

COMPANIES IN CIRCULAR ECONOMY



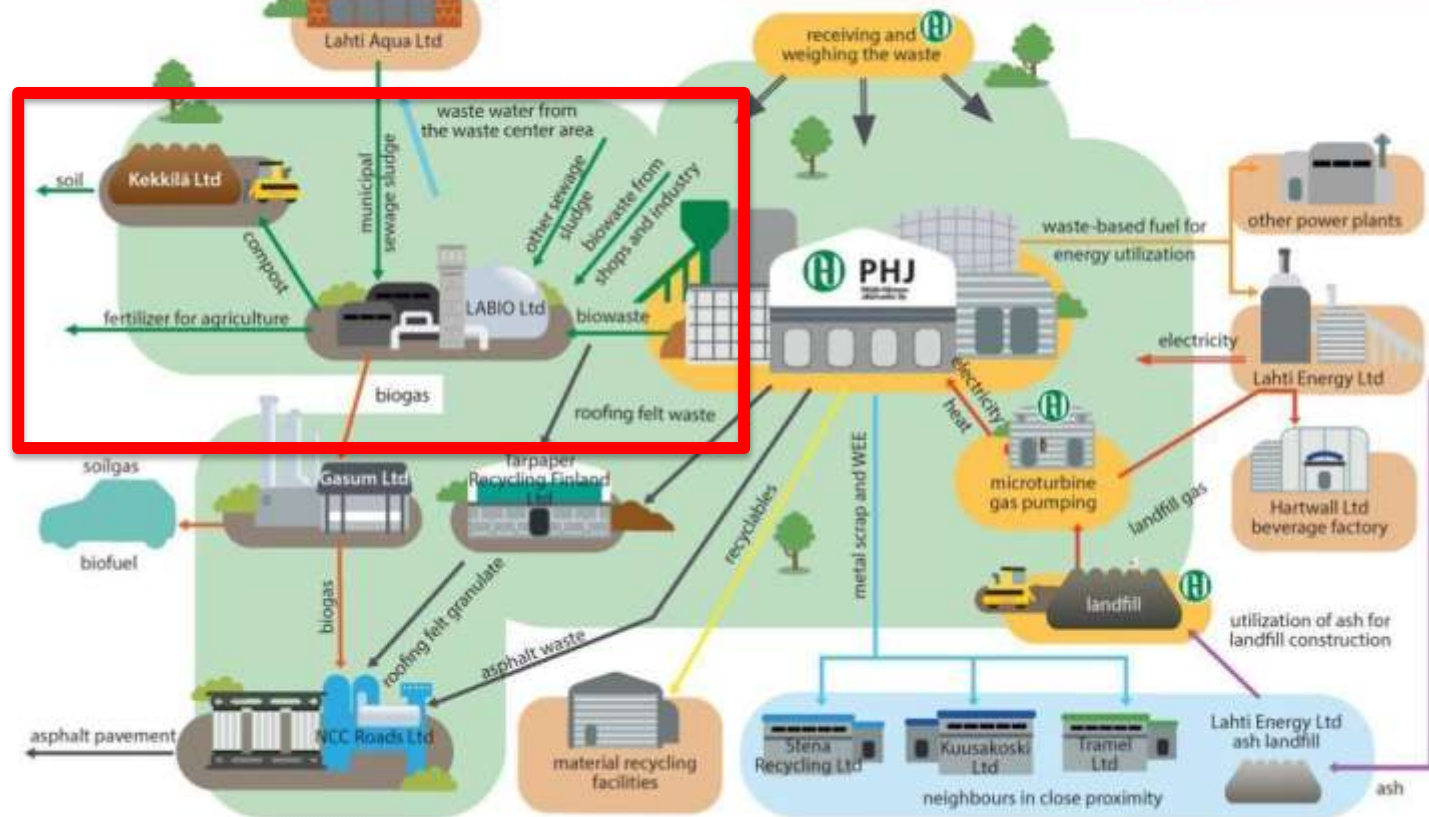
- LABIO Oy provides a service for treating bio-waste and wastewater sludge.
- Combined composting and gas production allows 98% of the raw material supplied to be utilized
- Processing capacity 80 000 tons of waste per year
- 50 GWh of biogas is produced a year, which corresponds to the annual fuel consumption for about 4500 cars or 140 city buses
- 500 – 1000 m³ compost products are produced per day. Used as sustainable fertilizer in agriculture



<http://www.labio.fi/en/>

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Kujala Waste Centre- Industrial Symbiosis Lahti, Finland





Case: Etanolix™ Lahti



- 2005-06 side products of Lahti Grain Cluster companies were studied
- 2010 started bioethanol plant of ST1 Oy (5th unit)
- Feedstock from Hartwall brewery
 - Excess yeast that contains alcohol
 - Process waters and product batches containing sugar or alcohol
- Side products from bakery industry and markets
- Integrated into Hartwall's brewery and beverage plant

Animation of Bioethanol production:

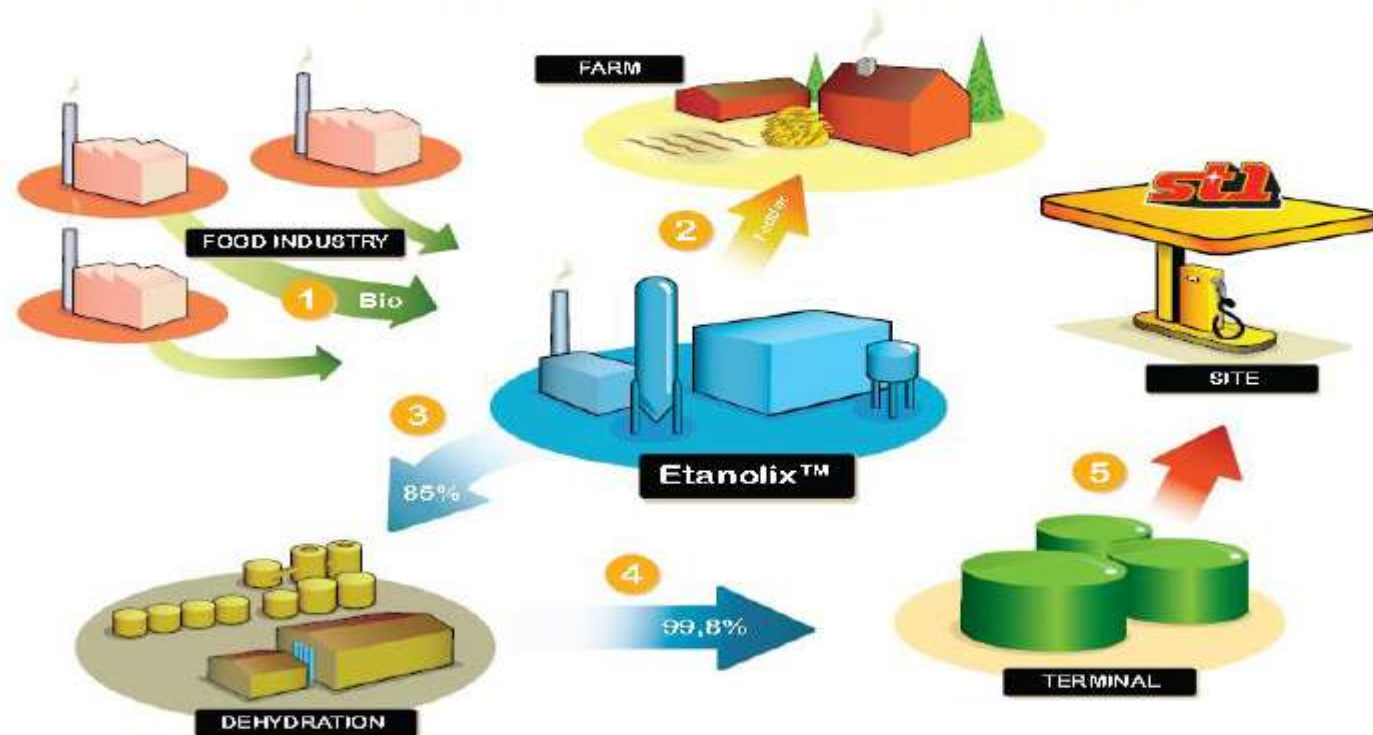
<https://www.youtube.com/watch?v=kqfW0VmONXc>



ST1 Oy Etanolix™-process

Distributed bio-ethanol production

St1 Oy, Finnish energy company, develops and commercializes environmentally sustainable solutions and delivers these solutions profitably



1 CO₂ Good bioethanol is produced from waste material - and industrial by-products - using Etanolix™ processing plants

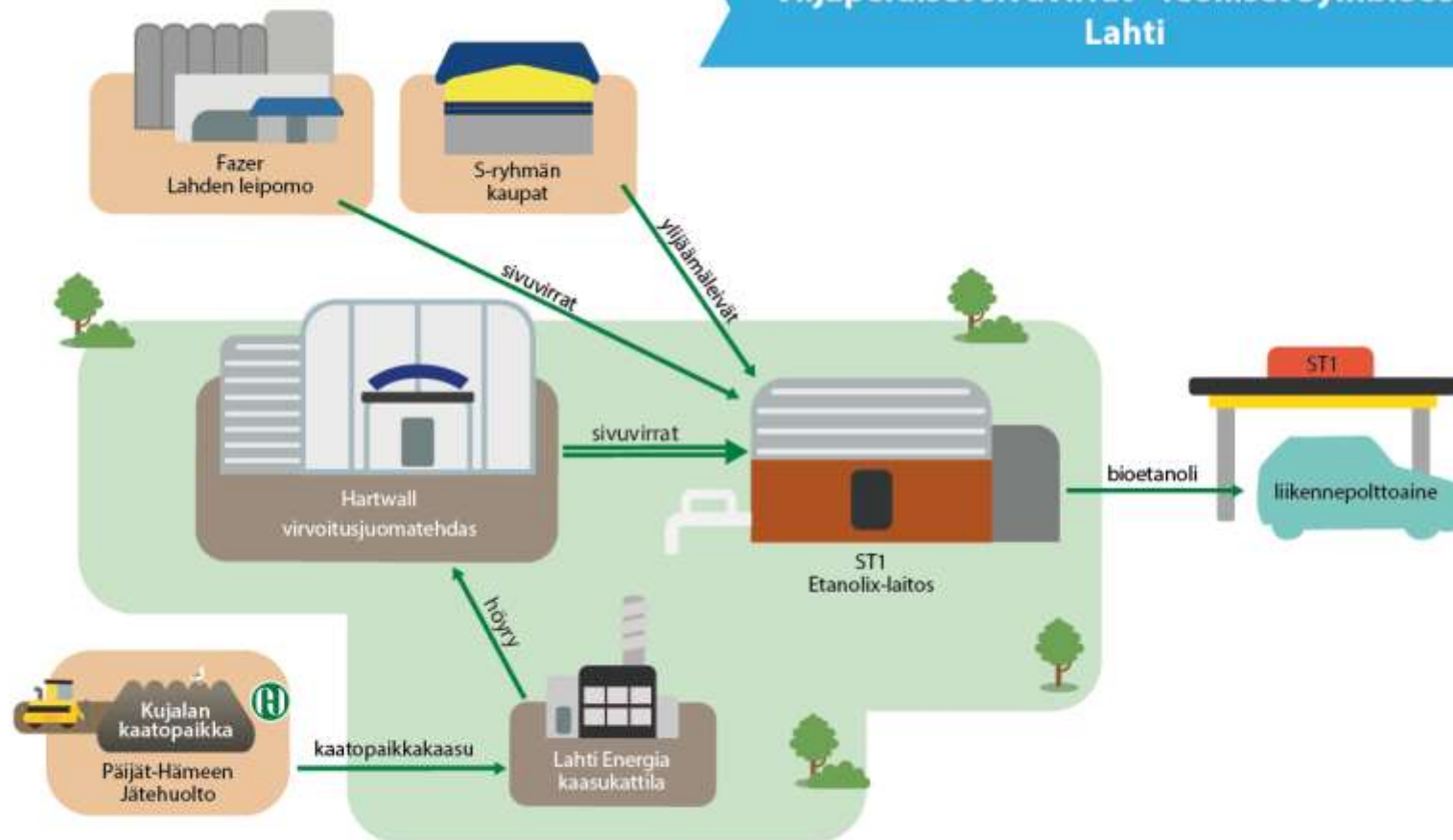
2 This process creates a by-product in itself which can be used as animal feed for farmers

3 The 85% bioethanol produced is then sent for dehydration to remove water and make it suitable as fuel component

4 Then the bioethanol is blended - as a bio component - to make final fuel blend

5 Biofuel is ready for distribution to service stations

Viljaperäiset sivuvirrat - Teolliset Symbioosit Lahti



Kuusakoski is Finnish company that operates globally collecting and recycling materials from different sources. Kuusakoski is able to recycle or reuse up to 90% of the materials collected:

Aluminium and aluminium scrap

Ferrous scrap

IT equipment

Non-ferrous scrap

Plastic scrap

Precious metals

Stainless steel scrap

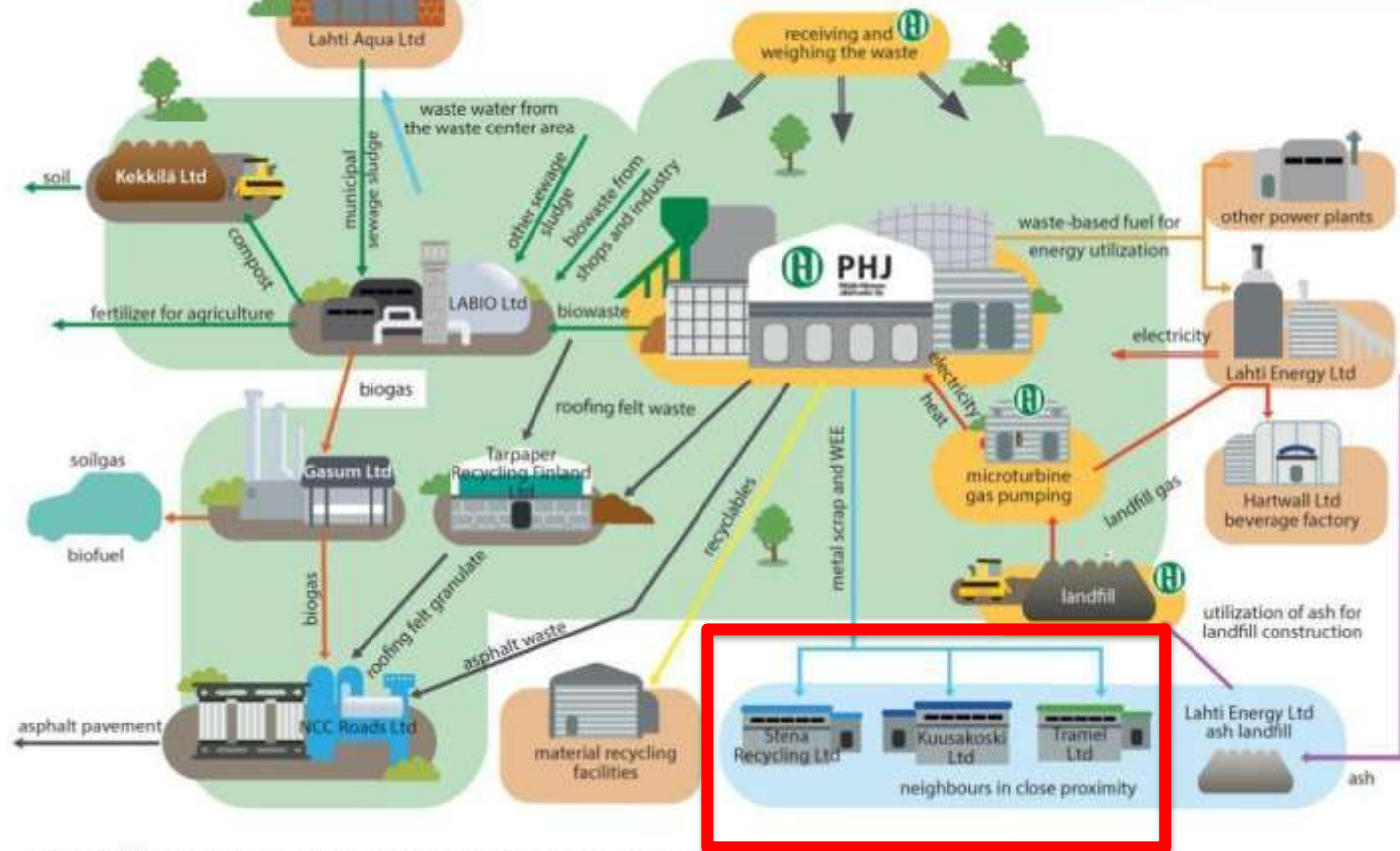


Kuusakoski – 100 years of recycling:

<https://www.youtube.com/watch?v=GqrvX3QUVWo>

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Tarpaper Recycling collects and recycles roofing felt waste to the asphalt production

www.tarpaper.fi



The collection of roofing felt waste



Recycling of roofing felt waste



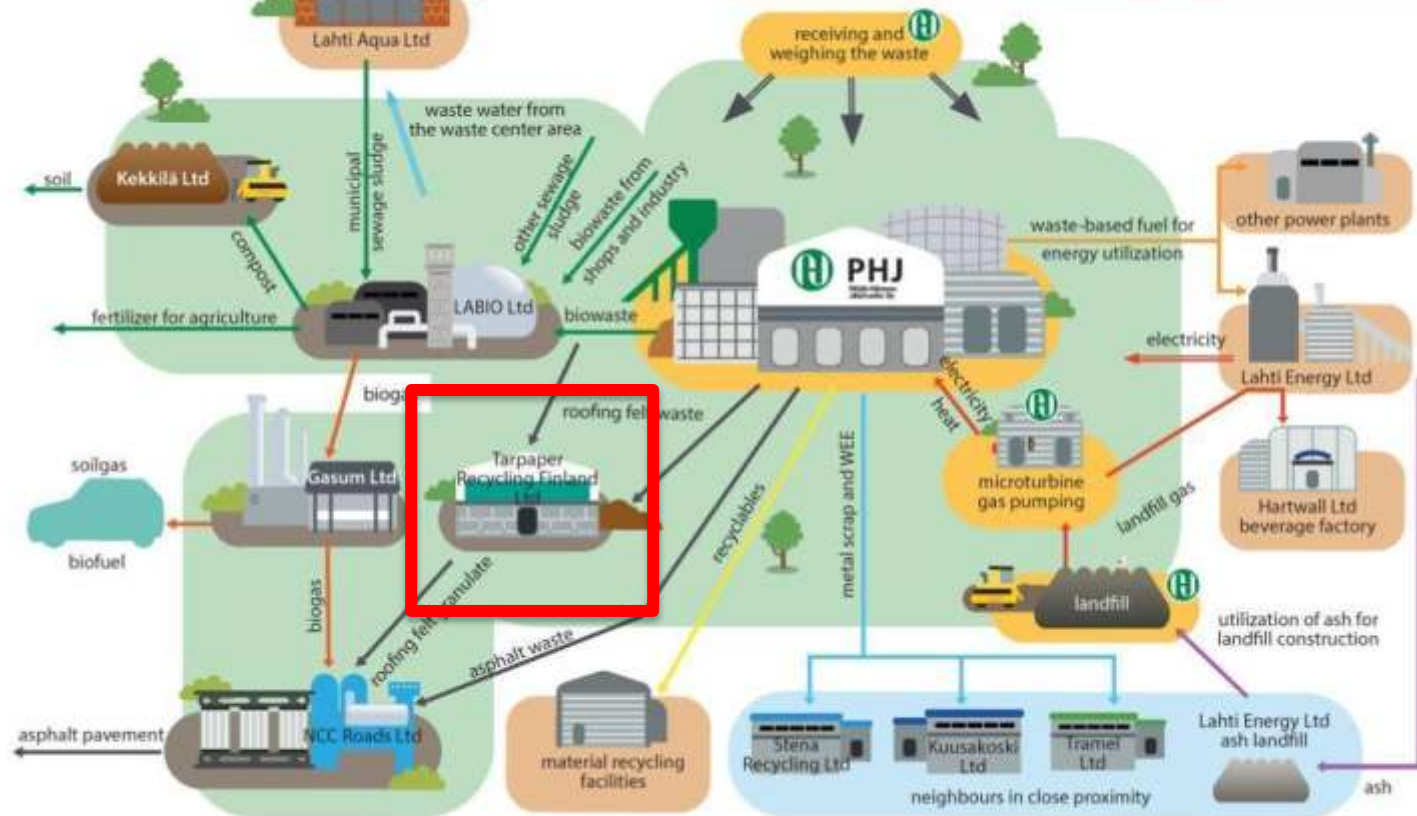
The production of asphalt



Asphalt Paving

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RESEARCH AND DEVELOPMENT



ENERGON – TOP FACILITIES FOR RENEWABLE ENERGY R&D

- An international level R&D and pilot environment for renewable energy and energy efficiency
- Equipment for research and development of e.g. heat pump and hybrid technologies, as well as combustion qualities and emissions of biofuels
- Rents out research and laboratory facilities to universities, research institutes and companies
- Facilities also utilised in the courses e.g. by Lahti University of Applied Sciences



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SOIL RESEARCH CENTER SOILIA

- The first pilot scale soil research center in the Nordic countries
- Basic scientific study of soil, sediments, groundwater and surface water
- Applied research supporting product development of the companies
- Utilised e.g. in remediation of contaminated soil
- The equipment includes 16 lysimeters, two research silos and two research fields

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