LAPPEENRANTA

Greenreality

It’s happening here

The target of the Lappeenranta municipality climate programme 2009 was to decrease emissions of carbon dioxide
by **30 %** by **2020,** from the level of 1990

The target was already reached in 2014

when emissions had decreased by 38 %.

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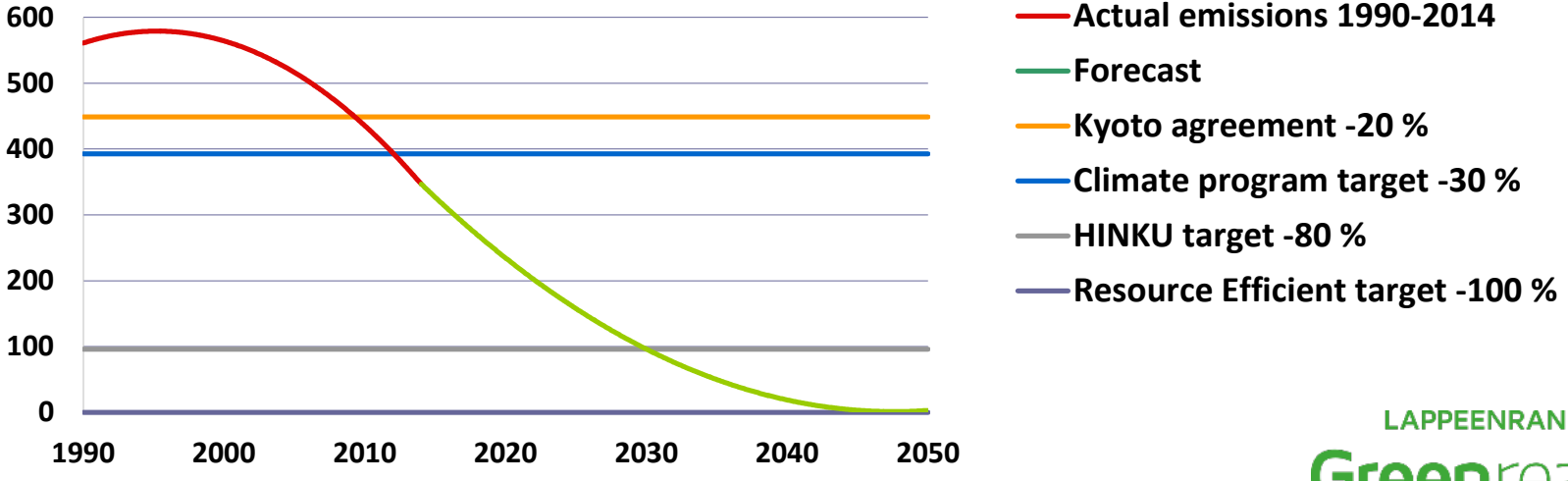
Municipality emissions in Lappeenranta

- Actual emissions 1990–2014
- Kyoto agreement -20 %
- Lappeenranta climate programme target -30 %
- HINKU target -80 %
- Resource-efficient target -100 %



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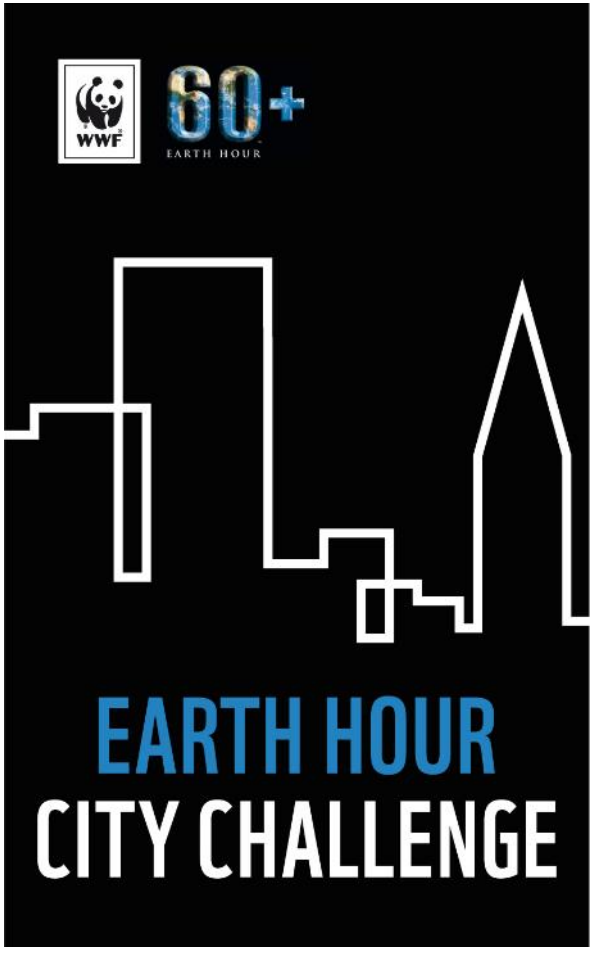

WWF Earth Hour Capital 2014, Finland

Lappeenranta is again among the best 45 cities in the world in the WWF City Challenge 2016

The WWF City challenge is a competition of cities´actions in mitigating climate change.

LAPPEENRANTA Greenreality

KAUKAAN VOIMA POWER PLANT

Finland's largest user of bioenergy in 2010

Greenexample 1

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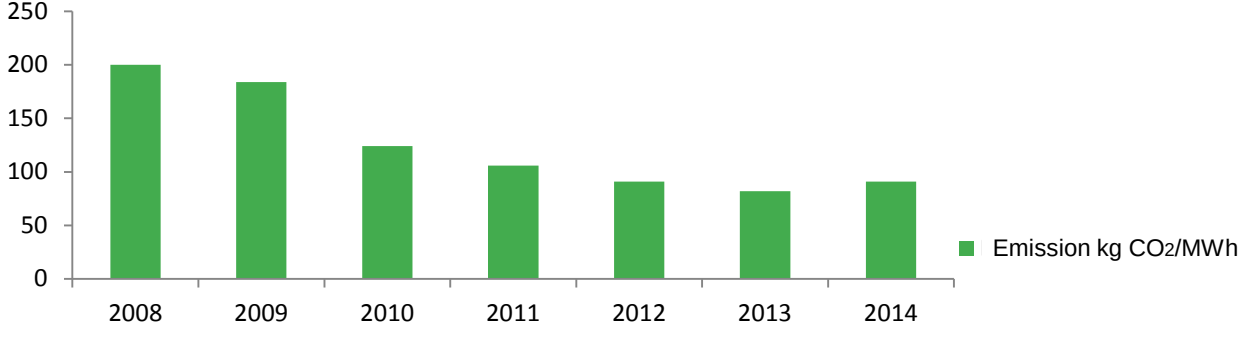
Greenexample 1

Forest by-product biomass is used widely in district heating

- Forest biomass is used widely in district heating in Lappeenranta – 85% of all district heating
- In 2013, CO_2 emissions from district heating at Lappeenranta Energia were only 82 kg/MWh compared to the average in Finland of 179 kg/MWh
- The forest biomass is mainly originated as byproduct of wood processing in the forest industry
- 80% of all the fuel in the Kaukaan Voima bio plant is a by-product of biomass



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Finland's first and largest inland wind farm (21 MW) in 2014

WIND FARM BY TUULISAIMAA OY

Greenexample 2

LAPPEENRANTA Greenreality

Wind energy production

- Seven 3 MW mills – total power 21 MW
- Tower height 90 m and blade lenght 60 m
- Total height 150 m
- Wind farm expansion: 2 mills in permission process
- 2014 production was equivalent to heating energy of over 3600 electrically heated small houses
- The biggest wind turbines in the world are manufactured in Lappeenranta by The Switch

The world's first second-generation bio-refinery using crude tall oil as raw material started up in 2015 in Lappeenranta.

UPM RENEWABLE DIESEL BIOREFINERY

BIOVERNO

Greenexample 3

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UPM BioVerno renewable diesel

- UPM BioVerno is a brand name of renewable diesel originating from tall oil
- Based on UPM innovation
- Annual production of renewable diesel 100,000 t
- Crude tall oil, a residue of the pulp-making process, is used as a raw material.
- Investment value €175 m

HYDROGEN-FUELLED DISTRICT HEATING IN THE JOUTSENO AREA

Greenexample 4

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Greenexample 4

FC Power Oy

- power plant uses hydrogen, which is a by-product of electrolysis, as a fuel to produce electricity for the factory itself and for district heating in the Joutseno area
- environmental effects are minimal, the **only “emission” from hydrogen is water**

0%
emissions

FC Power Oy is a production company owned by Kemira Chemicals Ltd and Leppäkoski Sähkö Ltd

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An internationally awarded
Green Campus
GREEN CAMPUS
LAPPEENRANTA
Greenexample 6
LAPPEENRANTA
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Green your mind – Mind your green

- In the Global Sustainable Campus Excellence Award, the Lappeenranta University of Technology LUT campus was selected as the best in the world
- A unique research and educational environment, where the university's expertise in energy, as well as its own innovations, are put to practical use
- 40% of Finnish energy research and education is conducted at LUT

LUT
Lappeenranta
University of Technology

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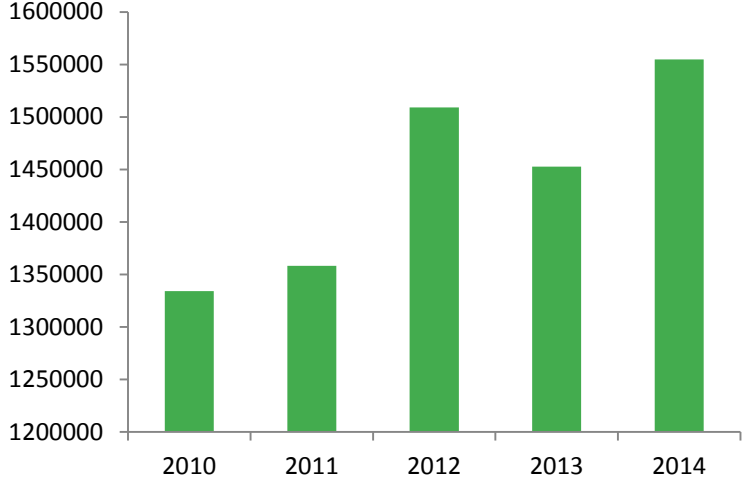
Public transport usage 2014

- In 2012, the campaign “Mennään bussilla” started, clearly encouraging the use of public transport
- In the period 2010–2014, growth was 17%



Increase in the use of public transport

Passengers

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CITY ENCOURAGES CYCLING AND WALKING

Greenexample 8

The Cycling City of the Year 2015 in Finland

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City encourages cycling and walking

- Main cycling lanes
- Cycling programme
- Cycling maps

- Lappeenranta spent 1.5 million euros on upgrading cycling lanes in 2015, which was 15% of total investments.
- **Lappeenranta was selected as the cycling city of the year 2015 in Finland, by the national cycling association.**

WE DARE. WE DO.

LAPPEENRANTA SETS THE STANDARD FOR SOLAR POWER USE IN FINLAND

Greenexample 9

LAPPEENRANTA
Greenreality

Solar power activity

- The proportion to population of installed capacity of solar power in Finland is the highest in the Lappeenranta area – 34 kWp / 10 000 inhabitants (South-Karelia)
- Lappeenranta University of Technology´s 208.5 kWp solar power plant is one of the largest plants in Finland
- In 2016, solar panel installations are strongly increasing by 33 % (153 kWp)
  - 49 kWp Myllymäki day-care centre
  - 49 kWp fire station
  - 55 kWp Lappeenrannan Energia power company

6%

of solar power in Finland is produced in Lappeenranta area

8.2 %

of solar power plants in Finland are in Lappeenranta

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EMISSION-FREE FUTURE
NOW AVAILABLE
NEO CARBON
Greenexample 10
A completely new, renewable, emission-free, cost-effective, and independent energy system
LAPPEENRANTA
Greenreality

Greenexample 10

A world electrified by solar and wind

- Neo-Carbon Energy is the largest renewable energy research in Finnish history – a breakthrough solution for a new energy system.
- By using innovative technologies, solar and wind power are turned into reliable energy sources. **This means highly cost-effective and 100% emission-free energy for our planet.**
- A completely new energy system is created, in which where the produced energy is emission-free, cost-effective, and independent. The problem of storing and distributing renewable energy will be solved.
- This will revolutionise the entire energy field.

- The project is carried out in cooperation with VTT Technical Research Centre of Finland Ltd, Lappeenranta University of Technology LUT and Finland Futures Research Centre FFRC.

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Cleans and protects Lake Saimaa

INNOVATIVE AND ENERGY-EFFICIENT PUMPING STATION

Greenexample 13

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Kivisalmi pumping station

- Energy-efficient pump developed by Lappeenranta University of Technology
- Four times more energy efficient than commercial solutions
- Reduces nutrient levels in Lake Pien-Saimaa area
- Measured decrease of 30% in phosphorous in 2015
- Prohibits algae blossoming

Our waste recycling rate is over 90%

EFFICIENT WASTE RECYCLING

Greenexample 14

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We separate our waste effectively

- **Our waste recycling rate is over 90%**
- Only 8% of domestic waste goes to landfill
- Biodegradable waste and dry waste are collected separately
  - Biowaste is collected separately from every household and composted
  - Dry waste is used for energy


Award winning **Finnish high tech company**
ECOLOGICAL ACTIONS AND NEW BUSINESS OPERATIONS TO ACHIEVE A MORESUSTAINABLE TOMORROW
LAPPEENRANTA
Greenreality

Greenexample 18

Technology saves fuel and lowers emission

- Visedo® provides Electric drive trains for applications in
  - Heavy Duty machines and vehicles (Off-highway)
  - Transportation
  - Marine
- The drive trains include all essential components from converting from traditional to hybrid electric (HEV) or electric vehicle (EV) solutions
- Visedo technology saves fuel and lowers emission and noise levels
- Visedo® is using the state-of-the-art technology based on own patents
- Award winning Finnish high tech company combining Finnish technological strongholds: electric machine building and drives technology

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LAPPEENRANTA: WE MAKE THE FUTURE LOOK BETTER

DEFINING A GREENER TOMORROW

LAPPEENRANTA

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Decrease in GHG emissions.

Active public transport.

High waste recycling rate.

Extensive use of biomass as a by-product of the forest industry in energy production.

The biggest inland windfarm in Finland 2014.

Large production of electricity by solar cells.

Energy-efficient pumping station purifying Lake Saimaa.

Combined power and heat production by CHP plant.

Raising the bar

New target **2007–2030:** CO_2 decrease of **80%**

How do we do it?

1. More efficient land use. Compact city structure
2. Traffic down by 5% by 2020: Increased public transport & cycling
3. Increasing renewable energy production by 160% in the period 2007–2030
4. Reduction of the city's own energy consumption by 9% from the level of 2005-2016
5. Improving energy efficiency of buildings, such as by lowering emissions of heating by 50% in the period 2007–2030

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The strategy of Lappeenranta

Defining a greener tomorrow

- Sustainable centrally focused living
- Lower costs of development
- Center focused developments ensures the maintenance of services for residents
- Planned environmental improvements
- Focused ongoing efforts for clean, pleasant, and attractive surroundings
- Environment programme to further the environmental issues in city management
- Member of HINKU (Towrds Carbon Neutran Municipalties) and FISU (sustainable finnish communities)

LAPPEENRANTA
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Policy actions in the Lappeenranta area

- Lappeenranta Municipality
  - Climate Programme 2009
  - A member of Finnish Carbon-Neutral Communities 2014
  - A Member of Resource-Efficient Cities in Finland 2015
  - HINKU roadmap –80% emissions to year 2030
  - Carbon-neutral roadmap to year 2050

- University of Technology Lappeenranta LUT
  - Internationally Awarded Sustainable Green Campus 2013
  - Verified Environmental Management according to ISO 14001 standard, 2014

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Carbon-Neutral Lappeenranta Roadmap 2030

- **-50%** Traffic emissions
- **-50%** Electricity consumption
- **-50%** Waste management emissions
- **-50%** Building heating emissions
- **-22%** Agriculture
- **+160%** Renewable energy production

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Lappeenranta joined national ´HINKU´ Group in 2014

Target: to cut GHG emissions by 80% by 2030

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Resource-efficient Lappeenranta Roadmap 2050

- Sustainable well-being
- Zero emissions
- No overconsumption
- No waste

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Other actions

Lappeenranta is replacing the street lighting with energy-efficient lighting

EKOenergy

Lappeenranta municipality is changing to green electricity from 2017

Eco-Schools in Finland: 3 schools and 1 kindergarten in Lappeenranta have Green Flag status

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THE POWER OF YES.

LAPPEENRANTA

Greenreality