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September 2021

**LICENCE
TO CHILL**

**TROUBLE-
SHOOTING CHILLER
PROBLEMS**

Dan Mizesko, US
Chiller Services

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**PUMPS AND
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**PAY-WHEN-PAID
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BSA Ahmad bin Hezeem
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**ALARM
ANNUNCIATORS
AND SCADA**

Omniflex

**SMART GRIDS AND
CLIMATE CHANGE**

Schneider Electric

'ARBITRARY CONCLUSIONS'

**Daikin, Hisense, Lexzander: 'No place for inaccurate
observations about VRF systems'**

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Why we do what we do

In the July 2021 issue of the magazine, Dan Mizesko, writing his monthly column (Licence to Chill), dismissed variable refrigerant flow (VRF) systems as inferior in their energy performance when compared to chilled water systems, and raised doubts over their operational safety. In doing so, he opened a can of worms, his words attracting criticism as being inaccurate in the portrayal of VRF systems.

Having given Dan space to express his views in the magazine, it was only right to invite proponents of VRF systems and even a contractor to have their say. Their responses became the basis of this issue's cover story. Hope you take the time out to read it from A to Z.

Dan will be among the interested readers and already has expressed his desire to respond.

Now, lest you think we at *Climate Control Middle East* are taking delight in playing one camp against another, please allow us to assure you that nothing could be farther from the truth. Our responsibility as a publishing house, as journalists, is to provide equal opportunity to all. We are equipment-agnostic, our overriding concern being the outcome of providing comfort cooling or industrial cooling – or heating – among other applications, in a safe, affordable, environmentally friendly and aesthetically pleasing manner.

The same set of objectives governs the giving away of trophies during the annual Climate Control Awards. With earnestness as our bedrock characteristic, our fundamental aim is to encourage the development of the best of technological, business, finance and policy solutions and strategies.

In end-August, towards that aim, a team of invited judges met with those that had submitted applications to the 11th edition of the Awards to find the most excellent among them. The meeting was an exhausting exercise of intense scrutiny of intent and application. The responsibility was immense, because in the selection of winners the Awards exercise was sending out a powerful message that integrity, untiring effort and relentless pursuit of improvement are cherished ideals.

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BIDEN'S SLOGAN

With lifestyles changing, with ever more people transferring to the consumer class of the world and with greater lifespans, the need to build will not dissipate, says **Krishnan Unni Madathil**, adding that the challenge lies in determining “how to make it better”



US President, Joe Biden's signature campaign slogan could alternatively be taken as a rallying call for a world that has seen just too much trouble in the space of a few summers. Or, it could be taken as that last hurrah before the world sinks into even more despair. How you take it depends on your personal convictions.

I would classify myself as a cautious but indefatigable optimist. And I suppose that is the required mentality for the times we are going through. We are in the second year of what is shaping up to be an epoch-changing pandemic. The great tide of global prosperity that swept the world for about three decades after the fall of the Soviet Union, and the onset of turbo-charged globalisation seem to be fraying at the edges, with the colour of uncertainty stretching much farther into the core waters. In its wake are left high and dry the aspirations of several hundreds of millions of souls.

Dubai, in the Middle East, has been one of the children of this era of global openness, commercial freedom and profit-driven cooperation.

Multilateral cooperation and participatory problem-solving, which has led to the lifting out of material poverty of almost a billion people, seems to be straining as never before. The first crisis of the 21st century – the financial meltdown of 2008 – set the stage for a series of

trends that have yet not fully abated more than a decade after its occurrence. Suffice it to say, confidence in established notions and received wisdom has been wearing off for some time; to the point where it can be said that none exists.

But the problems have not gone away. Indeed, new ones are cropping up, which call upon us to develop solutions for it in ways never imagined before.

Can we build back better?

If one talks about technological feasibility, then of course, we can. If anything can be learnt from the experience of the white-hot economic growth of China these past few decades, it is that humans can build. And how!

The question is, with strained national budgets and weakening financial credibility brought about by factors man-made as well as natural – the line is increasingly blurred – whether what is being built back counts for productive or real growth.

It is not enough anymore to build merely for the sake of building. “Build and they will come”, one of the favourite slogans of the heady days, will still be feasible, but not so straightforwardly. It increasingly depends on what you are building, what the net impact on the environment is, whether what is being built can be afforded to be bought, whether it can withstand the onslaught of technological changes as well as

new work practices – such as remote working – becoming mainstream, whether they contribute to overall physical and mental well-being of the users of the built structures and whether, very importantly, it is interfering with the environment in a significant manner thereby contributing to accelerated climate change.

One supposes that the answer to these rests fundamentally with a related question: Does humanity need more building? And the answer to that is a resounding “yes”. With lifestyles changing, with ever more people transferring to the consumer class of the world and with greater lifespans, the way forward is to determine “how to make it better”.

Existing structures have to be refurbished, new structures have to be conceived, mistakes have to be rectified and efficiencies created where they were previously absent.

And more people, more than ever before, want to live a life that is not merely satisfactory for themselves but also wish to leave as small an environmental footprint on the earth they will bequeath to posterity. This sentiment has been relayed quite emphatically with the declaration of the goals of the COP26 UN Climate Change Conference, scheduled to take place in November in Scotland, and the centrality of human activity-based climate change in the global conversation.

I get Biden. He wants to build back better. But he is not alone. And neither is he the first one doing this. What is the Saudi Vision 2030 programme if not in the spirit of Build Back Better? Indeed, there it may be a case of "Build for the Future". In the same spirit, the Egyptians are building an entire new capital. The Chinese, not content with building up their own country, now want to build up much of the rest of the world, as well, through their Belt and Road Initiative (BRI). The National Infrastructure Pipeline (NIP) in India is also based on similar lines of thinking. And so much more. The financial resources being committed to these ventures amount to the trillions of US dollars over a multi-year period in the medium term.

Needless to say, much of humanity has been hit on the chin like a stinger from Mike Tyson by the coronavirus pandemic. Work patterns have been disrupted, and several projects have been delayed or rendered frozen. Entities that were relying on a ceaseless pipeline of payments to fund their priorities have also

been upstaged, causing them to bleed resources, in the form of the workforce, or to cease operations.

Though we are yet to hear of a wholesale meltdown in the global economy, the pain felt is more chronic than acute; and the pain is much more dispersed than concentrated, as it was in the nearest experience of an economic depression which we had in recent years – the 2008 burst. In short, more people would feel the pain for longer.

Not several are the opportunities in the world when we all get to indulge in a collective exercise of self-correction. But the current scenario presents just such an opportunity. Doubtless, several entities would perish for reasons unmerited as well as merited, but there would be several that outlast the temporary crises.

Those would be the ones that would reassess their core competences, refashion their strategies in light of changed circumstances and work hard to stay relevant in a world where operating procedures are no longer standard. They

are the ones that would shed excess luggage, will become leaner, and more productive and efficient.

The entities that emerge on the other side of the challenges – whenever that may be – would be leaner, tougher and more in tune with the requirements of the new epoch. They are the ones that would have been humbled by experience. They are the ones that would have learnt, the ones that would have been born anew. They would build back, and they would build back better. **ccme**

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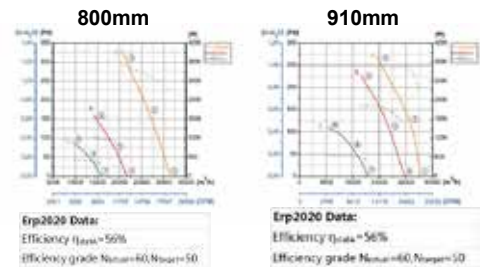


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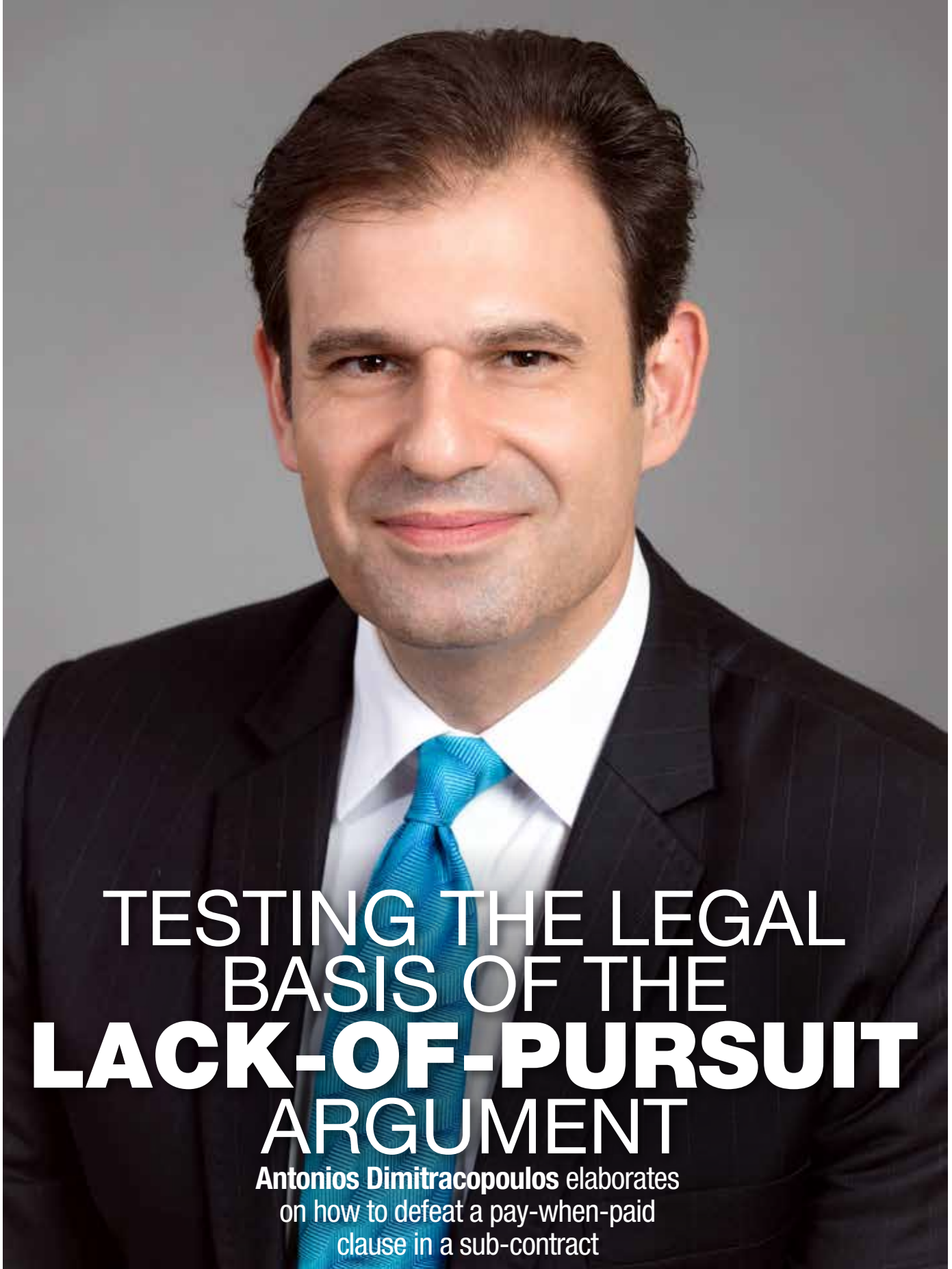


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TESTING THE LEGAL BASIS OF THE **LACK-OF-PURSUIT** ARGUMENT

Antonios Dimitracopoulos elaborates
on how to defeat a pay-when-paid
clause in a sub-contract

One of the most daunting prospects for an MEP sub-contractor – or, indeed, any sub-contractor – is the possibility of being held ransom to a pay-when-paid clause.

Quite commonly included in MEP sub-contracts, this clause effectively dictates that the MEP sub-contractor will receive payment only within a given period of time, usually around 14 days, after such payment has been actually received by the main contractor. This type of provision is usually interpreted by main contractors as a carte blanche to simply avoid making payments due to the MEP sub-contractor, unless and until the corresponding payment has been received from the employer.

Under normal circumstances, this type of provision is nothing more than administrative in nature and should not cause any problems. However, in instances where there is an underlying dispute between the main contractor and the employer, delays in payment may ensue, which could indirectly affect the MEP sub-contractor. In those instances, it is understandably a source of significant frustration for the MEP sub-contractor to not receive payment for work carried out and to also not have a clear and transparent line of vision on the negotiations between the main contractor and the employer.

The good news for MEP sub-contractors is that pay-when-paid clauses are not as undefeatable as they appear to be. In legal proceedings, it has been possible to argue on behalf of an MEP sub-contractor that the main contractor's lack of pursuit of the MEP sub-contractor's claim was in breach of the sub-contract, as well as in breach of the principle of good faith. This is so even in instances of additional complexities being present, where, for example, the dispute resolution clause, under the MEP sub-contract, allowed the main contractor to suspend any proceedings that the MEP sub-contractor commenced against it, pending resolution of any corresponding dispute that the main contractor had with the employer.

It is predictable that the main contractor's position is almost always likely to be that any amounts claimed by the MEP sub-contractor would never become due before they are actually



If the only condition to an MEP sub-contractor's payment is time-dependent, it may not be sufficient for a main contractor to simply plead non-payment by a party further up the contractual chain, usually the employer

received by the main contractor from the employer. Thanks to many MEP sub-contractors' reluctance to accept this as a valid justification for an indefinite delay in payment, it became possible to test the legal basis of the lack-of-pursuit argument.

Specifically, in seeking to defeat the pay-when-paid clause, it has been possible to argue that a main contractor cannot avoid nor delay payment simply because it has not received corresponding payment from the employer. The reason argued for this was that it is irrelevant whether payment from the employer has been received by the main contractor, to the extent that:

- a. The project was complete or has been terminated, and;
- b. The main contractor demonstrated no attempt to legally pursue and obtain from the employer payment of the MEP sub-contractor's dues.

It has also been possible to argue on behalf of an MEP sub-contractor that the pay-when-paid clause simply served

to bridge the gap of a lack of privity of contract between it and the employer. In other words, the pay-when-paid clause normally amounts to an undertaking by the MEP sub-contractor to bear the risk of a delay in payment but not the risk of non-payment.

Therefore, given the lack of privity of contract, the consideration that the MEP sub-contractor must enjoy, by agreeing to the rather unenviable pay-when-paid clause, is that:

- i. The main contractor must adopt the MEP sub-contractor's claims for payment, as if they were its own and,
- ii. The main contractor must then pursue them with the employer, again as if they were its own.

Any failure to do so, it has been argued on behalf of the MEP sub-contractor, must prohibit the main contractor from relying on the pay-when-paid clause, thus rendering it directly accountable to the MEP sub-contractor for the amounts it claimed. ▶

It is predictable that when faced with this line of argument, a main contractor may seek to submit in its defence that:

- a. The express terms of the MEP sub-contract state that any payment to the MEP sub-contractor was conditional upon its receipt by the main contractor;
- b. That such payments have not been received, hence the MEP sub-contractor's resorting to legal proceedings would be premature and in circumvention of the clear and express payment terms of the MEP sub-contract;
- c. The MEP sub-contractor would normally be fully aware of the risk it agreed to in respect of payments and that by doing so, it also accepted to bear the risk of non-payment and, finally, that;
- d. If an MEP sub-contractor were successful, this would lead to a situation whereby it would receive payment for amounts that are not due in accordance with the express terms of the MEP sub-contract.

These defences have been proven to be unconvincing in practice, thus prompting main contractors to demonstrate some semblance of an actual effort to pursue payment from the employer, which may, in turn, lead to a possible suspension of any legal proceedings, pending developments of such pursuit.

Even this approach, however, may only buy some time for the main contractor and serve as a dilatory tactic.

It is unlikely, however, to constitute an absolute defence, unless formal legal

proceedings are proven to have been commenced by the main contractor against the employer, properly pursuing the MEP sub-contractor's claims.

Even in that instance, the main contractor would ordinarily be requested to substantiate how the MEP sub-contractor's claims are being pursued, in terms of the arguments raised and the technical evidence submitted.

Therefore, by adopting the lack-of-pursuit defence, an MEP sub-contractor is likely to achieve one of two objectives:

- i. Either to defeat the pay-when-paid clause on the basis that the main contractor failed to pursue the MEP sub-contractor's claim and, in this way, obtain an award, judgment or – as is most likely – a settlement in its favour. or,
- ii. Force the main contractor to be forced to commence proceedings against the employer and, in this way, pursue the MEP sub-contractor's claim.

In reality, if a main contractor is inclined to pursue its claim legally against an employer, it would do so in any event, and it would be unlikely that it would wait to be faced with legal proceedings against it by the MEP sub-contractor.

Hence, the first possible objective of an award, judgment or settlement is the most likely one to be achieved in practice.

To conclude, it is critical to consider the operation of a pay-when-paid clause from the perspective of the parties' actions. These clauses are certainly not undefeatable and may very well result in a successful outcome for MEP sub-contractors, as long as a strategic

approach is adopted.

If the only condition to an MEP sub-contractor's payment is time-dependent, it may not be sufficient for a main contractor to simply plead non-payment by a party further up the contractual chain, usually the employer. This is because an implied obligation exists on the part of a main contractor to pursue the rights and entitlements of any sub-contractor. This implied obligation is that a main contractor must carry out with every means that the sub-contractor would, if it could enjoy a direct contractual relationship with the employer.

It is also significant to note that a sub-contractor must not base its claim simply on a mere lack of payment. Rather, the sub-contractor's claim should be presented as a failure on the part of the main contractor to pursue the sub-contractor's claims, coupled with a continued pressure on the main contractor that it demonstrates that such pursuit is purposefully made. [ccme](#)

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In the July 2021 issue of *Climate Control Middle East*, empanelled columnist, Dan Mizesko, in his article, 'Don't believe the hype about VRF systems', asserted that chilled water systems are more efficient than VRF (variable refrigerant flow) systems, adding that the data proves the claim. (The article is available at www.climatecontrolme.com.) Here, two manufacturers of VRF systems and an MEP contractor present their side of the argument...

'ARBITRARY CONCLUSIONS'

VRF systems have a strong case going for them and deserve accurate observations, argue **Utpal Joshi, V. Sekhar Reddy and Dharmesh Sawant...**



Utpal Joshi

*Consulting Sales Director, Daikin
Middle East and Africa:*

Dan Mizesko's article was, indeed, an interesting one, but I would like to clear the air on behalf of all VRF/VRV industry professionals. At Daikin, we take pride in having introduced VRV systems, in 1982, and are equally happy to chronicle the addition of numerous innovations that have ensured high performance characteristics.

If you have not read Dan's article, here is an executive summary:

- The author believes that only a chilled water system can provide better efficiency – no matter what type of project it is applied to.
- He contends that R410A entering the system could pose the threat of asphyxiation but also accepts that ASHRAE Standard 15 can be used to check if this could be a problem.
- The author points out that the global warming potential (GWP) for R410A (VRV) is 2,088, whereas the GWP for R134A (chiller) is 1,430.
- The author points to other issues, such as a dedicated fresh-air-handling unit (FAHU), long piping and joints, a fan-coil unit (FCU) in each room, long drain piping, quick heat-up of fresh air and the maximum allowable refrigerant concentration. He further says that in case of a leak, the new refrigerant needs to be replaced in full.
- Later in the article, the author accepts that VRV systems are suitable for small buildings but questions the pipe length, temperature and maximum load, which can decrease the efficiency of VRV systems.
- He says that the cost of a chilled water system is lower than that of a VRV system. He says that actual efficiency claims of VRV systems are difficult to verify in the absence of data and that a variable-pump chilled water system is better.



Further to Dan's words, I would like to offer my perspective on VRV systems vis-à-vis chilled water systems...

Chilled water systems are right up there in terms of technological prowess, but there are certain factors that dictate their performance:

- For example, chilled water systems are deemed to be practical for a minimum capacity of 100 TR, and only on availability of a stand-by chiller. VRV systems, on the other hand, constitute multiple modules of 6-20 HP, which make up the total building load; such an arrangement provides great flexibility for designers and end-users.
- A chilled water system requires a dedicated fixed plant room space for the chiller and pump room. And did you know that a space of 1,500-1,800mm is recommended between two chillers? VRV systems, on the other hand, can be accommodated in a flexible space around the building, freeing up usable floor space.
- Diversity of load is a hallmark with chilled water systems. It is equally a noteworthy feature in the case of VRF systems, which can boast of a combination of 50-130%. ▶



- In the case of a large community – comprising groups of buildings that may come up in different phases or, once ready, may have different loads – providing a central chilled water plant will require an underground piping network to be installed as infrastructure, along with a continuously working pumping system and a heat exchanger at each building, with a lower supply water temperature of 4.5 degrees C, which makes the cost of a chilled water system higher for tenants, in addition to the grave threat of Low Delta T Syndrome. By the way, laying the piping network is an additional cost. In sharp contrast, a VRV system can be installed without having to meet the requirement of costly underground piping or continuous pumping circuit. In the case of VRV, it is just one system for each building or zone, which translates to providing flexible and practical solutions.
- A Direct Expansion system like VRV, in which the cooling effect takes place directly in the fan-coil unit (FCU), is able to respond quickly to small load changes. Indeed, the compressor can unload faster, which results in superior part-load efficiency. In the case of a chiller, it takes 30-60 minutes for it to load 100%.
- Many chillers are made with a 10-year-old legacy design of twin-screw compressors with little technological advancement. Over and above that, the manufacturers cannot provide on-site compressor service; indeed, the equipment has to be shipped

for factory-only repairs, due to close tolerances. That said, some manufacturers of single-screw compressor chillers can provide on-site service without expensive and delayed factory repairs. VRV systems feature asymmetric scroll with inverter technology. They come with one or more compressors per module, which makes them more reliable and easier to maintain

- A chilled water system is designed by expert consultants, who put together the chillers, pumps, hydronic design and controls. The assembly is on-site by contractors, and the commissioning is by third-party experts following all the applicable codes. At the end of the day, though, a properly designed chilled water system has the same sophistication of a VRV system; only, it is more expensive than a VRV system. A properly designed chilled water system makes sense in the case of large projects, but in small- and medium-sized projects, which outnumber large projects, the design is not of the same standard, which results in poorer performance. This is evident from the large number of experts in the market who work purely to increase the efficiency of existing buildings.
- A chilled water system with the newest technology requires collaboration among various experts specialising in chillers, pumps, valves, water treatment and controls, to name a few. And if there is a problem

in the system, the owner needs to identify the particular equipment at fault, which is a formidable task. In the case of a VRV system, there is only one expert that the owner needs to reach out to – the manufacturer.

- Water-cooled chillers offer better efficiency, but so do water-cooled VRV systems. Case-in point, the 4,000 TR water-cooled system at a hotel in Qatar (G+40 building); the owner opted for a water-cooled VRV system in place of a chilled water system.
- All air systems, comprising AHU and VAV, do not represent a practical solution for every application, and that's the reason we have a large number of chilled water FCUs. VRV systems can work with AHUs as well as with FCUs. In fact, the sheer variety of VRV FCUs is common knowledge; and they boast highly practical features, such as auto ESP and auto-filter cleaning, amongst others.

As for claims relating to energy efficiency, data is available in abundance – I am happy to point to the many buildings with Daikin Cloud, providing live and continuous energy-usage data on dashboards.

The design of VRV systems requires considering actual piping, which is easy with VRVCAD; and the software provides actual capacity, along with easy pipe sizing. A typical VRV system features refnet connections for easy installation, and thermostat and central controls, as well.

As for concentration of refrigerant, ASHRAE Standard 15, ASHRAE Standard 34 and EN375 provide the direction, with which it is possible to very well manage any building without the need of an extensive leak-detection system.

In summary, VRV systems represent a great option for providing energy-efficient solutions, when we have situations like:

- Small zone loads 1.5-15 kW each
- Individual control
- Different type of FCU requirements
- Phased start-up requirements
- Separate billing
- Centralised system for <50-2500 TR
- Diversity of loads in residential
- Quick load response
- Horizontal communities (non-high-rise)
- Controls connectivity to BMS
- Easy piping design
- The manufacturer taking responsibility

V. Sekhar Reddy
Managing Director, Lexzander

I read with interest Dan Mizesko's article, 'Don't believe the hype about VRF systems', in the July 2021 issue of Climate Control Middle East.

While the article is informative, its contents are questionable, as certain observations are inaccurate or exaggerated. I feel Dan needs to take a second look and give each of the systems – chilled water (CHW) and VRF – its due before drawing what I can only characterise as arbitrary conclusions.

To start with, the efficiency of a system goes beyond how each key element – that is, product and process – is designed. The engineering, installation, commissioning and, most importantly, the maintenance have a huge role to play in arriving at the system's flexibility and operational efficiency; and the related costs – capital and operational – have a say in the long run.

We cannot overlook the flexibility the VRF system gives to the end-user; more on that, later.

Let me touch base on some of the points that Dan raised that need a second look:

- a) Dedicated ventilation system: While I concur with Dan's analogy on the popular refrigerant in use for VRFs, R-410A, his observation that thousands of feet of running with this refrigerant could be a health hazard, is totally inaccurate and incorrect. Much like a CHW system, a very small percentage of VRF piping runs in occupied areas. It is mainly limited to air wells or shafts. Of course, this will vary from one application to the next, but still, the piping in occupied areas is limited in most cases. Also, whatever could be the leaks, due to various reasons, gets diluted in the air. So the need for a dedicated ventilation system does not arise.
- b) Long refrigerant lines and large number of branch connections, resulting in chances of refrigerant leakage: Any system is as good as it is installed. So leakage – or the absence of it – depends on the workmanship. For some applications, a dedicated VRF system is preferable to a CHW system. So the application decides the system, rather than otherwise



In 2002, the share of VRF systems out of the total DX commercial air conditioner market was almost zero per cent; by 2020, it had increased to almost 60%, with a year-on-year growth of 10-15%

- c) The need for condensate drain lines for each VRF indoor unit: CHW fan-coil units (FCUs) also need condensate drain lines, so I don't see what the issue is.
- d) Compliance with maximum allowable refrigerant quantities within a given volume: In relative terms, it does not matter, as both are closed systems.
- e) Effect on capacity from choice of piping length: For particular applications, this is a non-issue, as proper sizing of piping will minimise capacity losses.
- f) Capital, installation, operational and maintenance costs: From a capital cost/TR perspective, a VRF system is any time cheaper than a CHW system. And installation-wise, a VRF

system is less complicated than a CHW system, given that there are fewer number of systems involved, which means lesser demand for expertise. From an operational costs perspective, the costs associated with VRF systems are compatible with, or lesser than, CHW systems. Also, the operational costs of CHW systems are heavily dependent on design, installation and, most importantly, the expertise to commission and maintain the plant. And as for maintenance costs, a VRF system wins hands down.

Conclusion

The application decides the type of system – that is, VRF or CHW – and its effectiveness. In my view, Dan misses the point by generalising and, most importantly, leaning more towards CHW system without considering the application it is meant for. ▶



Dharmesh Sawant

Sales Director (UAE, Oman, Qatar), Qingdao Hisense HVAC Equipment Company Middle East and North Africa (MENA):

Exactly, there is much hype about VRF systems – that they can be used for all applications. That is what I felt after reading Dan Mizesko's in-depth analysis.

Indeed, VRF systems are not suitable for high-rise developments above 14 floors, mega shopping malls and five-star hotels. However, there are some applications where I see an obvious migration from chilled water systems to VRFs. These applications include – but are not limited to – low- and mid-rise residential buildings up to 15 floors, standalone supermarkets, schools, villas and three-star hotels. I can say this with a great measure of confidence, for I have witnessed the migration through working closely in the air conditioning industry and in the Middle East region for the past two decades.

In 2002, when I first landed in Dubai, chiller systems were the common features in residential buildings and schools; the market share for VRF systems was negligible. In fact, many stakeholders were unaware of the benefits of VRF systems at that point in time.

That was the era when they were experiencing some pain with chiller systems over high electrical consumption

costs, higher AMCs and expensive spare parts. Let me clarify here that a higher electrical bill was not purely owing to inefficiency of the chiller system; more so, it was from the thought pattern that since chiller electrical consumption is already included in the rent or has a fixed service charge – advertised as free AC – the end-user was overusing it, leading to wastage of energy. Instances abounded of tenants going on vacation and smugly leaving the fan-coil units running for weeks and even months, knowing very well they did not have to face the consequences of having to pay for the electricity used to keep them running 24x7. And sadly enough, the building owners took the hit for this.

Later, BTU meters came to the rescue, but it is an entirely different story that very few buildings with standalone chillers use BTU meters, as the building owner is averse to taking on the additional headache of having to bill and recover the consumption fee from the tenants.

Another reason for high electrical consumption from running chiller systems is that since the chiller is connected to the building owner's DB, it will always fall in the topmost slab of electrical tariff – 44 fils per kW – whereas the standalone air conditioner in every apartment, which is

connected to the apartment's DB, will mostly fall in the first or second slab. So, the tenant has to pay almost double the tariff for the same kW consumption, if opting for a chiller.

I have experienced the above issues during numerous discussions with various small- and medium-size developers. In such circumstances, VRFs came to the rescue as a pain killer. Indeed, the circumstances triggered a favourable consideration of VRF systems and led to a sharp increase in uptake in the coming years. Other driving factors emerged, as the market plunged into an in-depth scrutiny and realised the advantage of opting for VRF systems.

My statement about an increase in uptake is not my hypothesis; rather, it is backed by the increase in sales figures – and as the saying goes, "Figures don't lie." In 2002, the share of VRF systems out of the total DX commercial air conditioner market was almost zero per cent; by 2020, it had increased to almost 60%, with a year-on-year growth of 10-15%.

Now, the question arises – whose market is VRF eating into? The answer is obvious – it is taking large chunks out of the air-cooled chiller market, owing to the aforementioned reasons and owing to the following factors...

Lower capex and opex: With numerous VRF players available in the market, the price of VRF equipment has become highly competitive. The total capex – the sum of the cost of equipment, installation and piping – of VRF systems is 15-20% lower than that of chilled water systems, even after considering the additional electrical cost of power cabling to multiple VRF outdoor units. The AMC cost of VRF systems is lower than that of chilled water systems, as the cost of spare parts of chilled water systems is higher and involves co-ordination with multiple vendors. Indeed, the cost of chilled water systems includes chillers, pumps, valve kit and chemical dosing, to name a few.



Lower connected electrical load: A VRF system offers lower connected electrical load (1.2 kW/TR) against 1.6-1.7 kW/TR, including pumps, in a chilled water system. Even with deration, owing to long piping, the connected load of a ▶


















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VRF system does not exceed 1.4 kW/TR for an outdoor unit, which still is lower than that of a chilled water system. This 20-25% increase in the connected load leads to increase in the connection fee for the developer. With an average connection fee of AED 1,500/kW, you are talking of a substantially high cost for the building owner. Indeed, in the case of a building with 1,000 TR of air conditioning, this extra cost would translate to anywhere between AED 300,000 and AED 450,000.

Faster procurement and installation...

lower chances of human error: A VRF system has fewer number of components, namely indoor and outdoor units, Y branches, remote controller, copper piping, insulation and refrigerant charge. In the case of a chilled water system, you have to contend with chillers, primary and secondary pumps, valve kits, pressurisation tank, chemical dosing system, two-way valves with actuators, BMS controls, MS piping and insulation. The greater number of components means a longer procurement time, co-ordination with multiple vendors, and perfect functioning of multiple components to get the optimal performance. Indeed, the proper selection of chillers, pumps, controls and two-way valves coming from multiple vendors is key for the designed performance. There is a higher chance of design errors, unless there is

a proper system of tight verification by consultants and contractors in place. Indeed, the complexity places a weightier burden on consultants to evaluate the submittal of multiple components in a chilled water system.

In the case of VRF systems, the challenge is less formidable, as the responsibility of proper design rests with the VRF vendor. Also, the design is software-driven, which means lower chances of human error. Also, the contractor is in a position to save time involved in techno-commercial negotiations, considering the fact that they have fewer components (2-3) to contend with, compared to 8-10 components in chilled water systems.


Redundancy: VRF systems offer higher redundancy through multiple compressors in each module, and multiple modules in each system. Also, the capacity of each compressor is a maximum of 10 TR, which means the cooling impact is only 10 TR, in case of failure of one compressor. However, in the case of chillers, the impacted area will be bigger – often about 100 TR. This threat necessitates a standby chiller and pump, especially for critical applications, which in turn, drives the cost up and increases the requirement for space.

Better control options: VRF systems offer diverse cost-effective control

options, like central controllers, IoT interfaces, home automation interface and APP-based cloud controls. In the case of chilled water systems, the cost of implementation of controls is expensive.

VRF systems offer benefit to all stakeholders, be they developers, consultants, contractors or FM companies; little wonder that I have seen many building owners changing from chilled water systems to VRF systems for their upcoming buildings, as a reaction to learning from the experience of working on earlier projects that involved chilled water systems; I have hardly seen the reverse migration phenomenon happening.

There are some issues of concern surrounding VRF systems, as well, but hey, nothing is perfect in this world! That said, addressing the concerns relating to ASHRAE 34 (Addendum L) regarding the “Refrigerant concentration level” can be taken care during the design stage by avoiding connection of the smaller room Indoor to the bigger outdoor unit. The impact can also be reduced by providing a door undercut in the smaller room and having an adjacent ventilated room, like a toilet.

VRF systems have been in operations for 15 years in the GCC region and, through that, have validated the afore-mentioned benefits during one complete lifecycle. I rest my case! 

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PUMPING TO THE SKIES

Exponential development of high-rises the world over is posing challenges to design of efficient water distribution systems, says **Ronak Monga**



Driven by an increase in density of population, urban cities the world over are seeing an increase in construction of high-rise buildings. We are witness to an exponential vertical development of structures, which in turn, poses a challenge when it comes to design of efficient water distribution systems in them.

When deciding the water distribution and pumping strategy, it's important to have a holistic view on the entire life cycle cost (LCC) of such systems. This article delves more on the various system layouts that are

practically suitable for water distribution in high-rise buildings, indicating their merits and demerits, as well as comparing their LCC.

Let's first look at some of the critical considerations in pressure boosting systems...

Water delivered at fixtures – such as showers and taps – should be at a minimum pressure of 1.5-2 bar to ensure comfort for the end-user. The higher permissible limit of the pressure on most of these fixtures is 5-6 bar. A standing

height of around 30 metres – that is, 6-8 floors – can add 3 bar static pressure to the lowest level. In a single zone 30-metre-height, wherein pumps maintain a pressure of 2 bar at the highest floor, the pressure at the lowest level in the zone will be 5 bar. Therefore, in a high-rise building, the zone needs to be formed after every 30 metres, or so, height.

Pressure-reducing valves play a key role in high-rise buildings. The flow to each

30-metre zone from the main riser passes through a pressure-reducing valve, so that pressure at the highest level in the zone is limited to 2 bar. However, there are some disadvantages when using PRVs:

- For each PRV needed in the building layout, the initial cost increases.
- The PRVs also need maintenance, and therefore, they need to be placed at an accessible place.

- Each PRV represents a loss, because the energy consumed by creating higher pressure is wasted.
- Risk of pipe damage and flooding, if a pressure-reduction valve fails and lets high pressure into a lower-graded pipe net.

Hence, it is important to consider different system layouts to evaluate which system would fit best for any building or system type. Which layout to choose depends on several factors and the specific building design task in question – for example, local legislation and traditions, flexibility requirements or the possibility for future expansions. Any one system layout is not ideal for all scenarios.

SINGLE BOOSTER SYSTEM

A single booster system is the simplest booster system available. It relies on a single set of

pumps supplying pressure boosting from the basement to the point furthest away from the booster

system. Such systems may be configured with or without initial break tanks.

A water tank is placed in front of the pump system and filled with water from the mains. This allows the capacity of the mains to be lower than the building's peak demand, ensuring constant pressure even in peak flow situations.

The break tank is filled with water during low consumption periods and always ensures a uniform water supply to the booster pumps.

The advantages are:

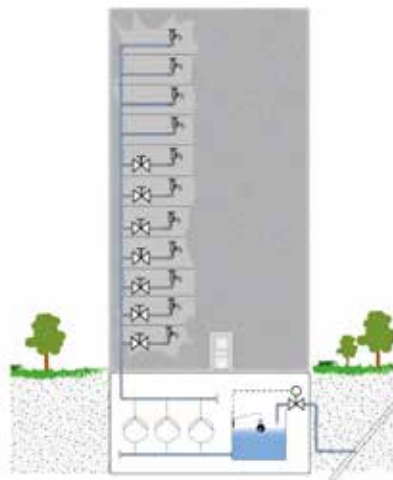
- No space is required for boosters on the upper levels
- One – or a few – riser pipe(s) in the building

The disadvantages are:

- High static pressure booster pump system
- Excessive pressure on lower floors requires pressure relief valves and high-pressure-graded pipes
- Sensitivity to electricity fall outs

ZONE-DIVIDED BOOSTER SYSTEM

The building is divided into pressure zones of 10 floors or less, with a booster supplying each zone from the basement through dedicated risers.



Single Booster system with one branch per floor

The supply system is split into several zones supplying a maximum of 12 floors each (approximately 40-50m static).

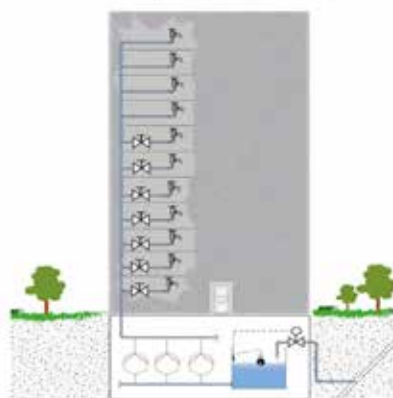
This ensures adequate water pressure on all floors without using pressure relief valves. The minimum pressure on the upper floor in each zone is kept at 1.5-2 bar. The maximum pressure on the lowest floor in each zone does not exceed 4-4.5 bar.

The advantages are:

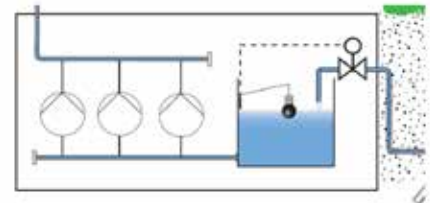
- Only the required water pressure is supplied, therefore creating manageable pressure zones
- No space is required for boosters on the upper levels
- Increased flexibility and security due to zoning
- Less vulnerability in the event of pump failure
- No pressure-reduction valves

The disadvantages are:

- More riser pipes in the building
- High pressure-graded pipes and booster sets
- Sensitive to electricity fallouts



Zone-Divided System



Zoom of the basement in the single booster system

SYSTEM WITH ROOF TANK (OVERHEAD TANK) WITH ROOF TOP BOOSTER SYSTEM

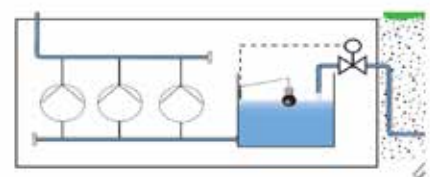
Overhead tank systems use a transfer pump in the basement to fill the overhead tank by a level switch-operated control.

Roof tanks ensure water pressure as well as water supply, in case of power failure. This solution requires pressure-reduction valves on each floor to avoid undesired high static pressures at the tap, which creates unacceptable noise while tapping.

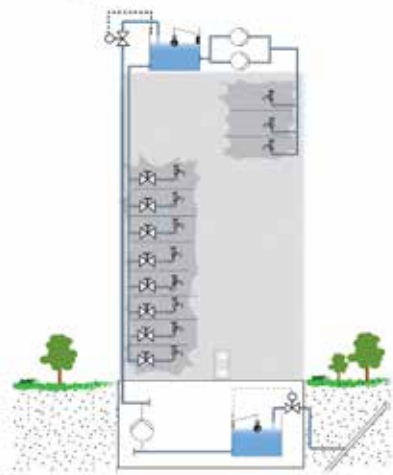
In this model, the upper six floors require a separate booster system to create sufficient pressure. The static pressure there is too low due to the insufficient geometric height to the roof tank.

The advantages are:

- Mature technology
- Only one discharge from booster set to top
- Space saving
- Less sensitive to electricity fallouts ▶



Zoom of the basement in the Zone-Divided booster System



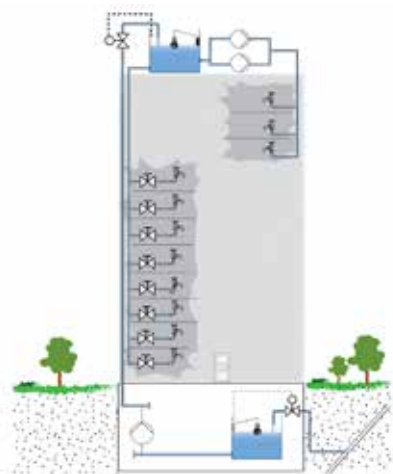
Roof tank system

The disadvantages are:

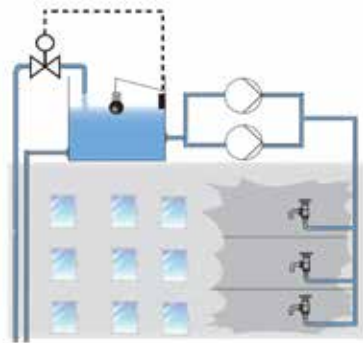
- Water is pumped past where it is required
- Insufficient pressure on the uppermost floors
- Excessive pressure on the lowest floors
- Pressure-reduction valves must be fitted
- Need for higher pressure grade of pipe work
- Space requirement for roof top tank
- Risk of microbiological growth in roof tank

SERIES-CONNECTED SYSTEMS WITH INTERMEDIATE BREAK TANKS

Series-connected systems with intermediate break tanks draw on several other systems, utilising centrally placed



Series-connected systems with intermediate break tanks. In this example, we have three boost zones



Zoom of the application on the roof in the roof tank system

break tanks to supply both the taps in their own boosting zone and all the zones above.

With this system, a building is divided into smaller and more manageable pressure zones of 12 floors each. Every zone is then served by its own booster set.

No pressure-reduction valves are required, and in case of electrical breakdown the tanks will be able to supply pressure and water for up to 12 hours. However, the tanks take up valuable room space within the building, reducing the room available for revenue generation.

The advantages are:

- Low-cost operation
- Low pressure in each zone
- Manageable pressure zones
- High system resilience
- Low power consumption of pumps

- and reduced load on power grid
- Less sensitive to electrical fall outs
- Low pressure-graded pipes

The disadvantages are:

- High initial investment
- Booster sets and tanks require space on service floors
- Loss of potential revenue-generating space
- Risk of micro-bacterial growth in break tanks

SERIES-CONNECTED SYSTEMS WITHOUT INTERMEDIATE BREAK TANKS

A series-connected system operates on the same principles as the previous system, but without the intermediate break tanks.

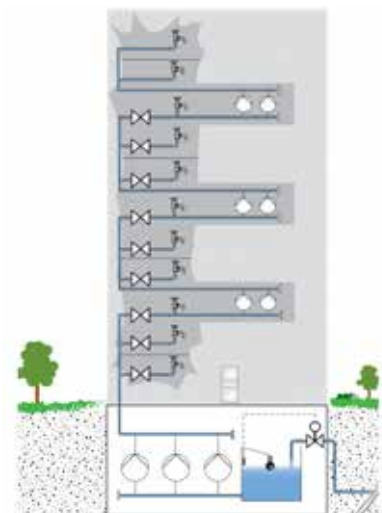
This enables an effective usage of power, because the water is only pumped to the zone where it is used and does not go past it.

However, complete control is particularly important. When a consumer draws water on the upper floors, the booster systems must deliver the water from the bottom of the building.

The advantages are:

- Low-cost operation
- No space is required for tanks
- Low pressure in each zone
- Manageable pressure zones
- Low-pressure consumption of pumps and reduced load on power grid
- Low-pressure-graded pipes

Zoom of the two first boost zones. Note that the break tanks become smaller, as we move up in the building. This is due to a decreasing need for water



Series-connected systems without intermediate break tanks

The disadvantages are:

- Vulnerability in case of pump failure
- Sensitivity to electrical fallouts

LIFE CYCLE COST - LOOKING AT THE COMPLETE PICTURE

Life cycle cost calculations for pumping systems are normally conducted with only three parameters considered.

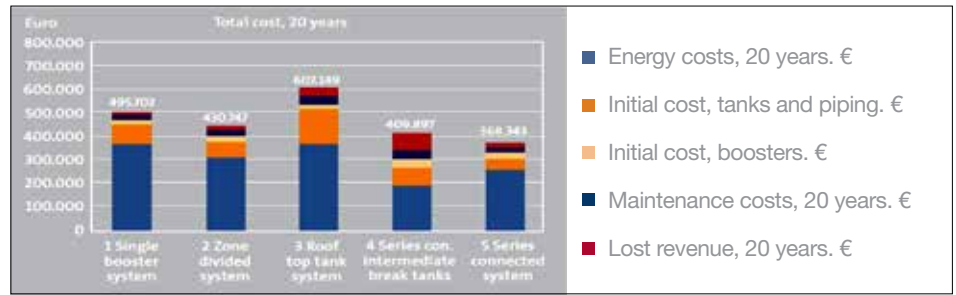
These observable costs are:

- Initial cost of booster sets
- Maintenance costs
- Energy costs

But more elements need to be considered, to ensure we are looking at the complete picture.

In high-rise buildings, capital costs for piping, valves and tanks often exceed the costs for boosters many times over. In terms of maintenance cost, the cost to maintain roof tanks and break tanks exceeds any other cost of maintenance, even including pumps.

In terms of energy costs, the more we can avoid over-pumping, or pumping beyond required capacity, the more the savings are available.



As real estate becomes more valuable, the amount of saleable area gets increasingly important. In many instances, it is profitable to extend the height of a building. Another and more effective way to increase the saleable area is to reduce “wasted” space for building services.

LCC = Cib + Cip + Cm + Ce + Cr

LCC = Life cycle cost

Cib = Initial cost for booster sets

Cip = Initial costs for piping, pressure reduction valves and tanks

Cm = Maintenance costs

Ce = Energy costs


Cr = Lost revenue costs

Representative LCC comparison for a







25-storey building, above, shows that what might appear to be a good strategy up front, based simply on initial cost of booster pump sets, energy and maintenance costs, may represent a different result when a complete LCC is conducted; and hence, it's indeed crucial to look at a total and complete picture. [ccme](#)

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PUMPING UP THE EFFICIENCY

Instances of development of large-scale projects, such as the USD 23 billion Barakah nuclear power plant, in the UAE and the USD 563 million Doha South STP, in Qatar, are expected to continue driving the demand for industrial pumps in the Middle East. **Raphael Torrano da Conceição** explains how key steps can make pumping applications more efficient



Driven in part by large infrastructure projects, it is estimated that the Middle East industrial pump market will continue growing at a compound annual growth rate (CAGR) of 2.8% during the next four years. Governments in the Middle East have sought to diversify their economies and reduce their reliance on hydrocarbons. Lower oil prices, along with the economic shock of COVID-19, have made this diversification even more important.

Growth in sectors, including healthcare, food and beverage, technology, telecommunications and clean energy, will lead to an increase in the deployment of industrial pumps in non-oil sectors across multiple Middle East countries. However, it's undeniable that the oil & gas industry will continue to be a key market for pump applications. So, as the demand increases, how can industry ensure that their pumping processes are energy efficient?

Avoid oversizing the pump

When choosing a new pump, engineers will always be cautious and include a safety factor plus a little extra, just in case. However, selecting a pump that can perform consistently at its optimum efficiency level, can significantly reduce energy usage and maintenance costs. For example, a higher performance of flow and pressure needs greater power from the motor, so an oversized

pump can result in unnecessary energy consumption. In addition to its size, the speed, power requirements, drive type, the mechanical seal and ancillary equipment need to be considered and selected to suit the application.

But, what are the options if an intervention at the design stage isn't possible, or if you wish to improve the efficiency of legacy equipment? If a pump is oversized for its application, trimming the impeller is a cost-effective way of reducing the pressure and flow. However, it's important to note that the impeller should not be trimmed below the minimum diameter shown on the manufacturer's pump curve. To achieve the required function, this is more energy efficient than using a throttling valve. However, due to the trimming, the clearances between the impeller and the casing widen, making it less efficient than the original. As a result, variable speed drives (VSDs) are often favoured to achieve energy efficiency.

Use a VSD dedicated for pumping systems

One of the main trends that is accelerating in the Middle East market, is the increasing focus on energy efficient equipment. For pumping applications, this growing awareness is influencing the uptake in intelligent pumps. For example, fluid handling can be turbulent; between leakages and low fluid levels, there's a

lot that can go wrong. Pumps, pipeline and fittings can get seriously damaged if pressure or flow are out of control and such occurrences are not tracked early. With an intelligent pump, this can be regulated and controlled before problems arise.

Built-in control enables more effective use of motors based on production demands and fluid availability. Dedicated for pumping systems, an intelligent pump control ensures accurate pressure and flow throughout the processing cycle.

While high efficiency pump seals should be used to consume energy from the mechanical friction and prevent leaks, an automatic broken-pipe-detection feature can identify leakage and adjusts the motor performance accordingly. Additionally, dry pump detection means if the system runs dry, the motor is automatically deactivated, and a dry pump alert is issued. With both cases, the intelligent pump control allows the motor, or motors, to reduce consumption of energy.

When multiple pumps operate as part of a parallel pumping system, there are real opportunities for significant energy savings. In such instances, jockey pump control can also optimise the use of different sized motors. It may be that demand requires just a small motor to be in use, or a combination of a small and large motor. Intelligent pump control gives increased flexibility to use the optimal sized motor for a given flow rate, by switching or adjusting as required.

There are instances where intelligent pump control systems also have a programme for “de-ragging” – clearing of the pump impeller, allowing for continuous use. This keeps the motor in optimal condition, which has positive effects on energy efficiency, and helps to minimise downtime and maximise energy savings.

Carry out maintenance

Regular maintenance should be carried out on the entire pump system. Pump performance will naturally decrease after prolonged heavy-duty use or due to exposure to harsh conditions. This can be as a result of erosion, corrosion, chemical attack, wear or cavitation. Engineers should firstly opt for products that can provide energy-efficient operation in the harsh environments that may be encountered in the Middle East, such as high temperatures, humidity and elevated levels of dust and dirt.

As deteriorations in the pump’s efficiency and capacity can occur long before obvious warning signs appear and the pump fails, it’s worth using condition



monitoring to monitor any significant changes within the machinery. For example, not detecting rotor erosion early can be costly and can reduce efficiency, as well.

In the coming years, the industrial pump market in the Middle East is expected to continue growing, so it’s important that existing and new pump applications consider energy efficiency as a priority to get the most out of their systems. **ccme**

Raphael Torrano da Conceição is Managing Director, WEG Middle East.

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MOISTURE-FREE, LEAK-FREE

Dan Mizesko elaborates on the importance of proper chiller evacuation, dehydration and the Standing Vacuum Test

A conventional centrifugal chiller is designed to operate with oil and refrigerant flowing internally. Anything else in the system is considered contamination and must be removed. This includes moisture and non-condensable gases, such as air. Proper start-up, commissioning and ongoing service practices are the first steps in keeping a system clean.

At sea level, one atmosphere exerts a pressure of 14.696 psi (pounds per square inch) or 29.921 in. Hg (inches of mercury). At this pressure, a calibrated compound pressure gauge will read 0 psig (pounds per square inch gauge). This pressure is referred to as Standard Pressure and is equal to one atmosphere (psia).

At this pressure, pure water boils at 212 degrees F. If we were to move our container of pure water to an altitude higher than sea level, say 5,000 feet above sea level, the water will boil at 203.4 degrees F, since the atmosphere exerts approximately 25 in. Hg, 12.278 psi or 0.835 psia. If we were to increase the pressure on the container of pure water to 15 psi or 30 psia, which is above standard conditions, our boiling point will rise to 250 degrees F, because the boiling point of water can be changed and controlled by controlling the vapour pressure above the water. This is known as the Pressure-Temperature Relationship.

In Figure 1, there are two pressure scales on the face of the gauge. Above 0 is the scale for measuring positive pressure or pressure above one atmosphere in pounds per square inch. The scale below 0 is used to measure negative pressure or pressure below one atmosphere in inches of mercury. This scale is accurate up to 29 inches of

mercury. Vacuum levels between 29 inch Hg and 30 inch Hg (absolute vacuum) are measured in microns. One thousand microns are equal to one millimeter of mercury and are measured with an electronic vacuum gauge.

If we were to reduce the internal pressure of a chiller to 29 inch Hg, we can say we have evacuated the system, meaning that we have removed air and non-condensable gases; and in doing so, we have lowered the boiling point of any remaining moisture in the system; but we have not dehydrated the system, if moisture remains. By attaching an electronic micron gauge to the system, we can measure the vacuum level between 29 and 30 inches of mercury.

The scale of the electronic micron gauge ranges from 0 to 5,000 microns. As we continue to extract molecules of vapour from the system with a vacuum pump, the decrease in pressure will register on the micron gauge. Conversely, if we were to stop extracting molecules of vapour and allow the system to remain static, no rise in pressure will be noted on the micron gauge, provided the system is completely sealed and dehydrated and no moisture is present. If moisture is present, a notable rise in pressure will be seen on the micron gauge, as liquid moisture boils off into vapour. Vacuum can also be measured with a U-tube mercury manometer.

The device has a glass U-tube, graduated in inches of mercury. One end of the U-tube is connected to the system and the other end is open to the atmosphere. When the internal pressure of the system is equal to atmospheric pressure, the mercury level in the side open to the atmosphere is equal to the



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side connected to the system. As the system pressure decreases, so does the level open to the atmosphere. A wet bulb vacuum indicator can also be used and proves very accurate in the absence of a micron gauge.

The device in Figure 4 uses Methyl Alcohol Anhydrous, which is poured through a fitting provided at the top of the cylinder. It is common practice to fill to the middle of the lower port and connect the Wet Bulb Indicator to the evacuation line. It should be evacuated until the wet bulb thermometer reads -32 degrees F. A chart is provided to convert wet bulb temperature to microns.

As we have covered several methods of measuring a vacuum, let's now discuss the equipment required to achieve the vacuum. The vacuum pump must be a high-capacity minimum 20 CFM pump to evacuate and dehydrate a large chiller in a reasonable period of time. It must be in good operating condition, leak free and clean. It is important to change oil prior to every use. Besides providing pump lubrication, the oil provides an internal seal. Clean fresh oil is a must. It is advisable to follow the pump manufacturer's maintenance instructions.

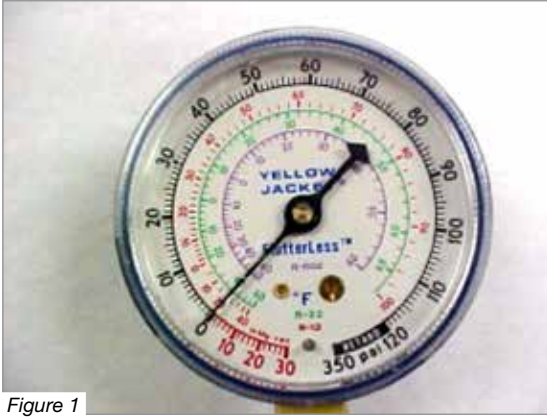


Figure 1

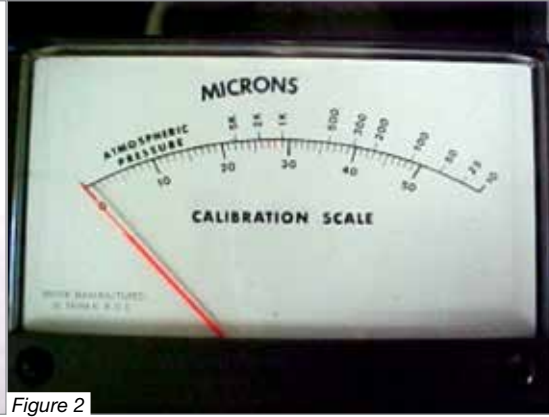


Figure 2

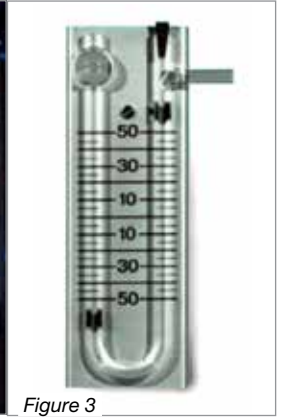


Figure 3

It is equally important to use good-quality hoses and be sure that they are free of cuts and blemishes and that they do not leak. Also, it is recommended to use copper tubing instead of hoses, whenever possible.

To improve evacuation, circulate warm water (not to exceed 50 degrees C) through the cooler and condenser tubes to thoroughly dehydrate the shells

Putting it all together – evacuation, dehydration, Standing Vacuum Test

A note of caution: Do not start or megohm-test the compressor motor or oil pump motor, even for a rotation check, if the chiller is under dehydration vacuum.

Insulation breakdown and severe damage may result on doing so. To be safe, isolate any starter before evacuating the chiller if you are not sure if there are live leads to the hermetic motor.

The following steps are recommended if the chiller has been open for a considerable period of time, if the chiller is known to contain moisture, or if there has been a complete loss of chiller charge. ▶



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LICENCE TO CHILL

Evacuation and dehydration can be performed at room temperatures. Using a cold trap (Figure 6) may substantially reduce the time required to complete the dehydration. The higher the room temperature, the faster dehydration takes place.

The following procedures are for high-pressure centrifugal chillers:

- 1) Dry nitrogen purge. This is done by connecting a nitrogen cylinder to the chiller in a manner that will permit a low-volume purge to remove as much moisture as possible. It is advisable to drain as much water as possible, paying close attention to all the low points. One pound of water, which is approximately one pint, will produce 2,948 cubic feet of water vapour.
- 2) Connect a high-capacity vacuum pump (20 cfm or larger is recommended) (Figure 7) to the refrigerant charging valve. Tubing from the pump to the chiller should be as short in length and as large in diameter as possible to provide least resistance to gas flow.
- 3) Use any of the instruments described in this article to measure the vacuum. Open the shut-off valve to the vacuum indicator only when taking a reading. Leave the valve open for three minutes to allow the indicator vacuum to equalise with the chiller vacuum.
- 4) With the chiller ambient temperature at 60 degrees F (15.6 degrees C) or higher, operate the vacuum pump until a wet bulb temperature of 0 degree C or a pressure of 5 mm Hg (absolute) is reached. To improve evacuation, circulate warm water (not to exceed 50 degrees C) through the cooler and condenser tubes to thoroughly dehydrate the shells. If



Figure 4



Figure 5

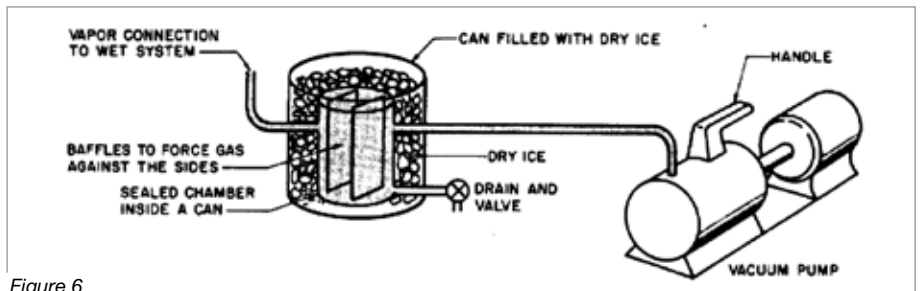


Figure 6

a source of hot water is not readily available, it is advisable to employ a portable water heater. Do not use steam, under any circumstances. A suggested method is to connect a hose between the source of hot water under pressure and the cooler head drain connection, out the cooler vent connection, into the condenser head drain and out the condenser vent. To avoid the possibility of causing leaks, the temperature should be brought up slowly so that the tubes and shell are heated evenly.

- 5) Valve off the vacuum pump, stop the pump and record the instrument reading.
- 6) Standing Vacuum Test. Hold the vacuum in the system for eight hours; the slightest rise in pressure indicates a leak or the presence of moisture, or both. If, after eight hours, the wet bulb

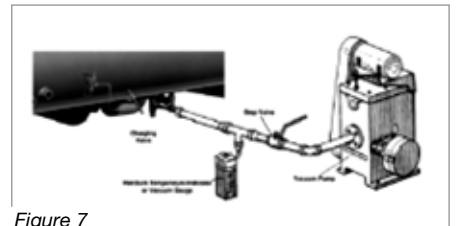


Figure 7

temperature in the vacuum indicator has not risen above 4.4 degrees C or a pressure of 6.3 mm Hg, the system may be considered tight.

7. If the vacuum does not hold for eight hours within the limits specified, the leak must be found and repaired.

If you follow these procedures, you will be assured your chiller is moisture free, leak free and ready for operation. [ccme](http://ccme.com)

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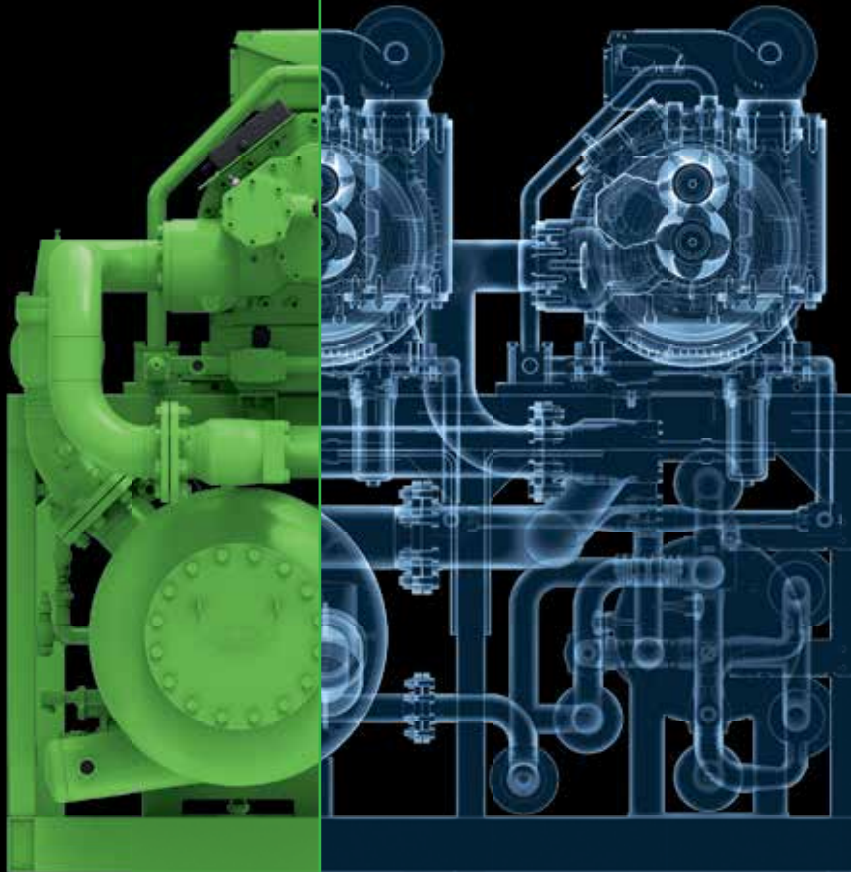
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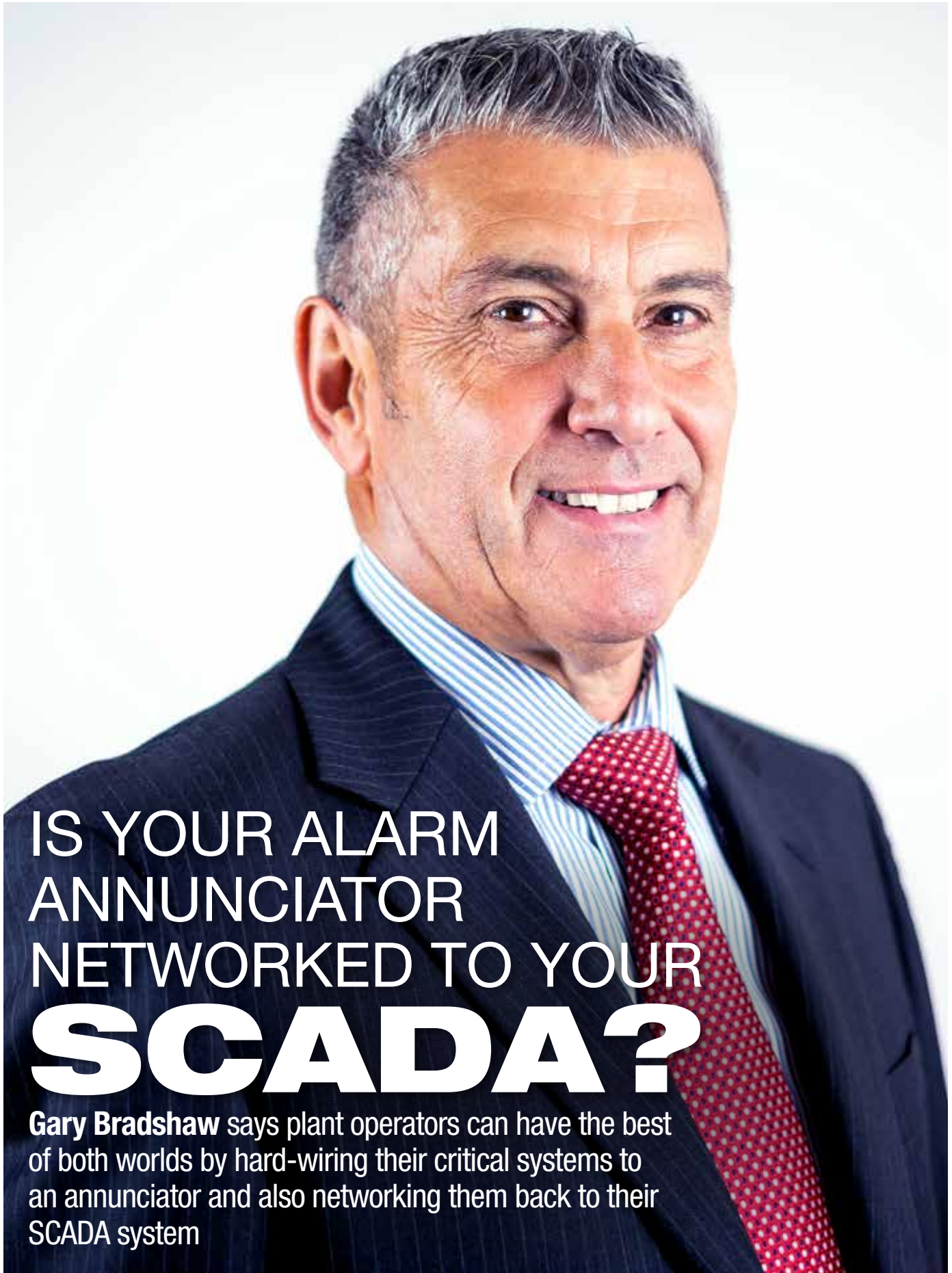
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IS YOUR ALARM ANNUNCIATOR NETWORKED TO YOUR **SCADA?**

Gary Bradshaw says plant operators can have the best of both worlds by hard-wiring their critical systems to an annunciator and also networking them back to their SCADA system

Alarm annunciators have been around for decades. Initially hard-wired to critical processes, then for many years plants began networking alarms to their SCADA systems. Today, due to improved safety standards, they are back to being hard-wired. Both methods have their advantages, but hard-wiring alarm annunciators is more effective for plant safety. Plant operators can have the best of both worlds by hard-wiring their critical systems to an annunciator and also networking them back to their SCADA system.

The rise of the alarm annunciator

The 1970s, 1980s and the early 1990s saw a big market for the hardwired alarm annunciator. Most plants containing hazardous materials had all their alarms hardwired to alarm annunciator systems around the plant and back to the control room. These alarm annunciators would have a matrix of numerous alarm windows in panels that would light up and sound an audible alarm in the event of abnormal operating conditions. The issue was that only operators, in the immediate vicinity of the alarm annunciator, would be alerted to the abnormal condition.

The solution to this during the mid-1990s was to network all the alarms to the plant's SCADA system. This had the advantage of cost effectively relaying the alarm to a safe control room, as well as logging the alarms and using the historical log for post-event analysis. However, notifications on the SCADA screen – when combined with other non-critical alarms/events – were easier to miss and cause confusion to the operators, resulting in response times suffering.

Today's alarm annunciators

The current IEC 61508 safety integrity levels are international standards by which most safety critical systems are rated. It is understood that while zero risk can never be reached, only probabilities can be reduced; there are safety functions that can be put in place to ensure risk is minimised.

The modern-day approach to the use of alarm annunciators is to rationalise the number of alarm windows so that only the safety critical alarms are displayed on them. This makes it easier for the operator to take immediate action. There is now



“ Although alarm annunciators are back to being hard-wired, this doesn't mean plant operators have to lose out on the benefits of having annunciators networked to their SCADA system

also the option to independently network the annunciator, wirelessly or via Ethernet, to the plant's SCADA system.

By doing this, data from the annunciator is logged without compromising the safety function, if the network connection were to be lost. This is possible by using Omniflex's Teleterm Unit, which simply connects to the alarm annunciator via a Modbus serial cable. These Teleterm units also provide a flexible interface to other process signals, allowing operators to remotely monitor and control other plant devices on their SCADA systems as well as the alarms.

Teleterm units are designed to enable operators to communicate with a wide range of devices and machines. They can use GSM, Ethernet, RS232, RS485, Licence-free radio or even existing plant cabling up to distances of 10 kilometres. They can also communicate directly with a plant's SCADA using Modbus TCP, OPC Servers or IoT web service.

Operator response times are an important part of the SIL-rating, so being notified early of any abnormal condition

occurring is crucial. Teleterm units also make it possible to send out SMS alerts or emails to phones, tablets and PCs, which can be customised as to who receives certain alerts. This ensures the relevant personnel are aware of the problem, which maximises response times.

Although alarm annunciators are back to being hard-wired, this doesn't mean plant operators have to lose out on the benefits of having annunciators networked to their SCADA system. Indeed, today, operators can get the best of both worlds, without compromising the safety function of the alarm annunciator. **ccme**

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THE POWER OF DIGITAL IN COMBATING CLIMATE CHANGE

Relying on renewable energy and ensuring modernisation of existing grids, including through the roll-out of digital infrastructure and smart grids, will play a key role in curbing distribution and transmission losses, amounting to billions of dollars, says **Ahmed Fateen**

Global warming in the coming decades – even if the rise in global temperature can be kept to below 2 degrees C – will adversely affect life on earth. The most important action the world can take is to keep the rise in temperature to a minimum by doing everything possible to reduce greenhouse gases in the atmosphere.

Despite an increase in sustainability-related efforts across the globe, climate change is accelerating much faster than anticipated. With the simultaneous ongoing acceleration of the global pandemic, the need for every stakeholder to act in unison for a sustainable future has never been more urgent. Indeed, if we don't act cohesively and quickly towards enabling a green recovery, the planet and all life as we know it will be irreversibly damaged by rising temperatures.

The evidence is in front of our eyes – destruction of life and livelihoods is occurring with increasing frequency, owing to the growing prevalence of extreme weather events in the forms of floods, cold snaps, heat waves and storms. Without immediate action, the earth is expected to be 4.1 degrees C – 4.8 degrees C warmer by the end of the century.

The Intergovernmental Panel for

Climate Change (IPCC) said that not only must emissions be zeroed by 2050, but they also need to be significantly abated by 2030 if the world is to stay within a global warming trajectory of 1.5 degrees C.

So, we're faced with a rapidly diminishing window of opportunity to avoid a catastrophe and limit the damage, but we need to act fast. The glimmer of hope is that we are finally seeing a growing willingness to embrace and invest in change, bringing about a green recovery.

We are the first generation to understand the full implications of climate change – and perhaps the last to be able to make a difference. Armed with knowledge and technology, we must act fast to avoid future catastrophe.

The first step is to become more efficient in how we consume energy, and to remove fossil fuels from places where they don't have to be – our homes and offices, our cars, public transport and our cities.

Raising standards for urban environments and technology will mean better standard of life for all of us – and the guarantee of better outcomes for the planet. Digital solutions and clean electricity are the way to get there.

Empowering tomorrow

Electricity networks are the backbone of a secure and reliable power system – there are nearly seven million kilometres of transmission lines and 72 million kilometres of distribution lines, worldwide. Inefficient power transmission and distribution infrastructure requires additional electricity generation to compensate for losses, resulting in emissions from extra electricity required to compensate for grid losses.

Modernisation of existing grids, including through the roll-out of digital infrastructure and smart grids, will play a key role in curbing distribution and transmission losses. The National Climate Change Plan of the UAE 2017-2050, which is aligned to the UAE Green Agenda, aims to create innovative solutions that involve the private sector in controlling gas emissions while maintaining economic growth, adapting to climate change, and promoting economic diversification. It targets the generation of 27% of energy from clean sources by 2021, further reinforced by the UAE Energy Plan 2050 that aims for 50% clean sources in the national energy mix and 40% improvement in energy efficiency by 2050.

The UAE has been rapidly increasing its renewable energy capacity over the

past four years, reaching over 2 GW out of its 30 GW grid capacity, mainly as a result of the Sweihan project in Abu Dhabi and the Mohammad Bin Rashid Al Maktoum Solar Park in Dubai. The rapid increase in renewable energy capacity was achieved through the government announcing its National Energy Strategy 2050. The Strategy ensures that 50% of the electricity generated comes from clean sources (44% renewables and six per cent nuclear).

The sooner emissions are reduced, the lower would be the carbon budget depletion, and the higher would be the chances to remain within global warming limits.

Changing how we use power is key to reducing transmission and distribution losses. Saudi Arabia's green energy investments represent a key pillar of the Vision 2030 strategy by the Saudi government – the National Renewable Energy Plan, which is designed to stimulate renewable energy development to deliver long-term economic diversification and economic stability by reducing domestic fossil fuel consumption.

Renewable energy can play a big role in cutting down transmission losses that will help GCC region countries achieve their national environmental targets. It also has the potential to improve power availability and quality, whilst helping to manage costs and boost efficiency. Whilst electricity powered by renewables and enabled through digital technology can't solve 100% of the climate challenge, it can get us a significant way there.

The sooner we recognise this and prioritise action and investment in the solutions at hand, the faster we can make serious inroads into our emissions. And power a green recovery with truly clean, green and plentiful energy. [ccme](#)

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Ahmed Fateen

DATELINE



BOSPORUS

The Turkish HVACR industry has witnessed turbulences, from financial instability to the pandemic; and yet, local and international companies say they are positive about the future, with technology being the key driver

BY CHARMAINE FERNZ | FEATURES WRITER



Turkey, as a country, has a unique advantage of being perfectly positioned at the junction of the Middle East and Europe. This locational advantage, coupled with diverse climatic conditions of extreme summers and winters, makes it the ideal location for the growth of a healthy HVACR industry. However, the country has had to weather its share of setbacks – in the forms of the economic slowdown, currency crisis and the ongoing pandemic – all having a major impact on the overall economic scales of the country.

As Istanbul-based Kenan Kus, Market Research Consultant, BSRIA Worldwide Market Intelligence, puts it, “The pandemic was the main market driver pushing the residential sector to invest in split units, such as single-split, multi-split or even the VRF market.” Thus, it can be rightly said that while the pandemic

has visited misery on the general populace, it has spurred growth across various HVACR sectors. The country’s Air Conditioning and Refrigeration Manufacturer’s Association, ISKID, in its 2020 Turkish Air Conditioning Industry report, highlighted data that supports the view: In 2020, the market witnessed more than 1.5 million production-sales activities. This resulted in industry growth by 10%, which was beyond the pre-crisis levels of 2019. For the pandemic duration, an increase in shopping sales to improve home comforts expanded the retail and wholesale market in domestic-type air conditioner purchases, resulting in a nine per cent growth rate. There has also been growing attention towards individual projects in the coastal areas and an increase in the use of mini-VRF devices in recent years.

Market analysis

Despite the pandemic, the fan-coil unit (FCU) market in the country recorded a 10% increase in production and a 40% decrease in imports in 2020. As per reports, the sales of air-handling units (AHUs) have increased year on year, with recent investments in airports and city hospitals. Domestic-type air conditioner sales, too, increased by 42% in the last five years, and by 14%, compared to 2019, exceeding 12,000 units. Export sales increased by 20% over the last five years, and by 3.6%, compared to 2019, exceeding 5,000 units. Turkey boasts nearly 50 manufacturers, and the manufacturing process meets 70-75% of the domestic market demand. As per manufacturing data, more than 17,000 AHUs were produced, but very few imports were made. ▶



Export acceleration

Recent years have seen a rather positive growth in Turkey's HVACR industry. As Ayfer Altun, Turkey DCS Senior Sales Manager, Danfoss, explains: "HVACR manufacturers have adapted to new technologies and regulations, resulting in success in their export business, especially to Europe, the Middle East, the Caspian Region and the United States. During the pandemic, the sector increased production capacity to meet the demand in countries under lockdown. Turkey HVACR OEMs reached the highest export sales in history. According to the first seven-month reports of 2021, Turkey's HVACR companies achieved an export volume of USD 3.5 billion, mainly to Germany, UK, Italy, France and Russia. The advantageous factors for Turkey are the geographical location, and low labour and energy costs, when compared to Europe. Fast and tailor-made unit availabilities have also been the biggest advantages."

Data from the Turkish HVAC&R Exporters' Association (İSİB) state that the Turkish air conditioning industry broke the all-time export record with monthly exports reaching USD 547 million in March 2021. The industry's export figures increased by 38%, compared to March 2020, and by 22% since the beginning of 2021. The share of the industry in Turkey's exports increased from 2.5% to 3.2%. The Turkish air conditioning industry, which increased its exports in all sub-product groups, achieved an export increase of 32.4% in heating systems and elements, 4.4% in the cooling systems and elements, 9.8% in the air conditioning systems and elements, 23.4% in the installation systems and elements, 32.9% in ventilation systems and elements and 20.9% in insulation materials. In March, the countries with the highest export figures were Germany, the United Kingdom, Italy, France and Poland, respectively.

Pandemic push

Reportedly, the government was of help during the pandemic. Support from the government ensured a positive outlook. "During the pandemic, the government allowed production facilities to continue work, increasing export numbers," Kus says. Subsequently, government-supported construction projects and industrial investments have been the main elements of growth in the domestic market. Further, there has been a focus on encouraging better Indoor Air Quality (IAQ), with more fresh air consumption.

Elaborating on the cause, Kus says: "The domestic air conditioning market saw the entrance of new filters with stronger features, such as UVC lamps, and more use of rooftop units. Companies like Hitachi, riding on the pandemic wave, introduced the Frost Wash technology in their units. Frost Wash is a self-cleaning technology, which aims to maintain the balance between

cleanliness and comfort. The frost is later melted and flushed away by the unit, unclogging the heat exchanger and enabling fresh, clean and comfortable air. However, the launch of new technologically advanced units came at a price – of 20-30% higher costs, resulting in lower sales.”

The industry

Turkey is primarily a locally dominated market with a lot of family-owned strong businesses in the HVACR industry. The list includes UNTES, Aldag, IMBAT, Achilles Group and VESTEL International, among others. This does not dilute the fact that major international players, such as Danfoss, Daikin and Mitsubishi, also have a significant presence. International does not guarantee protection from external forces, though. Sharing how Danfoss survived the tough period, Sertan Genc, Turkey DCS Senior Sales Manager, Danfoss, said: “For us, the year 2020 was a period of transition. This period negatively impacted our business, just like all other players in the market. However, when we compare our performance in 2021 to 2019, there is strong double-digit growth with recovering market conditions. This growth is mainly driven by industrial automation, cold chain and residential verticals.”

Post the pandemic, the industry has witnessed a huge penetration from the Chinese market. In the words of Kus, companies became very cost-conscious. This resulted in contractors and even consultants opting for affordable Chinese products. This also resulted in an increase in the import of Chinese equipment either through direct companies, branch offices or distributors.

The next development gaining momentum has been local companies selling their equity holdings to international companies, be it a 50% stake or even a complete 100% stake.

Industry enhancement

Market analysts state that Turkey has a robust HVAC industry base, owing to key factors, such as a growing urban population and decent growth in the economy. These factors will boost consumption in the coming years. While the factors are encouraging, companies



Ayfer Altun



M. Sanal



Mustafa Sezer

in the country have also been active in strengthening their operations. BVN is one such company that has implemented several strategies to be robust. As Mustafa S Marangoz, Export Sales and Operations Manager, BVN, says, “The pandemic made us implement some positive changes. In terms of management, we expanded our R&D centre staff. We served our Turkish customers with a new online sales site, launched in 2020, which in the coming months, will expand to international export markets, such as the Middle East. We are currently one of the suppliers of the Turkish national train project,

which is under construction. In the first phase of this project, we produced and delivered roof fans for trains. We are currently working on the second phase of the project. We are also in co-operation with the governmental authorities for localization of the foreign-origin products included in the project.”

Mustafa Sezer from VENCO shares his company’s focus, saying, “We shifted our focus to carpark ventilation systems and supplied service to clients and end-users, including mechanical system design, CFD analysis and commissioning.” VENCO, he says, also supplied F300 smoke-extract fans and jet fans to many projects. ▶

There is also the penetration of Artificial Intelligence and the Internet of Things, which is increasing year by year. Technological advancements are followed closely, but being a price-sensitive market, deployment is delayed





The Middle East connection

Turkey, through its location between two continents, shares a profitable relationship with the Middle East. This is evident from not just the export numbers but also from the companies that deal with their counterparts in the region. As Sezer explains, “VENCO began making a new design for F400 products prior to COVID-19, especially requested by countries like the UAE and Bahrain. Interestingly, the design and certification of F400 products were completed during the pandemic, and F400 products were launched to the market. These products will be the key to growth in the region.”

Sharing the Middle East growth story from a Danfoss perspective, Altun says: “Danfoss has identified huge growth potential in emerging markets such as Turkey, Middle East and Russia. Last year, these markets were growing despite the pandemic, driven by strong import, export, and domestic sales. The demand for HVAC products has increased due to factors such as high urbanisation rate and increase in construction and renovation of sites. All these are factors that will affect the growth of our brand in the region and increase our market share. Cold chain, district heating and cooling, industrial automation and new investments of residential verticals are high on the agenda for growth

opportunities. Green transition is also a big focus, with Danfoss having the solutions which fit perfectly enabling green transition.”

Striking a similar optimistic note, Marngaz says: “A project is underway to expand our existing SF model product ranges in cooling fans. Within the scope of this project, we will present cooling fans with 710mm, 800mm and 900mm diameter options to our business partners. The launch is planned for end of this year. These new products will strengthen our relationship with the Middle East markets.”

Technology drive

Turkey is a highly price-sensitive market. As Kus explains, “In Turkey, the Internet of Things is fast gaining ground with Building Automation Control Systems (BACS) and Building Management Systems (BMS). For example, automation and green buildings are now the focus. Turkey follows EU legislation, being a candidate member. So, new developments across the EU will within a year or more be implemented in Turkey, too. However, the new trend now is more towards refrigeration gases, such as R32, with a decline in consumption of R410A in the next few years. Like the EU, Turkey will also go more with green and sustainable refrigeration. There is also

the penetration of Artificial Intelligence and the Internet of Things, which is increasing year by year. Technological advancements are followed closely, but being a price-sensitive market, deployment is delayed.”

Danfoss is not far behind in terms of following the trend. As Genc asserts, “We are very focused on digitalization. The company entered into a collaboration with Microsoft to bring domain-expertise in refrigeration and HVAC to the cloud with Alsense IoT food retail services. The cloud services enable major savings and operational efficiency and can further increase sales effectiveness for refrigeration and HVAC system owners and professionals.”

The future

Turkey looks to be in a strong position with the kind of development in the HVACR industry. With the EU planning on going natural gas-free by 2050, Turkey will follow soon. Keeping with the trend, there is a lot of focus on heat pump technologies and products as well as solar thermal heat pumps. All have a focus on energy efficiency, including the fast-growing inverter technologies. Interestingly, the government ensures that companies consider solar thermal offerings right from the bidding stage of any project. [ccme](#)

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Empower acquires Nakheel's district cooling assets

Agreement between the two entities will see Empower take over 19 district cooling plants, valued at AED 860 million

By CCME Content Team



Standing (L-R): H.E. Mohammed Ibrahim Al Shaibani, H.H. Sheikh Ahmed bin Saeed Al Maktoum and H.E. Saeed Mohammed Al Tayer. Sitting (L-R): Naaman Atallah and Ahmad bin Shafar

In the presence of H.H. Sheikh Ahmed bin Saeed Al Maktoum, President of Dubai Civil Aviation Authority, Chairman of Dubai Airports, Chairman and Chief Executive Officer of Emirates Airlines and Group, and Chairman of the Dubai Supreme Council of Energy, Emirates Central Cooling Systems Corporation (Empower) signed an acquisition agreement of Nakheel's district cooling unit, with a total cooling capacity of 110,000 refrigeration tons (RT) and a total value of AED 860 million.

Making the announcement through a Press release, Empower said the acquisition agreement stipulates that it will acquire all the assets of Nakheel's

district cooling systems that serve more than 18,000 customers in 17 major urban projects through 19 plants across Dubai. Empower added that it will also manage and operate them and carry out all the activities, functions, operations and obligations.

H.E. Mohammed Ibrahim Al Shaibani, Director General of the Dubai Ruler's Court, CEO and Board Member of the Investment Corporation of Dubai and Chairman of the Board of Directors of Nakheel, and H.E. Saeed Mohammed Al Tayer, Managing Director and CEO of Dubai Electricity and Water Authority and Chairman of the Board of Directors of Empower, were also present at the

signing of the agreement, Empower said.

Ahmad bin Shafar, CEO, Empower, and Naaman Atallah, CEO, Nakheel, signed the acquisition agreement.

H.H. Sheikh Ahmed bin Saeed Al Maktoum highlighted that Empower's acquisition of the entire cooling systems of Nakheel reflects the booming business environment in Dubai and the growth in the number and type of the acquisition deals. This, indeed, embodies the vision of H.H. Sheikh Mohammed bin Rashid Al Maktoum, Vice President and Prime Minister of the UAE and Ruler of Dubai, he said. This vision, he said, was further demonstrated by His Highness' words a few days ago: "Everyone succeeds and

wins in Dubai, and the next is always more beautiful and greater.”

The deal also accentuates and adds to the position that Dubai occupies on the global sustainable development map.

H.E. Al Shaibani said the sale is a strategic move that allows Nakheel to focus on its core business and enhance the services provided to investors, residents, business partners and customers at some of the biggest, most established communities and retail destinations in Dubai.

H.E. Al Tayer said that the acquisition agreement is in line with the vision of His Highness Sheikh Mohammed bin Rashid Al Maktoum to promote sustainable development, and with the Dubai Demand Side Management Strategy 2030, of which district cooling is one of the foundations. District cooling contributes to enhancing energy efficiency in Dubai. The agreement is a new bright milestone for Empower’s success and a consolidation of its local, regional and global leadership as a model of growth and prosperity of all industrial sectors in Dubai, H.E. Al Tayer said. These

sectors are quite rich with investment opportunities and are definitely able to permanently develop and expand the scope of investment activities that relate to the present and future of the vital district cooling sector, he said.

H.E. Al Tayer said: “The positive implications of such partnerships far exceed their investment dimensions. We are keen that the deal would give thrust to improving the efficiency of the energy sector, achieving a qualitative breakthrough in the standards of meeting the growing demand for district cooling services, and nourishing the momentum of establishing environmentally sustainable communities across the Emirate. This, indeed, goes in line with Dubai’s vision to be one of the most sustainable cities in the world and to lead by example in energy efficiency.”

Bin Shafar said that Empower’s acquisition of Nakheel’s entire district cooling activities constitutes an important achievement for the company, which will serve some of the prestigious developments in Dubai. Empower has

been consistently growing its portfolio of projects, and the addition of the Nakheel projects will further diversify Empower’s portfolio, which will include The Gardens, Nakheel Mall, Dragon Mart, Souk Al Marfa, Jumeirah Islands, Circle Mall and Al Khail Avenue.

He explained that Empower has always focused on investing in advanced district cooling infrastructure, in line with requirements, and to provide seamless services to its customers. This strategy, he said, has helped Empower in achieving the leadership position in the industry. Empower, he said, will continue providing its world-class district cooling services to the new customers of Nakheel’s projects. Bin Shafar added that besides the newly struck deal, Empower is exploring various other opportunities to acquire more district cooling assets.

Bin Shafar confirmed that the financing of the deal will be through a mix of company’s funds and finance from local and international banks, with which Empower enjoys close strategic relations.

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Tabreed acquires additional stake in Al Maryah district cooling scheme

Utility provider will have an additional 50% ownership of the 80,000 RT project

By CCME Content Team

National Central Cooling Company (Tabreed) announced the acquisition of an additional 50% stake in the exclusive 80,000 refrigeration ton (RT) district cooling scheme, supplying Al Maryah Island in Abu Dhabi, including its entertainment, hospitality, retail, commercial and residential developments.

The acquisition is from joint venture partner, Mubadala Infrastructure Partners (MIP), bringing Tabreed's ownership to 100%, the district cooling company said through a Press release. Tabreed added that it will continue to operate Al Maryah scheme under a 30-year exclusive concession granted in 2014 by Al Sowwah Square Properties, a wholly owned subsidiary of Mubadala Investment Company.

Having doubled its stake in the district cooling scheme, Tabreed said it continues to deliver on its growth ambitions in key markets. It said that the deal is the fourth major acquisition it has achieved in less than two years, following the securing of an 80% stake in Emaar's Downtown Dubai network and acquiring Aldar's Saadiyat Island plant and the Masdar City district cooling scheme in Abu Dhabi.

Commenting on the deal, Khalid Abdullah al Marzooqi, CEO, Tabreed,



highlighted what it means for the next phase of growth at the company: "Since the start of our operations at Al Maryah island's district cooling scheme in 2014, with the collaboration of our partners MIP, we have developed the scheme into an industry-leading model of efficiency and reliability, and we view our recent move to acquire the entire operation as the next logical step for our growth plans in Abu Dhabi.

"I am particularly proud of our operations and technical teams, who have pioneered many of the latest technologies and operational philosophies at Al Maryah scheme and across all of our plants in the region. They have significantly increased overall

efficiency and reliability while reducing total carbon emissions for the UAE, further highlighting that district cooling continues to be a key component of the UAE's energy strategy and for developing nations in the region and internationally."

According to Tabreed, the new acquisition sees the company extend its reach in supplying high-quality district cooling services to the region's most notable developments. Al Maryah Island, Tabreed said, has become the leading business district of Abu Dhabi, home to Abu Dhabi Global Market, Cleveland Clinic Abu Dhabi, The Galleria Mall, Rosewood Abu Dhabi and the Four Seasons Hotel.

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New Dubai homeowners up for lifecycle analysis of AC units

Hitches & Glitches points out to residential communities such as The Springs, Greens, Meadows & Lakes, all over 15 years old, where air conditioning units are coming to the end of their lifespan

By CCME Content Team

Kelvin Varghese, Senior Director (TFM) at Dubai-based maintenance company, Hitches & Glitches, has alerted homeowners in 'New Dubai' that many will be faced with replacing their air conditioning units over the coming months and years.

H&G, part of the Farnek Group, has witnessed an increasing number of calls from homeowners and tenants, particularly those in the freehold communities in 'New Dubai', such as The Palm Jumeirah, Arabian Ranches, The Greens, and Emirates Living – comprising The Springs, The Meadows, The Lakes and Emirates Hills – Varghese said.

The owners and tenants of these freehold properties, which were mostly built between 2003 and 2007, are now beginning to experience issues with the performance of their air conditioning units, he said. Upon closer inspection, it is clear that many have come to the end of their lifespan and simply need replacing, he added.

“Modern AC units usually last somewhere between 15 and 20 years, but older models can begin failing after 10 years; however, well-maintained units will inevitably last longer than those that have not been serviced regularly,” he said. “Homeowners in these freehold communities will eventually have to decide whether to continue paying for repairs and accept deteriorating performance, or replace them.

“An AC system should be energy-efficient – compare your DEWA bills year-on-year to see if there has been any increase in energy consumption. A poorly maintained A/C unit can lose 5% of its overall efficiency, annually, whereas an efficient A/C system can cut monthly energy costs by up to 25%, especially during the summer months. There are also smart gadgets such as NEST that can also help in this respect.

“Also, remember your AC system should not only be able to reduce the indoor temperature but also be able to reduce



Kelvin Varghese

humidity levels and improve air quality, removing airborne dust and particles. Essentially, if your AC system is not working hard enough to keep your home comfortable during the hottest part of the day, you may need to carry out lifecycle analysis to ascertain whether you need to service, repair, modify or completely replace your AC system.”

Dentons advises Tabreed on disposal of stake in Qatar Cool

Proceeds of the transaction will be used to finance further growth of Tabreed's portfolio in key markets

By CCME Content Team

Dentons said it advised longstanding client, National Central Cooling Company PJSC (Tabreed) on its AED 417 million (USD 113.5 million) disposal of a 44% stake in Qatar District Cooling Company (Qatar Cool) to United Development Company. The proceeds of the transaction will be used to finance further growth of Tabreed's portfolio in key markets, Dentons said.

Dentons said the transaction follows its role in advising Tabreed on the successful completion of a number of acquisitions in the UAE, including its acquisition of the equity interests of Mubadala Infrastructure Partners in the Maryah Island district cooling facilities in Abu Dhabi; the AED 963 million (USD 262.2 million) purchase of Aldar Properties' district cooling assets on Abu Dhabi's Saadiyat Island, which was one of the largest M&A transactions in the UAE

and completed earlier this year; and the acquisition of Masdar's district cooling assets serving Masdar City in Abu Dhabi.

Commenting on the transaction, Dubai partner and team co-lead, Iain Black, said: “We are delighted to have been able to assist our longstanding client, Tabreed on its successful divestment of these assets. We were able to support Tabreed on all aspects of the transaction through our market-leading expertise in our Qatar and UAE offices.”

Dentons said its deal team was led by Black and Doha-based partner, Zaher Nammour, with support from associates, Jasem Alanizy (Dubai) and Joelle Salame (Doha) and paralegal Maryam Abbas (Dubai).

Hepworth launches DACTA range of piping systems

Company says the DACTA Therm (PP-R) piping system is suitable for use in central cooling systems

By CCME Content Team

As part of its growth strategy across MEA, Hepworth, which manufactures piping systems solutions, recently launched its DACTA range of solvent-weld, u-PVC, above-ground drainage systems (DACTA Drainage) and PP-R piping systems (DACTA Therm) to broaden its reach to the building construction sector. Making the announcement through a Press release, the company added that the new range of DACTA products, manufactured in the UAE, is synonymous with sustainability, quality and availability, and allows the company to be present throughout all segments of the sector.

Speaking on the occasion of the launch, Robin Appleby, Chief Executive Officer, Hepworth said, “Our customers deserve a fit-and-forget solution, a product that can give them complete

peace of mind. DACTA Drainage and DACTA Therm are manufactured by Hepworth at our manufacturing facilities in Dubai and Abu Dhabi, fully certified to the relevant international standards and locally approved.”

According to Hepworth, DACTA Therm (PP-R) is suitable for use in central cooling systems and is ideal for transporting hot and cold water in a variety of building applications. The system features high temperature and pressure resistance while being hygienically safe and eligible for use in potable water applications, the company added.

According to Hepworth, Dacta Drainage (u-PVC) above-ground drainage is suitable for use in commercial, residential and industrial applications for soil, waste and rainwater applications. The system complements the Hepworth drainage range, now introducing a



Surajit Mahanty

solvent-welding-jointing system for more demanding specifications, the company added.

Surajit Mahanty, Head of Marketing, Hepworth, said: “With Hepworth’s deep understanding of customers’ needs and leading market position for the last 40 years, the newly launched DACTA range aims to win the trust of construction professionals across the region.”



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Condair installs high-pressure humidification system at Dubai biodome

The system will help protect the flora and fauna in The Green Planet, company says

By CCME Content Team

Humidity control and evaporative cooling equipment company, Condair said it has supplied and installed a high-pressure humidification system to help protect the flora and fauna inside The Green Planet biodome, in Dubai. The indoor rainforest contains over 2,000 species, including insects, plants, fish and mammals. A Condair ML humidification system is spraying up to 750 litres per hour to recreate an indoor tropical habitat at the centre, the company said.

Victoria Lynn, General Manager, Attraction at The Green Planet - Dubai Holding Entertainment, said: "We need to maintain a humidity range of 70-90% throughout the year. We keep the temperature at between 24 degrees C and 26 degrees C inside the rainforest biome year-round. Keeping the biome within this humidity and temperature range is important, as we have numerous species of rainforest plants and animals that depend on a proper environment to survive and live a comfortable life.

"Some general consequences of not maintaining the required humidity and temperature include plants drying out, or not having enough water. Our birds require high humidity to keep their feathers and skin clean and healthy. For our reptiles, high humidity helps them to shed their skin properly and prevent dehydration."

Mahmoud Widyen, General Manager, Condair Middle East, said: "The Green Planet biodome is such an impressive and educational experience for its guests, and we are very proud to have supplied the humidification system for this project. It was important that the humidifiers blended in with the design of the environment, so we worked with the project team to embed the system's nozzles around some of the elevated walkways that surround the world's largest man-made tree. It was a very



successful installation, which we are delighted to be supporting with regular planned preventative inspection and maintenance."

According to Condair, the ML Flex high-pressure humidifier used at the centre is proven technology and consists of a water treatment and pump station, feeding water to a series of nozzles strategically located in the area requiring humidity control. As the water is pressurised to around 70 bar, when it is released from the nozzle, it rapidly atomises without any drips, Condair said. Its RO water treatment filter removes not only minerals from the supply water but also bacteria and viruses, the company said. This combines with the humidifier's on-board UV sterilisation system to ensure humidification is dust free and hygienic, the company added.



High-pressure humidifiers, such as the ML Flex, offer high capacity humidification as well as evaporative cooling to an environment, Condair said. For every one kilogramme of moisture delivered, 0.68kW of evaporative cooling is also provided, it added. As each pump station can provide up to 750kg/h of water, the system, the company further added, is ideal for large manufacturing and production areas, as well as greenhouses and agricultural applications.



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CONSIDER IT SOLVED

Phileo, Hall Mark launch AmericanACparts.com

Joint-venture initiative aims to foster availability of genuine spare parts and associated technical support through availability of expertise from the manufacturer's side

By Surendar Balakrishnan | Editor



Shariq Anjum



Moan Abraham



Jad Khairallah

Phileo PM Aircondition & Refrigeration Trading, in association with Hall Mark International Electromechanical Works, launched AmericanACparts.com, with the objective of serving genuine Trane spare parts with the support of AI Arabia Technical Supplies & Contracts (Juma Al Majid Holding Group), authorised distributor of Trane in the UAE.

Speaking during the launch ceremony, Shariq Anjum, Sales & Marketing Manager, AI Arabia Technical Supplies & Contracts, said the company holds stocks of products ranging from compressors to sealants. He highlighted how the company deals in Trane's unitary products portfolio, including ducted units (1.5TR-3TR) and packaged units (3TR-42TR), suitable for high-ambient conditions, up to 54 degrees C. The portfolio of products the company

distributes, he said, enables it to work on a wide range of projects, including mosques and villas. Trane units are installed in the fronds at Palm Jumeirah and in the Falcon City of Wonders, he said, mentioning two large projects.

Speaking on the benefits Phileo brings to the equation, Moan Abraham, Director and Managing Partner at the company, said that Phileo, set up as a B2B e-commerce HVAC platform in August 2020, is representative of the trend of digital stores the world over. "COVID accelerated the use of online stores the world over," he said. "Key benefits of online stores are reduced quotation turnaround time – about 80% time saved – and seamless integration of procurement till order fulfilment, including technical support." Saying so, dealing in genuine spare parts is a natural progression for Phileo, Abraham added.

Jad Khairallah, Leader (Services), Trane Middle East, spoke on the importance of choosing genuine spare parts from the manufacturers, as opposed to non-genuine parts.

Genuine parts, he said, give warranty coverage. "When you buy from Juma Al Majid, you will be covered by warranty," he said. "If not, you may struggle. Non-genuine parts could cause failures and give rise to issues in other parts in the equipment." Khairallah hastily clarified that warranty fulfilment depends on customer practices. If the compressor is genuine and if some other part is not, and if it affects the compressor, then the compressor would not be replaced, he said.

Genuine parts, he said, also increase equipment and staff safety and, further, facilitate the manufacturer in the quick identification of parts.



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Danfoss completes USD 3.3 bn acquisition of Eaton's hydraulics business

Will be combined with its Power Solutions business segment, Danfoss says

By CCME Content Team

Danfoss said it has officially finalised its USD 3.3 billion (approximately €3 billion) acquisition of Eaton's hydraulics business, following confirmation of all necessary regulatory approvals and closing conditions. Making the announcement through a Press release, the company said the move will see the Danfoss Group grow in size by a third and establish itself as a global leader in mobile and industrial hydraulics.

Danfoss said mobile hydraulics has been one of its core and most successful businesses for over 50 years. The acquisition of Eaton's hydraulics business is a vital aspect of its growth strategy, the company said. Eaton's hydraulics business will be combined with the Danfoss Power Solutions business segment, adding approximately 10,000 employees worldwide and USD 1.8 billion (around €1.5 billion) in 2020 global sales, it said. Combining the two organisations will double the size of Danfoss Power Solutions, increasing its innovation capacity twofold, it added.

The strengthened Danfoss Power Solutions will have the broadest selection of mobile and industrial hydraulics products and solutions available on the market, with the full line offering including fluid conveyance systems, the company said. Its distribution channels have also been significantly boosted, while its local application support and geographical reach have increased considerably, it said. All of these benefits will enable Danfoss Power Solutions to become an even stronger technology partner for existing and new customers, plus take the lead in digitalisation and electrification, it added.

Kim Fausing, President and CEO, Danfoss, said: "This is a great day for Danfoss as we welcome 10,000 new colleagues into the organization and



Eric Alstrom



Kim Fausing



Paulo Ruiz

create a global leader in mobile and industrial hydraulics. By combining the knowledge and experience of the two strong businesses and great teams, our customers will receive an unmatched level of service and expertise from a single partner. We will continue our significant investments to stay on the forefront of technology leadership and provide solutions that improve productivity and reduce emissions to meet the requirements of the future."

Eric Alström, President, Danfoss Power Solutions, said: "The need for technologically innovative and industry-changing hydraulic solutions is as great as ever. We're very pleased to complete this significant investment in our core hydraulics business so we can serve our customers and partners even better than before. Combining the two robust businesses represents a perfect match

and provides countless opportunities, such as increasing our engineering expertise and capabilities, doubling our global application support and extending the value of our Application Development Centers and digital design tools. Adding fluid conveyance and industrial applications are other assets gained through this transaction."

Paulo Ruiz, President of the former Eaton hydraulics business, added: "This is an exciting new chapter for both of our businesses and our people, which are stronger together. The new Danfoss Power Solutions team will create a global leader in mobile and industrial hydraulics, drawing on long legacies of innovation and industry-leading expertise. The combined product portfolio and broadened global reach will better serve customers and distributors all around the world."



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The ideal candidate should have a well-established local network of contacts and should be a person well known in the market. The candidate should provide past references, in terms of projects and personal feedback.

The ideal candidate should also have a UAE driving license, as well as fluency in English. Fluency in other languages will also be positively considered

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MARKETPLACE

Bitzer launches Varipack frequency inverters

Company says the devices provide flexible energy savings

By CCME Content Team

Bitzer has added models with IP55 and IP66 enclosure classes to its range of Varipack frequency inverters. Making the announcement through a Press release, the company further said that the additions retain all of the product family's known properties, such as user-friendliness, reliability and performance.

According to Bitzer, the inverters are designed for safe and easy capacity control and have been specially adapted for refrigeration and for the operation of Bitzer refrigeration compressors. They open up a wide range of applications in supermarkets, hotels and restaurants as well as in food manufacturing and processing, the company said. The inverters, the company added, are suitable for refrigeration and air conditioning systems as well as for heat pumps and can be combined with single compressors and compound systems alike. After intuitive commissioning, the inverters take over the control functions of the refrigeration system, the company said. They can be mounted in a switch cabinet (IP20) or outside of the switch cabinet, thanks to the higher IP55/66 enclosure class, it added.

According to Bitzer, the inverters can be operated in two modes: The compressor's capacity can either be controlled depending on an externally set signal or on the evaporation temperature with an optionally available pressure control add-on module. In addition to direct control of the evaporation temperature, the speed of the condenser fan can be set via a 0-10 V output signal, and a second compressor can be switched on, the company said. With regard to pressure control, the inverters have a database of all commonly used refrigerants for ease of configuration and monitoring, the company said.

According to Bitzer, its software can be used to select a frequency inverter for specific applications, and BEST software (Bitzer Electronics Service Tool) can be used for easy commissioning and monitoring. The stored databases simply select the compressor model to fully configure every compressor, the company said. BEST software is also the interface for communication to configure, monitor and read out error messages, the company said. The inverters, with the IP55/66 protection class, are also fitted with a display, as



Photo courtesy: BITZER

standard, which makes it possible to view the current operating conditions and adjust common parameters, the company added.

The inverters ensure that when operating in field-weakening mode, the maximum frequency is automatically limited, depending on the load, the company said. Optimised adjustment to suit the system's current cooling demand, the company added, reduces energy consumption, increases efficiency and lowers running costs.

Chillventa launches new Web site

Chillventa 2022 will run from October 11 to 13

By CCME Content Team

Following the Chillventa eSpecial 2020, and after four years without an in-person gathering, the exhibition for refrigeration, air conditioning, ventilation and heat pump technology will run from October 11 to 13 at the Exhibition Centre Nuremberg, the organisers said.

The Chillventa CONGRESS, will take place on October 10, the organisers said, adding that exhibitors

can register for the event immediately. The organisers said they have launched a new Web site, which offers an improved user experience and provides even more focused information.

Chillventa, the organisers said, will offer opportunities for networking in person and view innovations through live demonstrations. The planned trade fora, Chillventa CONGRESS and supporting programme will spotlight issues like energy performance, contributing to the energy revolution, combined cooling

and heating and the cooling of data centres, the organisers said. The event will also look at topics like the circular economy and the cold chain in the pharmaceutical sector.

"We are preparing to finally see our exhibition halls back in action again and to welcoming the international refrigeration, AC, ventilation and heat pump community in person to Nuremberg," said Daniela Heinkel, Director of Chillventa at NürnbergMesse. "We are sure that the kind of platform offered by Chillventa is now more in demand than ever and are confident that it will build on its successful 2018 round."

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Ziehl-Abegg invests €36 mn in expanding its facilities

Further investment of €20 million earmarked for machinery at the site, in Kupferzell, Germany, company says

By CCME Content Team

“The world’s markets will continue to need high-quality electric motors and fans in the future,” said Peter Finkl, CEO, Ziehl-Abegg, explaining why the company invested €16 million euros in the expansion of its production buildings at the Kupferzell site in the middle of the pandemic. This, he added, will be followed by a further €20 million for machinery. Dr Nicole Hoffmeister-Kraut, Minister of Economic Affairs, Baden-Württemberg, added, “With the new building, the company is further expanding its high degree of vertical manufacture and the resilience of the supply chains here at the site, whilst also securing valuable jobs both within and beyond the region.”

Finkl described how, in the early summer of 2020, many economic decision-makers were in shock due to the pandemic. “No-one knew what was coming next – and that’s when we started our current construction project,” he recalled. “The year 2020 resembled a rollercoaster ride – rapidly alternating between border closures, interruptions to material supplies, falling sales and rising orders. Thanks to the commitment of each and every one of the employees, the company still succeeded in posting an increase in sales at the end of the year – followed by an order intake that exceeded all previous records.”

Referring to the new building, he said, “So we’re now glad that we’ve already created more space for rapid growth.” New machines and systems that had already been ordered in spring 2020, will be arriving on a weekly basis, he said, adding that the building is also intended to create an additional 180 jobs.

The new building will result in an additional 8,700 square metres for manufacturing state-of-the-art generation of energy-efficient electric motors, the company said. “The durable and efficient electric motor has been our core area of expertise for more than 100 years,” Finkl said, adding that the company is a

Photo courtesy: Ziehl-Abegg/Ufuk Arslan



Peter Finkl shows Dr Nicole Hoffmeister-Kraut how fans for data centres and hospitals are assembled

technology leader in the design of fans based on the concept of biomimetics. “However, since many geometries offering perfect aerodynamics cannot be implemented in steel or aluminum, we are expanding the area of composite materials,” he said. “It is essential for us to have more space for additional injection-moulding machines for composite materials.”

Ziehl-Abegg, he said, is expanding its production facilities worldwide or optimising existing plants – in Schöntal-Bieringen, where the aluminium casting operation is based, and in America and Asia. “Corona,” he said, “has shown that we have to consider very carefully how we can design our production facilities in a way that enables us to satisfy the needs of the market to optimum effect.”

ASHRAE announces call for abstracts for 2022 Annual Conference

Event, in Toronto, scheduled to take place from June 25 to 29

By CCME Content Team

ASHRAE announced it is accepting abstracts for the 2022 ASHRAE Annual Conference, from June 25 to 29, in Toronto, Ontario, Canada.

According to ASHRAE, the conference will address the changes to buildings created by the pandemic and will present papers and programs that are pertinent to the future of the built-environment.

“As we move into 2022 and face climate extremes and natural disasters along with the pandemic, buildings continue to be critical to our everyday lives,” said Kristen Cetin, Conference Chair. “These commercial, industrial and residential buildings, in particular, face an increasingly complex set of competing priorities to balance, as well as an increasing number of technologies and solutions to use and implement. The 2022 ASHRAE Annual Conference focuses on such diverse priorities and methods to address them, while considering the dynamic nature of such priorities over time.”

According to ASHRAE, the conference’s technical program comprises eight tracks:

The “Buildings in the Aftermath of COVID-19” track will highlight the significant impacts on how buildings are used, the priorities associated with building operations to ensure healthy environments for occupants, and the transition to design and operation in the aftermath of the pandemic.

The “Connected Buildings, Connected Communities” track will focus on advanced smart building technologies and renewable energy resources, and the coordinated efforts in accomplishing improved building performance and demand flexibility.

The “IAQ, Energy Use, Comfort and Health of Sustainable Buildings” track will feature the following topics, and how they interact and impact one another: Indoor Environmental Quality (IEQ), energy use and efficiency, occupant comfort and

health, sustainability goals and owner/operator priorities.

The “Cold Climate Building System Design, Operation and Resilience” track will cover efforts and topics specifically focused on buildings, building systems and equipment in cold, arctic and sub-arctic climates. The track will also cover specific considerations for the building envelope and HVAC&R systems, and the resulting thermal and hygrothermal performance.

The “Professional Development” track will cover all aspects of business outside of engineering/technical applications and lends itself to interactive session types, such as workshops and forums.

The “HVAC&R Systems and Equipment” track will focus on the development of new systems and equipment, improvements to existing systems and equipment and the proper application and operation of systems and equipment.

The “Fundamentals and Applications” track will provide opportunities for papers of varying levels across a large topic base. Concepts, design elements and shared experiences for theoretical and applied concepts of HVAC&R design are included.

Finally, the “Research Summit” will feature active research, and the exchange of research findings, critical to the development of the


HVAC&R industry and built environment. The track includes a partnership with ASHRAE’s archival journal, *Science and Technology for the Built Environment*.

ASHRAE said that abstracts – 400 words or less – are due on September 20, 2021. If accepted, final conference papers (8-page maximum) are due on December 1, 2021, it added.

In addition, it said, technical papers – complete 30-page maximum papers published in *ASHRAE Transactions* – are also due September 20, 2021, and considered for Science and Technology for the Built Environment.

ASHRAE urged those interested in submitting to visit ashrae.org/2022Annual for more information on the call for abstracts and the 2022 ASHRAE Annual Conference.

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ASHE recognises member achievements within health care engineering

Timothy Eugene Adams of Indiana University Health wins Crystal Eagle Leadership Award

By CCME Content Team

The American Society for Health Care Engineering (ASHE) of the American Hospital Association said it celebrated the outstanding contributions its members have made to improve the health care physical environment. ASHE presented several awards during its 58th Annual Conference and Technical Exhibition, from August 8 to 11 in Nashville, Tennessee, United States.

The Crystal Eagle Leadership Award, considered ASHE's lifetime achievement award, went to Timothy Eugene Adams, FASHE, CHFM, CHC, an ASHE member since 1990. Presently, he is employed by Indiana University Health as program director of system environment of care and life safety, developing and directing a systematic program to promote best practices for all health care facilities throughout the health system. Adams served as the director of leadership development for ASHE from 2013-19 and held numerous other positions within the society since joining the team in 2005 after 30 years working in health care technical services and clinical engineering. Adams is a Certified Healthcare Facilities Manager, a Certified Healthcare Constructor, a Certified Life Safety Specialist and a Fellow status member with ASHE (FASHE). He is a past president and a long-term Board member of the Indiana Society for Healthcare Engineering, a 15-year member of the National Fire Protection Association (NFPA) 72 Technical Committee and a member of the national development team for the Hospital Incident Command System (HICS).

The ASHE President's Award, which is presented at the discretion of the sitting ASHE president to an individual who goes above and beyond to optimize the health care physical environment, was presented to Sean M Goings, CEM, CHSP, SASHE, President, DAC, Inc. in Houston, Texas. Goings has spent much of his over 20-year career working for global solution

providers that serve health care, such as Siemens and Schneider Electric, and he continues to deliver efficient solutions in the built-environment, ASHE said.

Goings is a Senior status member with ASHE (SASHE), a Certified Energy Manager and a Certified Healthcare Safety Professional. He has been a featured conference speaker for numerous organisations including ASHE and several affiliated chapters.

He has served on the Board of the Texas Association of Healthcare Facilities Management (TAHFM) for over a decade. He is a past president for the Houston Area Association of Hospital Engineering, and from 2016-2020, he served as an ASHE Associate Member Advisory Board Representative.

Also at the Annual Conference, ASHE recognised members who attained senior (SASHE) status this year and members who have fellow (FASHE) status within ASHE.

The SASHE designation is bestowed on those who have been ASHE members in good standing for at least five years and have supported ASHE in terms of education and leadership. The following members are new SASHE recipients:

- Lindsey Brackett, CHC, CHFM, SASHE, Legacy FM, LLC, Little Rock, Arkansas
- Joseph G. Buri, CHFM, SASHE, UNC Health Southeastern, Lumberton, North Carolina
- Mark H. Dease, CHFM, SASHE, Prisma Health, Greenville, South Carolina
- Robert J. Heidelbaugh, SASHE, WellSpan Health, York, Pennsylvania
- Frank D. Rudilosso, PE, M.Eng, CHSP, SASHE, New York-Presbyterian Hospital, New York, New York
- Clayton Smith, CHFM, SASHE, Children's Health System of Texas, Dallas, Texas
- Mark J. Thuringer, CHFM, CHC, SASHE, St. Croix Regional Medical Center, St. Croix Falls, Wisconsin



Timothy Eugene Adams

ASHE's Regional Leader Award recognises people for their contributions to the fields of health care engineering and facility management; planning, design, and construction; safety; clinical and biomedical engineering; and technical management. The recipients are:

- Region 1: Charles Brown, Women & Infants Hospital of Rhode Island, Providence, Rhode Island
- Region 2: Joyce Malone, Broadmead Senior Living, Cockeysville, Maryland
- Region 3: Jerry L. Thompson, PE, CHE, Duke Health, Durham, North Carolina
- Region 4: Terry E. Bowen, PE, CPE, CHFM, Tift Regional Health System, Tifton, GA
- Region 5: Jason Michael Hawk, St. Joseph Memorial Hospital, Murphysboro, Illinois
- Region 6: Robert J. Dubiel, CHFM, CHC, Mayo Clinic Health System in Eau Claire, Eau Claire, Wisconsin
- Region 7: Taylor Vaughn, MBA, CHFM, CLSS-HC, CHEPP, Children's Health, Rockwall, Texas
- Region 8: Nic Riesenber, CHFM, CHC, North Kansas City Hospital, North Kansas City, Missouri
- Region 9: Anthony K. Crawford, CHFM, CHEM, Kaiser Permanente Vacaville Medical Center, Vacaville, California
- Region 10: Clay Ciolek, CHFM, Providence Health & Services, Olympia, Washington



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Cooling to the Green Deal with natural CO₂ refrigerant systems

With a recast of the European F-Gas Regulation expected by the end of 2021, even more stricter emission targets are anticipated following the publication of the European Commission's Green Deal in July

By CCME Content Team

Invertek Drives showcased its dedicated VFD, Optidrive Coolvert, for use on CO₂ refrigeration display cases used in the retail sector. The company added that its Optidrive Eco operates on larger current refrigeration compressor racks and cold rooms.

Invertek made the announcement against the backdrop of the European Commission's Green Deal, also referred to as Fit for 55, which sets out proposals to cut EU net greenhouse emissions by at least 55% by 2030, compared to 1990 levels. This could mean the current target of reducing fluorinated greenhouse gas (F-Gas) emissions by two-thirds by 2030, compared with 2014 levels, will be adjusted and tightened further.

The EU F-Gas Regulation brought a 44% reduction in the amount of available HFCs in the EU, compared to 2015. By 2030, the current regulation allows only 20% of HFCs being available, with stepped drops between then and now. This could change in the recast.

According to Invertek, the impact of both means there is a need to ramp up the use of natural refrigerants, such as CO₂, in cooling and refrigeration systems. And this isn't just in the EU but throughout the world as part of

the existing Kigali Amendment to the Montreal Protocol, it said.

Variable frequency drives (VFDs), the company said, are playing an important role in reducing emissions and energy use in HVAC&R systems. Optidrive Coolvert, it said, is one of the smallest VFDs in its class providing OEMs with opportunities to reduce panel space and lower machine costs. It fits directly into refrigeration display cases alongside a CO₂ compressor, it added.

This is in addition to end-user savings of up to 25% using CO₂ refrigerant condensing systems, which it is specifically designed to work with, the company claimed. A combination of meeting EU F-Gas Regulations and cutting energy use is a significant benefit for the end-user as well as for the environment, it said.

Mike Carman, Head of Sales, Invertek Drives, said: "The recast of the F-Gas Regulation comes as the EU sets out its new and wider environmental ambitions through the Green Deal. It's widely believed this is the precursor to a significant adjustment in the F-Gas Regulation timeframe.

"With either more cuts in the amount of HFCs available in the EU or increased limits on emissions, it'll impact on the manufacturers and end-

users of refrigeration and wider HVAC/R systems."

According to Invertek, the Optidrive Coolvert also has the widest ambient operating range of between -20 degrees C and +60 degrees C, making it ideal for use in a wide range of environments. It can be used for the control of CO₂ rotary or scroll, BLDC compressors used in supermarkets and convenience store display cases; heat pumps, and condensing units, the company said. This is in comparison to the Optidrive Eco VFD, which operates on larger-capacity semi-hermetic and screw compressors used in industrial and food retail refrigeration racks, and chillers, the company added.

According to Invertek, Coolvert is compatible with all motor types, including induction motors, permanent magnet motors, brushless DC motors, synchronous reluctance motors and Line Start PM motors ranging between Single Phase (Active PSE) 7A and 20A, and Three-Phase 14A to 24A (input of 200V to 480V).

Its open Modbus RS485 communication, the company said, ensures seamless connection to any external application controller, allowing the OEM freedom to select which components to use, which again helps lower manufacturing costs.

With an IP20-rated front and an IP55-rated rear, its panel mounting allows the drive's power electronics to be cooled by the chilled air of the condenser, the company said, adding that this allows OEMs to select the smallest panel size for the control of the electronics, while removing heat generated by the drive and maintaining the IP rating.

AHRI to participate in The Big 5 Dubai

Expresses keenness in discussing solutions for the regulatory, environmental issues of relevance to the HVACR industry

By CCME Content Team

AHRI announced its participation in The Big 5 International Building and Construction Show, online from August 22 to November 17, and in-person from September 12 to 15 at the Dubai World Trade Centre.

The show features nine specialised events, three high-level summits, 70 free industry talks, and more, AHRI highlighted.

AHRI said it will be available at Stand 4A191 in Hall 4, which will be open from 10am to 6pm, GST. It added that it was open to discussing its turnkey solutions

for the regulatory and environmental issues most relevant to HVACR businesses and the wider industry. It added that it was keen on learning about the challenges HVACR industry players face in these areas, and on discussing solutions.

AHRI added that it would provide its AHRI MENA USB Toolkit, a comprehensive guide to the AHRI standards, certification, and other programmes relevant to the region, to visitors.

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'Clean up indoor air, or else expect COVID to surge'

To end the pandemic, the United States must look at the air we breathe, says New York-based HVAC consultant

By CCME Content Team

An air quality engineer warned that the COVID-19 pandemic won't end until Americans clean up the indoor air.

"With variants on the rise, all the talk this summer has been about vaccines," said Jeremy McDonald, Vice President at New York-based firm, Guth DeConzo Consulting. "Now we're hearing about masks again, which feels like a step back for most of us. But when it comes to preventing the spread of airborne viruses, like COVID-19, we also have to improve the quality of the air in our indoor spaces. As the seasons change, it seems like we're going back to old, tired strategies that haven't gotten us out of this mess. It's time to listen to the engineers: It's all about the air."

McDonald on July 26 published an essay, titled 'Moving Beyond COVID-19: It's Time to Look at the Air We Breathe', in which he argued that US President Joe Biden's 'American Jobs Plan' must include improvements to the indoor air quality (IAQ) infrastructure, if Americans are to finally beat the COVID-19 pandemic and improve defences against future pandemics and common day-to-day air quality maladies. Towards the end of July, COVID-19 cases began to surge in parts of the United States, and the Centers for Disease Control and Prevention, in the United States, revised its mask guidance to once again recommend that Americans wear masks indoors, even if vaccinated.

McDonald encouraged improvements to ventilation and the use of high-performance air filters and other air purification technologies, where appropriate. Buildings that have deferred maintenance and investment in modern HVAC may require more complicated and expensive solutions, he said.

"Although some buildings may require an expensive investment, we need to weigh this against the cost of our health and well-being," McDonald wrote in his essay. "Certainly, when considering our health, fixing 'sick' buildings is a much better choice than fixing 'sick' people."



Jeremy McDonald

Yet, McDonald said, there are plenty of low-cost or no-cost solutions that can drastically improve IAQ, such as cracking a window, which reduces the intensity and quantity of virus particles and their ability to spread to more people, using air purification technologies, and simply ensuring that buildings meet the spirit of building code requirements for minimal fresh air for buildings.

Saying that there is a historical precedent for this common sense strategy, McDonald noted in his essay: "In response to the Pandemic of 1918, when more than 20,000 New Yorkers died, ventilation was seen as one of the key attributes to protect residents from the devastation of the pandemic. Back then, New York City officials dictated that building heating systems were to be designed and sized to operate with all the windows open, since it was recognized that ventilation was key to purge the virus from indoor spaces. If it worked 100 years ago, it will work today."

One of the main challenges in getting

people to pay more attention to poor indoor air quality is that the problem is invisible, an issue McDonald commented on in an original cartoon he commissioned to get his point across. In the first panel of the cartoon, two fish swim in a bowl. One fish says, "I think the poor quality of the water is making us sick." The other fish asks, "What's water?" In the second panel, two office workers and an HVAC engineer stand near the same fishbowl. "Glad to be done with masks, sanitizers and social distancing forever!" says one office worker. "If we don't improve our air quality in our buildings, we will keep getting sick in the future," the engineer chimes in. "The air looks good to me," says the other office worker. Beside her, one of the fish in the bowl is floating upside down with Xs for eyes, indicating it has died. The caption below the cartoon reads, "We don't know who discovered water, but we're pretty sure it wasn't a fish," which is a modern proverb attributed to various sources. That saying, McDonald asserted, sums

up our own troubled relationship to air quality – because air is so fundamental to our existence, most of us don’t even think about it. But HVAC engineers think about air every day, all day, and it’s time to listen to them in the fight against airborne illness, he added.

“My frustration, which motivates me to write and speak out on the issue of air quality, is that our leaders are not getting it, and they aren’t listening to engineers,” McDonald said. “But the public health officials aren’t really talking about indoor air quality either, so a lot of politicians probably don’t want to go against the narrative.”


McDonald said that some of the anti-vaccine sentiments may stem from incomplete messaging that does not address indoor air quality. “Some of the resistance to masks and vaccines might be because people know in the back of their mind there’s something missing from the common messaging that is ringing hollow 18 months into this pandemic,” McDonald said. “We are constantly



hearing, ‘Wash your hands, wear a mask and socially distance, where possible.’ We need to add simple, yet time-tested, ventilation strategies to our messaging, which we all know implicitly makes sense to folks from all political persuasions.” Perhaps with improved messaging from our leaders and initiatives to fix our broken HVAC systems, we can truly address this pandemic without arguing about

the viability of masking and vaccines, he added.

McDonald said he is clear that vaccines are a key tool in beating this pandemic. But, without addressing the fundamental issue of indoor air quality, he said, we may be putting a “BAND-AID” on the current problem, missing out on the opportunity to improve public health for the long term.




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AMCA introduces tools to aid transition to Fan Energy Index

Initiative comes against the backdrop of the US DOE saying that states must review and certify their building codes relative to ANSI/ASHRAE/IES 90.1-2019 and the 2021 IECC

By CCME Content Team

AMCA International introduced tools to aid transition to the Fan Energy Index. The body did so against the backdrop of recent developments related to energy efficiency in the United States.

On July 28, the US Department of Energy (DOE) issued determinations that the 2019 edition of ANSI/ASHRAE/IES 90.1, Energy Standard for Buildings Except Low-Rise Residential Buildings, and the 2021 edition of the International Energy Conservation Code (IECC) “will achieve greater energy efficiency in buildings subject to the code” and “will improve energy efficiency in residential buildings”, respectively. Upon publication of these affirmative determinations, the DOE said, states in the country must review and certify their building codes relative to ANSI/ASHRAE/IES 90.1-2019 and the 2021 IECC.

As states begin to examine and update their energy codes, some are adopting an earlier edition of ANSI/ASHRAE/IES 90.1 (2016 or 2013) or the

IECC (2018 or 2015), AMCA said. In so doing, they are prolonging the use of fan efficiency grade (FEG) as the metric for efficiency provisions for commercial and industrial fans and blowers, AMCA said. FEG, which the DOE concluded in an as-yet-unfinished rulemaking is not an appropriate metric for a federal appliance/equipment regulation, was replaced by Fan Energy Index (FEI) for ANSI/ASHRAE/IES 90.1-2019 and the 2021 IECC, AMCA said, adding that it advises states adopting earlier editions of ANSI/ASHRAE/IES 90.1 and the IECC to “leapfrog” the outdated FEG metric to take advantage of the energy-saving, compliance-easing FEI.

For example, Florida, which on December 31 became the first state to adopt FEI when the seventh (2020) edition of Florida Building Code: Energy Conservation was published, adopted the 2018 IECC, but the 2021 IECC fan-efficiency provision, AMCA pointed out.

“Florida has set the example of how to leapfrog model-energy-code provisions to avoid prolonging the use of an outdated metric,” Aaron Gunzner, Senior Manager,

Advocacy, AMCA International, said. “To help other states achieve the goal of phasing in the new FEI metric, AMCA International has, with permission from ASHRAE and the International Code Council, developed templates with exact strike-out/underline language.”

Additionally, to describe the rationale for and the benefits of changing metrics, AMCA said it recently updated its Advocacy Brief: New Fan Energy Index (FEI) Metric and Scope for Energy Codes, a document for code officials and others considering proposals to transition from FEG to FEI.

Formalised in ANSI/AMCA Standard 208-18, Calculation of the Fan Energy Index, FEI considers the effects of motors and drives, not just fans, and aids the right-sizing of fan systems for the conditions they will operate in, AMCA said. In addition to ANSI/ASHRAE/IES 90.1-2019 and the 2021 IECC, it added, FEI has replaced FEG in:

- 2021 International Green Construction Code (IgCC)
- ANSI/ASHRAE/ICC/USGBC/IES 189.1-2020, Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings

AMCA recommended visiting www.amca.org/FEI, to download the templates and to view Advocacy Brief: New Fan Energy Index (FEI) Metric and Scope for Energy Codes. The microsite, AMCA said, additionally includes links to related codes and standards, technical articles and white papers, webinar recordings, and presentations.

DriSteem introduces Buyer's Guide

Company spotlights humidification issues and solutions for the electronics manufacturing sector

By CCME Content Team

DRI-STEEM Corporation, manufacturer of humidification, evaporative cooling and water treatment products, announced the introduction of a new buyer's guide focused on humidification for electronics manufacturing.

DriSteem said it knows the importance of maintaining the appropriate humidity level within electronics manufacturing facilities, as

proper relative humidity (RH) levels between 30% and 70% can significantly help decrease damage and stress to electronic components. When humidity levels are greater than 70%, corrosion can become an issue, the company said. In a controlled environment, manufacturers experience a reduction of electrostatic discharge, fewer brittle components, and fewer issues with soldering and de-soldering; they as well are able to create a safe environment for staff, the company added.

“This specific buyer's guide is positioned to educate facility directors at electronics manufacturing plants about the importance of maintaining proper humidity to not only protect the products they are developing but to also keep workers safe and healthy,” said Randall Potter, Business Development Leader, DriSteem. “Many facility directors have expressed a need for educational materials and meetings. This buyers guide is an easily accessible way to help educate building management about the importance of humidity and how best to manage it throughout a facility.”



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