
VEOLIA
Smart Control of Wastewater Treatment Aeration
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WATER TECHNOLOGIES


Requires electricity!

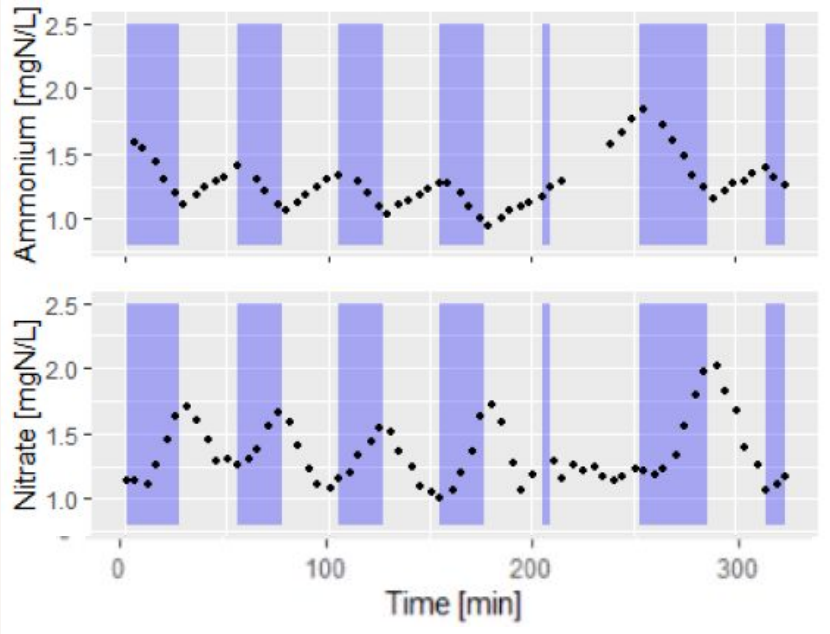
Aeration - example

40-75% of electricity consumption is aeration

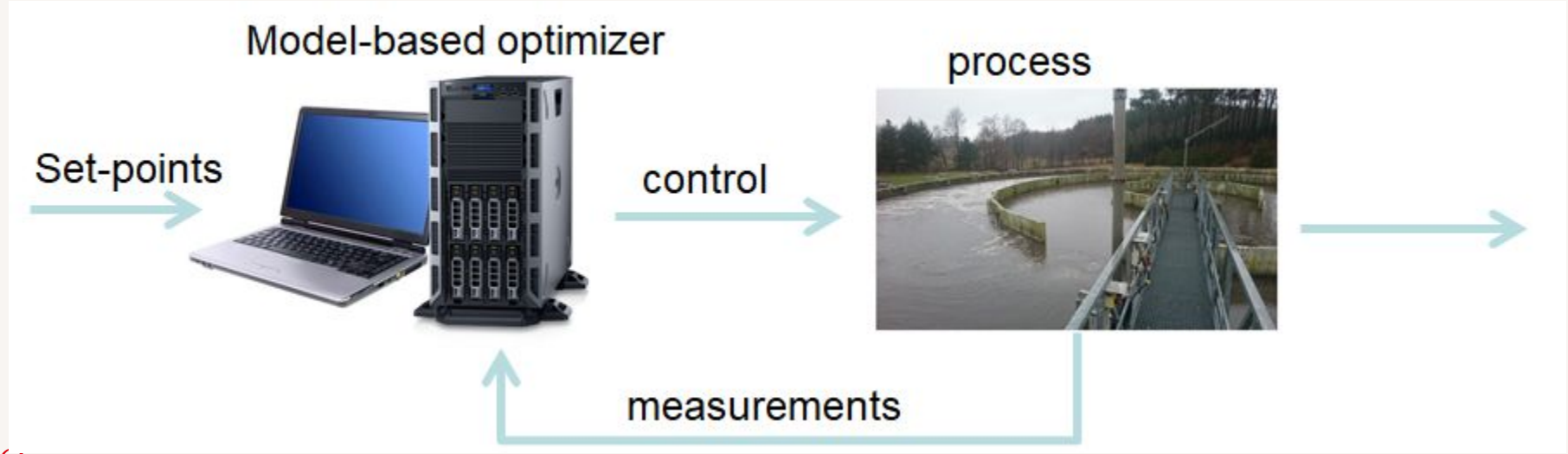
Measurements:

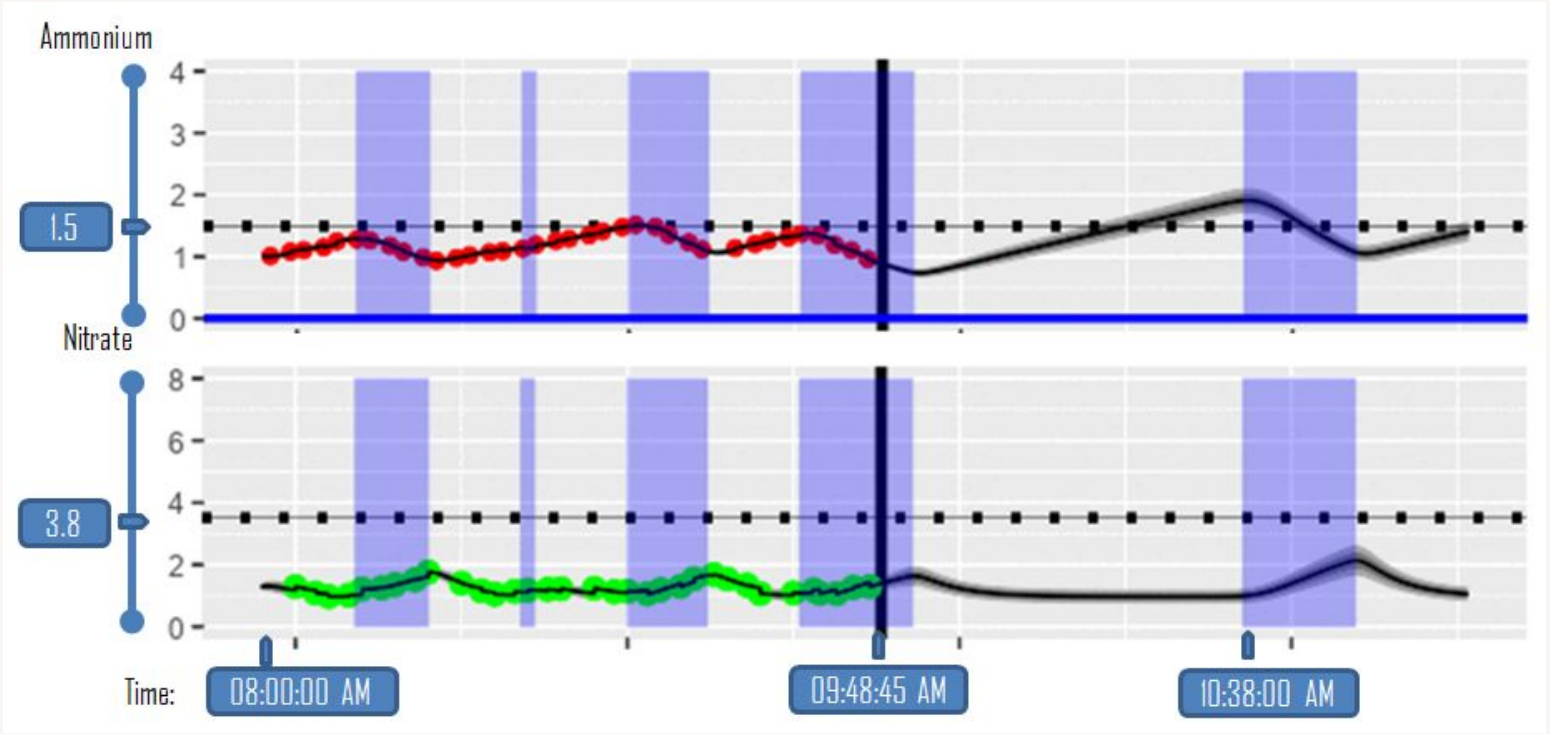
Aeration “on”:

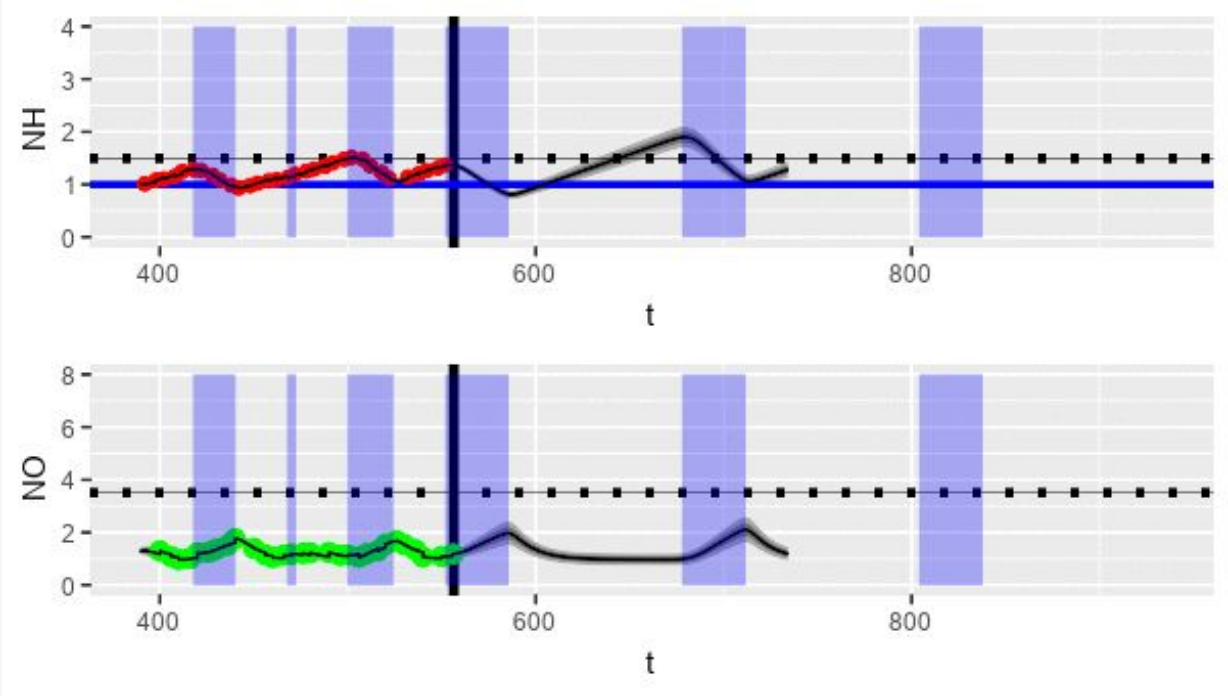
Aeration “off”:



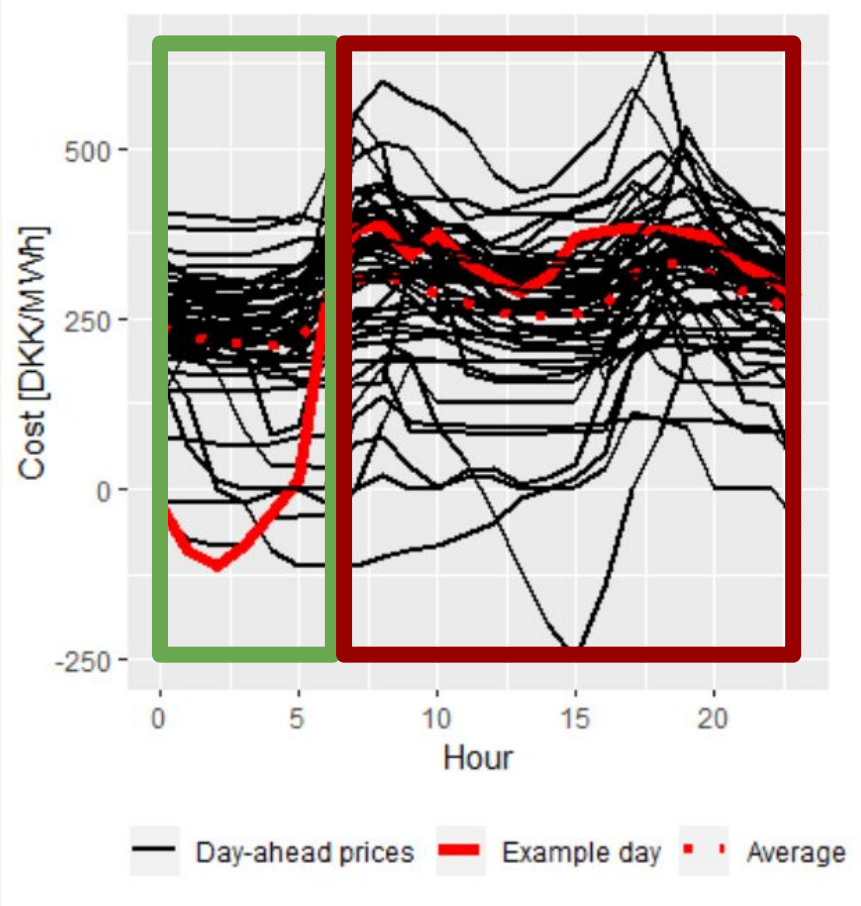
MPC for aeration?



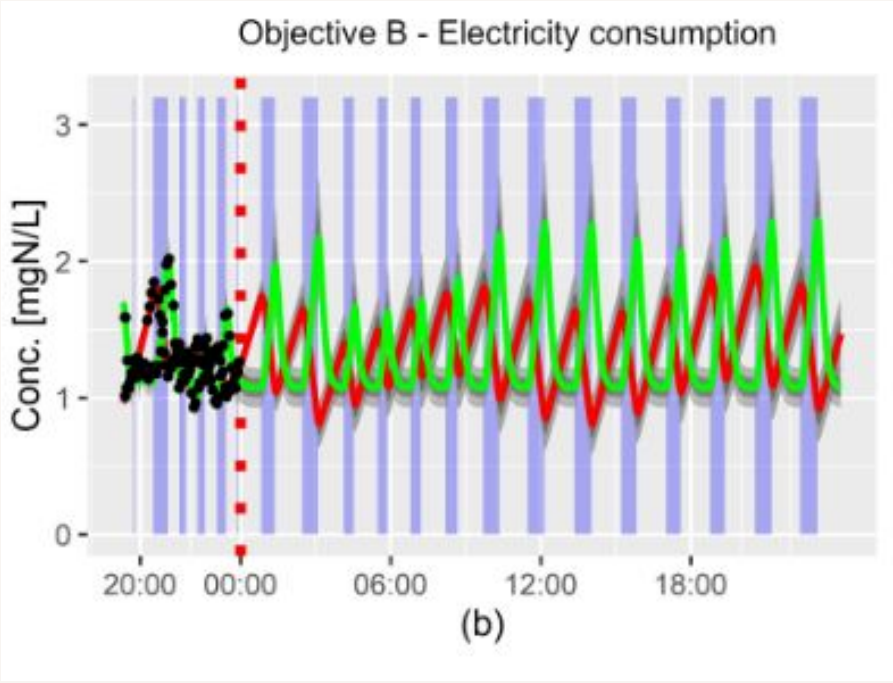

Ammonium
4
3
2
1
0
1.5
Nitrate
8
6
4
2
0
3.8
Time:
08:00:00 AM
09:48:45 AM
10:38:00 AM



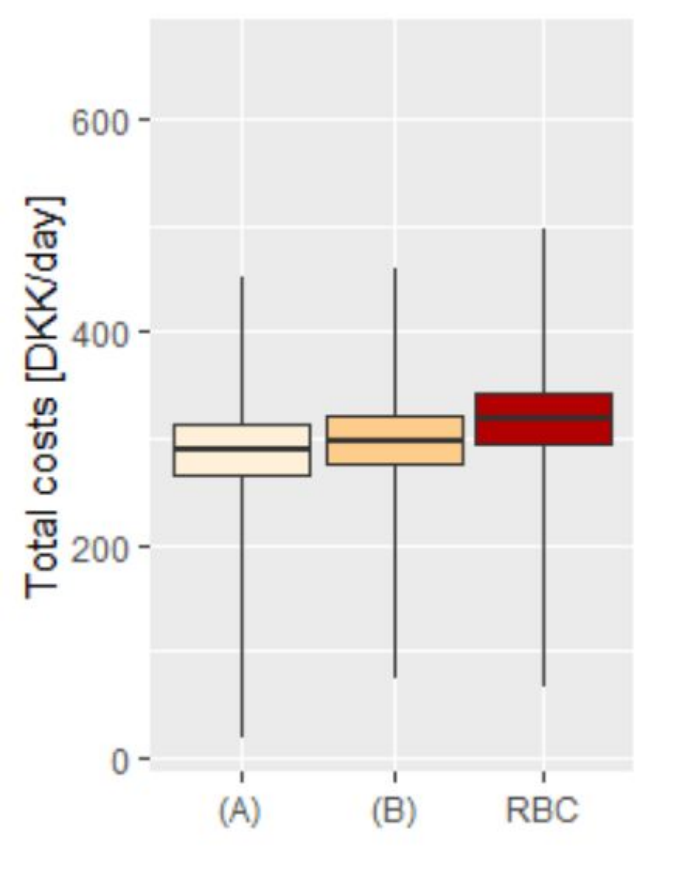
- **Changing ammonium requirement at t=1125 min**

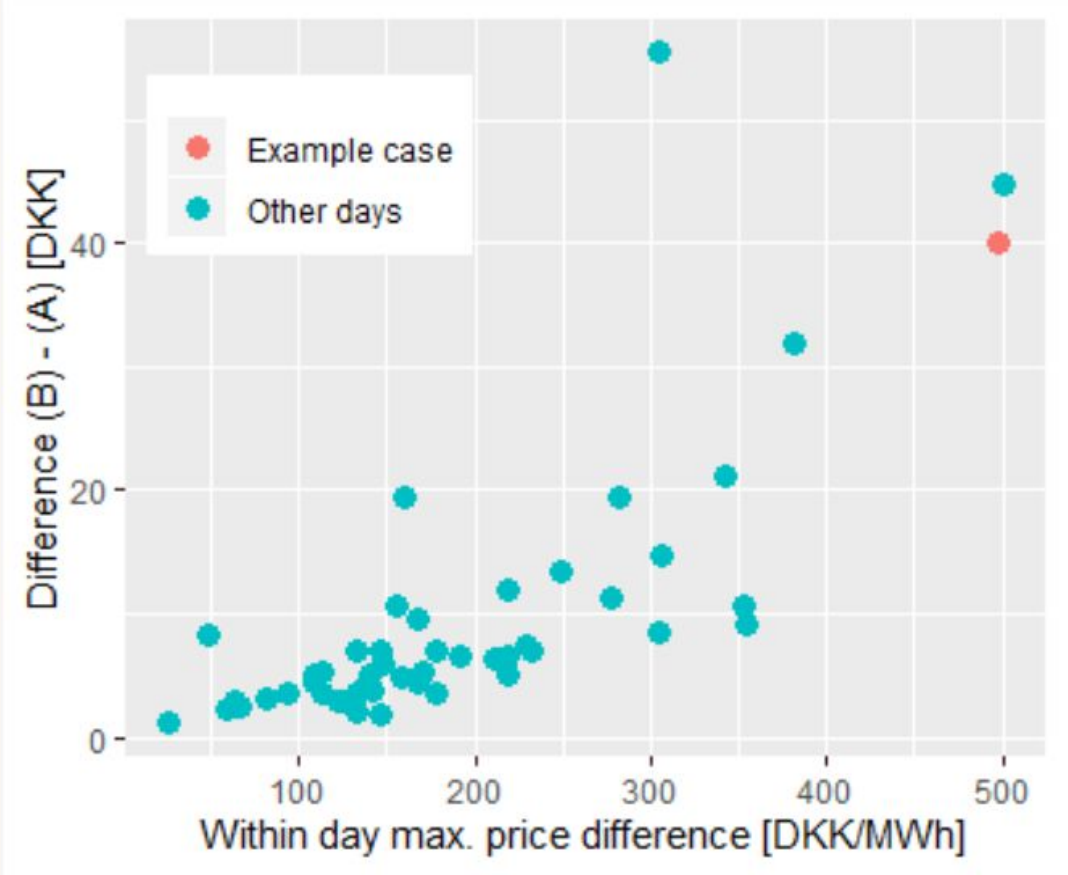

500
250
0
-250
Cost [DKK/MWh]
0
5
10
15
20
Hour
Day-ahead prices
Example day
Average

Different controls!



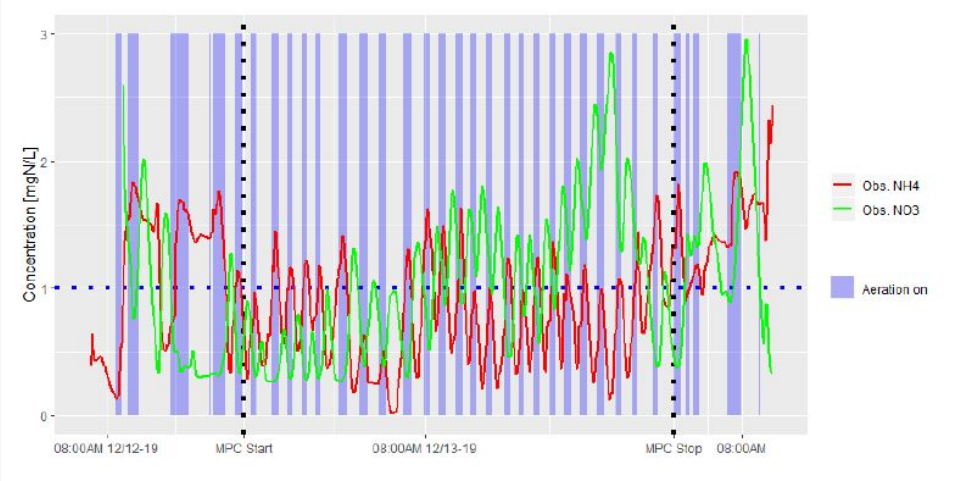
Comparison


600
400
200
0
Total costs [DKK/day]
(A)
(B)
RBC

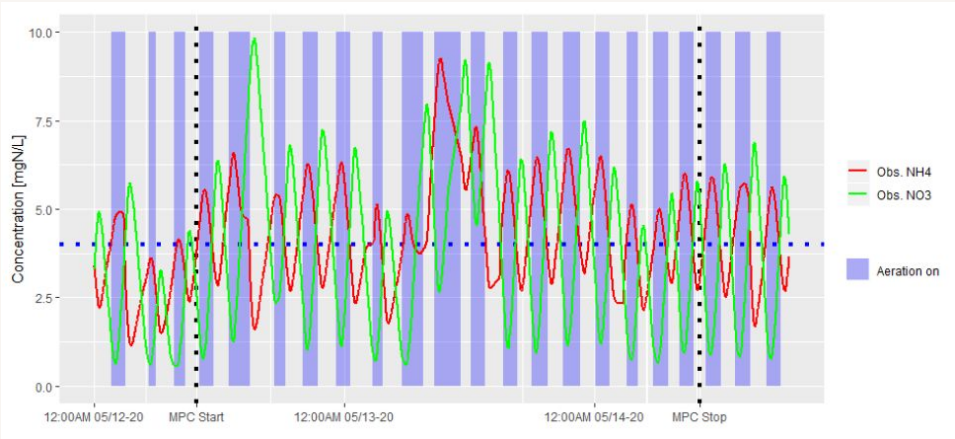

Example case
Other days
40
20
0
Difference (B) - (A) [DKK]
100
200
300
400
500
Within day max. price difference [DKK/MWh]

Full-scale tests

Vamdrup WRRF



Melby WRRF



Conclusion

- Possible to use MPC for minimizing costs
- Cheaper compared to current control
- Feasibility depend on markets and within day variations
- Tested full-scale, but more tests needed

Thank you!

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