
LUT
Lappeenranta
University of Technology
www.greencampus.fi
GREEN
PROGRESS

GREEN CAMPUS

– a unique research and teaching environment

On the Green Campus, we utilise science and technology to make the world the kind of place we believe it should be.

Lappeenranta University of Technology is searching for answers to key questions of humankind. Our research promotes economic and technological development and builds sustainable well-being.

The Green Campus is a philosophy and a concept that reflects the university's green values and strong energy expertise as well as helps to create sustainable solutions to global challenges.

We train specialists for a sustainable future

The infrastructure of the Green Campus is utilised in research, as well as in teaching activities and demonstrations. It allows our students to experience sustainable development on the campus in a concrete way. Additionally, all LUT students have the opportunity to complete the Sustainability module as their minor subject.

Responsibility for the environment is everyone's concern

We have committed to taking environmental responsibility into account in all our activities, including research and teaching. LUT is the only university in Finland that has ISO 14001 environmental management system, which covers all the activities. In addition we also have the WWF Green Office system. We have set targets for decreasing the environmental impacts of energy consumption, use of natural resources and traffic. Additionally, we are creating positive environmental impacts through research and teaching activities.

Green Campus's environmental promises

We innovatively utilise our university's interdisciplinary research and teaching activities to decrease our environmental load. We regularly monitor and measure the level of those of our activities that are related to environmental conservation and develop our environmental activities according to commitments we have made.

Targets in numbers:

- By the end of 2018, we aim to cut overall consumption of electric power/student by 5 % of what it was in 2015.
- By 2020, LUT will produce 5 % of the electricity it consumes with renewable energy.
- 100% of the energy purchased will be generated by renewable energy sources
- By 2020, we aim to cut overall water consumption by 20 % of what it was in 2012.

We have also committed to:

- developing the way in which we sort waste
- improving the life span of chemicals
- increasing the share of environmentally-friendly acquisitions
- minimising the environmental impacts of traffic on our campus

We can achieve our shared objectives with small deeds. Our Green Campus posters offer tips on sustainable choices in our everyday lives. The poster also outlines LUT's environmental policy and environmental objectives in numbers.

International award-winner

In recognition of our expertise, in 2013 LUT was awarded the top position in the International Sustainable Campus Network competition's Excellence in Campus category. Awards in this category were given on the basis of solid actions and demonstrations that best promoted sustainable development and green technology.

Close to nature

The Green Campus' parks and naturally beautiful landscape create a pleasant setting for studies, and allow students and staff to spend time on the Saimaa shore. Schwäbisch Hall Park, a part of Tervahaudanpuisto Park, was landscaped as a joint project with the city of Lappeenranta. The park was named after Lappeenranta's German twin city, Schwäbisch Hall. In turn, there is a bridge by the name of Lappeenranta in the town of Schwäbisch Hall.
According to a vegetation survey carried out at Skinnarila cape, many rare plants and valuable habitats are found in the area. A nature trail equipped with signs and maintained by the Lappeenranta environmental authority goes around Skinnarila cape.

The Green Campus has numerous perks including a row boat, which can be borrowed, and honey from the campus' own beehives. Beehives are located in Tervahaudanpuisto Park, as well as on the grounds of Skinnarilan Hovi. The honey produced in these hives is sold in the Aalef shop in the main lobby.

We work to conserve the environment

We research and develop the use of renewable energy by producing energy with our wind turbine and one of Finland's largest solar power plants. For research purposes we have a Smart Grid, built to serve the needs of decentralised electricity production units. In the Smart Grid, electricity is produced, consumed and stored.

In addition to these, we use our electric bikes, scooter and motorcycle, as well as our electric and hybrid cars to research options for electricity aided mobility. These vehicles are part of our Smart Grid.

Green vehicles

CAMBUS

The CAMBUS is a completely new hybrid bus prototype for public transport.

The city bus which has been modified into a hybrid vehicle is built by LUT in co-operation with the Saimaa University of Applied Sciences and the Saimaa Vocational College Sampo.

The new LUT-developed hybrid system that is built on the bus is significantly more energy efficient than current commercial versions.

Hybrid and electric car

LUT currently has a Toyota Prius hybrid, which is used for research and development activities. A special feature of the hybrid car modified by LUT is that, when necessary, electricity can be fed back into the grid. The opportunity to utilise electricity from a car's battery would be a welcome, for example, during power cuts. As a part of smart electricity grids, the car's batteries would also balance the load of the grid.

The range of electric vehicles on the Green Campus also includes two electric scooters and one electric motorcycle, both of which the staff may use.

Wind turbine 20kW

Equivalent to the annual electric energy consumption of 2-4 detached houses

The university's own wind turbine provides a tool for demostration and actual working conditions for research and teaching purposes. The wind turbine models high-powered direct drive turbines, which means it is can be used to demostrate the principles of production and machinery solutions of large production turbines.

The energy generated by the wind turbine is fed into the laboratory at LUT and will be used for versatile studies on electricity production and distribution networks.

- Turbine blade length: 6 m
- Total height of tower and platform: approx. 36 m
- Structure: reinforced fibreglass, horizontal triple blade turbine
- Rated wind speed (optimal): 11 m/s
- Requires a wind speed of over 3 m/s to operate, will not turn in weaker wind
- When wind speed is over 20 m/s the wind turbine is shut down and hub and generator are turned sideways towards the wind.
- When voltage disappears from the electrical grid, i.e. a power cut occurs, a protective relay trips the circuit thus shutting down the turbine. For safety purposes, a protective relay is a requirement for installing a micro-production grid

- The expected noise level between the blades at a height of 30 m is approximately 60 dB, when wind speed is 10 m/s, which is equal to the noise caused by average traffic (approx. 55–75 dB)
- The greatest amount of power produced at one time is 26 kW.
- The payback time for the Green Campus wind turbine is irrelevant, due to the reasons for its use and because it is located in a fringe area. With an average capacity factor (8 %), the turbine will pay itself back with zero interest in approximately 35 years, when its assumed price is 70,000 € and its maintenance expenses 100 €/year. These figures can be reached in high and open hilly landscape or on open terrain along the shore.

Solar power plant

Level roof 51,5 kW, facade 39 kW and carport system 108kW

Equivalent to the annual electric energy consumption of 15-20 detached houses

One of the largest solar power plants in Finland is located on the LUT campus. It will provide 210kW of power.

All electricity produced via solar power will be used to replace purchased electricity. In 2015, a total of 6,208 MWh of electricity was consumed at LUT. The new power plants produced approximately 138 MWh of electricity during year 2015.

Some of the solar panels have been installed on solar tracker on the wind farm. This way the panels will always be turned towards the sun. The energy collected by the panels will increase by 20-40 % on account of the turning frame.

The solar plant includes different types of panels, so that the differences between these can be studied.

Waste sorting point

This waste sorting point includes instructions on how the university community can correctly sort their waste. Please see the intranet or the GC website for more detailed information on sorting waste.

www.greencampus.fi

For more information

- www.greencampus.fi and the LUT intranet
- Feedback form: www.greencampus.fi
- Production figures for the solar power plant and wind turbine: http://www.lut.fi/solar
- Green Campus slides: www.greencampus.fi -> Green Campus in a nutshell

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