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MIDDLE EAST

KEY PERSPECTIVES ON THE REGION'S HVAC

August 2021

PERSPECTIVES:

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**LICENCE
TO CHILL**

**VARIABLE
CONDENSER WATER
FLOW SYSTEMS**

**Dan Mizesko, US
Chiller Services**

NEW HOPE?

Will Dubai RSB's new regulation persuade more building owners to sign up for district cooling?

+ Q&A
Martin Williamson, AESG



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Hello, silo!

If anything, the pandemic is revealing the frustration of engineers out to implement air quality measures in buildings, only to discover that the buildings in question were not designed to support the intervention.

For years, buildings have faced IAQ-neglect from the pre-design stage up to handover and the subsequent operation and maintenance period. Broadly speaking, architects, designers, contractors and installers have worked in silos several mental metres in height, with each group quite choosing to be oblivious of the other. And today, the chickens have come home to roost!

While advances in technology probably can alleviate the situation in some instances, engineers more often than not are up against legacy structures and are faced with the prospect of having to make do with far less than what they intended as effective solutions.

The pandemic ought to be an eye-opener for new construction – as and when we see a revival of building activity – to cover all bases, as far as the physical and mental eye can see. It needs the engineering community to rise to a level where it seeks to answer even those questions that nobody has imagined or considered asking. We are talking of a paradigm shift in thought and action. But at the base level, we need to dismantle the silos and instead embrace a culture of collaboration, cooperation and coordination.

Sustainable development depends on policies, standards and technological advances, but it as much relies on the human will to develop new approaches, new models of engagement. IAQ is no longer only about productivity and lowering absenteeism in schools and offices. The pandemic has made it clear that much depends on the built-environment to limit the spread of infection. Human lives are at stake here, as much as is the health and wellbeing of public- and private-sector organisations and the broader economy.

It is interesting that this issue is covering such topics as BIM and FIDIC. While one is a tool, the other is an enabler for greater clarity and, if adopted in whole, for a conflict-free approach to building structures that serve us well.

climate control MIDDLE EAST

KEY PERSPECTIVES ON THE REGION'S HVACR INDUSTRY

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Dominic De Sousa (1959-2015)



INDUSTRY

Presents

An evening with **James Grinnell**

Head of Water, Dubai Regulatory Supervisory Bureau, speaks on the newly introduced regulation of the district cooling sector



In March 2021, the Government of Dubai introduced regulation of the district cooling sector, under Executive Council Resolution (6) of 2021.

The Webinar will:

- Elaborate on the key points of the regulation
- Provide insights into the regulation's implications for developers, building owner associations, investors, consultants, contractors, manufacturers and suppliers

Who should attend?

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- District cooling providers
- Building Owner Associations
- Consultants
- Contractors
- Manufacturers and suppliers of district cooling-related equipment and digital solutions

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Hazem Balbaa

WHAT FIDIC'S NEW GREEN BOOK HOLDS

Asim Ahmed and **Hazem Balbaa** provide an overview of the new version, out this year...

The FIDIC suite of construction contracts is written and published by the International Federation of Consulting Engineers. The FIDIC acronym stands for the French version of the Federation's name (Federation Internationale des Ingenieurs-Conseil).

FIDIC's Contracts Committee produces standard forms of contract for civil engineering projects, which are used globally. The purpose of these standard forms is to define the contractual relationship between parties and to allocate risks between the contractor and the employer. FIDIC states that their contracts allocate risks fairly to the party that is best able to bear and control that risk.

The Green Book is FIDIC's Short Form of Contract, recommended for use on smaller value projects (less than USD 500,000) or when the construction time is shorter (less than six months) – although it is often used for higher value, longer projects. The first edition was launched in 1999 and consists of 15 clauses across 10 pages.

Under the usual arrangements for this type of contract, the Contractor constructs the Works in accordance with design provided by the Employer. However, it may also be suitable for contracts that include, or wholly comprise, the contractor's design. There is no reference to an impartial Engineer in the contract – something that has been an area of concern for contractors.

The second edition of the Green Book, first introduced at FIDIC's annual conference, will be launched in 2021 and is intended to be a 'Pro' version, 'fixing' the issues or gaps felt by all parties in the original edition. The new Green Book will be substantially longer than the first edition – but still shorter than other FIDIC books – and will be more wide-reaching, providing greater clarity. The Appendix in the 1st edition has also been developed into a more detailed list of Particular Conditions in the pre-release version.

Some of the key areas addressed by the new Green Book include:

- **The inclusion of the Engineer.** This makes the Green Book more aligned to the Red and Yellow Books provisions, adding contract administration details. The Engineer is to "act neutrally between the Parties and shall not be deemed to act for the Employer".

- **Prolongation Cost entitlement.** Defined as “on-site and off-site overheads associated with a compensable extension of time, as stated in the Contract Data”. These overheads are based on the average ‘Weight’ of the overheads and are payable to the contractor from the employer at a daily rate for the duration of the extension of time. Part A (the Contract Data) of Particular Conditions states that the PGC “shall be the only compensation due from the Employer to the Contractor for an EOT resulting from a compensable delay”, but the same section goes on to say that this does “not affect the Contractor’s compensation rights for other Costs (if any), such as disruption Costs (if any)”.
- **Claims and Disputes, which are now two separate clauses.** There is clear distinction between the two – a Claim is an entitlement under the terms of the contract, and a Dispute occurs when that Claim is rejected. It is also worth noting that Claims and Variations are also separated. The dispute resolution provisions in the FIDIC Green Book are more basic than other FIDIC contracts: There is no reference to ICC arbitration or a Dispute Adjudication Board. The parties decide on the applicable rules in the Appendix, but the Contract does also include Rules for Adjudication, an Adjudicator’s Agreement and guidance notes.
- **Advance Warning provision,** where either party is to notify the other and the Engineer about possible delays or disruptions.
- **Other new clauses,** such as testing and commissioning/take over, defects, limits on liability and indemnities will be much welcomed.

The new Green Book has also been designed for ease of use, with some new structural amends, as follows:

- A table that sets out the Employer’s risks
- A table that sets out the insurance responsibilities of each of the parties, inclusive of professional indemnity cover
- A tick box selection for payment valuation

Overall, given that the 1999 Green Book was being used increasingly for projects of higher value, the new version will be gratefully received, as it gives all parties more clarity and structure. The inclusion of some familiar FIDIC provisions – but which are new to the FIDIC Green Book – such as intellectual property and confidentiality, are also much needed.



Asim Ahmed

It is certainly in keeping with FIDIC’s stated mission: “To improve the business climate and promote the interests of consulting engineering firms globally and locally, consistent with the responsibility to provide quality services for the benefit of society and the environment.” At last, the FIDIC Green Book can take its rightful place with the Red, Silver, Yellow and Pink Books.

Other releases in 2021 of note are:

- A Guide to the 2017 Red, Yellow and Silver books (first quarter 2021).
- A new Bronze Book (originally scheduled for 2020), which is an Operate-Design-Build-Operate contract (as the Gold Book) but for brownfield sites that include an upgrade for existing facilities

Other contracts to look out for are:

- Sub-contracts for the 2017 Suite by the end of 2022.

- A form for PPP projects (2023), including concession agreements and direct agreements not covered by the Silver Book.
- A collaborative contracting form (2023) with optional payment provisions, such as Target Price.
- An EPCm form (2023). [ccme](#)

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A portrait of Martin Williamson, a man with short brown hair and a light beard, wearing a blue blazer over a white shirt. He is looking directly at the camera with a neutral expression.

CLIENTS WITH LIMITED BUDGETS TEND TO NEGLECT BENEFITS OF VFDS

Martin Williamson, Head of Commissioning (Middle East), AESG, gives a consultant's perspective on whether a critical mass has been reached with regard to the uptake of variable frequency drives (VFDs). Excerpts from the interview he gave to Surendar Balakrishnan...

Given that VFDs have been around for quite a while now, have we seen sufficient acceptance in the GCC region to confidently say we have reached a certain critical mass of their use in projects across the region, or even as a default solution?

In my opinion and experience, the use of VFDs in the region could be considered as the default option for ventilation and hydronic systems in new construction projects. It could even be argued the use of VFDs has become so widely accepted as the 'go to' option that even constant speed ventilation systems, such as fresh air handling units (FAHUs), designed for constant fresh air volume, are also fitted with VFDs where, with minor exceptions, modulating the air volume during operation will not be needed.

On hydronic systems, such as chilled water systems, I don't believe I've seen a system where VFDs are not utilised to modulate pump speed, even seeing the use of 'Triple Duty Valves', in addition to VFDs, on a few occasions.

The Middle East building services sector has evolved in the past decade in terms of awareness regarding balanced energy consumption and utilisation. This includes use of VFDs for almost all rotary equipment as an overall control and protection device.

To what extent are VFDs being used in retrofit projects? Is there a greater uptake, on the basis that they can lower the total cost of ownership (TCO) of buildings across the region?

It is essential to make evident to the client the multiple long-term operational benefits of using such devices. A certain segment of decision-making teams that are purely cost-based, tend to neglect the long-term perspective.

At AESG, for the retrofit projects we have handled, we have proposed VFDs and other sensory devices as alternatives to traditional manually operated systems, projecting the reduction in operating costs in the long run.

How much is cost an impediment, despite the ability to prove their positive impact on TCO?

Base product cost of any equipment is



a vital factor, which directly contributes to the initial BOQ, built essentially considering the construction phase and incorporating minimal operational requirements. Clients with limited base-build budgets and, in some cases, clients that are not end-users, tend to neglect these benefits.

Typically, what are the challenges in properly installing VFDs in retrofit projects? Are there constraints in the forms of space, access, etc.?

Most buildings have plantrooms that could accommodate retrofitting VFDs within MCC panels, with smaller wall-mounted VFD options available, where space may be a constraint. One area of consideration would be the electrical demand of a VFD when added to a system within an existing building. Incorporating VFDs on an existing system can be less challenging than presumed if certain fundamental parameters are considered. The basics being motor running current, distance from the control panel for cable sizing, and secondary protection for the VFD, such as overload and earth fault protection.

Does the deployment of VFDs in buildings connected to district cooling schemes have any impact on the contractual obligations between the district cooling provider and the building owner?

Generally, VFDs are connected to pumps that are in-feeding the building from the primary DCP system, with the secondary building-side, more often than not, also utilising VFDs. These are a collateral matter of concern for the district cooling provider, as these devices, in conjunction with actuator-controlled valves, will eventually affect the Differential Temperature (ΔT). With VFDs on the building system, these are likely to assist with control of the system, and should the system be set correctly with pressure set points, this should be of overall benefit with respect to the required 'Delta T'. However, we do not believe the contractual obligations would be void even though there would be a perceived benefit. [ccme](#)



HAVE YOUR SAY!

We welcome your views on the Q&A. Write to editor@cp-i-industry.com

BIM IS NOT A STANDALONE DISCIPLINE

We are not employing BIM to its full potential, says **Chris Meir**, adding that the way it is often carried out in the region lacks true collaboration

As our cities grow larger, so does the demand for building projects. To enable sustainable urban development, the construction industry must look to smarter, more efficient ways to design and build. The idea is not just to keep up with growing global demand but also to create more resilient spaces that support health, safety and sustainability.

This is where BIM can make a difference. Essentially, BIM (Building Information Modeling) integrates multi-disciplinary data to create detailed digital representations that can be managed in an open cloud platform for real-time collaboration. The practice allows us to create and manage data during the design, construction and operation stages of a project. By using BIM throughout the lifecycle of a project, we can increase efficiency and performance at every point in the supply chain, leading to a superior end result.

What makes BIM so useful is the fact that it can deliver diverse benefits across disciplines or parties involved in a project to work simultaneously and in real-time. This ensures all parties are up to date with the project at every stage, ultimately encouraging improved synergy and, thus, more seamless delivery.

From reducing risks to enabling true value engineering, BIM can add value through plan, design, build and operation processes in many ways.

When it comes to planning, BIM allows for more informed planning by combining reality capture with real-world data to generate contextual models that take into account the existing and natural environment.

During the design phase, BIM data should be used to inform the pre-construction processes. Conceptual design, analysis, detailing and documentation can all be done in real-time to keep everybody involved up to date. By doing so, the design phase becomes a more seamless process, eliminating risks later in the project.

BIM provides an actual representation of how the building will function. This includes displaying routes for pipework and other systems. By using BIM, you can detect potential clashes early on, in order to avoid further cost issues down the line. BIM enables you to take a preventative approach to construction. Not only does this approach save costs, but it also eliminates the need for

reconstruction, which can lead to delays, further costs and inconveniences for occupants. It's safe to say that prevention is indeed the best protection.

With an accurate visual representation of the project, designers are also given an added opportunity for flexibility. For example, they can more easily experiment with the design to optimise space, creating further opportunities to maximise usable real estate.

During the build phase, fabrication should begin by using BIM specifications. BIM should be used to drive decisions and shape the creation of a project. It allows for early stage engagement across the supply chain to ensure that when the build phase is reached, a significant amount of risk has already been mitigated. ▶



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When it comes to operations, BIM can be embraced by facility managers as a useful tool to understand how the building works and also to detect problems and drive decisions in terms of maintenance.

Currently, it is predicted that 95% of data on construction projects goes unused. BIM is designed to be used through the lifecycle of a project, and can be extremely beneficial even after project completion. It can be used to implement energy upgrades to HVAC systems, or to guide the retrofit of new systems into the building.

BIM is also extremely useful for maintenance. By using a live model of the building to guide maintenance, you can avoid deconstruction or unnecessary renovations. It also ensures superior operation of a building by offering an accurate point of reference even as the building changes – whether that be changes to staff, occupants or even function of the building.

In fact, in many countries, for projects above a certain value, using

BIM is mandatory. BIM improves cost, performance and function of a project, as it supports true value engineering. BIM allows the visualisation and testing of systems within a building, enabling you to virtually assess the performance of the building.

In the Middle East, BIM is being increasingly adopted in the construction industry. However, I believe we are currently not employing BIM to its full potential, and hence, we are not experiencing its full benefit.

The way BIM is often carried out in the region lacks true collaboration; it is often treated as a stand-alone discipline that produces the model based on the information that is fed it. Decisions and designs are often made up-front and then handed over to another department, who add on their contribution and pass it on. BIM models are sometimes created in stages, as opposed to being used as a collaborative working model, where all parties contribute simultaneously.

In this region, what we need is an

industry-wide BIM strategy. The key is using BIM from conception to creation, and even afterwards. The visualisation should dictate decision-making so that BIM is being used at every stage of construction, and not after the fact.

To truly take advantage of BIM, we must take our current approach a step further. We must drive increased collaboration by making it mandatory for all parties across the supply chain to employ and feed information into BIM throughout the project lifecycle. Only by doing so can we begin to fully harness the power of this innovative practice. **ccme**

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CHILL

TRACKING THE DISTRICT COOLING INDUSTRY IN THE MIDDLE EAST

**DISTRICT COOLING KEY TO FIGHTING
COVID-19,
FUTURE PANDEMICS**

Dominic Mc Polin, Ministry of Works, Municipalities Affairs and
Urban Planning, Bahrain; Patrick Andrew Shiel, Stanford University

‘NO, THANK YOU!’

Admitting that district cooling is not seen as a friendly solution amongst building owners, **James Grinnell**, Head of Water, Dubai Regulatory Supervisory Bureau, outlines remedial measures aimed at improving performance and increasing penetration. His views and more, recorded during the 5th edition of DC Dialogue

Story by Surendar Balakrishnan | Editor, *Climate Control Middle East*

The 5th edition of DC Dialogue, on June 14, in Dubai, was a platform for soul-searching, with a cross-section of participants clearly articulating their disappointment over the direction district cooling has been taking in the region over the years, and indicating the need for change. If James Grinnell, Head of Water, Dubai Regulatory Supervisory Bureau, pointed out that building owners don't see district cooling as a friendly solution and that the time is ripe for change, Dominic Mc Polin, Chief, Central Planning – Central Planning Office, Ministry of Works, Municipalities Affairs and Urban

Planning, Bahrain, spoke of customers not embracing it over cost, security concerns and consumer protection. George Berbari – CEO, DC PRO Engineering, and author of the book, *The Energy Budget* – who chaired the conference, spoke of how he was neither happy nor proud of the manner in which district cooling had not kept pace with technological advances, which if applied could lead to optimising the cost of running district cooling plants and, equally important, lead to greater energy savings. If the savings are passed on, he said, it could translate to financial savings for

building owners, ensuring their happiness and making district cooling an appealing proposition.

Mc Polin pointed out that a recalibrated approach to district cooling could mean much more than customer satisfaction. Highlighting the manner in which the pandemic has quite crippled the economy the world over and affected the human psyche, he spoke of how district cooling – with its potential for greater energy savings – could help fight COVID-19 and future pandemics. Saying that science supports an increase in ventilation, which inevitably would see an increase in energy demand, he added ▶



THE IMPLICATIONS OF DUBAI'S NEW DISTRICT COOLING REGULATION

In March 2021, the Government of Dubai introduced regulation of the district cooling sector, under Executive Council Resolution (6) of 2021. James Grinnell, Head of Water, Dubai Regulatory Supervisory Bureau, provided an outline of the document during DC Dialogue. Surendar Balakrishnan has the report...

Established by Executive Council Resolution (2) of 2010, the Dubai Regulatory Supervisory Bureau (Dubai RSB) is responsible for regulating the Emirate's electricity and water sector. It supports Dubai's demand side management strategy through accreditation of ESCOs, energy auditors and building energy managers. In 2021, the Dubai RSB took on the additional responsibility of regulating the Emirate's district cooling sector, under Executive Council Resolution (6) of 2021.

James Grinnell, Head of Water, Dubai RSB, said the body will be regulating the district cooling sector, because high cost and poor customer service in the district cooling sector means that AED 14.3 billion of savings are in jeopardy, and Dubai's attractiveness to residents and businesses is diminished. "We have seen advertisements that so- and-so development is non-DC," he said. "We don't want to see that. We want to see the penetration of DC will grow further."

Grinnell said the objective of the regulation is to establish a sustainable sector supporting Dubai's residents

and their businesses. Highlighting the expectations of multiple stakeholders, he said investors require reasonable returns to attract them to invest in the district cooling sector. As for customers, he said, they need to see and believe that district cooling offers value for money to them by delivering superior quality at efficient prices. Developers, he said, need to choose district cooling from the range of cooling options at their disposal. Overall, district cooling needs to be attractively priced and marketable to potential property buyers, he added.

Speaking on the prevailing issue of cost, Grinnell said excessive capacity estimates have led to a situation, where customers typically pay capacity charges well above their maximum use. Billing agents, he said, mark up higher charges for some customers. Further, the district cooling provider charges vary between one company to another. ▶

THE IMPLICATIONS OF DUBAI'S NEW DISTRICT COOLING REGULATION (continued)

In terms of service, he said, the penetration of meters is low, which means customers have little or no control over their bills. Broadly speaking, he said, there are few published service standards, and complaints are often unresolved.

The new regulation hopes to address these issues, he said. Additionally, the aim of the regulation is to bring about improvements in electrical efficiency, which would alleviate grid capacity pressures. Further, improvements in water efficiency, he said, would reduce demand for water.

Under the new regulation, Grinnell said, Dubai RSB's powers include setting technical standards, prescribing

measures that a district cooling provider can take against customers in arrears, resolution of disputes, approval of the basis on which district cooling services are charged and the content of bills. Further, the powers include approval of standard contracts for providing district cooling, approval of a district cooling provider's complaint-handling processes, and adjudication in instances where a district cooling provider objects to another's right-of-way application to the Roads & Transport Authority (RTA).

Grinnell clarified that as per the regulation, the Dubai Supreme Council of Energy would approve all charges, tariffs and fees levied for providing district cooling.

Grinnell said the Dubai RSB has established March 29, 2022 as the duration of the compliance period for the new regime to be put into effect. He said that Dubai RSB is following a consultative approach, which means the body has not yet settled on the final approach to many aspects of the regulation, including recommending any specific tariff or tariffs to the Council, the number of standard contracts, the flexibility they will offer permit holders and billing agents, the approach to be taken to address excess capacity in existing buildings, and the specific processes to follow for managing customers in arrears.



James Grinnell



Dominic Mc Polin

that the district cooling industry could be a vital cog in the COVID-recovery efforts.

Berbari, focusing on remedial measures that could shore up the performance of district cooling, pointed out to Denmark and Sweden, two of the participating countries in the conference, as shining examples that had married technology, innovation and policy to optimise cost of operating district cooling plants and to deliver energy savings, which in turn, had lowered greenhouse gas emissions and total cost of ownership. The GCC region, he said, could derive inspiration from Scandinavia to bring about some much-needed

Berbari called for an end to a palpable technological stagnation, and for adoption of newer technologies to lower emissions and total cost of ownership. He called for the use, or increased use, of shallow geothermal as heat sink, deep geothermal energy for extracting valuable thermal energy, and of green hydrogen. Engaging Steve Lemoine, GM & Business Director Middle East, Dalkia, in conversation, he asked if hydrogen could be the answer to energy needs to power district cooling plants. Lemoine answered in the affirmative, saying that Dalkia is focusing on hydrogen, whereas 10 years ago, it was focusing on solar

“With hydrogen, we are exactly where we were with solar, 10 years ago. I believe hydrogen is competitive

changes to the way district cooling schemes are operated. “Copenhagen will be the first carbon-neutral city in the world,” he said. “We need to keep pushing if we want to be carbon-neutral by 2050. Dubai needs to take leadership in energy also.”

energy. When questioned that it cost 1,000 euros per kilowatt for electrolysing to be able to operate hydrogen-based technology, Lemoine pointed out to how 10 years ago, solar was not only expensive but also did not quite have the efficiency it is able to boast of today.



“We have 2,000 MW through solar in Abu Dhabi, and it is one of the cheapest in the world,” he said. And the efficiency is more. With hydrogen, we are exactly where we were with solar, 10 years ago. I believe hydrogen is competitive.”

Grinnell, while agreeing with Berbari that technology has been quite stagnant, said the energy performance in Dubai has been fairly stable in the last seven years. “Last year, we saw an improvement on energy efficiency,” he said. “The technology has been quite stagnant, and the integration of regulation for energy and water performance will hopefully incentivise service providers even more,” he said. Grinnell pointed out to the creation of a district cooling association in Dubai in 2020. He spoke of how the association had met 2-3 times and that the most recent meeting was on innovation and on what service providers could do to improve energy efficiency. “New technology is being discussed, and the conversation is starting to happen,” he said.

Nasser Bin Jarsh, CCO, Emicool, joined the discussion on technology by saying that there are two sides to the coin – the product side and the consumer behaviour side. He said a major issue confronting district cooling in the region is the low delta T syndrome and the measure of introducing penalties

downstream, which is a bit of a sour spot. He added that it is as much upon the building owner to ensure the efficiency of the secondary system to resolve the syndrome. Grinnell, adding to what Bin Jarsh said, emphasised that while regulation for efficient production of cooling is essential so is it for the secondary system to be operated efficiently. “Regulation recognises those companies that operate the secondary system efficiently,” he said.

Pointing out to the example of New York City, which has made it mandatory for new buildings to report data, Berbari asked if any plans are afoot to do so in the region, as well. Responding to this, Grinnell said Estidama, in Abu Dhabi, and Al Safaat, in Dubai, recognise O&M of buildings. The quality of kit installed and design standards are under purview, he highlighted. “We are also looking at a buildings rating scheme, which would be voluntary, to begin with,” he said.

Adding to this, Bin Jarsh said that reporting on efficiency of buildings is not far away. “Every month, we at Emicool are reporting kWh,” he said. “Putting all of them in one bucket and looking to see a cross-section of building energy use would be amazing!”

Gustaf Landahl, Head of Department, Environment and Health Administration, City of Stockholm, said it is important ▶



George Berbari



Steve Lemoine



Nasser Bin Jarsh



Gustaf Landahl

“ In Stockholm, more than 80% of all buildings are connected to district heating. This did not come about owing to legislation, established in 1981, and which ran its course till 2006.

to work with building owners to bring the load down. A lot can be achieved through controlled buildings or intelligent buildings to improve energy efficiency, he said.

Touching on the subject of pricing, Bin Jarsh said that district cooling in Dubai still faced major difficulties over the costing and tariff structure. He added that Emicool has been looking at taking measures with the view to providing cost-effective solutions to customers. Pointing to the good talking points, he said the UAE has the largest penetration of district cooling in the world and that the industry has been helping the government in providing facilities “with what we have”, as opposed to adding more power-generation and T&D infrastructure. “We are reaching a sort of maturity with the help of RSB, and we would be looking to share the savings with end-users,” he said.

Sharing of savings would win acceptance among building owners.

Landahl alluded to this in a presentation he made after the plenary discussion.

In Stockholm, he said, more than 80% of all buildings are connected to district heating. This, he said, did not come about owing to legislation, established in 1981, and which ran its course till 2006. “We took it [legislation] away, because nobody used it,” he said. Everybody chose to connect in a market way, because it was more affordable to connect to district energy, he said. It was 10% cheaper than boilers, which involved maintenance, investment and the depreciation of equipment, he said, adding that district energy is more robust. “We have 250 kilometres of district cooling pipes, and sometimes these are combining heating and cooling,” he said. “And we have managed without using legislation. More and more people have connected, because they have seen feasibility and practicality and less cost in district energy.” [ccme](#)

POINT, COUNTERPOINT

Consultants and contractors, participating in a panel discussion, spoke on pricing bias over competency bias plaguing district cooling, among other topics. Excerpts...

Moderator: George Berbari, CEO DC PRO Engineering; Author, *The Energy Budget*

Panellists:

- **Khalid A Al Mulhim**, Business Development Director, Suhaimi Design – Protecooling
- **Ahmed Nabil El-Kasaby**, Director of District Cooling Department, Allied Consultants
- **Sagar Kulkarni**, Managing Director, Consistent Engineering Consultants
- **V. Sekhar Reddy**, Managing Director, Lexzander
- **Mohamed R Zackariah**, Chief Consultant, Suhaimi Design – Protecooling

George Berbari: We see a bias towards pricing component rather than competency component. Has district cooling not yet reached the level of penetration owing to maturity?

V. Sekhar Reddy: I agree with George that still, the understanding is lacking to get the best out of the plants for the end user. The plants themselves are high stakes in terms of value. In the 1990s, except for Dubai Airport, the plant size was 10,000 TR. And then, we saw rapid growth in 2000-2010, but consistency has been lacking in terms of deliverables. I see a gap in terms of end-user requirement. The fundamentals are being missed out in the process. There are continuous issues in terms of maintainability and running costs. The stress analysis, whatever engineering is done, is more or less

typical, but when it comes to AI and digital, we are still far away. Let's make sure the plant gives scope to move forward.

Berbari: Ahmed, are we still seeing consultant-contractor biases. Almost 70% of developers choose on the basis of cost. Why is the standstill prevailing?

Ahmed Nabil El-Kasaby: There is a lack of awareness of the importance of district cooling among developers and building owners, and this has an impact, starting from hiring experienced firms and understanding the importance of having good, well-experienced consultants. And in terms of the lifecycle of projects, having an experienced contractor helps.

Berbari: As a BDM, how do you see pricing pressure, Mr Mulhim?

Khalid A. Al Mulhim: Engineering is the soul of the project, but they might go on the basis of the quote. If you are meeting a client, typically it is 10-15% competency, 85% still on pricing.

Berbari: Zack, if we have issues, who is responsible for facing accusations?

Mohamed R Zackariah: If ideal situation, everybody does the job right; practically speaking, there is a tendency to oversize the plant. We should have district cooling plant system that is flexible enough to handle potential variations to adapt to requirements.

Berbari: Mr Kulkarni, we have an issue that designers are not executing design as per the needs of district cooling. We are seeing millions of dirhams in penalties. We have loose ends here.

Sagar Kulkarni: What you say is absolutely true. We should have detailed engineering done before we tender. Engineering needs time. We have to educate the client that the market is changing. All stakeholders should work together right from the beginning of the project.

Berbari: As consultants, have we become complacent and are avoiding innovation? AI, shallow geothermal, deep geothermal, fuel cells, solar PV... all these have potential. In your opinion, Zack, what is the solution? In 10 years, we have not seen much development.

Zackariah: The ability to innovate and improve has been available. In my view, a third party should finance the research.

El-Kasaby: I agree with Zack. Going through new technologies – hydrogen, say – requires courage.

Berbari: Reddy, contractors have to take a bigger risk. Is it why contractors are willing to only take on projects on the basis of the fact they are aware of it? Would a highly competent contractor take risk?

Reddy: Yes, they would. I advocate a proactive approach to transform the plant to a much better system.

Berbari: Are we seeing a reduced level of innovation coming from suppliers, owing to COVID?

Zackariah: Yes, I see a drop in level. The focus has been on survival instead of adopting innovation. Maybe we are seeing innovation in filtration and cleaning, but in other areas, innovation has taken a back seat.

Voices

Six years after the Paris Agreement, we have six months to go for COP26. We are



conscious of the scale of the task – net-zero, clean air, energy security and a more stable climate.

Janet Rogan, COP26 Regional Ambassador, MENA Region

Climate change is unequivocally a vital issue. We are seeing record heat waves, fires and floods in the region. By 2025, 80-90 million people will be exposed to water stress in MENA.

Janet Rogan, COP26 Regional Ambassador, MENA Region

In 2015, the share of district cooling was 15-16%. In 2020, it rose to 20-23%. The total



demand for district cooling has stopped, but district cooling has continued to grow. From a regulatory perspective, good progress has been made, but we need to strive for energy and water efficiency, and recycled water use.

James Grinnell, Head of Water, Dubai Regulatory Supervisory Bureau

There is new regulation in Abu Dhabi, where they are asking district cooling providers to not only



report on the efficiency of chillers and pumps but also on financial results. In Abu Dhabi, we are seeing a stringent review of what every district cooling plant is doing, and all district cooling providers are working to comply with the rules.

George Berbari, CEO, DC PRO Engineering; Author, *The Energy Budget*

We have appointed the Sustainable Energy Authority (SEA) in Bahrain. We have designated our first compulsory district cooling zone. We are more moving towards a



more robust regulatory environment.

Dominic Mc Polin, Chief, Central Planning – Central Planning Office, Ministry of Works, Municipalities Affairs and Urban Planning, Bahrain

In Stockholm, the government has established building codes for new buildings. Embedded carbon of buildings are the same as running the buildings.



Gustaf Landahl, Head of Department, Environment and Health Administration, City of Stockholm, Sweden

District cooling must be embraced as part of the COVID recovery plan. We are looking at a 30% increase in ventilation, which



means we will have to double our efforts to improve district cooling. If we are not aware of the sweeping changes then we are sleeping through this COVID. People are nervous coming back to offices and apartments, and they need assurance, and we need ventilation. And district

cooling has to be to the point of subsidies. If we have to follow standards for reopening schools, we have to use more energy, which means over 25% increase in energy use.

Dominic Mc Polin, Chief, Central Planning – Central Planning Office, Ministry of Works, Municipalities Affairs and Urban Planning, Bahrain

District cooling suppliers have no idea how efficient the buildings they are supplying to are. If there is an increase in IAQ measures,



owing to COVID, it is vital that the district cooling industry should know how efficient the buildings are that are connected to district cooling. The energy efficiency part of the buildings have to be made mandatory.

Patrick Andrew Shiel, Adjunct Professor, Stanford University, United States

There is a revolution coming in Europe in terms of the use of IoT, and we are seeing a lot of start-ups. Dalkia is



recovering heat from data centres, geothermal, seawater, gas turbines.

Steve Lemoine, GM & Business Director Middle East, Dalkia

Why aren't we using gas, which is in abundance in Dubai?

Sekhar Reddy, Managing Director, Lexzander



Five per cent of district cooling is run by trigen in Saudi Arabia and



Oman. We saw high prices and lack of facilities in supplying gas. In Amsterdam, they are discontinuing Natural Gas, and people want to move away from fossil fuels; hence, hydrogen. In terms of low delta T, penalties reached AED 5-6 million a year in Dubai, and are now forcing building owners to adopt solutions that are more energy efficient.

George Berbari, CEO, DC PRO Engineering; Author, The Energy Budget

Penalty is not the way forward.

Sekhar Reddy, Managing Director, Lexzander



In Denmark, we have world-leading companies.

We have highly efficient system of producing district heating and district cooling. Many of the companies today produce solutions. The big advantage we have in Denmark for district heating and district cooling is the ability to bring all elements together. In Denmark, the way we use district heating and district cooling is



not by isolating but by integrating them with our energy structure. We integrate the complete district heating and district cooling system with our electricity production, towards reducing carbon footprint by 70% by 2030. We believe we can achieve this.

H.E. Franz-Michael Skjold Mellbin, Ambassador of Denmark to the United Arab Emirates

Our goal is to be fossil fuel-free by 2040. We want to be climate positive by 2040. We have been working on climate since 1995. From 1995 to 2018, the



emissions from heating has been reduced significantly – almost by 60%.

Gustaf Landahl, Head of Department, Environment and Health Administration, City of Stockholm, Sweden



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JEDDAH, KSA

‘DISTRICT COOLING AN ESSENTIAL PART OF FRONTLINE HEALTH STRATEGY’

District cooling is one of the most impacting strategies within the energy equation and a key enabler in putting up an effective fight against COVID-19 and future pandemics, argue **Dominic Mc Polin** and **Patrick Andrew Shiel**



Dominic Mc Polin



Patrick Andrew Shiel

On June 6, 2021, a new monument was erected to commemorate British troops landing on the beaches of Normandy on D-Day, 77 years ago. June 2021 also saw a victory in a scientific dispute that has been quietly raging since the beginning of the COVID-19 pandemic.

That dispute was brought to the attention of professionals in the field in this region, last year, through the efforts of CPI Industry, publishers of *Climate Control Middle East* magazine, in conducting a webinar series, titled ‘The Air We Breathe’. Dr Stephanie Taylor, Infection Control Consultant, Harvard Medical School, was a participant in one of the webinars – on June 24, 2020 – of the series, in which she commenced a serious debate on the role of aerosol viral infection.

It was, indeed, an honour to share a platform with Dr Taylor, who in addition to her role as an infectious disease medical

expert, is an architect. A subsequent webinar in the series – the fourth edition, on September 30, 2020 – further explored the theme of the importance of air quality and humidity controls in defence against COVID-19.

AN END TO DEBATE: VENTILATION DAY

Broadly speaking, we have lived with chatter regarding sick building syndrome for a generation in the lecture halls of architectural colleges and in the literature, punctuated only with occasional brief hot-topic headline episodes, such as the discovery of Legionnaire’s Disease emanating from a hotel cooling system. But still, in 2021, we live, work and are entertained in buildings that are poorly ventilated; and yes, that brings us back to that V-word again, “ventilation”.

V day, I suggest, commemorates the day that ventilation was quietly inserted

into the official advice of a) The World Health Organization (WHO), b) Centers for Disease Control and Prevention (CDC), in the United States, and c) Other national government advisory outputs in the United Kingdom, Ireland and Europe. It’s official!

Ventilation is now part of the package. It may be the case that the recognition of ventilation as a major disease control mechanism was a difficult and slow-coming decision for the following reasons:

- 1) Resistance emanating from a scientific paradigm, which was based on a now-accepted unsafe premise regarding the airborne transmission of virus (the five microns fulcrum particle/aerosol dichotomy).
- 2) Society and the built-environment were not – and still are not – prepared for the full ramifications of such a recognition of aerosol transmission of COVID-19.

- 3) The general public has been subjected to lockdown and one of the most comprehensive and continuous worldwide media campaigns regarding the threats to life, safety and the economy from the virus that instigates COVID-19. It is difficult to raise such an additional issue just as lockdowns thaw and pent-up social interaction restarts.
- 4) The fear or doubt regarding the health of the air quality in communal buildings may be a further layer of psychological stress that could have a detrimental impact on mental health and certainly an impact on the level of comfort in offices and enclosed assembly areas, such as cinemas, restaurants, malls and auditoria.

These factors may be the reason for the quiet and undramatic introduction of ventilation as a major factor in COVID-19 control in June 2021. However, now that it is across the line, I predict that it will become an increasingly important focus, as economies try to return to a new post-COVID normality.

To understand the history of this internal debate, which came to the surface in this region through the CPI Industry webinars in 2020, I advise a revisit to the webinars and the advice on monitoring of air quality, filtration and building management. Lastly, for a very clear description of the resolution to the aerosol science, I suggest reference to an article from *Wired* (May 2021 issue), authored by Megan Molteni.

COVID-19 AND VENTILATION

Many in the building ventilation business, along with many others in the building management field, might have been surprised at the confused and oft-corrected messaging from the WHO over the past year. This is what we referred to as the emerging science in the CPI webinar series, 'The Air We Breathe'. Among physicists and engineers, whose professional interests are dedicated to the better understanding of aerosol transmission in air, the medical world must have seemed an unwelcoming and hostile place. In her article, Molteni explains with great flourish the issues at the heart of why the WHO has repeatedly backed away from engineering advice that COVID-19

can, indeed, be carried as an aerosol for much greater distances than previously thought. It seems a 60-year-old issue of interpretation of aerosols versus droplets/particles may have been finally resolved. The issue seems to have arisen between the Harvard engineer, William Wells, who studied transmission of infectious aerosols, and Alexander Langmuir, the influential chief epidemiologist of the newly established CDC in the early 1950s. Molteni explains the history behind the widely accepted 5-micron measurement of aerosol particles versus what the research demonstrated – it was closer to 100 microns. This implies that decades of medical advice may have wrongly suggested that particles larger than 5 microns will not remain in air as aerosols. Given the renewed focus on COVID-19 and its transmissibility in free air, particularly within occupied building spaces, this has profound implications for how we ventilate our buildings.

The process of more fully understanding how air flows work in enclosed spaces has been predominantly within the confines of Computational Fluid Dynamics (CFD). However, we were clearly alerted to these factors in the Keynote Address Dr Taylor gave during the webinar series. This was the voice of a frontline experience; however, another

In most cases, the volume of the building space is considered alongside the likely occupant numbers and other environmental factors to determine the required flow rates of fresh air. We know from many hundreds of building inspections that fresh air supply grilles are often badly placed and poorly maintained. This can often result in dead zones in building spaces, where the fresh air almost never reaches. The commissioning process simply verifies the design figures; it does not validate that the design is solving the problem at hand – how to properly ventilate buildings.

The problem is further compounded by the fact that construction budgets are always under pressure, and somewhere along the complex timeline of building construction, the first candidates for consideration to be dropped from the budget are energy-saving devices, such as variable speed drives (VSDs), but more importantly, any “superfluous” sensors, such as CO2 or volatile organic compound (VOC) sensors. Both sensor types, depending on their placed location, can provide invaluable data as to the ongoing air quality being experienced by the occupants. Again, we have explored these issues previously through other CPI Industry webinars – ‘Disinfection 360’ conducted in July 2020, and ‘IAQ strategies and Solutions’, conducted in September 2020. The cost

“ Governments around the region recognise the key to winning the environmental benefits of district cooling is in the change in the business model from a purely market-driven, entrepreneurial industry and investment strategy into an instrument of government policy on climate change ”

year was to pass before the universal acceptance of this experience was to appear as official advice from public health organisations. Particle movement simulation adds another dimension of complexity, usually involving Lagrangian Analysis techniques. The only reason I mention these computational techniques is to highlight the fact that these are seldom carried out for new buildings.

of such sensors is a miniscule fraction of any construction budget but can provide years of safe working environment. This is a particularly thorny issue, given how little we understand about the buildings we currently construct in this age of renewed awareness of transmissible pathogens. What we do know is there are new air quality standards emerging, which will inevitably impact building running costs. ▶

Here are some such standards...

- ANSI/ASHRAE Standard 62.1 - 2019, Ventilation for Acceptable Indoor Air Quality
- ANSI/ASHRAE Standard 52.2 - 2019, Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size
- ANSI/ASHRAE Standard 55 - 2020, Thermal Environmental Conditions for Human Occupancy
- ANSI/ASHRAE Standard 90.1 - 2019, Energy Standard for Buildings Except Low-Rise Residential Buildings
- ASHRAE core-recommendations-for-reducing-airborne-infectious-aerosol-exposure
- ASHRAE guidance for the Re-opening of Schools

COVID-19 has probably been the biggest wake-up call we have received in many decades when it comes to how we provide suitable levels of physical – and now – psychological comfort in our buildings. Today, the video signboard advertisement for Andrew Lloyd Webber's new show, Cinderella, in London's West End, reverts to a message stating that the theatre is ventilated and that the air circulation is switched off.

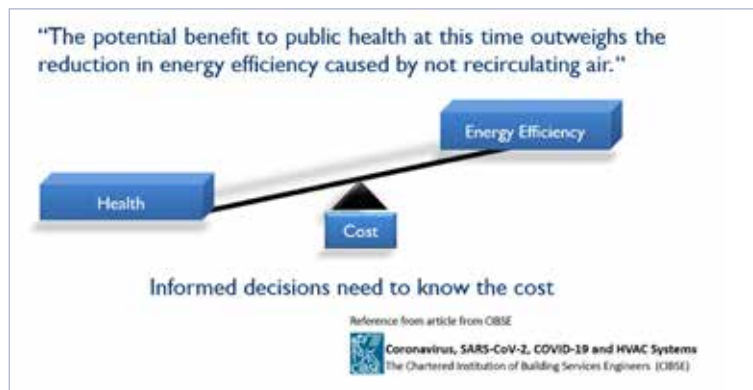
DISTRICT COOLING TO THE FORE

In hot and humid climates – such as the Middle East, in particular – summer cooling in commercial and domestic buildings has been a long-standing issue for electricity consumers and business overheads, plus the pressure on electricity authorities to plan production levels and secure continuity of supply through increasingly complex system controls. There is still a hesitancy in the construction industry and among design consultants to accept communal cooling solutions. District cooling is recognised as probably one of the most impacting strategies within the energy equation, as continuously reinforced at CPI Industry's DC Dialogue conference, and endorsed by the UN Habitat Report on district energy. Despite individual national initiatives on promoting district cooling, major obstacles still persist with regard to its wider roll outside of developer-led masterplans.

Governments around the region recognise the key to winning the environmental benefits of district cooling

is in the change in the business model from a purely market-driven, entrepreneurial industry and investment strategy into an instrument of government policy on climate change. Meaningful change is only possible through regulation. The emerging regulations vary across the region, but themes in common are securing energy efficiency and, of increasing importance, consumer protection.

Whilst all governments concerned were focused on the financial and environmental opportunities associated with district cooling, along came a worldwide pandemic, COVID-19. We are slowly coming to the understanding that the restarting of our economies must be on a controlled and safe basis. All action required must be taken to avoid the recurrence of infection, as the virus mutates, and ultimately, to learn all the lessons from this catastrophic pandemic and to ensure that next time – and we are reliability assured there will be a next time



designed to ventilate buildings, are built on the fact that recirculation is included. In recent pilot cases carried out by co-author, Professor Patrick Shiel, in conjunction with Siemens, in Vienna, Austria, during this Spring 2021, we have shown that overall, building running costs may increase by up to 28% if the guidance on higher levels of ventilation and fresh air flushing is adhered to. We need a way to mitigate that cost whilst still maintaining sufficient IAQ.

The Vienna case study involved two buildings – a school, 24,000 square metres in area, and an office block, 12,400 square metres in area – where cooling plants and ventilation were adjusted to comply with recommended guidance. The results showed

“ If the current recommendations on mitigation of aerosol transmission of viruses within our buildings are taken seriously, the efforts made in the energy efficiency field will be negated by the required recalibration of the energy demand figures for our schools, universities, offices, apartments, shopping malls, hospitals and places of entertainment

– we are much better prepared to save lives and reduce economic impact.

The link between district cooling and COVID-19 is obvious and, in a nutshell, the required ventilation to keep levels of cool fresh air available in all areas during the working day is going to cost significantly more than it costs now. This is because following the ASHRAE, AICM and EICM indoor air quality (IAQ) guidance would suggest not running the ventilation/cooling system in recirculation mode. In fact, many systems, which have been

a 28% weekly increase in energy use/cost, mainly down to longer running times and turning off recirculation, and CO2 monitoring in all occupied areas.

By way of mitigation, applied advance machine learning (ML) techniques, coupled with energy modelling, resulted in reduction of 24% energy usage. The study examined the impact of district cooling on energy usage, which showed a further decrease of nine per cent.

The business case for district cooling must now be reassessed as part of the



preparation for allowing the congregation of people in close proximity in public and private buildings. Discussions to manage aerosol transmission of viruses must also include the discussion to mitigate those increased running costs. Evidence is worldwide that district cooling is simply more efficient, cheaper and significantly better for our environment than the individual building chiller solution.

Recommendations

- 1) A more aggressive district cooling strategy for urban areas is required as part of COVID-19 response and a key element in preparation for future pandemics
- 2) Removal of barriers to the implementation of an increased role of district cooling in national energy strategies.
- 3) District cooling must become a fully integrated member of the infrastructure family in this region and a first-choice cooling option, where available, which is enforced through the planning system and building permit system.
- 4) A formula must be developed for regulated cost sharing, and importantly,

the sharing of savings from the deployment of district cooling must be addressed to bring this industry into a partnership relationship with government. This is essential to bring the CAPEX of district cooling down to meet the expectation of consumers.

- 5) Governments can look to the district cooling industry as a target for direct investment either through direct participation within an investment portfolio or by direct involvement through the provision of public land for district cooling plants, access to the public road system for the development of more extensive networks outside of real estate masterplans and possibly the development of pipe networks for plug-and-play district cooling concession agreements.

WHY OUGHT WE TO CONSIDER THESE RECOMMENDATIONS?

The answer is now even more clear than before. If the current recommendations on mitigation of aerosol transmission of viruses within our buildings are taken seriously, the efforts made in the energy

efficiency field will be negated by the required recalibration of the energy demand figures for our schools, universities, offices, apartments, shopping malls, hospitals and places of entertainment. This can be a major setback for all those efforts made so far in individual building facilities management and for national governments dealing with the power demand factors and system control challenges. We have demonstrated in the case study in Vienna that district cooling is no longer an energy question but is now part of the frontline health strategy. [ccme](#)

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A NEED FOR GAME-CHANGING DEVELOPMENT

While it is heartwarming to see consolidation in the district cooling industry, there is quite a bit of ground that needs to be covered in terms of adopting new technologies and practices, says **George Barbari**

After more than 23 years of district cooling as a service utility in the GCC region, the industry is taking solid steps towards maturity and consolidation but is wobbling towards innovation and game-changing development.

With more than five million tons of installed cooling capacity, district cooling is affecting more lives in the GCC region, varying from a coverage rate of as low as one per cent in Kuwait and Bahrain to as high as 20% in Dubai alone in the UAE; overall, though, it remains below 10% for the entire GCC region.

I would love to see an increase in penetration, but can the industry coverage rate grow to 50% with current approaches and practices? As a keen representative of the industry, I do not see that happening, unless there is a serious change at the

highest level in government planning to propel the various GCC region countries towards that goal.

In the years between 2005 and 2018, we have seen more development by government and private entities investing in district cooling than by providers of utility services. Lately, we have seen the trend of government entities adopting more sound financial policies, resulting in district cooling asset sales to established regional utilities, and in a strong appetite by international firms to acquire these assets in the GCC region.

Today, established utilities, such as Empower, Tabreed, Emicool and Pal, hold more than 60% of the district cooling assets in the GCC region, and that trend is expected to grow – international players based in China, Japan, Singapore, France and other countries are likely to join

the GCC region district cooling service providers. We have seen asset sales in excess of USD 2.7 billion in the past six years, which I must add is a phenomenal number. Listed below are the details:

In the pipeline is an estimated 10 deals worth an estimated USD 1.2 billion, which reportedly are likely to be finalised in the upcoming two years.

While the deals – concluded and waiting conclusion – are nothing short of astonishing, the same cannot be said about the technological progress. Indeed, on the technology front, we have seen little development in the industry; with a few exceptions, it is a curious blend of mature technology, stagnation and happiness with the status quo.

Chillers manufacturers are continuing to improve efficiency, which is in the range starting from 0.65 to 0.6 kW/ton. ▶

Consolidation of District Cooling Utilities in GCC

Utility Sold	Utility Sold by	Acquired by	Year	Value in Millions	
				AED	US \$
Palm District Cooling	Nakheel	Empower	2014	1,837.5	500.0
Al Wajeez - Maryah Island District Cooling	Mubadala	Tabreed - MIP	2014	1,050.0	285.7
40% of Tabreed	Mubadala	Engie	2017	2,850.0	775.5
50% of Emicool	Union Properties	Dubai Investment	2018	500.0	136.1
50% of S&T District Cooling	Al Dar	Tabreed	2018	348.0	94.7
8% of Saudi Tabreed	IDB Infrastructure Fund	Tabreed	2019	129.0	35.1
100% of Masdar District Cooling	Masdar	Tabreed	2020	50.0	13.6
80% of Emaar DC downtown 4 DC Plants	Emaar	Tabreed	2020	2,480.0	674.8
Saadiyat Cooling LLC	Al Dar	Tabreed			
Total Sold				9,244.5	2,515.5
Nakheel 5 plants	Nakheel	?	?	900.0	244.9
Dubai Airports 5 Plant	Dubai Airports	?	?	1,000.0	272.1
6 Schemes	Majid Al Futaim	?	?	500.0	136.1
Dammam Airport	DACA	?	?	80.0	21.8
50% of Mariah Island	Al Wajeez Mubadala & Tabreed	?	?	600.0	163.3
Total Sold				18,489.0	5,031.0



George Barbari

And we are benefitting from new, more environmentally friendly refrigerants, HFO R1234ze and R1234yf, which come with the promise of a substantially lower global warming potential. We are also seeing chiller compressors with variable speed drives, which offer up to 30% energy saving during milder weather periods.

Equally exciting, a new Artificial intelligence and machine learning software is emerging, with the promise of 10-15 % energy savings in relation to overall plant usage. However, the main players are still slow in testing and adopting these technologies, owing to concerns over their effectiveness and the required time and investment.

Hand in hand with the need for adopting new technologies is the need for integrating solar PV power generation with thermal storage and the move towards carbon-neutral cities. It is the responsibility of federal and local governments to trigger the move and to push through a concrete plan towards carbon neutrality. Of course, we are witness to new developments taking shape in Saudi Arabia – the likes of Red Sea, Amaala and Neom – which have been designated as carbon-neutral; however, the adoption of air-cooled district cooling systems in some of the developments may not be the best technology of choice.

In my view, producing Green Hydrogen, through using solar and wind, may be the future main income for the GCC region countries. And early adaptation in district cooling using fuel cells with heat recovery may enhance these futureproof technologies. One visionary service provider has commenced a feasibility study on this, and it is my fond hope that we will see these technologies seeping into the district cooling industry before the end of the decade.

An equally attractive proposition is geothermal energy. How wonderful it would be to consider shallow geothermal (less than 20 metres in depth) for heat rejection! It has already started to get some attention, with small-scale adaptation happening in some small projects, which in turn, will benefit the knowledge-bank of water temperature, salinity and ground hydraulic behavior in

terms of drawing or injecting ground water. Again, it is my fond hope that we will see a partial large-scale adaptation of shallow geothermal in the industry in the next few years.

I am likewise keen on large-scale deep geothermal (around 2.5 kilometres in depth). Such a project is being planned in Abu Dhabi, where ground temperatures higher than 95 degrees C can be utilised with a combination of absorption and adsorption chillers and thermal storage to produce a base load cooling of around 2,000 tons; I can't wait to see its imminent implementation in due course of time.

Broadly speaking, though, there is much that needs to be done to adopt new technologies. As the popular saying goes, 'A few swallows does not a summer make'. I would like to see vigour in adopting new practices, as well. Utilities, by and large, are still

idle capacity at 1.5 million tons in the GCC region. A likely solution would be to create a neutral piping distribution entity, which would extend the network to a concentration zone in cities and interlink them, whenever and wherever it is technically and financially feasible to do so. This model would improve the business coverage of district cooling utility providers through full capacity utilisation and economy of scale; and that way, they would be able to offer more competitive pricing on one side and reduce contracted capacity closer to actual peak.

In summary, the district cooling industry is mature, profitable and has the ability to attract large foreign investment. However, utility providers need to accelerate their technological development and focus on customer service, particularly in relation to competitive pricing.

“ Ground temperatures higher than 95 degrees C can be utilised with a combination of absorption and adsorption chillers and thermal storage to produce a base load cooling of around 2,000 tons

using unfavourable electricity and water rates for industries in most countries and emirates, except in Abu Dhabi; and it is negatively impacting district cooling rates, as evidenced by concerns raised by customers and end users.

The GCC region countries need to redesign their utility rates to enable efficient district cooling and centralised water-cooled air conditioning systems and to help improve the image of the industry from an end-users' perspective.

Abu Dhabi, Bahrain, Dubai, Saudi Arabia and Qatar have developed or are developing district cooling standards. How wonderful it would be if they would simultaneously undertake the standardising of service contracts, which would protect the interests of end-users!

As for the utilities, they perhaps ought to take a close look at their idle capacities. Current estimates place

It would be interesting to see GCC region governments evolving an integrated energy strategy, where district cooling would cover at least 90% of their major cities. And I am talking of a model of district cooling that would integrate renewable energy, hydrogen production, co-generation and thermal cooling energy storage as a base for future carbon-neutral economies, which in turn, rely on the export of hydrogen rather than oil. [ccme](#)

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THE CURIOUS CASE OF VARIABLE CONDENSER WATER FLOW

Would implementing them on water-cooled chillers reduce system energy consumption, or achieve the opposite?

For many decades, engineers and some OEMs have been recommending implementing variable condenser water flow on water-cooled chillers to reduce system energy consumption.

Proponents point to many ASHRAE studies:

- 1) Waller (ASHRAE Journal, January 1988) recommended a condenser water flow rate of 1.5
- 2) Shelton and Weber (1991 ASHRAE

Transactions) found that equipment selected for a condenser water flow rate of 2 gpm/ton saved 3.5% in system peak demand and 10.5% in annual energy consumption, compared to 3 gpm/ton.

- 3) Shelton and Joyce (June 1991 ASHRAE Journal) concluded that “the conventional practice of designing chilled water plants with condenser flow rates of 2.8 to 3.0 gpm/ton results in unnecessarily high condenser flow rates”.

However, there is another camp of engineers and OEMs that does not recommend this practice, and my experience in this industry leads me to agree with this camp – that lowering and/or varying the condenser flow in the chiller does not save energy, as the chillers’ increased power consumption outweighs any savings in condenser pumps or tower fans.

Dacen Kinser, of the University of North Texas, in Denton, Texas, wrote in an ASHRAE paper: “My analysis does not support the generalization that a condenser water flow rate design of 2 or 1.5 gpm/ton will result in the lowest system full load power consumption for chiller, condenser water pump and cooling tower. I conclude that a 3 gpm/ton (0.054 mL/J) condenser water flow rate will most often lead to a smaller full load power draw for system components compared to 2 or 1.5 gpm/ton, and although a lower condenser water flow rate can often result in lower annual energy cost, this result is highly dependent on the specific site utility rates, pumping head, and the chiller.”

So, let’s take a look at what happens when we lower the condenser flow. Reducing the condenser flow will increase the condenser water temperature range; it will also increase the required condenser pressure. Increasing the condensing pressure on a chiller will result in increased chiller power cost and reduced performance.

Variable flow in the condenser is not recommended by some chiller OEMs, as it generally raises the energy consumption of the system by keeping the condenser pressure high in the chiller. Although reducing the condenser flow will improve the cooling tower LMTD and a smaller tower can be used, the savings from

this strategy will not offset the increased cost of the chillers' increased power consumption. In addition, if implementing this on an existing plant that has been designed for 3 gpm operation, cooling towers typically have narrow ranges of operation with respect to flow rates and will be more effective with full design flow versus the lowered flow.

Another major consideration not generally mentioned by proponents of reduced condenser water flow is that the rate of fouling in the condenser will increase at lower water velocities associated with variable flow. This will not only increase maintenance costs but also increase power consumption tremendously.

In the May 2021 issue of *Climate Control Middle East* (Licence to Chill), I wrote as follows: "A chiller's efficiency is affected most by its resistance to heat transfer, its (LTD) Leaving Temperature difference of its heat exchanger tube surfaces more than anything else. So, it is imperative that the chiller's evaporator and condenser tube surfaces have the lowest resistance to heat transfer possible."

In the same article, I also stated that "fouling of the chiller condenser tubes substantially impacts the power consumption of the centrifugal compressor. This is why the focal point of any water treatment programme should be the prevention of deposition. A layer of scale that is one by sixty-fourth of an inch thick on the condenser tubes can increase electrical usage in a centrifugal chiller by as much as 33%. Biofilms can decrease condenser heat exchange efficiency to an even greater degree. Thus, it is of paramount importance to assure that chiller heat exchange surfaces



are maintained in a clean, deposit-free condition".

Fouled condensers are the major cause of increased chiller power consumption. Lowering the condenser flow will lead to increased condenser fouling, just the opposite of what you want to achieve.

If you are insistent on going the Condenser Variable Water Flow direction, I suggest you first baseline the current plant efficiency performance (plant annual kWh of chiller, cooling tower fans and condenser water pumps) and then divide this by the annual ton-hours of plant cooling. This is the annual performance in terms of kW/ton for the plant components (chillers, towers, condenser water pumps). This will be your baseline pre-condenser variable- or lower-flow retrofit. You will then compare this versus post-retrofit varying condenser water flow rate to prove or disprove the savings. You will need to install Utility-grade BTU meters on the

chillers and on the main plant header. You will also need to install Utility-grade power meters on the tower fans and the condenser pumps. I again suggest you get a full year's worth of data before you perform the retrofit.

Before you even attempt retrofitting your plant to variable condenser flow, you need to be sure the condenser system flow rate stays above the minimum flow rate, as per the requirement of the tower and/or chiller OEM. If either of these minimum flows are close to the current system design flow, variable flow should not even be considered.

Last, if you are still considering variable condenser flow, I suggest you have an automatic tube cleaning system installed to overcome the increased fouling associated with low-flow conditions; even with this in place, though, you may not get the savings you think you will with variable condenser flow. [ccme](#)

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THE PERILS OF A HEAVILY SCALED OR DAMAGED FILL

Stephen Andrew discusses the importance of regular maintenance and a thorough yearly inspection of cooling towers



Regular inspection of HVAC systems is vital to ensure they are functioning well, are in good condition, and ready to deliver dependable service in the coming year.

An annual inspection of evaporative cooling systems, such as cooling towers, is recommended as warm weather arrives and these systems begin working at full capacity. Now is the time to review your cooling tower user manual and inspect all components.

It's important to consult with your safety officer and follow all safety protocols before beginning the inspection process. Always shut off electrical power to the cooling tower fan motor using lockout/tag out procedures before proceeding.

A thorough cooling tower inspection involves using a methodical process to review and document the condition of multiple components and systems. The checklist, below, is based on our experience and comprises recommendations in several important areas:

Tower casing

- Inspect the exterior of the tower for leaks and cracks. We recommend walking around the tower twice.
- First, be aware of trip hazards as you focus on the lower portion of the tower.

- The second time around, look higher for cracks and leaks, signs of vibration and loose hardware, and the presence of rust or biological fouling, which could indicate a damaged water distribution system.

Louvres, heat transfer fill and drift eliminators

- Check louvres for deterioration and excess scale build-up.
- Inspect the fill media for excess scale, algae and other contaminants. Some light scale is typical on fill and can be removed with brushing in a crossflow application. Inspection of counterflow fill can be performed using an endoscopic camera. If the fill is heavily scaled or damaged, tower performance will be adversely affected.
- Drift eliminators should be clean and free of debris. Ensure the seals are in place and in good condition.

Cold water basin

- It is vital that your cold water basin and anti-vortex screens are properly placed and free of debris.
- If your cold water basin includes equipment such as basin sweepers that go to side filtration, check nozzle placement to ensure proper water flow.

- Inspect water level probes, whether manual or electronic, for corrosion.
- When the basin is clean and components are operational, refill the cold water basin to the recommended operating level.

Hot water basin (if applicable)

Remove the basin covers to clean the water distribution system basin and nozzles. Then, properly secure the covers.

Water distribution pipework

Check that all pipes are positioned correctly and that they are secure.

Check that all the nozzles or spray arms are installed correctly.

(Tip relating to counterflow application: Removal of an air inlet panel at low level during operation can allow you visibility of the flow from the underside of the fill pack. Any areas of noticeable heavy flow may be the result of a dislodged lateral pipe or missing nozzle.)

(Tip relating to crossflow application: Noticeable dry spots on the fill media may be the result of a blocked nozzle in the hot water basin.)

Piping

Check all supply and return piping to and from the tower; confirm valves are open and that the water treatment system is operating properly.

Fan

- Check the fan; blades must turn freely with equal tip clearance between the blade and the shroud.
- Verify blade pitch to eliminate vibration. Ensure the blade angle is consistent across all blades.
- Check that the fan drain holes are clear.

Motor

- Turn the motor manually and confirm hardware is tight and free of corrosion.
- Moisture and heat are detrimental to motors. Check that open drain holes match motor orientation.

Belt drive

- Check tension and wear on your belt drive.
- Inspect pulleys for corrosion and loss of metal in the grooves.

Gear drive

- Check oil level.
- Check oil appearance for cloudiness

or particulates, signs of water and other contamination.

- Check and lubricate bearings.
- Check seals for signs of leakage.

Driveshaft

- Check alignment of driveshafts and couplings.
- Inspect for corrosion and damage.
- Check rubber components for cracks and brittleness.

This article provides an overview of the various considerations necessary to safely and thoroughly inspect an HVAC evaporative cooling system. It is important that you always consult the cooling tower user manual and follow the manufacturer's recommended practices. As additional resources, I recommend following industry water management best practices as outlined in Health and Safety Executive's HSG274 Part 1: <https://www.hse.gov.uk/pubns/priced/hsg274part1.pdf> ccme



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Note: The 2022 edition of the *Climate Control Guide & Directory* will be published in September 2021, instead of in November, so as to coincide with *The Big 5 Dubai* (from September 12 to 15), which itself has been advanced, this year.

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SIMPLE IS BETTER

... in data centre M&E design, says Rehan Shahid



Government agencies, financial institutions, educational bodies, telecommunication companies and retailers, among others, all generate and use data, therefore presenting a need for data centres on some level.

Not all data centres meet the operational and capacity requirements of their initial designs, though; in fact, it's quite rare to see such occurrences. In data centre design, the principal goals are flexibility and scalability. In this article, I will focus primarily on Mechanical and Electrical (M&E) design, without delving too deep into the technical details.

Following are the critical M&E design elements that are required to be considered for a data centre:

- Developing an energy-efficient, climate-controlled environment that has specific ranges of temperature, humidity and cleanliness
- Appropriate redundancy (for example, N+1, 2N, 2N+1...)
- The tier classification of the data centre
- All of the equipment needs to be provided with the appropriate high-quality power
- A comprehensive fire detection and suppression system for protecting life and property, as well as ensuring quick operational recovery, owing to the significant risk of electrical fires in a data centre
- Designing and installing appropriate back up power systems with UPS, generators and substations

Generally speaking, no two data centres are the same. To produce a bespoke M&E design, a detailed analysis of current and future requirements is a must, and a one-solution-fits-all approach must be avoided.

It is not economically feasible to have all the electro-mechanical systems in place, particularly when taking into account future expansion. This expansion may happen sooner or later than expected, though the general trend skews sooner, rather than later. This has been especially true for the past few years, where the demand of building new data centres has soared. The rise in demand is perhaps due to radical changes made to the business model, combined with the work-from-home initiative and an increase in demand of streaming media.

The objective is to have a flexible and scalable infrastructure; M&E systems should also ideally be able to expand without any downtime, which may make it appropriate to consider a modular design approach. If additional racks of blade servers are added, then the M&E systems should be able to handle the new requirement without a redesign – much like adding RAM to your laptop, when a new operating system

demands more of it to run faster. In other words, there should be little fuss.

As the data centre is vitally dependent on electrical power, not just for the IT equipment but also to maintain and control the indoor environment, paramount importance should be given to the design of the electrical systems, quality of the power, alternative power source(s) and the system's ability to operate under fault or maintenance conditions. The design should also have the ability to add UPS capacity to existing modules without an outage.

How effectively power is used can dramatically affect energy consumption and carbon emissions. One measure that has been adopted by the industry is known as the power usage effectiveness (PUE).

The ratio of power available to a data centre versus the power consumed by IT equipment is described as Power Usage Effectiveness (PUE). A high PUE means that your data centre is consuming too much power and could be more efficient. New centres should aim for 1.4 or less, according to Federal CIO targets and benchmarks. The goal is to get the PUE ratio down as near as possible to 1.0.

Table 1: The four tiers of data centres¹

Tier 1	Tier 2	Tier 3	Tier 4
99.671% uptime	99.749% uptime	99.982% uptime	99.995% uptime
No redundancy Single cooling and power path	Partial redundancy in power and cooling systems	Redundant power, cooling and hardware components. Fault tolerant (N+1) Concurrently maintainable.	Redundant power, cooling, hardware components and fully fault tolerant. Two independent utility paths. 2(N+1) Concurrently maintainable.
28.8 hours downtime/year	22.0 hours of downtime/year	1.6 hours of downtime/year	0.4 hour of downtime/year

ESTABLISHING AN EFFICIENT COOLING STRATEGY

A Computational Fluid Dynamics (CFD) simulation of the airflow in a data centre should be considered to show its effectiveness and to mitigate risk, such as overheating resulting in less-than-intended design capacity. Separating the data centre's hot and cold aisles to prevent hot spots and hot air recycling is one of the most effective methods of achieving consistent temperatures; the key is to ensure that exhaust air is not allowed to mix with the supply air. Therefore, modelling and simulating all aspects of equipment arrangement – for example, perforated floor/ceiling tiles, hot/cold aisle containment, in-rack cooling and underfloor/overhead plenum – is crucial in order to arrive at energy-saving solutions.

Data centres are designed considering future loads and towards meeting particular heat load demands – though they may not reach the projected level until sometime in the future. Due to this, further analysis must be performed to identify the most flexible and economical way to cool the racks that are operational, thus not wasting energy cooling the entire data hall.

If a higher air temperature range (ASHRAE recommended range is from 18 degrees C to 27 degrees C, allowable range is from 15 degrees C to 32 degrees C)⁴ is being considered, then the risk of failure due to reduced thermal head-room should be studied following a cooling system or utility power failure scenario. Also, it needs to be ensured that all equipment in the data centre is suitable for the extended temperature and humidity ranges.

Having a reasonably airtight data hall and introducing an airlock – if possible – will prevent the ingress of dust, whilst keeping it under pressure and with comparatively less fresh air. This, in turn, will reduce the FAHU energy consumption and prolong the life of the air filtration system.

Finally, keeping track of energy use is a must, so it is necessary to employ energy and environmental monitoring systems.

Some of the design risks to consider are

- Water leaks through the building fabric
- External plant and equipment and the impact of vibration
- Facilities management (FM) and appropriate levels of technical training
- Ease of access, protection of fabric

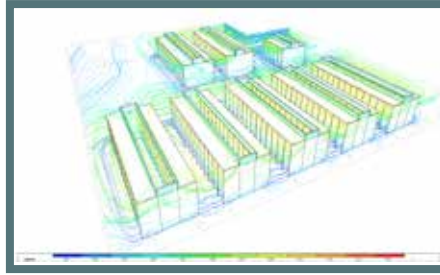


Figure 1: CFD analysis of a data centre, temperature contours

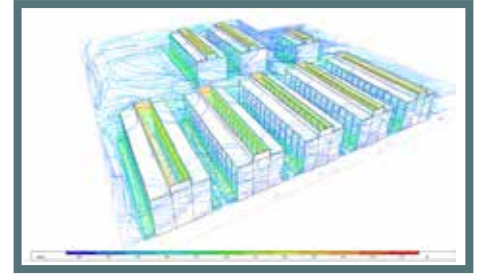


Figure 2: CFD analysis of a data centre, velocity contours

Note: Above images are for illustration purposes only³

- Ability to provide future expansion capability
- Reliability and redundancy
- Facilities management and maintenance
- Risk of system instability, both in steady state under dynamic conditions and low operation
- Electro-magnetic interference (EMI), CCTV and lighting
- Fire strategy
- Emergency provisions
- Health and Safety (H&S) risks during the project and thereafter¹

FOR WHAT IT'S WORTH

Data centres are critical buildings that demand planning and the designer's profound understanding of the requirements.

So, it makes sound sense to keep the design simple and flexible, for the following reasons:

- Complex design entails more equipment, which translates into more failure points
- Complex designs are inherently expensive and attract higher O&M costs
- It's a misconception that more systems equal less failures; increased complexity of design doesn't guarantee enhanced reliability

A modular and flexible design is the key to a successful data centre. The best way to mitigate risk and future-proof a data centre is to design it using technology that has proven itself over time. Please do remember, high-density equipment – blades, in particular – cannot function without cooling for more than a few seconds before going into self-protective thermal shutdown.

Amidst all this, try not to lose sight of the four elements that are fundamentally intertwined – performance, external dependencies, CapEx and OpEx. [ccme](#)

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1. Source: Public domain
2. Data centres: An introduction to concepts and design – CIBSE
3. One of P&T Architects and Engineers Data Centre projects
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Table 2: Classification guide of rack loads and popular cooling systems²

Description	Heat load per rack (kW)	Power density (W/m ²)	Typical cooling medium	Cooling system
Low density	1–7	500–900	Air	CRAC or CRAH All-air systems
Medium density	8–10 10–14	900–1500	Air CW/refrigerant/ carbon dioxide	Hot or cold aisle containment Containment and in-row liquid cooling
High density	15–24	5000+	CW/refrigerant/ carbon dioxide	Cabinet/rear door liquid cooling
High density plus+	25+	8000+	CW/refrigerant/ carbon dioxide	Cabinet/rear door liquid cooling

CRAC: computer room air conditioning; CRAH: computer room air handling; CW: chilled water
CRAC unit uses refrigerant and a compressor, whereas a CRAH unit uses chilled water to provide cooling.



GEMS FirstPoint School – The Villa

SIEMENS JOINS HANDS WITH GEMS FOR INTERNSHIP PROGRAMME

Students of GEMS FirstPoint School – The Villa, Dubai, gain exposure to HVAC- and lighting-related energy efficiency technologies

By Surendar Balakrishnan | Editor, *Climate Control Middle East*

Working on a two-year intermittent internship at Siemens, a select group of four students from GEMS FirstPoint School – The Villa, Dubai, learnt firsthand about sustainable development and the

latest HVAC- and lighting-related energy efficiency technologies, amongst other aspects of building performance.

The internship was an outcome of an MoU between Siemens and GEMS Education to increase collaboration

and integration between industry and the education sector. Siemens said the partnership builds on 'Rahhal', an initiative of Dubai's Knowledge and Human Development Authority (KHDA), which encourages schools to think outside



Matthew Tompkins



Jamie Hoyzer

the box and develop innovative learning opportunities that benefit students.

The Siemens-GEMS engagement – based on the UAE National Youth Agenda, the UAE Vision 2021, Abu Dhabi Vision 2030 and the UN Sustainable Development Goals – aims to explore sustainability and implementation of measures, enhance future employability of students, support the cause of creating a sustainable knowledge economy, and promote digitalisation and innovation.

As part of the internship, the students spent time interacting with Siemens employees at their workplace, in Dubai, where they not only learnt about the latest energy efficiency-related technologies and tools, ventilation strategies, controls and monitoring but also about such aspects as cost of installation and the overall structuring of business. They also had the opportunity of spending time with procurement and HSE teams at Siemens.

Jude Mirjan, one of the interns, described the experience as “unlike anything I could have expected”. She said she went to the internship expecting it to be more of paperwork and theorising but was pleasantly surprised to receive practical insights into building performance.

Another intern, Smitinjay Srivastava,

agreed with Mirjan – that the experience enriched his understanding of practical aspects. “We did a lot of theory and moved to the practical side, and it was easy to do,” he said. “While we did measurement on site, I was more interested in the business side of things, the cost of installing the system and the ventilation.”

engineers, they took part in exercises aimed at calculating its energy profile and arriving at the point of correlating intervention measures with the extent of energy savings.

Subsequently, Siemens commenced work on installing energy-efficiency devices at FirstPoint, with the objective of reducing power consumption by 15% of

“ We have 1,500 students and 240 staff members at FirstPoint. It is a large facility that was built eight years ago. Technology has moved forward significantly since then. ”

The highlight of the internship, the students said, was the intended opportunity of learning in the context of implementing the full spectrum of lessons on energy efficiency at FirstPoint and improving its ecological footprint and lowering its total cost of ownership (TCO) over a period of time – key objectives of the Siemens-GEMS collaboration.

The students identified the energy profile of the school, in terms of HVAC and lighting systems. Working with energy

the baseline. The scope of work involved installing variable frequency drives, adiabatic cooling and demand-controlled ventilation, and the upgradation of the Building Management System (BMS).

The onset of COVID-19, in the first quarter of 2020, meant the students were unable to shadow and witness the implementation phase of the internship. For Matthew Tompkins, Principal/CEO, FirstPoint, the internship opportunity and the broader Siemens-GEMS collaboration ▶



The students attend a briefing session at the Siemens office

is pure gold, nevertheless. At one level is the opportunity of overhauling old energy systems, he pointed out. “We have 1,500 students and 240 staff members at FirstPoint,” he said. “It is a large facility that was built eight years ago. Technology has moved forward significantly since then.”

Tompkins said the school was investing towards making significant energy savings. The ROI, Siemens said, was attractive and would have appeared even more so, had it not been for COVID-19. “The payback period is a bit longer because of the baseline and because we had COVID-19, and the school was closed, which saw a drop in energy consumption,” said Jamie Hoyzer, Executive Vice President, Finance, Smart Infrastructure, Energy & Performance Services, Siemens Industrial LLC. “If the school had been operational, the

“ The payback period is a bit longer because of the baseline and because we had COVID-19, and the school was closed, which saw a drop in energy consumption

payback period would have been less.” Nevertheless, Siemens said its intervention at FirstPoint would see significant reduction in energy use and subsequent lowering of greenhouse gas emissions – equivalent to planting 8,000-plus trees or providing energy to 50-plus households.

For Tompkins, the bigger picture, he said, is the development of the students. “We pride ourselves in developing the leaders of tomorrow, and I am proud of the students,” he said. “These people will go forward with the mindset of sustainability.”

When viewed from that perspective, he said he was delighted, as it was an attempt to narrow the gap between academic institutions and industry. “The gap between education and industry is getting wider and wider,” he said. “So, we felt the need to do this. The students have done a two-year internship with a globally recognised company. They know what it is like to work there, and they have seen that already. They give confidence to employers that these students have already gone through all of that. We are bringing industry and education together.” [ccme](#)

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LG highlights air solutions portfolio at new showroom in Dubai

Company says latest opening targets B2B customers and prospects seeking guidance and looking to invest in advanced HVAC technologies

By CCME Content Team

In partnership with Al Yousuf Electronics, LG Electronics (LG) celebrated its continued expansion in the UAE marketplace with the opening of its new enterprise-focused air solutions showroom in Dubai on July 5.

Centrally located on Sheikh Zayed Collector Road, the showroom aims to act as a base from which it can display its latest heating, ventilation and air conditioning (HVAC) technologies and act as a consultant for current and potential customers on their specific air solutions requirements, LG said.

Hongju Jeon, President, LG Electronics Gulf, said: "We welcome all decision-makers to come visit our new showroom in Dubai, where our team are on hand to understand your business challenges and objectives. For many, we recognize that this now includes instilling a confident return to public spaces, through the use of HVAC solutions, which integrate not only comfort but also thorough hygiene measures at their core. Whether operating in hospitality, retail, education, commercial or residential spaces, our experts can help to carve out an individual roadmap for any business, helping to achieve operational excellence."

LG said the new location showcases such solutions as its DUAL Vane and Round Cassette air conditioners, each featuring the company's inverter technology. The DUAL Vane Cassette AC, LG said, utilises two individual vanes to deliver wider and more customised airflow, with fine angle control. The AC features LG's Safe Plus Insulation – an antimicrobial treatment that is applied to internal insulation components to prevent the growth of mould and provide cleaner, fresher airflow, it said. For businesses



LG Electronics officials flank Al Yousuf Electronics officials at the new showroom

seeking further air care, the DUAL Vane Cassette can also be fitted with an additional five-step filtration air purification kit, it added.

Alternatively, owing to its design, the LG Round Cassette air conditioner proves popular for businesses operating hotels, shops and restaurants, alongside other luxurious indoor spaces, where maintaining aesthetics and ensuring comfort are equal priorities, the company said. The shape of the Round Cassette AC enables it to cover a large surface area and ensures there are no blind spots, it said. With its increased airflow and detailed wind direction, cool air can be spread both evenly and widely around a particular space, it added.

Speaking on its VRF technology, LG said that visitors to the showroom can learn more about its Multi V5 outdoor unit, which it described as an integrated solution that provides maximum energy efficiency while minimising operational costs. The LG Multi V5 features Dual Sensing Control to detect humidity and temperature, optimising airflow accordingly, it said.

LG said the Multi V5 can reduce installation requirements by as much as 23% when compared to conventional

VRF models – proving to be a crucial differentiator as organisations seek to install new systems, renovate or expand. LG said the system can also be combined with its Hydro Kit and air-handling units to meet the demands of advanced treatments and specialised environments, such as those required in healthcare facilities.

LG said the showroom also highlights its BECON cloud Digital HVAC Management Solution. The Solution, it said, enables business operators to remotely monitor and control their systems in real-time, with reduced costs and shortened non-operating times.

The showroom also displays LG's range of PuriCare air purifiers, including the PuriCare Double Tower, Single Tower, Mini and Wearable. According to LG, the Double and Single Tower models feature a 360-degree Clean Booster, which rises and rotates to deliver clean air to every corner of the room. The LG PuriCare Mini is a portable air purifier, whereas the recently launched PuriCare Wearable is a device that features H13 HEPA filters and a respiratory sensor that detects the cycle and volume of the wearer's breath, deploying DUAL Fans at one of three speeds to optimise required airflow, the company said.

Leminar Air Conditioning Company signs partnership agreement with ARES PHE

Says it will be UAE distributor of Turkish manufacturer's AHRI-certified gasketed plate heat exchangers

By CCME Content Team



Leminar Air Conditioning Company has signed a distribution agreement with ARES PHE, Turkey-headquartered manufacturer of gasketed plate heat exchangers headquartered.

Making the announcement through a Press release, Leminar said that under the agreement, it will be the UAE distributor for ARES' complete range of plated heat exchangers. The two companies have been affiliated since 2017 in Kuwait, so the agreement further reinforces their partnership and plans for regional growth, Leminar added.

ARES has a global sales network, with offices in Russia and distributors in over 30 countries, including Kazakhstan, Malaysia and the United States, Leminar said. ARES' heat exchangers, which are ISO-, CE- and AHRI-certified, have been used in the HVAC, marine, power, food and chemical sectors for the past 17 years, Leminar said. ARES has supplied hundreds of units to signature projects, both in its home market and internationally, it added.

Commenting on the new signing, Arben Yabali, Business Development Manager, ARES PHE, said: "ARES' efforts for continuous improvement steer us towards discovering the most effective and innovative methods of heat transfer technology for our customers.

We look forward to strengthening our Middle East footprint through our agreement with Leminar in the UAE, a valued partner with whom we have enjoyed much success in Kuwait."

Pramodh Idicheria, Chief Operating Officer, Leminar Global, said: "As one of the most trusted and competitive regional players in the HVAC industry, our vision at Leminar is to partner with the best global brands so that we may keep pace with the growing demands of our customers and continue to deliver cutting-edge solutions and world-class products. The extension of our relationship with ARES to cover the UAE market is a natural and exciting development and will certainly help us to do just that."

Kartik Raval, General Manager, Leminar Global, added: "Leminar is proud to bring ARES' award-winning heat exchangers to our customers in the UAE. With 100% thermal performance and a range of available sizes, from DN32 to DN500, customers can be assured of receiving the optimum exchanger size for their specific needs. This offering is perfectly aligned with our strategy to guarantee competitive pricing while not compromising on product and service quality, catalysed by the recent economic downturn caused by the global pandemic."

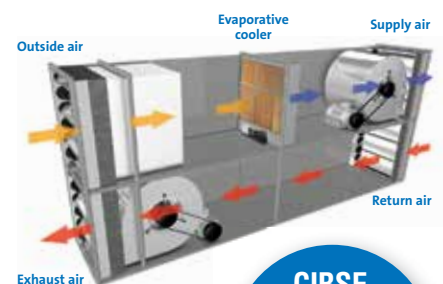


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Humidity Control and Evaporative Cooling



Honeywell announces ME region's first proof-of-concept project for its healthy buildings solutions portfolio

Company extends collaboration with Hamdan Bin Mohammed Smart University

By CCME Content Team

Honeywell announced today the Middle East's first proof-of-concept project for its integrated Healthy Buildings solutions portfolio at Hamdan Bin Mohammed Smart University (HBMSU) in Dubai.

Making the announcement through a Press release, Honeywell said these advanced technologies will support HBMSU's strategic goal of creating a healthier and safer environment for building occupants through the deployment of integrated air quality, safety and security solutions along with advanced analytics that monitor both the building environment and building occupants' behaviours.

Honeywell said its solutions help support business continuity and minimise the risk of disease transmission and the spread of other pathogens. The solution installed at HBMSU enhances indoor air quality, and also integrates security systems that analyse facility usage with thermal screening, social distancing and mask detection analytics, the company added.

Dr Mansoor Al Awar, Chancellor, Hamdan Bin Mohammed Smart University, said: "As the first accredited smart university in the UAE, we are committed to providing our learners, faculty and administrative staff with an environment that conforms to the highest standards of health, security and safety on our campus and supports business continuity. The launch of the first Honeywell project in the region demonstrates the effectiveness of integrated solutions for healthy buildings and is compelling evidence of the high international confidence in our University. It highlights HBMSU's commitment to adopting best practices that support sustainability within the education sector as well as harnessing the most advanced technology to provide better learning



Dr Mansoor Al Awar



George-Bou-Mitri

environments for innovators and creators of the future."

George Bou Mitri, President, Honeywell Building Technologies (Middle East, Turkey and Africa), said: "In the current environment, there is a greater need for building operators and managers to reassure occupants. Our Healthy Buildings Solutions at HBMSU will enable multi-level assurances for students and staff as they return. We're proud to partner with HBMSU as the first pilot project in the region and support its continued drive for sustainability and establishing regional best practice."

The deployment, Honeywell said, contributed to the International WELL Being Institute (IWBI) accrediting HBMSU with its WELL Health Safety Rating. It is the first university in the UAE and Middle East to achieve this milestone. HBMSU met all requirements for criteria, including cleaning and sanitisation procedures, emergency preparedness programmes,

health service resources, air and water quality management and innovation.

According to Honeywell, its Healthy Buildings solutions focus on two main elements: Facilitating safety and security and improving indoor air quality.

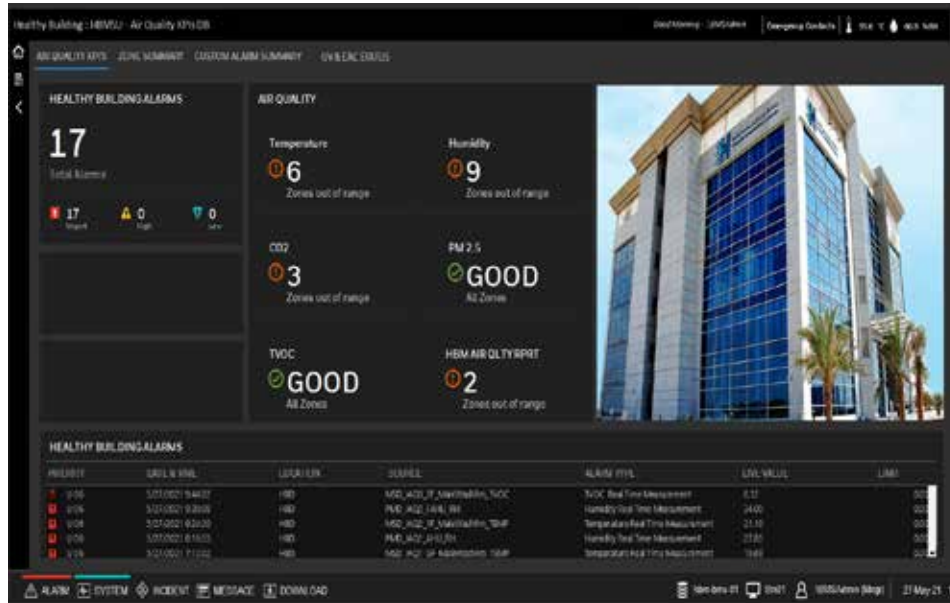
The key technologies deployed at HBMSU, the company said, include:

- Thermal cameras to detect elevated body temperature in building entrances, and deep learning video analytics with real-time alarms for non-compliance with masks and social distancing policies. The latter can be used by building owners and operators to adjust interior infrastructure and minimise close-contact hotspots.
- Indoor Air Quality sensors measuring temperature, relative humidity and contaminant concentration, with real time reporting to the Building Management System for adjustment of filtration, ventilation and other air quality parameters.

- Electronic Air Cleaner (EAC) with UV-C disinfection technologies, applied directly on existing building HVAC systems, which helps to improve air quality in two ways. EACs trap particles while UV lighting helps inactivate attached pathogens.

Central to these building systems, the Healthy Buildings Dashboard analytics provide real-time alerts to building owners and operators for dynamic decision-making of non-compliance issues or dealing with infection-related incidents, the company said. The dashboard can be provided to occupants in a simplified view to provide visibility into what is being done to improve the building environment's health and safety, it added.

According to Honeywell, the technologies were applied to HBMSU's existing building management system, which uses a third-party system, demonstrating the platform's open architecture and hardware-agnostic capabilities.



Honeywell said the proof-of-concept project is an extension of its collaboration with HBMSU to be its preferred technology provider. In early 2020 at HBMSU, the company launched Honeywell Forge Energy Optimization, a cloud-based, closed-loop, machine

learning solution that autonomously and continuously studies a building's energy consumption patterns and automatically adjusts to optimal setpoints for the building without compromising occupant comfort levels.

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Smart Farnek launches HITEK solution 4.0

Swiss Consul General to Dubai inaugurates Farnek's new command and control room in Jebel Ali

By CCME Content Team

UAE-based smart and green facilities management (FM) company, Farnek, today unveiled its new 24/7 command and control room, located in Farnek Village, the company's new staff accommodation centre in Jebel Ali.

Making the announcement through a Press release, Farnek said that through its 5G and Wi-Fi 6-enabled, operational 'nerve centre', it will be able to take advantage of increased bandwidth, ultra-low latency and enhanced security, to connect assets from multiple sites, so that they can be centrally monitored and managed.

This, Farnek said, will allow it to rollout connected and transformative applications of technology that not only uplift the face of FM digitalisation but also offer enhanced efficiency. This is achieved through the concept of a digitally connected workforce and customers, to its in-house stream of technically advanced and cost-effective solutions, utilising the Internet of Things (IoT), Cloud, Machine Learning (ML) and Artificial Intelligence (AI) based technologies, amongst others, the company said.

Following a tour of Farnek Village and the inauguration of its command and control room, H.E. Frank Eggmann, Consul General of Switzerland to Dubai, said: "I was particularly impressed with the innovative approach Farnek has taken by developing its own in-house 'Swiss made' technology. Equally impressive is the way this is being utilised, which will not only improve cost-efficiency but also has staff welfare and sustainability at its core. This is an excellent example of Swiss state-of-the-art technology at its very best."

According to Farnek, beyond operational efficiencies and sustainability, its HITEK solution 4.0 will save its customers significant amounts of money. The company said it has estimated that it can save up to 17% in manpower costs after traditional FM operational management has been transferred to HITEK's smart management.

In addition, through IoT sensors, there is the benefit of predictive and proactive



L-R: Markus Oberlin; Khaldun Aburok, Director of Business Development, Farnek; Javeria Aijaz; and H.E. Frank Eggmann

maintenance, which can reduce downtime and improve the lifecycle of assets, facilitating remote monitoring with a fully connected and mobile workforce, Farnek said.

Markus Oberlin, CEO, Farnek, said: "In the case of manhours, a centralised system can manage multiple sites, whereas operating a traditional Building Management System (BMS) could well require a series of operators in each building. In addition, they may not be experts in every aspect of facilities management and probably will not have the advantage of benchmarking property performance."

So far, Farnek said, its in-house technology team has developed initiatives, such as a smart washroom, wearable technology, eProcurement, telematic solutions, facial recognition as well as benchmarking and forecasting software to make buildings more sustainable.

Oberlin said: "As the technical specifications of 5G continue to evolve and expand that will capture and encourage even more advanced IoT and AI applications, which could start to become a reality, next year. So, we want to be ready to capitalise on these market opportunities, just as soon as the technology and connectivity is available.

"It is certainly going to take remote FM work to a whole new elevated level, enabling technicians to carry out tasks in either virtual reality or augmented reality environments, which are absolutely ideal for training purposes as well."

According to Farnek, standalone 5G deployment consists of user equipment – the RAN and NR interface – and the 5G core network, which relies on a service-based architecture framework with virtualised network functions. Network functions that usually operate on hardware, become virtualised and actually run as software, the company said.

Javeria Aijaz, Senior Director – Technology & Innovations, Farnek, said: "We have managed to develop our own 5G network infrastructure-based intelligent and connected platforms, which has its own cloud-native network core, which connects 5G New Radio (NR) technology, and non-standalone (NSA) infrastructures, which still partially rely on existing 4G LTE infrastructure.

"Until Etisalat and Du are able to build out the independent infrastructure needed for 5G, our approach uses a combination of 5G Radio Access Network (RAN), 5G NR interface, and existing LTE infrastructure and core network to provide a 5G-like experience."

The Big 5 returns to Dubai as a live event

Global construction players to reconnect in person to support the MENA region's USD 5.06 trillion future project market, the organisers say

By CCME Content Team

The Big 5 will return to the Dubai World Trade Centre from September 12 to 15 as a live, in-person event, dmg events, the organisers said through a Press release. Among the various tracks are the HVAC R Expo, The Big 5 Solar and FM Expo, dmg added.

Celebrating its 42nd year, the event has so far confirmed more than 1,000 exhibitors from 45 countries and will include 20 country pavilions, dmg said.

MEED Projects, the Projects Data and Intelligence Partner of the event, in a recent report revealed that the Middle East and Africa region saw USD 163 billion worth of contracts awarded in 2020, despite the impact of COVID-19, dmg said. USD 1.9 billion worth of projects are currently in execution in the region, dmg further quoted MEED as saying.

Josine Heijmans, Vice President, dmg events, said, "With USD 5.06 trillion worth of projects planned and unawarded across all sectors in the Middle East and Africa construction market, it is more important than ever to offer a safe environment for the regional and international community to come together, where they can boost business activities, rebuild partnerships and discuss vital lessons learnt – all in one place."

According to dmg, The Big 5 will welcome exhibitors across nine specialised events this year, offering visiting professionals the chance to source the latest industry innovations

for any stage of the construction cycle. Heavyweights signed up to exhibit include Climatech, Zamil Air Conditioning, Caparol, Soudal, Saudi Ceramics, MAHY Khoory and Emirates Steel, dmg said.

Christian Witsch, CEO, Gulf Extrusion, said: "For many years, we have been representing our products and innovations at The Big 5, which is a very important and great event for our industry. After one year of interruption due to COVID, we are very excited about the possibility to meet and engage with our important customers and the interested community about our products at The Big 5, once again."

The event will also feature 'Start Up City', where the most innovative, disruptive, and agile players in the market will showcase technologies transforming the construction industry, and the new 'Digital Construction World', which will provide a central hub on the show floor for construction technology, dmg said.

According to dmg, the event will feature high-level summits, including the highly anticipated Global Construction Leaders' Summit, the Future of Facades Summit and the FutureTech Construction Summit, all designed to shed light on crucial developments in the construction sector, covering all aspects of the industry from facades to building technology, whilst exploring long-term opportunities on the horizon.

The Big 5 will also host a series



comprising 70 CPD-certified Industry Talks, encompassing all disciplines in the construction industry, such as Architecture & Design, Project Management, Technology and Sustainability, to support learning, inspiration and collaboration within the construction community, dmg said.

Priscilla Joseph, Sustainability Project Engineer, KEO International Consultants, said: "The Big 5 offers the opportunity to learn, debate, and source products from industry experts. With global exhibitions back in Dubai, and all safety protocols being followed, I am excited to be part of the features and events at the event, and for the global construction community to reconnect once again."

Another feature of the event is 'The Big 5 Women in Construction Awards', which dmg said will highlight the positive socio-economic impact a gender-balanced workforce has on transforming the construction industry. Yet another feature, dmg said, is 'The Big 5 Impact Awards' which has been newly created to recognise sustainable development, and technological and digital achievements in the construction industry.

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ASHRAE opens registration for Building Performance Analysis Conference

Event slated to be its first hybrid conference, Society says

By CCME Content Team

ASHRAE opened registration for the 2021 ASHRAE Building Performance Analysis Conference, between November 10 and 12 in Denver, Colorado.

Making the announcement through a Press release, ASHRAE said it will be its first ever hybrid conference, where virtual attendees will have access to live sessions, participate in speaker Q&A as well as interact with virtual and in-person conference attendees. The theme of the conference, "Design and Operation for Resilient and Healthy Buildings", focuses on the practices of energy modeling and building performance simulation using existing simulation tools, software development, and future simulation research and applications, ASHRAE said.

"The past year has brought forward

new challenges for the design and operation of new and existing buildings, in particular challenges related to the health and well-being of occupants," said John Bynum, Conference Chair. "This conference will provide an opportunity for building professionals across disciplines to share and learn about these topics and many others, as we continue to work towards a better built environment."

According to ASHRAE, conference attendees will learn from more than 60 presentations by leading industry practitioners and academic researchers on topic such as machine learning, exascale computing, data visualisation and zero-carbon initiatives, along with advanced techniques, innovative workflows and future trends in building performance modelling.

The conference will also feature the 7th annual ASHRAE LowDown

Showdown modelling competition, ASHRAE said, adding that 10 teams, with members from across the globe, have signed on to compete in this year's competition. Teams comprise building analysts, designers, architects, engineers and other participants, and will be responsible for creating the architectural design and a performance analysis model based on model building data, ASHRAE said. The teams may use any software, or a combination of software, to complete their projects. The 2021 competition will ask teams to expand their comfort zone and take on the challenges of a tropical climate with particular challenges for resiliency and "near net zero" design, ASHRAE said.

ASHRAE urged those interested in attending to visit ashrae.org/BuildPerform2021 and ashrae.org/2021lowdownshowdown.

GrayWolf announces introducing smart IAQ and toxic gas probes

The devices connect directly to smartphones, company says

By CCME Content Team

GrayWolf's DirectSense II probes will now connect via Bluetooth LE wireless to Apple and Android devices, the company announced through a Press release.

GrayWolf said its DSII probes for Indoor Air Quality (IAQ) and toxic gas testing and monitoring will imminently have Apps for iOS and Android operating systems available free on the Apple and Google App stores. It added that it is possible to use a smartphone or tablet as a multi-parameter display or data-logger.

The company said that users can

choose from over 25 smart IAQ, green building, industrial hygiene and HVAC sensors, including TVOCs (PID), Carbon Dioxide (NDIR), Ozone (electrochemical), CO, NO₂, NH₃, SO₂, NO, Cl₂, H₂S, HCN, HCl, O₂, H₂, %RH and °C/°F. Each probe, the company said, accommodates from two up to eight true plug-and-play sensors into a single handheld, desktop or wall-mounted housing. The sensors offer low limits of detection and exceptional accuracy, the company claimed, adding that the CO₂ sensor, for example, leads the IAQ industry at +/-35ppm over the key range, starting from 350ppm to 2000ppm (while +/-3% of reading above that up to 10,000ppm for CO₂ toxic exposure use).



As monitoring IAQ parameters is a core application for GrayWolf, extensive development effort was put into assuring that the sensor smartboards would not introduce noise or degrade accuracy, stability or limits of detection (LODs) for the convenience of end-user swappable sensors, the company said. Other manufacturers, it pointed out, have prioritised convenience over performance.

Bitzer has a new CEO

Company's Supervisory Board appoints Christian Wehrle for the post

By CCME Content Team

The Supervisory Board of Bitzer has appointed Christian Wehrle, long-standing member of the Executive Board and Chief Operations Officer, as CEO and Chairman of the Executive Board with immediate effect, the company said through a Press release. At the same time, the Board appointed Rainer Große-Kracht, member of the Executive Board and Chief Technology Officer, as Vice Chairman of the Executive Board, the company added.

According to Bitzer, Wehrle will remain in charge of operations as Chief Executive Officer (CEO), Große-Kracht will continue to act as Chief Technology Officer, Martin Büchsel as Chief Sales and Marketing Officer and Frank Hartmann as Chief Financial Officer.

Almost six years after the death of her husband, Peter Schaufler, Senator h.c., who was the leader and CEO of the

company, the time has come for Christiane Schaufler-Münch, Chairwoman of the Supervisory Board of Bitzer SE, to realign the board structure for the future, in order that the company always remains able to act, and that the future development of the Bitzer Group is stable, the company said.

“Customer focus, values such as long-term thinking, partnership-based cooperation and loyalty to stakeholders as well as sustainability have shaped Bitzer in the past and are firmly anchored in its corporate culture, Wehrle said. In this spirit, he added, he wanted to continue managing and setting the course of the company together with his three board colleagues.

According to Bitzer, Wehrle joined the company in 2001 as Plant Manager, first in Sindelfingen, and as of 2003, in Rottenburg am Neckar, in the International Competence Centre for screw compressors. In 2007, he took over the management of the Bitzer production sites,



Christian Wehrle

Source: Bitzer

worldwide, as Chief Production Officer, the company said. Since mid-2015, he has been in charge of the entire supply chain of the Group as Chief Operations Officer, the company added.

As Chief Technology Officer, Große-Kracht is responsible for research and development, worldwide, Bitzer said. He has over two decades of experience in the refrigeration and air conditioning industry and has been working for the company since 1997, it said. In 2018, it added, he was elected Chairman of the Association of European Refrigeration Component Manufacturers (ASERCOM).

Frascold upgrades its test laboratory for R290 and CO₂ compressors

Investment includes new testing benches for propane, with an upgraded calorimeter and CO₂ endurance system, company says

By CCME Content Team

Frascold said it has upgraded its test laboratory for R290 and CO₂ compressors.

Making the announcement through a Press release, the company described the laboratory – situated at its production site, in Milan – as one of the most advanced of its kind. The strategic investment plan in the laboratory, it said, includes new testing benches for propane, with an upgraded calorimeter and CO₂ endurance system. The systems, added to the existing test benches, make the testing room an authentic centre of excellence, the company said.

The main innovation in the testing room, Frascold said, is the endurance/calorimeter for propane compressors, which allows different performance parameters to be tested and new

prototype components to be checked for efficiency. The company described the set up as a system dedicated to personnel safety, thanks to the numerous measures adopted, such as installation outside the building and the use of only ATEX components. Another advantage of the laboratory, the company claimed, is the possibility of using a single system to test a broad range of sizes of semi-hermetic compressors – from 30 to 300 m³/h, which correspond to cooling capacities up to 300kW, as well as other elements, such as the regulator and the flow switch intended for ATEX compressors.

Frascold also pointed out to the calorimeter for carrying out performance tests of CO₂ compressors, in compliance with the two reference standards: UNI EN 12900: 2013, which specifies the rating conditions, tolerances and method of performance data presentation, and UNI EN 13771-1:2017, which covers in

detail the performance test methods for compressors, which must be conducted in terms of refrigerating capacity, power absorbed, refrigerant mass flow, isentropic efficiency and the coefficient of performance.

Frascold said it has upgraded its Endurance system for CO₂ with the aim of carrying out life and durability tests on compressors under stress, to replicate real-field operating conditions and, thus, ensure maximum reliability of the entire range of transcritical compressors.

“With the aim of reducing the carbon footprint of the entire sector and meeting the stringent European and worldwide, which impose a drastic reduction of HFC, the industry-based actors are strengthening the development of systems which use refrigerants with low GWP,” said Marco Perri, R&D and Technical Support Manager, Frascold. “Frascold is one of the promoters behind this change and is investing accordingly in R&D and in its laboratory, with the aim of launching new generations of compressors and testing the existing ones, with alternative refrigerants, whether natural or HFO, capable of meeting the demand for sustainable, safe and high-performance solutions.”

LU-VE GROUP delivers 500 unit coolers for China logistics centre

The Nansha International Logistics Centre is one of the largest hubs in the world, serving cold chain needs of imported and exported products, company says

By CCME Content Team



The LU-VE Tianmen Team

LU-VE Group said that it has completed the delivery of 500 unit coolers for the expansion of the Nansha International Logistics Centre, one of the largest logistics centres in the world, at the port of Nansha, which serves the Guangzhou (formerly Canton) area in the Pearl River Delta.

LU-VE said that after about two years of work, the Centre raised a mega complex, consisting of six buildings for the storage of refrigerated goods, with a capacity of about 500,000 tons, which will expand the Port of Nansha, one of the five largest infrastructure projects in the world for container traffic. The complex will serve the cold chain (inspection, storage, processing, packaging and distribution) of the Jiangnan Fruit Market in Guangzhou and all major urban conurbations from Shenzhen to Hong Kong and Macao, in the Zhū Jiāng (or Pearl River) Delta, LU-VE said. It will be used for fresh fruit and vegetables imported into China from all over the world, especially from North America and South America, and for frozen products destined for export (mostly fish products), it added.

“In January 2020, our Tianmen plant was the first of our Group to suffer the negative effects of the pandemic,” said

Iginio Liberali, President, LU-VE Group. “It reopened in March, and since then our production has continued to accelerate in order to serve a rapidly and steadily growing market. Our presence in China is central to LU-VE’s internationalization strategy, due to its great potential for expansion. This new contract provides excellent support for our operations in the country. My applause goes to the whole Chinese team who managed to overcome difficulties, returning stronger and more performing than before.”

Most of the unit coolers – numbering 450 – that the LU-VE Tianmen plant, in Hubei Province, supplied belong to the LHS (Large Hitech Surface) industrial range, LU-VE said. The units use glycol water as refrigerant and are intended for cold rooms for storing products with high moisture content and for freezing (temperatures between -10 degrees C and -30 degrees C, the company said. Other compact unit coolers from the FHC commercial range, which the company claimed are characterised by quiet operation and low energy consumption, are instead installed in the cold rooms for fresh products (positive temperatures) or frozen products (temperatures below or equal to -18 degrees C.

Nidec Leroy-Somer announces the launch of LSA 47.3

Industrial alternator provides increased performance and an optimised cooling system, company says

By CCME Content Team

Nidec Leroy-Somer has launched the LSA 47.3 industrial alternator, which the company said offers increased efficiency and starting kVA over its predecessor, and also benefits from the implementation of the latest technologies it has developed.

Making the announcement through a Press release, Nidec Leroy-Somer said the LSA 47.3 delivers a rated power between 410 and 660 kVA at 50 Hz (495 to 825 kVA at 60 Hz). The 660 kVA rating (825 kVA at 60 Hz) was previously held by the LSA 49.3. Thanks to the cooling circuit optimization, the LSA 47.3 is now able to reach this power node for prime and demanding applications, the company claimed. This is a significant benefit for generator set manufacturers, as the same power is made available through a more compact machine, it added.

The LSA 47.3 alternator features a SHUNT excitation system with a R250 regulator as standard, the company said. An AREP auxiliary winding excitation system with D350 digital regulator version is also available to improve transient performances and provide high overload capacities, it said. A D550 digital regulator can also be used for grid connected applications, it said. A Permanent Magnet Generator (PMG) excitation system is also available as an option, it added.

According to Nidec Leroy-Somer, the LSA 47.3 is fully interchangeable with the LSA 47.2 (shaft height and feet configuration), and can, therefore, be coupled with all diesel engines on the market for this power range.

The alternator, Nidec Leroy-Somer said, is optimised for prime and demanding applications, such as marine and cogeneration. It offers an efficiency of up to 95.7% at $\cos \phi$ 0.8, which ranks it among the best in the category, the company claimed.

Johnson Controls launches OpenBlue Net Zero Buildings as a service

Company says it will provide a one-stop shop for companies looking to achieve net-zero-carbon and renewable energy goals

By CCME Content Team

Johnson Controls (JCI) today announced OpenBlue Net Zero Buildings as a service. The company said it will provide a one-stop shop for companies looking to achieve net-zero-carbon and renewable energy goals. It added that the offering recognises customers' need for assistance in making these goals easier to plan, execute, track and achieve.

"The need for making net-zero leadership easier to achieve is immediate and greater than ever," said George Oliver, chairman and CEO of JCI. "Buildings represent about 40% of global emissions, and Johnson Controls is uniquely positioned to help customers around the world pursue their net-zero-carbon goals. Our proprietary research echoes the demand, prioritization and urgency for support that businesses, governments and global leaders are calling for. Our As a Service model looks to provide our customers with guaranteed outcomes and risk management models to achieve emission reduction commitments that ultimately lead to healthier buildings, people, places and the planet."

JCI said that to ensure alignment with the needs of customers and prospects, in May 2021, it commissioned a survey of 1,046 North American professionals responsible for building operations, facilities management and energy & sustainability management across various industry verticals and building types. Over 90% of respondents have significant goals to reduce carbon emissions and energy consumption by 2030+ with over 60% of respondents targeting a 50% or greater reduction, it said. Goals include increasing building performance and value, positively impacting the surrounding community and talent attraction and retention, it added.


According to JCI, the OpenBlue Net Zero Buildings, as a service portfolio, includes a full spectrum of sustainability offerings tailored to schools, campuses,


data centres, healthcare facilities as well as commercial and industry players. Understanding the market trends, unique industry requirements and investment pitfalls is an important element in making large sustainability decisions, it said, adding that it helps customers stay abreast of important trends and technology innovations that feed into a customised roadmap highlighting opportunities and managing risks and uncertainties against a rapidly changing regulatory environment.

Additional results from the survey, the company said, revealed that respondents' top five solution pathways and also their drivers for sustainability and net-zero lean into As-a-Service capabilities, including improving energy efficiency, integrating onsite renewables, electrifying buildings, incorporating offsite renewables and adding grid interactive capabilities. However, it said, almost all respondents are facing challenges across these solution pathways while also feeling pressure to move quickly. Over 90% of respondents, it said, plan to pursue a LEED certification and yet run into challenges with measuring emissions, the largest being how to aggregate data from multiple sources. Digital solutions are needed to solve this and other measurement challenges, it added.

Supporting this need, Johnson Controls said it has created a new offering, called OpenBlue Net Zero Advisor. It will deliver real-time, AI-driven tracking and reporting of sustainability metrics, helping facility managers ensure and prove the net-zero-carbon reduction and renewable energy impact of their buildings, it said. Based on criteria, such as LEED certification, the new technology automatically gathers and analyses data about energy, water, materials and greenhouse gas emissions involved in every phase of a building's lifecycle and proves CO₂ reductions, renewable energy and efficiency gains, it said, adding that this will generate energy and environmental outcomes from improving building operations.

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Dunli launches B-Max backward-curved centrifugal fan

Company says the fan has been developed for high-end HVAC unit applications

By CCME Content Team

Dunli has launched the B-Max backward-curved centrifugal fan, which the company said is developed for high-end HVAC unit applications. Making the announcement through a Press release, the company added that the impeller, motor and controller of the fan were designed afresh to bring customers a better experience.

Describing the characteristics of the fan, Dunli said it:

- Is a one-piece solution, where the motor, impeller, inlet ring, supporting rack and mounting plate are matched and assembled perfectly into one piece. This feature, it added, enables ease of assembly for the customer.
- Has excellent efficiency, including industry-leading static pressure efficiency, which meets ErP2020 Standard requirements; an aerodynamic efficiency as high as 75% and above; and EC motor efficiency that meets IE4 standard.
- Has an optimised aerodynamic



airfoil-shaped blade design through using CFD technology; and industry-leading noise level. These two features, it added, are the outcome of 40+ reliability tests that were performed.

- Has various control functions, including 0-10VDC (15VDC)/PWM signal control; phase-missing, over-current, over-voltage, over-



temperature protections and signal control and fault alarm functions; and 485 communication function with MODBUS-RTU interface to monitor working, stop, speed and malfunction of the motor status.

- Has wide range of applications, wherein it can be widely used in AHUs, data centres and precision air conditioning



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