Interreg Baltic Sea Region

EUROPEAN UNION
EUROPEAN REGIONAL DEVELOPMENT FUND

VillageWaters

LEITGIRIAI VILLAGE PILOT (LITHUANIA)

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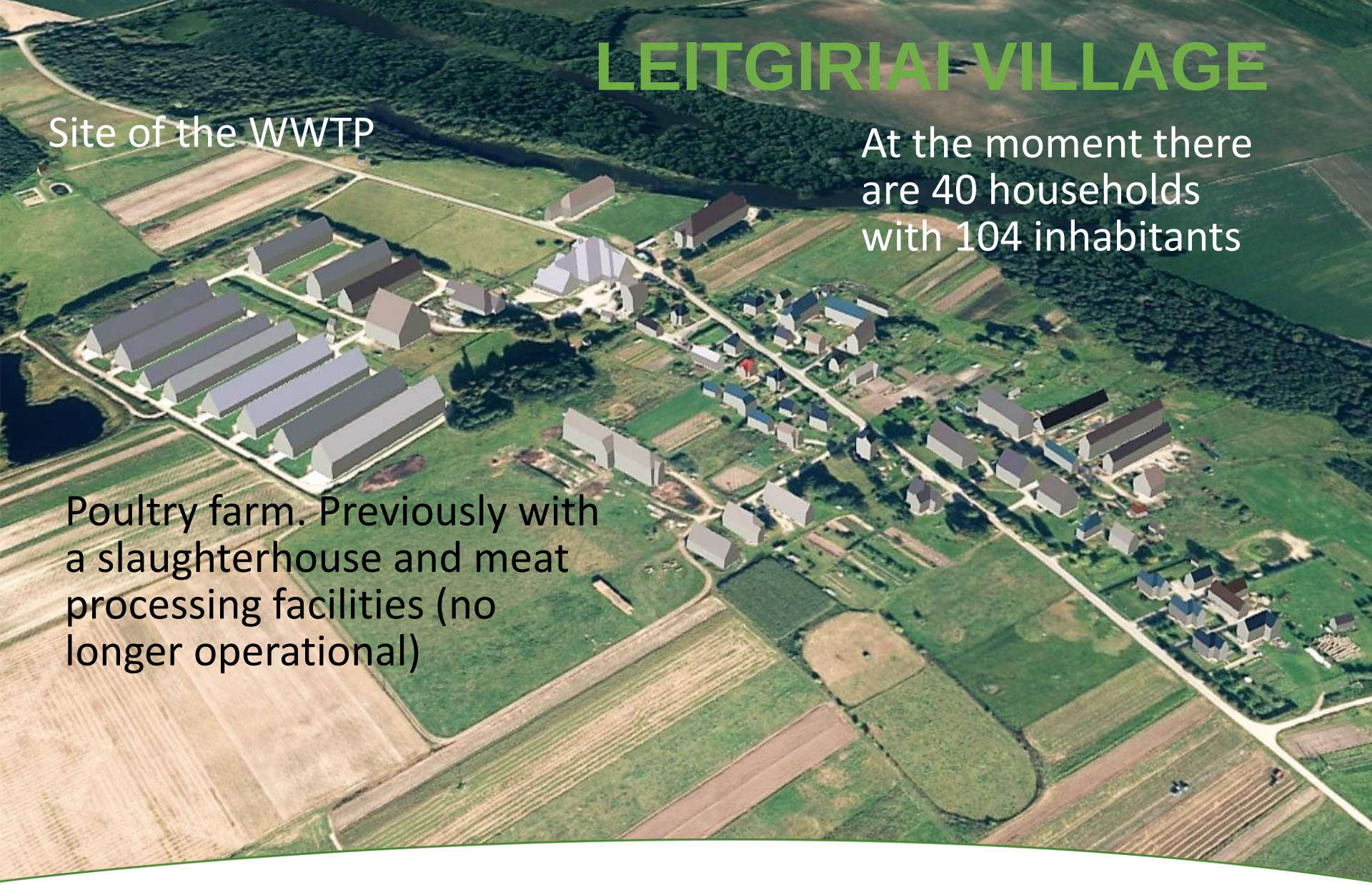
14 03 2018, RIGA

LEITGIRIAI VILLAGE



The old WWTP

Built in 1991m.
Design parameters:
- ✓ Inflow – 200m³/d;
- ✓ PE – 1777.

Discharge into – Leitė

Main problems of the old system I

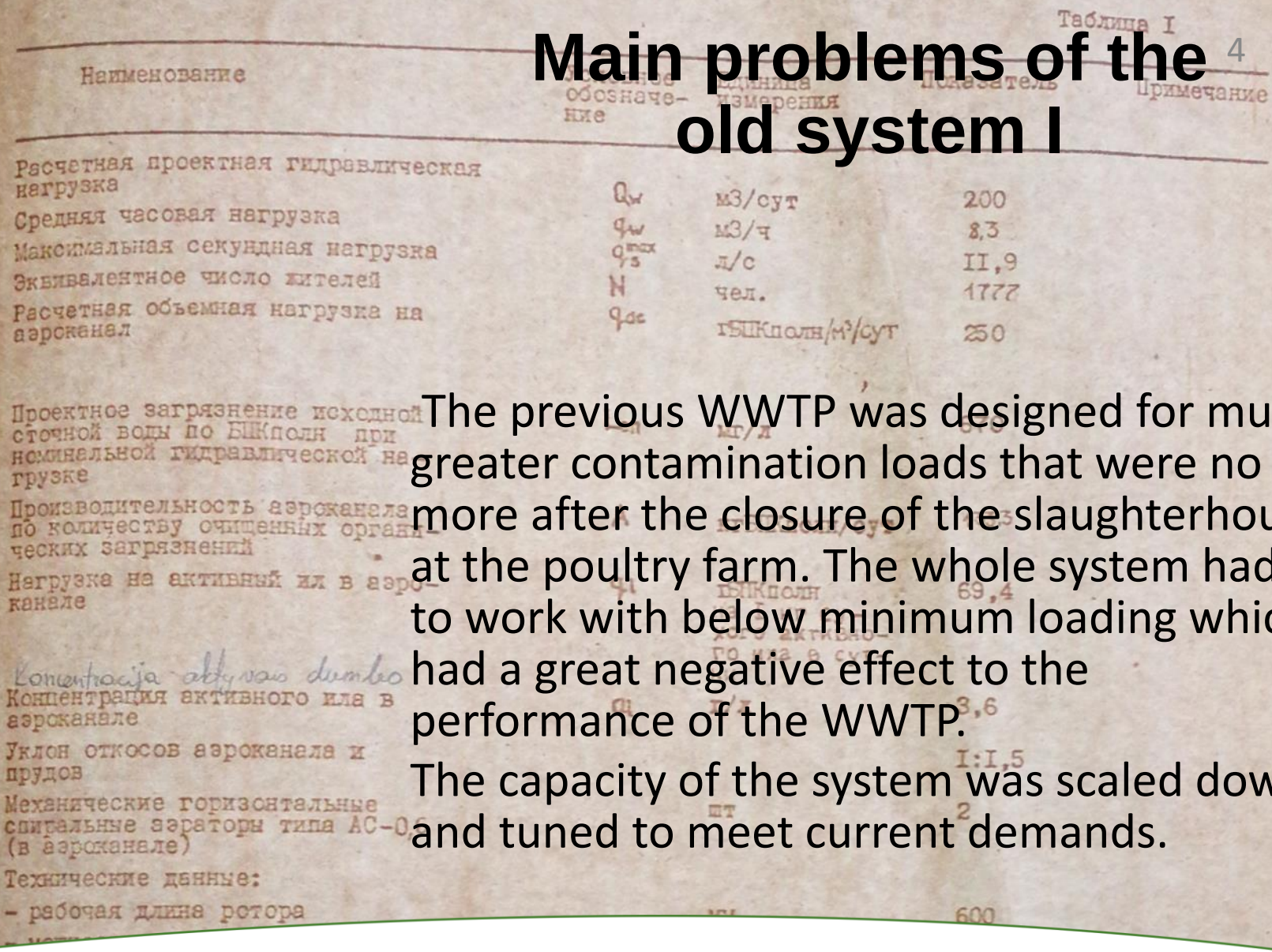


Таблица I

Наименование	Условное обозначение	Единица измерения	Показатель	Примечание
Расчетная проектная гидравлическая нагрузка	Q_w	м3/сут	200	
Средняя часовая нагрузка	q_w	м3/ч	8,3	
Максимальная секундная нагрузка	q_s^{max}	л/с	II,9	
Эквивалентное число жителей	N	чел.	1777	
Расчетная объемная нагрузка на аэроканал	q_{dc}	гБПКполн/м³/сут	250	
Проектное загрязнение исходной сточной воды по БПКполн при номинальной гидравлической нагрузке		мг/л		
Производительность аэроканала по количеству очищенных органических загрязнений				
Нагрузка на активный ил в аэроканале		гБПКполн	69,4	
Концентрация активного ила в аэроканале		г/л	3,6	
Уклон откосов аэроканала и прудов			I:I,5	
Механические горизонтальные спиральные аэраторы типа АС-0 (в аэроканале)		шт	2	
Технические данные:				
- рабочая длина ротора		мм	600	

The previous WWTP was designed for much greater contamination loads that were no more after the closure of the slaughterhouse at the poultry farm. The whole system had to work with below minimum loading which had a great negative effect to the performance of the WWTP.

The capacity of the system was scaled down and tuned to meet current demands.

Main problems of the old system II

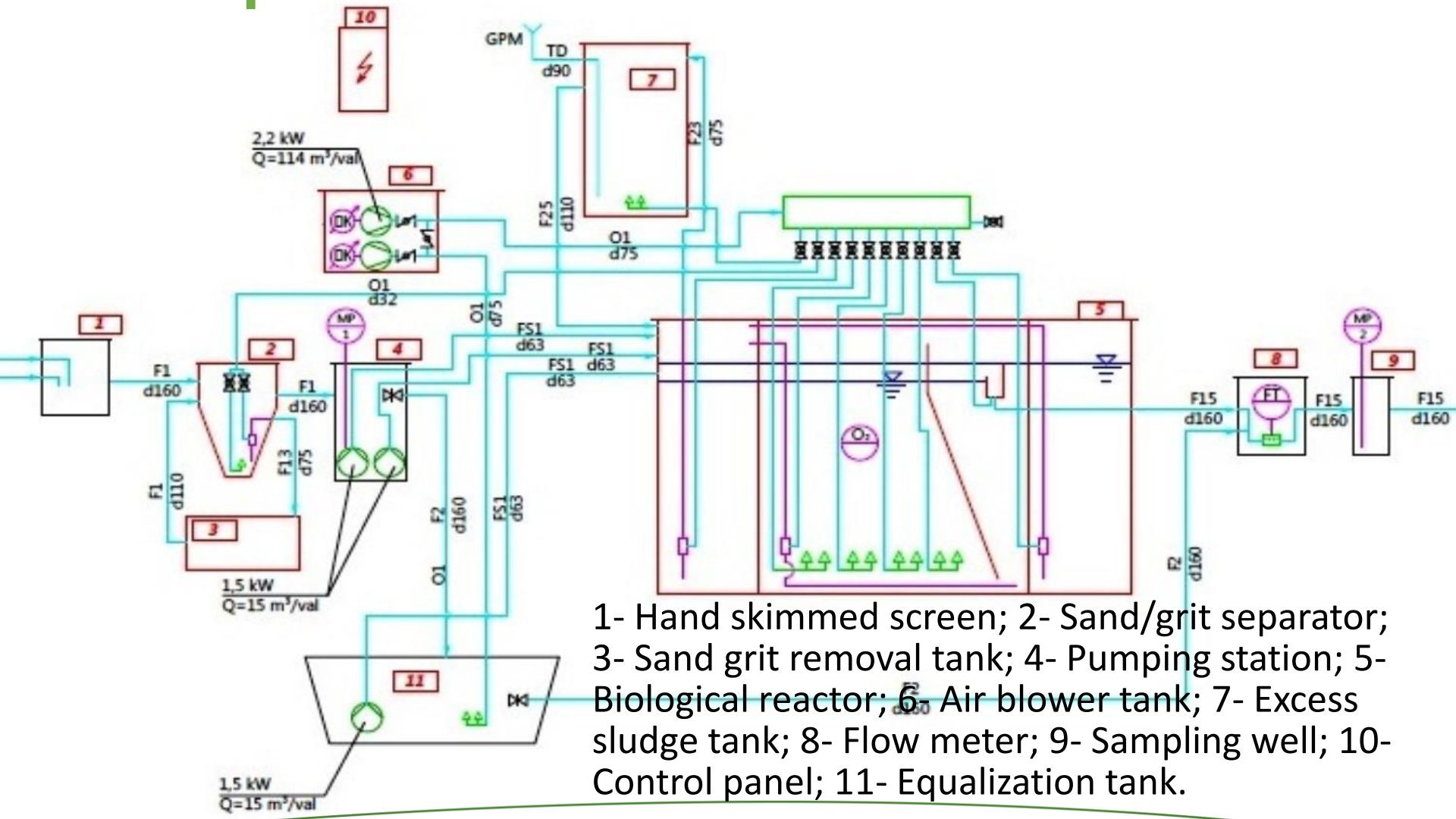
All the treatment steps were open (without covering or insulation) so during the cold season (October - April) weren't operational.

The new system doesn't share this weakness and can sustain stable performance and treatment efficiency.

Main problems of the old system III

The process required constant maintenance and daily visits of the service staff. Changing the operation modes (decantation) had to be done manually.

Composition of the reconstructed WWTP

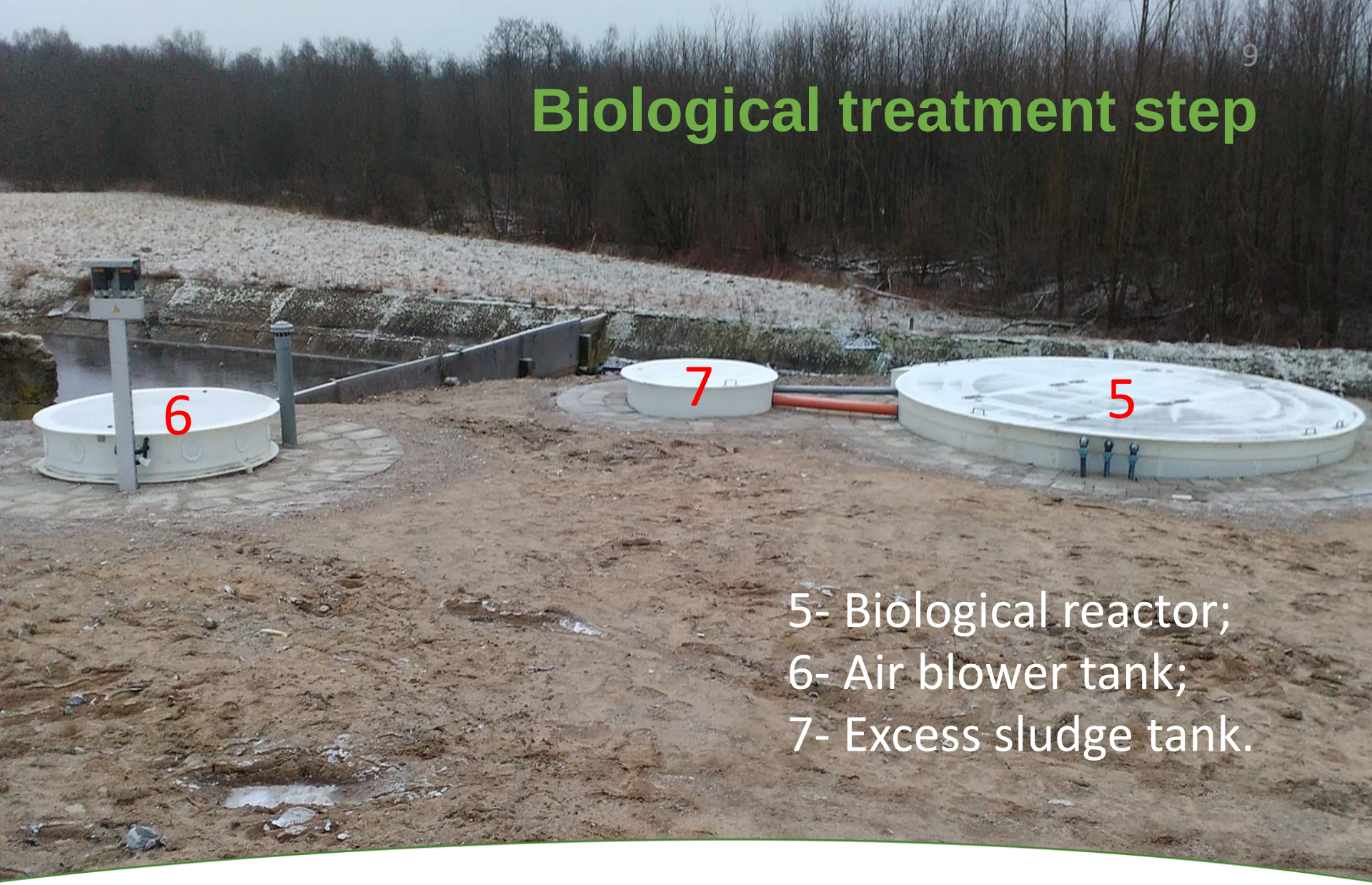


1- Hand skimmed screen; 2- Sand/grit separator; 3- Sand grit removal tank; 4- Pumping station; 5- Biological reactor; 6- Air blower tank; 7- Excess sludge tank; 8- Flow meter; 9- Sampling well; 10- Control panel; 11- Equalization tank.

Mechanical pretreatment

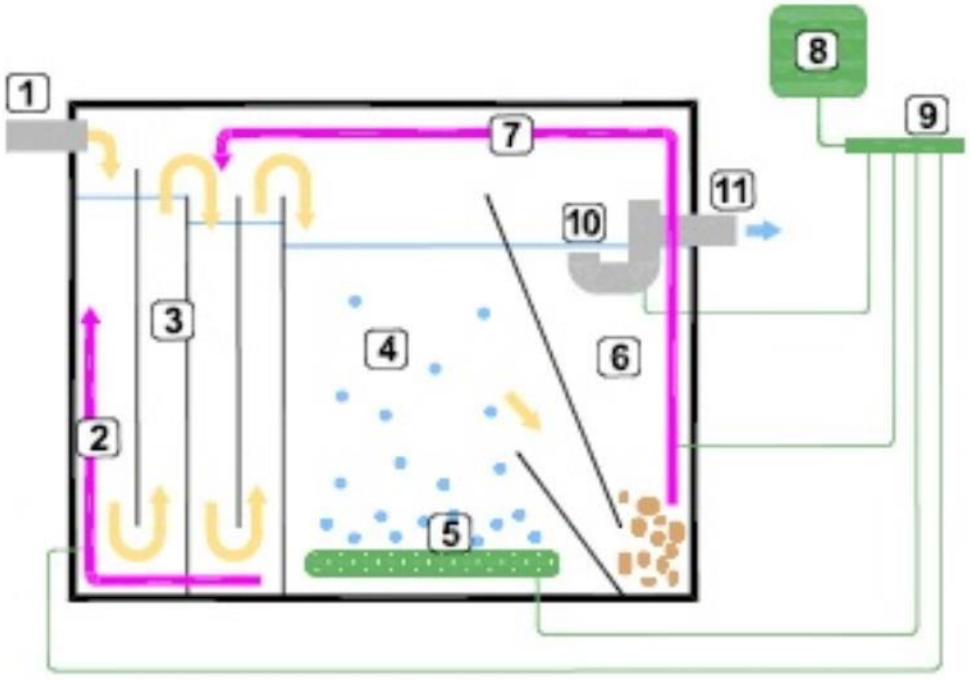
1- Hand skimmed screen;
2- Sand/grit separator;
3- Sand grit removal tank;
4- Pumping station.

Biological treatment step



5- Biological reactor;
6- Air blower tank;
7- Excess sludge tank.

Technological scheme of the biological treatment step

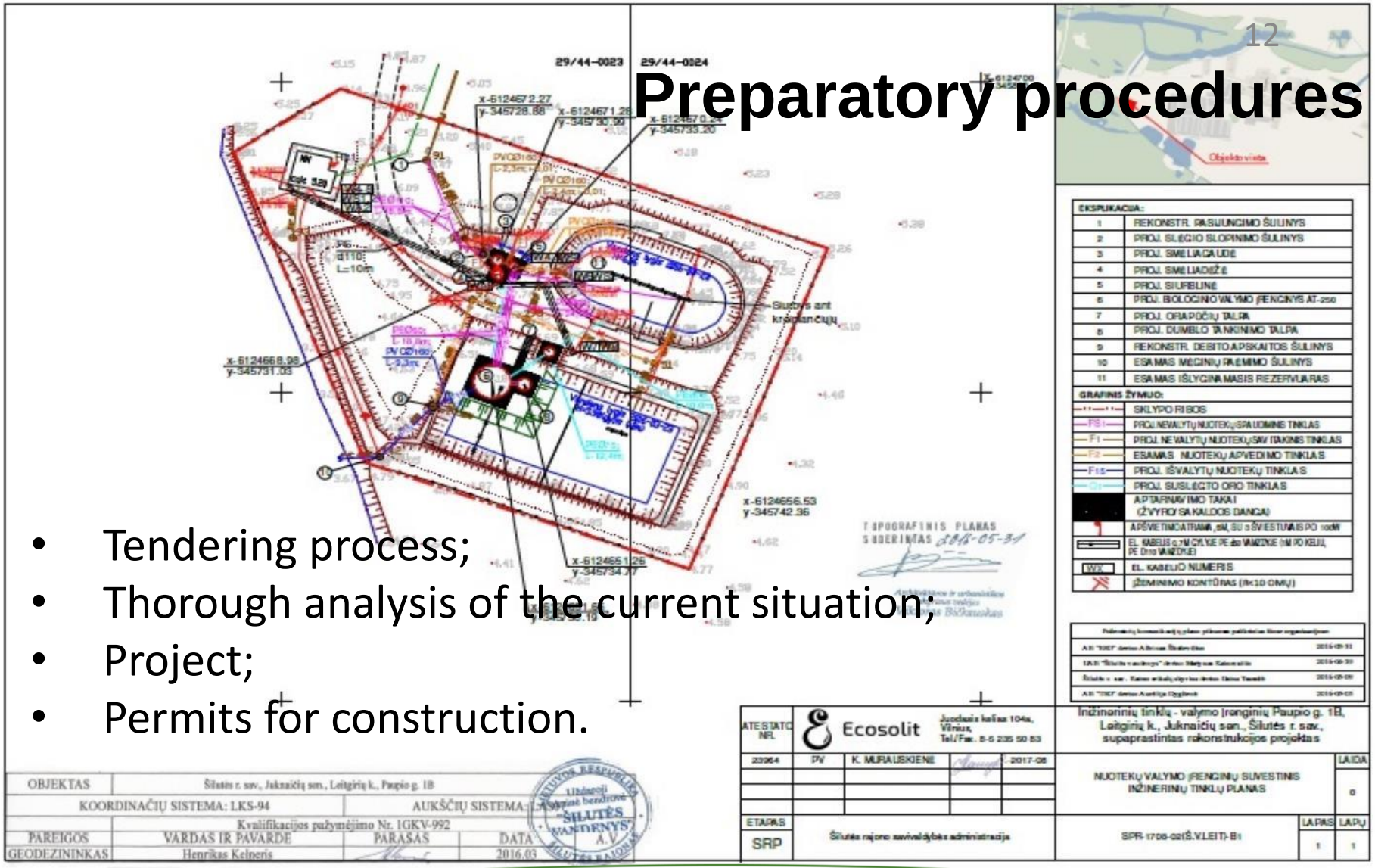


1. Inflow
2. Airlift No.1
3. Non-aerated chambers (anaerobic/anoxic)
4. Aerated chamber (oxic)
5. Aeration system
6. Final clarification chamber
7. Airlift No.2
8. Air blower
9. Air distribution system
10. Flow regulator
11. Outflow;

Equalization tank

- Prevents process disruption during extreme inflow periods;
- Equipped with a new aeration system.

Preparatory procedures



- Tendering process;
- Thorough analysis of the current situation;
- Project;
- Permits for construction.

Transportation

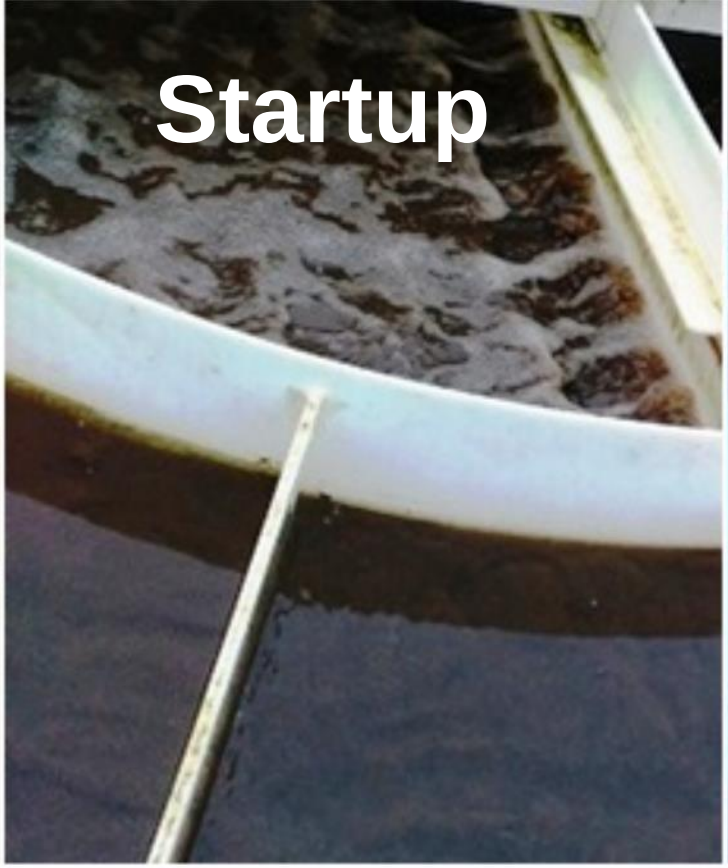
Installation of the biological reactor

Setting onto a foundation

Backfilling in steps

Last step, after connecting the piping

Startup



After all the construction and installation works are complete, startup of the system can be started:

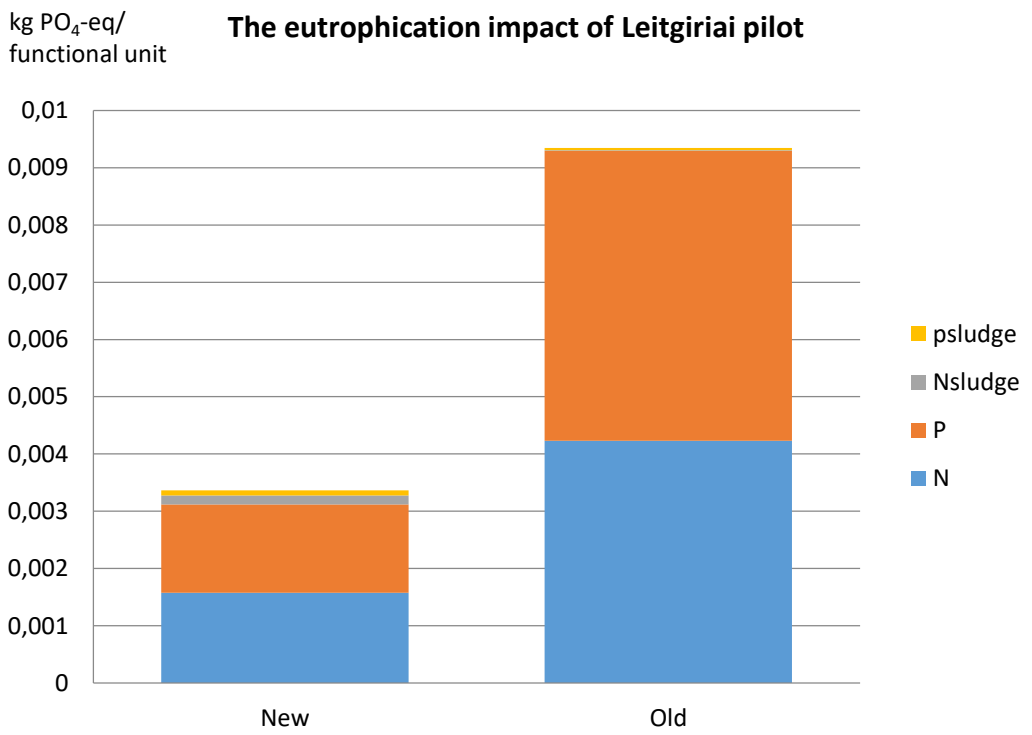
- Filling with active sludge;
- Tuning the dosing, aeration and circulation system.

Lithuania, Leitgiriai

Leitgiriai WWTP was built in 1991. It consisted of a grit chamber, a periodic operation ditch and pond – both with mechanical aeration, and a settling pond. Leitgiriai's wastewater treatment plant (WWTP) is being selected because it uses a typical biological treatment technology (the main treatment facility of which – periodical operation ditch with aeration).

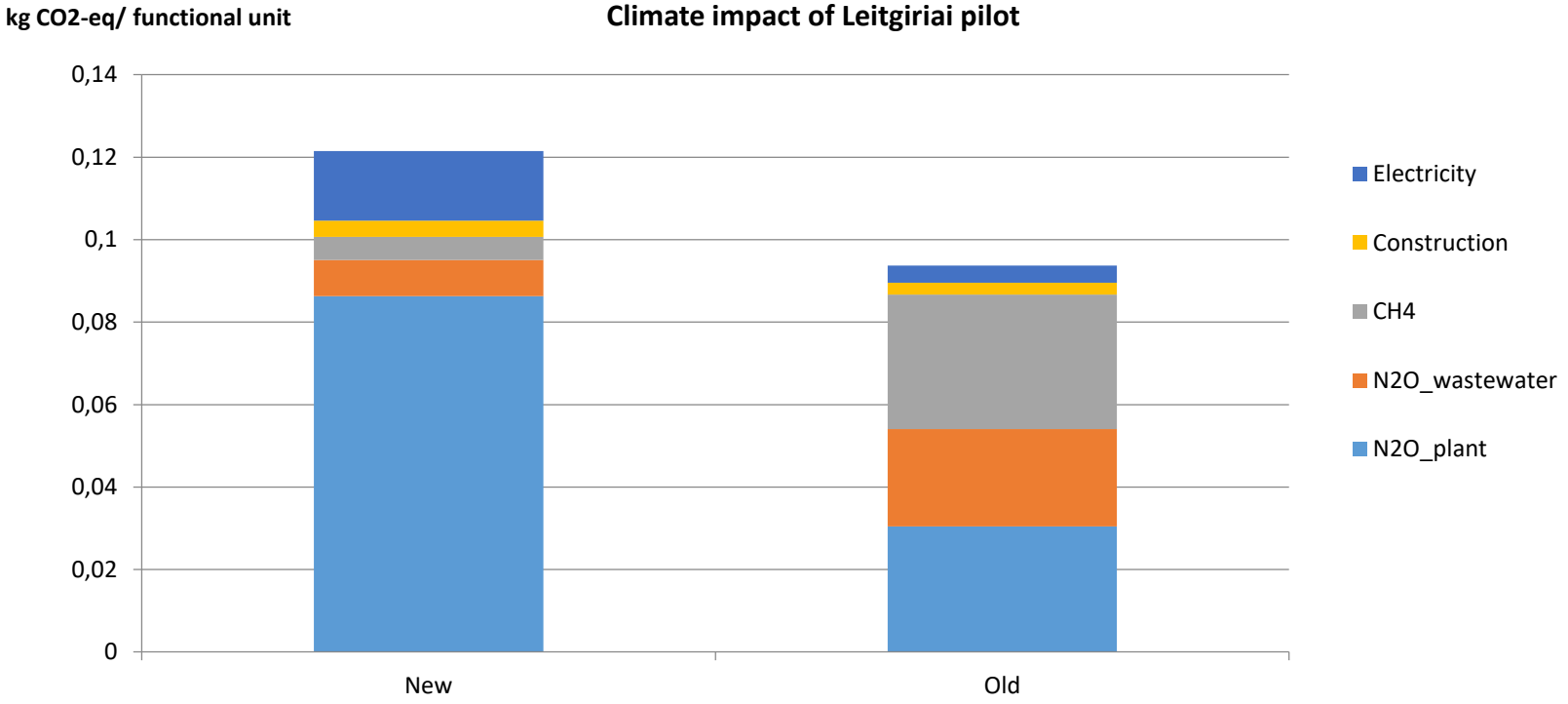
Eutrophication impact

- The eutrophication impact of Leitgiriai pilot is 0.0034 kg PO_4-eq/ functional unit after the change and 0.0093 kg PO_4-eq/ functional unit before the change. The part of nitrogen is 47 % and phosphorus 46 %. The parts of nitrogen and phosphorus are near to each other because of almost the same purification efficiency: for phosphorus 80 % and for nitrogen 92 % (Figure 14). Before the change the part of nitrogen is 45 % and phosphorus 54 %. The eutrophication impact reduces because of the changes 64 %.



Climate impact

The climate impact of Leitgiriai pilot was 0.12 kg CO2-eq/ functional unit after the change, and 0.094 kg CO2-eq/ functional unit before the change (Figure 15). After the change 78 % comes from N2O, 5 % from methane, 3.2 % from construction and 14 % from electricity and before the change 58 % from N2O, 35 % from methane, 3.0 % from construction and 4.4 % from electricity. New technology needs more electricity and efficient nitrogen removal causes more nitrous oxide emissions.



Overall conclusions

- **Complete renewal of all the treatment steps;**
- **Analysis of the current situation enabled selecting the best possible solutions;**
- **All determined drawbacks of the previous technology were eliminated;**
- **Cooperation between all participating patties hastened and optimized the procedures from first analysis to final startup of the system;**
- **The construction process was very fast, select materials durable and ensure long term service.**
- **Economic benefits:**

✓ **Minimalized maintenance necessity;**

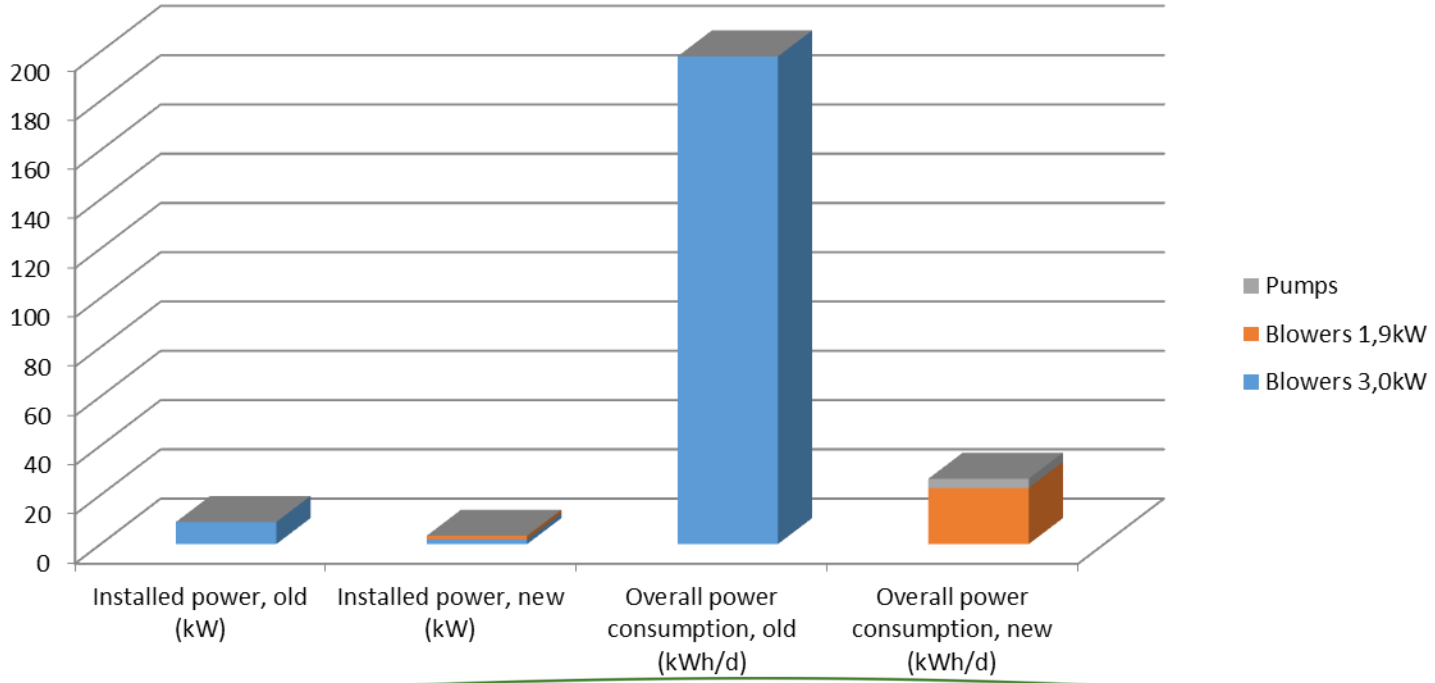
✓ **No chemicals required;**

✓ **Minimalized running costs.**

Overall conclusions

Electricity consumption

Device	Number of working units	Work time, h/d	Installed power, kW	Power consumption	
				kWh/d	kWh/year
Blowers, new	1	12	1,90	22,80	8322,00
Pumps	1	2,5	1,50	3,75	1368,75
Overall			3,40	26,55	9690,75
Previous technology					
Blowers, old	3	22,0	3,00	198,00	72270,00



Thank You for attention!

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