



Tertiary continuous filtration

Revival of a multifunctional treatment system



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Proven multiple references in wastewater treatment

Solids/BOD

- Load up to $1.5 \text{ kg}/(\text{m}^2 \cdot \text{h})$
- Filtrate $< 5 \text{ ppm TSS}$

Biological denitrification

- Load: $1.5 - 4.0 \text{ kg N}/(\text{m}^3 \cdot \text{day})$
- $5 - 25 \text{ degrees C}$
- Filtrate $< 3 \text{ ppm nitrate-N}$

Biological nitrification

- Load: $0.3 - 1.5 \text{ kg N}/(\text{m}^3 \cdot \text{day})$
- $5 - 25 \text{ degrees C}$
- Filtrate $< 0.6 \text{ ppm ammonia-N}$

Total phosphorus removal

- Load: $20 - 50 \text{ g P}/(\text{m}^2 \cdot \text{h})$
- Filtrate $< 0.2 \text{ ppm total-P}$

Combined n and p removal

- Filtrate $< 0.5 \text{ mg/l total-P}$ &
 $< 5 \text{ ppm nitrate-N}$



Sand-Cycle diagnosis – monitoring – control - optimization

Technology

- RFID
- Tags with unique number, no battery

Application

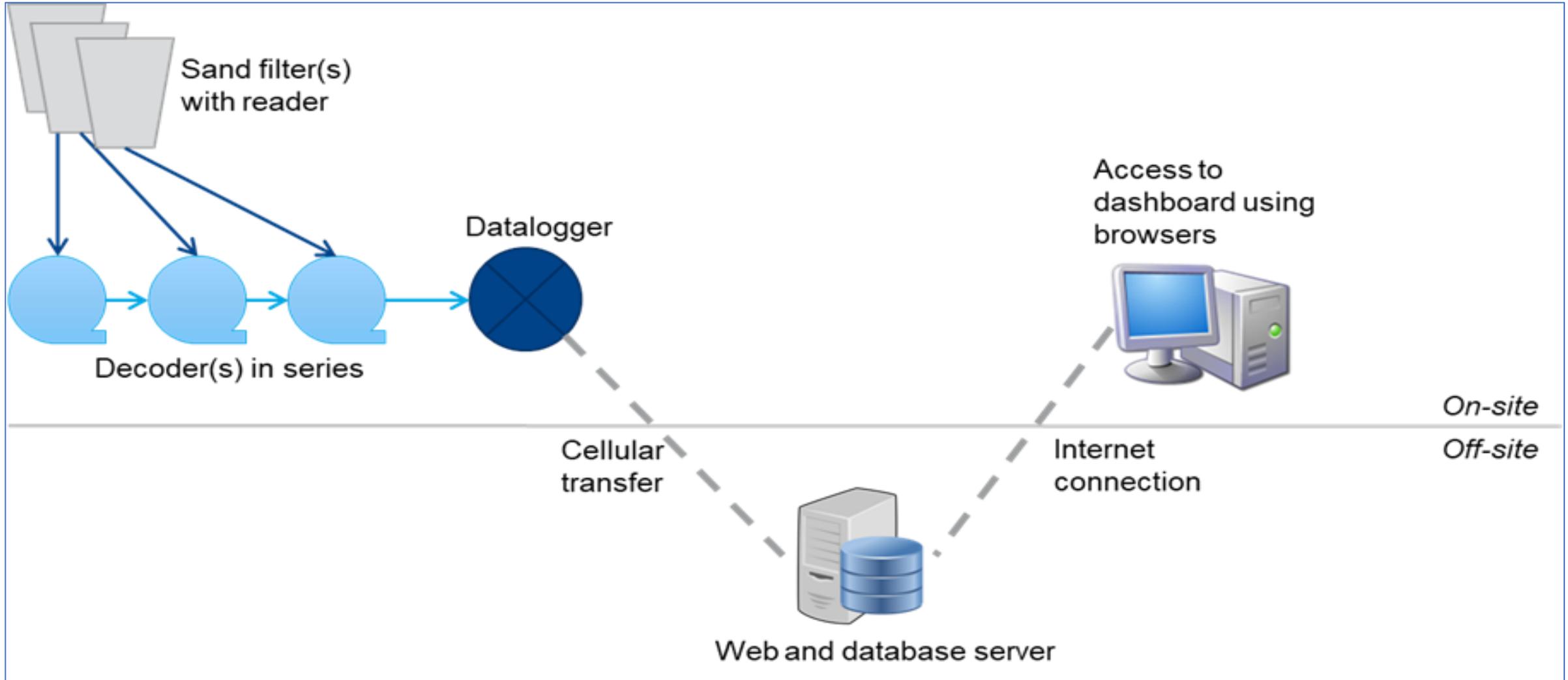
- Tags acting as sand grain “proxies”
- 20 – 60 tags per filter
- Continuous dataflow of timestamps and tag IDs
- 24/7 remote output dashboards

Advantages

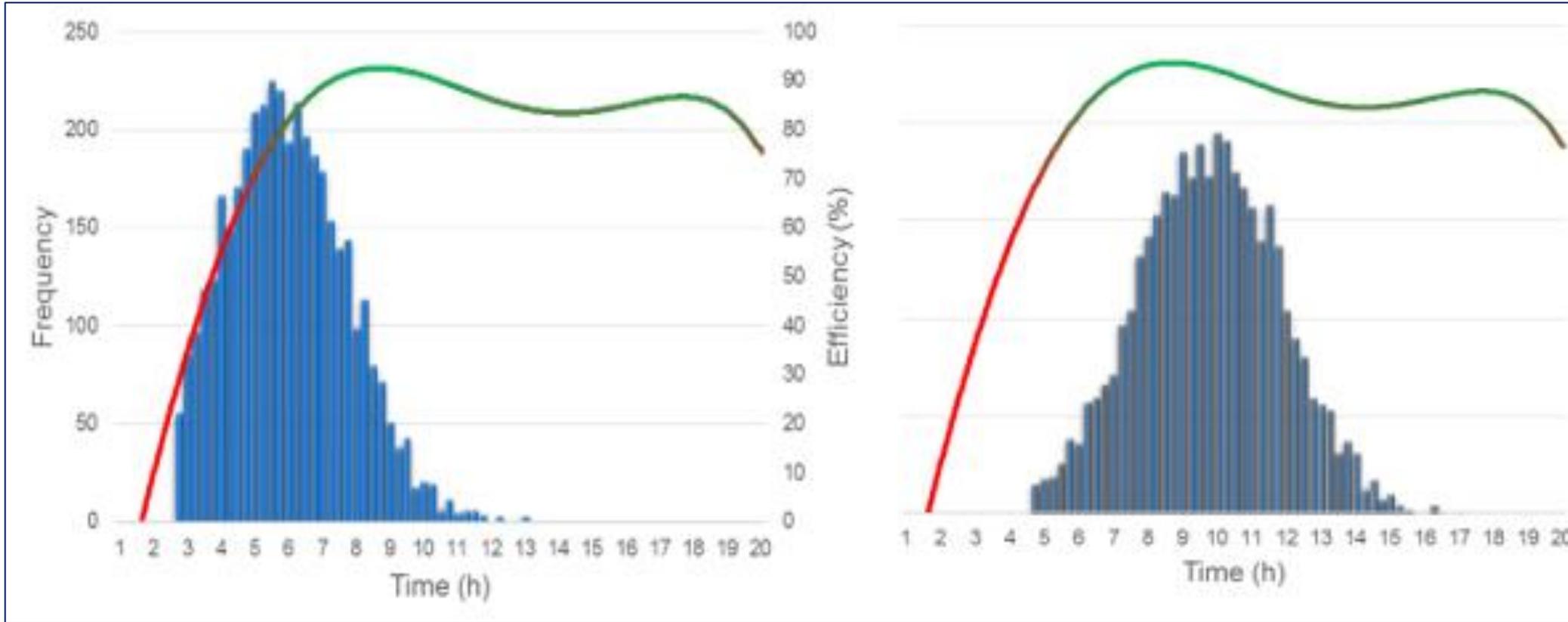
- Better filter performances
- Stretched filter applications
- Reduced and focused operator attendance
- Energy savings
- Longer lifetime of wear and tear parts
- Far less assets down-time



Sand-Cycle: system set-up



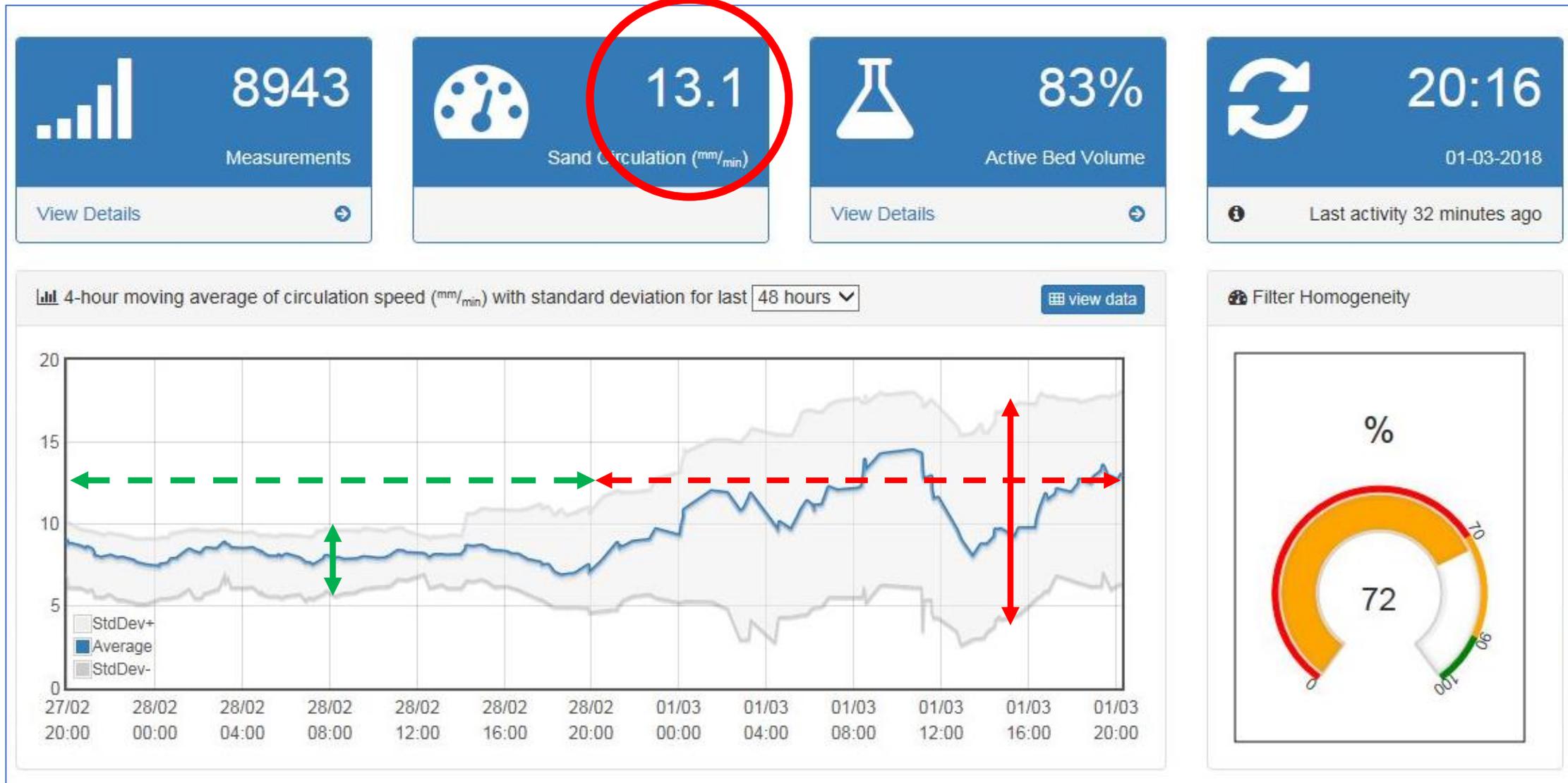
Sand-Cycle: impact of turnover rate on efficiency



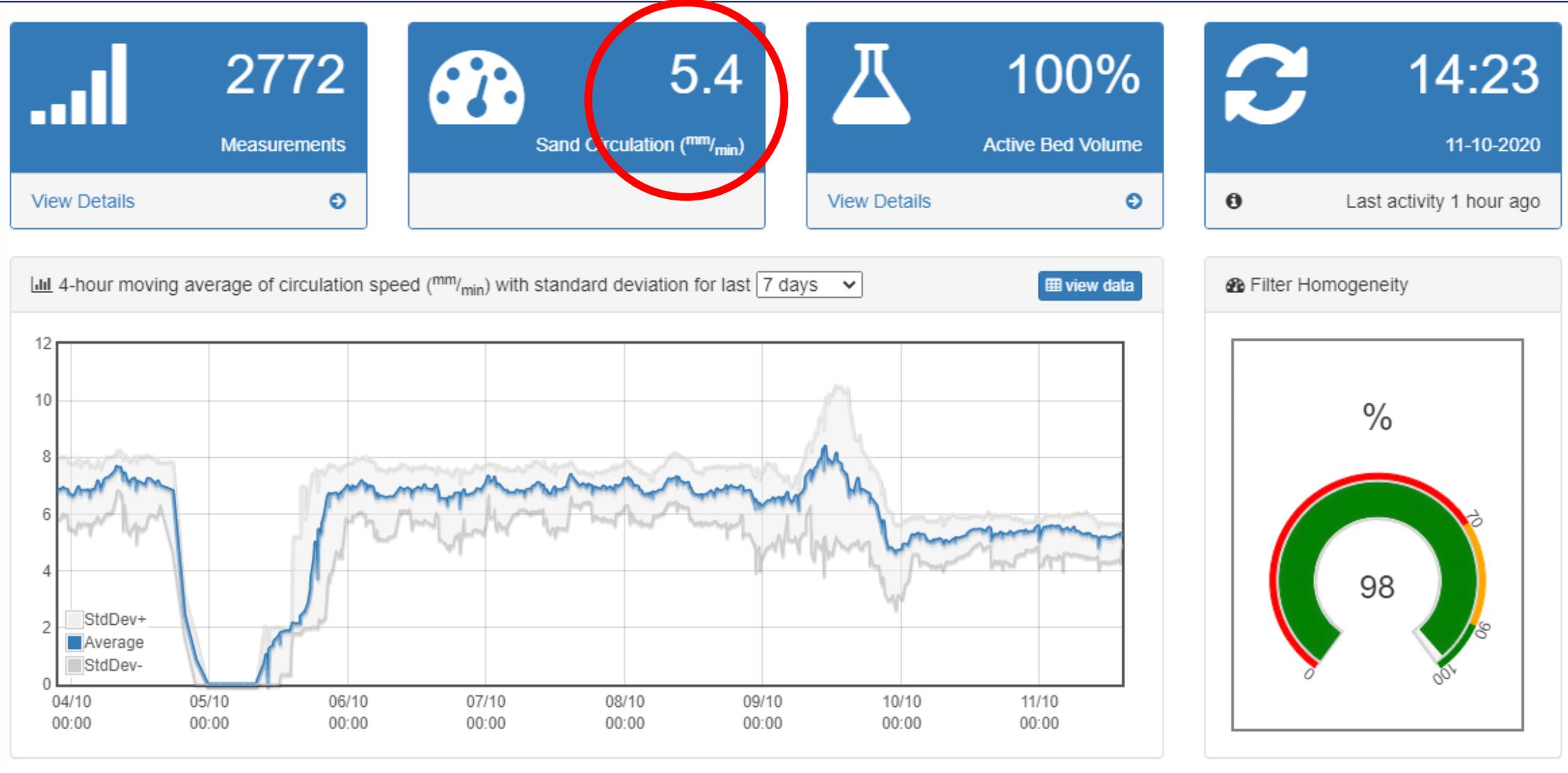
Average Sand-Cycle	6.0 h
Average Sand-Cycle rate	8.6 mm/min
90% interval Sand-Cycle rate	From 5.3 to 15.6 mm/min

Average Sand-Cycle	9.8 h
Average Sand-Cycle rate	5.0 mm/min
90% interval Sand-Cycle rate	From 3.6 to 7.5 mm/min

Sand-Cycle dashboard example 1



Sand-Cycle dashboard example 2



“Collaborating to improve your processes” – How can we help?

Learn more

- Free webinar with life access to remote dashboard
- Share your experiences with our experts
- Get feedback

Diagnosis

- Share your tertiary filter plant operation data
- Future plans and consent levels
- Remote analysis and possibilities
- Results exchanged (MS Teams)

Field assessment

- Field survey if required

Remote monitoring

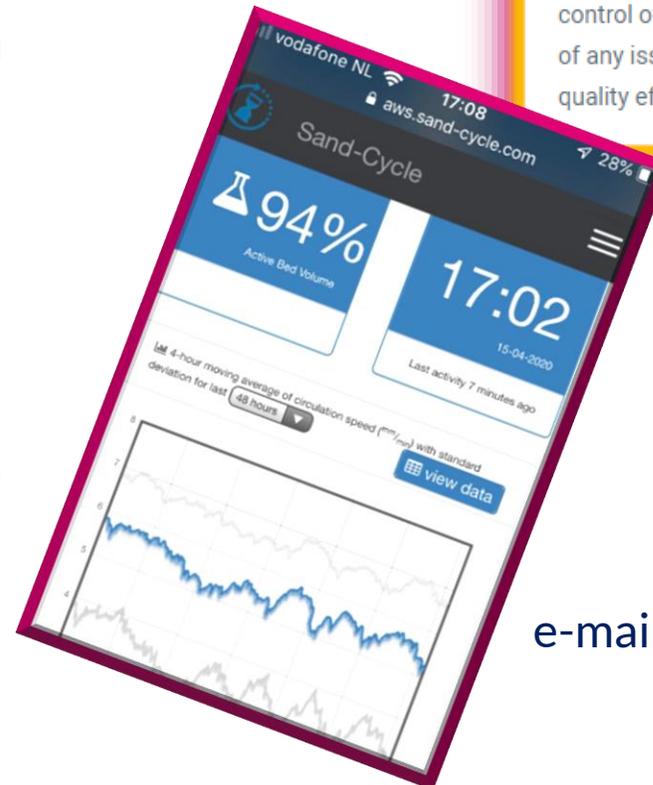
- Sand-Cycle implementation
- Join the community and exchange knowledge
- Follow up of operational data

Further actions (if required)

- Remediation of anomalies

This is what our customers say

Saskia Hanneman, innovation manager at Waterschapsbedrijf Limburg about Sand-Cycle: "With the Sand-Cycle implementation at our wastewater treatment plants in Wijlre and Simpelveld we are better in control of our tertiary sand filters, enabling us to react pro-actively in case of any issues. It definitely contributes to always discharging a good quality effluent."



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