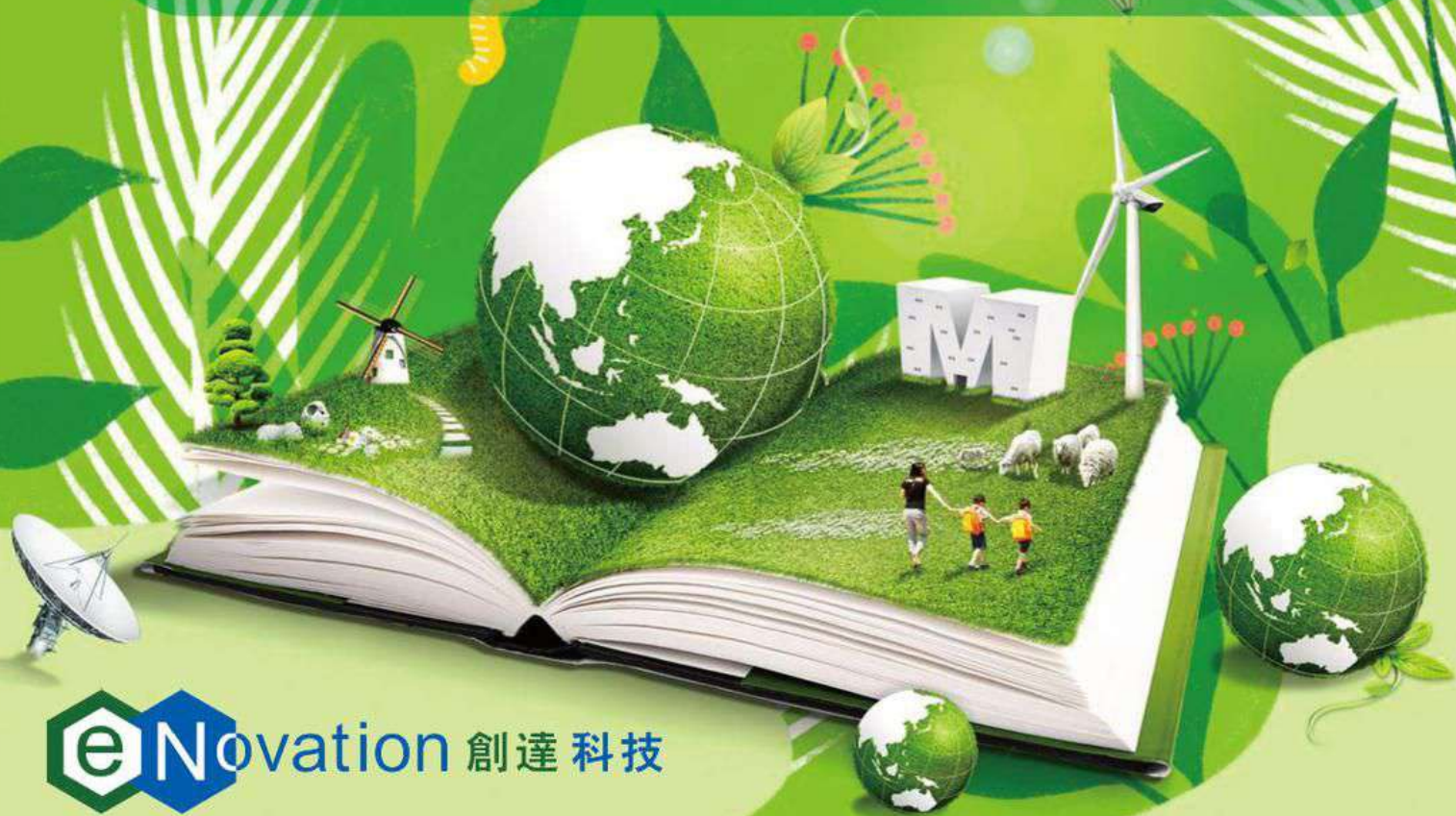


eNovation Technologies, founded in 2013, is a technology based and quality-driven company in Macao. Our focused businesses include but not limited to energy-saving, indoor air quality, smart systems, as well as ICT solutions. With high-tech and good quality products, together with eNovation's unlimited creativity and professionalism, we believe our clients would experience infinite ideas and make them applicable, further enriching their productivity and competitiveness in the growing economy.

The preeminent energy-saving, water-saving, and various IAQ solutions introduced by eNovation received welcoming feedback by the market. We promise to research, develop, optimise, and upgrade our services and products to provide the best solutions for our customers. We catch the latest trend of innovation and service — driving true customer satisfaction and solutions within our industry.

Macao Based, Technology Focused, Customer Satisfaction, Quality Driven are the four pillars leading us to success!

www.enovation.mo / info@enovation.mo





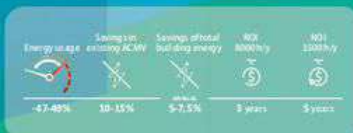
ZERAX® FAN GREEN INNOVATION

- ❖ EFFICIENCIES UP TO 92%
- ❖ ENERGY SAVINGS UP TO 50%
- ❖ 20+ YEARS OF LIFETIME
- ❖ LOW SOUND LEVELS
- ❖ ROBUST AND RELIABLE DESIGN
- ❖ AVAILABLE AS EC + SOLUTION 

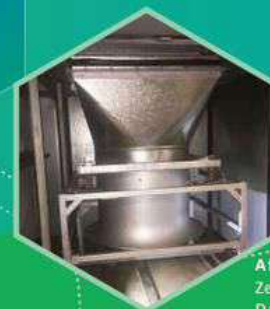
Building & Industry

NOVENCO 
SCHAKO Group

Case Story Keppel Bay Tower



Before
Centrifugal
blower system



After
ZerAx® &
Danfoss EC+

Key Benefits

- Annual energy consumption reduced from 39,279 kWh to 18,807 kWh
- System Efficiency improved from 60% to 82%
- Energy savings of 46% to 48%
- Specific Fan Power improved by 46%
- Sound level reduced by between 3% to 17%
- System resistance reduced by 35%
- Significant reduction in CO₂ emissions
- 98% recyclable at end of useful life
- Retrofit completed in 12 hours

As reported by independent ESCO consultant and verified by BCA

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INCREASED PRODUCTIVITY
ENERGY-SAVING, COST REDUCTION
ENVIRONMENTAL FRIENDLINESS



Presses



Conveyor



Compressor



Hoists, Cranes



Extruder



Winder

YASKAWA GA700



THE NEW GENERATION DRIVE
FOR INDUSTRIAL APPLICATION



*HV 600
HVAC Drives
for Fan and Pump
Application*

SCALEBUSTER

ISBF – a 2 stage whole-house water filter.
with Ion ScaleBuster® water conditioner



Ultrasonic BTU Meter

- Precision Matched Platinum RTD Temperature Sensors
- PT1000 temperature sensors are matched to a differential uncertainty of better than $\pm 0.18^\circ \text{ F}$
- EN1434 Compliant

Ultrasonic Water Meter

Metrological Performances

- Very low starting flow allows leakage detection
- Large measuring range
- Easy Reading
- Large LCD with good contrast
- Can be installed both horizontally and vertically



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BASI CONTROLS

DUST FREE
BREATHE THE DIFFERENCE.
Air Knight
AIR PURIFICATION SYSTEM



← AK-IPG
↓ AK-PTAC

- Patented Technologies
- Ionized Particles Gathering (IPG)
 - Active air scrubbers by UV energy & 5-metal quint metallic core (PX5)



SINRO®



Intelligent FCU
(with EC Motor and Energy Balancing Control Valve)



Electronically Commutated Motor
(ECM)



Energy Balancing Control Valve
(EBV)

OPTIMIZE AHU/PAU SYSTEM

Building & Industry

NOVENCO

YASKAWA

eNovation

THE GREEN AMBASSADORS



92%

NOVENCO ZERAX
HIGHLY EFFICIENT AXIAL FAN

x



95%

HIGHLY EFFICIENT
PM MOTOR

x



98%

YASKAWA VFD
TECHNOLOGY



=



85%

AHU Efficiency

Macau Project Reference

A casino resort aims to optimize energy consumption to reduce CO₂ emissions and cut energy costs. In the gaming hall that works 24/7, two centrifugal fans were replaced with **Novenco Zerax Fan** and **Yaskawa VFD**.

eNovation verified that the new system consumes significantly lower energy across various operating frequencies.

Running at Fixed Frequency and beyond designed Airflow

Centrifugal Fan

- 79% efficiency
- IE3 Motor used
- Star-Delta motor starter
- Belt loss and tension maintenance
- 63 decibels sound level



14.25 kW power consumption

Running at Nominal Frequency and designed Airflow

Novenco Fan

- 84% efficiency
- High-efficiency IE5 PM motor
- Yaskawa VFD
- Direct motor driven fan without belt losses
- 55 decibels sound level



4.43 kW power consumption



Optimized
PAU System



68% Energy Saving





Running at Maximum Operational Frequency and Airflow

Centrifugal Fan

- 56% efficiency
- IE3 Motor used
- VFD not suitable for IE5 PM motor
- Belt loss and tension maintenance
- 59 decibels sound level



17.64 kW power consumption

Novenco Fan

- 80% efficiency
- High-efficiency IE5 PM motor
- Yaskawa VFD
- Direct motor driven fan without belt losses
- 55 decibels sound level



9.50 kW power consumption



Optimized
AHU System



46% Energy Saving



On-site Installation



Centrifugal Fans



Novenco Fans



AHU



2 years



2.6 years

KEY BENEFITS AND ACHIEVEMENTS

- Reduced energy consumption as high as 46 & 68%
- Reduced CO₂ by 7.65 & 9.23 kg per day
- Reduced sound level by 4 & 8 decibels
- Improved AHU & PAU efficiency by 46 & 84%
- Annual economic savings of 78,000 & 94,000 MOP
- Return on investment within 2 & 2.6 years

- Low maintenance costs (no belt, pulley or grease required)
- Attained recommended system optimization
- Beneficial to the end-user and to the environment

AHU OPTIMIZATION = CONSULTANCY + IMPLEMENTATION + DUCT MODIFICATION (Optional)

RETROFITTING OF A CENTRIFUGAL FAN AHU SYSTEM

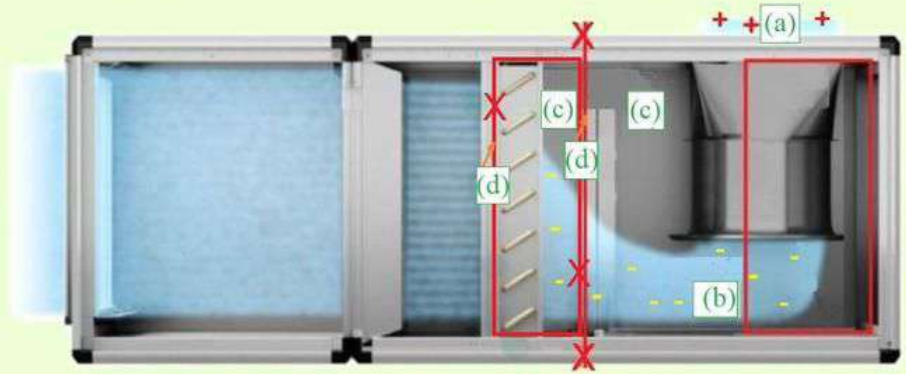
PURE COMPETENCE IN AIR

YASKAWA



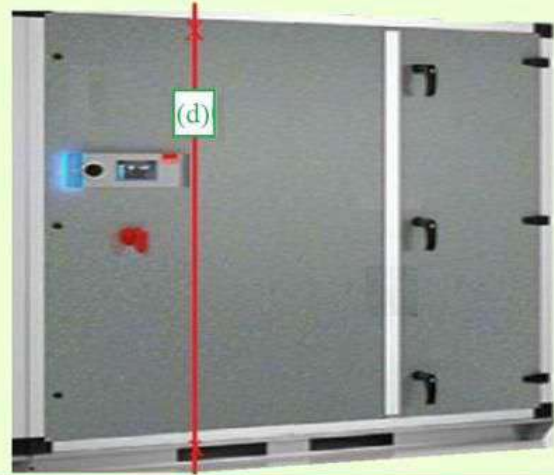
Building & Industry

NOVENCO



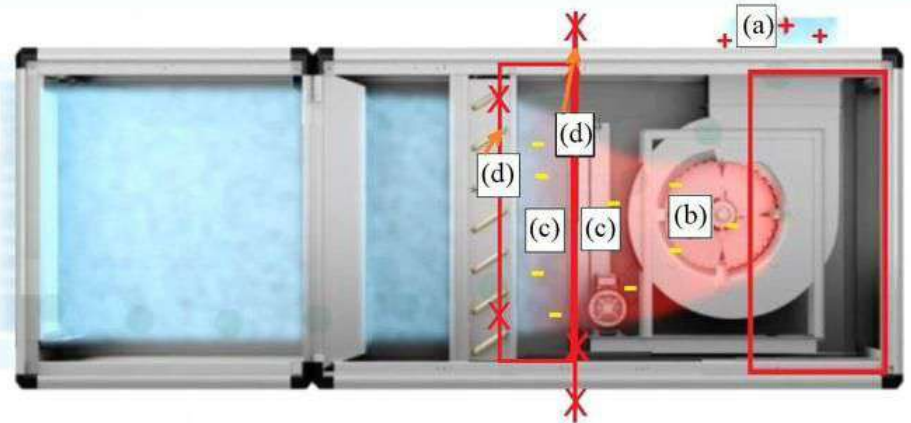
NOVENCO Fan

- Similar design to that of Centrifugal Fan (a), (b), (c), & (d)



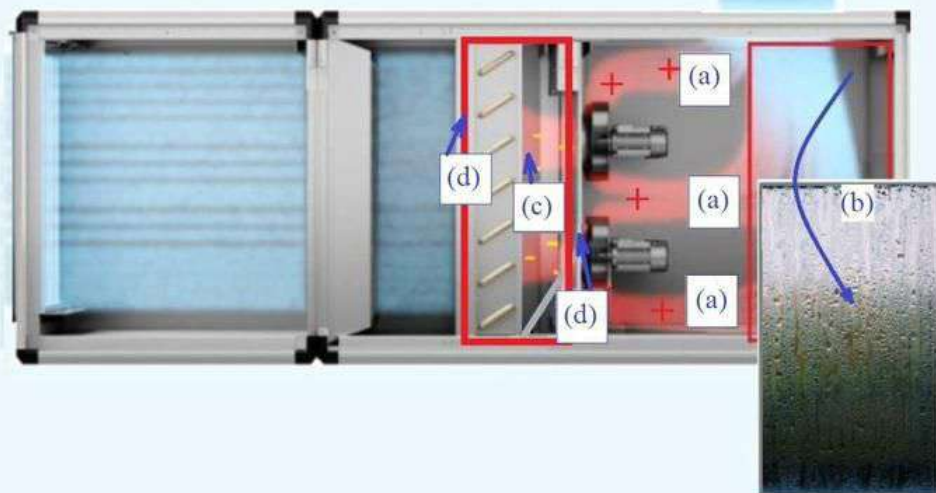
CENTRIFUGAL FAN

- Air discharged into the duct area (a)
 - * Negative pressure is within the fan area (b)
- Sufficient maintenance area (c)
- No partition panel and additional door is required (d)

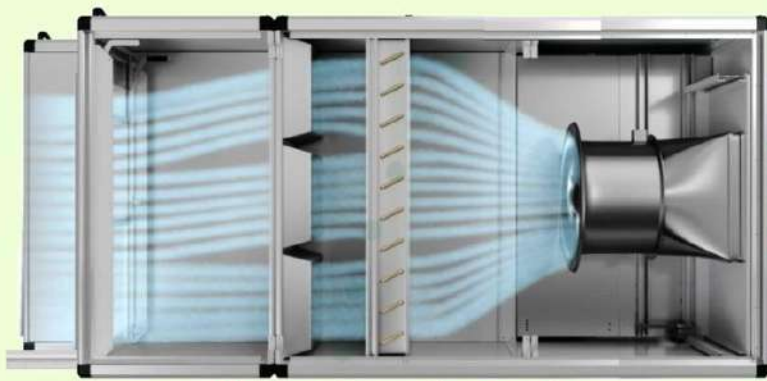


EC PLUG FAN (Array design)

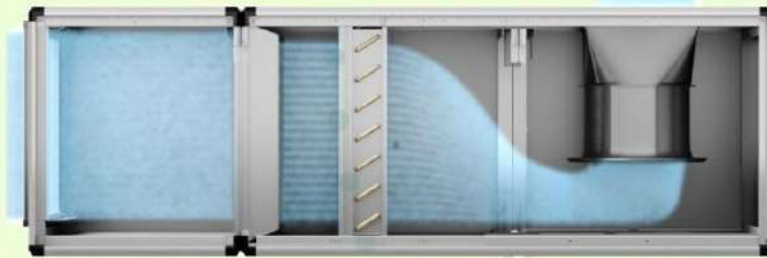
- Air discharged into the pressure partition area (a)
 - * Positive pressure is within the AHU (a)
 - * Condensation or leakage may occur at the door or walls (b)
- Limited maintenance area (c)
- Partition panel and additional door are required (d)



TYPES OF FAN IN AN AHU SYSTEM



Horizontal mounting - top view



Vertical mounting - side view

NOVENCO FAN

- Axial fan (92%)
- PM motor (95%)
- VFD (98%)

Total efficiency
= 85%



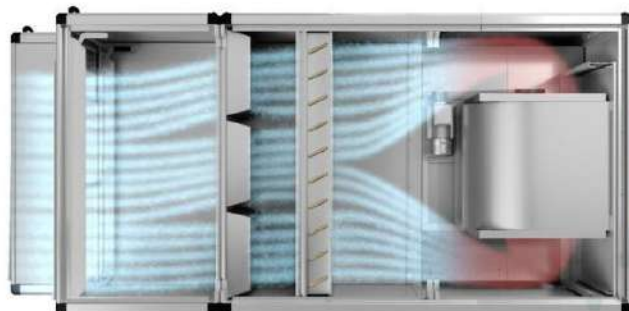
OUTCOME

- Smooth airflow
- Minimal pressure loss
- Low noise level

NOVENCO Fan
* Vane axial fan

Motor type
* Induction
* PM motor

Speed controller
* VFD



Horizontal mounting - top view

CENTRIFUGAL FAN

- Centrifugal fan (75%)
- Belt (95%) and AC motor (91%)
- VFD (98%)

Total efficiency
= 63%



Centrifugal Fan

- * Forward curved
- * Backward curved
- * Backward inclined
- * Backward aerofoil inclined

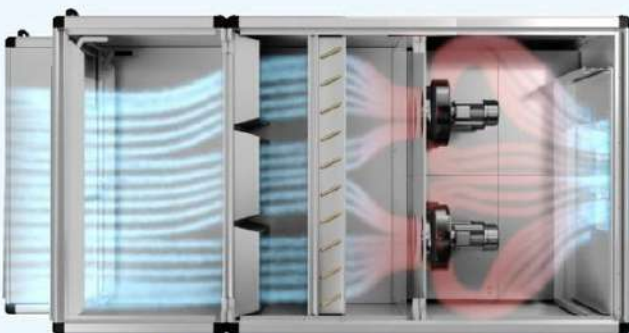
Motor type
* Induction

Speed controller
* VFD



OUTCOME

- High turbulence in fan section
- Reduced efficiency
- High noise level



Horizontal mounting - top view

EC PLUG FAN (Array design)

- Plug fan (75%)
- EC motor (93%)

Total efficiency
= 70%



EC Plug Fan

- * Backward curved

Motor type
* EC motor

Speed controller
* Built-in controller



OUTCOME

- High turbulence in the fan section
- Collision of airflow of the fan array
- High noise level