

Pure competence in air.

REFERENCE LIST

ZERAX[®] AXIAL FANS



Building & Industry

NOVENCO 

SCHAKO Group



DATA CENTRES

DATA CENTRE, SWEDEN

This hyperscale data centre is located close to the Arctic Circle in Luleå, Sweden.

The favourable location ensures easy access to natural cooling and provides optimal conditions for employment of the ZerAx® fan-based free-cooling solution to control the temperatures in the data centre halls. The facility is as large as 13 football fields and is one of the most advanced and energy-efficient data centres in the world.

NOVENCO® Building & Industry has delivered 52 specially designed ZerAx fan arrays, each consisting of nine fans and 56 ZerAx exhaust fans.

In this project the ZerAx fans are key components that ensure a significant reduction of the energy consumption and save the environment from 365 tons of CO₂ each year.

Moreover, the sound level of only 84 dB makes this data center one of the quietest in the world.



DATA CENTRE, UNITED STATES

Located in the western United States on an area the size of 26 football fields, this hyperscale data centre is part of the valuable infrastructure and amongst the most advanced, energy and water-efficient facilities in the world, setting new standards for data centres.

NOVENCO® Building & Industry has delivered its innovative direct free-cooling solutions consisting of 112 fan arrays and 224 exhaust fans, based on the unique and patented ZerAx® fan technology. The advanced fan technology makes the ZerAx fans the best on the market in terms of highest levels of efficiency, lowest TCO over an expected lifetime of 20+ years, and 98% recyclability rate. The NOVENCO free cooling solution, greatly contributes to achieving LEED® Gold level certification under LEED for Data Centers®, the leading certification program for sustainable, energy efficient and high-performance data centres.



AARHUS CONCERT HALL, DENMARK

The Aarhus Concert Hall opened in 1982 and was expanded in 2007 by 17,000 m² to a total area of more than 33,000 m² and 500 rooms. Annually more than 700,000 people visit the venue in connection with more than 1,000 events.

The installation of 12 air handling units with ZerAx® fans was part of a comprehensive energy-retrofit of the building complex.

The upgrade has resulted in a 50% reduction of the energy consumption and an environmental saving of no less than 170 tons of CO₂ each year.

The low sound emissions of the ZerAx® fans has furthermore meant that the sound levels of the air handling units are reduced considerably and to far below the general requirements for this type of building.



CARLSBERG BREWERY, DENMARK

The world-known Carlsberg breweries were founded in 1847 on the outskirts of Copenhagen. In the 1970s the times and the city had long since caught up with the facilities and it was decided to move the production to Fredericia, in the western part of Denmark. The new facilities were inaugurated in 1979 and the transfer of all production for the Danish market was completed by the end of 2008. The facilities in Fredericia are huge and have been expanded and modernised several times. The daily production capacity is between 5,000-6,000 pallets of beer and soft drinks.

To optimise energy consumption and reduce CO₂ emissions, it was decided to replace the old fans in one of the bottling halls with NOVENCO® ZerAx® fans.

The replacement has resulted in **52%** less energy consumption and an environment strain reduction of 161 tons of CO₂ emission each year.



RETROFIT

CS GRUPPEN, DENMARK

The Danish company CS Gruppen operates daily logistics in the Danish food industry and has freezer plants located all over Denmark. The company freezes up to 1,800 tons of meat a day, so a large amount of energy is required to keep the plant operational and to meet customers' demands. The freezing of fresh meat occurs under extreme cold conditions with high requirements for quality and reliable equipment. As a part of an energy optimisation of the freezing tower plant in Padborg, where the existing fans represented a large part of the energy consumption, four high efficiency ZerAx® fans were installed. The ZerAx® fans were delivered with highly efficient motors designed for temperatures as low as -30 °C. Due to the high efficiencies of the ZerAx®, the ROI was calculated to only 23 months. The ROI calculations were based on the plant running at full capacity (5,000 hours/year).



DS GROUP, INDIA

The DS Group performed a large retrofit project of the air handling units (AHUs) at the headquarters in Noida. The retrofit comprised replacement of 40 outdated centrifugal fans with highly efficient NOVENCO® ZerAx® fans. The initial phase of the project included Proof of Concept - in the form of replacing a single existing centrifugal fan with a ZerAx fan. The purpose of this pilot project was to test the ZerAx and to witness the energy savings first hand, when replacing an old centrifugal fan with a modern and advanced ZerAx axial fan. Prior to the retrofit, the performance of one of the existing AHUs with centrifugal fan installed was measured by our Authorised Channel Partner AIR TECHNO INDIA PVT. LTD. to establish the baseline. The same measurements were then made post-retrofit. The results showed that for the same air flow rate the ZerAx fan had reduced the energy consumption by **55%**.



FRANKFURT AIRPORT, GERMANY

Fraport AG with over 95 years of aviation expertise, is one of the leading players in the global airport business. At its Frankfurt Airport home base, Fraport welcomes more than 70 million passengers and handles over 2 million metric tons of cargo annually.

With the optimisation of an older ventilation system with highly efficient Danfoss speed-controlled NOVENCO® ZerAx® fans, the company Fraport AG at Frankfurt Airport in Germany saves approximately **60%** energy and 2.2 kt CO₂ annually.

The use of the ZerAx fans in combination with advanced system concepts proves the huge potential for reduction of the ecological footprint in ventilation systems. In the Frankfurt Airport project fewer kWh are consumed, fewer raw materials are used and less CO₂ is emitted in comparison with the old ventilation solution.



JK TYRES, INDIA

JK Tyres has nine large factories across India and is undeniably one of the world's leading tyre manufacturers. High cost of energy and the increasing level of environmental awareness spurred JK Tyres to search for modern and more efficient energy saving solutions for their tyre manufacturing plant in Chennai.

After an exhaustive research of all available solutions on the market, including EC fans, JK Tyres chose the market's most efficient and innovative solution known as the EC+ concept. It comprises high efficiency ZerAx® fans from NOVENCO® Building & Industry, high efficiency motors and the intelligent and high efficiency Danfoss VFDs. With an original expectation of 30% energy savings and an actual implementation of more than **50%**, this project displays the enormous energy savings achievable by retrofitting centrifugal fans with ZerAx axial fans based on the EC+ concept.



RETROFIT

KEPPEL BAY TOWER, SINGAPORE

Over 50 applicants applied to take part in the Green Buildings Innovation Cluster (GBIC) competition, arranged by the Singapore Buildings and Construction Agency (BCA). The objective of the GBIC program was the large scale demonstration of novel energy efficient technologies in the Keppel Bay Tower. Out of the original 50 applicants, BCA chose 5 technology partners for the trial. NOVENCO's proposal to retrofit an existing plug fan in an AHU with a high efficiency ZerAx® axial fan was chosen due to the significant energy reduction potential. For the project the most modern technology of the EC+ concept with a highly efficient ZerAx® axial flow fan, high efficiency motor and Danfoss VFD was selected. The retrofit work was completed in an impressive time of less than 10 hours. The energy savings, as verified by Nanyang Technological University (NTU), who were appointed as independent adjudicators, were at least **43%**.



ODENSE HOSPITAL, DENMARK

Hospitals rely on lots of space and have huge demands for ventilation. The Odense University Hospital in Denmark is no exception, as it is one of the largest heat ventilated hospitals in the Danish hospital service.

As part of the first stage in a renewal project, it was decided to replace 35 old fans with efficiencies around 40% with new high performance NOVENCO® ZerAx® fans. The ZerAx fans with fan efficiencies above 90% bring the ROI down to less than a year due to the significant reduction in energy consumption. The environmental strain is lowered by more than 400 tons of CO₂ each year.



SIMA POWER STATION, NORWAY

The second largest hydro-electric power station in Norway, the Sima Power Station is located in Eidfjord in Hordaland and is surrounded by fjords, which are so characteristic of the Norwegian landscape. The main hall of the power station is placed 700 metres inside a mountain.

The Sima Power Station draws water from several river basins, enabling the water to be stored in reservoirs. The water is released when extra supplies of electricity are required.

The Sima Power Station operates at an installed total capacity of 1,120 MW and has an average total annual production of 2,850 GWh.

The installation of nine ZerAx® fans was part of a comprehensive energy-retrofit of the plant, and resulted in a **50%** reduction in energy consumption. Furthermore, and perhaps more importantly, environmental impact and CO₂ emissions were significantly reduced.



TEUTSCHENTHAL BACKFILL MINE, GERMANY

The Teutschenthal backfill mine in Thüringen, Germany is one of the most modern mines of its kind in Europe. Over the past few decades the mine operated to extract salt before it was closed in 1982. It has now been converted into a modern backfill mine and serves to protect the surface through filling up the cavities in the former excavation.

For the latest renovation project at the backfill mine, carried out to improve the ventilation systems in the mine, NOVENCO® Building & Industry has delivered a highly efficient ZerAx® exhaust fan. The fan with a diameter of 2 m, is combined with an IE5-class Nidec PM motor type Dyneo+ and a Danfoss VLT frequency converter and is 98% recyclable. This unique configuration with the latest EC+ fan technology has the highest possible system efficiency and goes beyond today's requirements. With focus on a sustainable green solution for the project, this solution was approved as an obvious choice.



RETROFIT

TÜV SÜD, GERMANY

TÜV SÜD, German: Technischer Überwachungsverein (English: Technical Inspection Association) is one of the world's leading companies for product certifications and approval tests.

Convinced by the performance and stability of NOVENCO® ZerAx® fans through tests of their own, TÜV SÜD chose to install 11 ZerAx fans in the test facilities in Olching, Germany.

The facilities are designed for testing of ventilation and air handling units.



VOLKSWAGEN, SPAIN

The focus of the VW Group, Europe's largest automobile manufacturer, on innovation and impact on the natural environment was the reason behind their exhaustive investigation of the technical possibilities of high-efficiency axial fans in connection with the renewal of their largest production facilities – the VW factory in Navarra, Spain.

For this strategic and quintessential project, the ground-breaking technology represented by the ZerAx® axial fans appeared a natural and ideal choice. The key phrase here is intelligent interaction of system components. At NOVENCO® Building & Industry, this interaction is embodied by the EC+ concept, which is the result of development efforts and cooperation between the Danish company Danfoss and NOVENCO. The optimal interaction of the system components fan- motor- electronics- diffuser makes the full potential of the highly efficient ZerAx fans available.



LEWISHAM EXCHANGE, UNITED KINGDOM

NOVENCO® Building & Industry has designed, supplied, installed and commissioned the certified NOVENCO Clear Choice™ depressurisation systems for the The Lewisham Exchange, a newly modular build students towers in London, United Kingdom.

The lobby smoke ventilation systems protect the three staircases in case of fire, together with a system that protects the final route to the outside. A separate smoke clearance system for the basement areas is also part of the NOVENCO installation.

Unique to the smoke ventilation systems is the use of the highly efficient NOVENCO ZerAx® smoke fans, fully tested and compliant with the EN12101-3 requirements.

The fans are rapidly becoming the preferred choice for BREEAM certified constructions due to their high efficiency and 98% recyclability rate after a 20+ years life span.



GROTIUS TOWERS, THE NETHERLANDS

NOVENCO® Building & Industry was selected to design, supply, install and commission the certified pressurization systems and the car park ventilation system for the Grotius Towers in The Hague, The Netherlands.

In the event of a fire in the residential towers, the NOVENCO Clear Choice™ pressurization systems ensure that the stairwells remain free of smoke.

The Clear Choice pressurization systems are designed using Revit 3D BIM and are based on ZerAx® certified axial smoke fans.

The complete ZerAx® fan range is certified for variable speed operation during smoke extract.

For the two-level underground car park, NOVENCO's jet fan-based ventilation system is installed to ensure fresh and healthy air throughout the car park.



PRESSURE DIFFERENTIAL SYSTEMS

OSIERS ROAD, UNITED KINGDOM

The Osiers Road comprises three newly constructed residential buildings located in the Riverside Quarter of Wandsworth London, UK. NOVENCO® Building & Industry was awarded the contract for design, delivery, installation and commissioning of the certified NOVENCO Clear Choice™ dual smoke and environmental ventilation systems for the project.

The lobby smoke ventilation systems protect the three staircases in case of fire.

A separate smoke clearance system protects the basement and is also part of the NOVENCO installation. All systems and designs are coordinated with the fire engineering team and assessed by CFD modelling analysis to meet the project Fire Strategy and current Building Regulations.

The systems employ highly efficient NOVENCO ZerAx® smoke fans, fully tested and compliant with the EN12101-3 requirements.



WIND INDUSTRY

SIEMENS GAMESA

The highly efficient and reliable wind turbines produced by Siemens Gamesa enable them to offer solutions that meet both energy and environmental needs. With over 25 GW of wind power installed, Siemens Gamesa delivers clean, renewable energy around the world.

NOVENCO® Building & Industry has designed and delivered a unique solution for the wind turbines - a complete and optimised ventilation set consisting of a ZerAx® fan and complementary components.

A key requirement for the development of the cooling solution for Siemens Gamesa, was sound reduction in the wind turbine tower. This was, amongst other things, achieved by optimising the channel lead with the ZerAx fan.

By switching to the ZerAx based solution, the internal energy consumption for driving the ventilation was reduced by **40-50%** compared to the previous solution.





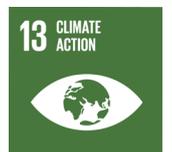
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