


# CLIMIFY ENERGIFORUM Case: **Borgerskolen**

**Davide Cali**

CLIMIFY ('klaimə,fai/)  
CLIMATE-MODIFY

**TRY IT YOURSELF!**  
app.eu.climify.com  
Username: **feelthecomfort**  
Password: savetheclimate

SAVE  
THE  
CLIMATE

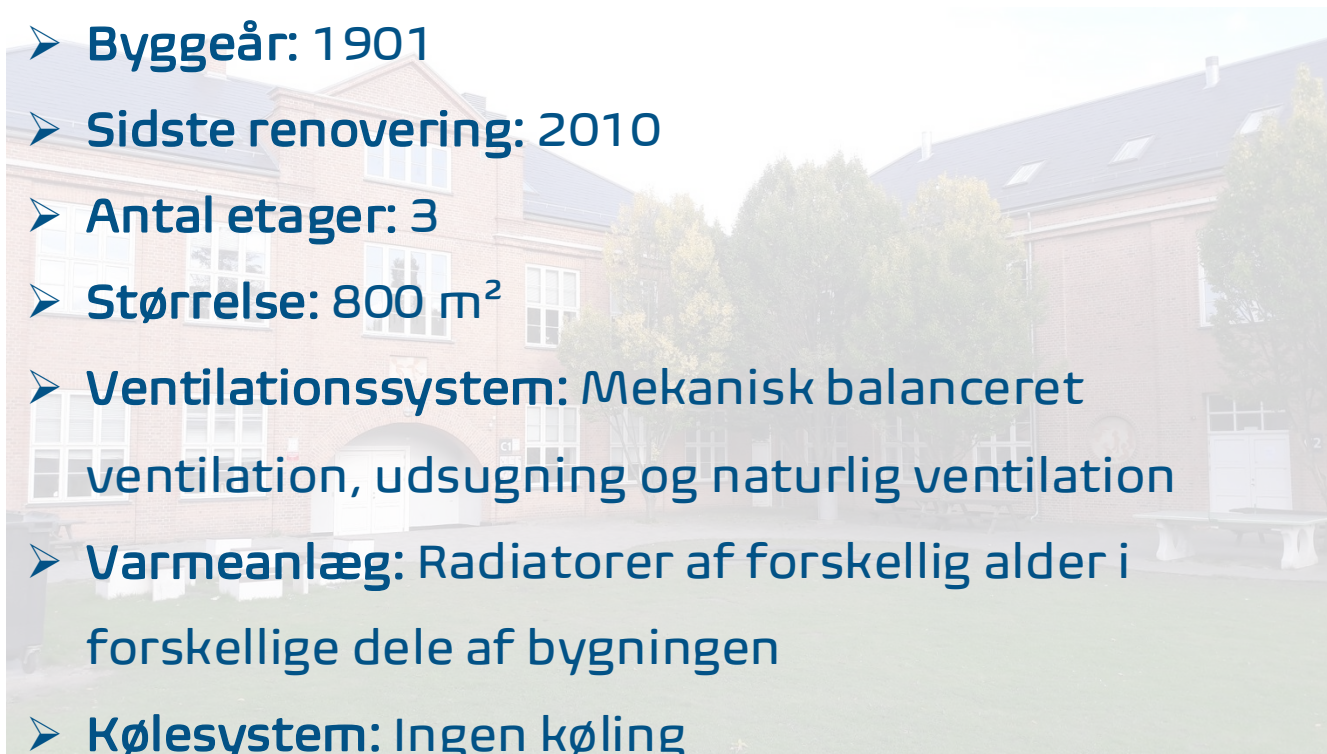
**CLIMIFY**   
**FEEL THE COMFORT™**  
**REDUCE** CO<sub>2</sub> EMISSIONS

## **FAKTA**

- Oprettet – Jan. 2021 som DTU spin-off
- Medarbejdere – 8
- Kunder – 12, i DK, USA, og Europa
- Demo Cases i DK, AT, NO, ES, NL, Hong Kong
- Marked: Kommuner, Regioner, Store ejendomsejere, husejere osv.
- I øjeblikket involveret i/leder 4 R&D projekter
- Rejste R&D-midler: >10M DKK

# Høje Taastrup Living Lab: Borgerskolen

- Type af Living Lab: Folkeskole
- Byggeår: 1901
- Sidste renovering: 2010
- Antal etager: 3
- Størrelse: 800 m<sup>2</sup>
- Ventilationssystem: Mekanisk balanceret ventilation, udsugning og naturlig ventilation
- Varmeanlæg: Radiatorer af forskellig alder i forskellige dele af bygningen
- Kølesystem: Ingen køling
- Bygningsstyringssystem (CTS): LTECH CTS



# Timeline



Forvurdering



**Etablering**

- Installation af sensorer
- Tilslutning til målings-tjenester\*

**Vurdering og planlægning.**

- Vurdering af indeklimate\* og energiforbrug
- Identifikation af specifikke aktuatorer

**Retrofit-tiltag**

- Installation af smarte termostat-ventiler
- Registrering af retrofit i bygnings log

**Vurdering og planlægning.**

- AI og ISO 50001 baseret Vurdering
- Identifikation af yderligere retrofit-tiltag

## ELOVERBLIK

 [Bygningsreglementet.dk](https://www.bygningsreglementet.dk)



\*e.g. ElOverblik, EnergiData, Eniscope, Ltech, ultrasonic meters, etc.

\* BR18, Arbejdstilsynet, Skimmelrisiko

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Log Details

Building: Single Family House

New Log Entry

Title: \_\_\_\_\_

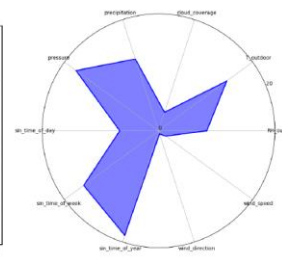
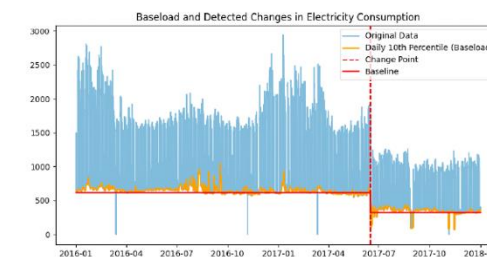
Description: \_\_\_\_\_

Start Date: 19/08/2024 End Date: 19/08/2024

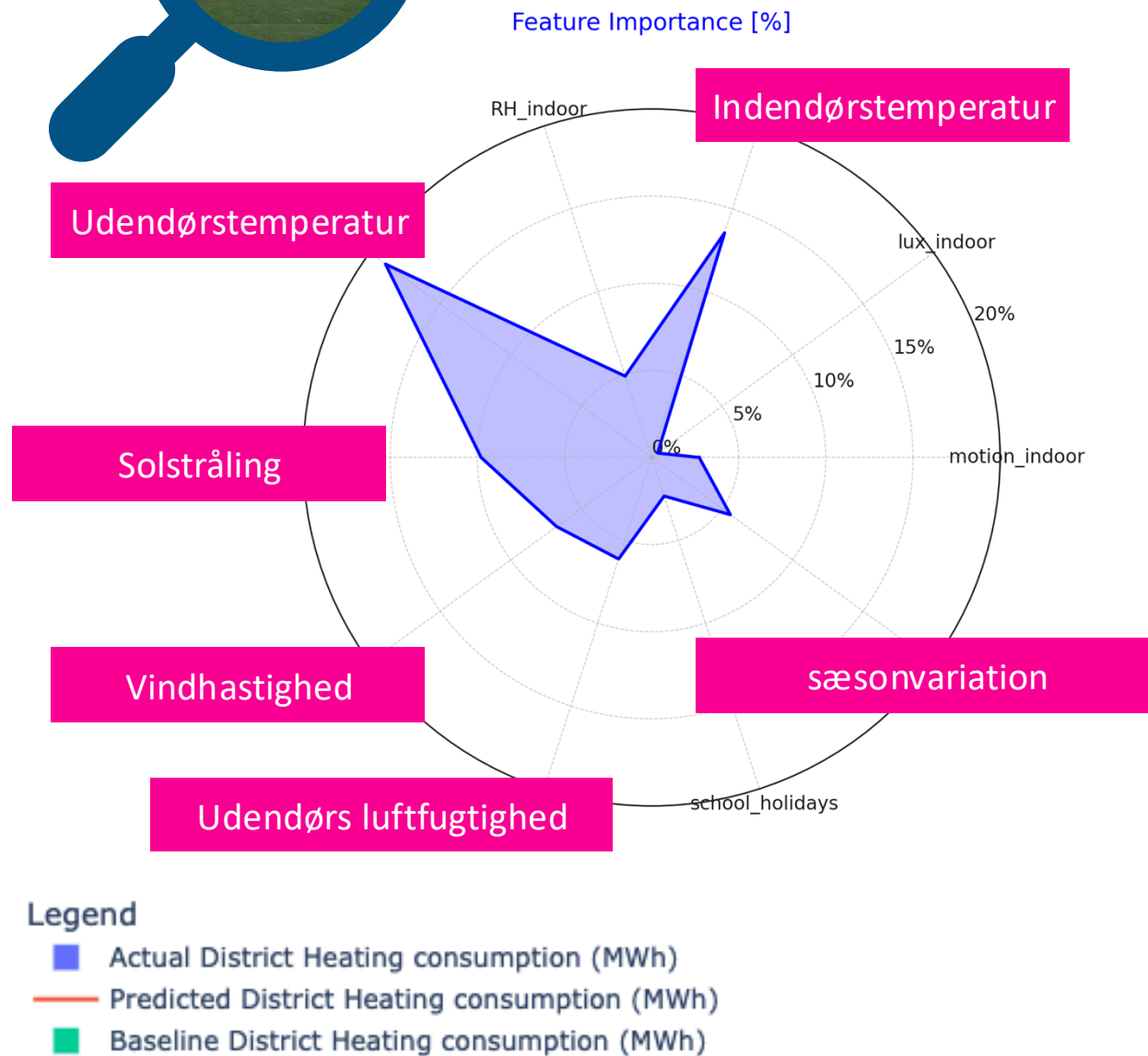
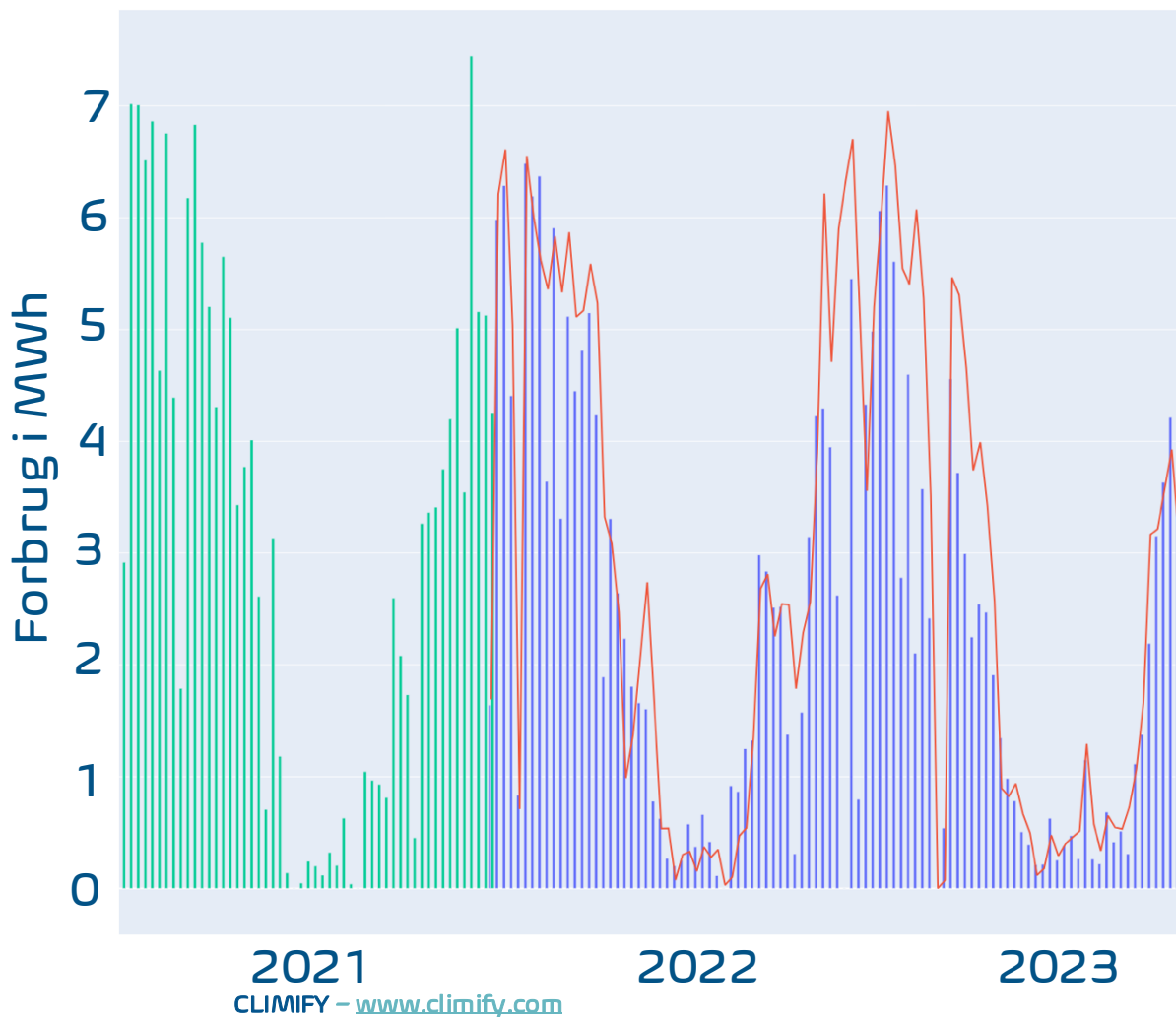
Cost: 0 DKK

Responsible Person: \_\_\_\_\_

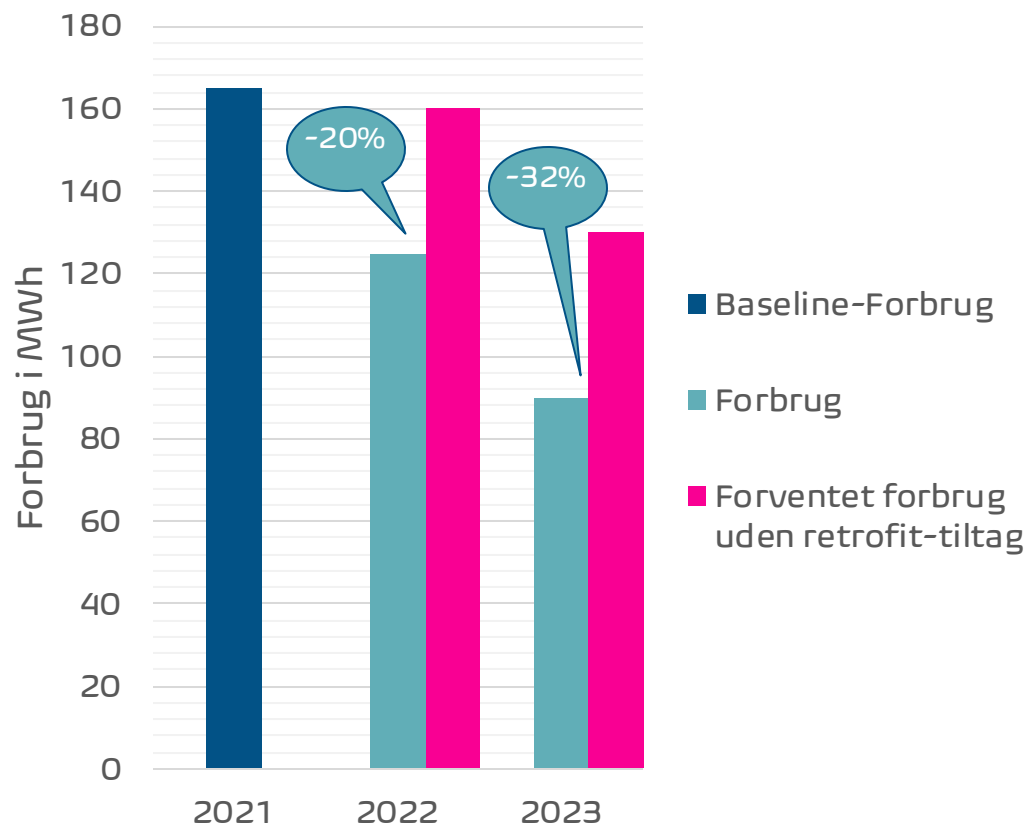
Tags: Heating Water Electricity Ventilation Custom



# Resultater fra Borgerskolen



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	2021	2022	2023
Fjernvarme*	110.000 kr.	83.300 kr.	60.000 kr.
Fjernvarme høj temperature straff**	12.000 kr.	✓ 0 kr.	✓ 0 kr.
Elforbrug***	80.000 kr.	72.000 kr.	72.000 kr.
<b>Besparelser</b>		<b>43.300 kr.</b>	<b>46.600 kr.</b>

\* Estimeret omkostning baseret på energipriserne i 2021.

\*\* Estimerede besparelser baseret på HTK's interne beregninger.

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# Resultater fra Borgerskolen: ROI



Brugertilfredshed:  
+24%  
takket være vores AI-styring

- Hardwareomkostning: 53.000 kr.
- Installation: 10.000 kr.
- Årlig softwareafgift: 10.000 kr.
- ROI: mindre end 2 år

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# LoRaWAN Network Design

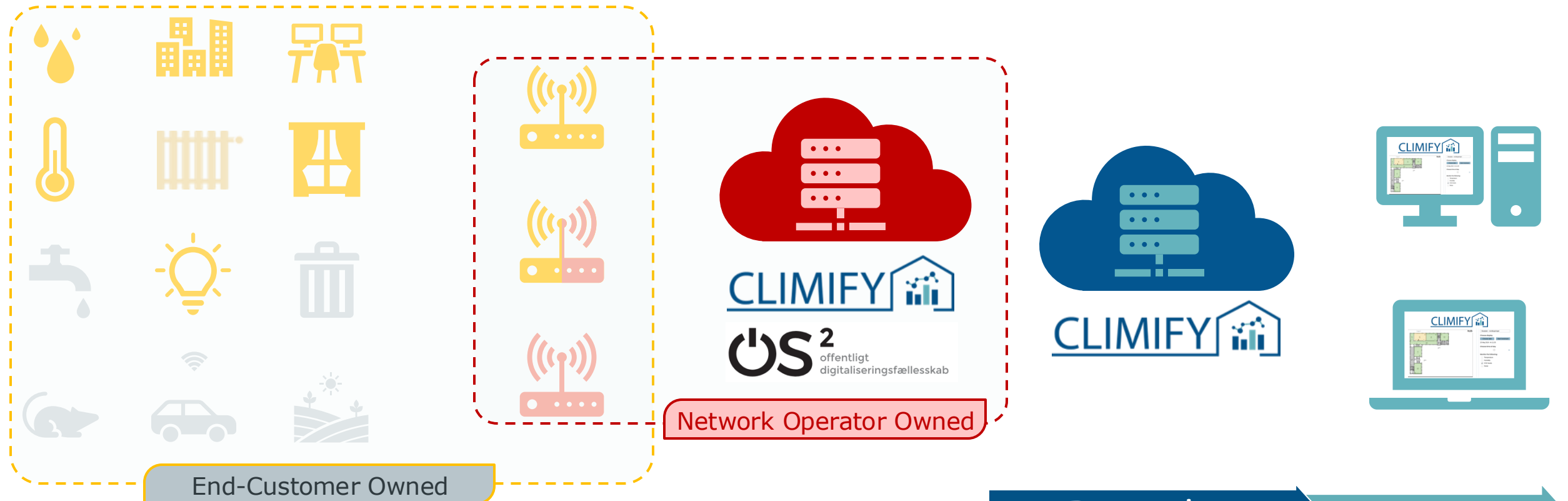
Sensors & Actuators

Gateways

Network Server

Application Server

End Customer

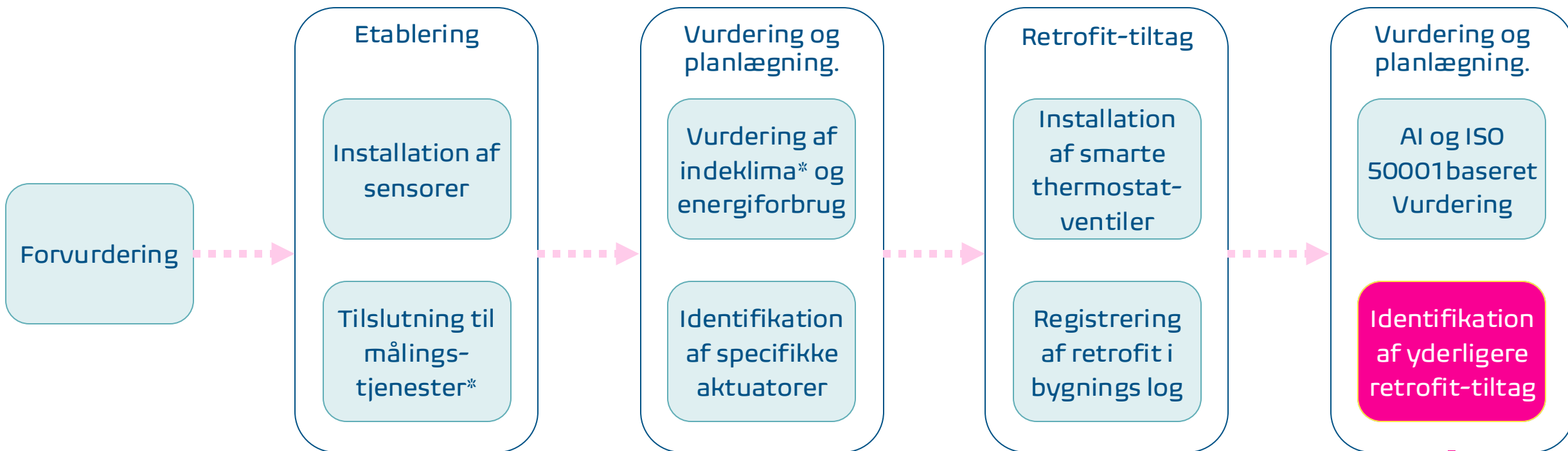


Data flow






# Timeline



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# Value Propositions

What you get and how Climify stands out

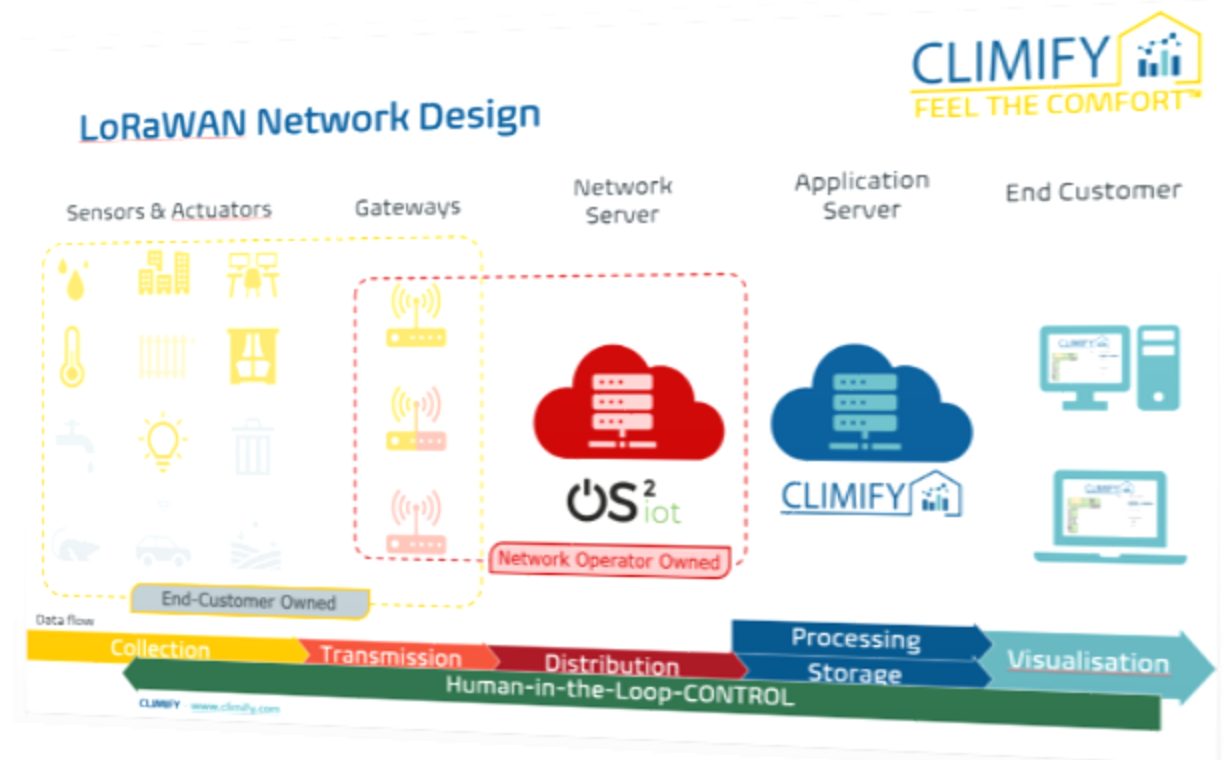
# CLIMIFY VALUES: FREEDOM

- We do not lock you into Hardware nor Software:
- Open sensors, Open network:
  - Monitoring,
  - Transmission,
  - Distribution of data

All in customers' hands



Through OS2IoT, the entire operation & maintenance of the municipality network costs less than 10.000 DKK / year



# CLIMIFY VALUES: TRANSPARENCY

- Everybody in the municipality can access data, with different access rights
- **Advanced, hierarchical access control**
  - Organizations' managers,
  - Buildings' managers,
  - Teachers,
  - Pupils, guests.

Include employees and  
citizens



Access management is included  
in our offer



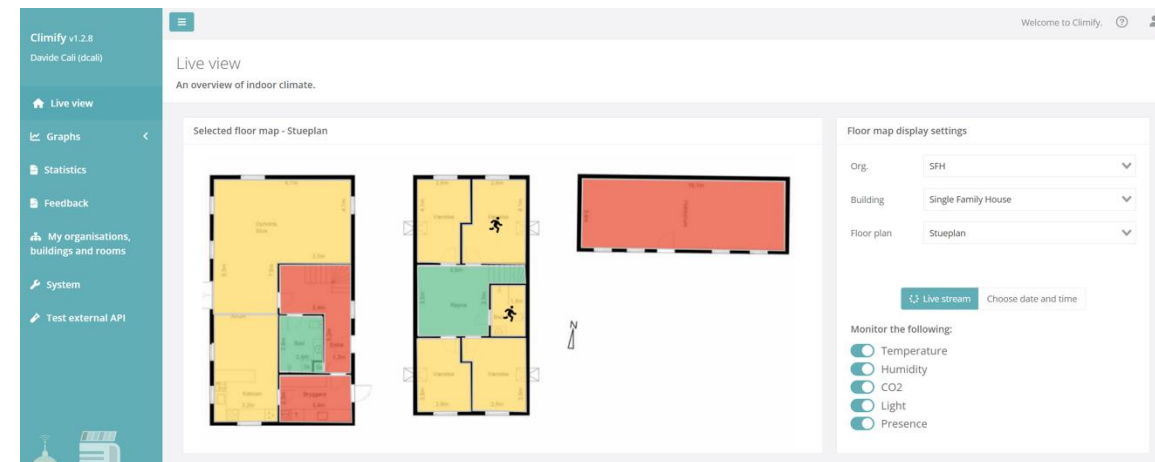
# CLIMIFY VALUES: LIVE DATA

- Accessing the data live saves you time, resources, and money.
- Live status and data evaluation for all users
  - Live assessment
  - Thresholds' analyses
  - Over-time live evaluation
  - Data mapping

Interact with your data



Live evaluation of data is included in our offer



# CLIMIFY VALUES: OWNERSHIP

- Your Data, your Learnings: You own the data that we store and evaluate for you.
- **Open API**
  - Unlimited API calls
  - Integration in other environments
  - Already existing Integration in third parties products and CTS
  - 3 years of data constantly accessible, on demand more

Get your data



Open API included in our offer

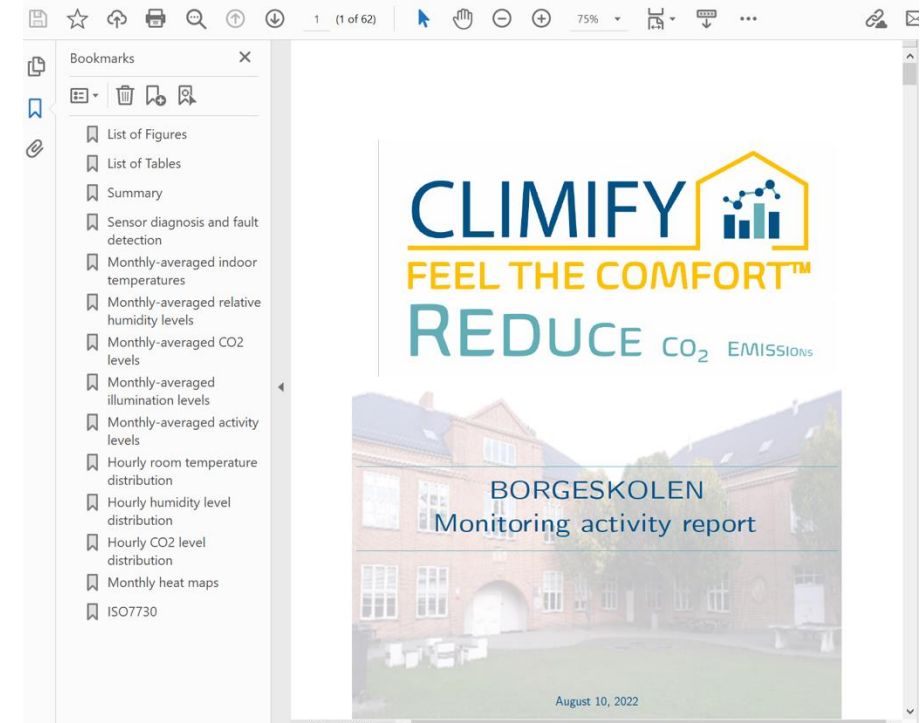


# CLIMIFY VALUES: CONTINUOUS LEARNING

- We evaluate, regularly, your data for you.
- Co-Designed the reports and the alarms about your building stock:
  - Thermal comfort evaluation
  - Indoor environmental quality assessment
  - Air quality assessment
  - Mold risk assessment
  - Room usage
  - Alarms
  - BT18, AT compliancy

Interact with your data

Planned reporting and time-dependent alarms included in our offer





# CLIMIFY VALUES: END USERS INVOLVEMENT

- Inform the users of your buildings about the indoor climate
- Information about indoor climate helps taking decisions about ventilation and heating:
  - Qualitative evaluation of temperature, relative humidity, carbon dioxide and light (Green - Yellow - Red)
  - QR Code in each room
  - Account free access per Bluetooth beacon
  - Account-based access

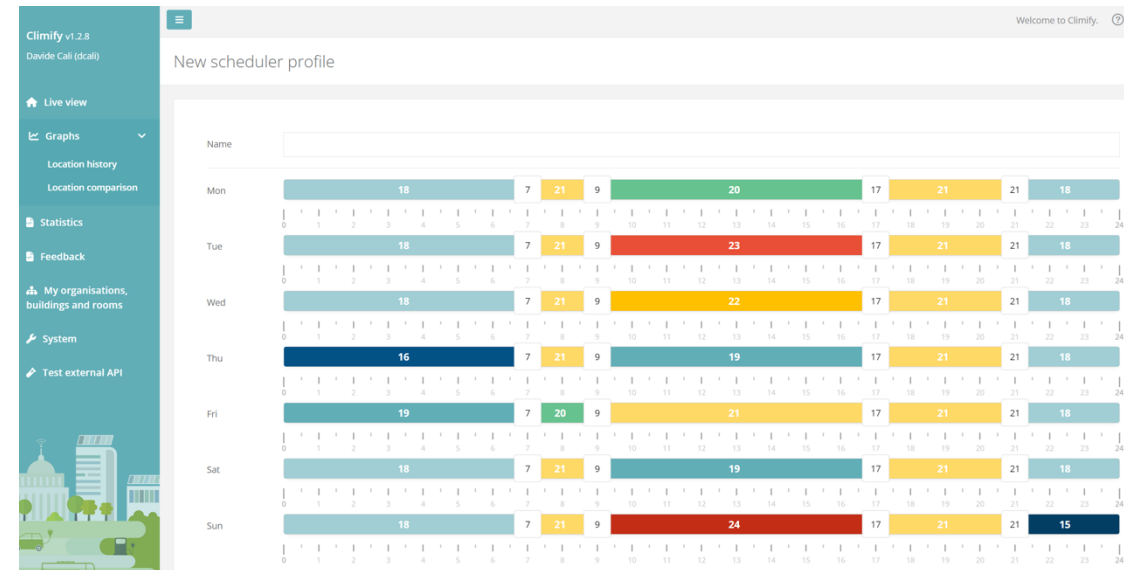
Pleanty of options to let your occupants interact with data

Mobile and browser App included in our enterprice offer



# CLIMIFY VALUES: CONTROL

- Control your system based on data and on feedback
- Live data are optimal for live smart control and operation
  - Integrate in BMS
  - Control smart thermostats
  - Control smart windows (e.g. Velux) and other devices
  - Define schedules
  - Use Digital Twin to save energy and reduce CO<sub>2</sub> emissions



Pleanty of options to let your occupants interact with data

On demand integrations developments

# Different price models for different needs

Package	Monitoring	Monitoring, Assessment & Automation					
	Light	Premium XS	Premium S	Premium M	Premium L	Premium XL	Premium Enterprise
Maximum Devices	unlimited	500	1.000	2.500	5.000	10.000	Custom
Maximum Rooms (Locations)	unlimited	50	100	250	500	1.000	Custom
Maximum Buildings	unlimited	5	10	25	50	100	Custom
Reporting Functions	✓	✓	✓	✓	✓	✓	✓
Scheduler		✓	✓	✓	✓	✓	✓
Ad-hoc Automations		✓	✓	✓	✓	✓	✓
FeedMe App		✓	✓	✓	✓	✓	✓
Buildings' Log		✓	✓	✓	✓	✓	✓
Energy Savings Tracker		✓	✓	✓	✓	✓	✓
Data Retention	3 Years	3 Years	3 Year	3 Years	3 Years	3 Years	Customizable
Actuators Support	✓	✓	✓	✓	✓	✓	✓
API	✓	✓	✓	✓	✓	✓	✓
Users' Management	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited
Consultancy / Developments	1.500;-/h	950;-/h	950;-/h	950;-/h	950;-/h	950;-/h	negotiable
Yearly Price	<b>Request offer</b> 500;- per device	<b>request</b>	<b>request</b>	<b>request</b>	<b>request</b>	<b>request</b>	<b>negotiable</b>

# Hardware & Sensors

A selection of 3<sup>rd</sup> party open hardware  
that we recommend

HW prices might fluctuate, always ask for a specific offer.

## Gateways

- Kerlink Wirnet iFemtocell-evolution LoRaWAN 868 MHz

→ 1.720,- per gateway



# Indoor Climate

- ELSYS ERS CO2

→ 25 x with batteries → approx. 1.210 DKK per piece

→ 100 x with batteries → approx. 1.110 DKK per piece



Temperature-,  
humidity-,  
light-,  
motion  
and  
CO<sub>2</sub>-sensor

## Desk sensors

- ELSYS ERS Desk (Occupancy, temperature, humidity)

→ 50x with batteries → 492 DKK / piece

EMS Desk is a sensor slightly larger than an AA-battery and ideal for mounting under desks. It is designed to detect occupancy regardless of type of table and position of the person.



## Leakage sensors

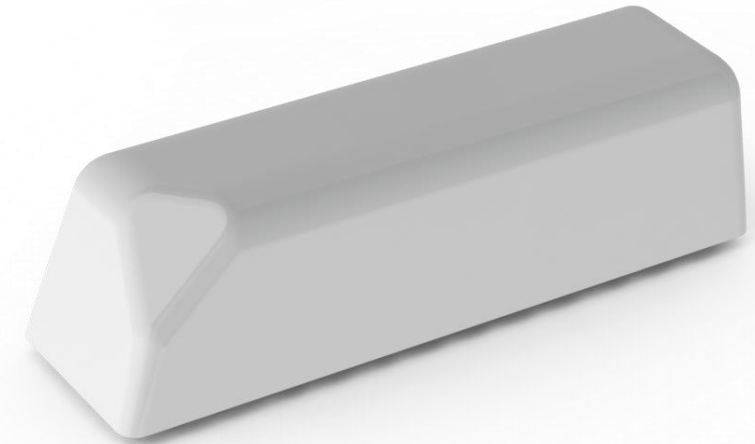
- ELSYS EMS Lite (leakage, temperature, humidity)

→ 50x with batteries → 380 DKK / piece

This is an indoor LoRaWAN® room sensor for measuring the indoor environment and detect water leakage.

The battery life is estimated to be up to 10 years but depends on sample interval, transmit interval, data rate, and environmental factors. It is powered by one 3,6V AA lithium battery.

All Elsys sensors are equipped with NFC (Near Field Communication) for easy configuration with an Android phone. You can change the sample rate, data rate, encryption keys, triggers, activation, and much more in our application "Sensor Settings". All Elsys sensors are built on the LoRaWAN® stack from Semtech.





## Investment in Window Sensors

- Sensative Comfort Stripes(& humidity and temperature)

→50x with batteries → 365 DKK / piece

- ELSYS door/window Sensor (& humidity and temperature)

→50x with batteries → 395 DKK / piece



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# Investment in BLE beacons

- Anchor Beacon 2

→ Price per BLE Beacon

→ 50x with batteries → 220 DKK / piece



## Thermostats

- Mclimate Vicki eTRV

→ 50x with batteries → 700 DKK / piece

