

Practical insights from Kiertokaari pilots

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Kiertokaari

Kiertokaari Ltd.

- Company owned mainly by the city of Oulu and partly by seven other municipalities
- Kiertokaari is legally responsible for arranging waste management in the municipalities and cities within its operational area
- Operations are funded by waste management fees, no tax money is used





The largest owner is the City of Oulu (n. 91 %)

Profit

0,2 M€

Turnover

21,3 M€

Number of inhabitants

290 000

Permanent personnel

39 

9 waste stations

Customer satisfaction

4,3 / 5

Utilization percentage

Nearly 100 %

Received waste

225 000 tons


Kiertoakaari

Values

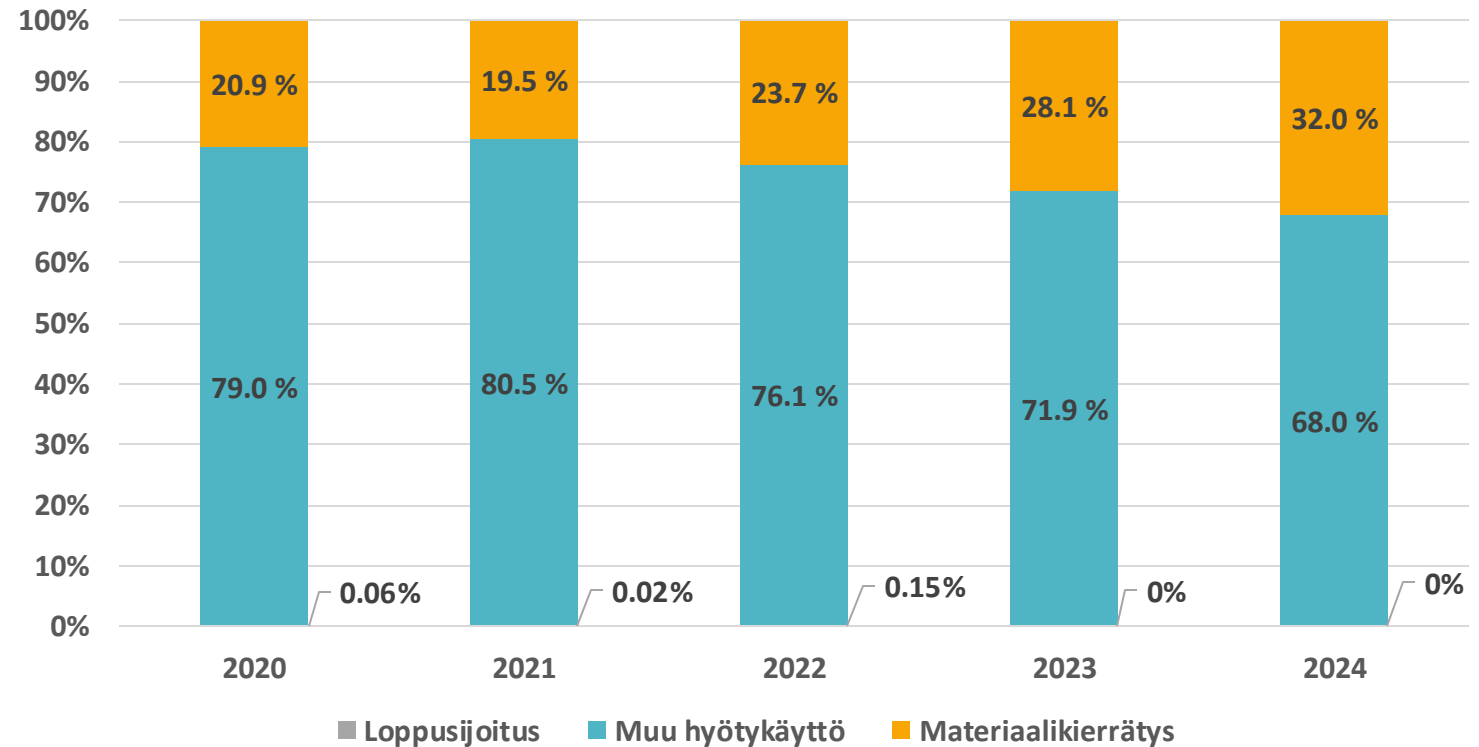
Responsibility
Customer orientation
Courage

Municipal waste treatment in Kiertokaari

In 2023, Kiertokaari received 89,314 tonnes of municipal waste

Goal:
Material recycling percentage in municipal waste

40 % in 2025



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Rusko waste management centre 1998



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Research and development

Some ongoing projects (reference group, steering group, participant)

Circular economy

- **AshCycle**, until 5/2026
 - Incineration ash recycling and utilization
- **NOWA**, until 12/2025
 - Waste management in northern areas of FI, NOR and SWE
- **Fiksuhasu** until 8/2026
 - Acid sulfate soil utilization and treatment
- **THREADs**, until 12/2027
 - Textile waste collection development
- **KAMU**, until 10/2025
 - Biochar utilization and garden waste fermentation pilot
- **PURKU**, until 4/2026
 - Construction and demolition waste utilization
- **Kiertola**, until 12/2025
 - Recycling demolition waste with digital applications

Green transition and biogas

- **KAJASTUS**, starts 5/2025 – 3/2027
 - Improving landfillgas utilization
- **MarineCO2**, until 2026
 - CO2 collection from marine engines and local utilization for fuel production
- **Boost Nordic Biogas**, until 12/2025
 - New business for biogas production e.g. from agricultural feedstocks
- **MEQAL**, until 2/2028
 - Modelling methane emissions
- **LocalGREENE**, until 12/2025
 - Hydrogen production



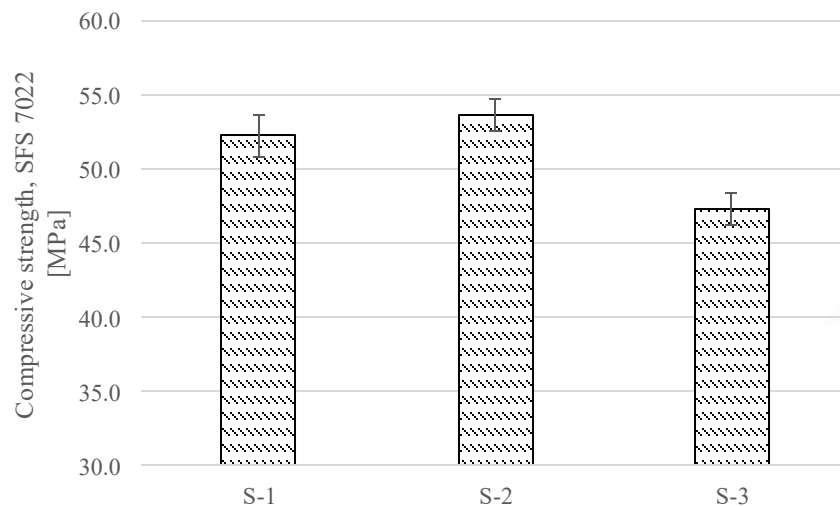
AshCycle

- Time 6/2022-6/2026
- EU Horizon project
- Involves 28 partners from 8 countries
- Purpose it to utilize incineration ash metals and nutrients
- Kiertokaari is contrubiting mainly in two WPs
 - WP4: Protreatment of the ash before earth construction pilot
 - WP5: Utilization of ash in earth construction and geopolymers (two pilots)



AshCycle pilots

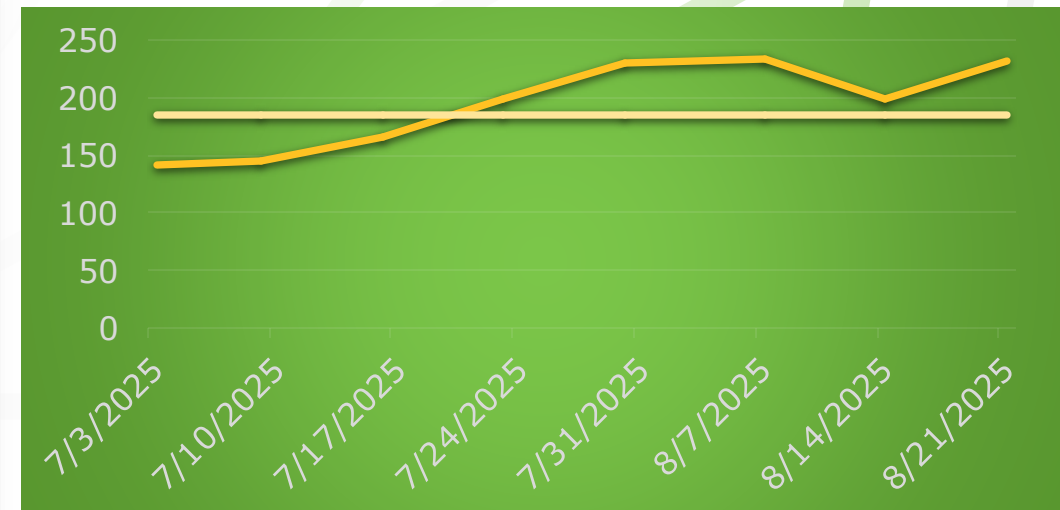
- Concrete abutment elements 2024
 - Bottom ash and fly ash
 - Recipe upscaling for pilot use
 - 16 “Lego blocks” and 3000 kg of ash
 - Leaching and concrete product properties
 - Compressive strength higher with ash



AshCycle pilots



- Granulation and earth construction pilot 2025
 - Bottom ash and fly ash
 - Upscaling granulation process
 - Pilot area 100m of road in Välimaa with 30 000 kg of granulated ash
 - Measurements with bearing capacity in PURKU-project
 - Leaching properties



KAMU pilots

Biochar utilization

- No significant improvement in composting process
- Nutrients could be added in the biochar and therefore improve the substrate manufacturing

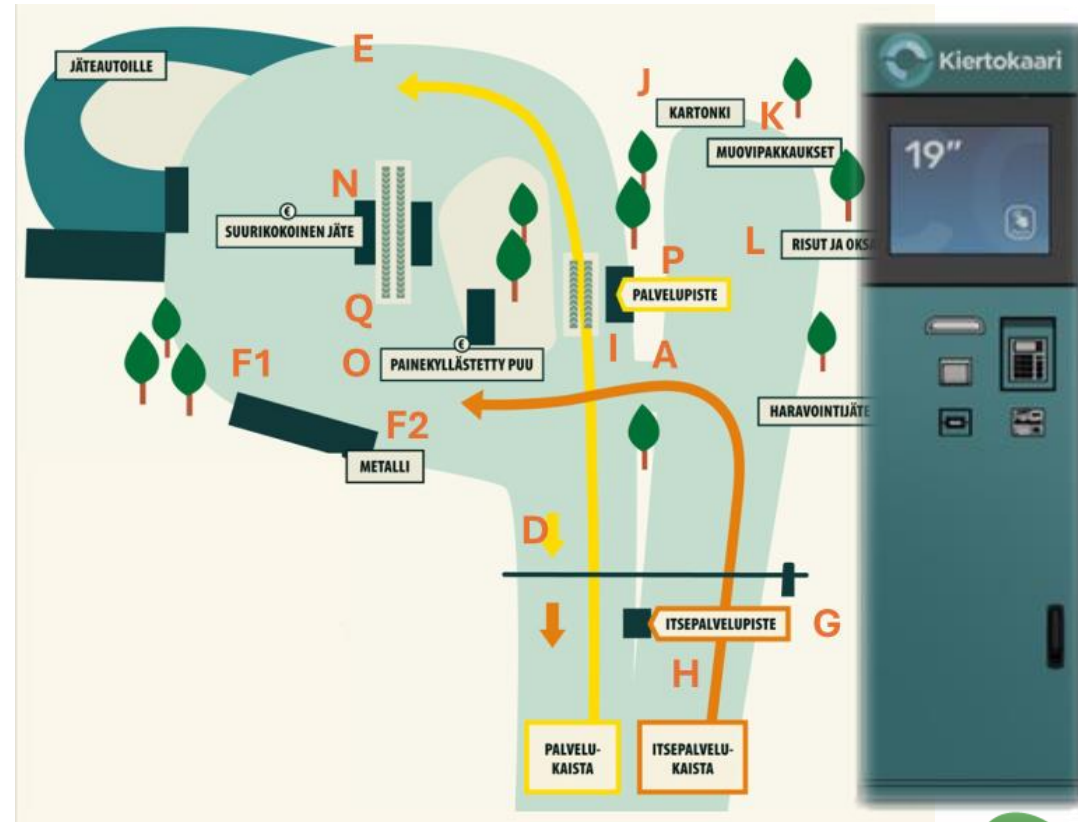
Garden waste fermentation pilot

- Anaerobic fermentation process with microbes (bokashi add-on) and heat
- Surprisingly good results in the pilot
- Substrate was mature in just two days
- Fermentation equipment will be used in R&D – processes in the future



Digitalization pilots

- Application for smart household waste management
- PAYT –pilot for mixed waste in Oulu house fare area
- Self service (24/7) waste drop-off points, pilot in Pudasjärvi and Oivapiste start of next year
- BOTEK pilot in Pudasjärvi, weighing waste vehicle
- Smart container pilot for textile waste (THREADs)



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Thank you!

