Greenreality Lappeenranta

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LAPPEENRANTA
THE CLIMATE CAPITAL OF FINLAND

Winner 2021 - Lappeenranta
EUROPEAN GREEN LEAF
An initiative of the European Commission


THE PAST.


THE PRESENT.


UNIVERSITY CITY
Lappeenranta University of Technology, LUT
M.Sc. (Econ.) 186 | M.Sc. (Tech.) 410
INVEST › LAPPEENRANTA


LAPPEENRANTA WILL BE
CARBON NEUTRAL IN 2030

WHY LAPPEENRANTA Is a Green Leaf Winner?

THE FIRST
ECOENERGY CITY

100%
OF ELECTRICITY
USED BY CITY
IS CARBON
DIOXIDE-FREE

70%
OF DISTRICT
HEATING
PROCUDED
CARBON DIOXIDE -FREE

SUSTAINABLE DEVELOPMENT
TAUGHT TO
3000
CHILDREN AND YOUTH
IN LAPPEENRANTA
JUNIOR UNIVERSITY
ANNUALLY

2000
ENERGY AND
ENVIRONMENTAL
JOBS

OVER 100
WETLANDS
FOR SAIMAA

2009–2017
CARBON DIOXIDE EMISSIONS
REDUCED BY
46%

CITY ACQUIRES
SOLELY
BIOGAS OR
ELECTRIC CARS
FROM 2017 ONWARD

100%
OF WASTE
RECYCLED

Green Leaf Award year 2021

LAPPEENRANTA
SUOMEN ILMASTOPÄÄKAUPUNKI

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NETWORK

Case FLOWROX
Plasma Oxidizer at City Central Hospital

FEATURES

- Non-thermal plasma technology for industrial water purification
- Low energy consumption
- Chemical-free

MAIN BENEFITS

- *Destroys 90-99 % pharmaceutical residues* from the hospital wastewaters
- Degrades pharmaceuticals before the hospital sewage enters the public sewer network and the concentrations are diluted

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Case WIMAO RECYCLING TECHNOLOGIES
Waste to Products Pilot Factory

- Recycles challenging waste materials:
  - plastics, wood and textile
  - all recycled materials otherwise to be incinerated
- End products, for example, pallets, street tiles

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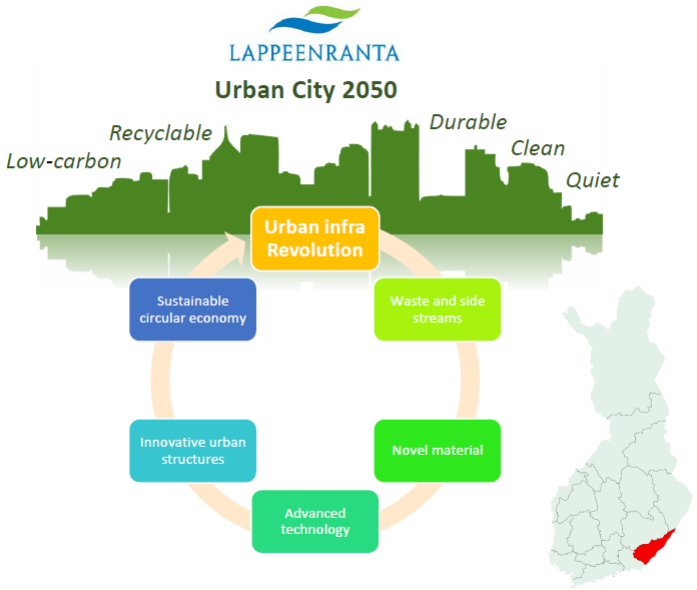
UIR - Urban Infra Revolution

November 2017 – December 2020

https://www.uia-initiative.eu/en/uia-cities/lappeenranta

- The target of the *Urban Infra Revolution* – project is to produce geopolymer composites out of local industrial side streams and use these materials for creating city infrastructures by additive manufacturing.
- Geopolymer composites are an alternative for traditional construction materials and improve the material efficiency within the industry by enabling the utilization of industrial side streams, and therefore sparing natural resources. They also have a lower environmental impact due to the circular economy aspects and low-carbon binder materials.
- Virtual reality is used in the project for urban planning and by utilizing the novel cost-efficient materials and additive manufacturing technology, new aesthetic possibilities and innovative structures can be achieved.
- Sustainability and ecodesign principles guide the development work and additionally, business potential and markets of geopolymer composites are studied and business models and ecosystems are being developed.



The project is funded by *Urban Innovative Actions* that is an initiative of the European Union promoting pilot projects in the field of sustainable urban development. The consortium is coordinated by the City of Lappeenranta and it includes 12 local partners consisting of universities and companies (https://www.uia-initiative.eu/en/uia-cities/Lappeenranta).

Duration of the project: 01.11.2017 - 31.12.2020

System boundary

Ecodesign

MATERIALS

Outotec

ASH

Metsä

GREEN LIQOUR DREGS

rethink.

storaenso

TAILINGS

FIMATEC

FINNISH INTELLIGENT MODULE APARTMENTS

Nordkalk

CONSTRUCTION AND DEMOLITION WASTE

UPM

FIBERWASTE

ENERGY

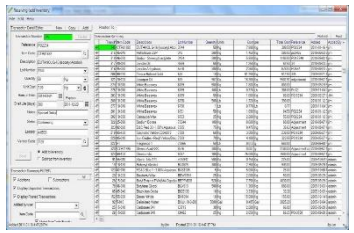
NOISE BARRIER

SKATE RAMP

PARK BENCH

EUROPEAN UNION

UIA URBAN INNOVATIVE ACTIONS



Data

LIFE CYCLE ASSESSMENT LCA

LCA

Interpretation

Recommendations for sustainable use

Noise barrier

Cata3Pult Finnish Russian PPP
catalyzing new green business

- **Leader of the project:** City of Lappeenranta
- **Project partners:**
  1. Green Net Finland (Helsinki)
  2. St. Petersburg House Property Owners Association (Clean tech cluster of St. Petersburg)
  3. Environmental office Kosmos (St. Petersburg)
  4. Metropolia University of Applied Sciences (Helsinki)

- Improving energy and eco efficiency in private houses in SPb for example heating, lighting and waste management.
- Decreasing environmental load of transportation in SPb and South Eastern Finland.
- Decreasing use of natural resources by deploying circular economy principals.

CBC 2014-2020
SOUTH-EAST FINLAND - RUSSIA

Funded by the European Union,
the Russian Federation and
the Republic of Finland.

Cata3pult
FINNISH RUSSIAN PPP
CATALYZING NEW GREEN BUSINESS

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Electrification - Basis

ELECTRICITY

-> unlimited !

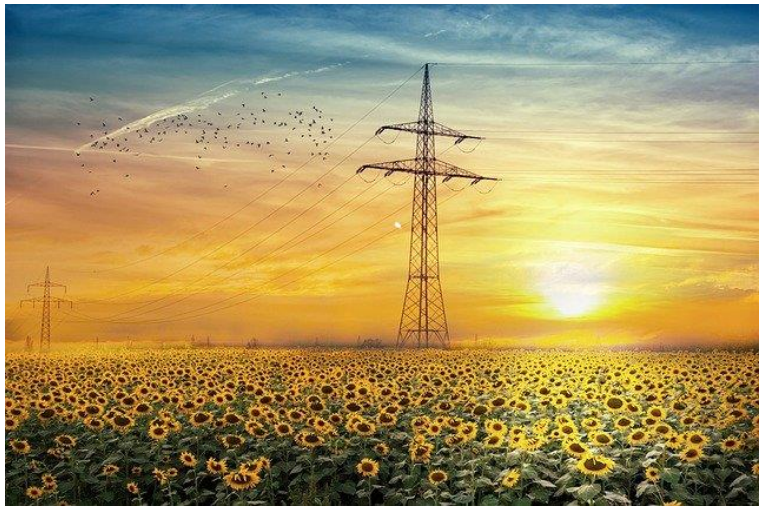
-> The primary energy source

→ electrifying combustion engines

→ **Second wave of electrification:**

- ❑ Chemical *industry*, steel industry, cement industry, energy sector, *transportation, agriculture*, … (target of COP21)

→ CO_2 **is** *a* ***valuable*** *raw material*



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CASE Danfoss Editron

Ellen, world's strongest Electric Ferryboat

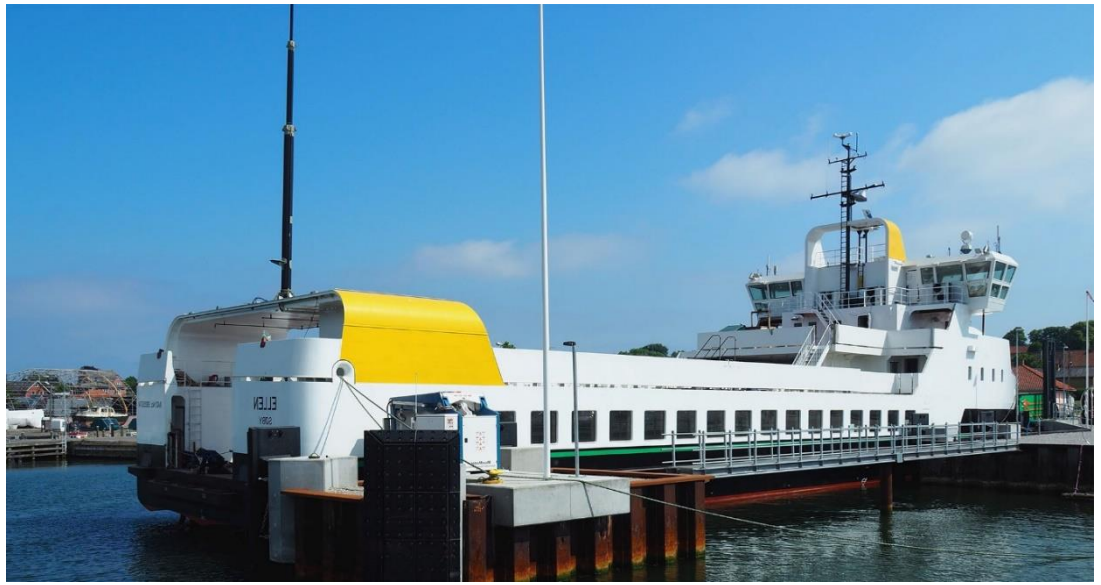
- Builder: Søby Shipyards Ltd.
  Type: Battery electric
  Delivery: 2019

SCOPE OF DANFOSS DELIVERY

- EM-PMI electric machines
- EC-C inverters
- EC-C DC/DC converters for batteries
- Propulsion and power management controls
- Battery charger for shore

MAIN BENEFITS

- Reduction of CO2 emissions by 2000 tons and NOx emissions by 41,500 kg/year
- Safe and silent operation



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CASE ELSTOR
Power Heat Thermal Energy Storage

- Replaces fossil fuel generated heat with renewable electricity at Port of Lappeenranta district heating grid
- Storing electricity from volatile renewable energy sources makes it a more economic heat source than natural gas or fuel oil
- Heat generation solution for district heating and industrial steam/heating needs

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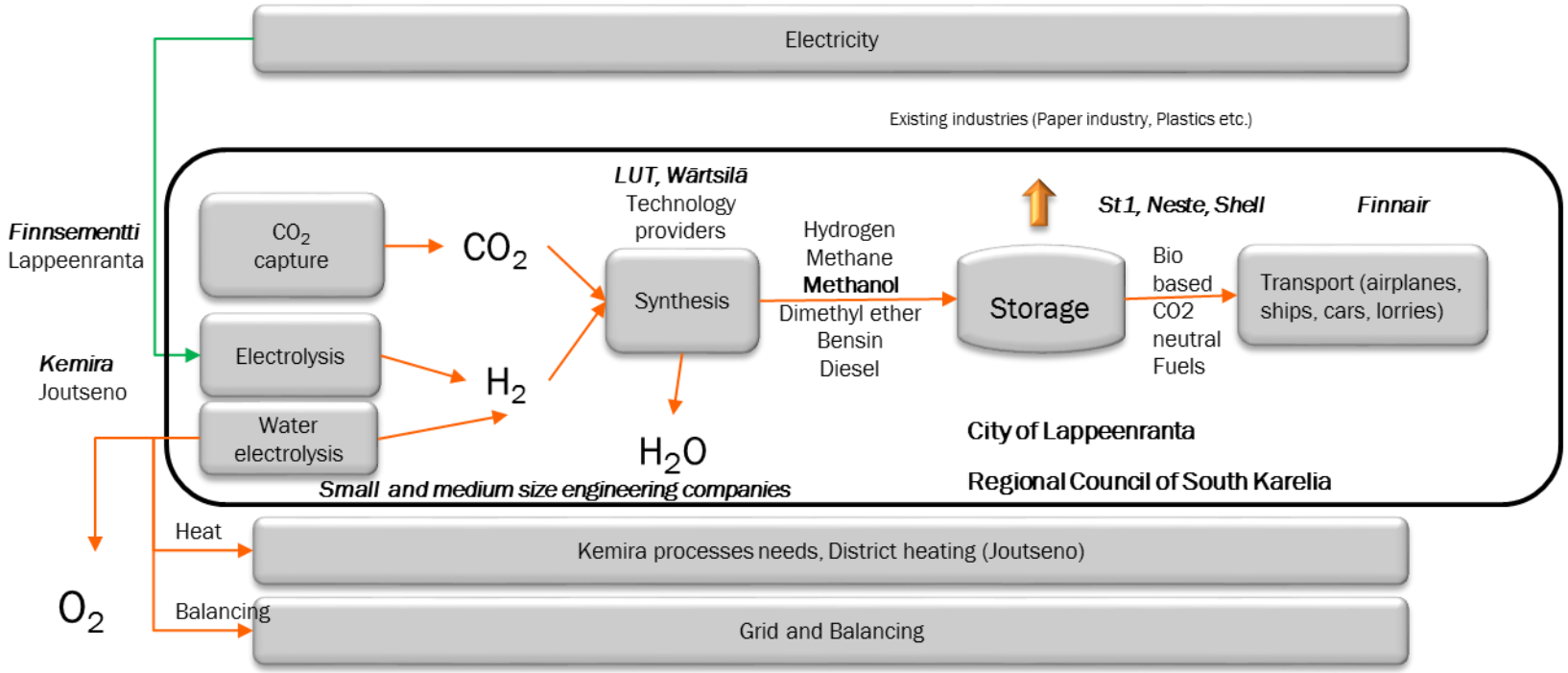
Industrial sized production pilot of carbon neutral fuels at Lappeenranta



27 000 tn/a

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Electrification start-ups

"Doing what and why?"

"Food out of thin air"

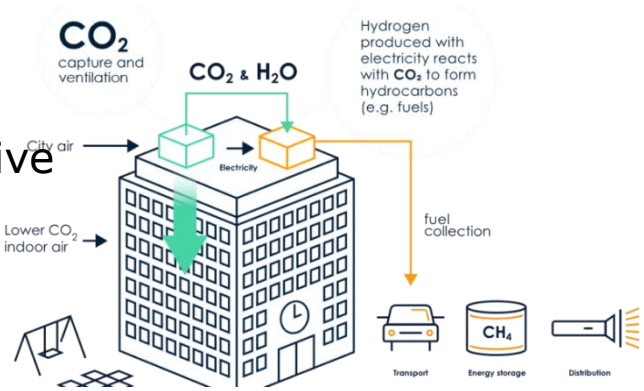
- Food protein produced by natural fermentation
- Renewable energy and CO2 used

Captures CO_2 from building ventilation

- Makes people more wellbeing and productive

Captured CO_2 is combined with hydrogen

- Creates renewable fuels



Produces efficient small gas turbines

- Very high electrical efficiency
- Designed to use hydrogen, biogas and synthetic gas, as well as other renewable and non-standard fuels.

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More information at
www.greenreality.fi/en
Thank you!
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SAIMAA ORIGINAL

The Saimaa ringed seal (Pusa hispida saimensis)

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