

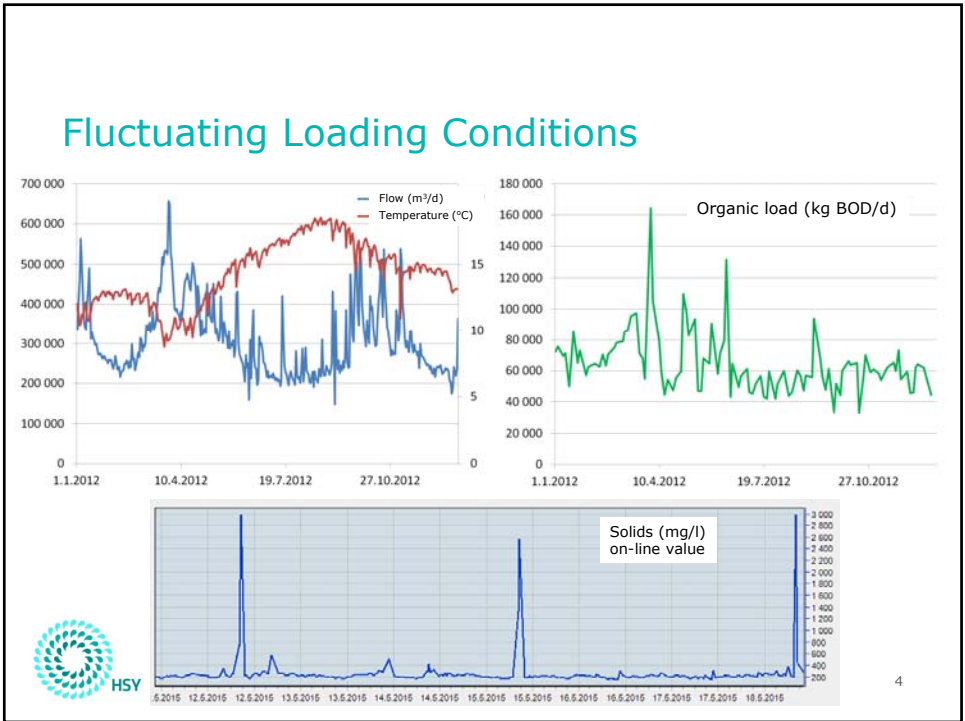




Process Challenges


"Why do we need new and improved on-line monitoring and data analyses in wastewater treatment?"

Challenges


- Requirements
 - Good effluent quality (constantly)
 - Sludge quality
- Limitations
 - Space, energy, chemicals, work
- External conditions
 - Fluctuating loading
 - Temperature changes




Challenges ...tomorrow




- **Stricter requirements**
 - N, P, COD...
- **New requirements**
 - Chemicals, drugs, metals, pathogens...
- **More efficient use of resources**
 - Energy
 - Chemicals
 - Footprint
- **Increasingly challenging conditions**
 - Growing influent loads
 - More extreme rain events

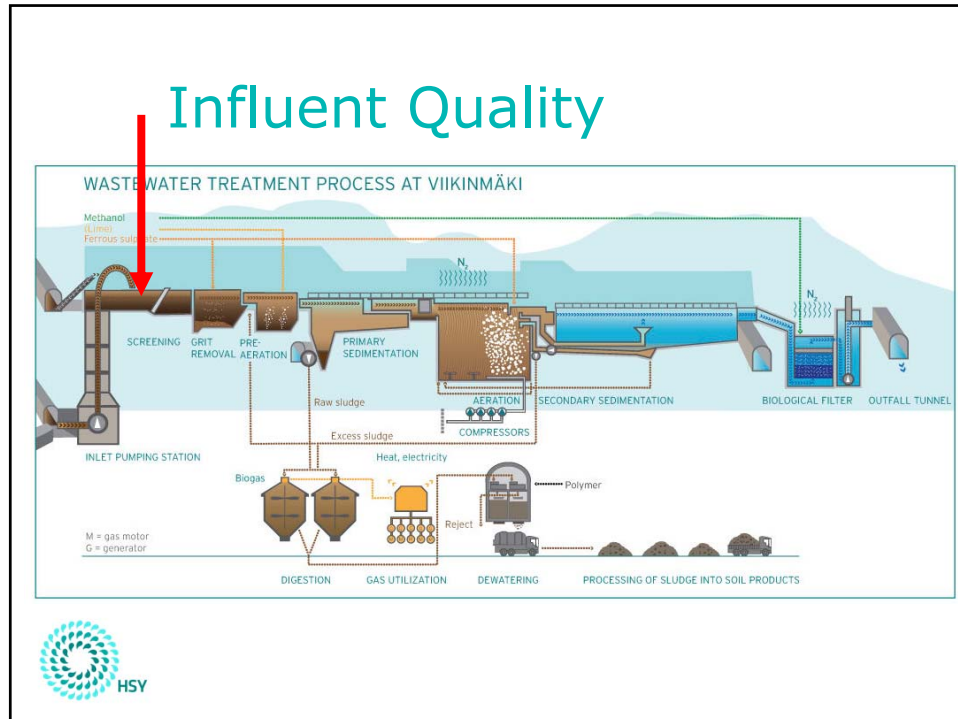


Tools



- **Higher level of automation**
 - Control of flows, chemical feeds and biological process
- **Higher knowledge**
 - Better tools for operators
- **Reliable measurements in challenging conditions**
 - E.g. solids measurements in sludge treatment
- **Intelligent use of data**
 - Correlations, predictions...
 - Clear outputs

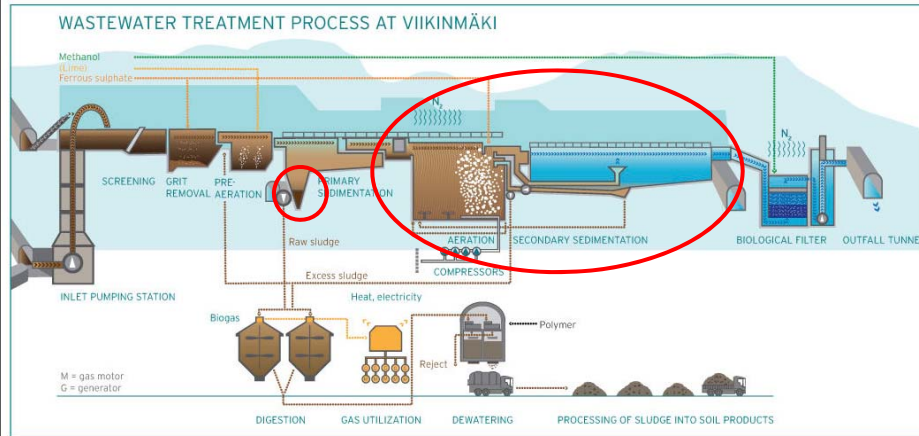




Challenges

- Large variations in influent concentrations
 - Largely correlated to solids content
- Laboratory analyses are time consuming and costly
 - Not done daily, even less hourly
- Problematic environment for on-line measurements
 - Solid wastes, grease and sand

Activated sludge



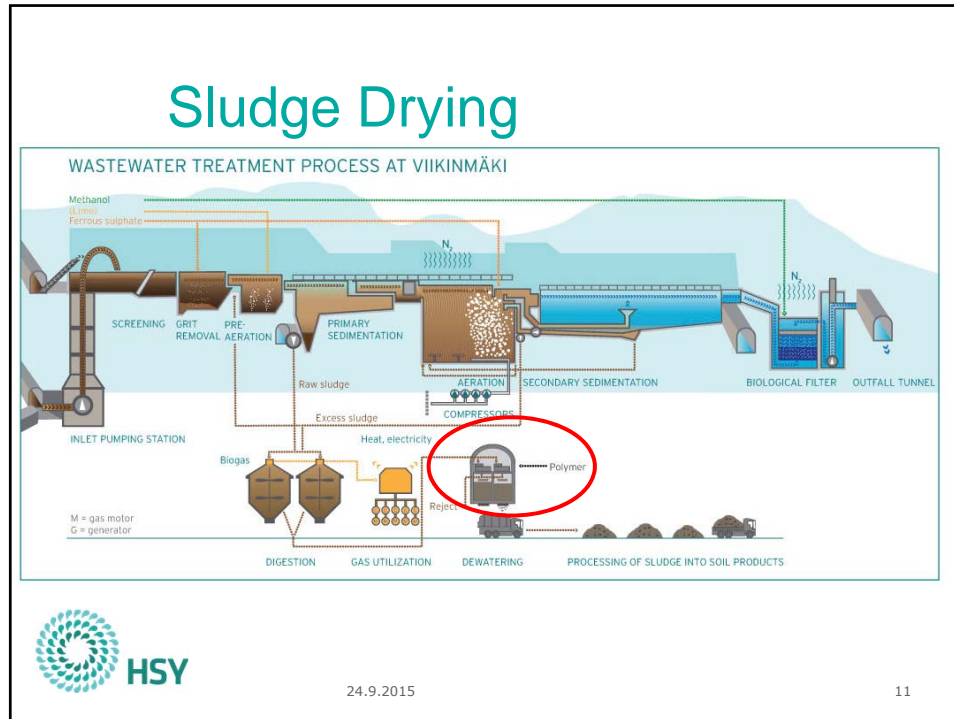
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Challenges

- **Good flocs in activated sludge**
 - Settling → good treatment result & hydraulic capacity
 - Thickening → high retention time and gas production in digestion
- **Microscopic examination of flocs**
 - Time consuming
 - Requires praxis
 - Subjective
 - The registered values are vague



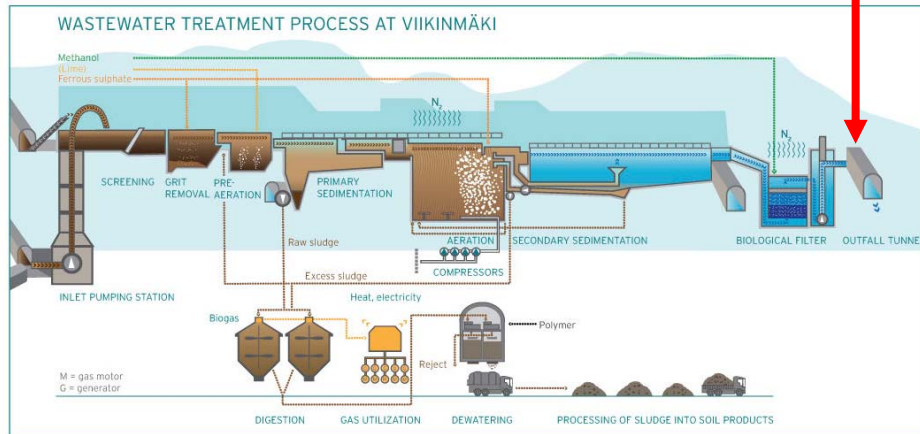


Challenges

- The "success" of sludge drying has a large impact on operation costs
 - Amount of dried sludge (10 tons 30 % TS vs. 20 tons 15 % TS)
 - Internal load from reject water TS
 - Feasibility of treating reject water for total nitrogen
- Polymer use
 - Crucial, expensive
 - Must be optimised

NOTE: This applies to biowaste digestion plants as well

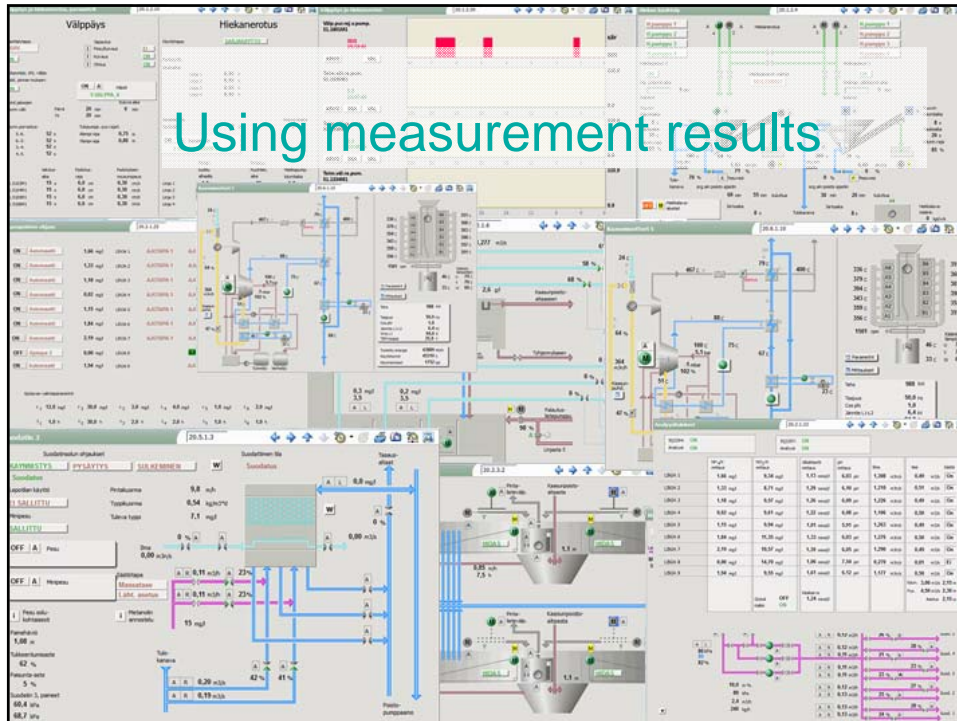
Effluent Organic Matter



Challenges

- With denitrifying filters
 - Methanol feed
 - Washing of filters
 - Risk of organic matter release to effluent wastewater in soluble or solid form





Challenges

- Vast amount of measurements
 - With very different levels of importance
 - Varying time scales
 - External conditions and effectiveness of responses
 - Interpretation of results
 - The levels of measured values can be important as such and/or in relation to other values
- Noticing critical situations and reacting correctly to them requires intelligent processing of data and useful outputs