ADVERTORIAL

THIS HOME-GROWN COMPANY IS PROVIDING A PARADIGM-SHIFTING HEAT REMOVAL SOLUTION TO COOL THE WORLD'S DATA CENTRES

KoolLogix's patented energy-efficient cooling system for data centres reduces energy consumption by up to 50 per cent

KoolLogix' leadership team, staff and senior advisors at the company's most recent quarterly business review meeting. PHOTO: KOOLLOGIX

Organisations need to make important, timely and informed decisions to stay competitive and relevant. Businesses will increasingly leverage shared IT operations in data centres that will help store, process and disseminate critical and proprietary digital assets with powerful computing resources.

With the upward surge in global data centre builds, led by the adoption of cloud technology and the advancement of high-speed internet connectivity, the demand for better heat management solutions is experiencing a projected boom from US$187 billion (S$256 billion) today, to an estimated US$517 billion (S$709 billion) by 2030.

To ensure optimal performance and the longevity of these powerful computing resources, effective and targeted heat-management systems need to be employed. But how can this be done while maximising energy efficiency?

Enter KoolLogix, winner of OCBC's 2021 Emerging Enterprise & Sustainability award which not only solves the heat management problem, but also promises to deliver with proven energy efficiency technology. The outcome is a lowering of carbon emission by data centres, improving environmental sustainability, and thereby furthering clients' ESG goals.

Nine years in the making - an energy-efficient data centre heat management system

The journey started back in 2013 when KoolLogix's parent company, ERS Industries Pte Ltd – an established SME that manufactures electronic equipment racks for use in data centres, saw the importance of having to further innovate and develop a new generation of products to stay ahead of the competition.

With the help of IPI, which today is a subsidiary of Enterprise Singapore, ERS analysed and identified the technological areas critical to its new product roadmap. The company was further connected by IPI to a thermal management expert from the National Technological University (NTU), who not only developed the new products and strengthened the organisation's engineering capabilities, but also later joined ERS as its CTO.

ERS also collaborated with A*Star's Institute of High-Performance Computing (IHPC) to develop the thermal management technology.

Dr Su Yi, Executive Director of A*Star's IHPC, says: "A*Star's IHPC has been partnering with ERS Industries and its spin-off KoolLogix to co-develop energy efficient solutions for data centres since 2013. By leveraging IHPC's capabilities in computational fluid dynamics and high-performance computing, the KoolLogix cooling system is an innovation that aims to contribute to Singapore's decarbonisation efforts sustainably, while supporting our smart nation initiatives. IHPC will continue to build upon such public-private partnerships to encourage businesses to co-innovate and conduct local test-bedding for more regional and global business opportunities."

The results and potential of the technology were so promising that in 2018, ERS's management team – C K Cheong (CEO), K H Lee (Chairman), and Dr. Seri Lee (CTO) – spun out KoolLogix so as to ensure dedicated resources for both R&D and business development.

Unlike conventional systems that cool the rack-mounted servers directly, the KoolLogix system first extracts and removes the waste heat of the computing servers, before reintroducing cooled air back into the ambience of the server room. This reduces the reliance on the often-overcompensated energy-guzzling air conditioners, as well as effectively handling any excess heat leakages that might be detrimental to computing server performance and longevity.

The KoolLogix system uses the discharged waste heat from the servers to drive a refrigerant-based circuit that absorbs the heat energy and transports it away from the immediate proximity. Relying solely on the natural convection flow of the refrigeration working fluid, where no mechanical pumps or compressors are used, the system results in both lower energy consumption and reduced maintenance complexity. After the heat is extracted from the server discharge, cooled air is reintroduced back into the ambience of the server room through a low-power fan array. A typical 20kW-powered server rack needs only a sub-150W fan array to perform the tasks, making the overall system not only highly efficient, but also able to greatly reduce the carbon emission.

KoolLogix is currently studying the use of alternate refrigerants for its systems to further fulfil the company's mission in helping to promote environmental sustainability and greenhouse gas reduction.

Helping data centres reduce operational costs

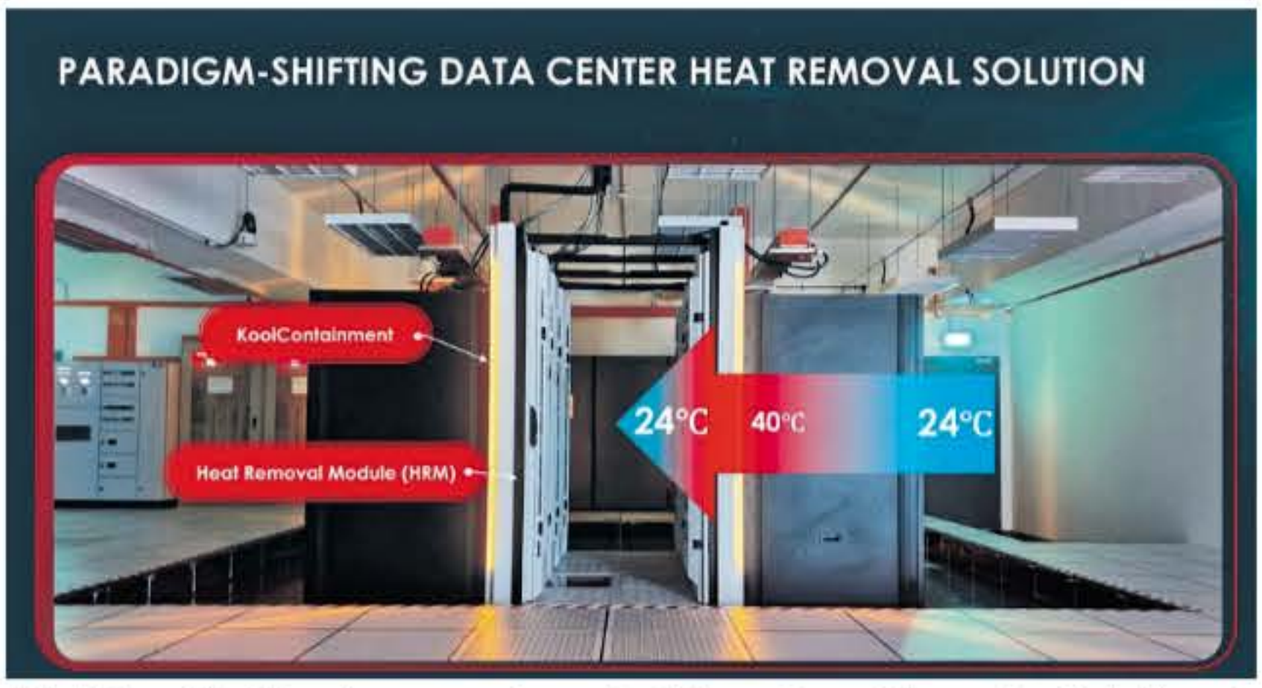
Other than the efficient management of energy, data centres also have to maximise space to ensure better return-on-investment. The KoolLogix system addresses both interests.

Comprising of two main components – the KoolLogix Heat Removal Module and KoolContainment Shared Cooling Housing Structure – that are modular in nature, the KoolLogix system replaces the need for raised floors, precision row cooling and aisle containment systems, hence allowing data centres to have more space to house servers.

This modularity is unique when compared to other products currently in the market and was a key deciding factor for Singapore's National Supercomputing Centre (NSCC) to adopt the KoolLogix solution for its newest and most powerful supercomputer.

"One of the key factors in designing Singapore's first tropical supercomputing data centre, was to ensure that the supercomputer and the data centre supporting it were able to meet Singapore's sustainability and carbon reduction goals", says Associate Professor Tan Tin Wee, Chief Executive of the National Supercomputing Centre Singapore.

"The KoolLogix rear door heat exchangers, or RDHX, are a key component in the design of our data centre, which allowed us to deploy 20KW high density racks to aid in the cooling of the supercomputer and lower the power consumption of the system. Estimates by KoolLogix point to a potential 80 per cent reduction in our annual carbon footprint when compared to a conventional row cooling system. This allows us to have a higher inlet temperature of 26 degrees Celsius as compared to most Singapore data centres, which operate at between 21 to 24 degrees Celsius, which helps further reduce our cooling costs," he adds.



Ambient (24-degrees Celsius) air from a data centre enters the server rack, quickly heats to 40-degrees Celsius, passes through KoolLogix' patented KoolContainment technology, then finally through the Heat Removal Module (HRM) which cools the exhaust air back to an ambient 24c.
PHOTO: KOOLLOGIX

Early successes in the local market

Mr Tan Chor Sen, Head International Global Commercial Banking, OCBC Bank, says: "We see KoolLogix's proprietary technology in Thermal Management as a differentiating factor in driving towards a carbon net-zero environment. KoolLogix has helped its clients to achieve both sustainability and economic impact through the adoption of their solution and has emerged as one of the winners of the Emerging Enterprise Award 2021, organised by Business Times and OCBC, while also clinching the Sustainability Award category. OCBC is happy to support KoolLogix through the Enterprise Financing Green Scheme, as the company continues to gain visibility and traction locally and regionally."

In addition, Mr Francis Kee, Head of Data Centre Solutions of ST Engineering, says: "As part of our sustainability efforts, we constantly seek to reduce the carbon footprint of our data centres, improve cooling efficiency, and increase rack power density. We welcome KoolLogix onboard as one of our natural partners for efficient and effective cooling of our facilities."

As further illustration of the encouraging performance of KoolLogix systems to date, Mr Ng Hoo Seng of Media Access International comments: "We had successfully completed a non-purpose-built facility in a JTC building. The project from design to operational readiness took about three months and this was accomplished with the CDC-Koologix solution achieving a PUE of under 1.3. We intend to build a scaled-up project based on this experience with some further design enhancements to demonstrate efficiency and stability.

Future plans

With the continued support from IPI, KoolLogix has been working closely with industry veterans under the Innovation Advisors Programme (IAP) to develop its growth strategies and network to scale into the region, while continuing to establish itself firmly in the local market.

The company is also in early conversations with potential investors to expand its business teams and technology advantage. Building upon its established 50 per cent energy saving solution, KoolLogix will continue to collaborate with A*Star's IHPC to develop other carbon-efficient and sustainable products through the integration of AI and software-driven technology into its product roadmap.

Its long-term vision remains unchanged: To provide a paradigm-shifting heat removal solution to cool the world's data centres, whilst furthering its clients' ESG goals.

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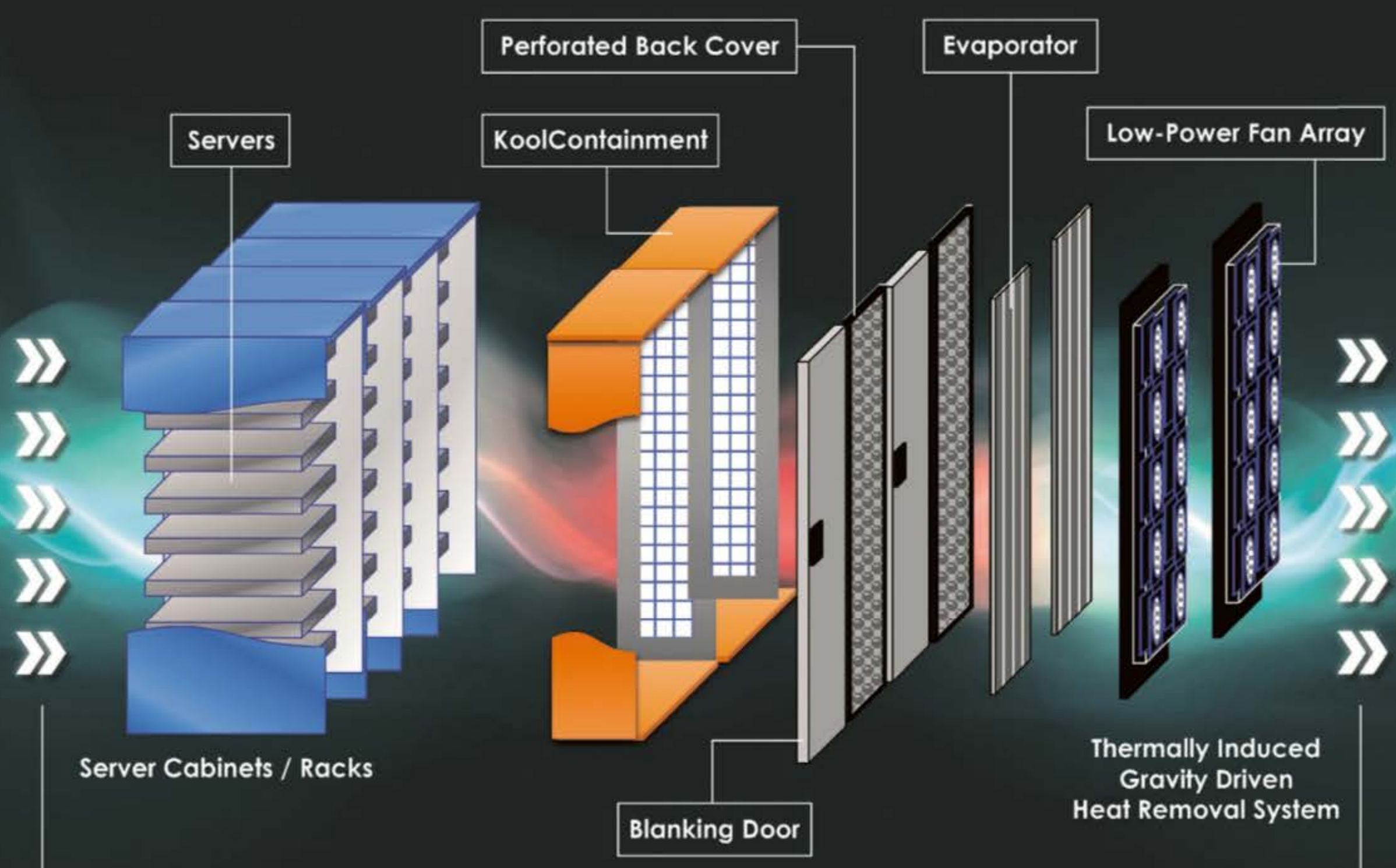

A paradigm-shifting heat removal solution which cools the world's data centers and furthers your ESG goals

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