Vilhjálmur Nielsen & Christian A. Hviid
Department of Buildings and Energy,
Technical University of Denmark

Preparing a school building from 1920's for low temperature district heating while improving indoor climate by use of wireless sensors

Interreg Öresund-Kattegat-Skagerrak European Regional Development Fund
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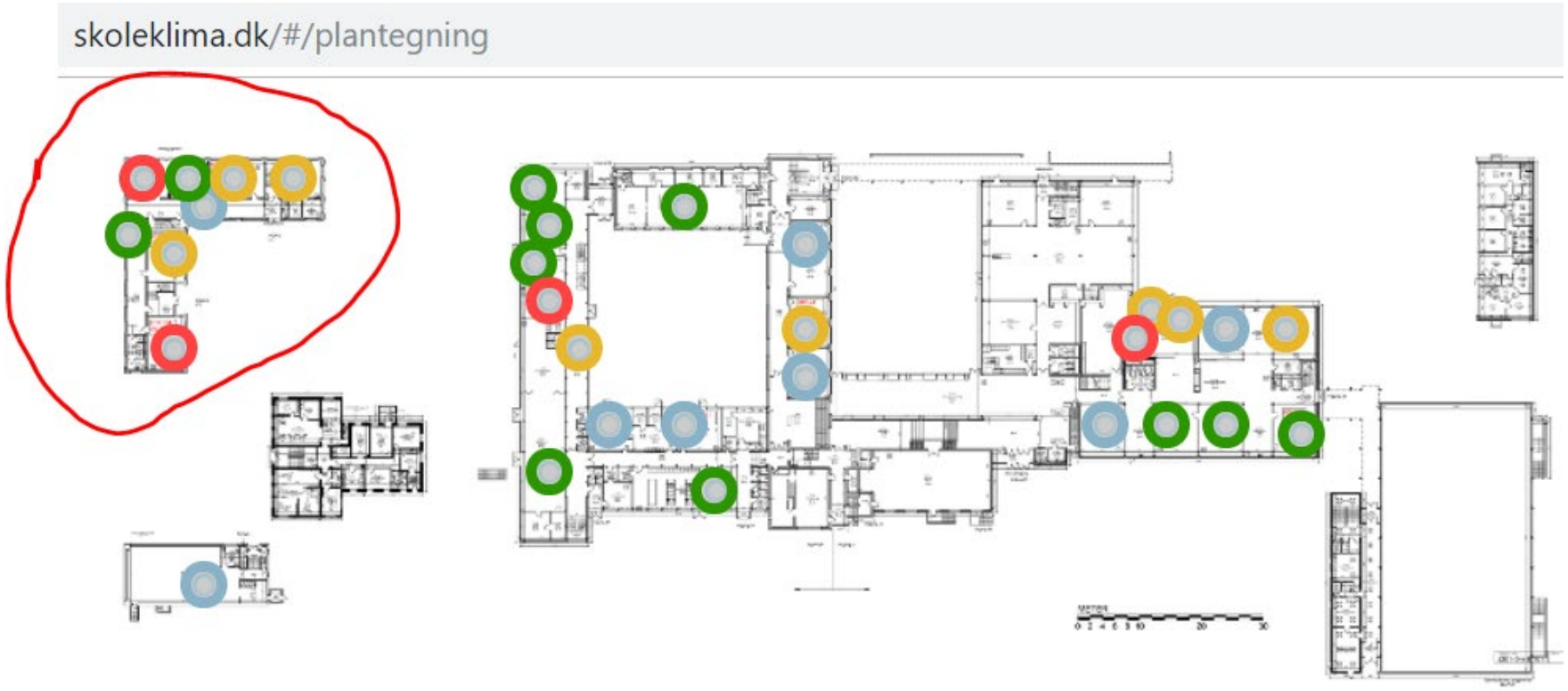
Smart Cities Accelerator

Borgerskolen - Taastrup

- An uninsulated school building from the 1920ies
- Very limited budget
- Technical staff has limited time and limited insigth in heating installations and acts on complains
- Responsibility of heating installations and BMS is centralised
- The BMS gives limited overview and logging of data
- There is no measurement of indoor climate
- There are complaints about cold classrooms
- Return temperature to district heating is 46 degrees

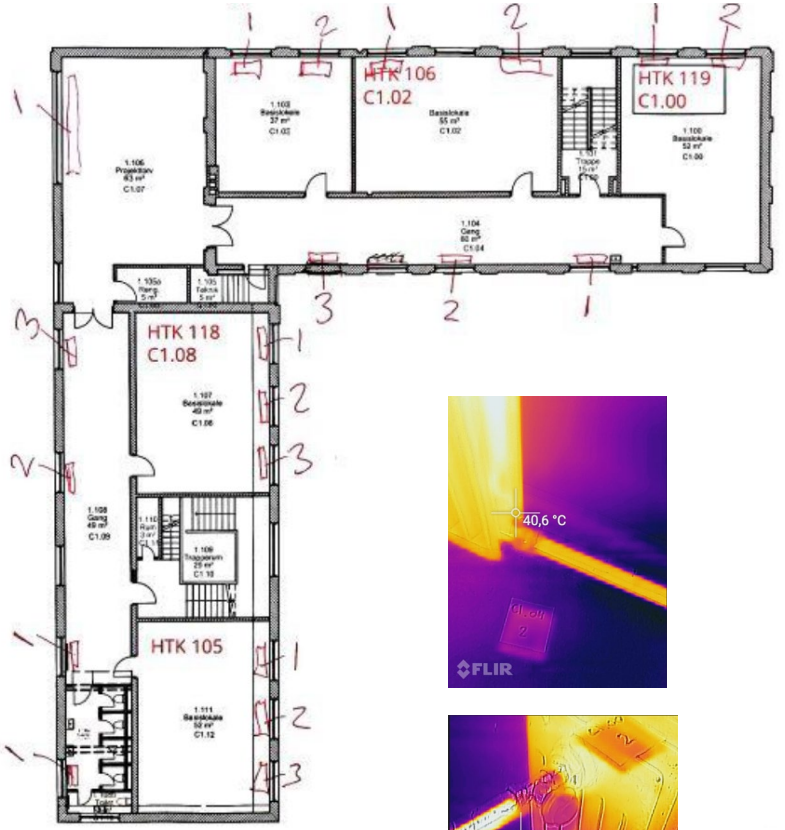
Skoleklima.dk visualisation of indoor climate documentation using IC-meters

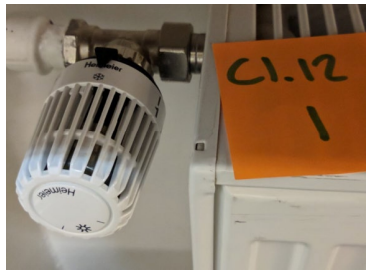
- Documentation and visualisation is a powerfull tool for communication
- But make sure to be ready for action – otherwise it creates frustration.

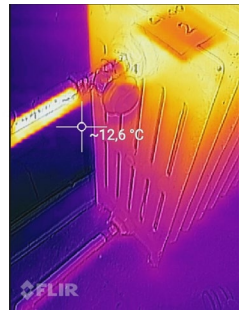


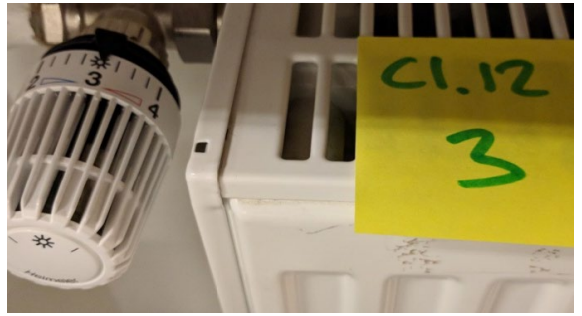
Mapping and fixing Radiators

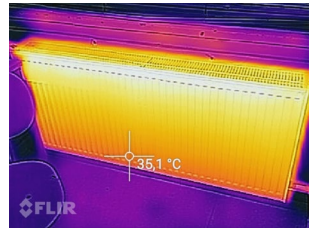
- Different settings in same room
- Very small radiators close to main doors
- Radiators in hidden unused rooms
- Air filled radiators
- Broken thermostats











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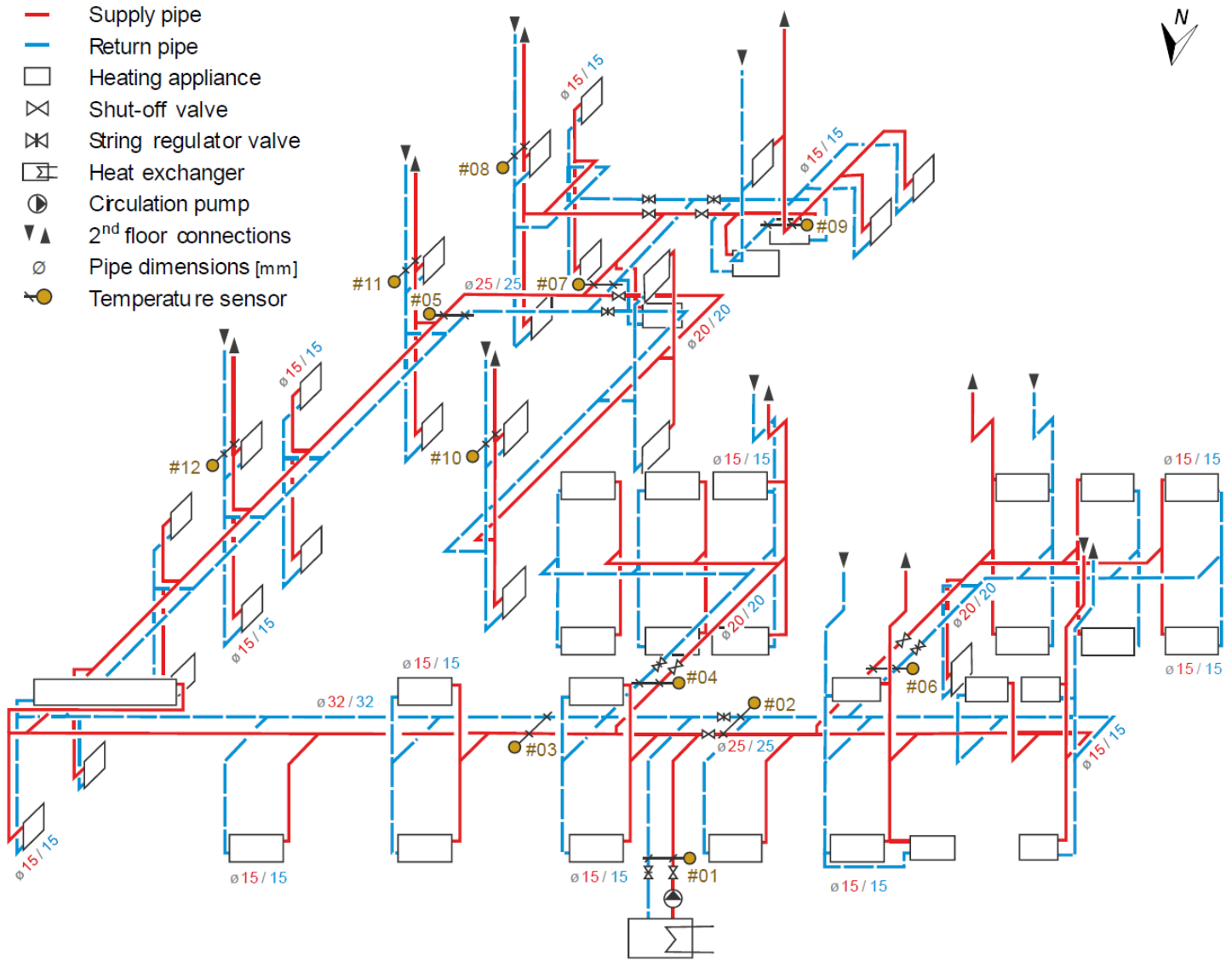
Mapping the pipes

- All pipes are mapped
- Hidden bypasses are found and closed

It is observed that there are no balancing of the system anywhere

- Remoni HeatMoni spot sensors have been placed so failures can be localiced



- Initial control strategy focussed on not paying penalty
- But building cold

- Temporary settings is high supply temperature securing room temperature at cost of energy consumption
- Return temperature can be low with low flow – one sintle radiator can ruin return temperaure
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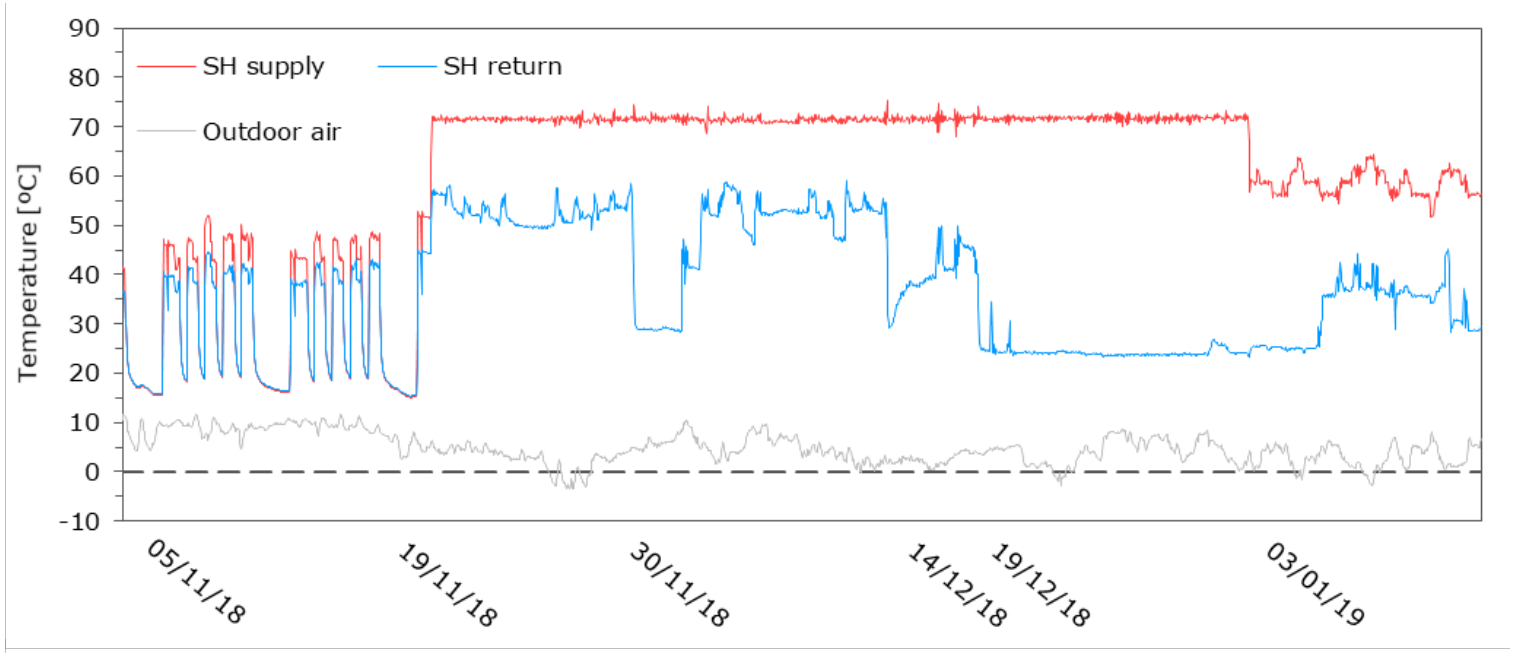
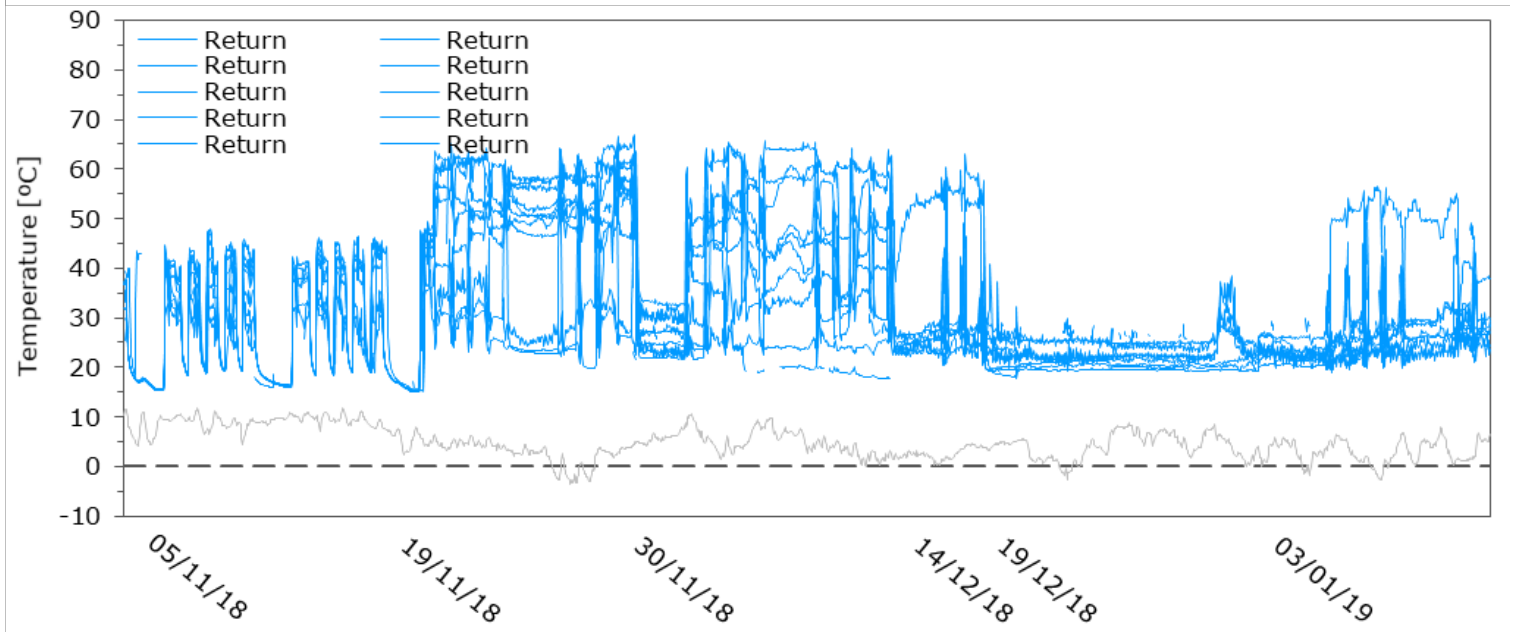
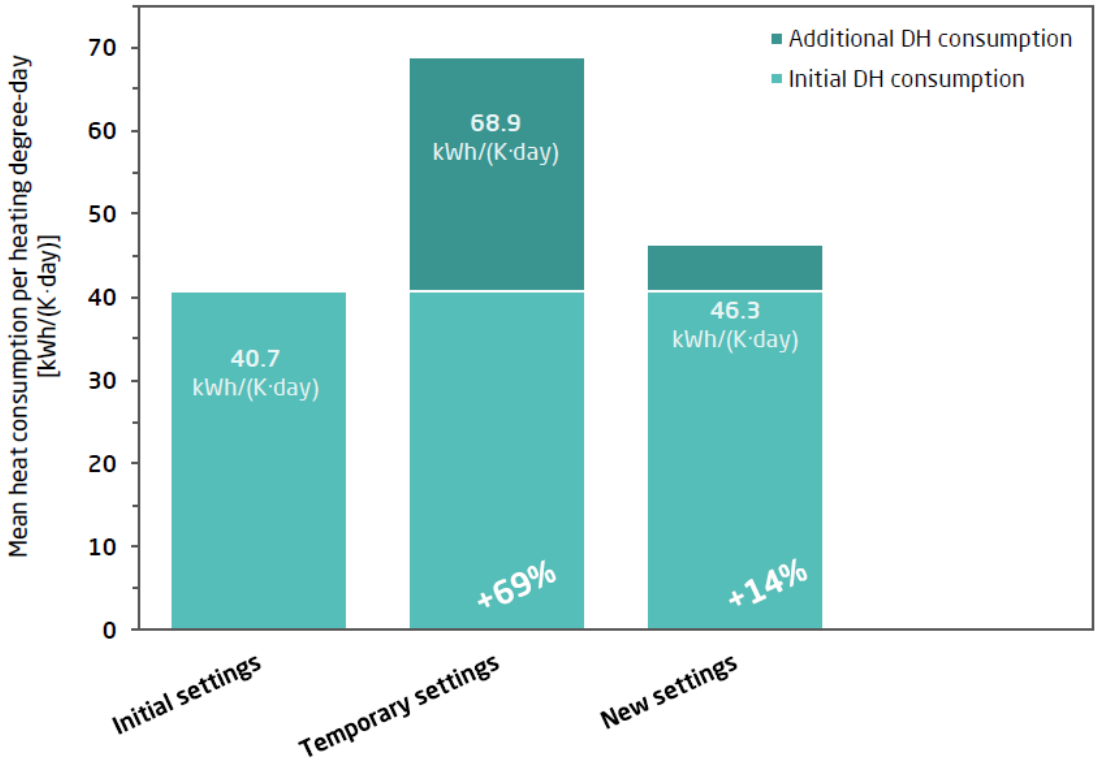
- New settings reduces supply temperature without raising return temperature





Higher energy consumption to secure warm rooms
Lower heating bill by securing low return temperature



Conclusions

- It was possible to improve the indoor thermal climate in the old school building from 1920ies.
- This could be done by raising forward temperatures at the cost of return temperatures.

- The return temperatures can be lowered significantly by eliminating failures and bypasses

- As any small failure will significantly “pollute” the return temperature – there is a need for continuous monitoring of room and return temperatures

- The savings due to temperature incentives in Høje-Taastrup Fjernvarme makes a very good business case for securing a sustained low return temperature.

- We need robust technical solutions and support of wireless sensors to document and secure the business case.
- The municipality awoids larger investment in new radiators – changed use of corridors need to be solved