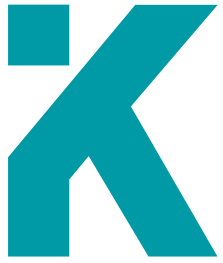




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# Ongoing Circular Economy cases at KAMK

4.3.2021  
Outi Laatikainen



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# Presentation content

- Sludge management: REMAC
- Runoff water management: PeatStop
- Water treatment & recovery: WaterPro
- Sustainable waste management: SUSWAM
- Low-carbon building: RAVE
- Microplastics: REMMI





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# Ajankohtaista:

- Webinaareja tulossa:
  - Jäte vai raaka-aine? Teknologiaa ja innovaatioita rajan molemmin puolin: 27.4.
  - Aurinkoenergia & aurinkosähkö; RAVE – rakentamisen vähähiiliset ratkaisut: 28.4.  
→ ilmoittautuminen avautuu vkolla 12. voit ennakoilmoittautua jo nyt Outille (etunimi.sukunimi@kamk.fi)
- Avointa koulutusta:
  - Ilmastomuutoksen perusteet, 1 op virtuaalikurssi: [Edukamu: Ilmastomuutos](#)
  - [Ilmastomuutoksen perusteet -opintojakso – YouTube](#)
  - Tulossa Ilmastotoimet tekniikan alalla, 2 op





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**REMAC**

Renewing Sludge Management  
Practices



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# Presentation content

- REMAC in a nutshell
- REMAC numbers and partners
- REMAC in Kainuu, Finland
- REMAC in Russian Karelia





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# REMAC in a nutshell

## The aim

→ to develop ecologically and economically sound sludge management concepts in smaller regional towns

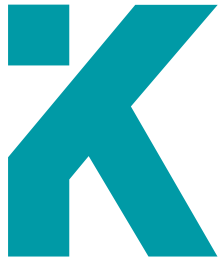
## The need

→ to respond to the specific element for improving the people's physical living environment by providing new methods for sustainable concepts for wastewater utility sludge treatments for regional towns in relatively dispersed settlements

→ in many cases, current sludge treatment practices are not carried out on ecologically or economically solid basis

→ <https://www.kareliacbc.fi/fi/projects/ka11000-remac-lietteiden-kasittelyn-investointihanke>





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# REMAC numbers and partners

- project is funded by Karelia CBC cross-border programme
- total volume 2,8M €
- 10/2020 – 08/2022

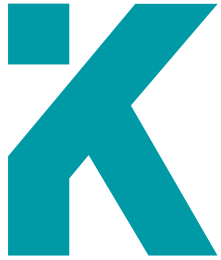
## **Partners:**

- KAMK University of Applied Sciences (Lead partner) (FI)
- Puolanka municipality (FI)
- Macon Oy (FI)
- Gordovokanal (RU)
- Kostomuksha city administration (RU)
- Kondopoga City Administration (RU)
- Voda I Ekologija (RU)

**KARELIA**

CBC // Cross-border cooperation



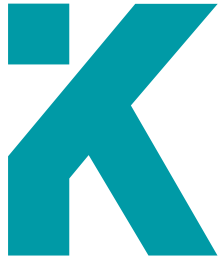


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# REMAC in Kainuu, Finland

- in Finland, open-pit composting of the sludges is about to end due to existing environmental permit practices
- Finland is nationally supporting biogas production, which is implemented nationally as big-volume anaerobic digestion units. Whilst the increase in biogas production supports environmental sustainability, the dependency on centralized high-volume units forms problems in areas with dispersed population
- in Puolanka, Kainuu, a small-scale biogas reactor will be built to process the sludge of Puolanka and the nearby small towns
- the biogas will be used to replace fossil fuels used in the municipality's heating plant
- Two technology demonstrations will be set up to support further development of existing plants





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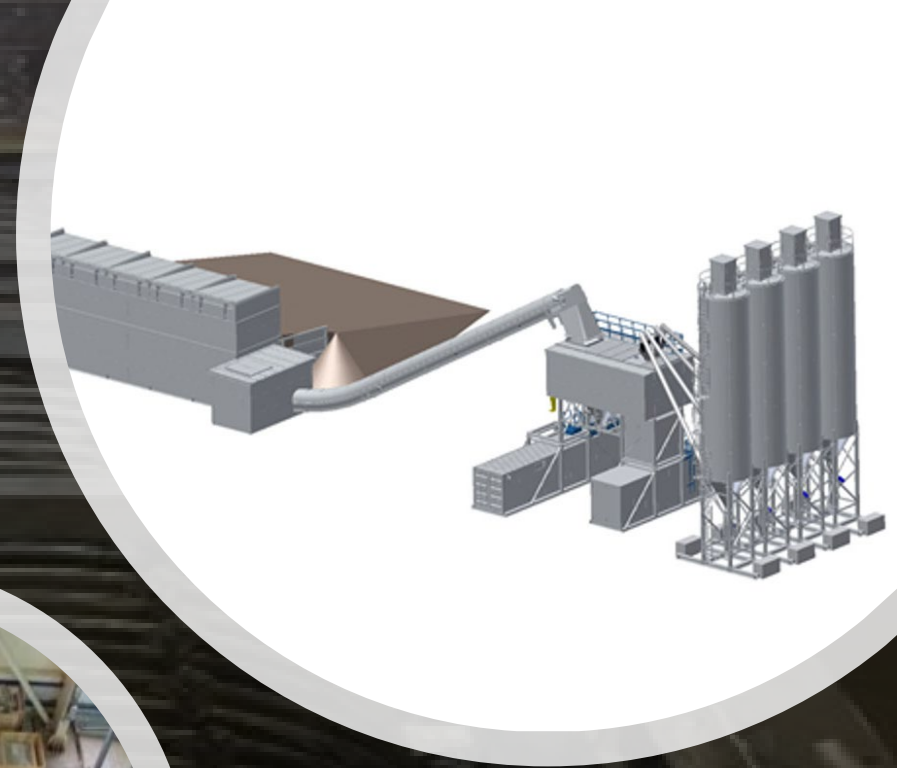
# REMAC in Russian Karelia

- in Russian Karelia, landfilling or open-pit composting of sludge is common practice, leading to uncontrolled methane leakage and leeching of nutrients and possible harmful compounds into soil and nearby waterbodies
- in Kostomuksha a feasible solution for sludge drying and incineration is needed
  - The aim is to combine the dried sludge with woodchip for incineration and district heat provision
- in Kondopoga district the aim is to find better environmental solutions for sludge storing and transportation



## REMAC in practise

- Active cross-border communication on technologies and business initiatives
- Webinar coming on Apr the 27th, stay tuned!!







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**Thank You for Your  
attention!**

**Спасибо!**

**Kiitos!**



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**PEATSTOP**

**Sustainable runoff water  
management in Karelia and Kainuu**





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# Presentation content

- PEATSTOP in a nutshell
- PEATSTOP numbers and partners
- PEATSTOP in Kainuu, Finland
- PEATSTOP in Russian Karelia





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# PEATSTOP in a nutshell

## **The aim**

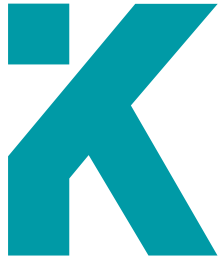
→ the development of transboundary solutions to improve the condition of urban water bodies through the introduction of effective monitoring and the use of new environmentally safe runoff water filtering solutions

## **The need**

Water reservoirs located within the boundaries of populated areas are often exposed to the anthropogenic impact from polluted surface runoff, which leads to their pollution. The coastal zones where water and population come into contact are most heavily polluted. Often, water bodies that receive contaminated runoff are also sources of water supply, which can adversely affect the health of the population

**<https://www.kareliacbc.fi/fi/projects/ka10020-peatstop-hulevesien-hallinnan-kehittamishanke-kainuussa-ja-karjalassa>**





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# PEATSTOP numbers and partners

- project is funded by Karelia CBC cross-border programme
- total volume 445K €
- 11/2019 – 04/2022

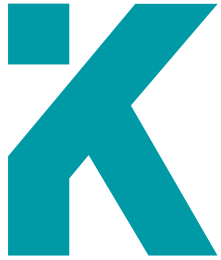
## **Partners:**

- KAMK University of Applied Sciences (Lead partner) (FI)
- Regional Company Water and Ecology LLC (RU)
- Petrozavodsk City Administration (RU)
- City of Kajaani (FI)

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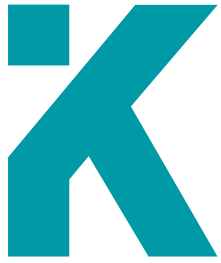


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# PEATSTOP in Kainuu, Finland

- in Kajaani, the main interest is to mitigate further eutrophication of a pond Kaupunginlampi, located in a very popular recreational area near the city center which has been suffering from eutrophication and traces of pollution, mainly due to the ingress of surface rainfall and runoff water outlets into it
- the number of other types of contamination caused by runoff water is not solely understood at the moment, which underlines the need for actual contaminant level monitoring
- the runoff water management pilot will help the aquatic environment in target area to recover, which gives a good reference for future planning in similar targets
- City of Kajaani is planning to invest in other pond recovery activities responding to urgent needs and the proposed project supports these activities by providing solutions to cut the further load caused by runoff water

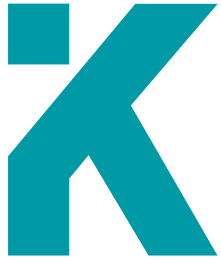




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# New viewpoints for water status monitoring; participatory observations

- Stakeholder participation by Citizen Observations might provide possibilities for
  - Getting environmental background data with better coverage (relatively low-cost)
  - Building trust and dialogue with local communities
- Implemented as a sampling with chemical reagents for selected parameters, results read with smartphones and transmitted to data management platform
- Possibilities and mechanisms for getting or distorted information need to be understood
  - Technical limitations; in this case colorimetric indication without pretreatment limited available solutions
  - Monitoring protocol complexity depending on target contaminant
  - Need to recognize possible interests to provide misinformation in purpose
- Aims:
  - To recognize possible bottlenecks in sampling, analysis and data management procedure in selected monitoring use cases
  - To gain user and stakeholder experiences on suggested citizen observatory method
- [http://www.procedia-esem.eu/pdf/issues/2020/no1/16\\_16\\_Laatikainen\\_20.pdf](http://www.procedia-esem.eu/pdf/issues/2020/no1/16_16_Laatikainen_20.pdf)
- <https://uasjournal.fi/3-2020/amkit-sos-kestavyiden-edistajina/>

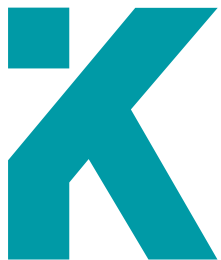


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# PEATSTOP in Russian Karelia

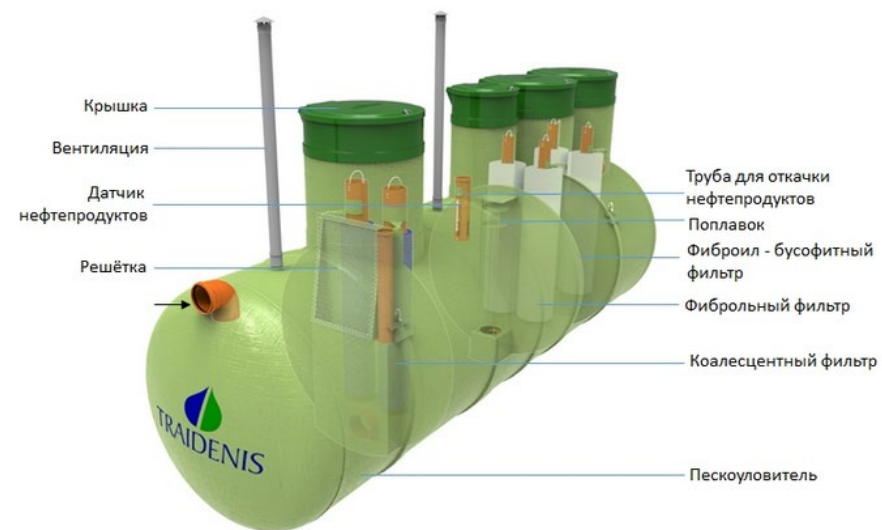
- in Petrozavodsk, the main interest is to prevent oil leakages in lake Onega in order to ensure the natural water quality in the recreational beach area and to prevent possible oil contamination near drinking water intake area
- the surface runoff from the entire city area flows through underground pipelines directly into the lake through 12 outlets along the embankment of Lake Onega
- one of the outlets is close to a popular beach and is recognized to be a remarkable carrier for oil and some other contaminants
- a remarkable amount of the raw water for city's drinking water production is taken from a nearby location
- the planning and construction of filters solves a remarkable part of the problem and pilot filter gives valuable references for future investments





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# PEATSTOP in Russian Karelia





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**Спасибо!**

**Kiitos!**





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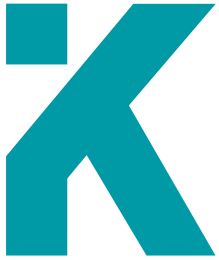
WaterPRO

Esther Takaluoma

[Esther.Takaluoma@kamk.fi](mailto:Esther.Takaluoma@kamk.fi)

0442543266

WaterPRO, -> 31.12.2021	Kiertotalouden uudet prosessit veden ja jäteveden käsittelyssä
kumppanit	OY, JY, KAMK, ylimaakunnallinen rahoitus, Keskipohjanmaa liitto
Budjetti	958 734 €
KAMKin budjetti	398 862 € -> ~67 000 € investointiin
Rahoitus	Jeppo Biogas Boliden <b>Hyxo</b> Norilsk Nickel Isolann Oy/Isofert Oy Kosek
Henkilöstö	Tatiana Samarina, Marjukka Hyyryläinen, Jani Heikkinen, Kai Tiihonen, Antti Kuoppala, Esther Takaluoma



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## Tavoitteet

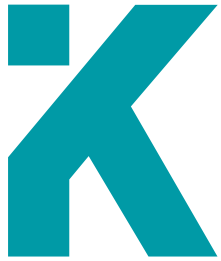
Hankkeessa kehitetään vedenpuhdistusteknologioita teollisuuden jätevesien **puhdistamiseen ja arvoaineiden, kuten metallien ja ravinteiden, talteenottoon**. Tämä mahdollistaa kiertotalouden soveltamista, tukee vähähiilistä yhteiskuntaa, mahdollistaa uutta yritystoimintaa, parantaa jo olemassa olevien yritysten liiketoimintaa sekä luo uusia työpaikkoja.

Konttiratkaisu, pilotointi, 2 vedenpuhdistuslinjaa, taloudelliset laskelmat

# Teollisuuden sivuvirrat vedenpuhdistusaineiksi

- Tutkimuksissa käytetyt raaka-aineet:
  - masuunikuona
  - muut terästeollisuuden kuonat (JV- ja LD- kuonat)
  - metakaoliini
  - muut luontaisesti esiintyvät savimineraalit
  - analsiimi
  - zeoliitit
  - lentotuhkat
  - rikastushiekka
  - jarosiitti

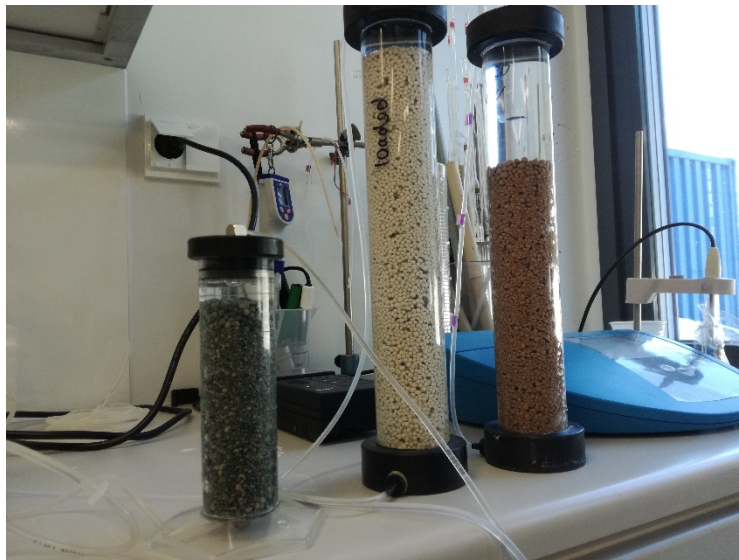




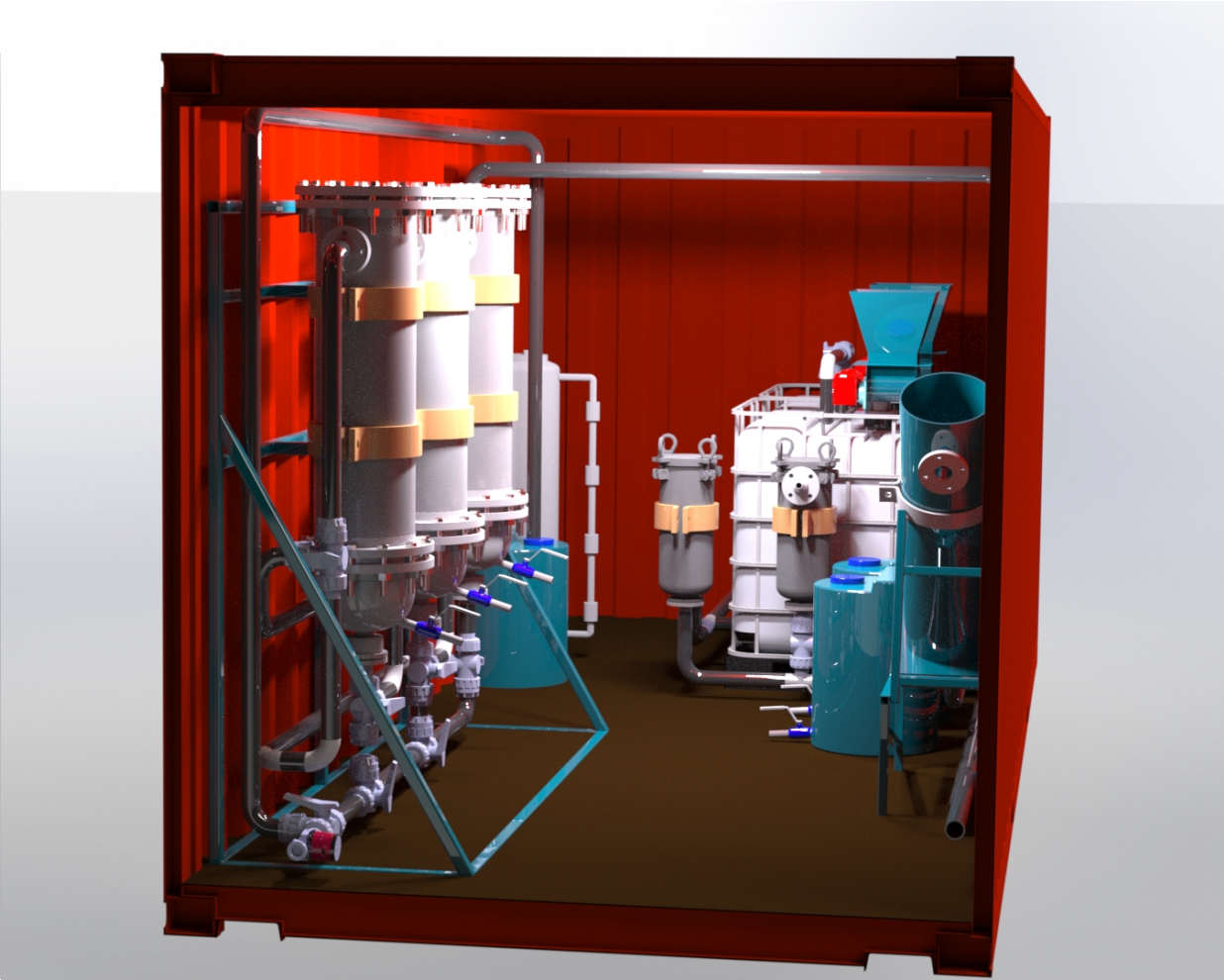
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# Arvoaineiden talteenotto jätevesistä

- Arvokas materiaali (akkukemikaaleja; Cu, Co, Ni)
- Energiarikas materiaali (ammonia)











Euroopan unioni  
Euroopan aluekehitysrahasto

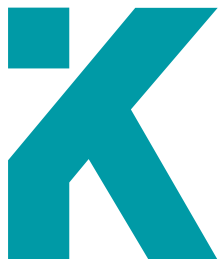
Vipuvoimaa  
EU:lta  
2014–2020



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Elinkeino-, liikenne- ja  
ympäristökeskus



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# RAVE – Rakentamisen vähähiiliset energiaratkaisut

**Hankkeen tavoitteena** on rakentaa tietä kohti vähähiilistä ja resurssitehokasta yhteiskuntaa edistämällä uusiutuvien ja innovatiivisten energiantuotanto- ja varastointimuotojen käyttöönottoa rakentamisessa.

**Osatavoite 1:** Kerätä tietoa rakentamisen yhteydessä toteutettavista uusiutuvan energian ratkaisuista ja suunnitella niiden perusteella Kajaanin kaupungissa sijaitsevan Sammonkaari-korttelin energiaratkaisut.

**Osatavoite 2:** Lisätä paikallisten toimijoiden osaamista vähähiiliseen rakentamiseen ja uusimpiin energiainnovaatioihin liittyen.

<https://www.kamk.fi/fi/Tutkimus-ja-kehitys/Vahahiilisyys-ja-kiertotalous/RAVE>



Euroopan unioni  
Euroopan aluekehitysrahasto

Vipuvoimaa  
EU:lta  
2014–2020



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Elinkeino-, liikenne- ja  
ympäristökeskus

**Toteutusaika:** 1.8.2020 – 30.6.2022

**Rahoitus:** EAKR (Pohjois-Pohjanmaan ELY-keskus)

**Budjetti:** 281 678 €

**Työntekijät:**

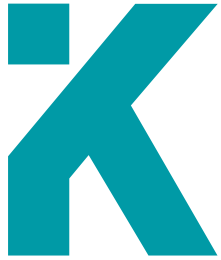
Projektipäällikkö Silja Keränen  
[silja.keranen@kamk.fi](mailto:silja.keranen@kamk.fi)  
044 7100 288

Projekti-insinööri Miia Rönkkö  
[miia.ronkko@kamk.fi](mailto:miia.ronkko@kamk.fi)  
040 573 6455

Viestintäassistentti Jaana Salo  
18.1.2021 alkaen

Talousvastaava Päivi Kyllönen





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# RAVE - käytännössä

- Tehdään Sammonkaari-kortteliin energiasuunnitelma
  - Juuri valmistumassa, tarkistuskierrös talvikauden 21-22 aikana
- Tehdään rakentamisen vähähiilisyyden arviointi Sammonkaareen
  - Ympäristöministeriön ja Green Building Council Finland:n kehittämällä menetelmällä
- Kartoitetaan uusiutuvan energian tuotannon mahdollisuudet kiinteistöjen yhteydessä
- Seminaarit ja asiantuntija-artikkelit
  - Tuleva seminaari: aurinkoenergiasta 28.4 klo 9-12
- Viestitään aiheista aktiivisesti
  - Uutiskirje. Haluatko postituslistalle? Kerro Outille tai Siljalle, niin lisätään 😊

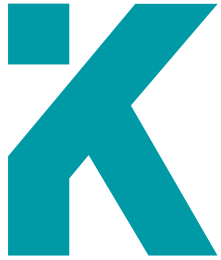




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# SUSWAM Project summary

- **Objective is to reduce waste-based harmful effects on environment in Kainuu and Karelia, achieved by improving waste sorting and processing.**
- Project activities include
  - to benchmark current waste management practices in Karelia and Kainuu (WP1)
  - to create operating models for sorting of municipal solid waste and for collecting and treatment of valuable waste and hazardous waste in Kostomuksha (WP2).
  - to create infrastructure (asphalted sorting ground) that enables sorting and recycling of waste in Kostomuksha (WP3)
  - to develop hazardous waste treatment in Kajaani by analyzing fractions of incinerator ash to determine possibilities for its further use and disposal (WP4)
  - to increase project impact in the Karelia CBC Programme area by dissemination and communication with stakeholders (WP5)
- More info: **<https://www.kareliacbc.fi/en/projects/sustainable-waste-management-karelia-and-kainuu-ka10013>**



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# Project Summary

- Project duration 1.12.2019 – 31.10.2022
- Project partners: Ekokymppi, Entrinki, Kostomuksha City Administration, KAMK, OOO MSA, RK Water & Ecology
- KAMK staff: Tatiana Samarina, Marjukka Hyyryläinen, Anu Martikainen
- Project duration 1.12.2019 – 30.11.2022
- Budget 476 364 euros

## KARELIA

CBC // Cross-border cooperation





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