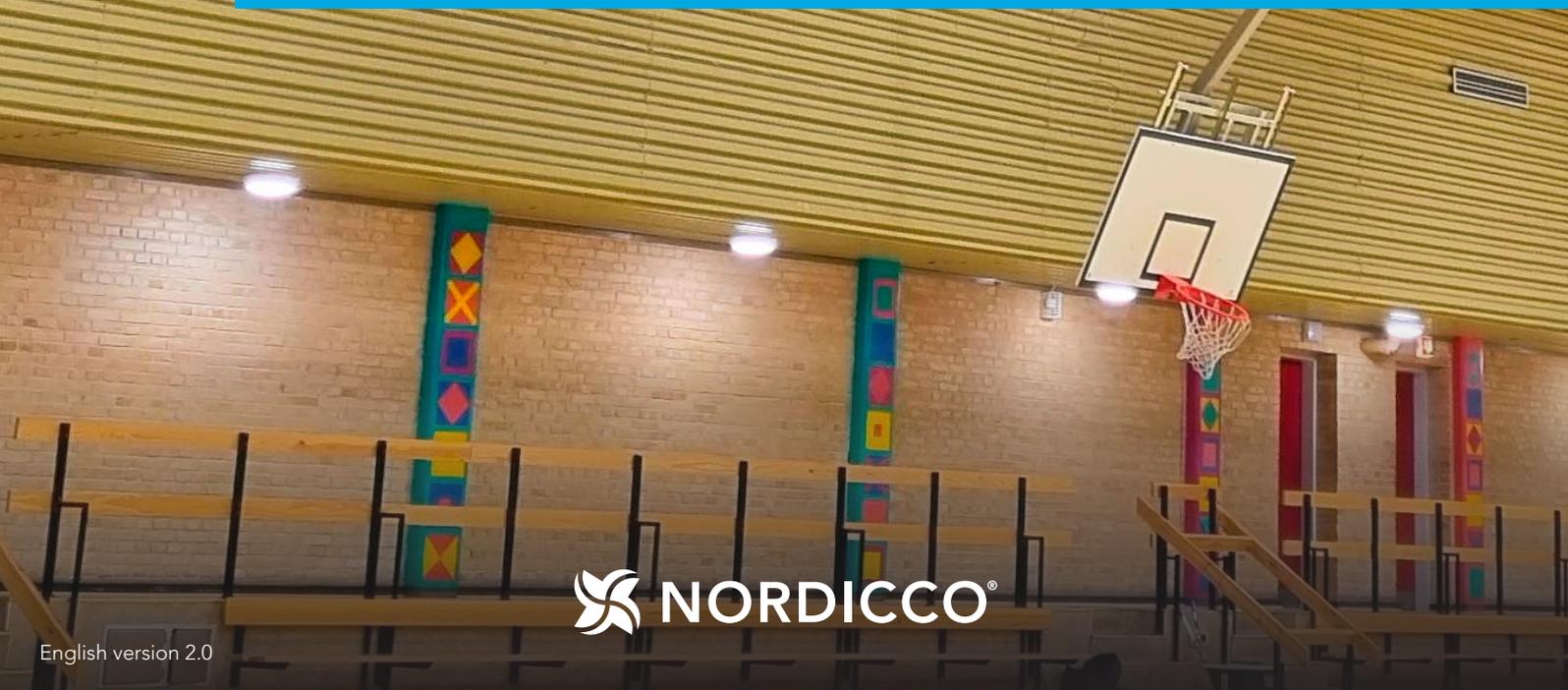




# ENERGY SAVINGS

- WITHOUT COMPROMISING THE INDOOR CLIMATE

CASES FROM SELECTED MUNICIPALITIES



# THE GREENEST ENERGY IS THE ONE NOT USED

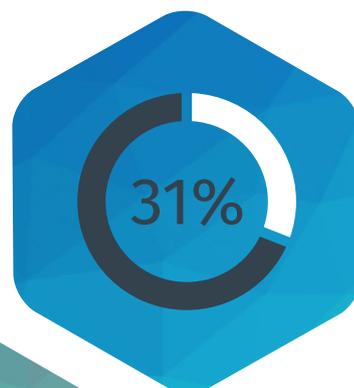
Energy use in buildings constitutes around 30% of total energy consumption. The energy is primarily used for heating, ventilation and lighting (International Energy Agency). This is why energy renovation of buildings plays such an important role in reducing CO<sub>2</sub> emissions.

Municipalities and organizations worldwide work with Nordicco A/S to reduce energy consumption in large buildings — including over half of all Danish municipalities. This typically takes place as part of municipal energy-saving or indoor climate projects.

The idea behind this case collection is to share valuable experiences and examples. What all municipalities in this collection have in common is a clear objective from the start: to reduce energy consumption.

All case solutions are based on HVLS fans, which can deliver significant heating savings and an immediate impact—something often in high demand. The use of HVLS fans can be seen as a low-hanging fruit within energy savings. They are budget friendly and don't require major resources to implement.

ACHIEVE BIG SAVINGS  
ON YOUR HEATING BILL



# HOLBÆK

## MUNICIPALITY

### PROJECT INFO

#### Timeline

Winter 2021/2022

#### Project Scope

8 Sports facilities

#### Savings Potential

24% across all halls

#### Actual Savings

30%



### 3 benefits of an HVLS fan

- according to Christoffer Larsen:

- Improved indoor climate
- Better distribution of warm air
- Lower heating consumption = energy savings

### REDUCED ENERGY CONSUMPTION BY 30% IN SPORTS HALL

85% of all buildings in Holbæk Municipality are heated with gas. To take advantage of low-hanging fruit in energy-saving measures, the municipality decided to install large ceiling fans in 8 buildings during the winter of 2021/2022. The installation of Northern Air® HVLS fans was specifically aimed at optimizing energy use in the sports facilities, with a total potential savings estimated at 24%. The HVLS fans have not only generated significant energy savings but have also improved the indoor climate in several of the facilities.

As the table below shows, some halls achieved savings beyond the projected figures. For example, Undløsehallen – a standard 800 m<sup>2</sup> sports facility – reduced its energy consumption by 36,000 kWh per year, achieving actual savings of 30%.

### Energy Data from Undløsehallen

Actual	Calculated			Actual	
Consumption before	Consumption after	Savings	CO2-reduction	Consumption after	Savings
120,000 kWh	96,000 kWh	24,000 kWh 20%	4,925 kg/år	84,000 kWh	30%

Data from Holbæk Municipality regarding Undløsehallen's actual energy consumption before and after the installation. The energy savings calculation is based on the dynamic simulation module from EWII energy.



What caught my interest was the significant energy savings that could be achieved for a relatively small investment. Instead of having to insulate the entire roof, we could make a relatively simple investment with an uncomplicated setup.



**Christoffer Larsen,**  
Energy Technician, Holbæk Municipality



# KALUNDBORG

## MUNICIPALITY

### PROJECT INFO

**Timeline**  
2020

**Project Scope**

A wide range of sports facilities across the municipality.  
Highlighted: the Høng case with a school and sports facility.

**Project Budget, Høng Case**

Supply and installation of 3 HVLS fans, approximately EUR 20,000.

### TACKLING TEMPERATURE DIFFERENCES WITH HVLS TECHNOLOGY

Heat rising in sports facilities and other high-ceilinged spaces is a well-known challenge. This was also the case at Høng School and Høng Hall, where there was often a significant temperature difference between the floor and the ceiling. During winter, heating the hall to achieve the desired comfort temperature at floor level required a lot of energy. Conversely, users also experienced it could become too warm certain times of the year, for example when sports activities were taking place.

Kalundborg Municipality therefore wanted to “kill two birds with one stone”: to optimize energy use while also improving the indoor climate. HVLS fans have been successfully installed in many municipal buildings in a project led by Technical Services Manager, Henrik T. Pedersen. In Høng, for example, two fans rotate in the sports hall and one in Høng School's high-ceilinged atrium.



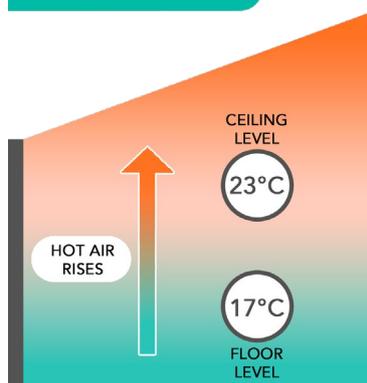
For most of the year, the fans ensure even temperatures by running in ‘reverse mode’. This constantly pushes warm air downwards, reducing temperature differences (and heat loss) between floor and ceiling.

In addition to reducing heating consumption, the fans also relieve the ventilation system. Last but not least, they have improved the indoor climate year-round. During a heatwave, for example, the fans ran in ‘forward mode’ to create a cooling effect.

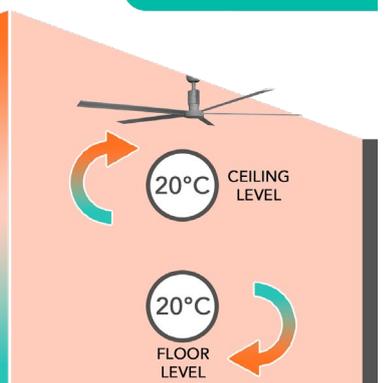
Kalundborg Municipality has invested in Northern Light® fans, which feature a built-in air disinfection system that can be turned on or off as needed. This way, the municipality is prepared for future epidemics.

Based on master data from Høng Hall and meter readings from the facility, the energy savings from the Høng project are expected to be 24%, corresponding to approximately EUR 5,400 per year.

#### WITHOUT HVLS FAN



#### WITH HVLS FAN



# LEJRE

# MUNICIPALITY

## PROJECT INFO

**Timeline**  
2020



**Project Scope**  
2 HVLS fans for  
Bramsnæsvig Sports Hall

**Result**  
25% energy savings



## BETTER INDOOR CLIMATE AND 25% LOWER ENERGY USE IN SPORTS FACILITY

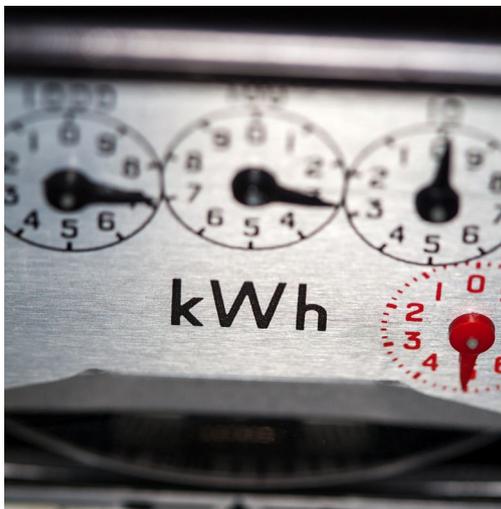
Many people and high activity levels in a sports facility cause CO<sub>2</sub> levels in the air to rise. When the CO<sub>2</sub> concentration in the occupied zone is high, the air can feel heavy and uncomfortable. This was precisely the case in Bramsnæsvighallen in Lejre Municipality, which, in addition to improving the indoor climate, aimed to make the hall more energy-efficient.

Therefore, two large HVLS fans were installed in Bramsnæsvighallen in January 2020 as part of a project led by Construction Advisor, Per Stallknecht. Calculations estimated an annual energy savings potential of 26%. By continuously mixing the air in the hall, the HVLS fans improved air quality and ensured that the supplied heat was optimally distributed and much better utilized.

As the figures show, energy savings of 25% was achieved in the first year after installation:

Actual	Calculated			Actual	
Consumption before	Consumption after	Savings	CO <sub>2</sub> -reduction	Consumption after	Savings
269.382 kWh	199.340 kWh	70.042 kWh 26%	14.372 kg/year	201.990 kWh	25%

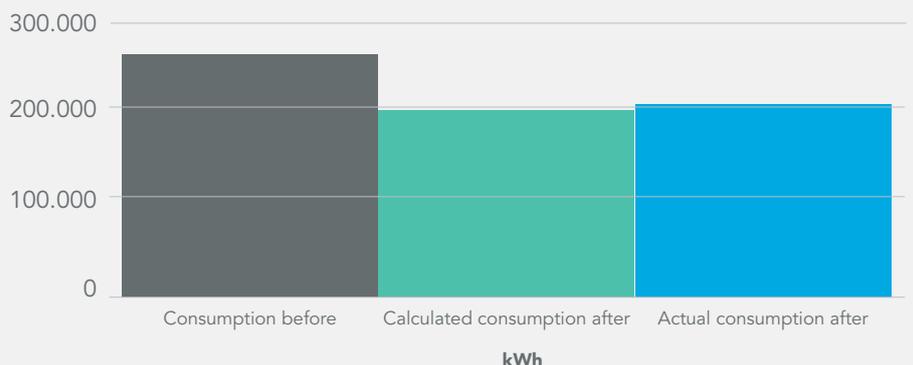
Data from Lejre Municipality's Bramsnæsvighallen regarding actual energy consumption before and after for 2019 and 2020. The energy savings calculation is based on EWII Energy Consultants' dynamic simulation model.



During 2020/2021, the facility's operating and usage patterns changed significantly due to the COVID-19 pandemic. The facility was used as a testing and vaccination center, which meant higher heating temperatures in 2021.

Despite the higher heating temperatures in 2021, a real reduction in energy consumption was still measured compared to the period before the fans were installed.

## Energy data from Bramsnæsvighallen, before and after fans



# GLADSAXE AQUATIC CENTER

## PROJECT INFO

### Timeline

Installed July 2022



### Project Scope

3 x Aqua HVLS fans

### Results

- 33% reduction of air volume
- Lower district heating use
- Significantly lower electricity consumption

## 33% LESS AIR VOLUME TRANSFORMS CONDITIONS IN AQUATIC CENTER

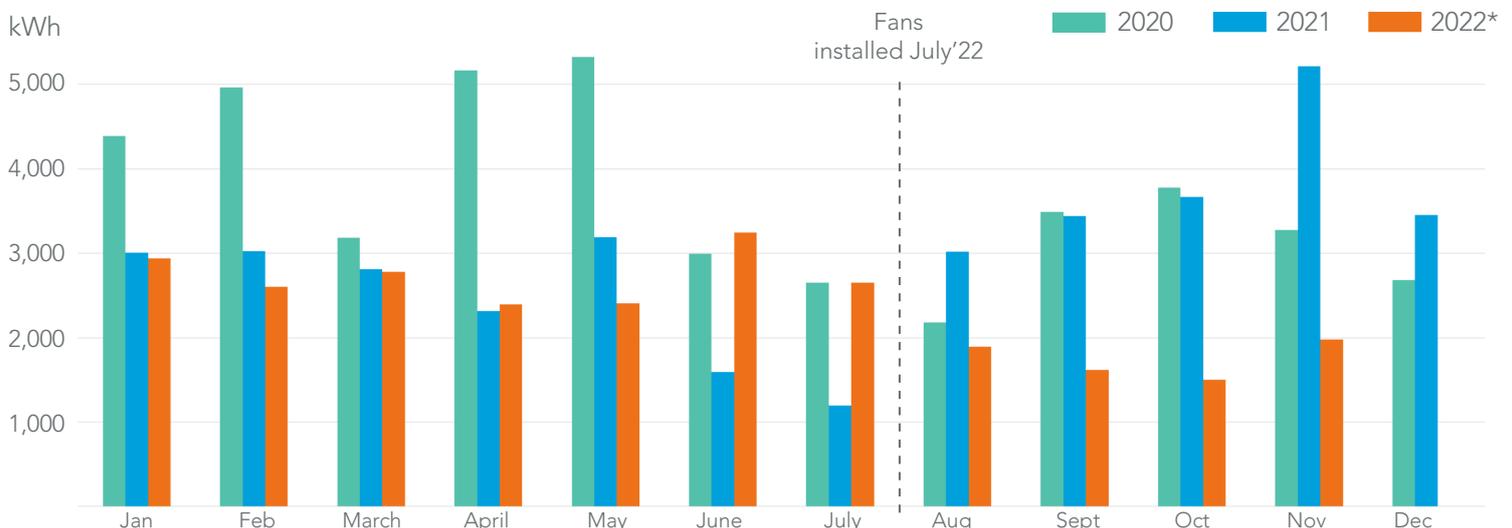
In the summer of 2022, Property Technician Jörgen Vienberg decides to install large HVLS fans in Gladsaxe Aquatic Center in Copenhagen. The center operates on electricity and district heating and is equipped with a MENERGA ventilation system, which runs smoothly.

The challenge was, as for many other indoor pools, their large energy consumption as well as a less than optimal air movement. In addition, there was a problem with external doors often being opened by guests.

The solution ended up being 3 HVLS fans of 4 meters in diameter, which were installed in less than a week. Jörgen then slowly adjusted the air volume on the ventilation system: "We first went from 24 to 20,000 m<sup>3</sup> per hour and tested what difference it made on the air and whether the users noticed anything. Now we are down to 16,000 m<sup>3</sup> of air per hour."

Thanks to the HVLS fans, there has been a 33% reduction in air volume, leading to a significant decrease in electricity usage. The data illustrates a dramatic drop in consumption: 37% in August, 53% in September, 59% in October, and 62% in November, all compared to the same months in 2021. Similarly, district heating usage has decreased by about 5% in the latter half of 2022 compared to projected figures.

## Gladsaxe Aquatic Center - Electricity consumption, monthly



Source: Consumption data provided by Gladsaxe Aquatic Center. Note: Data was obtained in beginning of December 2022, which is why this month does not appear on the graph.

# TAARNBY MUNICIPALITY

## PROJECT INFO

### Timeline

Spring/summer 2022

### Project Scope

3 Aquatic Centers  
2 Sports facilities  
1 School  
1 Culture Center

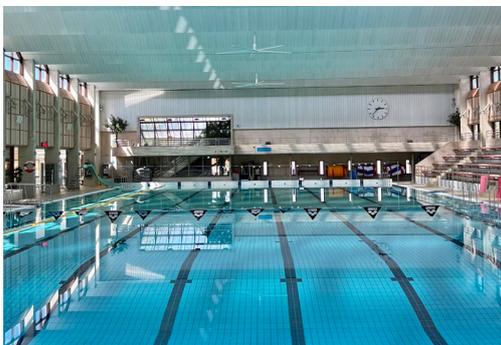


Photo - example of Northern Air® Aqua installation.

## MUNICIPALITY AIMS FOR EFFICIENT AND AFFORDABLE ENERGY SAVINGS

Taarnby Municipality has installed HVLS ceiling fans in several venues, including three aquatic centers, as part of a project led by Climate and Energy Advisor, Rune Klitgaard.

The primary challenge in these swim halls was the enormous energy consumption. Simply reducing the operation of the ventilation systems risked compromising the already strained indoor climate, exacerbated by high relative humidity. To address this, Taarnby Municipality opted to install Northern Air® Aqua fans, specifically designed for harsh environments.

These HVLS fans allow for reduced energy consumption without sacrificing indoor air quality. Apart from the aquatic centers, standard Nordiccio HVLS fans have been installed in two sports facilities. With a total of 14 fans distributed across various locations, the goal for Taarnby Municipality is to achieve significant energy savings.

However, these savings are expected to vary by location, as the most substantial reductions typically occur in the largest facilities. Furthermore, the decision to install HVLS fans was due to them being a quick and cost-effective solution.



# WHY WASTE ENERGY - WHEN YOU CAN SAVE IT?

Most people are surprised by the significant impact HVLS fans can have on their facilities and how attractive the business case can look.

Are you ready to enhance your facility's efficiency and comfort?  
If you're interested in having your facilities evaluated and would like to arrange a free, no-commitment consultation, please reach out to us.

Our team is eager to guide you through the possibilities our solutions offer.  
Discover the difference!

//The Nordicco Team



 **NORDICCO**