

JVP-EURA OY

Waste Water Treatment Plant

Managing effluents from varying industrial sources

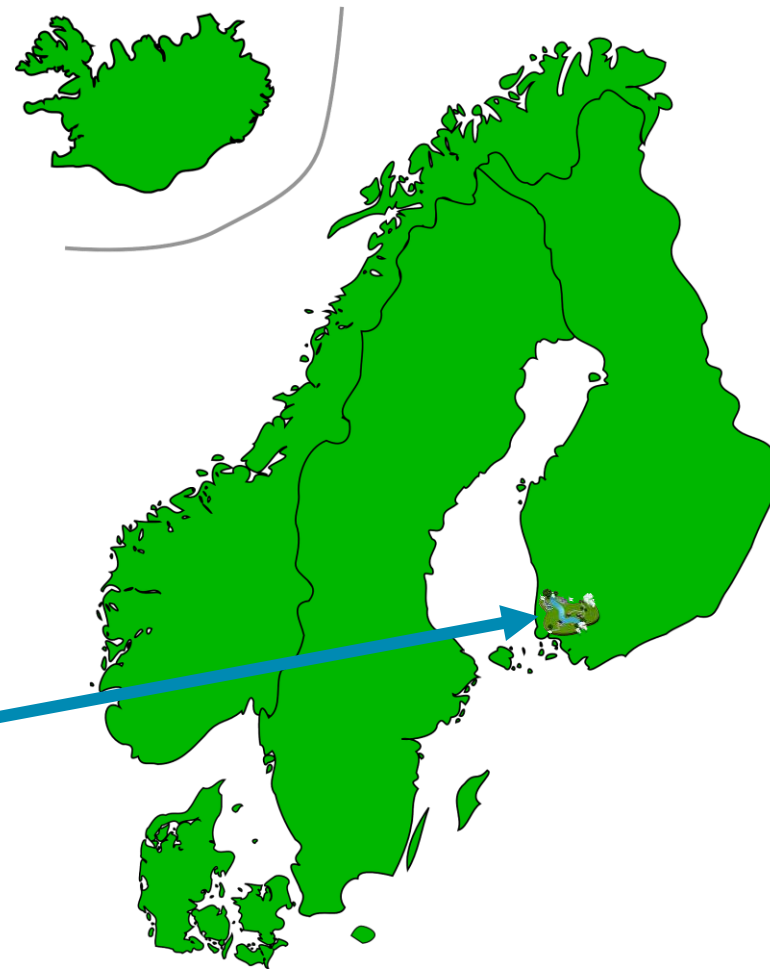
Pirjo Patala, JVP-Eura Oy
BEST-Riga 3.4.2019



JVP-EURA
Euran jätevedenpuhdistamo

JVP-Eura WWTP

- Eura is a small town situated in western Finland by the river Eurajoki, which flows to the Gulf of Botnia.
- River Eurajoki is a small river with low flow and is in the middle of countryside with recreational activities fishing, swimming, paddling, canoeing



Company JVP-Eura Oy = Eura and Jujo Thermal WWTP



Combined WWTP in
Finland by the river
Eurajoki

2018:

PE = 30 000

Treated WW 2,3 M m³

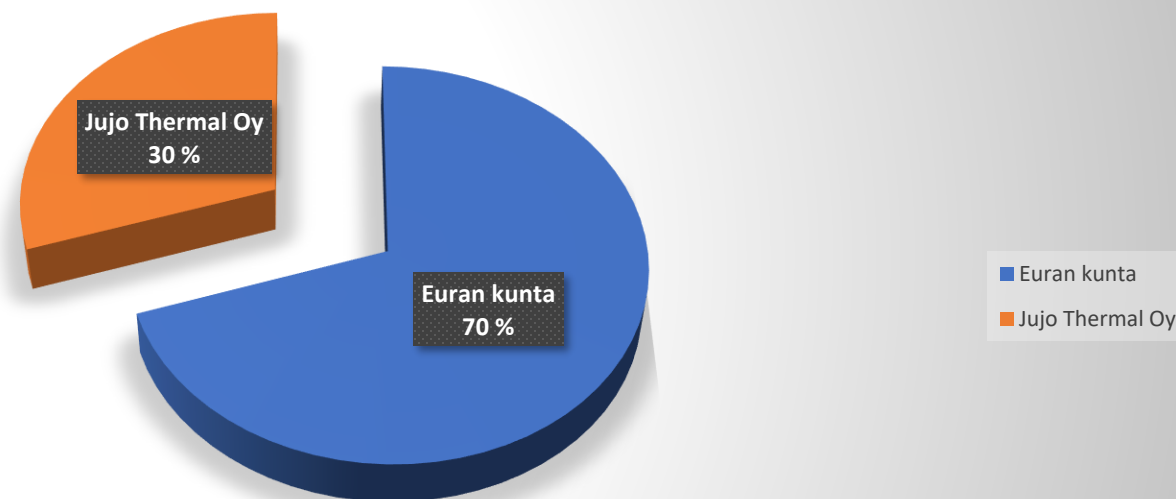
- Eura 30%
- Jujo Thermal 70%



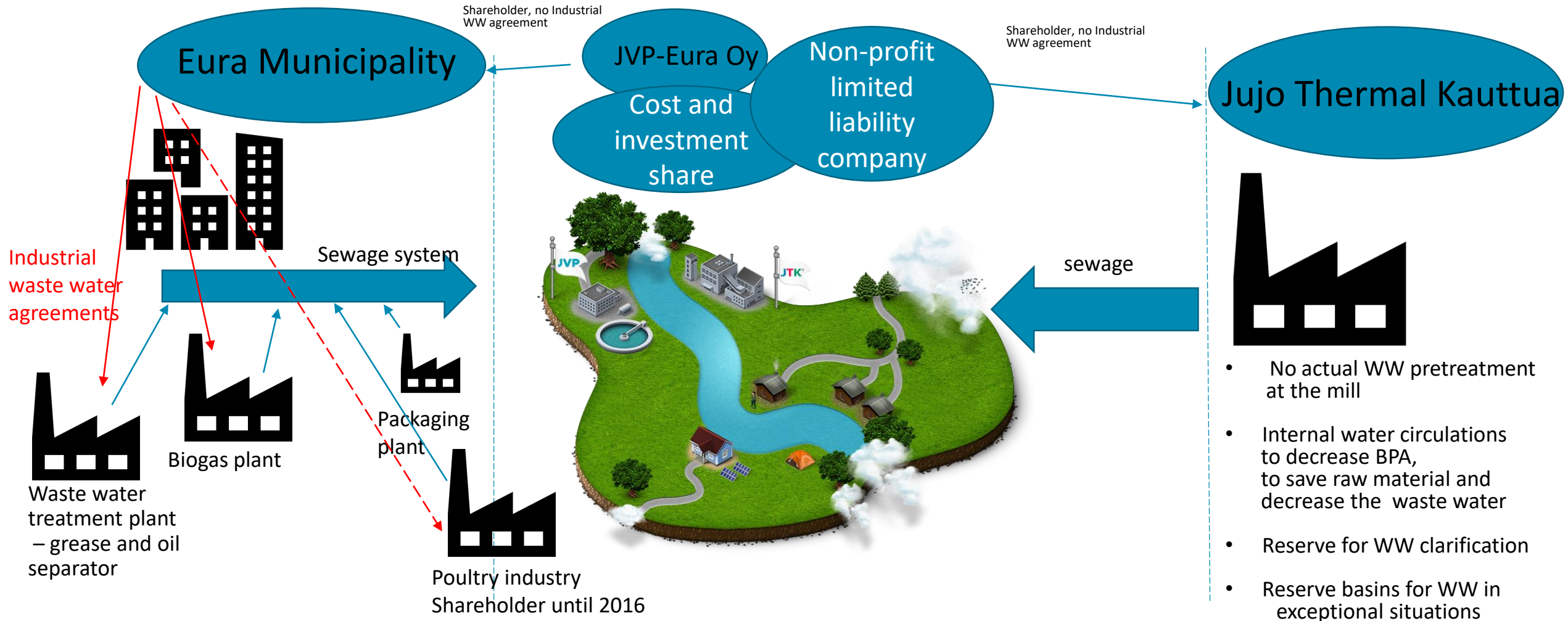
The company and shareholders of JVP-Eura

- Cooperative company between Eura Municipality and private company Paper Mill Jujo Thermal
- **Non-profit limited liability company**
The owners are the customers of the company
- Cost of the waste water treatment is shared by flow and load

Shareholders



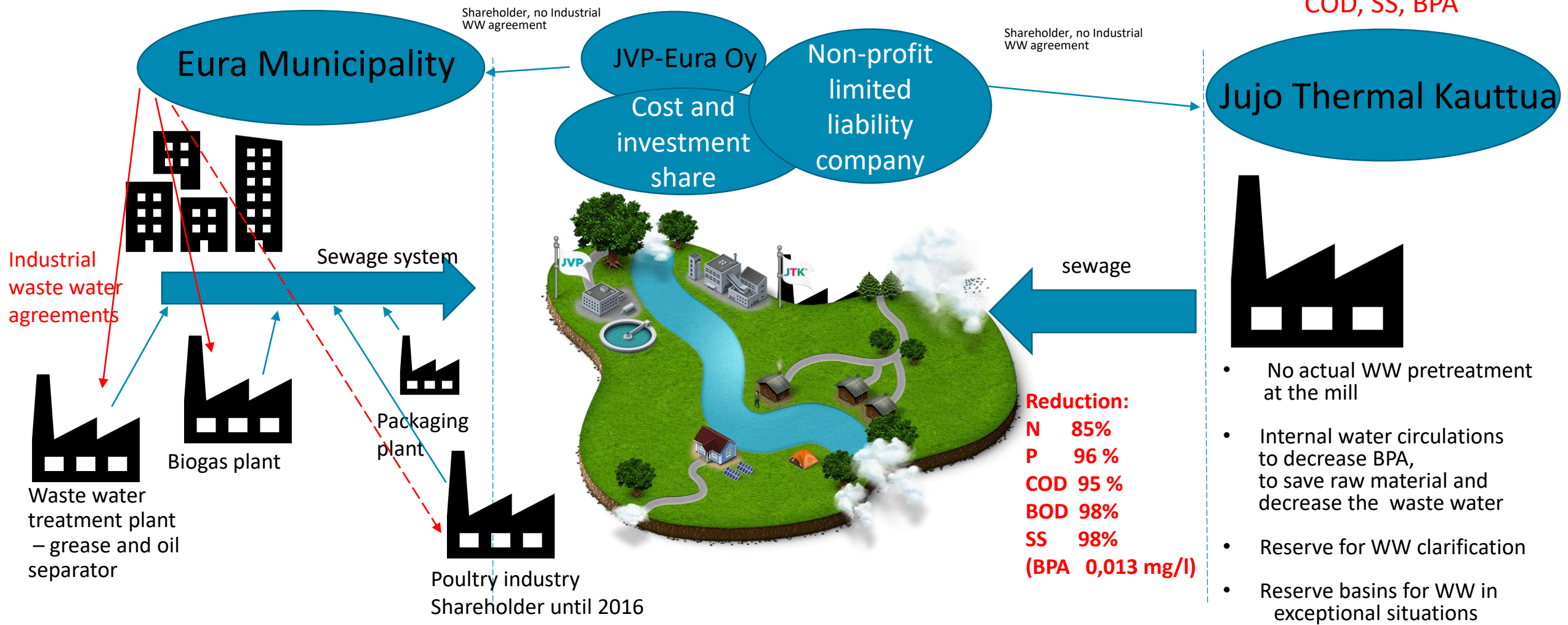
Operation model JVP-Eura Oy



Effluents and effectiveness 2018

N, P, BOD, COD

COD, SS, BPA



Load to WWTP and discharges 2018

Inlet

Flow	6300 m ³ /d	
		%%
	mg/l	Eura/JTK
N	43	94/6
P	3,3	90/10
COD	980	36/64
BOD	330	52/48
SS	800	24/76



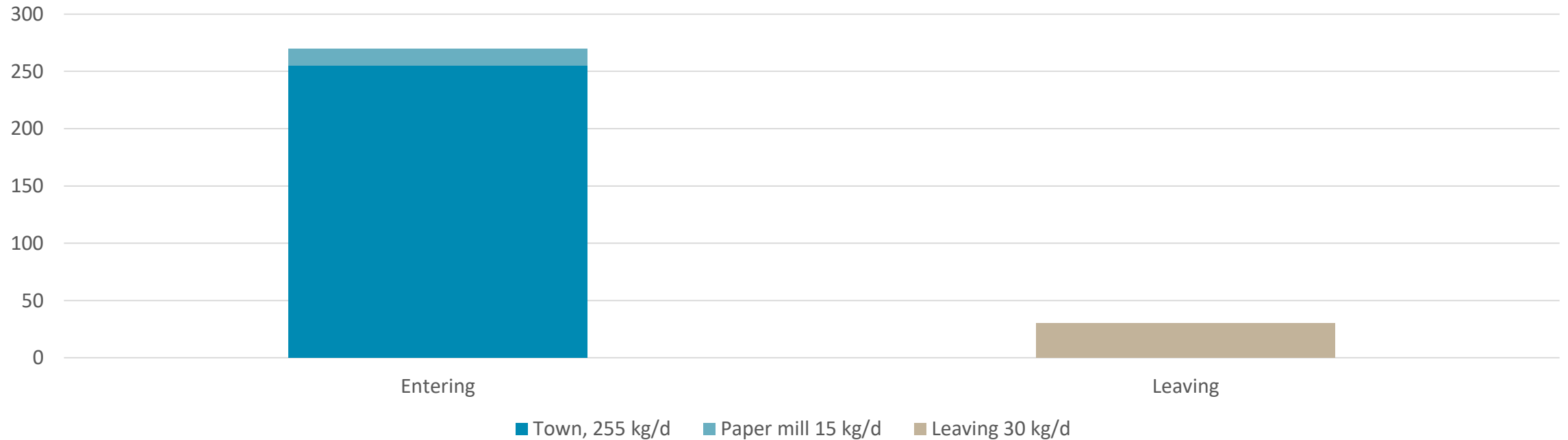
Discharge

	mg/l(permit)	red.	kg/d
N	6,3 (15)	85%	40
P	0,14 (0,3)	96%	0,89
COD	56 (100)	95%	350
BOD	7,5 (15)	98%	47
SS	19 (15)	98%	120
*BPA	0,013(0,02)		0,082

*target

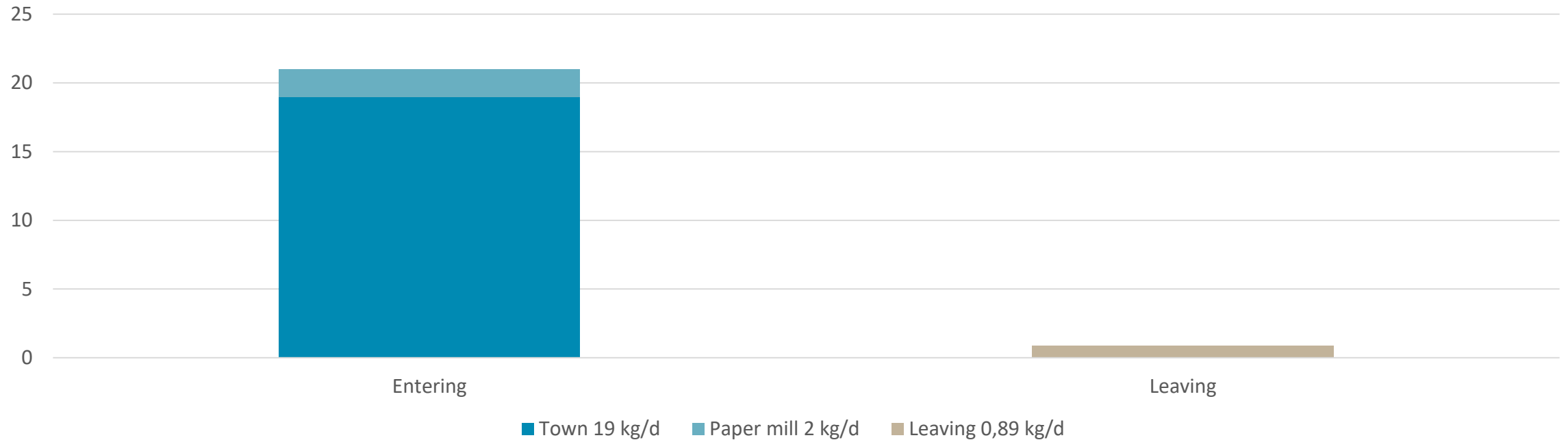
Nitrogen reduction kg/d, entering and leaving

Temperature in nitrification 17-36°C
Nitrogen reduction 85%



Phosphorous reduction kg/d, entering and leaving

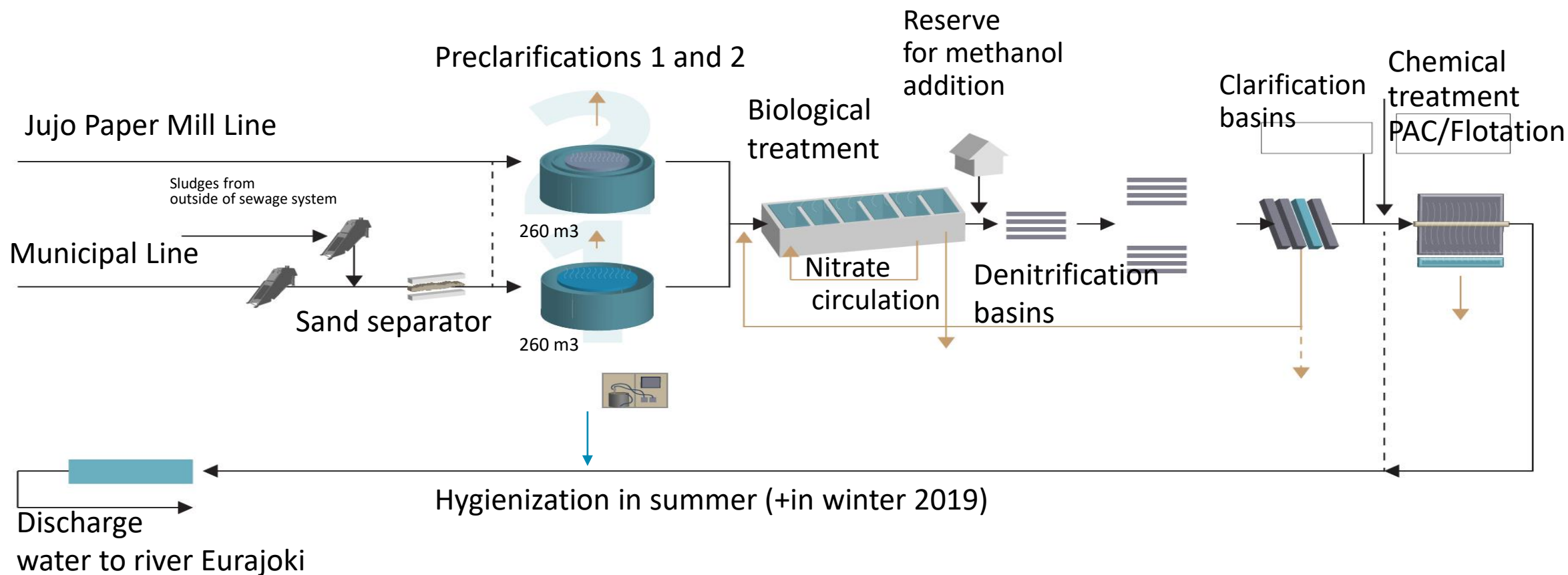
Temperature in Nitrification 17-36°C
Phosphorus reduction 96%



JVP-Eura active sludge process



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Combined WWTP +/-

- **Benefits ++**

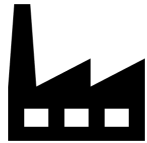
- Nitrification temperature 24°C (17-35°C) and pH 7,5-8 are optimal ++
- The nutrients from municipal are used for the need in paper mill waste water biological reactions → No carbon or nutrient addition in paper mill ++
- Phosphorous is mostly removed biologically – P removal is finished in flotation chemically → high P removal ++

- **Challenges ++**

- Variations in flow and load of two very different flows → peaks and control of the system and biology --
- Disturbance situations in process and difficulties in problem solving -
- Administration of municipal and private owned limited liability company - Industrial WW agreements and the agreement parties --
- Cost sharing between shareholders--

- Sludge treatment of two different sludges (together, separate, equipment?) +-

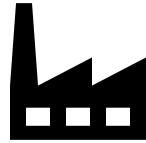
Effluent load and share of various industry (monitoring)– inlet to WWTP 2018



Paper Mill
68% from the total flow

COD 64%
BOD 48%
N 6%
P 10%
SS 76%
BPA (measured only from leaving WW from JVP-Eura)

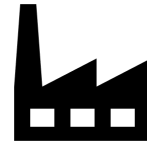
Owner, no agreement for quality of WW



Poultry Industry
11% from the total flow (2017)

*N 13,5%
P 5%
BOD 1%
COD 2%
SS 2%
*Grease <10%

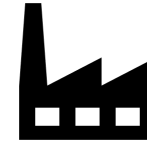
Former owner, agreement for quality of WW
(Operations moved to the new production plant in the end of 2018, loading values from year 2017)



Biogas Plant
0,9% from the total flow

*N 24%
P 8,1%
COD 3,4%
BOD 3,5%
SS 0,51%

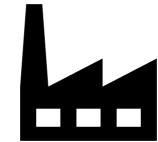
(Production shut-down 2019)
Industrial WW agreement Year 2017



Grease and oil separating plant
0,09% from the total flow

*Grease < 10 mg/l
Oil (Permit accepted, In operation 2020)
BOD 0,067%
COD 0,058%

Industrial WW Agreement 2019



Packaging plant
0,03% from TF

Copper 0,28 mg/l
Chrome 0,083 mg/l

Small flow, no industrial WW agreement

*Load, which is challenging to manage

Performance and environmental permit 2013-2018

2013 (Permit) mg/l

	incl. bypasses
• Solids content	58 (35)
• Nitrogen	20
• Phosphorous	0,79 (0,3)
• Ammonium N	15
• BOD	35 (15)
• COD	110 (125)



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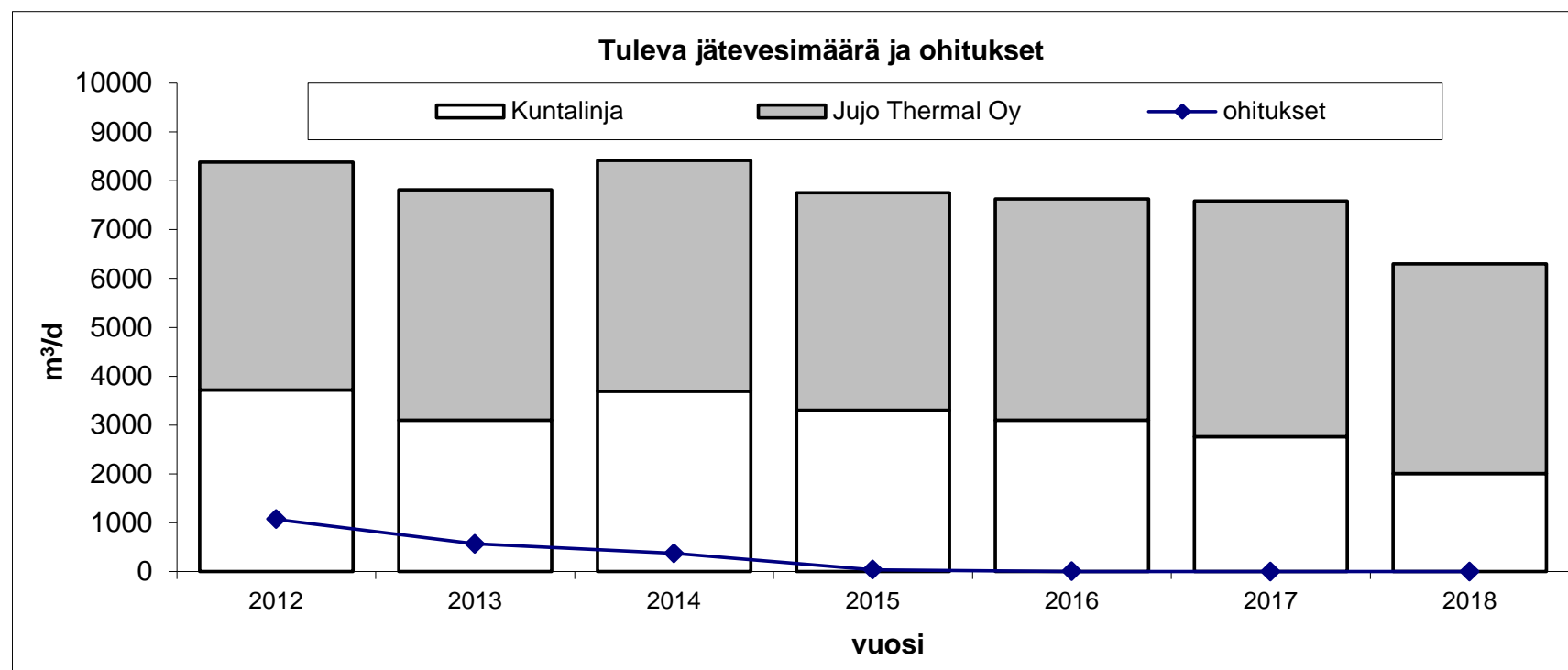
Performance and environmental permit 2013-2018

	2013 (Permit) mg/l	2018 (Permit) mg/l	Reduction %
	incl. bypasses		
• Solids content	58 (35)	19 (15)	98(95)
• Nitrogen	20	5,9 (15)	85(75)
• Phosphorous	0,79 (0,3)	0,14(0,3)	96(90)
• Ammonium N	15	2,6 (5)	85(75)
• BOD	35 (15)	7,5 (15)	98(90)
• COD	110 (125)	56 (100)	95(80)
	BPA	0,0013 (0,02)	
	Hygienization	(Kemira Desinfix during 1.5-31.10)	
	Fecal coliformic	1528 (<2000 pmy/100 ml)	
	Fecal enterococcus	522 (<500 pmy/100 ml)	



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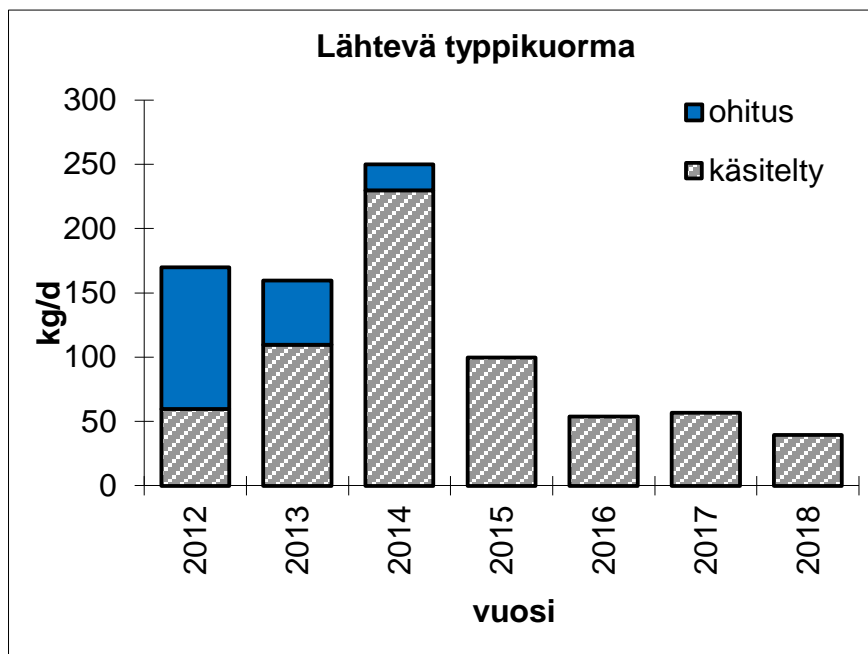
Inlet waste water and bypasses 2012-2018



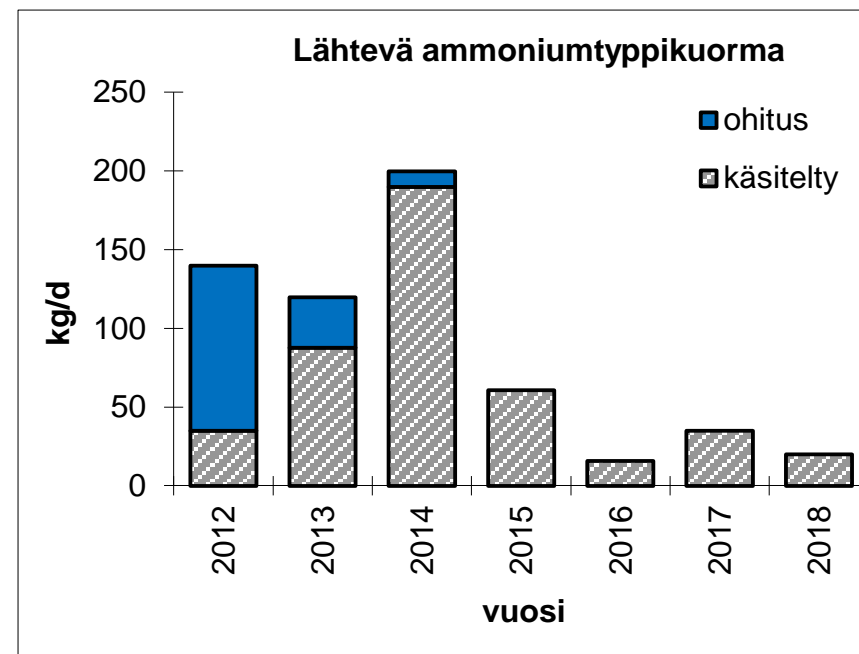


Discharges 2012-2018

Nitrogen

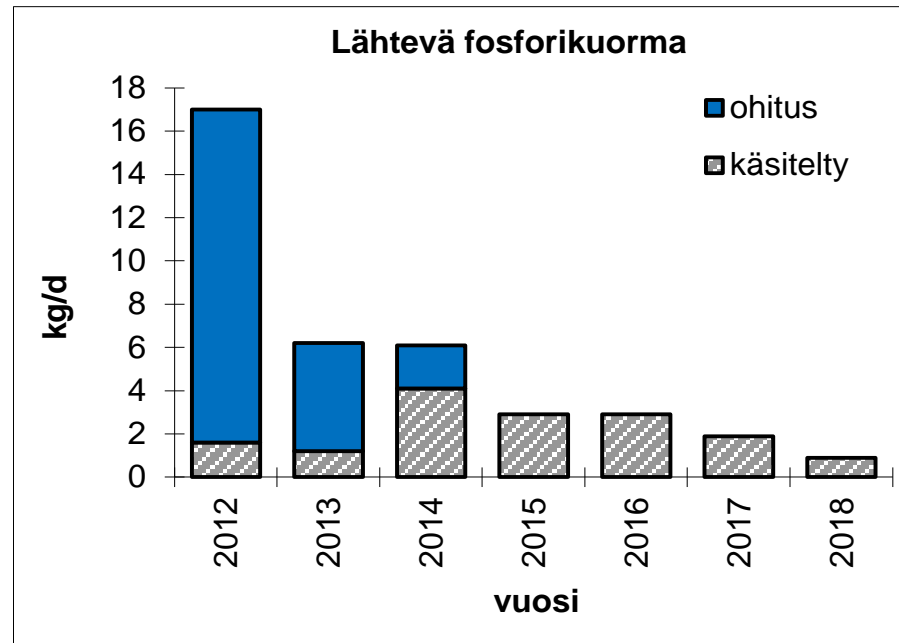


Ammonium N

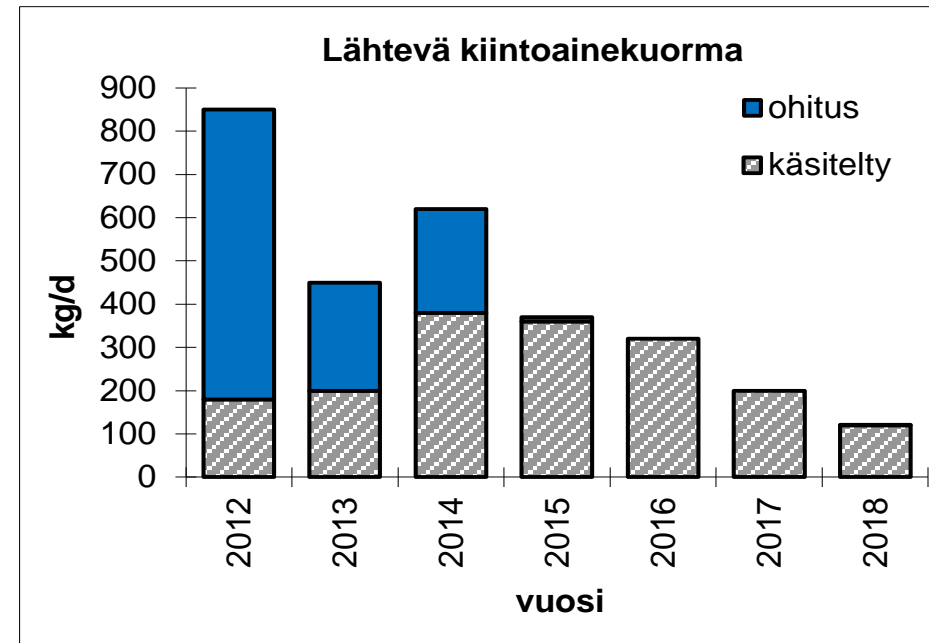


Discharges 2012-2018

Phosphorous

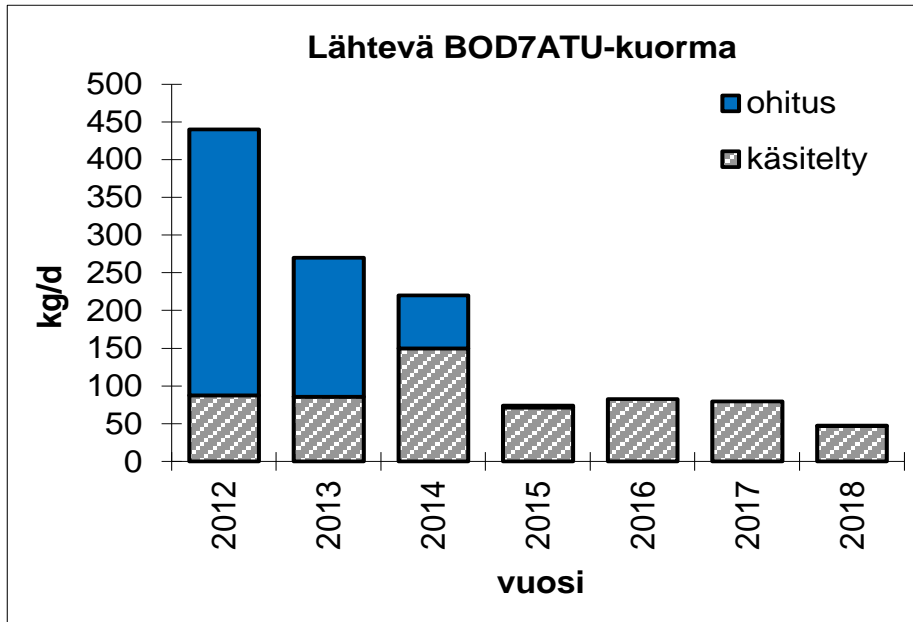


Suspended Solids

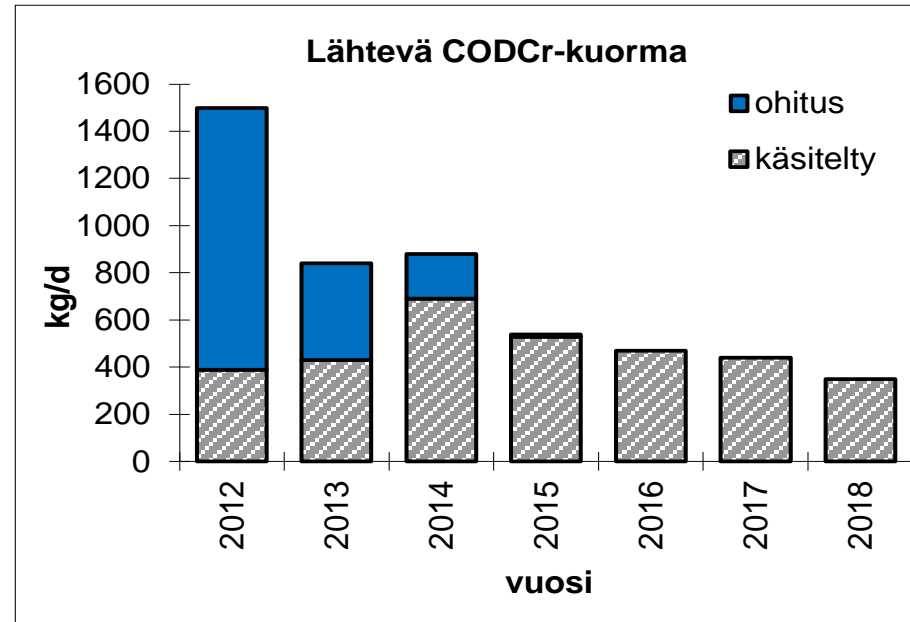


Discharges 2012-2018

BOD7ATU



CODCr



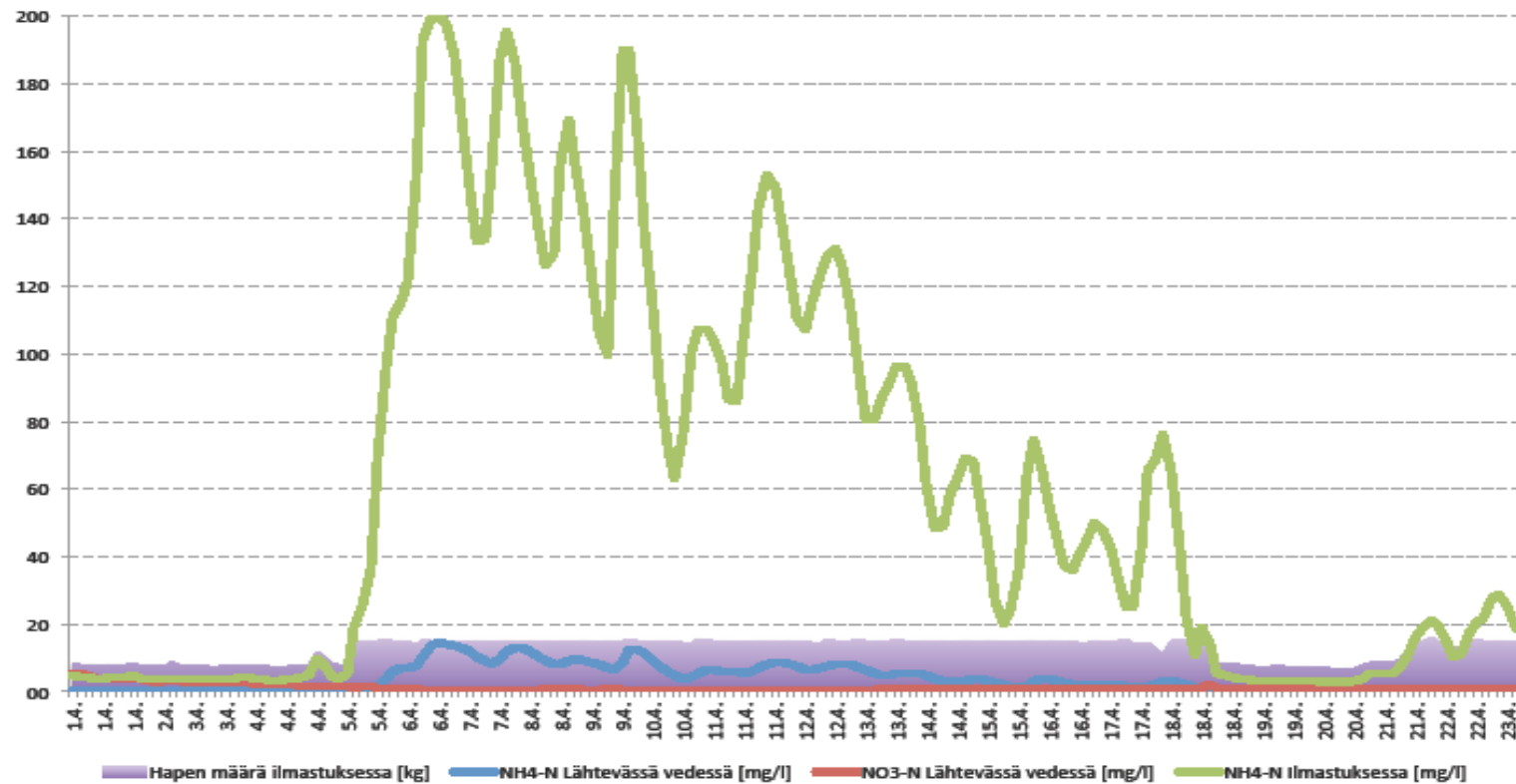
Investments and improvements 2013-2018 (8 MEUR)

- Expanding the biological treatment
- Methanol station
- Hygienization
- New automation and electrification, reserve power
- Equilizing inlet pumping by increasing pumps
- Eura municipality has renovated the sewage system yearly
- Aeromatic system to control aeration for better managing the nitrogen load



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Aeromatic system



- Aeromatic system controls the aeration basins and air amount according to inlet ammonium load.
- Reacts fast to ammonium peaks and minimizes breaks in biology.

Challenging operation

- Very high ammonium load from biogas plant, can be 4X more than regular municipal WW – load is almost regular rather than exceptional
- High flow variations from municipal line - too high hydraulic load
- Grease disturbs process and biology very often, almost regular
- Process can be managed, but:
 - Sludge escapes easily, hydraulic load is occasionally too high
 - Sludge volume needs to be in low level → Sludge retention time is low.
 - Process very sensitive – needs attention!

Co-operation with stakeholders

- Eura has signed **Industrial WW agreements** with Biogas plant and Process Water treatment plant.
 - WWTP has **meetings** with the industrial companies always in problem situations to increase the awareness. **Contact with biogas plant is almost daily**
 - **Remote control** in biogas plant flow
 - **2016 Trouble-shooting with a consultant** (with all parties)
- Process Improvements in the industry to decrease the load to WWTP (for example improved water circulations in industry).

Other actions for co-operation

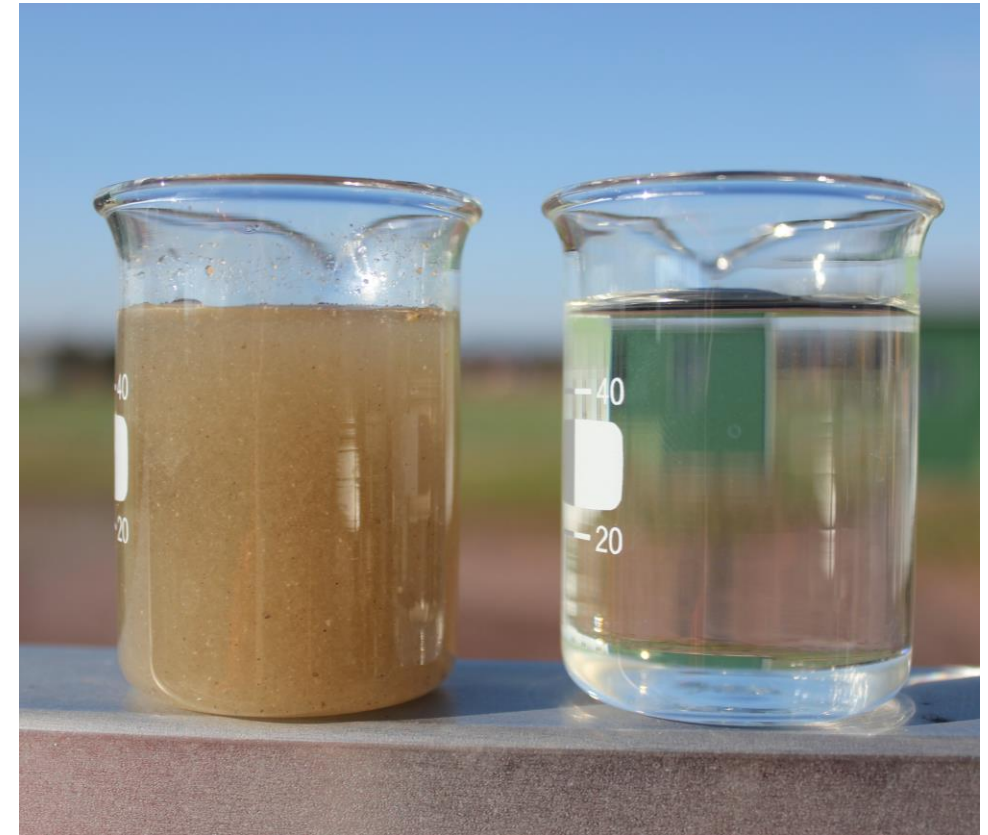
- JVP-Eura Oy is participating in local environmental projects
 - Pyhäjärvi-institute JOKI-program (RIVER-program)
 - Renovation plan for water environment in river Eurajoki and increase fish population by planting certain fish species (JVP-Eura, VARELY and PJI)
 - JVP-Eura total funding 50 000 Eur/year 3 year program
- Purpose is to improve the recreational use of river especially fishery and fishing.



Kuva: Pyhäjärvi-instituutti

Performance and environmental situation today

- Under normal conditions discharge water is very good quality. Discharge water is clear, odorless and nutrient discharge is low.
- On-going permit process: Due to earlier bypasses and high discharge load, authorities (permit) have required JVP-Eura and 2 other WWTP's in the area.
 - to move the discharge pipe of to another water, which can better receive the discharge water (costs 38 Meur, JVP-Eura share 15 Meur)
 - or still improve the process and cut the discharges.
- Local community is strongly supporting for moving the discharge pipe away from the area despite the high price tag.



Incoming waste water

Discharge water

Future Plans for better effectiveness

Plans

- SSP Sanitation safety Plan 2019
 - Contingency Plan
 - Long term investment Plan

Coming investments

- Emergency and equalizing basins 2019-2020
- Hygienization all year round 2019-2020

Better practices for co-operation

- Aim to have tripartite agreements with monitoring plan (JVP-Eura, Eura municipality, industry).
- Permit level in industrial WW agreements should be minimum what it is in their environmental permit added with the conditions which are supporting the good operation of WWTP
- Regular yearly/half yearly/quarterly meetings with industry to review the situation

A photograph of a wooden pier extending into a body of water, surrounded by tall reeds and a clear blue sky. The pier is made of dark wooden planks and leads towards the center of the frame. The water is calm, reflecting the sky and the surrounding vegetation. The reeds are tall and thin, with feathery heads, and are scattered throughout the scene, particularly on the left and right sides. The sky is a uniform, clear blue. The overall scene is peaceful and natural.

Eurajoki
– towards cleaner waters