



Lappeenranta University of Technology – Embracing Sustainability in Society



Open your mind. LUT.
Lappeenranta University of Technology

Review by the Rector



A handwritten signature in black ink, which reads "Ilkka Pöyhönen". The signature is written in a cursive, flowing style.

Ilkka Pöyhönen
RECTOR

Lappeenranta University of Technology, LUT, takes sustainability into account in its operations not only in economic and social concerns, but also in environmental issues. The foundation for the university's societal interaction and impact is scientific research and the related undergraduate and continuing professional education, as well as open university education.

2010 was a success for LUT with a record number of degrees completed: the university awarded 221 Bachelor's degrees in technology, 106 in economics and business administration, 687 Master's degrees in technology and 185 in economics and business administration, as well as 42 PhDs, of which 32 were in technology, 8 in economics and business administration and 2 in humanities and natural sciences. The university registered 875 man-years in 2010. By the end of 2010, LUT enrolled 4,568 undergraduate and 337 postgraduate students. Moreover, the university listed 3,187 mature students of whom 1,490 were enrolled in open university programmes and 1,697 in continuing professional education in 2010. Special emphasis was placed on research and promoting the university's internationalisation efforts which was reflected not only in the marked increase of 22% in international refereed publications compared to the previous year, but also in the surge of 240% in international graduate and teacher exchange compared to the previous year.

Finland underwent a university reform at the beginning of 2010 which meant increasing uncertainty in



the universities' status in their operating environment with regard to political and economic decision-making. The first financial year (January 1–December 31, 2010) after the reform met expectations: the university's overall result was €2.2 million, or 3.2% of turnover. LUT launched a risk management project in 2010 to organise risk management according to good governance principles. The LUT risk management scheme is intended to safeguard the university's operations and implement its strategy.

Prepared at the beginning of 2011, the letter of intent about increasing collaboration among Aalto University, Tampere University of Technology and Lappeenranta University of Technology will have a remarkable effect on the development of Finnish research and education in the field of technology not only from the perspective of LUT, but also nationally. The universities will arrange to share research equipment and facilities, as well as reduce overlapping in their operations. Distinguishing responsibilities begins with identifying quality in specific disciplines and investing in superior research and teaching based on the universities' own strengths.

Saimaa University of Applied Sciences will relocate in the vicinity of LUT. Consequently, LUT will make more efficient use of its premises by letting some of its facilities to the University of Applied Sciences and establishing a joint science library.

The LUT campus will become a Green Campus over the course of two years. The Green Campus programme falls into the university's central areas of expertise, in particular, in energy. In both teaching and research, LUT is the leading academic institution in Finland in the field of energy. The campus area will witness renewable energy applications, and energy efficiency will be taken into consideration in the campus operations. The Green Campus will be an example for the surrounding society regarding sustainable future energy solutions related to research, teaching and campus life.

This summary of the LUT sustainability report describes the central economic, social and environmental impacts of the university's operations in 2010, as well as the core aspects of operating responsibly in the public sphere. Sustainability is examined from the perspective of the entire university. The key economic figures as well as the environmental and social performance indicators presented also cover all the university's operations. The key economic figures are taken from audited accounts and approved financial statements.



LUT strategy and background

Established in 1969, Lappeenranta University of Technology combines two disciplines, technology and business. The university's operations are governed by the Universities Act which defines the university's duties. The mission of the universities is to promote free research and academic and artistic education, to provide higher education based on research, and to educate students to serve their country and humanity. In carrying out their mission, the universities must promote lifelong learning, interact with society and promote the impact of research findings and artistic activities on society.

The highest decision-making body in the university is the Senate, the members of which are chosen by the University Collegium. At LUT, the Senate includes five outside members and four members from the university one of whom is a student. The Rector is the head of the university and is chosen by the Senate. The Rector appoints the Vice-Rectors and assigns their duties. Subordinate to the Rector, the three faculties are the Faculties of Technology, Technology and Management, and the School of Business, which are comprised of Departments with one or more Degree Programmes.

In accordance with the LUT Strategy 2013 "Independently Together", the university develops the following strategic areas of expertise: Energy efficiency and the energy market, Strategic management of busi-

ness and technology, Scientific computing and modelling of industrial processes, and Expertise in Russian business and industry related to the areas above. Research is conducted in all these areas to promote sustainability in several ways.

Conducting sustainable academic activities is also governed by the university's quality policy which lists the following principles:

- The university's activities and management are based on continuous assessment and development.
- The university fulfils its mission in ways that promote the well-being of the staff and students.
- The university maintains a quality management system which ensures that the university is able to operate in a reliable, ethical, efficient and quality-oriented way, taking the needs of clients and other stakeholders into consideration.

The LUT quality management system includes many practices that support the university's sustainability. For example, internal and external audits, international accreditations for degree programmes, as well as feedback from various stakeholders and the resulting development measures, such as feedback after each study module, graduate surveys, feedback from employers commissioning theses and clients in research projects, job satisfaction surveys and the unit advisory boards.





Economic sustainability

The first financial year (January 1–December 31, 2010) after the university reform went according to plan for LUT. The university's overall result was €2.2 million, which is 3.2% of turnover. Return on equity was 5.2%, and equity ratio in 2010 was 86.6%.

The university's funding relies on an annual general subsidy granted by the Ministry of Education and Culture based on principal education and science policy objectives set in the incomes agreement for 2010–2012 between the Ministry and LUT. The government subsidy from the Ministry of Education reinforces universities' performance and quality. In 2010, general government funding for LUT was €40.526 million which is included in the university's economic value generated. The subsidy from the Ministry of Education and Culture is heavily supplemented by other national and international funding. In 2010, the university's supplementary funding was 42.8% of turnover.

Direct economic value generated

- Economic value generated
= turnover €71.036 million
- Economic value distributed
 - * operating costs €24.597 million
 - * personnel costs €44.152 million

Studies have shown that LUT's performance is successful in the Finnish academic world. In 2010, the University of Jyväskylä conducted its third investigation into the correlation between resources and results in Finnish universities. It revealed markedly great differences in the universities' performances. LUT was rated the fourth most effective university in Finland. With the best scores, LUT School of

Business has long been evaluated as the highest performer not only in research and postgraduate degrees, but also in graduate degrees in Finland. In technology, LUT was rated the most effective unit in postgraduate education. Moreover, the performance index of technology studies at LUT improved markedly compared to the previous assessment period.

Key indicators:

Energy consumption

- * Heating: 9,943.5 MWh
- * Electricity: 6,446,726 kWh

Water withdrawal/consumption: 28,992 c m

Waste and recyclable materials:

- * Non-recyclables:
 - Dry residual waste 76,335 kg
- * Recycled waste and materials by category: :
 - Bio-waste 34,740 c m
 - Recovered waste paper 23,000 kg
 - Combustible waste 38,730 kg
 - Cardboard 9,660 kg
 - Wood 11,500 kg
 - Sensitive papers 6,920 kg
 - Waste electrical and electronic equipment (WEEE) 24,550 kg
 - Devices containing stored information (plastic) 390 kg

Environmental sustainability

The gross area of LUT premises in 2010 was 68,879 sq m. The university only uses hydroelectricity which does not produce carbon dioxide emissions into the atmosphere. In autumn 2010, the university began an environmental community effort to pay special attention to energy saving, materials consumption, as well as reducing and sorting waste. The facilities are being extensively renovated which added to the university's waste load in 2010. The environmental effort, therefore, did not show in the university's environmental performance indicators even though measures have already been taken and choices made. At LUT, the aim is to sort all waste at its place of origin. One example of LUT's environmental sustainability is the ISO 14001 environmental management system certification awarded in 2010 to the university's Information Services and Technology unit for its IT equipment recycling.

LUT conducted several research projects in 2010 which promote its activities related to environmental sustainability, as well as reduce the impact on the environment and increase environmental consciousness at least in the long term. Some examples of such research projects are outlined in the following:

A study investigates the possibility of harvesting excess fish from the Baltic Sea and utilising its biomass to produce bioenergy and fertilizer. In a bioenergy plant, the fish is rotted and the resulting phospho-



rous is processed into fertilizer. Common reed from the sea could also be possibly utilised for energy production. The study examines the environmental and economic perspectives of biomass produced from excess fish and explores the carbon footprint of the fish's life cycle from the sea to the bioenergy plant, as well as emissions and energy generation from the rotting process.

■ **Researchers have developed a method at LUT by which wastewater containing residues from analgesics can be cleaned up.** Used in painkillers, paracetamol is not easily biodegradable. It is broken down by electric discharge into intermediate products which can be further treated with traditional wastewater treatment methods. Residues from pharmaceuticals have been found in surface waters almost everywhere in the world. If drinking water in the waterworks comes from surface water, it will contain pharmaceutical residues, because they are not removed in ordinary biological wastewater treatment processes. These residues are harmful to the environment, even if their concentrations are not high.

■ **The SMOCS project** for Sustainable Management of Contaminated Sediments in the Baltic Sea develops innovative, cost-effective and environmentally safe solutions to map, treat and utilise contaminated port sediments. Of the coastal states of the Baltic Sea,

Finland, Sweden, Poland, Lithuania and Germany take part in the project which is led by SGI, the Swedish Geotechnical Institute. In Finland, Professor Heli Sirén from LUT is coordinating the project as the project manager. SMOCS aims to provide guidelines for the management of contaminated sediments, tools for planning projects and to support decision-making, as well as field test evidence to demonstrate the environmental safety and technical usability of the stabilisation technology.

Professor at LUT and the University of Eastern Finland, Mika Sillanpää was granted an international environmental science award in 2010. The Scientific Committee on Problems of the Environment, SCOPE of the International Council of Science gave the new Environmental Awards for the first time and the first prize to Professor Sillanpää in environmental technology. An international, multidisciplinary scientific committee, SCOPE focuses on topical environmental issues both in science and to help decision-making. Awards were granted in three categories which were Environmental Sciences, Environmental Management and Environmental Technological Innovations. Professor Sillanpää's contribution was acknowledged in the Environmental Technological Innovations category. The award committee mentioned his significant contribution to research on global environmental problems and, especially, to developing various applications in environmental technology and innovations in water and wastewater treatment.



Social sustainability

Employees

As of the beginning of 2010, LUT has converted 55 fixed-term employment relationships into permanent ones. This is part of streamlining the LUT strategy in which one objective is permanent appointments. The university has also adopted the scheme of international four-step careers in research which enables a clear academic career path from postgraduate studies all the way to professorships. The preamble to the Finnish Universities Act warrants researchers' fixed-term employment. At LUT, however, researchers' fixed term appointments are longer than previously.

In December 31, 2010, Lappeenranta University of Technology had 929 employees, of whom 41% were women. In proportion, most of the female staff are in administration and clerical duties. In 2010, 43% of the staff were in permanent employment and 57% in fixed-term

posts with 15% in part-time employment.

In 2006, the university introduced an employee compensation system based on both the competence level required and individual performance with separate assessment schemes for the teaching and research staff and other personnel. In the assessment scheme for the teaching and research staff, the individual performance based pay for women has increased by 1.9 per cent over the past four years to 30.4% in 2010. Correspondingly, in the assessment scheme for the teaching and research staff, the individual performance based pay for men has increased by 3.2% over the past four years to 32.2% in 2010. In the assessment scheme for other personnel, the individual performance based pay for both women and men has increased markedly in the past four years: for women by 25.1% and men by 24.7% in 2010.

The latest, valid equality plan at LUT was drafted in 2008. It acknowledges equality not only of the genders, but also of ethnic origin and nationality, age, sexual orientation and disability.

LUT has been conducting job satisfaction surveys since 2004. The surveys comprise eight sections: management, the content and demands of the job, remuneration, support for development, workplace atmosphere and co-operation, as well as communication and employer image. Compared to previous years, the index measuring general job satisfaction grew somewhat in 2010 to 3.4 (on a scale 1–5).

Making the development and well-being of its staff a priority, LUT supports all its employees in sustaining and improving their skills to advance the scientific community. It arranges annual personnel training and activities to promote well-being at work: in 2010 LUT



provided work organisation coaching, language courses and project manager training. The university's occupational health care regularly conducts physical examinations in the various units. LUT also holds regular development discussions between superiors and their subordinates.

Other stakeholders

The staff and students at LUT are involved as expert members and decision-makers in several international, national and regional task forces and organisations, as well as collaborative bodies, to develop and promote scientific and societal activities.

LUT appreciates its stakeholders' satisfaction with its operation, and collects feedback from students, alumni, employers commissioning research and the clients of research projects. The feedback received is systematically utilised to develop

operations. Some of the satisfaction survey results from 2010 are outlined in the following.

International Student Barometer
Lappeenranta University of Technology came first in the extensive International Student Barometer survey which assessed international students' satisfaction with their universities. When evaluating academic institutions as a whole, LUT was number one both in Finland and overseas. The survey was completed by approximately 125,000 international students in 186 institutes of higher education. In Finland, the survey was conducted in 23 institutions in November–December 2010 with over 5,000 foreign student respondents. At LUT, the survey was submitted to 350 students of whom 228 completed the questionnaire. The survey investigated the students' satisfaction with studies, accommodation and living, support services and arrival at the university.

Graduate survey

The survey conducted with graduates at the time of their graduation in 2010 indicated that the graduates' satisfaction with the content of the degree programme, professional competence provided by the curriculum and study atmosphere has remained the same compared to 2004–2009. The mean values for these were approximately 3.8 on a scale of 1–5. Satisfaction with the general competence provided by the curriculum has somewhat improved but is still a development target at LUT.

The Finnish Association for Business School Graduates, SEFE, recently completed a survey study with the class of 2009 graduates which revealed that Master's graduates from the LUT Business School were more satisfied with their education than their peers on average. The study surveyed student counselling, the Master's thesis process, teaching, units,



education in general and how the curriculum prepared for work life. The respondents regarded the atmosphere, faculty student counselling, basic abilities acquired, the versatility of studies, as well as the competence to learn and acquire knowledge, extremely high at LUT. Evaluated better than the average, education at LUT met expectations, and was found high-quality and motivating. The study atmosphere was considered better than average. The survey, moreover, revealed that LUT shows more interest in students' opinions than other academic institutes. LUT also provides students with better than average opportunities to participate in developing their education.

Alumni

LUT participates in a national career survey which examines alumni's career paths five years from their graduation. Of the class of 2005, five

years after their graduation, 90% were employed, 2% unemployed, 1% studying full-time and 7% on family leave or in some other situation. Of the respondents, 63% were satisfied or highly satisfied with their degree from LUT concerning their career, and only 4% were unsatisfied or highly unsatisfied.

Employers commissioning research

In 2009, LUT began requesting feedback from employers commissioning research. Some 80% of the university's students complete their Master's theses for some company. The survey conducted with these employers in 2010 revealed that they are highly satisfied with the students' ability to learn and work independently. As an example of room for improvement, many employers wished closer contact and communication from the university. The employers' satisfaction with the

theses on the whole was graded 8.5 on a scale of 4–10.

Research projects

LUT conducted several research projects in 2010 which promote the university's sustainability and especially social responsibility. Some examples of these research projects are outlined in the following:

■ **The project Corporate social responsibility and value creation challenges in the global forest industry** describes how socially responsible practices are adopted and identifies the external factors in the business environment and the internal ones within companies that have an impact on them, as well as models the effects of socially responsible measures on the companies' market value and profitability. The project combines



two topical significant themes: the future of the forest industry and environmental concerns. The forest industry in the boreal countries is under great pressure to change due to the increase in the investments and consumer demand in Asian and Latin American markets. The purpose is to describe the rate and diffusion of adopting innovations promoting CSR, as well as to recognise the factors both in the operating environment and within the company that impact on them. The project also aims to model the dynamics of global consumption and raw material flows.

In a study examining how physical exercise affects bone strength, the method employed is unique. Traditionally, simulation in machine technology is used in modelling machinery. Now, it is being applied to modelling human muscles

and bones. Aiming to find the best physical exercises to combat osteoporosis, the LUT study seeks to accumulate enough information to develop gym equipment to exercise bones. Measuring bone strength can, moreover, be developed into a commercial product.

The purpose of the Mobiserv project is to support senior citizens' independent living at home or in an assisted living facility by utilising the latest technology. The project involves nine organisations from seven countries: four universities or research institutes, four SMEs and one assisted living facility. The project has developed an architecture in which an intelligent mobile robot has been integrated with functions, services and alarms that utilise information from the environment. The robot is equipped with several sensors, a camera, a touch screen,

a voice synthesiser and recognition unit, a system monitoring vitals and a smart home automation and communication unit. The primary target is to monitor the well-being of the elderly and to improve their quality of life, as well as to secure their living independently at their own home or in an assisted facility longer than before. The technology creates savings in eldercare expenditure, postponing the option of nursing homes. The responsibility of LUT is to make the project partners' various features to function seamlessly together.





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