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# Legislation for P<sub>tot</sub> removal in the Czech Republic

Amendment to the Water Act No. 254/2001 on waters Different target for Ptot depending on the size

EI	No of WWTPs	P <sub>tot</sub> Average	P <sub>tot</sub> Maximum
> 100 000	26	1 mg/l	3 mg/l
10 001 - 100 000	175	2 mg/l	6 mg/l
2 000 - 10 000	325	3 mg/l	8 mg/l

Sensitive protection zones – around drinking water sources (limit 0,75 mg/l) All WWTPs > 2 000 El use chemical precipitation based on ferric salts All WWTPs > 100 000 El use P-analyser in combination with precipitation

11/24/2019

### P- Optimiser in Olomouc

Olomouc – center of Middle Moravia

WWTP for 260 000 Equivalent inhabitants

 $Q_{max} = 66\ 000 \text{m}^3/\text{day}, P_{tot} = 400 \text{ kg/day}$ 

Mechanical-biological WWTP

Activation R-D-N with post-denitrification and post-aeration

Partial bio-P removal during summer period

Application of External carbon (discontinuous – winter period)



	COD	SS	N <sub>tot</sub>	P <sub>tot</sub>
Inlet	> 500	< 200	> 50	> 7
Outlet	< 30	< 10	< 10	< 0,8
Limit	40	25	15 (20)	1

11/24/2019



### WWTP Olomouc – P-removal history

Start of chemical precipitation – limit 3 mg/l, fixed dose 40 l PIX/hour, consumption appr. 500 t/y

P-analyser, higher consumption – appr. 650 t/y testing of combination of preprecipitation and simultaneous precipitation (low nutrients in the second stage)

new Ptot limit 1 mg/l, combination of fixed dose to the activation and variable dose to clarifier according to P-analyser, consumption approx. 850 t/y

operator`s dosing control algorithm – 15 % reduction of coagulant consumption – 750 t/y



May – KemConnect Poptimizer test





### **KemConnect P-Optimizer**

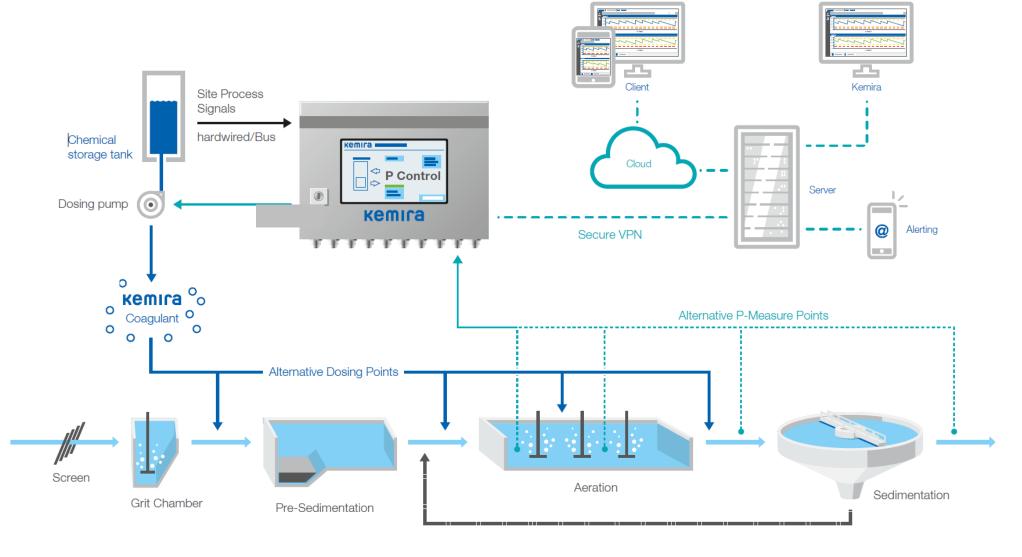
#### The Technology

#### **OPTIMIZATION SYSTEM**

- Online process data
- Dosing algorithm
- Secured data transfer
- Optimized chemical selection and dosing points

#### ONLINE WEB BASED PORTAL

- Realtime online KPI dashboards
- Set-point alerts via sms
  & emails
- Automatic monthly reporting



### **KemConnect P-Optimizer**

The Benefits

Meet regulation and reducing Total Costs of Ownership with **online application support given by your chemical expert.** 

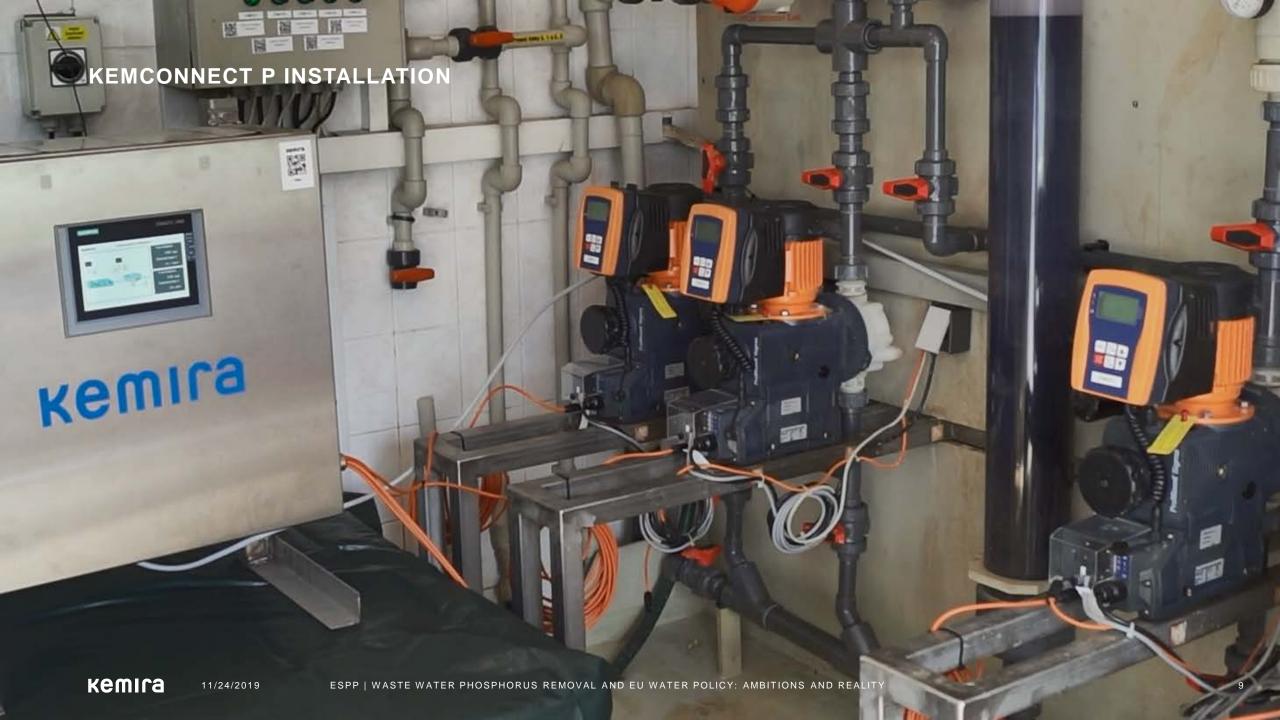


Secured effluent compliance [online, on-time process info]

Optimized chemicals costs [P-related, real-time dosing]

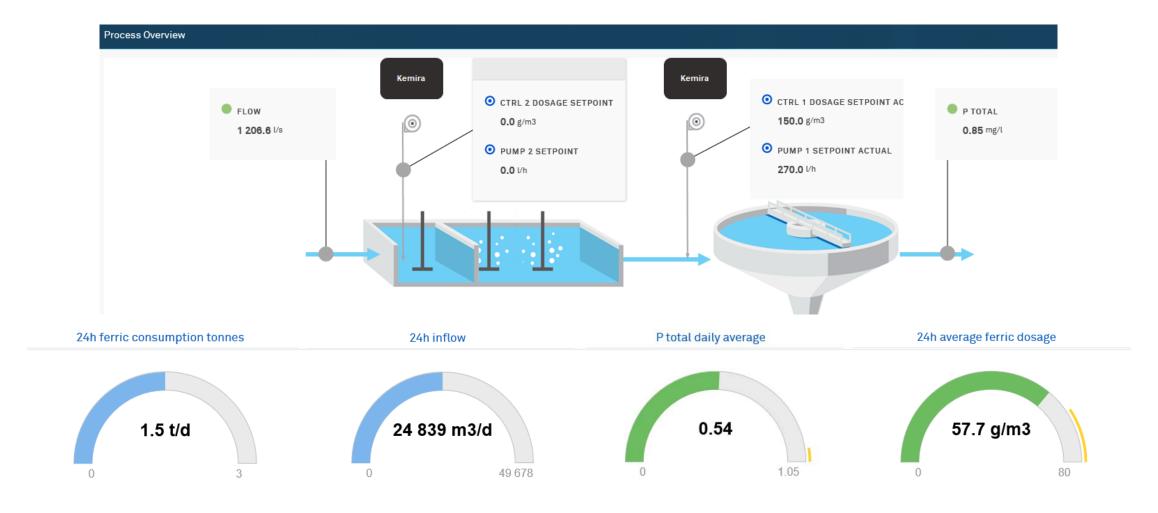
Process visibility [performance dashboards]

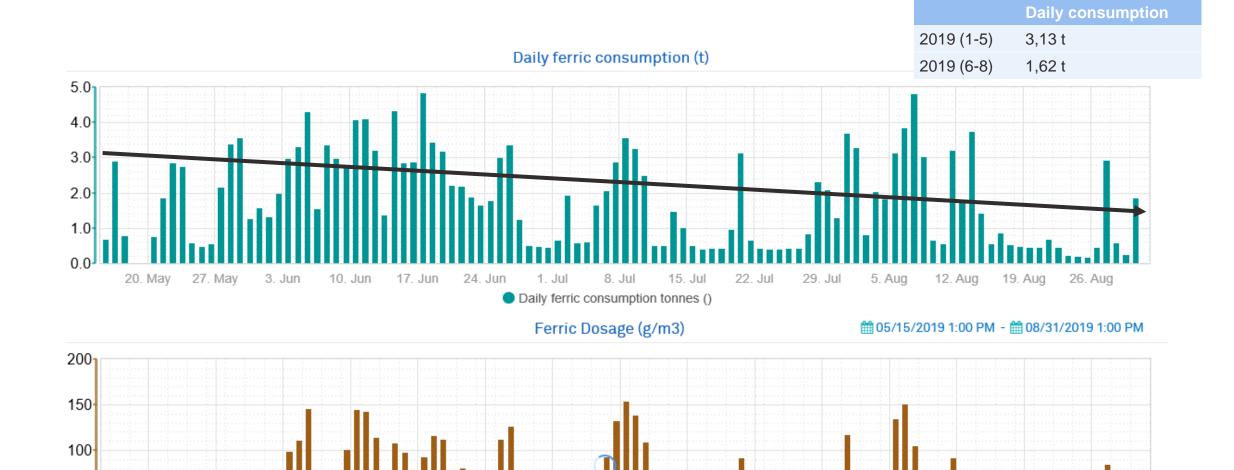
Smart chemical stock management [linked to VMI, supply security]



### KemConnect P-optimiser dashboard

#### ON TIME OVERVIEW ON THE PERFORMANCE& REPORT ON KPI





Kemira P-Optimiser system after some weeks have been able to improve the performance, leading to a reduction of ferric consumption on a daily basis

8. Jul

Daily average ferric dosage ()

1. Jul

22. Jul

29. Jul

15. Jul

5. Aug

12. Aug

19. Aug

26. Aug

24. Jun

50-

27. May

20. May

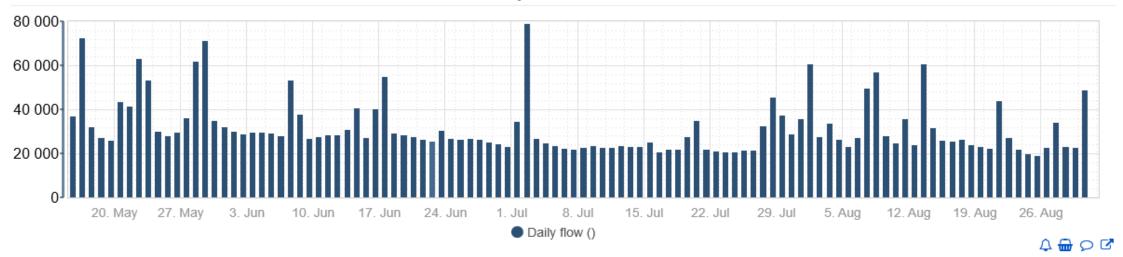
10. Jun

17. Jun

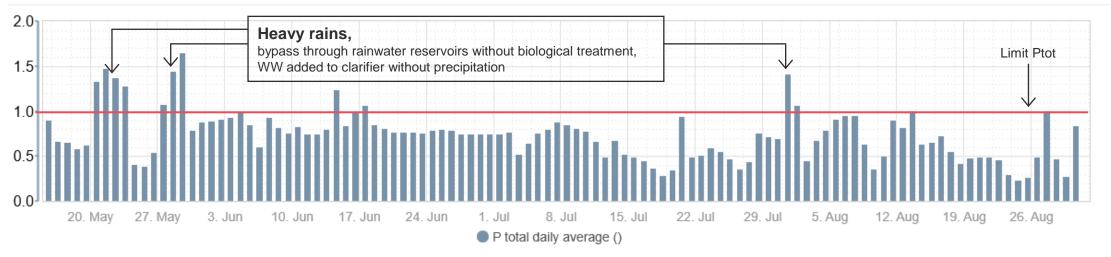
3. Jun



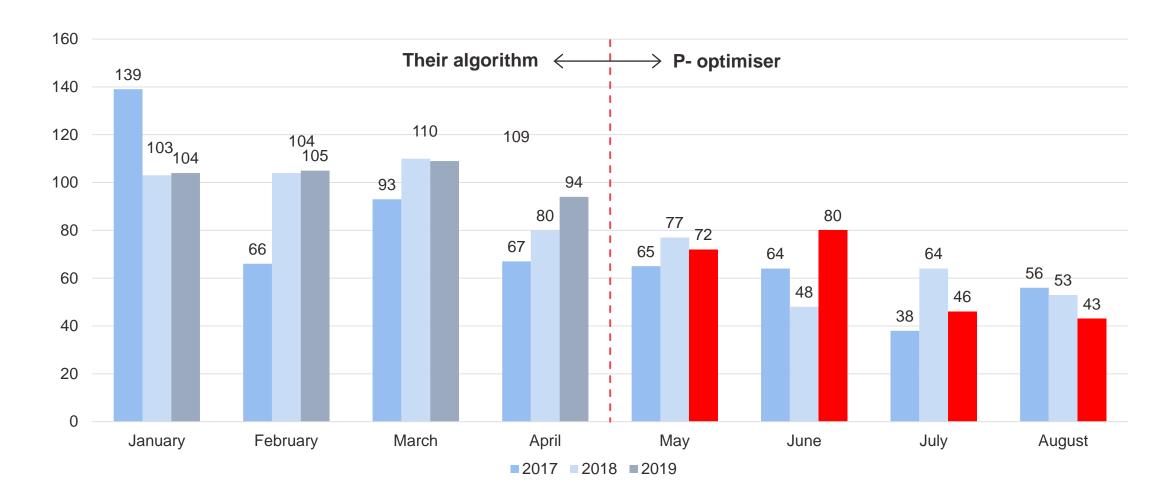
#### ## 05/15/2019 2:00 PM - ## 08/31/2019 2:00 PM



#### Daily P-tot average (mg/l)

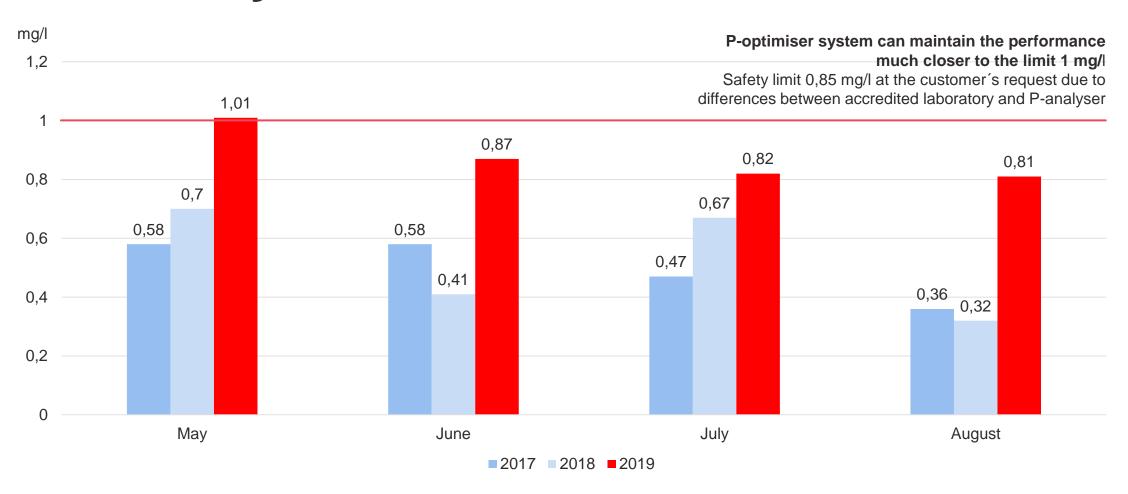


### Comparison of PIX doses for last 3 years





# Comparison of P<sub>tot</sub> during tested period for last 3 years



## Conclusions

#### **POSITIVES**

- More sophisticated system
- Fully automatic
- All date on 1 display
- Creation of graphs and reports
- Maximal optimization
- Cost savings on coagulants

#### **OBSERVATIONS**

- Sensitive for setting (retention time)
- Frequency of outputs from their P-analyser (30mn)
- Heavy rains and storms short term exceedances of P-Limit
- Installation of a second analyser to inlet was recommended

OPERATIONAL TEST WILL CONTINUE UNTIL THE END OF NOVEMBER AND THEN A COMPREHENSIVE ASSESSMENT WILL BE MADE AFTER 6 MONTHS

