

# Airlich

Clean Air. Clean Conscience.

Copenhagen, Denmark  
December 2023

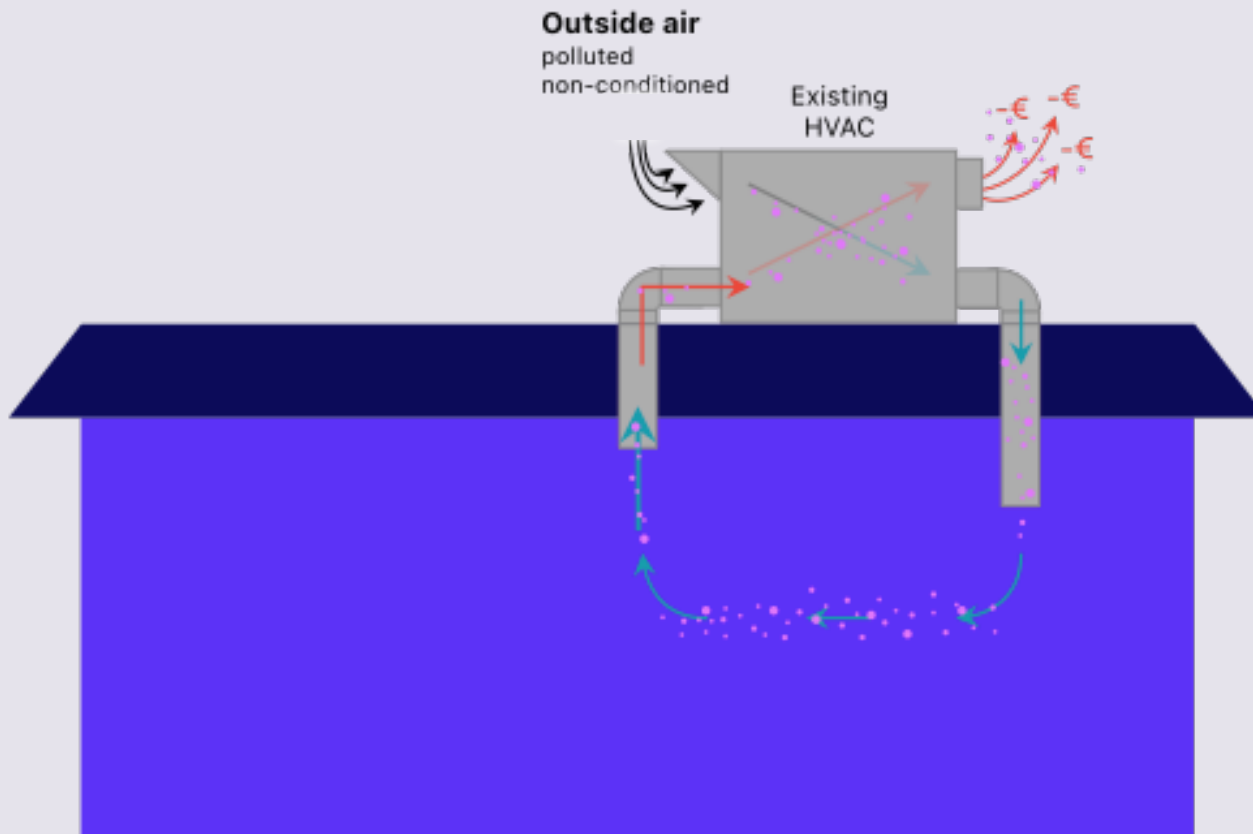
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Airlich delivers an easy-to-install retrofit solution that boost HVAC energy efficiency, enhance indoor air quality and protect CRE asset value by improving building EPC labels and sustainability credentials



# Retrofitting Airlich RACC™ Technology to Recirculate Indoor Air and Boost HVAC Energy Efficiency



# INDOOR CONTAMINANTS

Traditional ventilation relies on removal of indoor contaminants by expelling conditioned indoor air to the outside surroundings and take in outside air.

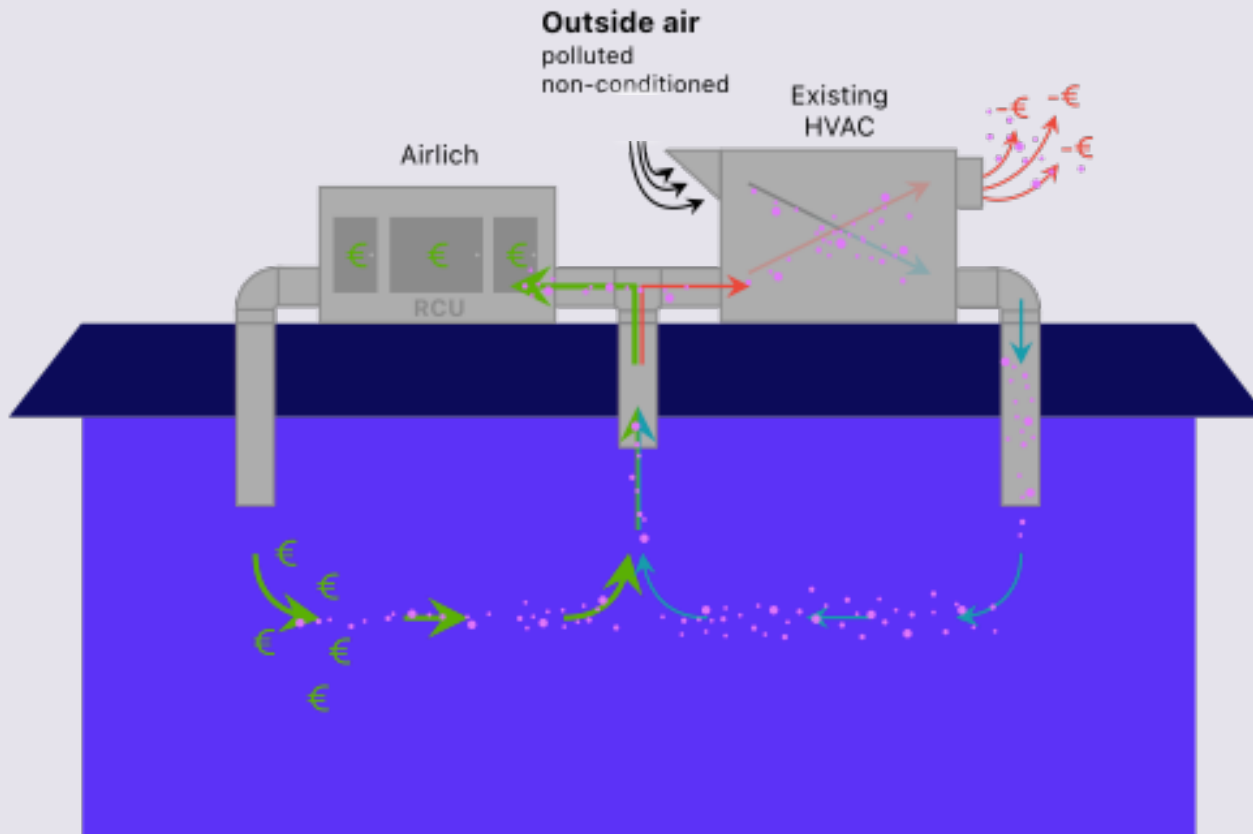
## POOR HEAT RECOVERY

Between 20-40% of the energy in the conditioned indoor air is lost due to poor heat exchange recovery in the air handling unit.

# OUTSIDE POLUTION

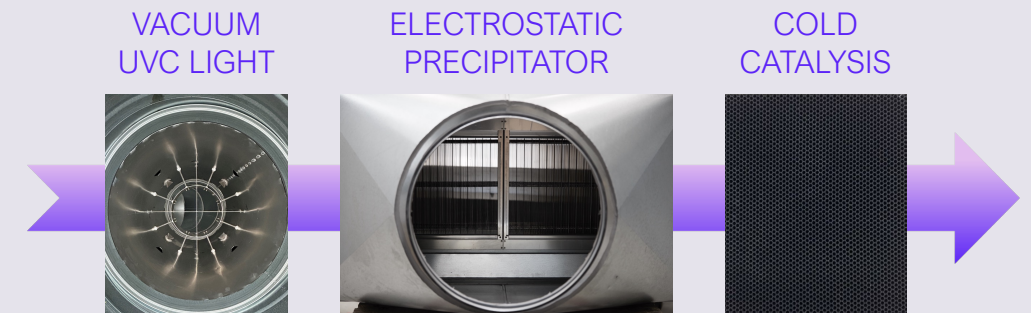
Outside air may be contaminated especially in urban areas with high population density negatively affecting the indoor air quality.

# Retrofitting Airlich RACC™ Technology to Recirculate Indoor Air and Boost HVAC Energy Efficiency



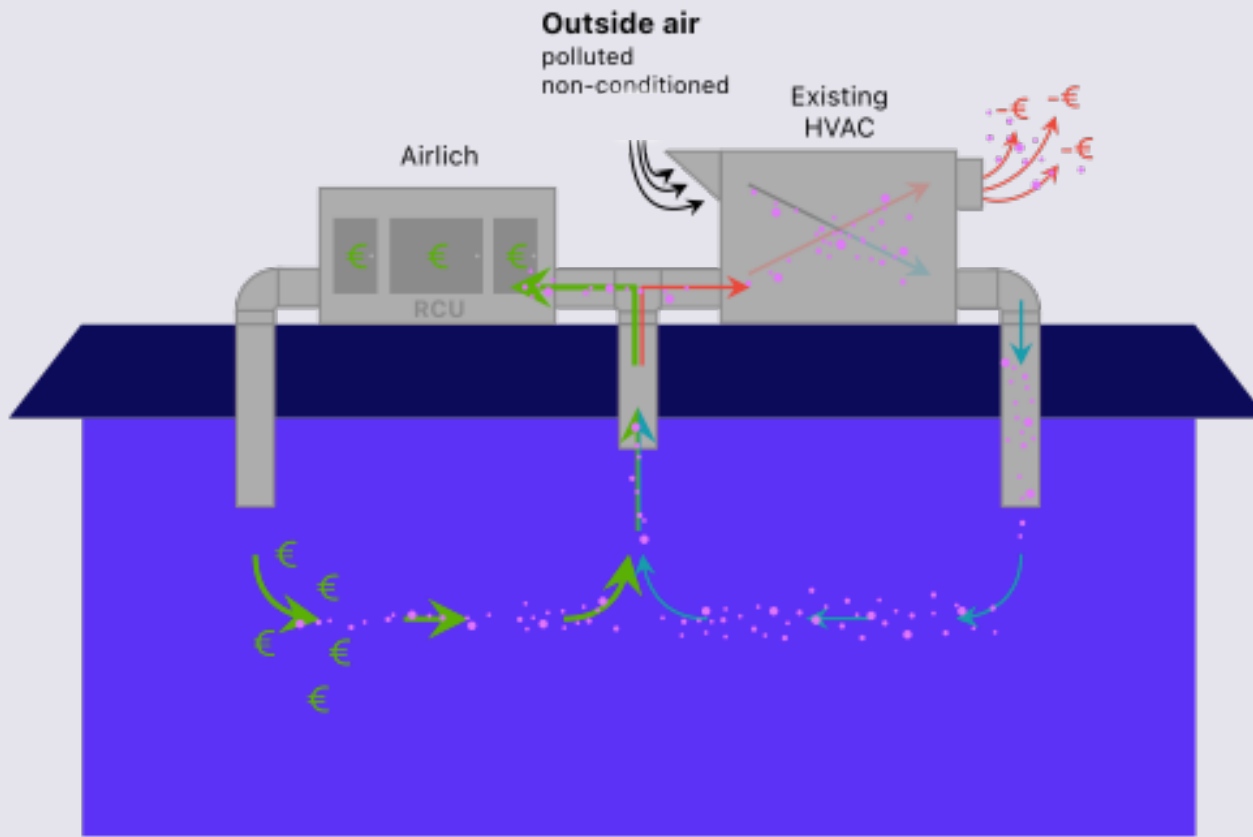
## RECIRCULATION OF AIR

Highly efficient air purification by Airlich technology enables safe and energy efficient re-use of indoor air.





# Retrofitting Airlich RACC™ Technology to Recirculate Indoor Air and Boost HVAC Energy Efficiency



Up to  
**45%**  
reduced HVAC system energy  
consumption

↓ **CO<sub>2</sub>**  
emissions from the operation  
of buildings due to enhanced  
energy efficiency

↑ **IAQ**  
by efficiently removing  
VOCs, particles, bacteria  
and viruses

Inspired by nature, Airlich's RACC™ technology breaks down and removes gas-phase pollutants, particulate matter, virus and bacteria through chains of radical reactions *in situ*



3<sup>rd</sup> ring road, at the Royal Danish Embassy in Beijing (Feb. 2016)

# Atmospheric VOC Removal under High NO<sub>x</sub> Conditions

## USING OXYGEN AS FUEL

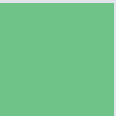
Atmospheric oxidation of VOCs under high NO<sub>x</sub> conditions using oxygen and high energy light to trigger deposition



Atmospheric oxygen  
as oxidation fuel



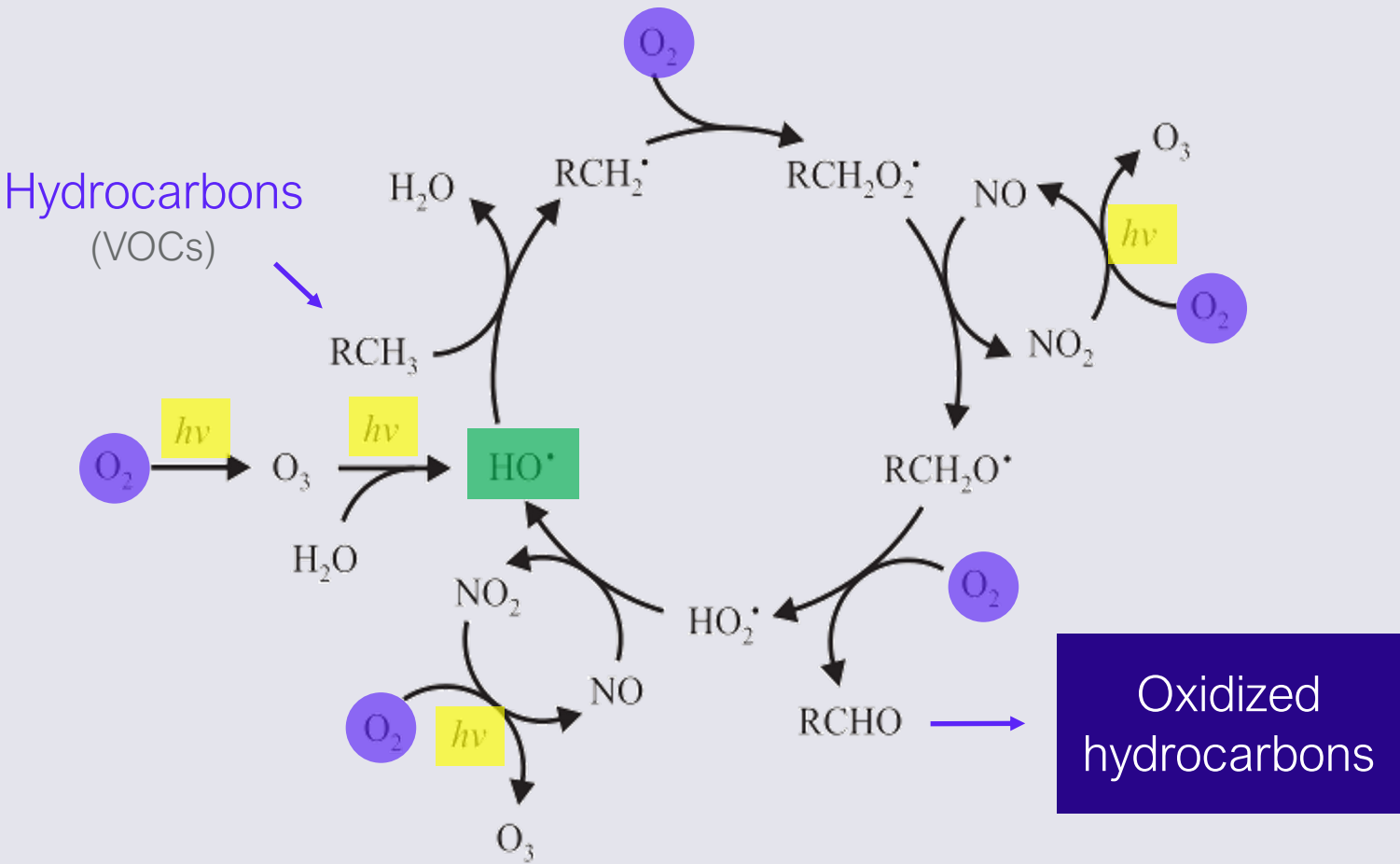
Exposure to high-  
energy light (sunlight)



Hydroxyl radical also known as the  
“Detergent of the Atmosphere”



Wet and dry deposition  
of atmospheric VOCs



Airlich collaborates with dedicated partners with high focus on ESG by conducting pilot installations across high fit segments





## 2023 Case



Estimated

# >60 MWh

energy savings (combined) per year<sup>1</sup>

# 19.7t

less CO<sub>2</sub> emission per year due to enhanced energy efficiency<sup>2</sup>

# ↑IAQ

by efficiently removing VOCs, particles, bacteria and viruses



## 432

Restaurants in the Nordics of which 50% anticipated free standing buildings<sup>3</sup>

50%

## 19,4 GWh

energy savings (combined) per year<sup>4</sup>

## 3.29 mEUR/year

reduced operational costs per year before tax<sup>5</sup>



## 1,367

Restaurants<sup>3</sup>



## 1,432

Restaurants<sup>3</sup>

<sup>1</sup> Estimated savings by Danish Technical Institute based on building simulations after installation of Airlich technology. Data on file

<sup>2</sup> Total CO<sub>2</sub> reduction based on average CO<sub>2</sub> emission from energy (combined) in 2022. Source; <https://www.nowtricity.com>

<sup>3</sup> Number of McDonalds restaurants at end-year 2021. Source; <https://corporate.mcdonalds.com/content/dam/sites/corp/nfl/pdf/Restaurants%20by%20Country%202021.pdf>

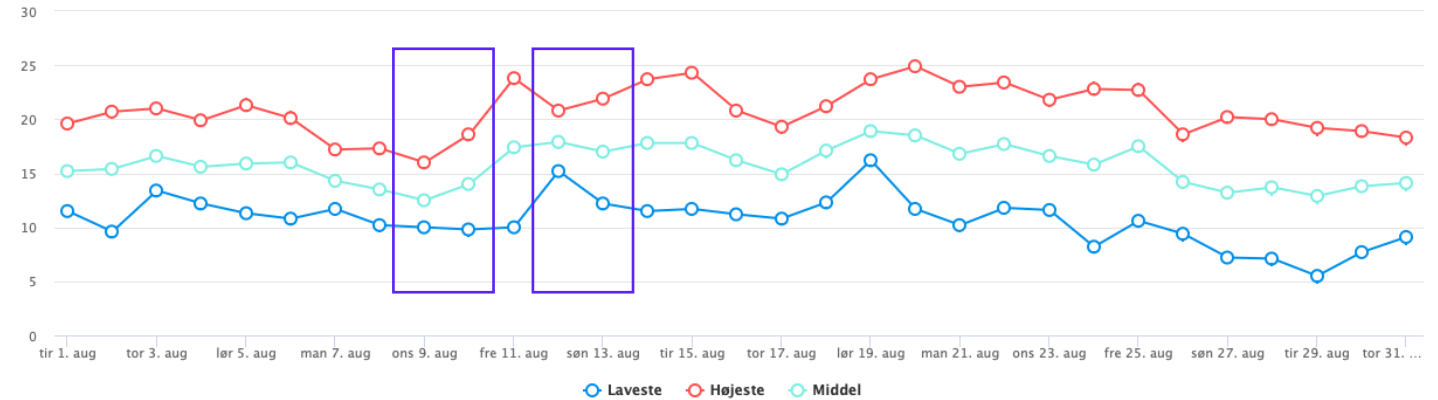
<sup>4</sup> Total energy savings in all restaurants in specific country based on estimated savings by Danish Technical Institute

<sup>5</sup> Eurostat. Electricity prices for non-household consumers H2 2022 without taxes. Source; [https://ec.europa.eu/eurostat/databrowser/view/nrg\\_pc\\_205/default/table?lang=en](https://ec.europa.eu/eurostat/databrowser/view/nrg_pc_205/default/table?lang=en)

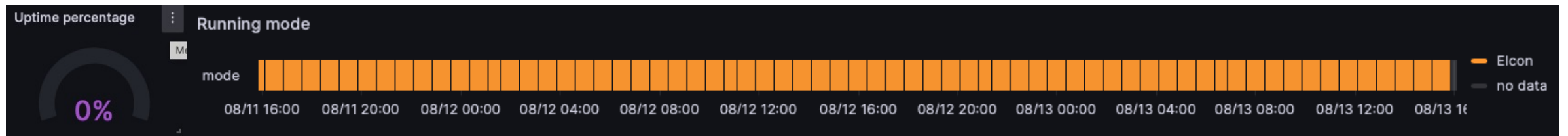
# Summer days

## 68% saving

Vejle kommune august 2023  
Temperatur (°C)

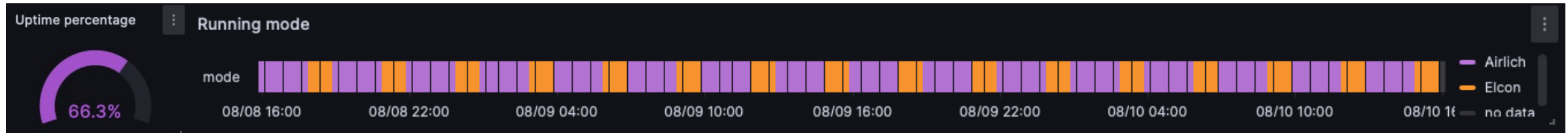


August 11, 1600h – August 13, 1600h



Elcon: 175.6 kWh, Airlich: 2.1 kWh, Total 177.7 kWh per 48h = **3.7 kWh per hour**

August 8, 1600h – August 10, 1600h



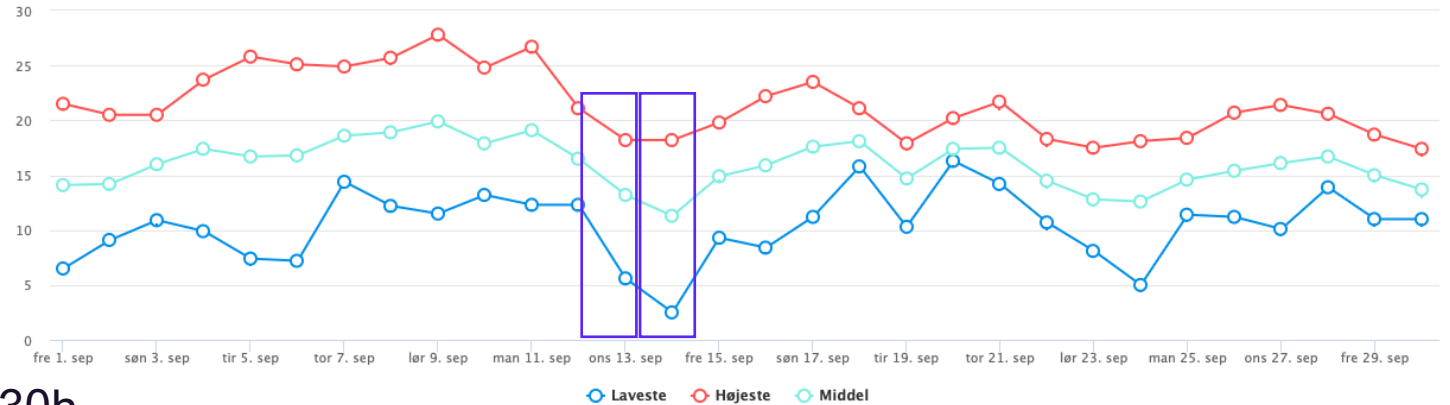
Elcon: 25.4 kWh, Airlich: 32.1 kWh, Total 57.5 kWh per 48h = **1.2 kWh per hour**

# Fall day

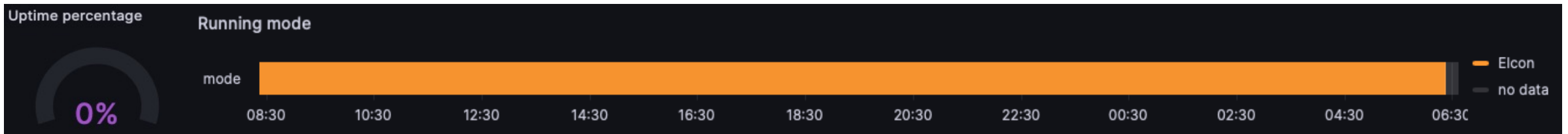
## 58% saving

Vejle kommune september 2023

Temperatur (°C)

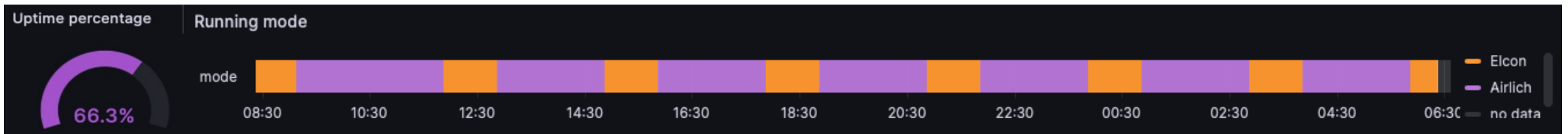


September 12, 0830h – September 13, 0630h



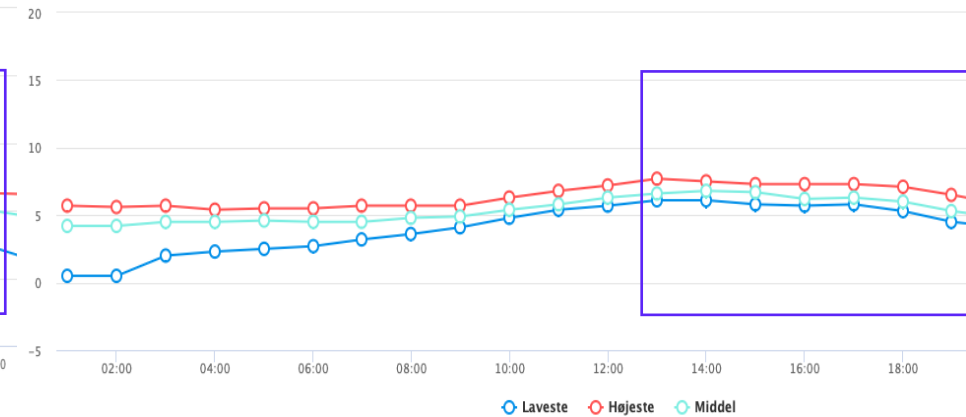
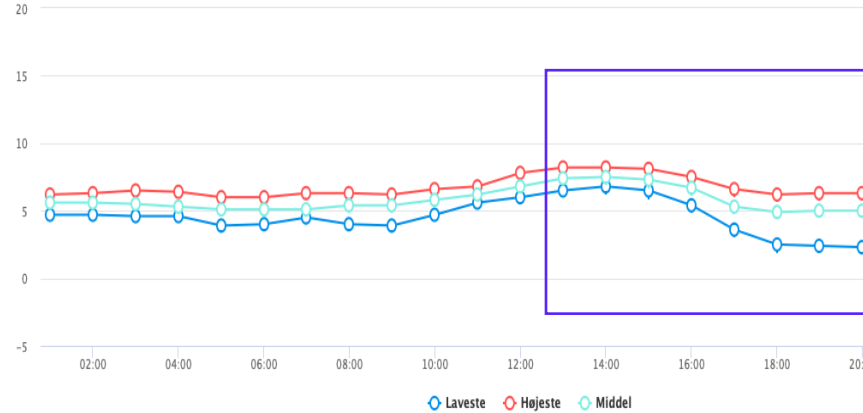
Elcon: 67.2 kWh, Airlich: 0.95 kWh, Total 68.2 kWh per 22h = **3.1 kWh per hour**

September 13, 0830h – September 13, 0630h

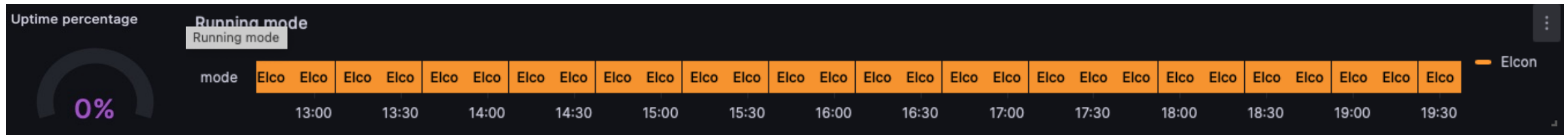


Elcon: 12.7 kWh, Airlich: 13.7 kWh, Total 26.4 kWh per 22h = **1.3 kWh per hour**

Winter day  
**70% saving**

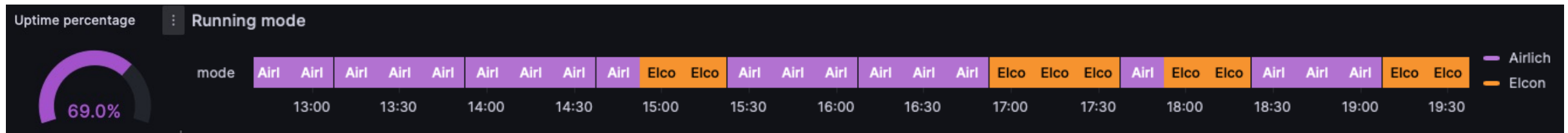


November 12, 1240h – November 12, 1940h



Elcon: 83.5 kWh, Airlich: 0.3 kWh, Total 83.8 kWh per 7h = **12 kWh per hour**

November 13, 1240h – November 13, 1940h



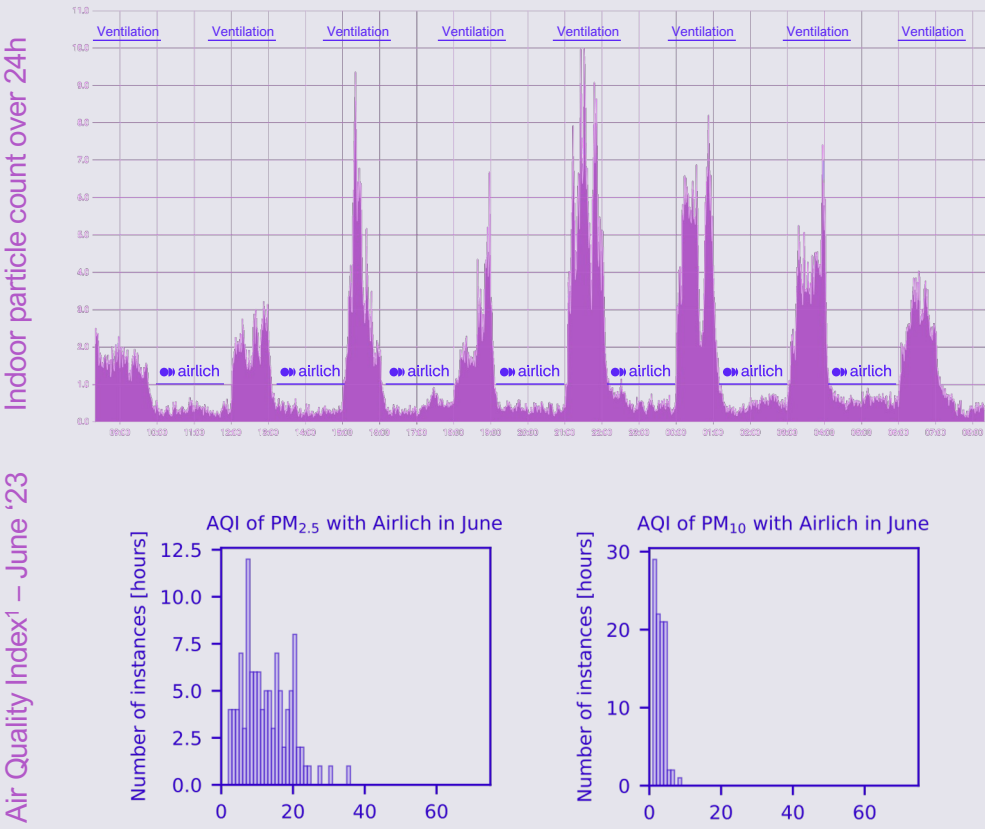
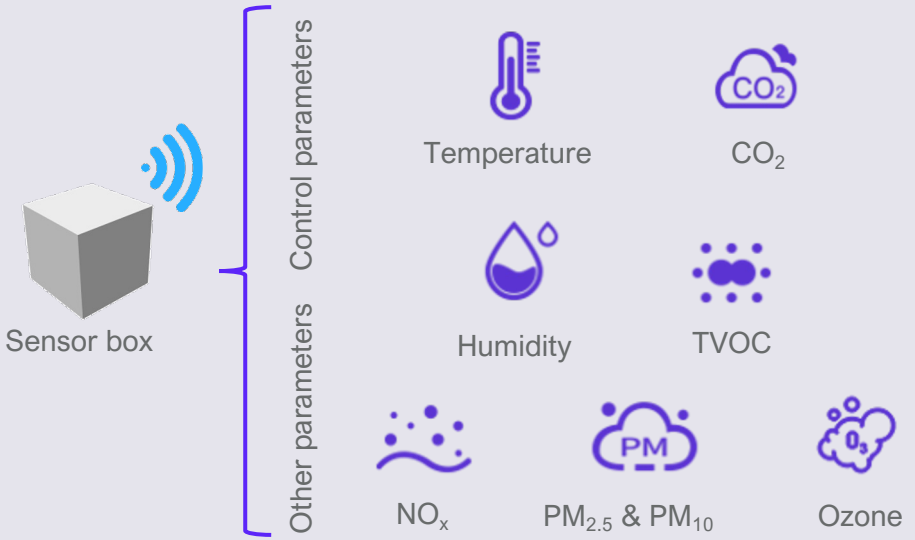
Elcon: 22.6 kWh, Airlich: 2.5 kWh, Total 25.1 kWh per 7h = **3.6 kWh per hour**



# Impact on Air Quality Following Installation of Airlich Technology

## MONITORING AIR QUALITY THROUGH BUILT-IN SENSORS

Real-time monitoring of all relevant indoor air quality parameters to control optimal recirculation rate and secure excellent indoor air quality



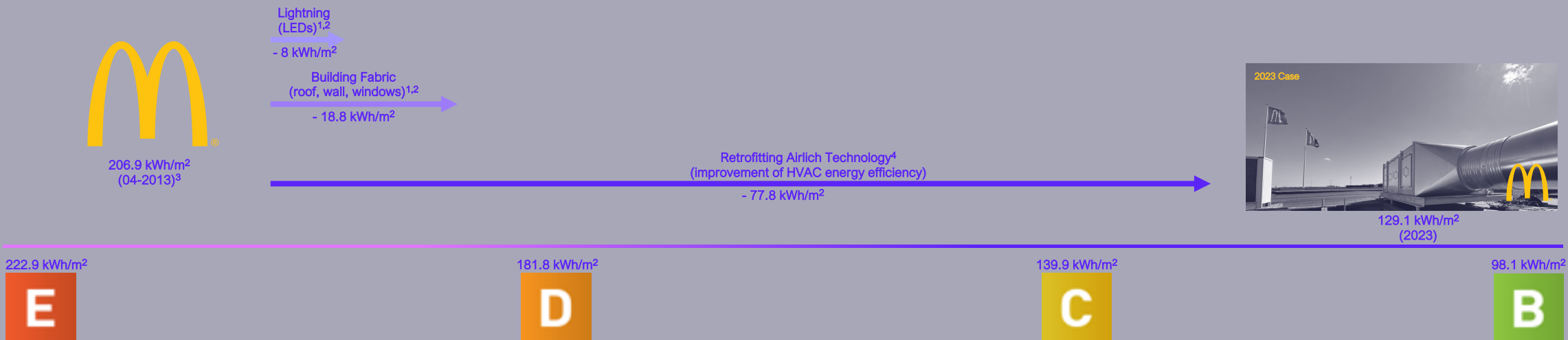
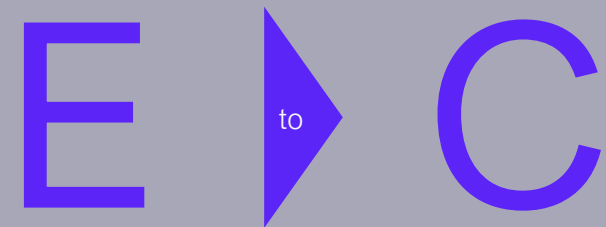
<sup>1</sup> Indoor air quality is reported according to the AQI defined by the U.S. Environmental Protection Agency (EPA), the most recognized approach to evaluate air quality. AQI scores are obtained by averaging readings from installed air quality sensors inside the building, measuring all relevant indoor air pollutants and computed to give a corresponding AQI number from 0-500; 0-50 = Good, 51-100 = Moderate, 101-150 = Unhealthy for sensitive groups, 151-200 = Unhealthy, 201-300 = Very unhealthy, 301-500 Hazardous. The lower the AQI the better the air quality

# Impact on EPC Label Following Installation of Airlich Technology



Significant impact on building energy efficiency by retrofitting Airlich technology protecting CRE value and ESG compliance

EPC impact



<sup>1</sup> The De-risking Energy Efficiency Platform. Energy efficiency outcomes are based on around 1600 observations from buildings in the residential, public, health care and educational building segments

Source; [https://energy.ec.europa.eu/topics/energy-efficiency/financing/de-risking-investments\\_en](https://energy.ec.europa.eu/topics/energy-efficiency/financing/de-risking-investments_en)

<sup>2</sup> Eurostat. Electricity prices for non-household consumers H2 2022. Source; [https://ec.europa.eu/eurostat/databrowser/view/nrg\\_pc\\_205/default/table?lang=en](https://ec.europa.eu/eurostat/databrowser/view/nrg_pc_205/default/table?lang=en)

<sup>3</sup> Energy Label for McDonalds Vejle DTC (310036668) dated 04-2013.

<sup>4</sup> Improved energy efficiency modelling by Sustain Solutions for McDonalds Vejle DTC. Data on file

# Impact on DGNB Scoring Following Installation of Airlich Technology

## ENV1-B Climate Action & Energy

The purpose of the criterion is to enable CO<sub>2</sub>-neutral building operation. Any reduction in the building's total CO<sub>2</sub> emissions will therefore have a positive effect on this criterion.

A total of 100 points can be achieved in the criterion. Including bonus points, up to 140 points can be obtained..

**The criterion makes up the largest proportion of all 9 criteria and weighs 30%.**

## ECO1-B Operating Costs

The purpose of the criterion is to evaluate and control the financial expenses for building operation and to identify cost-effective measures for future optimizations.

A total of 100 points can be achieved in the criterion. Including bonus points, up to 120 points can be obtained.

**The criterion is weighted with 10%.**

## ECO3.2-B Procurement & Operations

The purpose of the criterion is to achieve a more sustainability-conscious procurement and operational management. It is desired to promote products, materials and services with recognized environmental and social certifications.

A total of 100 points can be achieved in the criterion. Including bonus points, up to 105 points can be obtained.

**The criterion is weighted with 5%.**

## SOC1-B Indoor Comfort

The purpose of the criteria is to deliver a suitable indoor climate that ensures optimal conditions for the building's users all year round

In this criterion, a total of 100 points can be obtained. With bonus points, a total of 117 points can be obtained.

**The criterion is weighted with 10%.**

## SOC2.4 Health and Well-being

The purpose of the criterion is to create a basis for dialogue around a working and living environment in buildings that support the various needs of our society, as well as helping to house facilities with a focus on user satisfaction and well-being.

There are a total of 135 possible points in this criterion. However, a maximum of 100 points can be used for the evaluation, with bonus points totaling 105 points.

**The criterion is weighted with 10%.**



# Get in Touch

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