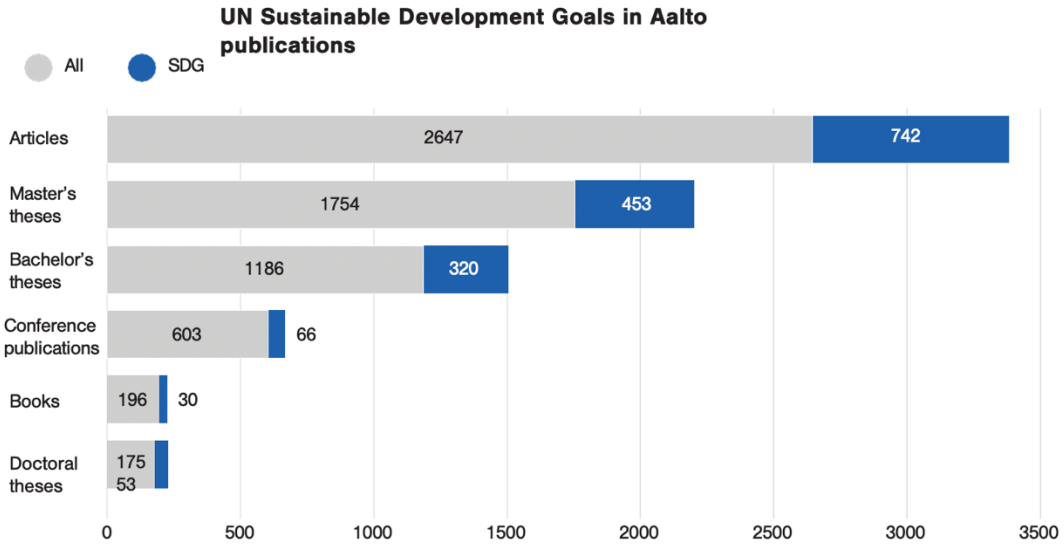


Figure 2: Publications related to the UN Sustainable Development Goals (SDGs) at Aalto University in 2020 and 2021.

Teaching

Here at Aalto, we approach sustainability from the viewpoints of arts, science, technology and economics. We put an emphasis on systemic understanding. We are integrating the teaching of sustainability expertise more strongly into all our programmes and expanding our offering of multidisciplinary studies.

- In 2021, we launched the Aalto Co-Educator (ACE) team. The ACE team works to integrate strategic cross-cutting themes, sustainable development, radical creativity and an entrepreneurial mindset into teaching and to strengthen multidisciplinarity.

- Some of our degree programmes addressing sustainable development include Creative sustainability (ARTS, BIZ and CHEM) and Innovative Sustainable Energy Engineering (CHEM, ELEC, ENG and SCI). Sustainability is taken into account in other programmes, too. For example, the most popular course at Aalto, covering the basics of industrial

engineering and management, now includes a sustainable development module and a panel discussion with representatives from various companies on sustainable development in business.

- Finding courses with SDG labels among Aalto's course offering, needs to be still significantly improved, so that the courses that will enable students to develop their expertise on sustainability challenges and solutions are fast and intuitive to find.

Figure 3: The number of courses addressing the SDG's in Aalto University

Doctoral education

Aalto University's new Bioinnovation Centre hosts a new transdisciplinary doctoral programme which creates circular economy solutions, drawing from the viewpoints of technology, arts, design and economics. Its research focuses on ecological textiles and packaging.

Lifewide learning

Aalto University also offers courses that are open to all. Our popular 'Sustainability in Business' course was published as an open, practically oriented online course called 'The New Sustainability in Business'.

Competence development

The inclusion of sustainability in all degree programmes is a challenging task for teachers. A pedagogical training course was developed to support this work. It is called 'Sustainability in Teaching' and was completed by 34 participants in 2021.

Collaboration

Aalto University actively participates in the work of several networks that promote sustainability education, such as Universities Finland UNIFI and the Unite! and CLUSTER networks of European universities of science and technology. We are also engaged in teaching cooperation through the Climate University network of Finnish universities.

Socially sustainable university community

We are building an inclusive, barrier-free operating environment where employees and students from different backgrounds can feel a sense of togetherness.

We treat every applicant equally in recruitment and student admissions, and we evaluate work and study attainments fairly with transparent criteria. We offer employees opportunities for personal development and career advancement. In our daily encounters, we all contribute to a community where members with diverse backgrounds feel welcome and safe and get their voices heard. We are committed to identifying and removing discriminatory structures and practices.

Our Equality, Diversity and Inclusion (EDI) Plan defines the ways in which we promote the equality, diversity and inclusion of our community.

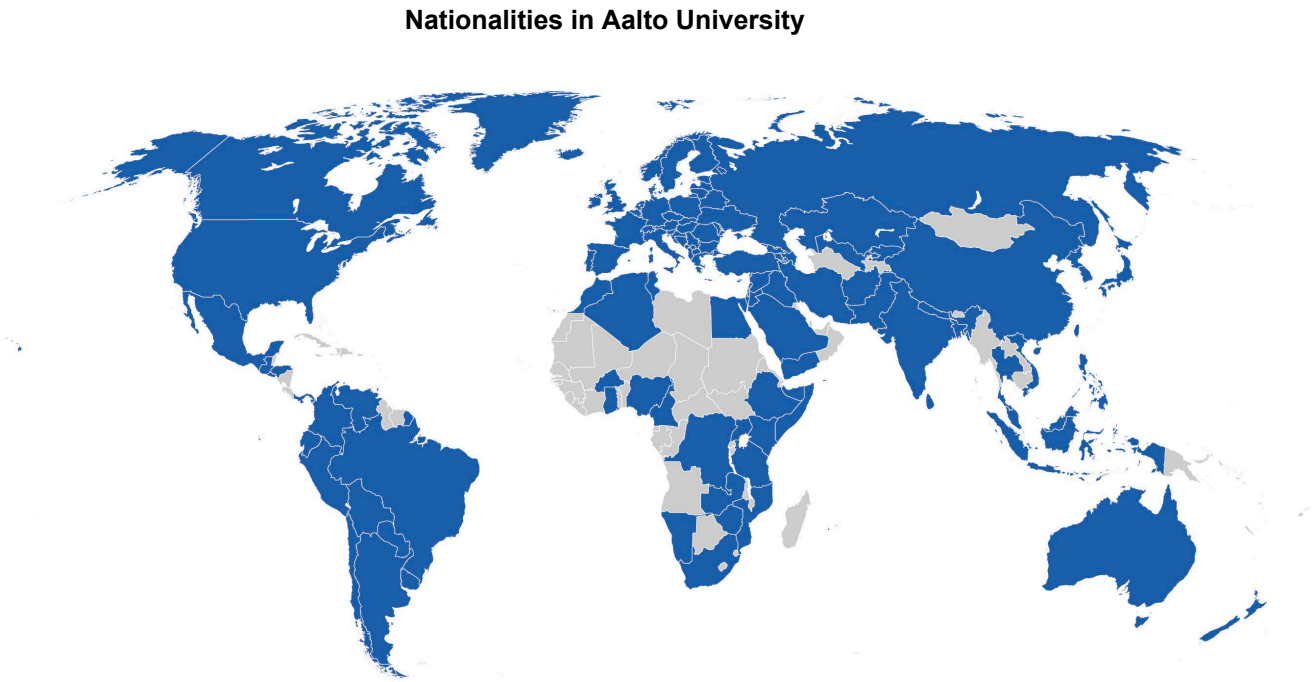


Figure 4: Nationalities in Aalto University

Communication and impact

Aalto University is solving some of the greatest challenges facing humanity. Problems such as the environmental crisis will be solved through new ways of thinking and border-breaking collaboration.

In 2021, we developed a sustainable development communication strategy for the university. Our aim is to create motivating and interesting content for selected target audiences with the goal of strengthening the role of science and sustainability in decision-making. We strive to measure our reach and impact even better than before. We emphasise the importance of multidisciplinary collaboration and systemic solutions in addition to swiftly deployable innovations. To name an individual important focus area, we strive to make our students' views better heard.

Sustainable development is a highly visible part of Aalto's communication. We still have room for improvement in better linking individual outputs to the broader context.

The highest visibility in the largest Finnish media outlets has been gained by sustainable design and fashion industry, the energy transition, circular economy and economic themes. They have been featured for example on Yle and in the newspapers Helsingin Sanomat (HS), Ilta-Sanomat, Taloussanomat and Kauppalehti. Aalto University has gained a lot of exposure for example in HS Visio articles (Meltwater analysis 2021). In terms of foreign news outlets, we were the most prominently featured in Forbes and on Medium and Yahoo News.

In line with our communication strategy, we closed the Aalto's sustainability related social media channels in 2021. We are now highlighting sustainable development themes in a more versatile way in Aalto University's main channels. Among the themes featured in our channels in 2021 were the climate (the IPCC report and COP26) and biodiversity.

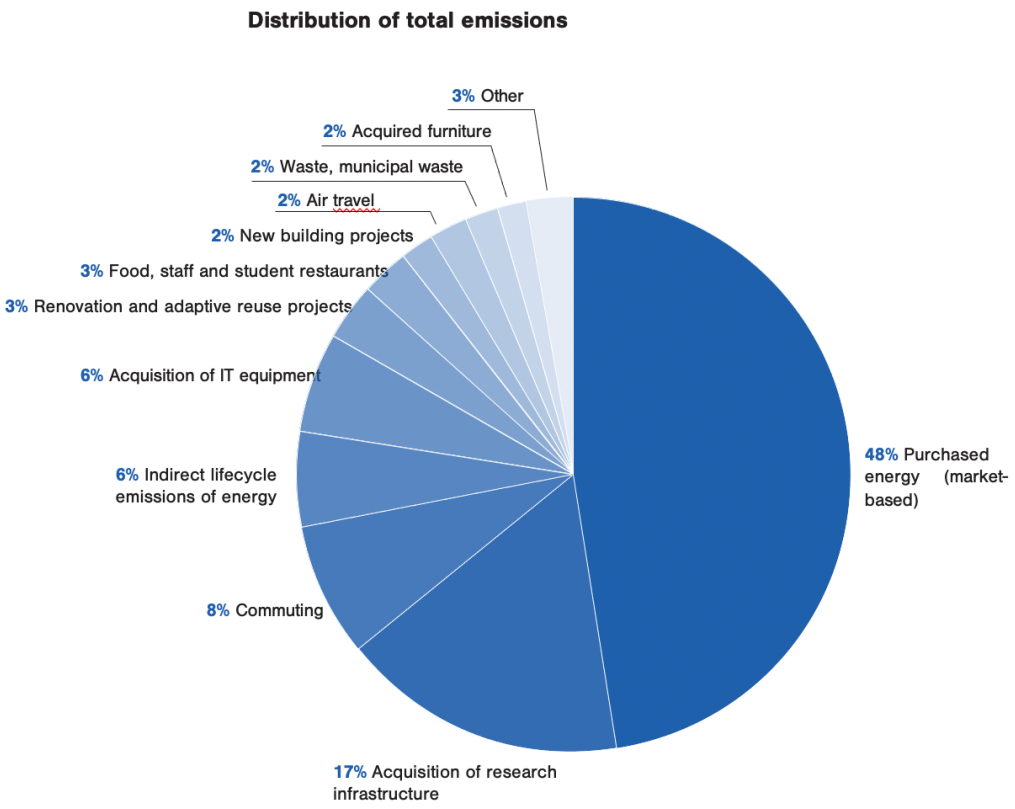
We continued to organise the Sustainability Science Days conference for the academic community in cooperation with the University of Helsinki. In 2021, the conference was organised online with the theme 'Destruction and Creativity?'. It attracted some 900 participants. We also once again organised the Designs for a Cooler Planet exhibition intended for the general public.

Environmental effects of the campuses

Aalto University is committed to reducing the energy consumption emissions of its real property by 30% from 2019 levels by 2024. Aalto has agreed on the objective with the Ministry of Education and Culture. In addition, Aalto aims to achieve a carbon-neutral campus by 2030. This goal applies to all Aalto campuses and activities.

Aalto University's carbon footprint in 2021

In 2021, Aalto University had a carbon footprint of 18,628 tCO_2e. Figure 3 below illustrates the division of Aalto University's emissions into different categories.



Category	tCO_2e	%
Purchased energy	8698	47.6%
Acquisition of research infrastructure	3059.9	16.8%
Commuting	1408.1	7.7%
Indirect lifecycle emissions of energy	1037	5.7%
Acquisition of IT equipment	1033.7	5.7%
Renovation and adaptive reuse projects	596	3.3%
Food, staff and student restaurants	545	3.0%
New building projects	363	2.0%
Air travel	360.1	2.0%
Waste, municipal waste	359.4	2.0%
Acquisition of furniture	350	1.9%
Other	457.5	2.5%

Figure 3: Distribution of Aalto University's total emissions.

The emissions of purchased energy clearly make up the majority of Aalto's emissions, about 48 per cent. The campus runs solely on renewable energy that has been granted a certificate of origin. In practice, the emissions of purchased energy are caused by campus heating.

In 2021, the most significant reduction to the emissions of purchased emissions was achieved with the completion of the first section of the Aalto University Works block. An air-to-water heat pump solution was selected and developed for the block in collaboration with the district heating provider, to replace district heating. Air-to-water heat pumps currently cover some 10% of all heating energy needs on campus.

Aalto University's public procurement plays a significant role. In 2021, the procurement of research infrastructure, IT equipment and furniture accounted for some 25% of Aalto's total emissions. In addition, new building, adaptive reuse and renovation projects accounted for about 5% of total emissions.

In the area of procurement, the greatest development was achieved in the calculation of the carbon footprint of IT equipment. Our calculations were made more accurate and significantly more comprehensive. The carbon footprint calculation for IT equipment will, in the future, set an example for the calculation of other emissions.

Carbon footprint trends in 2019-2021

Aalto University first calculated its carbon footprint in 2019. Figure 4 illustrates our emission trends by category from 2019 to 2021.

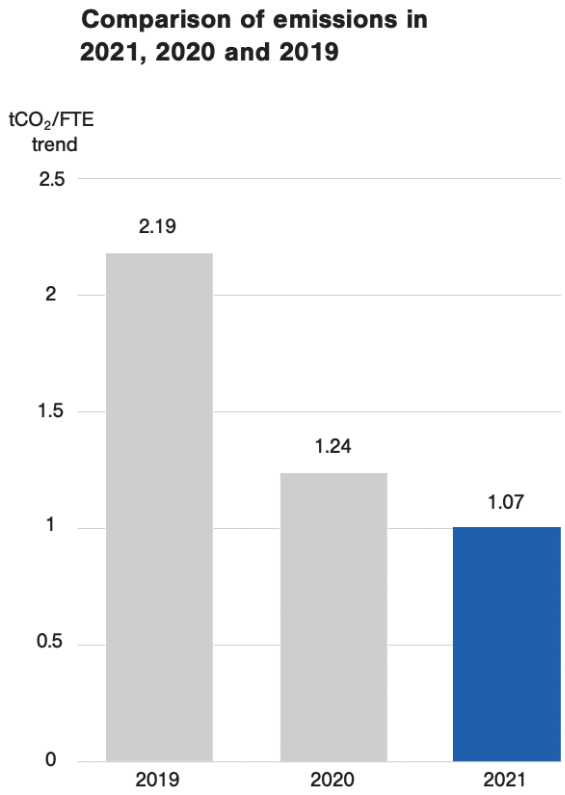


Figure 4: Emission trends at Aalto University in 2019–2021. (Consumption in the Covid year of 2020 was lower than in 2021 when the situation returned to normal at times. The volumes of emissions changed not only because of the pandemic in 2020 but also due to increased new building activity, a decrease in renovation projects and an update to the calculation method of Fortum's specific emission factors. FTE-specific specific emissions in the above-mentioned years: 2021: 1.00 tCO_2/FTE (2021 FTE = 17009) 2020: 1.24 tCO_2/FTE (2020 FTE = 16035) 2019: 2.19 tCO_2/FTE (2019 FTE = 15380)

In 2021, Aalto University's total emissions were around 46% lower than in 2019. The most obvious changes took place in emissions from air travel, the consumption of purchased energy and commuting.

During the period considered, air travel emissions decreased the most, by around 94%. Air travel has decreased mainly due to the coronavirus pandemic: in 2021, the university was responsible for only about 20 flights. Air travel will certainly increase in the coming years. However, we hope that the pandemic has encouraged us to find suitable ways of getting things done remotely, resulting in less need to resume our old flying habits.

Emissions from purchased energy have also clearly decreased with a drop of about 33%. Emissions have been reduced not only by the energy solution implemented in the Aalto University Works block mentioned above, but also by Aalto's switch in 2020 from conventional district heating to environmentally friendly heat mainly produced with biofuels.

The reduction in the emissions caused by purchased energy is partly explained by the reduction in the specific emission factors of Fortum's district heating between 2019 and 2021.

The commuting of workers and students decreased by around 71% from 2019 to 2021. The 2019 calculation was based on movement data from the period before the metro connection to Otaniemi was completed. The calculations for 2020 and 2021 were based on surveys on modes of transport. The metro was included as an option in the surveys. The large decrease in commuting emissions in 2020 and 2021 is therefore explained by both the completion of the metro and the coronavirus pandemic.

Other university campus sustainability actions include the competitive tendering of waste management services, the preparation of planning guidelines for outdoor areas, the start of landscaping in the Dipoli and Amphitheater areas, and the mapping of sustainable transportation on campus.

Along with the competitive tender for waste management, the campus has also improved its recycling framework: all properties now have separate plastic and cardboard collection, increasing the re-use of the material.

Biodiversity has been taken into account in the landscaping and planning of outdoor areas. The main goal of the outdoor planning guidelines is to increase biodiversity, and biodiversity has been one of the criteria guiding the construction of the Dipoli and Amphitheater outdoor areas.

Otaniemi's linden alley received the 2021 Campus Sustainability Champion award. The historic value of the alley and its role in preserving biodiversity were cited as reasons for the award. In addition, a research project was launched in the grassland area around Ossinlampi to study the carbon sequestration capacity of different grasslands.

IT equipment and services

The carbon footprint calculation model for IT is based on data on all IT equipment, the energy consumption of data centres and data on the use of cloud services. For the purposes of the

calculation, the life cycles of the devices have been updated to correspond to actual use. The first calculations of the carbon footprint of cloud services have been completed, but we do not yet have a comprehensive picture of service-specific carbon footprints.

We have been developing automatic monitoring and activities to reduce emissions. We have invested in the energy efficiency of the data centre at Otakaari 1 in particular. IT solutions have been transferred as widely as possible to energy-efficient virtual servers. In 2021, preparations were made for heat recovery at the Otakaari 1 data centre. Classroom workstations have been virtualised to some extent to conserve energy. Aalto IT's computers – with the exception of classroom computers – employ a power saving mode.

IT devices are procured through joint public procurement agreements handled in a centralised manner by the public procurement company Hansel. The suppliers and supply chains have been given a Code of Conduct. Hansel's ecolabels set requirements for the devices' energy efficiency, materials and recyclability. Hansel's framework agreement puts an emphasis on sustainability and supply chain assessment. Hansel prepared it in cooperation with Finnwatch, a non-governmental organisation monitoring the human rights impacts of Finnish companies.

Effects of remote work

Here at Aalto University, we created the basic structures for the digitalisation of our basic operations already before the pandemic began. We continued to strengthen them during the pandemic.

According to estimates, the use of video during remote meetings increases their carbon footprint by up to more than 90% compared to meetings in which video is not used. Employees working from home need not only proper Internet connections but often also an extra monitor, a headset, a laptop docking station and home office furniture – all of which have an environmental footprint. It has been estimated that remote work has increased domestic electricity consumption. In 2020 at least, this increase was very moderate according to Statistics Finland. On the other hand, staying at home has reduced commuting and business travel.

Energy use on campus increased in 2021 due to our need to increase ventilation to reduce the risk of infections. We have sought to keep buildings open even if they have not been used to full capacity.

The transformation of work raises the question as to what kinds of indoor and outdoor spaces will be needed in the future. How will spaces contribute to togetherness, learning, productivity and innovations? It will be all the more important to think about ways to design energy-efficient IT solutions.

Carbon footprint and impact of endowment portfolio

Aalto University has set a long-term target of a carbon-neutral endowment portfolio. The progress towards this goal continued in 2021 with adjustments in the investment portfolio. As a result, the carbon intensity of public equity investments included in the portfolio declined by more than 20% from the previous year and is currently some 30% below the global market average. Other key sustainability indicators of the endowment portfolio also improved during the year.

However, it should be noted that right now, a portfolio with the lowest possible carbon intensity is not the portfolio that best contributes to the green transition. The sectors and well-motivated actors with the biggest influence on the green transition will have to make major investments. This is something that must also be taken into account in investment impact assessment. Active ownership, monitoring of our investment portfolio companies' climate strategies and continuous discussion are also important components of impactful investing. Our progress towards lower carbon intensity will continue in 2022, focusing on improvements within listed equity investments. All the improvements in the sustainability profile of the endowment portfolio will be made in a way that does not jeopardise its ability to generate funding for the university's academic activities.

The future of Aalto sustainability impact

Aalto's most substantial sustainability impact arises from multidisciplinary research, teaching, and sustainable development solutions that apply research results in practice. The time window for solving the environmental crisis is getting narrower, and universities play a key role in solving it. Research has to result in sustainability innovations and green business increasingly quickly. Education must also produce experts whose skills correspond to the needs of a sustainable society. Cooperation with other game changers in society, the private sector and legislators is now more important than ever.

In the area of social responsibility, we want to ensure that Aalto's highly multinational working and studying environment is increasingly reflected in equal career paths and a fully safe and comfortable working environment.

In 2022, Aalto University started developing a roadmap for carbon neutrality under the leadership of the new Climate Change Lead. Aalto will develop the roadmap together with Aalto University Campus & Real Estate (ACRE), Aalto's experts and external partners.

The aim is for the whole community to promote carbon neutrality. We will extensively integrate climate work into education and research and increase its visibility on campus.

We will also further develop our sustainability reporting. Instead of annual reporting, we will focus on continuous data-based monitoring and continual development of our activities. In the coming years, the focus of our reporting will be on our successes, failures and openly describing our experiments.

Aalto's sustainability reporting should inspire other organisations to boldly experiment with new solutions and practices and build a more sustainable world.