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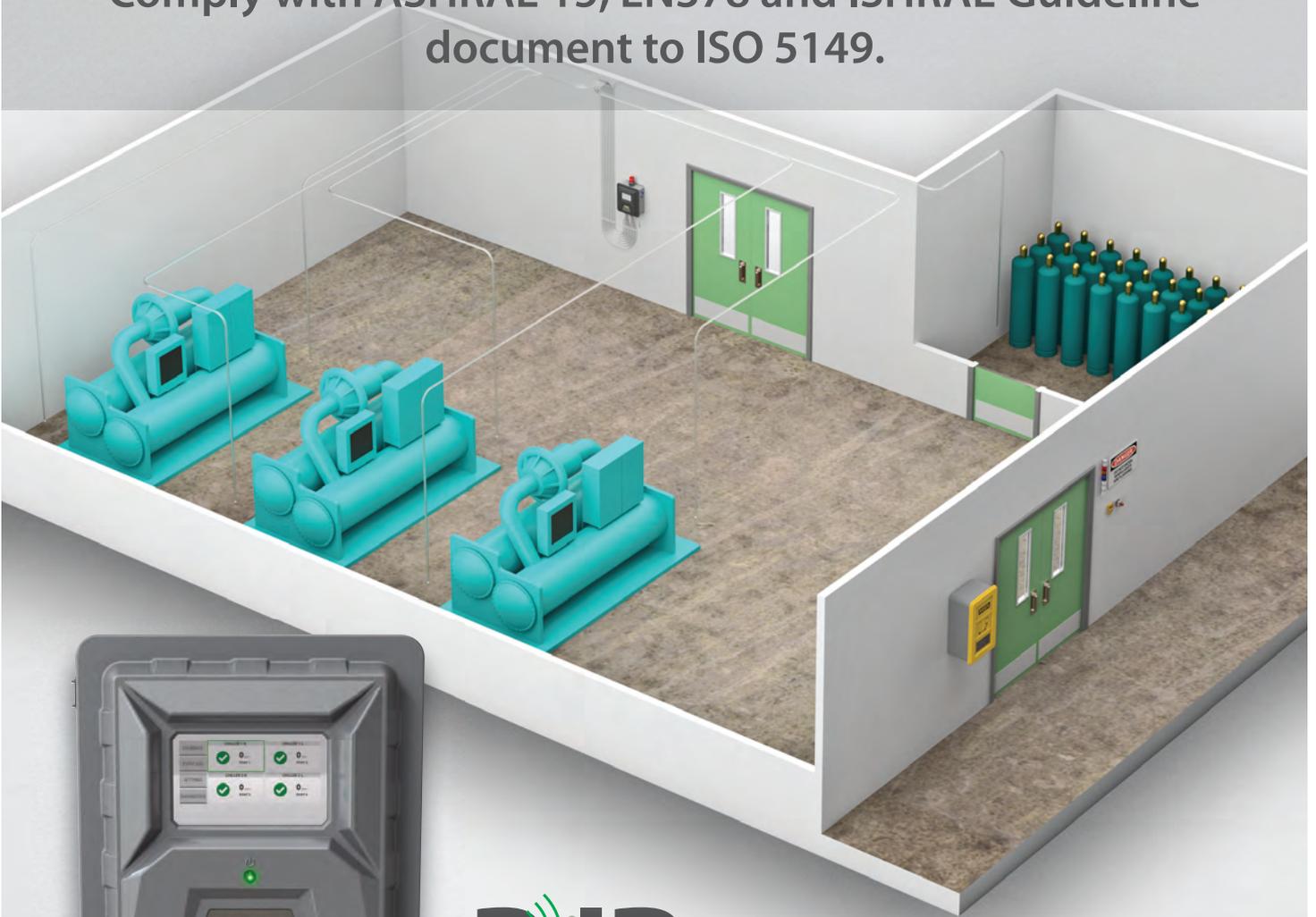


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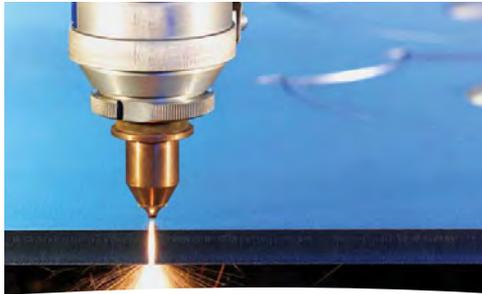
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Publisher's Letter

Hello and welcome once again to *Cooling India*.

The government's commitment of reduction of emissions to 35 per cent by 2030 and enhancement of non-fossil-based power capacity to 40 per cent can plummet carbon footprint by almost three billion tonnes by 2030. This pledge has scaled up the development of green buildings.

Green building concept has gained momentum with political leaders, stakeholders, organisations and businesses touching every sector starting to embrace green building and sustainability as a crucial strategy to meet their sustainability, climate and corporate social responsibility goals and address pressing issues impacting human health and the environment.

This time, we focus on how the right selection of energy efficient HVAC system in green building helps in reduction of energy consumption thus, improving the overall performance of the building as HVAC systems play a key role in green buildings since many of the green building factors are directly or indirectly affected by the performance of the HVAC systems. Notably, HVAC accounts for nearly 50-60 per cent of the energy used in commercial buildings in India.

Net zero energy buildings produce as much energy as a building consumes through the use of innovative and highly efficient materials, technologies and practices. Here, Mili Majumdar, Managing Director of Green Business Certification Institute and Senior Vice President, U.S. Green Building Council explains the concept of net zero buildings and HVAC systems' role in carbon neutral buildings.

The article 'Green Buildings: Investment Not Extra Cost' talks about how conscious passive architectural design strategies enables the projects to not only attain green building certifications but also achieve reasonable operational savings at almost no or negligible cost premium.

In today's world, the green building concept has emerged as a powerful tool for leveraging lower carbon emissions, conserve resources and reduce operating costs. Thus, this has been a game changer for all the stakeholders.

We hope you enjoy reading this issue as always! Please write to me at pravita@charypublications.in


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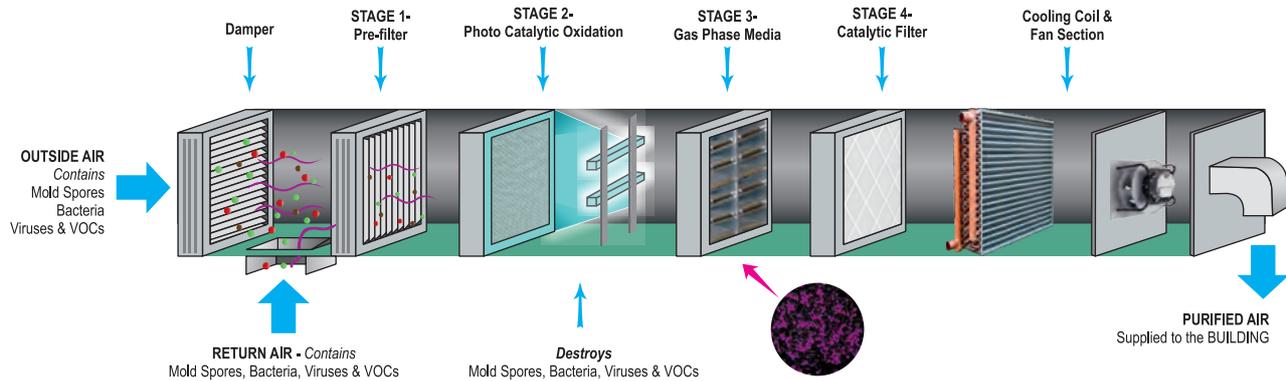
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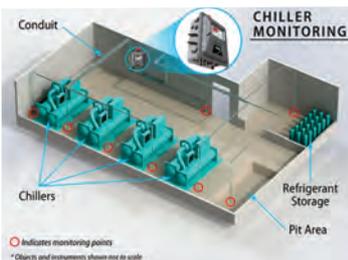


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Voltas & Tata Power partner to promote energy efficient ACs for consumers in Mumbai

Voltas, one of the market leaders for air-conditioners in India, announced its partnership with Tata Power to promote energy efficient ACs in Mumbai. As part of the exclusive scheme, the consumers will be able to avail upto 50 per cent discount on the purchase of Voltas' 5-star rated ACs. The partnership is in line with the group's energy conversation drive.

Under the scheme, Tata Power's consumers in the city can exchange their ACs for Voltas' 5-star rated inverter split AC (1 ton, 1.5 ton and 2 ton). The scheme is open for residential segments of consumers.

Besides providing an attractive price on select models, the scheme would also help consumers save on their electricity bills annually, depending upon the use. The scheme is open till 31st December, 2019.

Pradeep Bakshi, Managing Director & CEO, Voltas said, "We are delighted to partner with Tata Power and provide consumers in Mumbai with 5 Star Inverter ACs that offers more savings in terms of cost and energy."

Praveer Sinha, CEO & MD, Tata Power, added, "We are glad to collaborate with them and look forward to offer our consumers with an efficient product that ensures substantial savings on their monthly bill and leaves a minimum carbon footprint without compromising on their comfort." This exclusive partnership has been targeted at households as the domestic sector accounts for almost 20 per cent of energy consumption in Mumbai and AC power consumption is a key component of the same. It is estimated that 5-star rated ACs can help reduce electricity consumption significantly. According to estimates, around 40 per cent of Mumbai's power demand in summer is because of the cooling load involving air conditioners, coolers and fans. ■

Johnson Controls-Hitachi Air Conditioning opens Global Development Centre in India

Johnson Controls-Hitachi Air Conditioning announced the opening of a new Global Development Centre in Kadi, Gujarat State, India. The new centre was inaugurated by Vijaybhai Rupani, Chief Minister of Gujarat and Nitinbhai Patel, Deputy Chief Minister of Gujarat. The result of a USD 22.5 million (approximately Rs 157 crore) investment, the state-of-the-art facility will drive the company's world-class innovation capabilities with a strong focus on developing residential air conditioners and commercially packaged air conditioners for India as well as the Southeast Asia, Middle East, and European markets.

Staffed at launch with over 150 engineers and with the capacity to accommodate upto 300 in total, the new centre is equipped with state-of-the-art research and testing laboratories, including reliability labs, annual performance factor labs, electromagnetic compatibility labs, electronics labs, and semi-anechoic labs to maximise the potential of the local engineering talent. The centre also offers a wide range of capabilities, including user experience design, industrial design, simulation, controls, design quality, project management, and engineering information systems. It also features an experience zone that will give customers a hands-on



experience of the latest air conditioning innovations and technologies.

"This is a crucial step for Johnson Controls-Hitachi Air Conditioning to further strengthen our global position. Now, this new Global Development Centre will play a critical role in developing new and exciting products, particularly, for Southeast Asia, the Middle East, and Europe to enhance our ability to meet diverse market needs in these regions," said Franz Cerwinka, Chief Executive Officer, Johnson Controls-Hitachi Air Conditioning.

Gurmeet Singh, Chairman and Managing Director, Johnson Controls-Hitachi Air Conditioning India said, "The launch of the new Global Development Centre is yet another milestone for investment in Gujarat State, India. This engineering and innovation hub will put Gujarat on the world map for industrial research, product development, and skill enhancement. With the launch of the new Global Development Centre, we have created additional opportunities for the local talent to demonstrate their skills and capabilities to respond to the dynamic global market needs." ■

Danfoss approves EVR V2 solenoid valves for low GWP refrigerant

As part of Danfoss' wide range of servo-operated solenoid valves, its newly-qualified EVR valves have been designed to be used in liquid, suction, and hot gas lines, and are now compatible with R1234ze refrigerant and oil-free systems.

"Since we launched our pioneering Turbocor TG compressor in 2013 and expanded to a full range portfolio in 2017, we've been market-leaders in R1234ze and oil-free component qualification testing," claimed Drew

Turner, Global Marketing Manager for Danfoss cooling oil-free solutions.

"While other manufacturers test their components' performance and reliability using air, Danfoss uses refrigerant in real-world conditions in its application development centres. We believe testing in complete systems not only delivers greater accuracy, but also improves reliability and energy efficiency—a win-win situation for our customers, and indeed, their customers too." ■



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AAF announces promotion of Ramanathan to CFO

American Air Filter (AAF), a Daikin group company, one of the world's largest clean air solution providers



announced the promotion of Ramanathan S from Finance Head- India to Regional Chief Financial Officer ((CFO) effective from October 1, 2019. Ramanathan will be responsible for Finance and IT functions for the entire region - EEMEA, CIS and SAARC countries.

"I am delighted to welcome Ramanathan to this new regional position. Ramanathan has more than 20 years of experience in financial planning and analysis. Since joining AAF from the last six months, he has been integrally involved in the development of our financial systems and processes," says Rahul Uppal, COO for AAF-Daikin - EEMEA, CIS and SAARC Countries.

"In his new role, he will be a part of senior management team. He will be involved in the strategic decisions of the finance and IT functions for the entire region. I am confident that his skills will propel the company to the next stage of growth," he continued.

Ramanathan's additional responsibilities will include corporate finance - FP&A, reporting, funds management and costing, internal control, secretarial and compliance, ERP and IT management.

Ramanathan joined AAF in April 2019 as Finance Head- India. Prior to AAF, Ramanathan was the Group Financial Controller of Cura Healthcare, Chennai, a medical equipment manufacturer and supplier. Previously, he has worked with Cameron, a Schlumberger company, Deloitte, Areva T&D, MB Petroleum and other reputed companies. ■

CAREL acquires 100% of Enersol

The acquisition of 100 per cent of Enersol, the Canadian distributor of humidification systems with registered office in Beloeil (Quebec), was concluded on September 16.

Founded in 1978 and Carel's commercial partner since the foundation of Carel USA in 2000, Enersol is focused on the distribution of humidification solutions and the associated service, thanks to, expertise accrued over more than 40 years on the Canadian market. The current manager, Patrick Landry, has been appointed Managing Director of the new Carel subsidiary and will have the opportunity to expand and supplement the product portfolio with the various solutions produced and devised by the Carel Group.

Martino Manfrin, Regional CEO, Carel North America, said, "We are proud to be



able to present a new acquisition in such an important market for us as that of North America. This operation", continued Manfrin, "is part of our expansion strategy of the direct sales network, aimed at reinforcing the direct relationship with our clients in order to consolidate the strong growth in the North American market and our leadership position on the global market." ■

Honeywell new Genetron App to tackle counterfeit refrigerants

Honeywell launched a first of its kind application to combat counterfeit refrigerants in the Middle East region. The new app, named after Honeywell's Genetron brand of refrigerants, provides proof of authenticity to customers across the region and directs access to important resources for end-users. It was unveiled at a customer event at Honeywell headquarters in Dubai.

Genetron branded products have been a target for counterfeiters in the Middle East region. Fake refrigerants can cause a variety of issues, ranging from increased energy use and decreased cooling performance, to significantly reducing the operating life of systems and causing injury and equipment failures. They can also damage air conditioning and contain dangerous chemicals. According to research as little as 2 per cent of the wrong chemicals present in a refrigerant mix can cause costly system failure.

The digital platform, specifically beneficial for small and medium enterprises, is part of Honeywell's ongoing efforts to ensure the correct usage of refrigerants across the Middle East. The app will provide

customers with direct and quick access to Honeywell consultants and technicians, and enable users to learn about other new relevant solutions and technologies.

"The launch of the Genetron app highlights Honeywell's commitment to using the latest technologies to create safer communities and industries," said Amir Naqvi, Regional Business Leader, Middle East, Turkey, and Africa, Honeywell Fluorine Products. "All Genetron refrigerants are subject to extensive quality and safety testing before they are sold. This platform is a step forward in helping our customers authenticate our refrigerants as the industry grapples with counterfeit refrigerants in the market." The Genetron app is free to use for customers and can be downloaded from iOS and Android app stores. Honeywell Genetron refrigerants are hydrofluorocarbon (HFC) refrigerants that provide better performance and energy efficiency than previous generation HCFC refrigerants, leading to reduced operational costs as compared with the currently prevalent refrigerants in the region. With the new Genetron app, users can be certain they use original Honeywell products. ■



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Ingersoll Rand's Trane and Thermo King increase sustainability ambitions

Ingersoll Rand, one of the leaders in creating comfortable, sustainable and efficient environments, with its leading climate brands Trane and Thermo King, is further committing to bold action towards sustainability recently on a global stage at Climate Week NYC in New York City.

The company and its Trane and Thermo King businesses have launched the Gigaton Challenge to reduce 1 gigaton of carbon emissions from its customers' footprint by 2030, transforming the way the world heats and cools buildings, and refrigerates cargo in transport. One gigaton is the equivalent of the annual emissions of Italy, France and the United Kingdom combined. The Gigaton Challenge is one of three pillars of the brands' 2030 Sustainability Commitment.

Trane and Thermo King are committed to lead by example, transforming supply chain and operations to have a restorative impact on the environment. This includes achieving carbon neutral operations and giving back more water than used in water-stressed areas. Together, Trane and Thermo King will also increase opportunity for all, strengthening economic mobility and bolstering the quality of life of its people. This includes achieving gender parity in leadership roles, a workforce reflective of its community populations, maintaining liveable market-competitive wages and broadening community access to cooling comfort, housing and food.

"The next frontier of sustainability starts with bold action," said Michael W Lamach, Chairman and CEO of Ingersoll Rand. "Addressing the world's greatest challenges including climate change, urbanization and resource scarcity requires companies like ours to make ESG core to how we innovate, operate and engage. Collaboration is key to accelerating positive change and Climate Week NYC provides a powerful platform to engage." ■

Blue Star embarks on aggressive expansion drive in Western Africa

Air conditioning and commercial refrigeration major Blue Star wholly owned subsidiary in Dubai, Blue Star International FZCO, has embarked on an aggressive expansion drive in Western Africa. The company, with its comprehensive range of air conditioning and refrigeration products, had commenced operations in Nigeria in association with its local distribution partner, Merald Technology Solutions Nigeria, in 2017, and now it intends to rapidly expand its business in this market. To promote its wide range of offerings, the company hosted a technical seminar on September 6, 2019, at the Sheraton Lagos Hotel, Ikeja, Lagos, Nigeria.

Technological leadership Blue Star, with its rich pedigree of 75 years of leadership in the HVAC industry, has an edge in the industry due to its diverse and technologically superior product offerings such as air cooled chillers, water cooled chillers, process chillers, ductable splits, ductable packaged

systems, VRF systems, magnetic turbocor chillers, cold rooms, banana ripening chambers, chest freezers, room air conditioners, water coolers, and bottled water dispensers, amongst others.

Blue Star's new generation highly energy-efficient 100 per cent inverter VRF V Plus systems, for example, exemplify the company's leadership. These systems are best-in-class as they deliver 100 per cent capacity up to 43C ambient temperatures. With over 75 models of indoor units, and outdoor units with capacities upto 112HP, they can cater to a wide range of applications. In addition, each of these systems has a 34-litre accumulator which is one of the largest in the industry, enabling their use across diverse operating loads from 5 per cent to 130 per cent. Besides, they come with a host of advanced controllers such as group controllers and central controllers, and tenant billing software that tracks power consumption parameters. ■

Beijer Ref invests in new plant for green refrigeration technology

In order to meet the market demand for refrigeration based on natural refrigerants, the production capacity of the subsidiary SCM Frigo is being expanded with a new plant.

SCM Frigo S.p.a, based outside Padua, Italy, is one of Beijer Ref's fastest growing subsidiaries. The company develops refrigeration systems based on the environmentally friendly refrigerant CO2. SCM Frigo is one of the global leaders in the market.

Demand for environmentally friendly refrigeration is driven by the European F-gas regulation and a general green trend. The regulation means that F-gases, which are the most important refrigerant for industrial and commercial refrigeration, will be reduced by 80 per cent by 2030. The current production capacity for SCM Frigo, therefore, needs to be expanded. ■

Beijer Ref is investing in a new facility of approximately 13,000 m² which will contain production, storage and space for the Beijer Ref Academy training centre. Construction will begin in the fall of 2019 and the plant is expected to be completed by the end of the fourth quarter of 2020. The investment is expected to amount to approximately € 10M. The plant will have a green profile. Per Bertland, CEO, Beijer Ref, comments, "Due to the European F-gas regulation, we expect the market for environmentally friendly refrigeration systems to continue to be strong over the next five to ten years. The transition to green technology has just begun and so far, an estimated 15-20 per cent of retailers in Europe have converted to chillers that are adapted to the new regulation. With the new plant, we ensure that Beijer Ref can meet the increased demand of the market." ■

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Recent developments on European and international level showcase that cooling is no longer a 'forgotten' sector on the way towards carbon neutrality. With demand set to grow in the coming decades, and being essential for health, fresh and safe food, through to comfort and well-being, cooling contributes to many Sustainable Development Goals. EPEE, the voice of the heating and cooling industry in Europe, is committed to provide and promote sustainable solutions that are fit for the future, demonstrating the industry's value to contribute to carbon neutrality.

At the UN Climate Action Summit, EPEE – along with the activities of the recently launched UN Environment Programme's Cool Coalition – published a pledge on the cooling industry's commitments on sustainable cooling. Andrea Voigt, EPEE's Director General, stated, "Cooling does not suffer from a lack of innovation or sustainable technologies. There are many efficient and sustainable solutions readily available that are only waiting to be scaled up and deployed. They are not just limited to the product level but are based on an integrated approach to cooling and heating in individual buildings up to entire cities. Our toolbox includes many solutions from heat recovery, thermal energy and heat pumps through to demand side flexibility providing stability to the grid as we move to renewable energy, and many more."

Voigt added, "Whether it was at the Climate Summit in New York or at the EU's R&I Days in Brussels, there was no doubt that this message, our message, is not an isolated one: there is an overwhelming consensus, across industries, that solutions and technologies are generally available to meet the 1.5C target. It's not a question of technological innovation. It's a question of reaching the people. The gap between science, policy and people is huge and needs to be closed as a matter of urgency." ■

Mitsubishi Electric Trane HVAC US opens product showcase room

Mitsubishi Electric Trane HVAC US (METUS), the exclusive provider of Zoned Comfort Solutions and a leading supplier of Variable Refrigerant Flow (VRF) heating and cooling systems, is excited to announce the opening of the product showcase room.

"Interactive experiences will be based on a customer's input and what they want to view," said Brinnon Williams, Senior Director, Residential Channel Development for Mitsubishi Electric Trane HVAC US. "The product showcase room will provide customers with innovative tools and resources previously unavailable."

METUS developed the Product Showcase room over an eight-month period, culminating in the grand opening on August 28. METUS designed the



room so customers can take self-guided tours through 11 stations where they gain insight into the company and its state-of-the-art technology by interacting with products and videos. ■

Carrier to protect priceless collection of books & manuscripts at New World-class Library

Priceless books and manuscripts dating back nearly 1,000 years will be protected in controlled environmental conditions courtesy of high efficiency Carrier AquaSnap chillers and heat pumps in a new world-class library at Lambeth Palace, home of the Archbishop of Canterbury.

The new building, currently under construction within the grounds of Lambeth Palace on the South Bank of the River Thames, will house the priceless collection comprising over 4,600 manuscripts and 200,000 printed books stretching back to the 9th Century. They document over 1,000 years of ecclesiastical and cultural life of the Church of England and Great Britain, including the Gutenberg Bible with English illumination, which is believed to be the first printed book to arrive to England, as well as Elizabeth I's own prayer book.

The current storage conditions for the archive are less than ideal, and the new purpose-built library has been designed to the highest architectural and environmental standards to ensure the

fragile collection is conserved for future generations.

The building and its services are designed to protect the archives from changes in humidity, temperature, air pollution and flood risk. The design for the environmental control solution, produced by engineering firm Max Fordham, had to address the needs of two principal zones within the building – archive storage facilities and areas occupied by people on a daily basis.

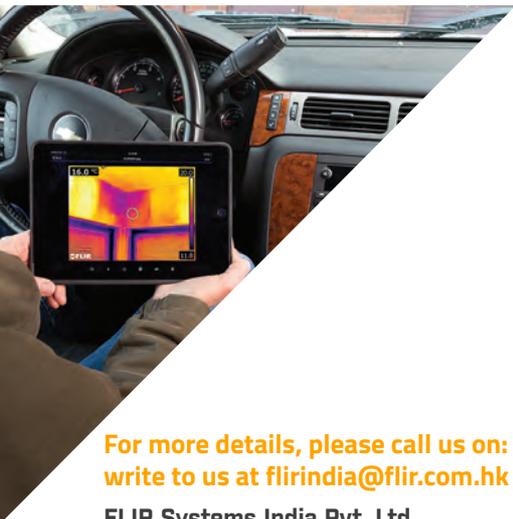
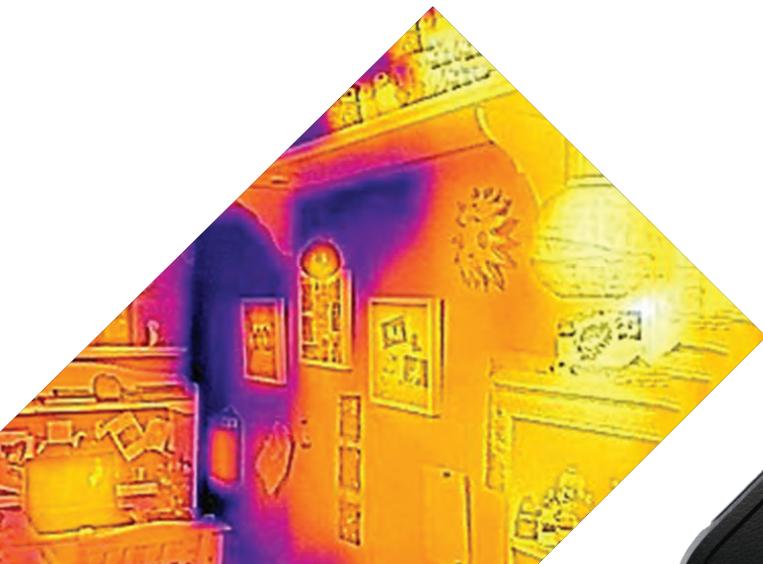
Conditions for archive storage areas follow the recommendations of PD 5454, Guide for the Storage and Exhibition of Archival Materials, which requires a temperature of 8C during winter and 18 degrees in summer, with a Relative Humidity (RH) of 45 per cent. These conditions will be maintained as far as possible using a passive approach, with high levels of insulation and thermal inertia provided by the building fabric. Conditions will be constantly monitored and if they begin to drift outside pre-set limits, the HVAC equipment will be used to maintain temperatures and humidity levels. ■

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AHR Expo announces 2020 Innovation Award Winners

AHR Expo Show Management announced the winners of the 2020 AHR Expo Innovation Awards competition. Hosted annually by the AHR Expo, products in 10 industry categories are recognised for their innovative contribution to HVACR. The winning products, technologies and systems from each award category will be formally recognised during the 2020 AHR Expo, February 3-5 at the Orange County Convention Center in Orlando, FL. Additionally, one of the category winners will be recognised as the most inventive and original product and will receive the 2020 Product of the Year Award. The ceremony is open to all Show attendees and is slated for February 4.

Winners are carefully reviewed and selected by a panel of third-party ASHRAE member judges who evaluate award entries based on their innovative design, creativity, application, value and potential market impact.

"We had more entries submitted for the 2020 Innovation Awards than we've ever had," said Mark Stevens, AHR Expo Show Manager. "This speaks volumes to the advancement and outstanding innovation happening within the HVACR industry at the moment. As in previous years, the technologies vying for a category award more than exceeded our expectations. We

would like to congratulate each of our winners, finalists and all entrants for their leadership in advancing the future of our industry. We look forward to seeing these inventive solutions in action on the Show floor in Orlando and to honour our winners in a special ceremony."

2020 AHR Expo Innovation Award Winners and finalists selected within the categories of building automation, cooling, green building, heating, indoor air quality

In Building Automation, Delta Controls is the winner for O3 Sensor Hub 2.0. In Cooling, Danfoss has claimed the award for Danfoss Interlaced Micro Channel Heat Exchanger (iMCHE). Further, Danfoss again has proven its position in Green building category for Danfoss Turbocor TG490 Compressor. The company has also claimed the top slot in Refrigeration category for Danfoss CO2 Adaptive Liquid Management Solution.

York For Your Home has won the award for YORK LX Series TL9E Ultra-Low NOx Gas in Heating category. In Indoor Air Quality segment, Fresh-Aire UV has won the coveted trophy for Purity Low Profile LED 1" Polarised Filter or LED Disinfection System.

In Ventilation category, the winner is Infinitum Electric for Infinitum Electric, a breakthrough HVAC motor. ■

Steve Gill wins RAC Gold

Steve Gill, the man behind this year's inaugural World Refrigeration Day, was honoured with the RAC Gold Award for service to the industry in Cooling Industry Awards.

The announcement sparked a standing ovation for the Derby-based refrigeration consultant from the 500 guests at the London Hilton Hotel. The first World Refrigeration Day on June 26 received the backing of all the world's major air conditioning and refrigeration



bodies and was celebrated in more than 153 countries.

Another notable winner at the Cooling Industry Awards was German manufacturer Ziehl-Abegg which picked up two awards for its ground-breaking ZBluefin ECblue centrifugal fan.

Sam Gills of Star Refrigeration, ACR Trainee of the Year in 2017, took the Gold Medal in the RAC National Student of the Year Award. Ryan Walton of AC Solutions took Silver and Adam Walker of J&E Hall won the Bronze Medal. ■

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Data Centre Cooling market size to surpass USD 15 bn by 2024

Technological advancements, rising competition, and the need for environment-friendly and cost-effective solutions for reducing energy consumption is driving the demand for green data centre cooling market.

According to a new research report by Global Market Insights, Data Centre Cooling Market size is poised to surpass USD 15 billion by 2024.

The rise in smartphone and Internet penetration in several countries including Indonesia, Vietnam, India, China, and Japan is expected to fuel data centre cooling market growth over the forecast period. Currently, the Indian market has around 400 million active Internet users and 350 million connected smartphone users due to rapid Internet growth in rural areas. Similarly, China has around 3.8 billion Internet users. With such increased Internet penetration, the demand for data centres to manage the massive amount of data will be witnessed, fuelling the data centre cooling market revenue. With more capacity and high density of data centres, the need for energy-efficient cooling solutions is being witnessed. The equipment will reduce damages on systems and processors by dissipating excessive heat from the infrastructure. It will also balance temperature and control humidity levels inside data centres.

Technological advancements, rising competition, and the need for environment-friendly and cost-effective solutions for reducing energy consumption is driving the demand for green data centre cooling market. The introduction of Green Data Centre (GDC) provides maximum energy efficiency and minimum environmental impact for storing, managing, and disseminating data. Several companies are investing in green data centres to ensure that cooling, power, and security systems are providing a high-grade environment. For instance, in February 2015, Apple invested around USD 2 billion to construct two new data centres in Europe, which will be powered by renewable energy. The company also announced that data centres in Ireland and Denmark will power their online services for customers across the region.

In 2016, the liquid cooling segment accounted for around 10 per cent of the data centre cooling market and will witness high growth owing to its benefits of reducing the data centre power consumption and Power Usage Effectiveness (PUE). In addition, liquid cooling solutions help in reducing the physical footprint by

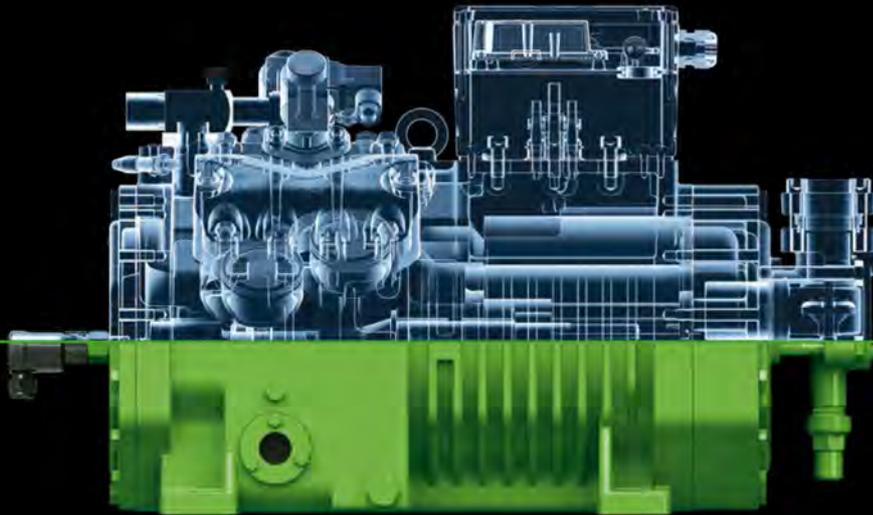
75 per cent from air-cooled alternatives. Liquid cooling technology eliminates the need for air conditioning systems, fans, and other specialised facilities. The growth of the liquid cooling segment is largely due to high heat absorption properties of liquids that are far greater than that of the air. The technique is a powerful method compared to air cooling as the water carries over 3,500 times heat than air. To reduce power consumption by cooling equipment, data centre operators are adopting economiser-based data centre liquid cooling, which can reduce cooling energy consumption by 5 per cent and carbon dioxide (CO₂) emissions. Companies, such as CoolIT Systems and Stulz GmbH, are investing heavily in the development of this technology.

The IT & telecom sector in data centre cooling market is witnessing digitalisation and penetration of technologies such as big data, AI, and IoT. The need for interconnection and the availability of data from different sites will drive the data centre industry growth. Moreover, the proliferation of smart devices and the rising consumer demand to safeguard information property and financial assets are anticipated to drive the demand for data centres. Majority of IT organisations are moving their workloads to the cloud and are preferring to use enterprise-owned data centres. The European data centre cooling market is anticipated to witness a growth of over 12 per cent CAGR owing to the rising number of data centre constructions in the region, which are necessitating high demand for cooling solutions. Global companies, such as Facebook Inc. and Microsoft Corporation, are investing highly in the construction of data centre facilities in the region. For instance, in May 2019, Google announced investments of over USD 675 million for constructing a new data centre in Hamina, Finland. Additionally, the region is one of the earliest adopters of advanced technologies owing to its stable economic conditions and developed infrastructure. A noticeable trend in the region is the introduction of green data centre initiatives coupled with stringent government regulations for maintaining energy efficiency. ■



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GOING GREEN MAKES SENSE

- Supriya A Oundhakar, Associate Editor

The article sheds light on how the right selection of energy efficient HVAC systems in green building, helps in reduction of energy consumption, thus improving the overall performance of the building.

Green buildings are the need of the hour due to depletion of natural resources across the globe. They are designed or constructed with the aim of sustainable development and help to reduce the harmful impact on natural resources. They are designed to consume the optimal amount of energy so green buildings by their definition have low impact on the environment and consume minimal energy and water as well as minimise waste. Based on the building design, the building envelope and the varying climate of the location of the building,



Every customer must opt for higher energy efficient products even if the initial cost is higher by approximately 25 per cent as the additional cost of investment can be recovered in less than 24 months.

- Senthil Thangam, Senior General Manager, Commercial Air Conditioning Division, Blue Star Limited

it is quite possible to operate such a building without air conditioning by adopting natural cooling or forced ventilation.

Heating, Ventilating, and Air-Conditioning (HVAC) Systems play a key role in green buildings since many of the green building factors are directly or indirectly affected by the performance of the HVAC systems. HVAC accounts for nearly 50-60 per cent of the energy used in commercial buildings in India.

“However, the density of the occupancy, the building’s internal loads as well as the climate may necessitate air conditioning to be installed and operated. In such a case the designer of the green building must achieve very low use of air conditioning system energy per unit area of the occupied space. Air conditioning may be driven partly by alternate energy sources too,” states Vikram Murthy, National President of ISHRAE (Indian

Society of Heating, Refrigerating and Air Conditioning Engineers).

Since HVAC energy costs account for more than 40 – 50 per cent of the building’s energy expense, it is critical that the HVAC system operates as efficiently as possible. Elaborating on this, Abhijit Pisal, Business Head, Godrej Green Building Consultancy Services, states that the HVAC system for green building shall be designed to reduce energy consumption while maintaining the interior conditions at a comfortable level to keep occupant’s health and productivity. HVAC system design should not only meet the standard on energy front but beat the standard codes like Energy Conservation Building Codes (ECBC), Indian and American Society of Heating, and Refrigerating and Air Conditioning Engineers (ASHRAE) standards to achieve higher level of green building rating.

Any commercial building has the potential to realise significant savings by improving its control of HVAC operations and improving the efficiency of the system it uses, he further adds.

“In industrial applications, the share of energy consumption of HVAC systems can be even more. Hence, it is important to design and install the most energy efficient HVAC system to reduce the total energy consumption. The lower energy consumption will reduce the carbon footprint of the building and make the building green,” informs Senthil Thangam, Senior General Manager, Commercial Air Conditioning Division, Blue Star Limited.

Eco-friendly HVAC system in green buildings

HVAC systems have major carbon footprint on the environment by use of energy that results in depletion of non-renewable energy resources and impact the performance of a building.

An eco-friendly air conditioning system focuses on a low carbon footprint design that may be an outcome of passive measures in building design and building materials to reduce heat load, the use of natural ventilation and cooling by natural

cooling systems for non-critical areas and non-conventional cooling systems such as radiant cooling.

Depending on a combination of the above strategies, the first or installed cost of an eco-friendly HVAC system for a green building may cost just between 5 to 10 per cent higher than a conventional system, and the savings in operating cost will pay back the higher investment, opines Murthy.

Pisal emphasises on improving control of HVAC operations in any commercial building in order to realise significant savings and thus, improving the efficiency of the system. An integrated and holistic design process beginning at a project’s inception is required to optimise the HVAC design, HVAC commissioning and operation for green buildings.

Senthil from Blue Star gives prominence to use of eco-friendly refrigerants that are responsible for reduction in energy consumption of HVAC system in green buildings. He further adds that the choice of the refrigerant will



Any commercial building has the potential to realise significant savings by improving its control of HVAC operations and improving the efficiency of the system it uses.

- Vikram Murthy, National President, ISHRAE



The time is now to put in the best possible chiller available irrespective of cost so that the environmental impact of chiller operations can be minimal.

**- Aneesh Kadyan,
Executive Director,
CBRE South Asia**

have a direct impact on depletion of ozone and also on global warming. Hence, it is imperative to use eco-friendly refrigerants such as R-134a which has zero ozone depletion potential and lower global warming potential. Every customer must opt for higher energy efficient products even if the initial cost is higher by approximately 25 per cent as the additional cost of investment can be recovered in less than 24 months and after that the customer will save month after month.

Many studies have proved that use of high efficiency, low IKW chillers in HVAC can give better energy savings as against the standard chillers in the market. The reduction in energy costs for chiller operations can vary between 10 – 25 per cent, depending on the usage and design of the system. Payback periods for retrofits can range from three to five years. “With the current state of the environment and the impact of climate change so

strongly visible, the question is not of the economics of eco-friendly chillers as we have crossed the tipping point. The time is now to put in the best possible chiller available irrespective of cost so that the environmental impact of chiller operations can be minimal,” informs Aneesh Kadyan, Aneesh Kadyan, Executive Director, CBRE South Asia.

Variable speed drives can help to reduce fan and pump capacities and speed and thus, lead to reductions in both peak and off-peak energy. “They pay off better if the systems they are applied to operate at part load for relatively long hours. Variable speed pumping can dramatically increase energy savings, particularly, when it is combined with demand-based pressure controls,” states Pisal from Godrej Green Building Consultancy Services.

Achieving efficiency in HVAC

It is important to select the right HVAC products and systems while designing green buildings. For example, by installing and operating a more energy efficient product the customer can achieve lower energy demand even if the product has a slightly higher initial investment.

Optimising the operations and maintenance of an HVAC system in a green building is a key to achieving efficiency. According to Murthy from ISHRAE, a good facility management system can achieve it in following multiple ways:

- Re-commission an HVAC system regularly to operate as per original design or an upgraded design.
- Monitor minute operations of pressure, temperature and current extensively with multiple individual sensors to detect likely failure or higher energy consumption and take action to prevent it or reduce it.
- Improve efficiencies of subsystems, one or two at a time by retrofitting complete system components – such as Air Handling Units (AHUs), pumps and chillers.

- Routine maintenance, predictive maintenance to change parts based on its running time.
- Plan on operating systems at part load based on varying demand using variable speed drives connected to occupancy or temperature sensors.

If the plant and associated systems are maintained regularly and correctly, then the system will run to its design parameters and the energy consumption will be optimised. “Another key factor is to run the plant and systems as per the OEM recommendations, especially, the loading of the system. Design changes in the work space require changes to the HVAC system but in the most cases, this is not undertaken resulting in improper loading of the system,” states Kadyan.

Thangam observed in many applications that installation of Variable Frequency Drive (VFD) driven HVAC equipment result in maximising the



Variable speed pumping can dramatically increase energy savings, particularly, when it is combined with demand-based pressure controls.

**- Abhijit Pisal, Business
Head, Godrej Green
Building Consultancy
Services**

overall efficiency of HVAC systems. “Additional incorporation of heat recovery system for fresh air applications can also enhance the efficiency,” he suggests.

Going Green

Another key factor that is driving the demand of sustainable HVAC systems is the cost of running plants and operating buildings. There is pressure from the occupants to reduce operating expenses and since the HVAC system is a major contributor to the energy cost, building owners are looking at bringing down costs by use of more efficient chillers.

Now a days, consumers prefer HVAC systems with lesser energy consumption. There is also greater emphasis by the government on promoting more energy-efficient equipment. The recent Chiller labelling

program and India Cooling Action Plan are some of the important initiatives by Government of India to encourage the use of energy efficient of HVAC equipment in India.

Green buildings require selection of the most energy efficient equipment including HVAC. “These energy efficient systems offer the least life cycle cost even though they may have higher initial purchase cost. Generally, energy efficient HVAC products used for green buildings would have a return on investment of less than two years. The average of life of these are around 10-15 years thereby, resulting in significant savings on the operating cost every year,” states Thangam from Blue Star.

Echoing the opinion of Thangam, Murthy adds that customer or occupant delight can be enhanced due to enhanced system reliability and efficiency;

improved indoor environment quality and low HVAC systems failure. Reduced energy costs can be used to amortise retrofit costs.

Conclusion

Although HVAC systems offer many opportunities for recovery and re-use of thermal energy, the preferred solution is to use less energy in the first place. This is achievable by more energy efficient buildings, systems and equipment and through improved operating and maintenance procedures. “More attention should be paid to the thermal characteristics of building and strategies for minimising internal loads, examining in detail the opportunities for natural ventilation and daylighting, and exploring ways to reduce the energy requirements of HVAC,” suggests Pisal from Godrej Green Building Consultancy Services. ■



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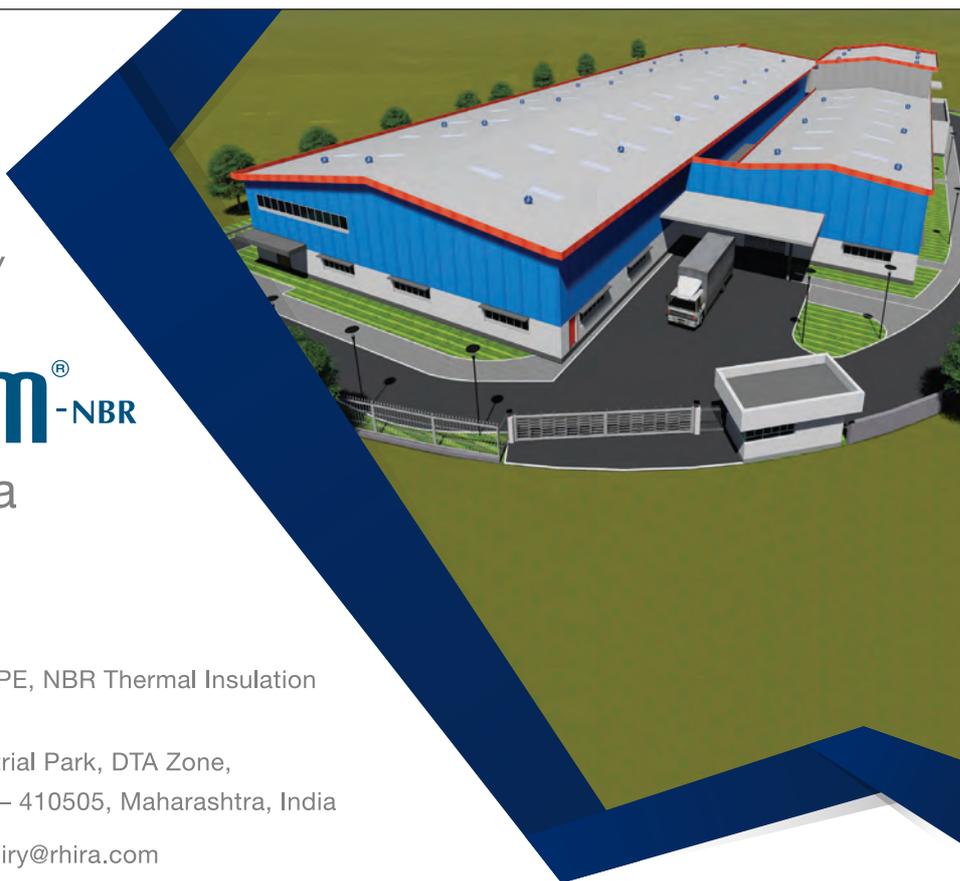


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GETTING TO ZERO



Mili Majumdar explains the concept of net zero buildings and HVAC systems' role in carbon neutral buildings.

Globally, green building is becoming more and more of a mainstream concept, and political leaders, stakeholders, organisations and businesses touching every sector are starting to embrace green building and sustainability as a crucial strategy to meet their sustainability, climate and corporate social responsibility goals and address pressing issues impacting human health and the environment. These leaders recognise that green building is a powerful tool that they can leverage to lower carbon emissions, conserve resources and reduce operating costs, while also prioritising sustainable practices and creating a healthier environment.

In fact, green building itself has grown into a trillion-dollar industry. And thanks to the emergence of green building certification programs like LEED (or Leadership in Energy and Environmental Design), the most widely used green building program in the world, millions of us are living, working and learning in green buildings around the globe. These spaces are using less energy and water. They're mitigating the environmental burden on their communities. They're saving money. And they are offering the people who occupy them a better quality of life.

That reality is changing the way all of us think about buildings—not as inanimate structures, but as opportunities to help create a healthier, more sustainable future. That hasn't happened by chance. It is a culmination of



The first building to certify using LEED Zero for energy is the 440-square metre headquarters of Petinelli, a Brazilian engineering and green building consulting firm

countless small-scale changes that have come together over decades, structure-by-structure and block-by-block. And together, they've inspired people around the world and have ignited a fundamental shift in the way we think about our buildings and communities.

As green building continues to gain momentum, net zero buildings have also recently started to emerge as a trend. Net zero energy buildings produce as much energy as a building consumes through the use of innovative and highly efficient materials, technologies and practices. And while this concept can seem daunting at first, those seeking to achieve net zero can get started by turning to their heating and cooling systems. HVAC efficiency is a crucial factor in net zero energy and the HVAC industry continues to

create innovative technologies and products designed to maximise energy efficiency.

The first step in creating a net zero energy building lies in an integrated and thoughtful design. From an HVAC perspective, this means adopting passive design principles and incorporating adaptive comfort and relaxed design conditions for heating and cooling, which will result in a lower HVAC load. Incorporating this at the design stage is important because it allows you to use high efficiency equipment and controls to achieve higher energy efficiency and lower demand for energy. And once the demand for energy is low, it also becomes very cost effective and technically feasible to use renewable energy to further offset conventional energy use and have net zero demand for energy from conventional

and non-renewable energy sources.

Getting to zero

Recognising the growing importance of net zero in the building industry, we at the US Green Building Council have recently intensified our efforts to support and advance global collaboration to decarbonise buildings, grids and communities by investing our resources and leveraging our tools and technology towards a positive vision. As the developers of the LEED green building program, we believe net zero is a powerful target that will move the entire industry forward. For years, we've witnessed LEED projects around the world aspire to net zero energy, net zero water and net zero waste milestones. It's time we recognise the leadership of those projects—and formalise the commitment to net zero across the entire LEED community.

That's why we recently launched a net zero certification program that gives the green building community a new standard to strive for: LEED Zero. This new certification will help reinforce the leadership behind these visionary projects, while improving performance, accountability and transparency. LEED projects can achieve LEED Zero certification when they demonstrate net zero for any or one of the following: carbon emissions, energy use, water use or waste. Collectively, these new certification programs will encourage a holistic approach for buildings and places to contribute to a regenerative future and enhance the health and well-being for not only building occupants, but all of humanity. Vision is to ensure that, in the future, green buildings are actually generating more energy than they use, and removing more carbon than they produce.

A case study in zero energy

The first building to certify using LEED Zero for energy was the 440-square metre headquarters of Petinelli, a Brazilian engineering and green building consulting firm. LEED Zero energy certification recognises buildings or spaces that achieve a source energy use balance of zero over a period of twelve months. In order to achieve



certification, all energy at Petinelli's office is produced on-site, with an energy use intensity for the site of only 25 kilowatt hours per square meter per year. A 15 kilowatt photovoltaic array provides around 125 per cent of the energy needed to run the 25 person office.

The opportunity for India

India has been a long-time leader in sustainability, and, now, net zero presents a unique opportunity that our country can take a leadership role in. We are steadily scaling up our green building footprint and India is now the fourth largest market in the world for LEED certification. This has set in place a good framework and pathway for adopting net zero energy buildings. In addition to a growing interest in green building, we've also set ambitious sustainability targets and adopting net zero

buildings provides an additional pathway toward achieving these. For instance, our government has committed to reducing emissions to 35 per cent by 2030, increasing our non-fossil-based power capacity to 40 per cent and reducing carbon by almost three billion tons by 2030. We are also becoming a leader in the production and manufacturing of renewable energy – and these new technologies will play a critical role in scaling up our net zero building stock. ■



Mili Majumdar,
Managing Director of
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The article illustrates some of the case studies which have implemented various low or no cost space conditioning technologies.

The building and construction industry in India is posed with several challenges today. Rapid urbanisation coupled with larger disposable income has led to a surge of affordable cooling systems in the market. To put things in perspective, the air conditioning market has been growing faster than other sectors, at CAGR of 18-20 per cent over the last decade. Furthermore, India is projected to overtake the US to become the world's second-biggest emitter of carbon dioxide from the power sector before 2030. As the nation's electricity demand skyrockets, carbon dioxide emissions from India's power sector are expected to rise nearly 80 per cent by 2040 as power use almost triples, driven in part by air conditioning.

While active cooling systems provide controlled comfort conditions, they come with a higher capital investment and operation and maintenance (O&M) costs. Passive systems on the contrary have lower investments both in terms of capital

and O&M costs. Passive cooling systems, however, require a nuanced understanding of space planning and climate responsive design strategies which must be integrated within the building from the design inception. In this regard, contextual solutions are essential for optimum comfort and one strategy can often not be made to fit different site conditions and project requirements.

In lieu of exponentially increasing energy demands, passive cooling strategies are critical to drive down energy consumption and carbon emissions in turn. This article illustrates some of the case studies which have implemented various low or no cost space conditioning technologies.

Residential - Smart Ghar (affordable housing), Rajkot – registered for GRIHA AH (affordable housing)

Located in Rajkot and developed under the PMAY (Pradhan Mantri Awas Yojana) by Rajkot municipality, the project demonstrates one of the no or low-cost strategies which can easily be implemented without increasing the capital investment of the project i.e. climate responsive designing.

In modern high-rise residences, the provision for openable



Image 1: Smart Ghar 3, Rajkot registered for GRIHA AH rating.

windows to allow for cross ventilation in spaces when the ambient temperature is comfortable and often not provided. Inadequate fenestration design without proper shading results in unfavourable conditions such as glare, wind-driven rain or strong wind drafts in the space which in turn prompts users to keep the windows shut or blinds drawn, even if the ambient conditions are favourable.

Vernacular design strategy i.e. use of ventilators has been incorporated in these affordable flats. Focusing on the affordable nature of these flats, the design ensures that the dependency on active cooling systems is reduced to the maximum extent possible. The windows have been provided with top hung ventilators providing an option to the users to operate it during pleasant weather times and with the opening, the wind speed can also be controlled. The top hung window also acts as a protection from rain and prevents its entry inside the building. To create a through passage within the living space the door design also incorporates louvered ventilators for cross ventilation.

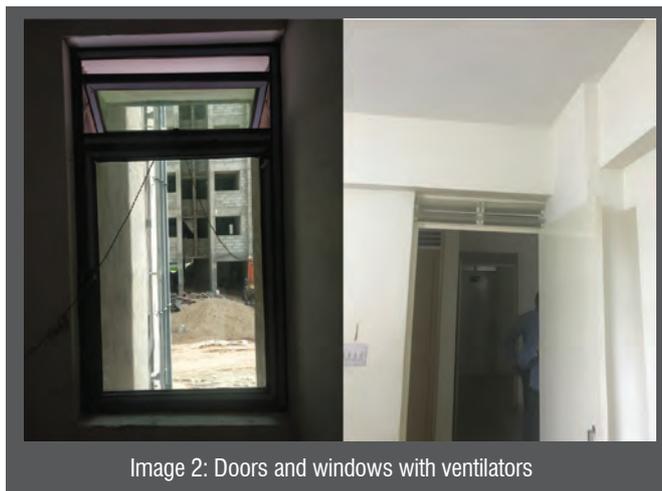


Image 2: Doors and windows with ventilators



Image 3: Forced ventilation in the common shafts

In the flat’s design, negative spaces such as toilets and kitchen share the shafts for piping and ventilation. However, to make sure that there is negative pressure in toilets and kitchen which will provide a natural air suction through bedroom and living room windows and facilitate cross ventilation, forced ventilation is being done on the roof in these common shafts. This strategy also makes sure that the foul smell does not go inside the living space of the flats. To reduce heat ingress and further facilitate thermal comfort, the buildings have cavity walls built with AAC blocks.

Climate responsive design philosophy if implemented properly can easily reduce 90-80 per cent space conditioning cost both at the initial installation as well as future operation.

Commercial - Akshay Urja Bhawan office (HAREDA), Panchkula – GRIHA 5-Star rated

Located in Panchkula, Haryana, this government office building has been made to showcase passive and hybrid space conditioning systems. Panchkula with 8-9 months of dry and hot weather and remaining 2-3 months of rains provided a suitable location for a naturally ventilated office design.

Looking at the glass façade, most of people assume that this is an air conditioned building. However, it is one of the buildings which contradicts the belief that glass buildings cannot be sustainable and



Image 4: Akshay Urja Bhawan office (HAREDA), Panchkula – GRIHA 5-Star rated

require air conditioning. The building planning has been done keeping the regularly occupied spaces in north and southern façade. East and west façade window fenestration design is responsive to the direction, making sure that there is no glare and reduced heat.

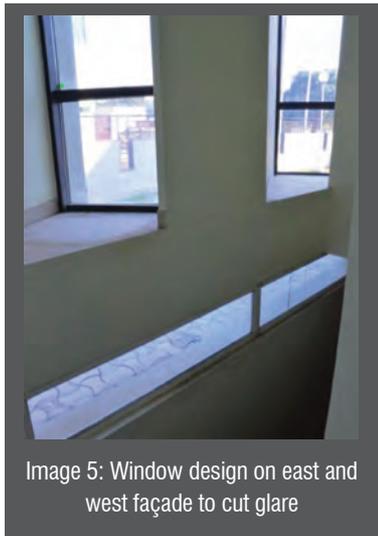


Image 5: Window design on east and west façade to cut glare

Further, the south façade has been designed with excess glass and concrete box (solar chimney) making sure that the internal office space is rapidly heated. Solar chimneys located inside the office space have the provision of louvers which facilitate exhaust for the heat generated.

This process makes sure that the office space develops negative pressure. The project has been designed with a courtyard. To further generate positive pressure



Image 6: Misting in central courtyard

and initiate the wind flow to cool the office spaces. The project has installed misting system in the courtyard through which small water droplets are sprinkled in the courtyard to cool the air.

As per the wind flow, air from the courtyard starts flowing towards the office space. To facilitate this, flow the corridor walls have designer jalis created near the floor level. The draft created from these jalis and the exhaust created by the louvers in chimney makes sure that the space is thermally comfortable.

These projects demonstrate how innovative solutions can not only provide adequate comfort conditions for the users but also reduce energy demand significantly. The adaptive thermal comfort models reinforce the idea that building users are comfortable in a much wider range of temperature, RH and wind speed conditions, which provides the opportunity for a wide range of building typologies to adopt such strategies. Furthermore, advancements in software to simulate heat exchange and wind flow patterns allows designers to not only iterate strategies but also predict thermal performance in buildings more accurately.

In wake of the multifarious challenges that India faces, it is imperative to make a paradigm shift towards passive and hybrid cooling systems especially in cooling dominated countries like India where ample solar and wind energy can be harnessed for improved thermal comfort and reduced energy consumptions. ■



Akash Deep,
Senior Program Manager,
GRIHA Council



Gauri Mathur,
Project Office,
GRIHA Council

Light weight dock house from Gandhi Automations



Dock House

Dock houses are an economic insulation solution that contributes to energy savings and an improved working environment. They contain all the relevant components for a complete docking bay; leveler, shelter and door. Together with dock levelers, dock shelters and an insulated or non-insulated cladding house, a complete, stand-alone dock loading system is formed.

The dock house makes it possible to move the actual loading and unloading area outside the building, thereby, releasing the corresponding floor area inside. No major building modifications are required.

Due to the thermal separation between building and docking unit, the dock house can be used in temperature-controlled applications.

Gandhi Automations believes that dock houses are an underrated option that more logistics operations should consider. If properly designed, dock houses can be relatively light in structure whilst still being strong enough to cope with heavy loads.

Dock houses are generally manufactured from insulation panel with a minimum 40 mm thickness (80 mm is optional). They can, however, be covered in single-skin cladding for ambient buildings. Insulation panels are self-supporting and are extremely strong when fixed in position with deep 'U' channels. Roofs are usually made from a deep corrugated section, which is flashed and fitted with downpipes to take rain water down to the service yard level.

The dock shelter or dock pad fixing is organised within the structure and this is generally taken care by galvanised folded sections fabricated into a frame. The door can be housed at the building line creating maximum insulation of the main warehouse when the door is closed. Alternatively, it can be housed within the dock house – either at the front or rear. However, it is important to remember that, if a sectional door is to be used, the dock house must be sufficiently high and long to take the door tracks.

Installation needs to be carefully considered. At many sites, the dock houses are entirely separate and independent of each other because it suits the programme for pouring the floor slab

inside the warehouse. By contrast, they can be installed in multiple units if space between them is limited.

Dock houses are available as individual units or as a row of houses.



Load House

Advantages of Dock Houses

- **Save space:** Dock houses do not take up valuable internal warehouse or factory space and keep loading and unloading functions to a confined area.
- **Reduce accidents:** Cross traffic will not interfere with the loading dock which delivers distinct health and safety benefits.
- **Easy to install:** There is no major civil engineering work required when installing a dock house and the installation should not disrupt any work taking place inside the warehouse or factory. Dock houses can also be repositioned on the site if required.
- **Save energy:** Gandhi Automations' dock houses are lightweight but exceptionally strong. They are insulated and weatherproof which makes them ideal for ambient and temperature-controlled buildings such as cold stores and also means they deliver energy saving potential.

Gandhi Automations Loading bay equipment's experience and expertise means that the company can build dock houses in virtually any shape or size incorporating a variety of cladding finishes. ■

For more information, visit: www.geapl.co.in



Dock Shelter



MSA SAFETY: PIONEER IN REFRIGERANT LEAK DETECTION SYSTEMS

Dr Jason Shilliday, Business Development Manager, MSA Safety outlines evolution of MSA Safety in India, solutions and products offered by the company for India, demand for gas sensor technologies or products and many more in an email interaction with Cooling India.

Established in 1914, MSA Safety Incorporated is the global leader in the development, manufacture and supply of safety products. When do you enter India markets and how has your business in India evolved over the years?

MSA entered the India market in 1965 as MSA (India) Limited. Our business in India has steadily increased over the last 54 years in both our gas detection products and our PPE business. We work closely with consultants and end users and educate them on gas safety and our PPE safety products and systems.

A refrigerant leak is one common air conditioning problem. How is MSA Safety geared up for this challenge?

MSA manufactures refrigerant leak detection systems which can detect leaks down to 1 part per million. This enables even the smallest leak to be detected by our systems. Refrigerant leaks cause the cooling system to operate inefficiently, consuming more electricity than required. The leaking refrigerant can also be a safety concern due to the toxic nature of some of the gases and

the risk of asphyxiation as most of the refrigerants have no smell to enable the person to sense the gas.

According to you, how to select a gas detector for EN 378 safety compliance?

EN378 is a safety standard for refrigeration systems. Gas detectors should be installed if, due to a leak the volume of refrigerant in the occupied space could go above the RCL (Refrigerant Concentration Limits). RCLs are set in EN378 and ASHRAE 34. This safety standard is mostly applied to machine rooms housing water-cooled chillers and VRF systems supplying cooling to hotel rooms, also Ammonia refrigeration systems. All these systems contain large volumes of refrigerant where there is a risk of asphyxiation or worse due to a leak.

What are the required safety practices and procedures to be used in connection with refrigerant gas detection?

ASHRAE has published Standard 15 which is a safety standard for the design of refrigeration systems and Standard 34 which is the safety classification of refrigerants, both have been updated for 2019. ISHRAE has published Guidelines to document ISO5149 which highlights Chapter 8 on Alarms due to refrigerant leaks and Chapter 9 on Refrigerant Detectors. EN378 is a European standard for the safe design of refrigeration systems.

What are gas sensor technologies or products offered by MSN Safety for refrigerant leak detection that comply ISHRAE and ASHRAE safety norms?

All of our refrigerant detection systems can make refrigeration systems comply with ASHRAE and ISHRAE safety standards when refrigerant leak detection is required.

How do you envisage the demand of MSA Safety products or technologies in India?

India is a growing market with ever increasing demand for cooling, both for air conditioning and for food processing and pharmaceutical processes. Safety awareness and the adoption of international and local standards on refrigerant safety should help to grow the demand of MSA Safety products.

Do you have robust service and maintenance network for your products in India?

MSA works with authorised service centres in India who are trained to install and maintain our products.

What are your future plans to introduce refrigerant leak products in Indian market?

We are looking forward to distributing our products through new and existing distribution channels in India and are currently working with consultants in the region on improving the safety of refrigeration systems and the safety of buildings. We offer free training sessions on how to apply the latest updates on ASHRAE 15 and EN378 to buildings. ■

“Safety awareness and the adoption of international and local standards on refrigerant safety should help to grow the demand of MSA Safety products.”

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GREEN BUILDINGS INVESTMENT NOT EXTRA COST

With conscious passive architectural design strategies viz. optimum building orientation, form and shapes of the buildings enable the projects to not only attain green building certifications but also achieve reasonable operational savings at almost no or negligible cost premium.

Buildings are a big part of sustainability challenge, and thus, a huge opportunity. The World Green Building Council counts buildings as fundamental to 9 of the 17 UN Sustainable Development Goals.

“The construction and operations of buildings account for 40 per cent of global energy use, 30 per cent of energy-related GHG emissions, approximately 12 per cent of water use, nearly 40 per cent of waste, and employs 10 per cent of the workforce” - UN Environment Programme from Sustainable Buildings and Construction.

This implies that if we want a more sustainable society and economy, we need to create green



buildings. Moreover, people spend 90 per cent of their time indoors. Because buildings consume so many resources, and we spend so much time in them, they represent an outsized opportunity.

As per World Green Building Council, green buildings represent a major global investment opportunity, with buildings making up the largest segment of the USD 231 billion energy efficiency market.

Defining Green Buildings

There is no single definition of a green building, though some organisations have their own definition. For example, the International Finance Corporation (IFC), which is focused on supporting the private sector in emerging markets, defines a green building as one that saves 20 per cent of embodied energy (the total energy required) and water in its construction and operations. There is an increasing trend to go beyond environmental aspects in defining a green building to incorporate other environmental, social and governance (ESG) criteria, such as wellbeing.

There are several projects where better outcomes for people, planet, and profits are simultaneously achievable. Building

| City | Type of Building | Sub-Market of the City | Rental (in INR per sq.ft.) | Vacancy Rate |
|-----------|------------------------|------------------------|----------------------------|--------------|
| Mumbai | Conventional non-green | BKC | 220-225 | 20-25% |
| | LEED certified green | BKC | 250-255 | 10-15% |
| Bangalore | Conventional non-green | SBD | 70-75 | 10-15% |
| | LEED certified green | SBD | 95-100 | 0-5% |
| Delhi-NCR | Conventional non-green | Noida | 35-40 | 25-30% |
| | LEED certified green | Noida | 40-50 | 0-5% |

Table 1: Occupiers willing to pay a premium rent
Source: JLL REIS & Research Report

owners can profit from energy efficiency measures, retrofits and improvements. Reducing energy use reduces utility bills. Better, healthier buildings typically command higher rents and are worth more.

Thereby, it will not be incorrect to define it as “Green Buildings are the ones that achieve Triple Bottom Line – People, Planet & Profit”.

Rental values and vacancy in non-green buildings vs Green Certified Buildings

As per paper published by JLL India, occupiers are willing to pay a premium rent in an effort to reduce overall operation,

maintenance and costs as this has far more benefits than paying lesser rent while incurring an overall higher expenditure. This proves to be a win-win situation for both developers and occupiers.

Do Green Buildings Cost More?

There has been a widespread perception in the real estate industry that building green is significantly more expensive than conventional methods of development. However, determining a precise “incremental cost for green” for a given project is often very difficult for several reasons viz.

- Some green buildings being built today are showcase projects that may include

additional and sometimes costlier materials and finishes that are unrelated to greenness but that nonetheless are counted as incremental cost for building green.

- Design and construction process for the first green building of a building owner, developer or design firm is often characterised by significant learning curve costs, and design schedule problems such as late and costly change orders.
- The relative newness of green technologies and systems can make designers, architects and clients conservative when using them. They may oversize building systems and not fully integrate them into the building, thereby, reducing cost savings and other benefits.
- Similarly, cost estimators may add uncertainty factors for new green technologies that they are not familiar with, and these can compound, further inflating cost estimates.
- Moreover, adding green concepts as add-ons to an already completed design leads to redesign and thereby, change the project economics pertaining to green buildings.

A detailed research report prepared by Davis Langdon cites that “there is no significant difference in average costs for green buildings as compared to non-green buildings. Many project teams are building green buildings with little or no added cost, and with budgets well within the cost range of non-green buildings with similar programs.”

Commons in Regulatory Norms & Green Buildings

It is worthy to note that by complying with the requirements of Ministry of Environment and Forests (MoEF) and Energy Conservation Building Code of India, many green building requirements are automatically met in the projects including but not limited to the following:

- Incorporate rainwater harvesting
- Installation of sewage treatment plant
- Installation of Solar Hot water systems
- Efficient building envelope
- Efficient electro-mechanical systems

Cost saving strategies

On contrary to the perception that green costs more, it would be interesting to note that many green building requirements are rather save costs, for instance

- Reusing construction waste generated at site leads to reducing cost of purchasing fresh materials for site management.
- Usage of locally available materials allows reducing transportation costs for material procurement.
- Usage of salvaged materials enabling project to procure cheaper materials.
- Top soil preservation and its reuse lead to saving cost in buying soil for landscaping.
- Implementing construction indoor air quality management strategies leads to scheduled interior construction activities and avoids damage of costlier furnishings materials.
- Selecting a site that's closer or in the middle of previously developed urban areas. The advantage lies in terms of

roof to reflect heat and reduce surface temperatures

- Using low VOC paints for interior spaces to maintain healthy indoor environment
- Providing energy and water meters for different end-uses
- Using energy star rated appliances
- Installing low flow water fixtures
- Using native or adaptive species for landscape
- Using pervious pavers for pathways and parking lots
- Using CFC free refrigerant in air-conditioning systems

Incorporating above mentioned strategies form a considerable part of overall requirements of specified under different green building rating systems. Combining these strategies with conscious passive architectural design strategies viz. optimum building orientation, form and shapes of the buildings enable the projects to not only attain green building certifications but also achieve reasonable

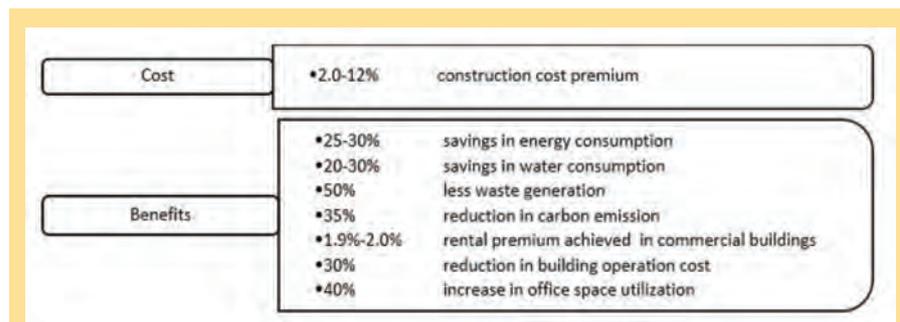


Table 2: Cost benefit analysis

Source: www.grihaindia.org

less site clearing activities and removing less vegetation. Additionally, the site is likely to be closer to public transportation and basic amenities, which is also a requirement of green buildings.

Low or No cost strategies

Many green building requirements have minimal or no cost implications such as,

- Adequate sizing of parking spaces
- Providing preferred parking spaces for electric vehicles, carpools and differently abled people
- Using reflective paints or materials on

operational savings at almost no or negligible cost premium.

Incremental Cost & Paybacks

Additional measures including the installation of onsite renewable energy generation like solar photovoltaic; incorporation of advanced technologies in the design of building's mechanical, electrical and plumbing systems; installation of sensing devices for light, carbon dioxide, carbon monoxide, occupancy etc. though add to the project's incremental costs however provide operational savings in terms of reduced utility bills and maintenance

costs and thereby additional cost spent in implementing those can be recovered within a reasonable period.

The cost benefit analysis is shown by Green Building Rating Council in Table 2.

Incorporation of these measures also enables the projects achieving higher levels of Green Building ratings which, as a subtle advantage, provides a higher brand image for corporates, owners and other stakeholders.

Incentives for Green Buildings

Considering the economic, social and environmental benefits associated with the green buildings, local regulatory bodies have also started providing supplementary benefits for constructing green buildings. Local authorities of several states like Punjab, West Bengal, UP, Haryana, Rajasthan are now offering 5-15 per cent extra buildable FAR to the developers if they construct a building to achieve minimum GOLD or equivalent rating. Apart from this, faster clearances and lower development charges, rebate in submission

fees are few more incentives available for projects that are aiming Green Building Ratings.

With these incentives, green building movement has been considerably accelerated and the question of incremental cost is being faded due to the simple fact of having increased saleable area and other benefits. In fact, developers are now expecting increased revenues by constructing green buildings.

In addition, a number of other studies document measurable benefits for enhanced day lighting, natural ventilation, and improved indoor air quality in buildings. Benefits associated with these green features include enhanced worker and student productivity, as well as reduced absenteeism and illness. A study at Herman-Miller showed up to a 7 per cent increase in worker productivity following a move to a green, daylight facility.

We continue to see project teams conceiving of sustainable design as a

separate feature. This leads to the notion that green design is something that gets added to a project – therefore they must add cost. This tendency is especially true for less experienced teams that are confronting higher levels of certifications (Gold and Platinum). Until design teams understand that green design is not additive, it will be difficult to overcome the notion that green costs more, especially, in an era of rapid cost escalation.

Moreover, in this age of climate change, going green should not be conceived as a choice but a responsibility for creating a livable future for ourselves and next generations. ■



Ashish K Jain,
Partner, AEON
Integrated Building
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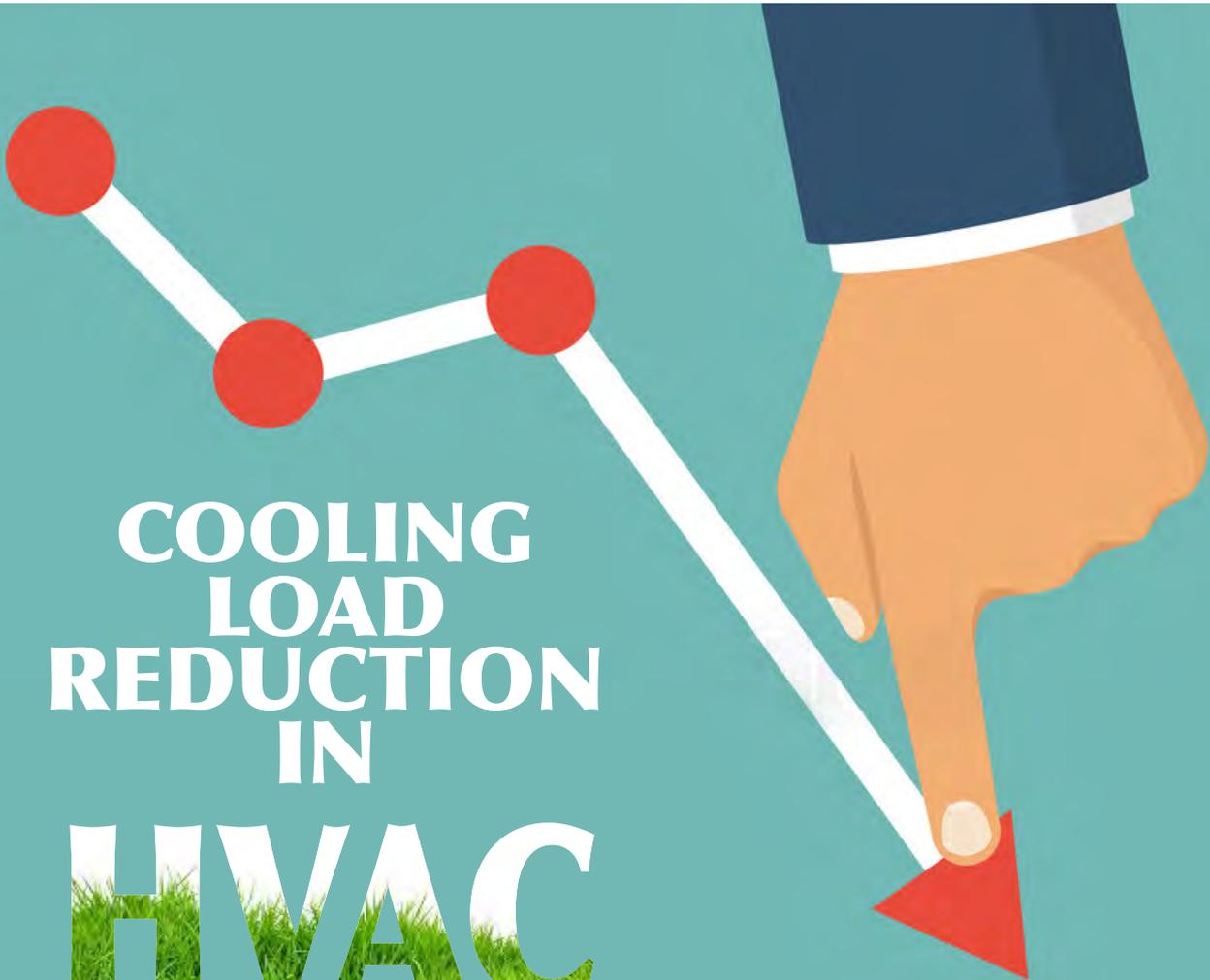
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COOLING LOAD REDUCTION IN HVAC

The focus on energy performance of buildings states the importance of stimulating refurbishment of existing buildings into near zero-energy buildings. However, the effectiveness of the process depends on the basic building structure and the refurbishment designs

Heating, Ventilation, and Air Conditioning (HVAC) systems account for a large share of the energy consumed in commercial buildings. Simple strategies such as adjusting HVAC set point temperatures can lead to significant energy savings by substantial reduction in the cooling load on HVAC. This is because buildings worldwide consume approximately 47 per cent of primary energy sources, making it the single largest energy consumption sector. The importance of improving a building's energy performance was emphasised by the enforcement of sustainable building policies. The focus on energy performance of buildings states the importance of stimulating refurbishment of existing buildings into near zero-energy buildings. However, the effectiveness of the process depends on the basic building structure and the refurbishment designs. Hence, a method to find the effective strategies for retrofitting and modeling to predict energy reduction is vital.

The building surface provides a barrier among the indoor space and outside climate. The building external cooling load greatly depends upon exposure of wall, roof and windows to outdoor ambient. While the internal cooling load depends upon the heat and moisture

produced by the occupants as well as appliances and activities associated with daily living. The cooling loads are what drive HVAC design and capacity. One important distinction between heating load and cooling load is that heating loads are based purely on thermal energy transfer driven by the temperature differences. Cooling loads, on the other hand, related two distinct components like as one thermal and the other moisture related. These components are described more precisely as the sensible and latent portions of the cooling load respectively. The sensible cooling load is the most dominant in residential HVAC applications. Three basic cooling load reduction strategies mostly employed to optimise HVAC design are air sealing, insulation and shading or reflectivity. The following Table 1 shows how each technique applied to control the cooling load of HVAC.

Floor

Insulation and air sealing are available options for reducing cooling load through the floor. Even left uninsulated, in summer time heat gained through the floor is relatively small compared to other cooling loads. Air leakage through the floor could have a significant impact on the air conditioner but would be difficult to quantify as separate load. Two load reduction alternatives that could still be implemented at a later date are primarily focused on reducing air leakage through floor. The first involves adding a layer of polyurethane foam insulation directly to the bottom of the floor which could provide an excellent seal as well as R-value. The second is more extensive requiring the crawl space to be enclosed with an insulation and air boundary and adding a vapour barrier on the ground beneath the home.

are the only ones with a significant overhand which means shading have to be provided by surrounding trees and operable attachments to the windows. Strom shutters are useful shading devices, especially the type with operable louvers that can be adjusted to block direct sunlight while maximising the free area for air and light to pass through.

Ducts

Duct leakages have a devastating impact on indoor air quality, building durability and air conditioner performance when not held in check. In small duct high velocity (SDHV) subject to higher system pressures, this higher pressure is more potential to leak air than in other standard systems, emphasising the need for a tight duct system. Upon maintenance, duct leakage to the outside within 3 to 5 per cent of air handler flow volume is permissible.

Infiltration

Infiltration or envelop leakage from roof, wall, floor and windows increase the load on HVAC greatly. So, buildings should be extensively renovated with almost the entire original breadboard replaced with gypsum wall board on the walls and ceilings. Modern double pane, vinyl framed windows were also installed throughout. Another major source of air leakage, the fire place, was blocked off.

The cooling load distribution among the cooling load components are shown in Figure 1.

Challenges

Design of glazing should integrate the

Table 1. Techniques for cooling load reduction in HVAC.

| | Air sealing | Insulation | Shading or Reflectivity |
|--------------|-------------|------------|-------------------------|
| Roof | × | × | × |
| Walls | × | × | × |
| Floor | × | × | |
| Windows | × | × | × |
| Ducts | × | × | |
| Infiltration | × | | |

Roof

The roof represents one of the largest potential cooling loads in residence. Roof related cooling loads can be reduced by incorporating any of the above three strategies. But the metal roof provides some inherent reflectivity so only insulation and air sealing were addressed.

Wall

Several strategies for insulating the exterior walls are considered including the use of expanding polyurethane foam which could provide air sealing as well as insulation. The decision to do without insulation in the walls was driven by the fact that only 1.5 to 2 TR cooling load would be saved and that extensive deconstruction would be required. Adding insulation to the wall cavity may have unintended impacts on the moisture dynamics within the wall.

Windows

Window loads are typically one of the largest sources of heat gain in buildings. Now-a-days, window cooling loads are reduced by integration of simple and high-tech strategies including shading, air sealing, special coatings, and multiple panes of glass. The front porch windows

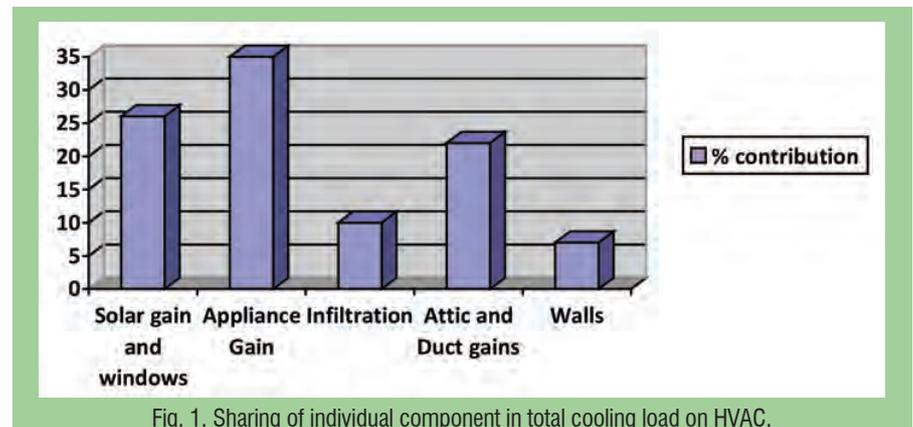


Fig. 1. Sharing of individual component in total cooling load on HVAC.

technical selection of windows and skylights, atriums, and other glazing units with important architectural issues, including view for the occupants, building appearance, day lighting, and passive solar heating. Ironically, the most important aspect of solar energy for many buildings is keeping sunlight out. Since the advent of modern architecture, with its vast expanses of bare glazing, designers have failed to deal effectively with the enormous increase in cooling load that is caused by such design. The air conditioning load caused by entry of sunlight through glass typically is the largest cause of high air conditioning cost in commercial buildings. In recent years, electricity demand charges have risen steeply as utilities seek to avoid building new power plants. Even in northern climates, heat gain through glass may cause a large fraction of annual energy costs, especially, in heavily glazed buildings. The heat content of direct sunlight is about 240 BTU per hour per square foot (about 0.7 kilowatts per square metre), measured perpendicular to the direction of the sunlight. Vertical glazing that is oriented toward the east, west, or south receives roughly 1,000 BTU per square foot (about 3 kilowatt-hours per square metre) per day in clear weather. This figure does not vary much throughout the middle latitudes, and it does not change much as the seasons change.

Solutions

Many methods are available to reduce solar heat gain in virtually all types of buildings. The most powerful methods are based on shading. Exterior shading methods include parts of the building structure, including balconies, eaves, soffits, window insets, and other architectural features. External shading devices include awnings, louver materials, horizontal shelves, and other types of shading in almost unlimited configurations. Interior shading devices include venetian blinds, roller shades, draperies, louver blinds, diffusers, and a variety of other techniques that are classed as 'window treatment.' Some shading devices are built into windows. Plastic window films can be

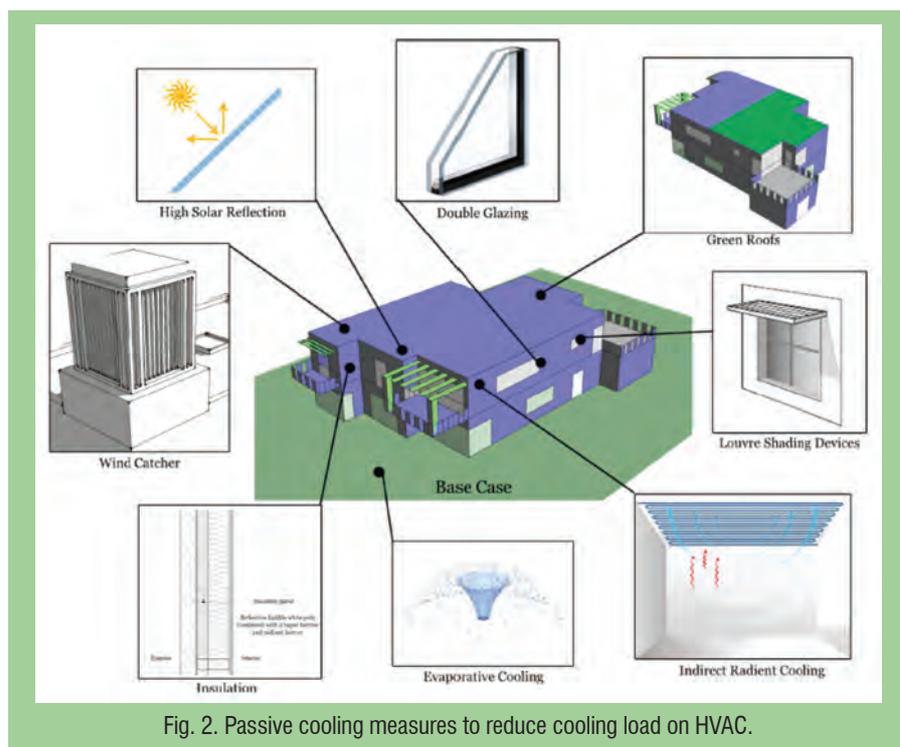


Fig. 2. Passive cooling measures to reduce cooling load on HVAC.

attached to existing windows to reduce solar heat substantially, as well as providing other benefits, such as breakage resistance. The ultimate shading technique is to reduce the area of glazing, which can be done in existing buildings as well as new construction. Windows, skylights, and other glazing should be selected to reduce both heating and cooling energy consumption. Selection factors involving the glass include the number of panes, the gap between panes, colour, low emissivity coatings, visible light transmission, infrared heat transmission, and breakage resistance.

Lighting system modification

The proper use of lighting is one of the most cost-effective ways to reduce carbon emission and application of existing technology could reduce electricity use for lighting by 50 per cent. A lighting system that includes automatic daylight dimmer in corridors and office zones as well as replacing existing lamps with high-efficiency LEDs. Luminance in the office zones were adjusted to 300 lux by the recommendations. Lighting operating schedule was proposed to accommodate the employees when the area is occupied.

The passive cooling measures also reduce the total cooling load on HVAC as shown in Figure 2.

Conclusion

In an architectural building design to reduce cooling load on HVAC, it is important that all main elements of the building should either block or reject solar heat gain and try to keep the building cool against the heat of summer. The architectural building design depends greatly on the climatic conditions of the area and should therefore, be oriented building accordingly. A passive building is often the key foundational element of a cost-effective zero energy termed as green building. In a hot and arid climate, most of the energy load is from mechanical systems, so this load could be reduced by adding elements to the building, such as louvered shading devices which can significantly reduce energy consumption by reducing the HVAC cooling load substantially. ■



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FabricSox spearheading fabric ducting

Nutech Ducting Solutions Pvt Ltd, one of the established names in HVAC industry, has been providing ducting solutions for more than 15 years. Helmed by industry veterans, the company's fabric ducting product 'FabricSox' is one of the industry leaders in fabric air dispersion systems in the country.

FabricSox, the first fabric duct product manufactured in India, is a classic example of 'Make in India'. FabricSox has over 800 installations and the company boast one of the highest growth rates in recent times. Strong and dynamic product combined with highest quality of service has been the company's motto.

Nutech entered the HVAC industry, when the industry was in an unorganised state with few players offering quality solutions. Issues like time consumption, noise disturbance, chain of contractors as per respective jobs or skills, inline duct accessory installation issues and unpolished aesthetic was dominating the industry.

The owners sensed a requirement to provide quality solutions across the entire value chain of the low side of HVAC deliverables. Thus, the journey of the company began in the field in year 2004-05.

Nutech introduced pre-insulated ducting solutions (PIR core with aluminium embossed foils on both sides of the core) to Indian industry. This ducting offered low noise, was aesthetically appealing and could be customised as per site conditions. The company installed over two million square meters of this ducting pan India across industries.

The company has always believed in innovation and looking at newer and better solutions in this field. This led to fabric ducting air dispersion systems. The company realised that fabric ducting is the future in this space as it fulfilled all the requirements of a high-quality ducting product and additionally was much customisable, safer and cost-effective. The company is proud of pioneering this product in the country.

The company started as an installation and service company for fabric ducts and after extensive R&D and innovation after manufacturing high quality fabric ducts under the brand 'FabricSox'. Today, the company has executed projects in over ten countries.

FabricSox is manufactured from an inherent fire-retardant fabric approved by inspection agencies across the world. The product has one of the lowest permeability and noise absorption level in the market. The fabric is made out of high-quality non-fading dyes with minimal colour loss even after repetitive wash. The company carries out complete performance testing of every duct before it leaves the facility.

The company also strives to provide good post – installation service, as required. FabricSox manufactures, installs and services fabric air dispersion. The product has found applications across industries.



Anil Sarwade,
Managing Director,
Nutech Ducting
Solutions Pvt Ltd

The company has executed projects in industries like food, beverages, dairy, automobile and auto-ancillaries, aviation, pharmaceuticals, textile, warehousing, FMCG, corporate and business hubs, restaurants, malls and movie theatres, sports complex, exhibition centres etc.

FabricSox has a state-of-the-art manufacturing and testing unit. The company aims to provide the highest customer satisfaction.

FabricSox has one of the highest customer retention rates.

Some of the innovations include fabric ducts for return air requirement and fabric nozzles for spot cooling.

Nutech believes that there cannot be one special aspect, there must be value in the whole process, and the company is involved in offering high quality service right from conceptualisation to commissioning. The company understands the application of the product where it hand holds the customer and strives to provide optimised techno-commercial solution.

One of the major advantages of the product is that it has application in almost every industry. Today, HVAC is not a luxury but a necessity for human comfort and process cooling, making it a 'must' requirement product. This opens innumerable opportunities for the company's product. The customisation aspect of this product places it among the top brass of ducting products.

As various industries are growing, the requirement of HVAC is finding more and more importance. The growth of Asia-Pacific across various industries have proven to be beneficial to this sector.

Its product places itself successfully as environmentally friendly, promotes low energy consumption and has a less CO2 footprint. It is a recommended product for green projects.

The product is preferred by architects apart from the technical strength of the product as it is high on aesthetics and appearance.

As the product has minimal logistical issues and have low transportation costs, it removes geographical limitations. ■



SMOOTH CASHFLOW KEY TO THE FACILITIES MANAGEMENT INDUSTRY

While assessing the Facilities Management (FM) market, **Prabhu Ramachandran, CEO, Facilio**, speaks with Ranjana Konatt, on the issues surrounding cashflow – concerning the maintenance of contracts to the lack of strategic planning for FM services within the scope of HVAC.

As a Facilities Management company, could you provide a brief overview of the issues related to cashflow, especially regarding the contracts drawn up for building maintenance purposes?

Cashflow is a core component for the smooth functioning of any industry, whether to survive or to scale. But in HVAC this gets compounded several times over - owing to the complex nature of the industry and the size and the scope of projects. When it comes to post-construction,

facilities management companies usually take over the general up-keep and the maintenance of buildings. And needless to add, cashflow is also critical to the efficient functioning of facilities management companies as it allows them to deliver their services promptly with a focus on quality and efficiency. The FM industry has also been facing cashflow issues, which are sometimes the ripple effect of cashflow concerns during the construction phase or due to market conditions like an economic

downturn or recession when holding onto cash is seen as a safety net. While the construction and real estate business does have a higher threshold of acceptance for delayed payments, almost seen as an industry norm, there are instances where these cashflow issues start impacting the business performance, and at times the very existence of suppliers and contractors. At the same time, liquidity and cash flow issues of clients impact the availability of working capital for FM companies, which work on a cash-intensive operating model.

With growing cashflow concerns and a higher focus on ROI in an increasingly competitive space, how can the FM industry and building owners benefit and strive to progress?

Involving FM professionals in the early stages of infrastructure development to provide FM consultancy for better FM service planning can help. Also, having technology interventions like IoT and AI enable a predictive model for FM operations that directly saves money and time, plus it delivers a high ROI owing to continued energy efficiency, sustainability, reduced operating costs, an extended lifecycle of assets, and optimal workforce productivity. The future of the industry will lean heavily on data-driven continuous efficiency in building operations. The intersection of IoT, smart buildings and unified automation with predictive software-led and real-time FM is already being acknowledged as having the potential to impact 80 per cent of the expense of a building over its life. As far as the maintenance phase in particular, automation and IoT led BMS not only assists in optimising process efficiencies, it can completely redefine the entire cost-vs-revenue profile. Added sophistication due to transparency in operations, and a reliable real-time feedback mechanism allows real estate owners the leeway to identify the most cost-beneficial course of action. Over the entire timeline of a project, these savings and optimisations add up very significantly. Contracts drawn with these inputs result in a win-win for owners and FMs, as well as contractors, and are inherently more stable and profitable.

Where do the issues in cashflow stem from, and how can the issues be addressed?

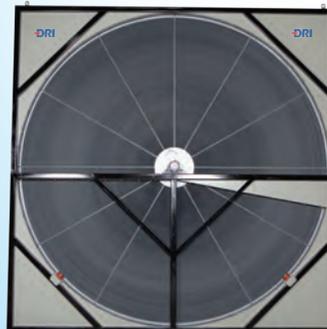
A significant driver of cashflows, especially in the



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post-construction maintenance contracts stage, is the lack of strategic planning for FM services and an incomplete consideration of the variables involved. Clients face cashflow issues when the outflow of cash exceeds revenue inflow. By becoming strategic partners with their clients, FMs can help plan their asset acquisition and maintenance better, reducing high-capex and high opex. This, in turn, means greater liquidity that clients can then share with FMs. Therefore, the early inclusion of FMs is a key factor influencing decision-making and projections, and can significantly restrict delays and cashflow issues at every stage of a building's post-construction lifecycle and across all processes and automation. Drawing contracts on estimates and projections is highly problematic if these are incomplete or inadequate. Such issues are the best addressed to the satisfaction of all stakeholders, otherwise, the response has merely been postponed. An Enterprise Platform for Portfolio-wide Facilities O&M can make a significant impact being able to provide reliable predictive projections, avoid wastage of money, time and manpower, and allow ongoing course correction. The resulting predictable model of operations can lead to far greater control over variables and fewer cashflow surprises.

How about countries like India, what are the issues related to cashflow within the scope of contracting in HVAC?

The Indian facilities management market is presently on the brink of a massive revolution. Despite the existence of guidelines, such as ASHRAE and USGBC, most CREs lack the integrated systems to meet them. Legacy building management systems restrict responsive functioning and weigh businesses down. Apart from these limitations, the market has also experienced a slowdown due to oversupply and some decisions made by developers a few years ago, that can be argued should have been more conservative. The banking sector too made some missteps that it is only now cleaning up. So, a significant amount of cashflow issues in the Indian market can be said to be due to the industry not anticipating change and the reforms that have been initiated. However, in the long run, the huge scope for urban renewal, growing purchasing power, government initiatives and the resurgence in enthusiasm from international institutional investors should result in an energetic expansion, with some corrective measures having already been set in motion. And the FM industry will be a natural beneficiary of these changes and eased liquidity.

What are the issues concerning contracts drawn up with suppliers or manufacturers for the replacement, maintenance of HVAC equipment in buildings?

The performance of each component in automation has a significant influence on the overall performance of a built asset. HVAC equipment plays a critical role not only in occupant experience but also in the operating costs of the building as a business asset. Fairly marginal inefficiencies in energy utilisation can add up to a significant cost over time. HVAC operating even slightly above or below its recommended range can undermine operational goals. Monitoring the asset in real-time can give real estate owners a predictable model according to which contracts with suppliers and manufacturers can be drawn. In my opinion, both parties stand to gain from the performance expectations and contractual obligations being mapped as identifiable and specific metrics, which take into account consumption, asset performance, and the stage of the lifecycle of the asset.

What are the various techniques that can be used to incentivise timely payments?

Performance-based incentivizing of FM vendors can be a good model, where timely delivery, quality of work, qualified workforce etc. are incentivized. With real estate owners having an O & M technology platform, it will help them acquire, own and derive insights from their collected data over a period to be able to make such decisions. And for FM's themselves, having an IoT and AI-led automation platform for managing facilities can mean higher workforce productivity, extended asset lifespans and savings in time as well as energy, which all eventually translate into real cash savings for clients. This is sure to incentivize clients to make timely payments to the FM companies.

I believe the answers to most of the cashflow woes plaguing FM's and owners lie in technology. The predictive real-time ability that an enterprise-level IoT and AI-driven FM system can bring to a building can significantly impact the capex and opex across a building portfolio. Research indicates that nearly 5-6 times more money is spent on Operational Costs than on Construction Costs. The impact on ROI is huge if continuous efficiency can become the default for FM and an AI & IoT enabled approach is crucial to achieving this. A data-led approach can enable cost savings in energy consumption, reduced wastage of resources and consumables, optimal workforce productivity, better supply chain planning, extended asset lifecycle as well as reduced downtime. ■



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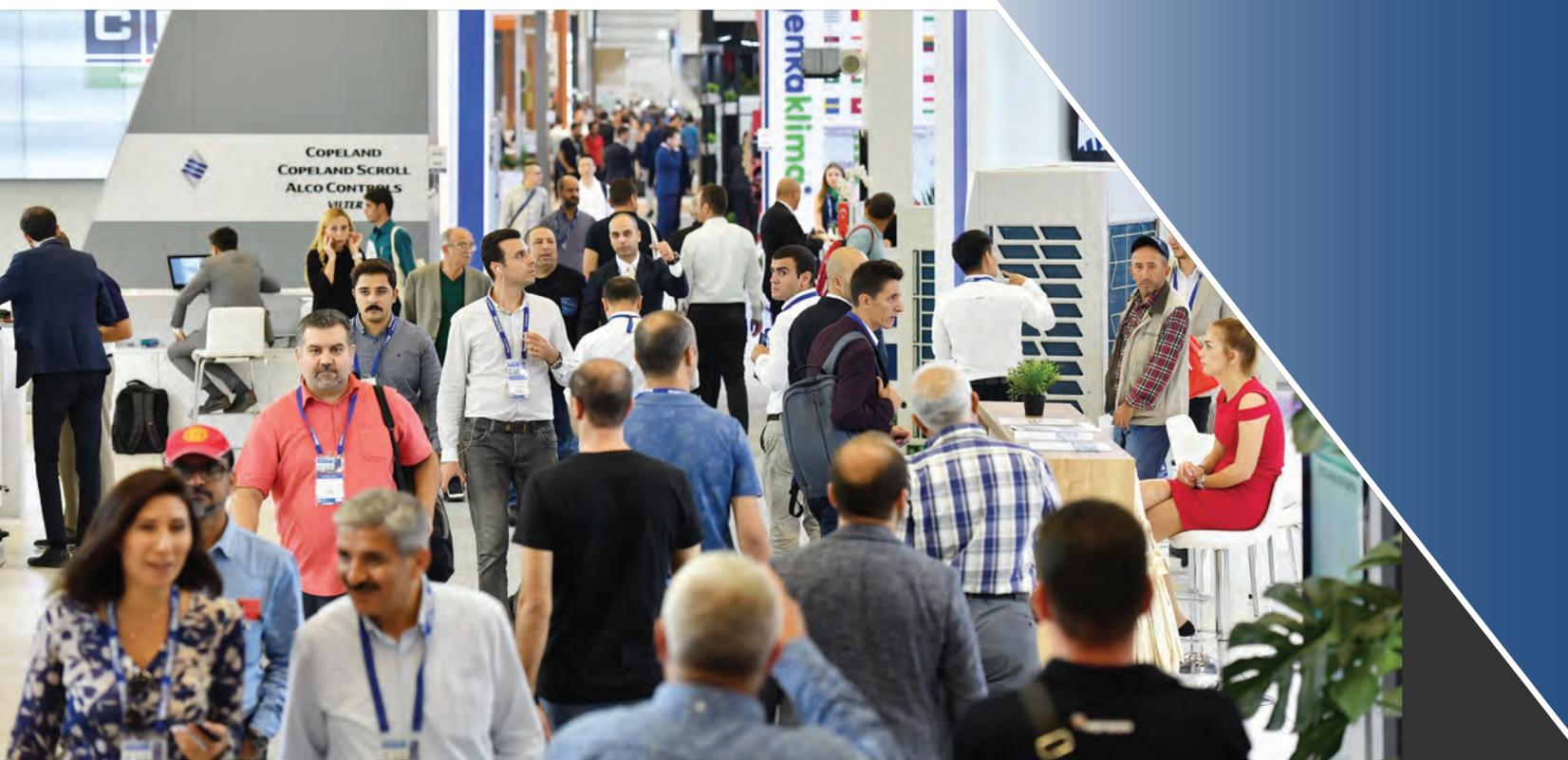
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ISK-SODEX

opens up new export opportunities for HVAC&R industry

On the sidelines of the 4-day event, while interacting with Group Editor *Subhajit Roy*, a sizeable number of Turkish manufacturers have expressed their keen interest in doing business in India.

ISK-SODEX, the leading air conditioning industry exhibition in Eurasia, brought the industry players together in Istanbul between 2–5 October and paved the way for new export cooperation. The exhibition organised by Hannover Messe Sodeks Fuarçılık showcased the futuristic technologies that will transform the HVAC&R industry.

According to statement released by the organisers, 1,021 exhibitors from 36 countries and 85,371 visitors were hosted during the event. 10,027 of them were international visitors from 107 countries representing 4 per cent increase compared to previous edition.

Stating that foreign interest in ISK-SODEX is rising every year, Hannover Messe Sodeks Fuarçılık General

Manager Alexander Kühnel said, “This year, we had many firsts at ISK-SODEX. The exhibition was incredibly beautiful and productive in terms of both the number of exhibitors and visitors and the business volume it generated. We brought together procurement committees from Africa and South America, and especially from EU countries, which have an important place in the industry’s exports, at the same table with Turkish manufacturers. During the four-day expo, Turkish manufacturers made good use of the opportunities offered by the exhibition and signed major deals. We hosted an event that will help the industry come close to achieving its export targets.”

Global giants brought together in Istanbul

ISK-SODEX 2019 brought together more than 1,000 brands from 35 countries, primarily from Germany, China, France, India, Italy, South Korea, Thailand, the UAE, Lebanon, Pakistan, Spain, Iran, Russia, Greece, the United States, Taiwan, and Japan.

Glimpses from the show

Established in 1967, **ALDAG A.S.** has been one of the leading manufacturers of heating, ventilating and air-conditioning products in Turkey. Apart from having

significant presence in all around Turkey, ALDAG is exporting to several countries like Netherland, UK, Romania, Ukraine, Algeria, Bulgaria, Georgia, Kyrgyzstan, Kazakhstan, Uzbekistan, Cyprus, Turkmenistan, Azerbaijan, Tajikistan, Iraq and Syria. At ISK-SODEX 2019, ALDAG unveils its new generation of air handling solutions for the global market.

Siemens was showing its advanced technology products and solutions that shape the air-conditioning sector. The company presents its diverse range of SINAMICS modular multifunctional frequency converter



Siemens SINAMICS G120X



Imbat



Planer Chillers V Type Dry Coolers



Kale Fans EURUS III



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including the advanced SINAMICS G120X frequency converter, which controls the power of water and air. The SINAMICS G120X series of products ensures that water and air are controlled, limited, separated, processed and transported in a controlled manner at all times.

Imbat is a homegrown company in Turkey that has created a name in the global market. Imbat manufactures rooftop air-conditioning systems, panel room air-conditioners, chillers etc. The company is looking for suitable partner to make an entry in the Indian market.

Point HVAC Units, a HYT Group Company, is a big name in Turkey’s HVAC market. The company offers a large range of heat recovery units, ventilation units, air handling units, axial fans, and jet fans. They are keen on importing raw materials from India and in search of a suitable importer.

Planer Chillers has extended family of finned piped heat exchangers, air-cooled industrial and commercial condensers, condenser units, evaporators, shock freezers, water-glycolic coolers, dry and evaporative coolers, water cooler groups for comfort and process, cooler groups with natural cooler system, oil coolers and heat recovery batteries. Their products are CE certified and meet the safety standards of health, safety, and environment and consumer protection. At ISO-SODEX Planer Chillers displayed its V Type Dry Coolers that are designed for use in large capacity process cooling and air-conditioning systems.

Kale Environmental Technology (Shanghai) Corporation has been specialised in producing the large energy saving fans whose maximum motor power is only 1.5 kW but with a coverage over 1,000 square metre and above. At the ISK-SODEX 2019 the company showcased Eurus III series of large HVLS fans that are mainly used in large space such as workshop, warehouse, distribution centre, gymnasium, station, cow shed farm etc. They could also significantly save on cooling costs if used in combination with cooling equipment.

Indian exhibitors made their presence felt

The HVAC solutions manufacturers from India represented by a few companies also made their presence felt at this international platform. The list of exhibitors from India includes Desiccant Rotors International, Blowtech (India), Rexnord, LU-VE Group, and Akshay Enterprise. Representatives of these companies present at the occasion, unanimously agreed that Turkey has got the potential to be an important export market for Indian MSMEs or SMEs due to its strategic location at the crossroads of Europe and Central Asia.

ISK-SODEX once again proved its leadership in its field with innovative concepts and new halls

The ISK-SODEX and Pool Expo was held under the same roof at Istanbul. Exhibitions brought exhibitors together with potential clients to establish new partnerships and provided a platform to share knowledge and experience through a number of forums and conferences organized throughout the exhibition.

For the first time this year, new topic “Fire Prevention” systems at Hall 10 and MEP services (Mechanical Electrical and Plumbing) at Hall 13 have also had enormous interest from the industry.

In addition to the new topics and showcase areas, the “ISK-SODEX Masters League 2019” held for the second time this year and awarded the top three contestants who competed over four days and ranked in the criteria of correct installation, project conformity, and aesthetic with the title of “Best Combi Boiler Installer of Turkey.”



Acting smart with ammonia

Denmark's largest food processors repeatedly opts for Ammonia Compressor Packs made by BITZER ACPs.

Danish system manufacturer ICS and BITZER Nordic, the BITZER branch office responsible for the Scandinavian markets, successfully passed various BITZER Ammonia Compressor Packs (ACP) on to one of the biggest Danish food-processing companies. Additionally, this company benefits from the BITZER IQ modules being an integral part of every ACP.

One of Denmark's largest food processors repeatedly opts for Ammonia Compressor Packs made by BITZER (ACPs). Last year they initiated another big project: since early 2018, two ACPs with three IQ modules each cater for the production of ice water with (+)1C, serving the customer's production processes. Their reliable partner in this case is Industrial Cooling Systems (ICS). The Danish system manufacturer has been partnering with BITZER since 1987.



Image 1: ICS installed two BITZER ACPs for the production of ice water at one of Denmark's largest food-processing companies

Mikael Olsen, Project Manager, ICS, reports, "It's a longer story in January 2018, ICS brought two ACPs into operation at one of our biggest customers, who subsequently disposed of a refrigeration capacity of 4 MW at their central cooling plant. Concept and implementation were convincing, so planning for the final completion with BITZER ACPs with a total capacity of 12 MW began. A requirement was the use of products from BITZER, since some years ago ICS delivered and installed a rack which was



Image 2: Every ACP is monitored by three BITZER IQ modules

constructed with BITZER components." For this new application, system requirements were very clear: the solution had to fulfil specific claims regarding the capacity demand of a high COP and compact sizes. Now this design performs at a COP of 6.2. Claus Groenne, Regional Manager BITZER Nordic, agrees, "We know that ICS attaches great importance to the COP – so, we recognised right away that ACPs would be the best solution to go with in this special case."

Ammonia has no global warming potential, making it an excellent choice for environmentally conscious Danish companies. There are two screw compressors in each ACP, with each compressor and oil separator being monitored by a BITZER IQ module. These modules operate all compressor features such as the mechanical capacity control, additional cooling, oil return and the oil heater. They also monitor the oil level, the discharge gas and motor temperature, and can even monitor the application limits of the compressor.

Mikael Olsen recapitulates, "The ACPs are running very well. We often opt for ammonia, as it is highly efficient and has no global warming potential. This was a very important argument for our customer. At their premises, there are also more than 20 BITZER screw compressors in operation using ammonia as well. Currently, we have four BITZER ACP units running there which are meant for refrigeration and four of our own heat pump units using BITZER screw compressors. BITZER provides excellent service for all of them."

AC/DC Utility Clamp Meter from FLIR

The CM94 clamp meter is designed to tackle high-current measurements in demanding utility and industrial job sites. Its oversized, 55 mm jaw can securely clamp around conductor wires and busbars for accurate readings upto 2000 A AC & DC. Designed with a CAT IV-1000 V safety rating, the CM94 is ready to work on relays, distribution panels, and



switchgear as well as service conductors, feeders, and production power lines. VFD mode allows the user to tackle noisy signal environments to ensure correct measurements when working on large motors and motor controls. Utilities and industrial electrical technicians demand the best, and FLIR delivers with the rugged and dependable CM94 clamp meter.

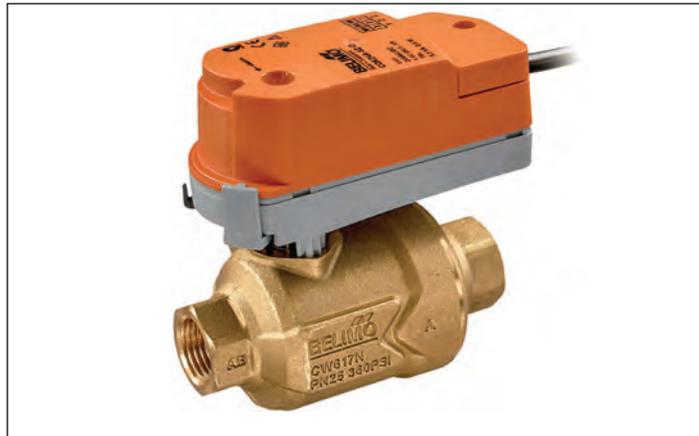
This is the right tool for high current jobs with improved safety built in. It is a full-featured clamp meter saves time and helps the user troubleshoot effectively. The FLIR CM94 features an oversized jaw to clamp around large conductors or multiple conductors. ■

For more info, email: flirindia@flir.com.hk

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Date: 21st to 23rd November 2019
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Venue: Bombay Exhibition Centre, Mumbai
Date: 4th to 6th December 2019
Website: www.indiacoldchainshow.com

AHR Expo

Venue: Orange County Convention Centre, Orlando
Date: 3rd to 5th February 2020
Website: www.ahrexpo.com

Global Logistics Show

Venue: Somaiya International Convention Centre, Mumbai
Date: 20th to 22nd February 2020
Website: www.globallogisticsshow.com

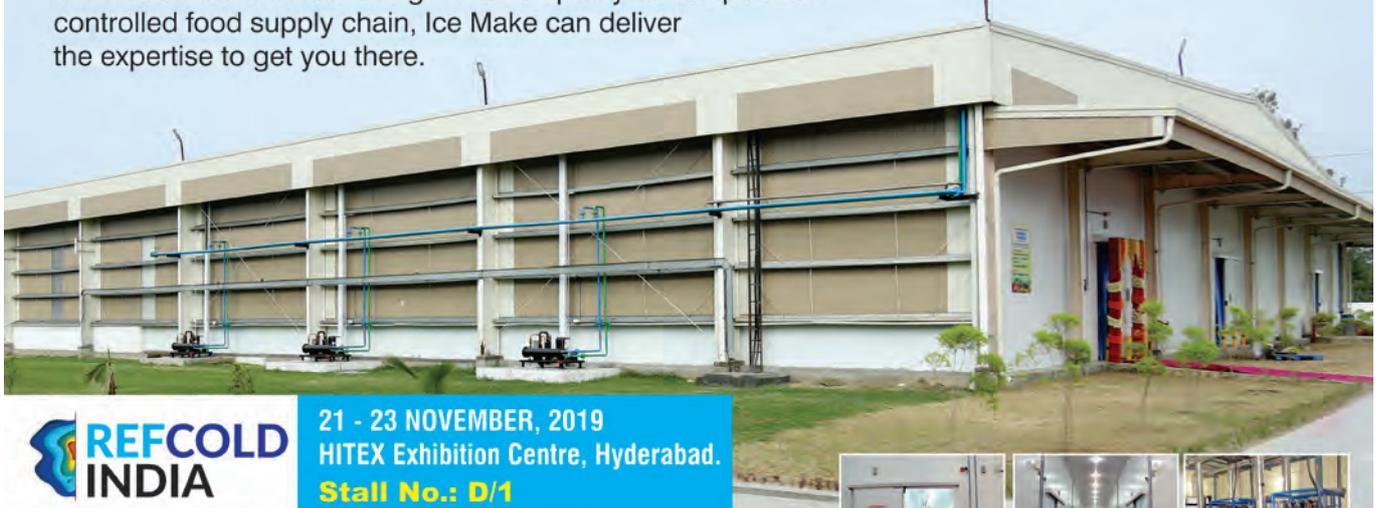
ACREX India 2020

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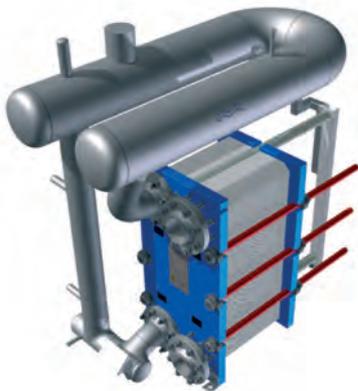


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