SLUDGE DEWATERING AND NUTRIENT RECYCLING

Harry Piirainen

Eco WWS Ltd

31.8.2020

CV

Russia

- St. Petersburg South-West Waste Water Treatment Plant; Helsinki Water & St. Petersburg Vodokanal
- Modernization of Manure Processing Lines for Three Pilot Livestock Farms in the Leningrad Region
- Dubna Waste Management System Development
- Financing Options for North-West Water Utilities in Russia
- Archangelsk Municipal Services Development Project
- Vodokanal Rostov-on-Don Financial Performance Project

Other Water Supply & Waste Water Treatment Projects Abroad

- Bosnia & Herzegovina, China, Egypt, Estonia, Kosovo, Palestine, Sri Lanka, Tanzania, Turkey, Ukraine, Vietnam

Operation of the Wastewater Treatment Plants

- Kemwater **S**ervices/Kemira (Joint Venture Helsinki Water & Kemira)
- Veolia Water

Current Tasks

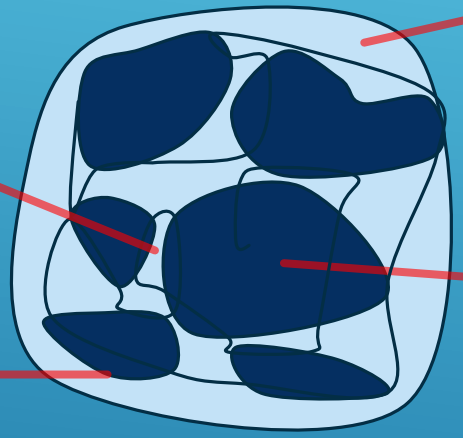
- Eco WWS Ltd (2018 -)
- European Commission - SME Instrument under Horizon 2020 (2014 -)
- EBRD, Advisor (2020 -)

WATER IN SLUDGE

With current sludge treatment techniques, only free water can be removed, leaving a dry matter content of 10-30%.

Capillary Water
-bound to sludge blocks

Free Water



Absorbed Water
- On the surface of solid particles

intracellular Water

The Eco Pro technology removes intracellular water, absorbed and capillary water, resulting in a dry matter content of up to 40-70%.

1. **TREATMENT BY HIGH ULTRASOUND TECHNOLOGY**

- Filamentous bacteria that strongly interfere with water separation can be digested and re-flocculated after digestion
- The walls of the cell can be broken or weakened so that the water inside the cell can be accessed.

2. **WATER REMOVAL IS ENHANCED WITH ELECTROKINETICS**

- Absorbed and capillary water can be efficiently removed from the sludge by means of electro kinetics, resulting in a dry matter content of up to 40-70%.
- The resulting fines are controlled by double-sided dewatering, which is further enhanced by electro kinetics, while preventing clogging of the filter material.

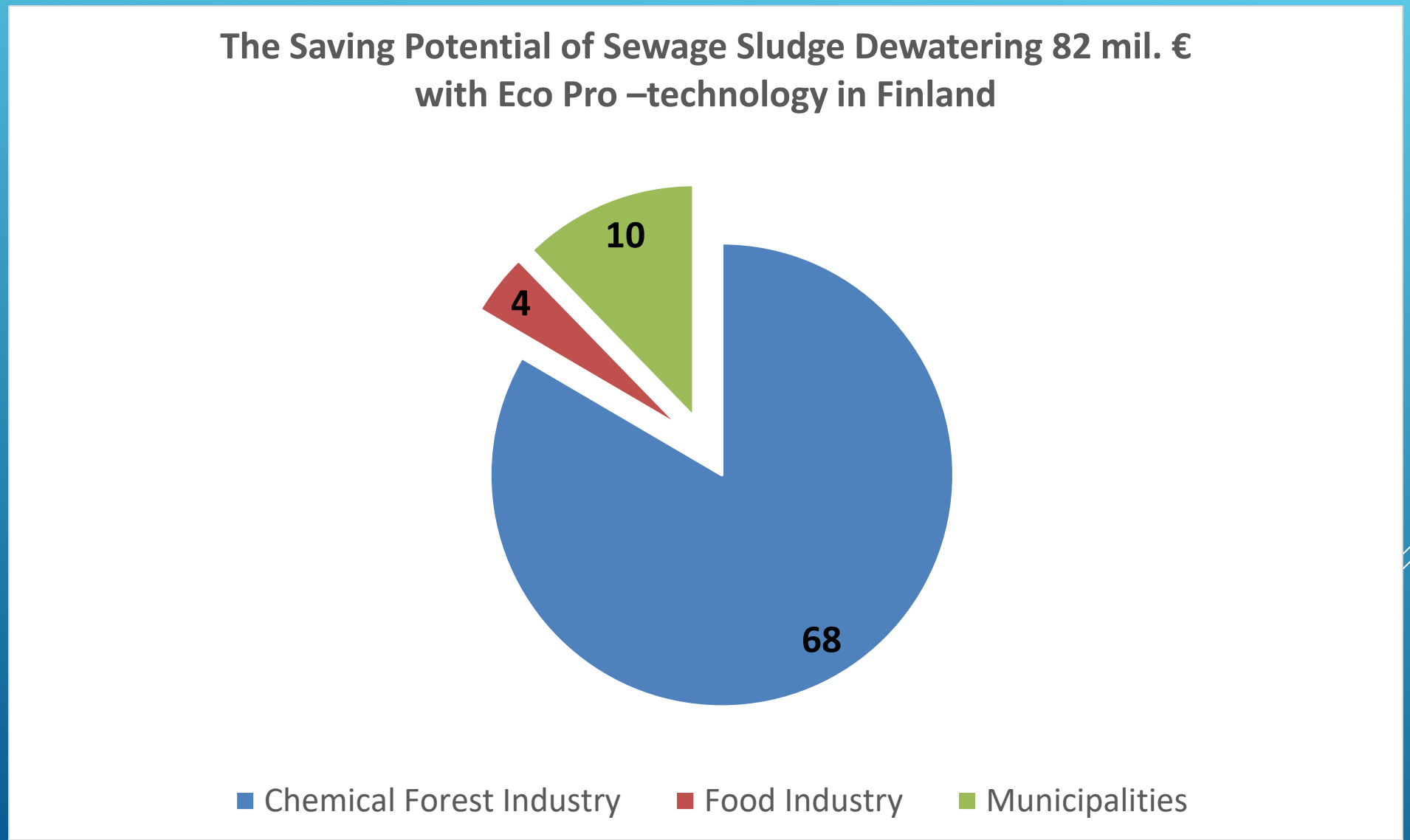
BENEFITS OF ECO - PRO TECHNOLOGY

- Transport costs to the sludge disposal site are reduced
- Port charges for a biogas plant, composting or other disposal site are reduced
- The calorific value of sludge increases (forest industry)
- The increase in the dry matter content of the sludge enables new recovery and nutrient recycling sites
- Wastewater treatment plant capacity increases (no unnecessary internal circulation)
- Contamination of process equipment is reduced and service life is increased
- In the nutrient-poor wastewater of the forest industry, treated sludge / dryer reject water can be used as a nutrient source (nutrients in soluble form)
- Reduction of chemical consumption
- Nitrogen removal becomes more efficient, potentially avoiding significant investments
- Hygiene is more efficient
- Energy production from biogas plants will become more efficient
- Heavy metal removal becomes more efficient

ECO PRO TECHNOLOGY ENHANCES SLUDGE UTILIZATION AND NUTRIENT RECYCLING

- Fertilizer production (improving hygiene)
- Replacing purchased chemicals with an internal nutrient cycle in a wastewater treatment plant
- Improving biogas production
- Cooperation with South-Eastern Finland University of Applied Sciences (XAMK) and Lappeenranta - Lahti University of Technology (LUT)

BUSINESS IDEA AND EARNINGS LOGIC



THE CURRENT STATE OF ECO - PRO TECHNOLOGY

- Runar Bäckström Foundation Grant 1.2019
- Patent Application 11.2019
- Pilot Site Search and Funding