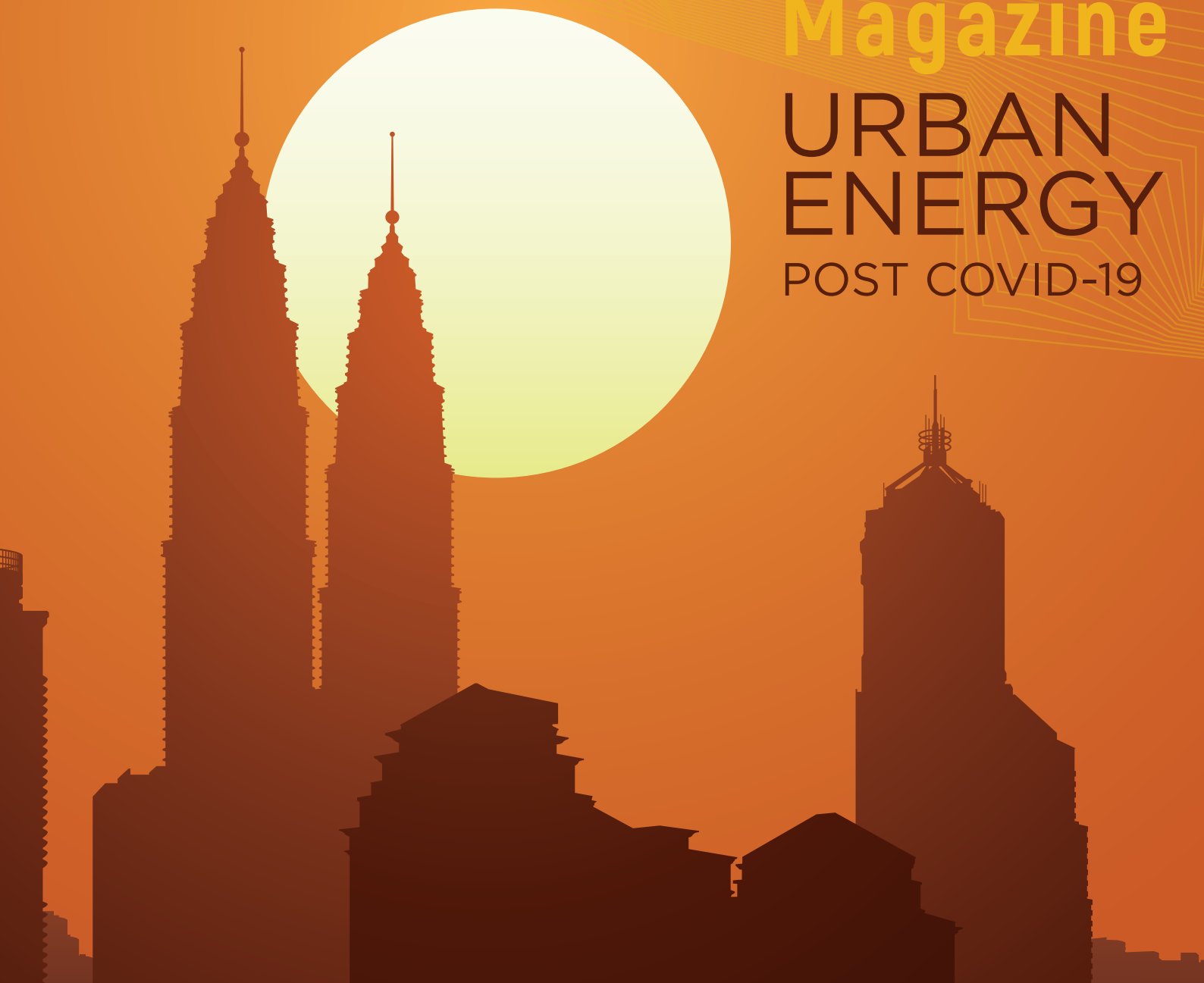


# APUEA

Magazine

URBAN  
ENERGY

POST COVID-19





# Content

08

**POST COVID, A RETURN FROM THE FICTITIOUS TO THE REAL?**  
by SIVECO

12

**DRIVING HVAC PERFORMANCE TO NEW HEIGHTS FOR HEALTHCARE FACILITIES**  
by ABB

16

**5 MAJOR BENEFITS OF DISTRICT COOLING SYSTEMS (DCS) FOR BUSINESSES**  
by KJTS

20

**MODERN SIMULATION TOOL ANALYSING THE ENTIRE SYSTEM UNLOCKS THE FULL POTENTIAL OF INTEGRATED DISTRICT ENERGY SCHEMES**  
by NXITY

28

**ENERGY STORAGE SYSTEMS ARE KEY IN THE ENERGY TRANSITION AND TO ACHIEVE CARBON NEUTRALITY IN 2050**  
by APUEA

32

**GLOBAL DISTRICT ENERGY CLIMATE AWARDS 2021: WINNERS**  
by Robin Wilthsire

38

**RECENT APUEA ACTIVITIES**  
by APUEA

44

**EVENT CALENDAR**

46

**MEMBER DIRECTORY**

48

**APUEA MEMBERSHIP FORM**

# Editorial

## Mikael Jakobsson

Executive Director,  
Asia Pacific Urban Energy Association (APUEA)

Two years have passed since the COVID-19 pandemic hit us. While we are still fighting the pandemic, many of us have managed to adapt to a new (ab)normal. Thanks to healthcare workers, vaccines, medicines, restrictions, and other measures, most of us are moving on with our lives. It's been two challenging years, no doubt, but we might see signs of a transition towards an endemic. I'm not an epidemiologist, but I choose to think positively.

As mentioned in the previous Editorial, the recent IPCC report was no pleasant reading. Scientists suggest that human activity is the cause of climate change. 2021 turned out to be the fifth-hottest year on record, resulting in the last seven years being the warmest on record. The importance of listening to scientists was illustrated in a somewhat amusing way in the recent Netflix movie "Don't Look Up" featuring Leonardo DiCaprio, Jennifer Lawrence, and Meryl Streep, among others.

Already in the 1980s, the American astronomer Carl Sagan among others before that publicly expressed his fear for climate change. Since then, scientists have both confirmed that this fear was legitimate and have shed light on many of the questions and uncertainties expressed back then. We must remember that what the scientists actually say is not that the situation is as hopeless as the alarmists believe, while it is much more severe than the ignorance from climate change deniers. There are solutions, and we have to act now.

As we are moving from a COVID-19 crisis to a potentially more severe climate crisis, it makes no good to panic but to focus on taking action. Therefore, we must join forces and turn the green transition into opportunities. The green transition of the urban energy sector must be approached from a holistic perspective across traditional sectors (silos) and stop only to focus on individual technologies. With that said, there is no system without individual technologies. Before we start thinking about green energy supply, we preferably take departure from the consumer side, working tirelessly with energy

conservation and energy efficiency.

In 2021, APUEA was honoured to host the virtual 7<sup>th</sup> Global District Energy Climate Awards in conjunction with the newly established Asia Urban Energy Assembly. The six award winners represented impressive projects from around the world, which will serve as inspiration for new sustainable urban energy schemes worldwide. The 7<sup>th</sup> Global District Energy Climate Awards will also take place in person during the 2<sup>nd</sup> Asia Urban Energy Assembly, 15-16 September 2022, in Bangkok, Thailand. The event will be held in conjunction with the ASEAN Sustainable Energy Week. I would like to express my special thanks to Silke Schlinnertz at Euroheat & Power for a great collaboration over the years, not only in regards to the 7<sup>th</sup> Global District Energy Climate Awards.

At APUEA, we are looking forward to accelerating the efforts in 2022, most likely with a steady increase of physical meetings, while applying online platforms developed during the pandemic in parallel to avoid unnecessary traveling. Recently, APUEA has taken a leap to become a fully independent association from the International Institute for Energy Conservation (IIEC), in accordance with the initial operation plan from 2017. For the initial five (5) years of operation, APUEA was governed as a program under IIEC, being provided benefits in terms of office space, administration, and other supporting staff.

The support provided by IIEC has been crucial to succeed in establishing the association. From 2022, APUEA is registered as an independent separate legal entity, incorporated in Hong Kong SAR (in accordance with the initial operation plan from 2017). The secretariat in Bangkok will remain intact and is even expected to expand in the course of the year. We are looking very much forward to continuing the successful collaboration with our existing and new members to accelerate the development of sustainable urban energy systems development.

In this issue of the APUEA Magazine, you can read articles on sustainable urban energy concepts, technologies, and tools applied to accelerate decarbonization post-COVID. We want to thank ABB, Euroheat & Power, KJTS, NXITY, and Siveco for contributing to this issue of APUEA Magazine.



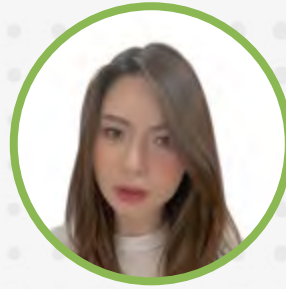
# Secretariat



**Mikael Jakobsson**  
Executive Director



**Peter Lundberg**  
Head of Operations



**Nathinee Roongsitong**  
Publications Manager



**Teruhisa Oi**  
Policy Advisor



**Chen Chen**  
China Advisor



**Muhammad Ali**  
APUEA Australasia  
Advisor



**Peter Anderberg**  
APUEA Academy Officer

## GET IN TOUCH

Asia Pacific Urban Energy Association  
1168/27 Unit B, 15th Floor, Lumpini Tower, Rama IV Road,  
Thungmahamek, Sathorn, Bangkok 10120, Thailand

 +66 2 285 6349 |  FAX +66 2 285 6348

 [info@apuea.org](mailto:info@apuea.org)



[www.apuea.org](http://www.apuea.org)

 [apuea](#)

# ASIA PACIFIC URBAN ENERGY ASSOCIATION



## APUEA

Asia Pacific Urban Energy Association

For more information about APUEA and how to become a member, contact [info@apuea.org](mailto:info@apuea.org)

[www.apuea.org](http://www.apuea.org)



The Asia Pacific Urban Energy Association (APUEA) was launched in 2017 to promote the development of sustainable Urban Energy Systems in the Asia Pacific region. The APUEA platform promotes public and private sector collaboration to develop sustainable urban energy systems that support livable cities across the Asia Pacific region. Our membership and activities serve as an information hub to support city policymakers, program managers, and other stakeholders in the design, development, and implementation of sustainable urban energy systems. Through our activities, including APUEA events, conferences, and continuous outreach to our members, we share international and regional best practices for planning and implementing sustainable urban energy systems—including policies and regulations, business models, and technologies for implementing district heating and cooling, smart grids, energy efficiency improvements, and renewable energy systems.

The APUEA membership provides a unique opportunity to liaise with governmental agencies and important stakeholders and get access to valuable information and intelligence on urban energy developments, business opportunities, trends, and financing in one of the fastest growing energy and infrastructure markets in the world. Membership benefits include a marketing platform, newsletters, APUEA Magazine, Annual Publications, Annual General Meeting including Trade Exhibition and Direct Assistance.



# ASIA PACIFIC URBAN ENERGY ASSOCIATION MEMBERSHIP



The Asia Pacific Urban Energy Association (APUEA) is a platform to collect and disseminate knowledge, best practices, and tools related to the development of sustainable urban energy systems, and thereby support the development of livable cities in the Asia Pacific region.

APUEA serves a broad range of members including but not limited to utilities, manufacturers, investors, engineering companies, donor agencies and sector associations that are active in the urban energy sector. Members can choose among several membership categories, depending on their sector and level of engagement in APUEA.

## PREMIUM MEMBER

Premium membership includes an active role in the governance of the association through the APUEA Executive Committee and during the APUEA Annual General Meeting.

Premium membership also includes special recognition in APUEA publications and marketing channels, and free participation at APUEA events.

## CORPORATE MEMBER

Corporate membership includes influence on the association's activities during the APUEA Annual General Meeting, recognition in APUEA publications and marketing channels, and discounted participation at APUEA events.

## AFFILIATE MEMBER (Invitation only)

Individual or agency invited by the Association to participate as an individual member; and entities such as regional NGOs, development agencies, and utility organisations. An Affiliate Member benefits from the Association but does not take an active role in the Association in terms of its governance and operation.

### THE ANNUAL MEMBERSHIP FEE DEPENDS ON THE MEMBERSHIP CATEGORY AND ORGANIZATION SIZE:

CORPORATE CATEGORY	EMPLOYEES		
	< 1,000	1,000 - 10,000	> 10,000
PREMIUM MEMBER	USD 10,000	USD 10,000	USD 10,000
CORPORATE MEMBER	USD 3,500	USD 5,000	USD 6,500
AFFILIATE MEMBER	N/A		

## BENEFITS

- ✓ Advocacy and Representation
- ✓ Matchmaking and Referrals
- ✓ Direct Marketing
- ✓ Market Intelligence
- ✓ Knowledge and Best Practices
- ✓ Regional and International Events
- ✓ Direct Assistance

Scan to Download



Download  
Registration Form





# POST COVID, A RETURN FROM THE FICTITIOUS TO THE REAL?

BY BRUNO LHOPITEAU  
MANAGING DIRECTOR, SIVECO CHINA



Bruno Lhopiteau, a 25-year veteran of the digitalization of infrastructures in Asia, is the Managing Director of Siveco China ([www.sivecochina.com/en](http://www.sivecochina.com/en)).

He also lectures on Industrial Risk Management at Shanghai University.

To an Industrial Risk Management practitioner, the Covid-19 crisis, soon entering its third year, provides solid material for both theory and practice. Asked by the Editor to make predictions, in such uncertain times, in a market so polluted by peddlers of near-magical “predictive” digital solutions, I am tempted to quote Victor Hugo, who in his historical novel *The Miserables*, set in times of immense struggles, wrote that: “A revolution is a return from the fictitious to the real”.







## An unprecedented infrastructure boom

While everyone obsessed about the Metaverse, this virtual-reality prison-world of consumerism, space exploration has made amazing progress. In the United States owing to the previous administration's bold decisions and to the entrepreneurial genius of the SpaceX founder. In China thanks to the unwavering historical vision of its leadership.

And to a lesser extend in other nations. The possibilities of economical space travel, asteroid mining, large-scale construction in orbit, space cities, and ultimately the interplanetary development of Humanity have become realistic. "Space travel has again made children of us all", wrote another famous

author. In the same period, nuclear power has regained strength versus the overhyped renewables. Again, China appears to be leading the way due to its massive scale and consistent industrial policies.

The French government has shown signs of returning to rational energy policies, recently announcing plans for innovative small-scale nuclear reactors. Through international cooperation, many other countries are moving towards a nuclear future. The iconic fields of space exploration and nuclear power are of course directly relevant to tomorrow's urban infrastructures.

More generally, we observe developing nations have decisively taken the path of infrastructure-led industrialization and urbanization, some of them as part of the China-led Belt & Road initiative. My point is that we aren't moving our plants and engineers to the Metaverse yet: real public infrastructures, growing in number and sophistication, have a brilliant future.



## Increasing environmental and cyber regulation

Government is naturally the main driver in these initiatives through direct control and regulations. Amidst the Covid-19 crisis, governments all over the world have taken a much larger role in the daily life of citizens, which many hope will be temporary. At the same time, increasing regulation with regard to safety, the environment and data security is accompanying, and often shaping, industrial trends.

The phenomenon is global, with national differences and geopolitical interplay (most notably the so-called decoupling or perhaps New Cold War between China and the West).

The Chinese authorities, in response to disastrous industrial accidents during the previous decades and in support of the "China Dream" aimed at ensuring quality of life for all, have enacted strict safety and environmental laws. This resulted in a remodeling of the local utility market and is now impacting all manufacturers and private enterprises. Similar developments may be taking place in Southeast Asia for the same reasons.

At the same time, cybersecurity regulations, personal data protection, debates over the need for sovereign clouds (independent from American giants or their upcoming Chinese competitors) have emerged.

Data regulations have attracted more media attention due to their geopolitical implications and because digital technologies have become so prevalent. The two regulatory trends, environmental and cybersecurity, come together beautifully: digital solutions offer indispensable tools for traceability, reporting and to support best practices.

By their very nature, they are subject to data security regulations. Many utilities have experienced cyberthreats in recent years. Global energy players are impacted by local data laws as their strength lies in part in their capability to benchmark, to reuse knowledge, throughout their global operations.

## The end of dreamware as we know it

Back to the Metaverse (hopefully well-regulated) and to its current industrial form: Digital Twins, the Internet-of-Things, Smart Glasses etc. Many companies have been lured by the limitless, magical, promises of solutions vendors. I call it Dreamware.

Enormous budgets have been spent on consultants, IT suppliers and software licenses. Alas, concrete results still lag far behind expectations. So-called "Smart" Glasses merely perform as head-mounted teleconferencing devices during Covid-19 travel restrictions. Digital Twins (a combination of IoT and visual display, sometimes in the form of 3D BIM models) seldom go further than monitoring meters and displaying trends. Clever salesmen call this "predictive" maintenance. Industrialists see through this fiction. Predictive maintenance is a well-known specialized discipline, applied primarily to standard machinery (such as turbines), requiring significant engineering efforts and domain knowledge.

Most 3D "BIM" models remain unused after construction, except as demonstration toys. Yet, amazing new technologies are now available, more open, more flexible, more widespread than ever (not reliant on just a handful of US vendors). We know now that seemingly unlimited funds can appear out of nowhere for us to use. The wastes and disappointments of Industry 4.0 constitute lessons from which the industry can learn. The return to the real, said Hugo.

# A star in the East

The confluence of these three major global trends, the strong role Asian economies naturally play in them, offer a fantastic opportunity for players of the Asian urban energy market.

An opportunity to refine theory from practice, to put the new theory into practice, to get rid of unrealistic IT gimmicks, perhaps to repurpose them, to repurpose all the “smart money” for good use. A revolution. I am an optimist and, as I write these lines, it’s beginning to look a lot like Christmas. Beyond all the blinking lights of the fancy Digital Twin demo, I can see the Guiding Star.



**ENORMOUS BUDGETS  
HAVE BEEN SPENT ON  
CONSULTANTS, IT SUPPLIERS  
AND SOFTWARE LICENSES.**

**ALAS, CONCRETE RESULTS  
STILL LAG FAR BEHIND  
EXPECTATIONS**

Siveco China ([www.sivecochina.com/en](http://www.sivecochina.com/en)) is a pioneer in the development of Smart Technologies for Operation & Maintenance, with a focus on mobile solutions “for the worker of tomorrow.” The company helps facilities owners to optimize assets lifecycle and ensure regulatory compliance.

Siveco China has its Asian headquarter and R&D center in Shanghai, serving clients all over Asia and on the New Silk Roads. It is the only company in Asia to be ISO 9001-certified for this scope of business.



**PROMOTING SUSTAINABLE URBAN  
ENERGY IN THE ASIA-PACIFIC**





THE HVAC NEEDS OF HEALTHCARE FACILITIES ARE MUCH MORE SPECIALIZED AND DEMANDING THAN SAY AN OFFICE OR HOTEL.



# DRIVING HVAC PERFORMANCE TO NEW HEIGHTS FOR HEALTHCARE FACILITIES

---

Frank Taaning Grundholm, Vice President, Global HVACR Sales, ABB Motion, explains why the latest developments in variable speed drives (VSDs) will ensure that the Asia-Pacific region's new generation of healthcare facilities will be energy efficient, flexible and resilient.

Continued population growth, economic expansion and the challenges of the COVID-19 pandemic are driving major investments in new healthcare facilities across Asia-Pacific. Currently, there are estimated to be healthcare construction projects ongoing in the region of US\$110 billion. To ensure the success of these projects it is critical to invest wisely in hospital systems that will meet clinical needs while also optimizing capital and operating costs.

One area that requires particular attention is the selection of modern heating, ventilation and air conditioning (HVAC) systems. This is because a hospital is an extremely energy intensive building in which HVAC represents a very significant proportion of the overall electricity use. Specifying VSDs, ideally with high-efficiency motors, can potentially lower the energy use of fans and pumps by 20 to 70 percent. This delivers financial savings as well as substantial reductions in carbon footprint.

The reason for these substantial savings is that many pumps and fans in HVAC systems are controlled by throttling – the motor is driven at full speed and then the flow rate of liquid or air is regulated by dampers, valves or vanes. Instead of this, a VSD adjusts the motor speed to the correct operation point. A small reduction in speed can make a big difference since a centrifugal pump or fan running at 80 percent speed consumes only half as much energy as a unit running at full speed.



## FLEXIBILITY

The HVAC needs of healthcare facilities are much more specialized and demanding than say an office or hotel. There are some areas, such as regular hospital wards, that require only general air-conditioning for patient and staff comfort. However, to ensure safety, other areas require dedicated, specialized and precisely-controlled systems. For example, pressure-controlled isolation rooms and laboratory spaces will need to manage bacteria or cross-contamination, with positive or negative pressurization, depending on the situation.

Operating theatres often have air distribution arrangements with multiple filtration stages. These include high-efficiency particle arresting (HEPA) filters that can add significant static pressure loads on supply fans.

VSDs provide the control to regulate air flows in different areas. They also ensure the flexibility to allow different areas to adapt to changing needs, for example a change from negative to positive pressure. In addition, filtration systems require fans to deliver higher operating pressures. While an office building today might require a typical 800 Pascals (Pa), the pressure serving an operating theatre could be above even 2000 Pa. Therefore, the energy efficiency of VSDs can offset the increased electricity demand of running at high pressures.

“

MODERN HEALTHCARE FACILITIES REQUIRE SMART HVAC SYSTEMS THAT CREATE HEALTHY, COMFORTABLE AND SAFE ENVIRONMENTS FOR PATIENTS AND MEDICAL STAFF. DEPLOYING SPECIALIZED HVAC DRIVES WITH ULTRA-LOW HARMONIC TECHNOLOGY ENSURES THE ENERGY EFFICIENCY, FLEXIBILITY AND RESILIENCE THAT DELIVERS THE MAXIMUM RETURN ON INVESTMENT.

”



## RESILIENCE

The main power supplies serving healthcare facilities are designed to be “strong” and unaffected by harmonic pollution on the network. The situation changes when there is a power outage and the hospital needs to switch over seamlessly to local backup power via generators. This because standard VSDs will require the generator, and other equipment such as transformers and cables, to be substantially over-dimensioned. However, installing specialized ultra-low harmonic (ULH) HVAC drives will maintain power quality and network stability, while reducing the size of transformers and backup generators. Or they can allow the same size of generator to support more equipment.

The active-front-end (AFE) technology in ULH drives offer an additional advantage. This is because it can compensate for variations in voltage on the input side to deliver a constant output that ensures the application continues to operate without interruption.

Specialized HVAC drives also provide a very important safety feature with the fireman's override mode. This disables non-critical warnings and faults, allowing the drive to run continuously even in adverse conditions. The ability to run to failure enables fans to be turned into smoke extraction units to allow the maximum possible time for people to evacuate the building.

There is one very important, and often overlooked consideration: variable speed drive systems should be backed up by soft-start systems as a minimum requirement. Ensuring continuity demands that the normal HVAC control system has a backup. However, if the backup is a simple direct online switch, the fans start at full speed and the consequence is an immediate surge in pressure. This shock risks rupturing the filters, especially older designs, enabling viruses to pass through. Deploying a soft-start system or even better parallel drives backup avoids this risk.



## BHARAT BIOTECH'S COVAXIN MANUFACTURING FACILITY

As an example of the capability of VSDs in healthcare, ABB's ACS560 drives are playing a vital role in Bharat Biotech's clean room infrastructure, where the company manufactures 'Covaxin', India's first indigenous vaccine for Covid-19. The filtration systems control temperature, humidity, and air pressure as well as the direction, speed, and filtration of air as it flows into and out of the space.

## LISMORE BASE HOSPITAL

ABB VSDs were deployed as part of the \$320 million redevelopment of Lismore Base Hospital in New South Wales, Australia. They were used to upgrade the hospital's ventilation systems for efficiency, cost-effectiveness,

and most importantly, thermal comfort and quality. As part of the upgrade, safety was considered top priority, and this includes precise temperature control, in both normal and mission-critical situations.

## HVAC DRIVES ENSURE MAXIMUM RETURN ON INVESTMENT

Modern healthcare facilities require smart HVAC systems that create healthy, comfortable and safe environments for patients and medical staff. Deploying specialized HVAC drives with ultra-low harmonic technology ensures the energy efficiency, flexibility and resilience that delivers the maximum return on investment.

For further information:

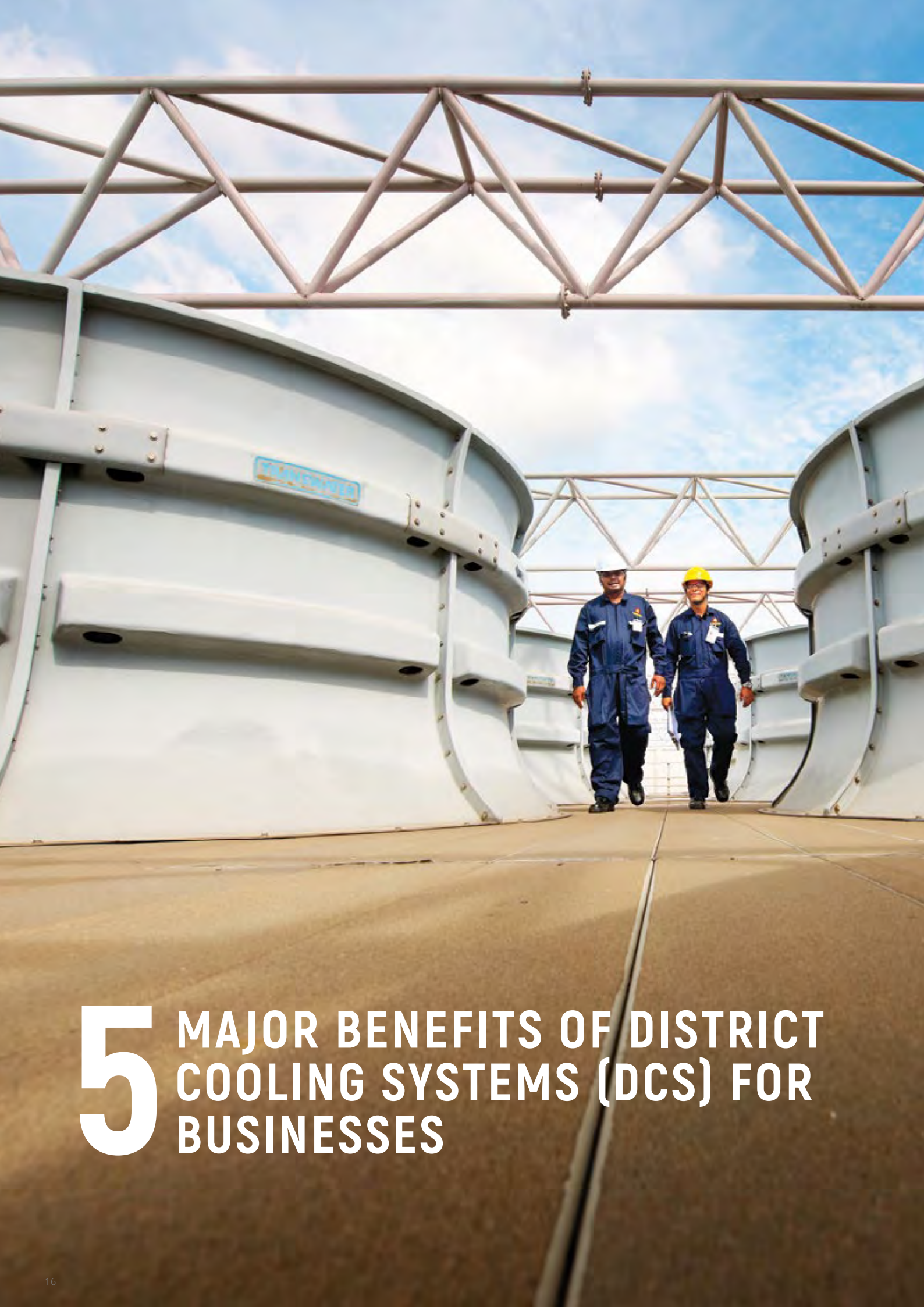
<https://new.abb.com/drives/segments/hvac/hvac-industries/healthcare>



**ABB** (ABBN: SIX Swiss Ex) is a leading global technology company that energizes the transformation of society and industry to achieve a more productive, sustainable future. By connecting software to its electrification, robotics, automation and motion portfolio, ABB pushes the boundaries of technology to drive performance to new levels.

With a history of excellence stretching back more than 130 years, ABB's success is driven by about 105,000 talented employees in over 100 countries. [www.abb.com](http://www.abb.com)





# 5 MAJOR BENEFITS OF DISTRICT COOLING SYSTEMS (DCS) FOR BUSINESSES





## HERE'S WHY DISTRICT COOLING SYSTEMS ARE A SOLUTION TO THE EXCESSIVE AMOUNTS OF ENERGY CONSUMPTION THE WORLD FACES TODAY, AND THE MAJOR BENEFITS OF HAVING ONE.

As a country with the second-highest gross domestic product (GDP) per capita among the ASEAN member states, Malaysia has continued to see a high demand for air-conditioning systems. The country, which has a population of 33 million, has recorded a high air conditioning systems utilization rate of 80%. It also has a developed District Cooling market. The statistics consequently means an increase in energy costs and emission of greenhouse gases as well.

There are 23 District Cooling Systems in operation, and another two are currently under development in the country. With its tropical climate and robust economic development, Malaysia has a large potential for District Cooling systems.

As such, it has become a challenge for energy experts to come up with viable solutions that minimise the negative impacts of cooling systems on the environment without eliminating their usage entirely. One of these solutions is the installation of district cooling systems. To learn more about this modern solution, read on and discover the significant benefits of a district cooling system, particularly to the commercial sector.



## SAVES ENERGY

A District Cooling System (DCS) is rising in popularity for its high energy efficiency today. A DCS is considered an ideal energy-saving system for heating, ventilation, and air-conditioning (HVAC), since it utilises efficient systematic production and distribution of chilled water. It also takes full advantage of the diversity in cooling demands for various buildings and the economy of scale.

Although energy-saving levels vary according to the individual configuration of each DCS – such as the application of heat rejection method or the length of distribution pipe works – a saving of about 20% and 35% can usually be achieved with a DCS as compared to traditional air-conditioning systems.

## SAVES COSTS

With minimised energy consumption, one can naturally expect a reduction in costs when adopting a DCS. A DCS typically enables building owners to do away with their on-site chiller operation and maintenance. That means you will no longer need to operate, maintain and or replace chillers at the end of their life cycles. As a result, you can minimise your capital investment and the subsequent maintenance costs of air conditioning.

## MINIMISES GREENHOUSE GAS EMISSION

Aside from being a huge energy guzzler, air-conditioning systems are also known for contributing vast amounts of hydrofluorocarbons (HFCs) to the environment and negatively impacting the climate in turn. These HFCs are present in the refrigerant fluid, which may escape from an air conditioning unit. While HFCs are not toxic, they are a form of greenhouse gas that significantly contributes to the rising temperature on earth.

The installation of a DCS ensures a reduced emission of HFCs as well as carbon dioxide. As a result, the decrease in energy consumption and improvement of energy efficiency through DCS help minimise fossil fuel consumption for power generation, consequently reducing greenhouse gas emissions.

## IMPROVES SPACE UTILISATION OF BUILDINGS

As chiller plants are no longer required once a DCS is in place, buildings or facilities that adopt this system can save remarkable amounts of space usually intended for plant rooms. On average, building owners can save 75% of plant room space when using a DCS compared to conventional air-conditioning plants. Additionally, removing chiller plants also allows power companies to save space typically intended for transformer rooms.

## ENHANCES FLEXIBILITY AND RELIABILITY

Building owners and facilities management teams can streamline their facilities management processes without running and maintaining chiller plant equipment. The use of DCS provides these building owners or management teams with fewer restrictions when expanding their cooling capacity and eliminates the need to allow provisions for chiller replacement. As a result, building owners or facilities management teams can concentrate more on their core business.

Unlike a traditional centralised air-conditioning system, a DCS is typically built with standby cooling capacity to ensure that cooling remains available at the central plant at any time. As such, properly designed and well-constructed DCS ultimately provides commercial buildings with more reliability.



“ ”

WITH OUR COMPREHENSIVE SOLUTIONS, LET US HELP YOU BOOST YOUR ENERGY SAVING IN AN INSTANT. KJTS PROVIDES INTEGRATED AND INTERACTIVE ENERGY MANAGEMENT AS WELL AS PERFORMANCE-BASED FACILITIES MANAGEMENT SOLUTIONS ON A REGIONAL SCALE.



## CONCLUSION

As the effects of excessive energy consumption, global warming, and space scarcity worsen each year, the benefits of district cooling systems are becoming more and more relevant. Much of the world's excessive energy consumption levels have caused irreversible impacts on the environment. For this reason, it is crucial for the various sectors of society, particularly the household and business sectors, to look towards adopting viable environmental solutions.

Suppose you are looking for more ways to reduce your business' energy consumption to a significant level. In that case, you should consider engaging a company that provides reliable energy management services with guaranteed saving. Here at KJTS, we have an experienced team of reputable facilities and energy managers who believe in the ability of performance-based solutions to solve energy management problems you might face. With our comprehensive solutions, let us help you boost your energy saving in an instant. KJTS provides integrated and interactive energy management as well as performance-based facilities management solutions on a regional scale. We continuously work to incorporate measures within our services that would render our models to efficiently and effectively reduce energy consumption and carbon emissions as well as to improve overall environmental concerns. KJTS has operations in Malaysia, Thailand and Singapore.



KJTS Group provides integrated and interactive energy management as well as performance-based facilities management solutions on a regional scale.

With the advancement of technology, we are able to offer international market-value services to a variety of sectors. We continuously work to incorporate measures within our services that would render our models efficiently and effectively to reduce energy consumption and carbon emissions as well as to improve overall environmental concerns.

KJTS has operations in Malaysia, Thailand and Singapore.

✉ [enquiry@kjts.com.my](mailto:enquiry@kjts.com.my) | [www.kjts.com.my](http://www.kjts.com.my)





## MODERN SIMULATION TOOL ANALYSING THE ENTIRE SYSTEM, UNLOCKS THE FULL POTENTIAL OF INTEGRATED DISTRICT ENERGY SCHEMES

By John Jakobsson, Managing Director, NXITY Energy ICT Solutions

**T**here is a great potential in decarbonizing the energy sector through District Energy schemes – District Heating and District Cooling. Beside reliable, safe, energy efficient and cost-effective heating and cooling supply, district energy schemes provides opportunities for maximizing utilization of local resources in terms of renewable energies (e.g. biomass and solar) and energy recovery (e.g. from wastewater, industries, data centers, etc.).

In the past, district heating and district cooling have mainly been considered as energy efficient heating and cooling supply technologies. However, in light of the ongoing electrification of the energy sector, district energy schemes provide the opportunity to couple the heating (and cooling) sector with the electricity sector providing great technical, financial, and environmental benefits to both sectors. We shall not directly compare district heating or district cooling with individual fuels or technologies but see it as a unique energy carrier and system, able to integrate all kinds of fuels, technologies, systems, and sectors. District energy schemes are crucial for energy symbiosis and systemic efficiency.

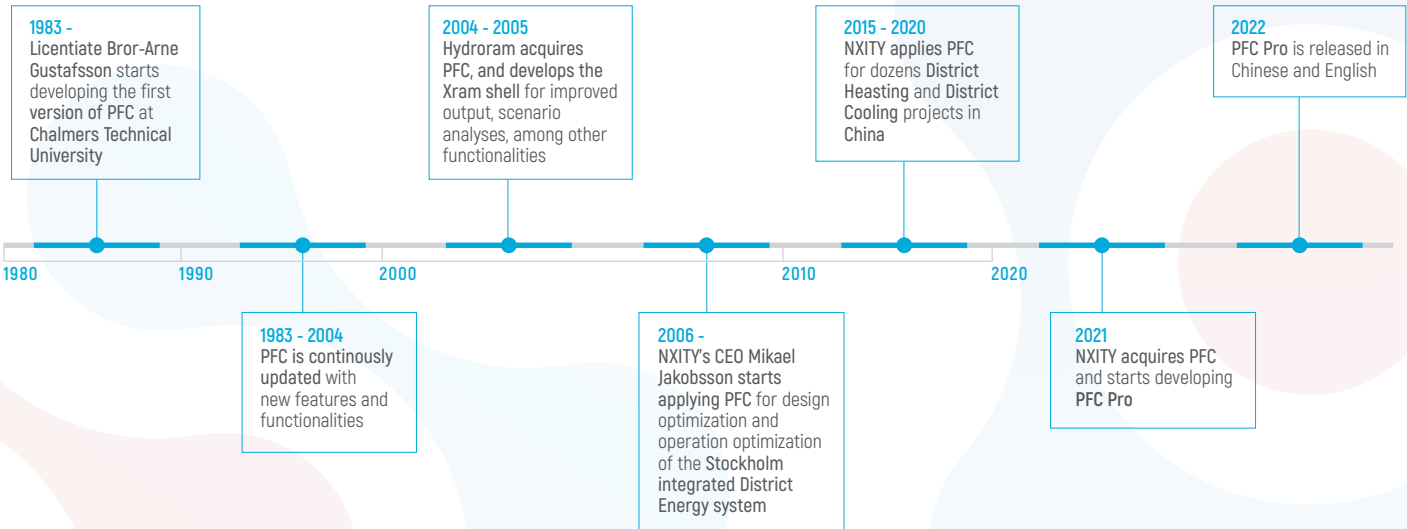
For District Energy schemes to reach its full potential, experience, specialist knowledge and digital tools are of great importance. In 2021, NXITY joined forces with Hydroram to strengthen the company in all these aspects. The unique PFC software was acquired, and PFC Pro was developed.



**PFC Pro** is a unique simulation tool for design optimization and operation optimization of entire district heating and district cooling systems. The development of PFC started at Chalmers Technical University in the 1980s by licentiate Bror-Arne Gustafsson. New features and further improvements have been made by Ola Rossing and Gunnar Larsson at Hydroram over the years, with focus on functionalities. PFC has a long history, being applied for several hundred district heating and district cooling systems worldwide.

To develop PFC Pro, NXITY partnered with Iglu Network Ltd. Iglu is a trusted partner throughout the development process providing a team of architects, programmers, and designers. "Iglu has been a perfect partner for us at NXITY, showing extraordinary professionalism, skills, and sense of innovation and the trend of both software development and product management", according to John Jakobsson, the Managing Director of NXITY ICT Solutions and the project manager of the PFC Pro project.

PFC Pro by NXITY brings all functionalities from PFC into a user-friendly modern interface with additional features to perform planning, design optimization and operation optimization of multi-source and complex district heating and district cooling systems.



## User experiences

NXITY employees have long experience using numerous commercialized district heating and district cooling simulation tools. PFC has shown to be outstanding compared with other commercialized and often (too) simplified simulation tools – not least for design optimization. “If a solution or control logic works in PFC, it works in reality”, says Mr. Shaofang Li, NXITY’s Chief Engineer. Mr. Li continues “while other tools are too simplified, we have full flexibility with PFC to model and simulate anything we want. Not only along the network but also inside production facilities and other main facilities to ensure that we are not overseeing any critical thermal or hydraulic events”. Beside energy efficiency and optimized operational and capital expenses, safety is a very important aspect for NXITY’s clients. Without proper modeling and simulation of main facilities, there is an apparent risk that safety and reliability of the district energy system is jeopardized. Safety issues is not only a potential cost, but a danger for personnel and the public.



## PFC Pro features

With PFC, seamless thermal, hydraulic steady-state and hydraulic transient-state analysis of entire district heating and district cooling systems can be conducted, including valve closure and pump trip analyses. Engineers can perform detailed modelling and analysis of production facilities including but not limited to Combined Heat and Power (CHP) plants, Heat Only Boiler (HOB) plants, Solar Thermal plants, and Heat-Pump/Chiller stations. Transmission pipelines and distribution networks with facilities such as booster pump stations, valve chambers, mixing-loops, heat-

exchanger stations, pressure separators and sub-stations can be detailed modelled and simulated. If required, even secondary systems can be simulated.

It is not only the realistic modeling and comprehensive simulations of district energy systems that is unique for PFC, but also the control functions of pump drives, valve actuators, boilers and other equipment. PFC allows the engineers to make realistic simulations of the entire district energy system both for design optimization, but also for operation optimization.

## Localization and compatibility

PFC Pro is designed to function in all markets globally, including China. At launch it will support local map integration in all target locations and will support Chinese, English, Swedish, and Danish languages. With Russian, French, and German being added in late 2022. PFC Pro has been developed to be hosted on public cloud data centers. NXITY provides both technical software and engineering support to PFC Pro customers in Chinese, English, Swedish, and Danish.

PFC Pro has been developed following modern cloud native best practices. With a special focus on compliance with GDPR, data geolocation, privacy, security, and local regulations. To support our Chinese customers, NXITY holds an ICP License issued by China's Ministry of Industry and Information Technology (MIIT).

PFC Pro can import and convert simplified models from many commercialized district energy planning software, including but not limited to Tervis, Netsim, Flowra32, and Grades, and take the district energy system analysis to the next level for design optimization, safety analysis and operation optimization.



## Applying PFC Pro in the daily work

PFC Pro is an outstanding simulation tool for engineering consulting firms and utilities to improve development, implementation and O&M of district energy systems.

With PFC Pro, static, quasi-static, and (real) dynamic simulations can be performed. Operation scenarios can be defined to reflect realistic control and operation strategies for time horizons spanning from years to split-seconds. Below examples of typical simulations performed by PFC Pro are listed.

CALCULATIONS	EVENT TIME ASPECTS	RESOLUTION
<ul style="list-style-type: none"> <li>Thermal</li> <li>Hydraulic steady-state</li> <li>Hydraulic transient-state</li> </ul>	<ul style="list-style-type: none"> <li>Historical / Past</li> <li>Real-time / Present</li> <li>Forecast / Future</li> </ul>	<ul style="list-style-type: none"> <li>Annual simulations</li> <li>Weekly simulations</li> <li>Daily simulations</li> <li>Hourly simulations</li> <li>Minutes, seconds or split-seconds</li> </ul>

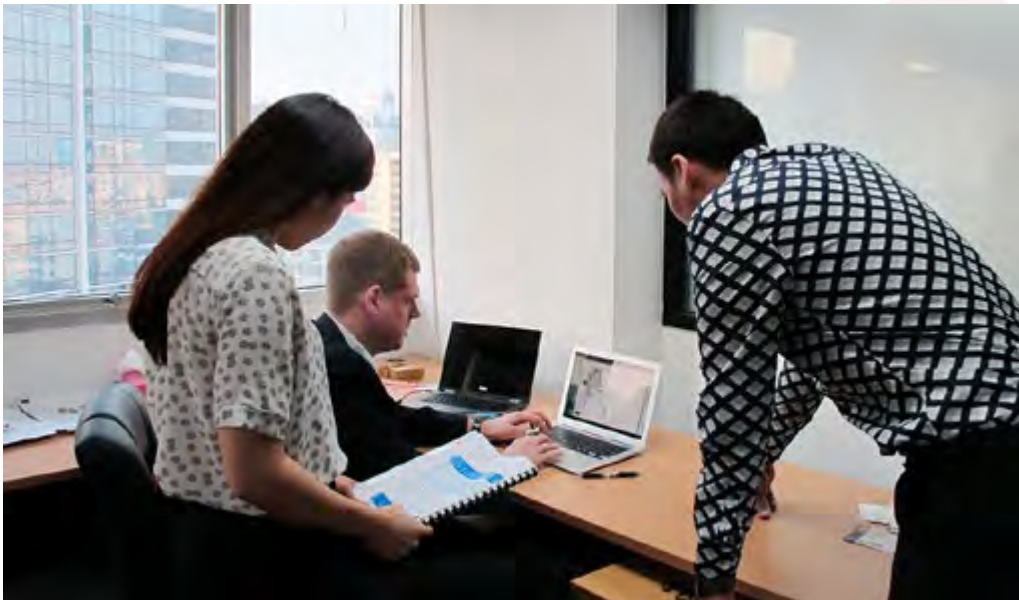
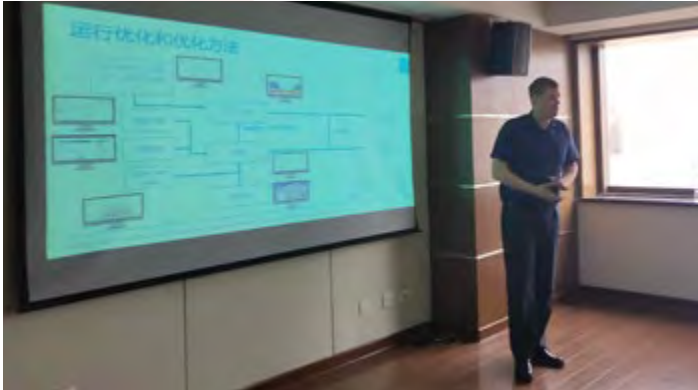
With PFC Pro historical and real-time analyses can be performed based on monitoring data from e.g. a SCADA system or an IoT platform, and forecast analyses can be performed based on production planning and load forecasting solutions. PFC Pro provides optimization features throughout the entire project value chain, taking the entire system value chain including all main facilities into consideration. Below examples of applications where PFC Pro is used are presented.

PLANNING FEATURES	DESIGN OPTIMIZATION	OPERATION OPTIMIZATION
<ul style="list-style-type: none"> <li>Network dimensioning</li> <li>Expansion planning</li> <li>Modernization</li> <li>Emergency sectioning</li> </ul>	<ul style="list-style-type: none"> <li>Production facilities</li> <li>Transmission pipelines</li> <li>Distribution networks</li> <li>Substations</li> <li>Pump stations</li> <li>Valve chambers</li> <li>Thermal energy storage</li> <li>Heat exchanger stations</li> <li>Pressure separators</li> <li>Surge tanks</li> <li>Pressure relief valves</li> </ul>	<ul style="list-style-type: none"> <li>Overall system control strategy</li> <li>Control logic for main facilities</li> <li>Control logic for equipment</li> <li>Pressure optimization</li> <li>Temperature optimization</li> <li>Pump trip analyses</li> <li>Valve closure analyses</li> </ul>
PLANNING SUPPORT		
<ul style="list-style-type: none"> <li>Production planning</li> <li>Fuel purchase planning</li> <li>Operation manuals and guidelines</li> <li>Maintenance planning</li> </ul>		

# District Energy Capacity Building

PFC Pro with its modern user interface is perfect for capacity building purposes. PFC has been used for decades to educate professionals in the subjects of district heating, district cooling and hydraulics. Training has been conducted for university students, design engineers, consultants, O&M personnel and managers.

When NXITY provides district heating and district cooling consulting services with focus on design and operation optimization, training is often part of the deliverables. O&M personnel and engineers are typically trained with introductory courses and tailor-made courses focusing on the aspects of the present project.



Beside district energy, Hydroram has conducted training in hydraulics for university students, design engineers, consultants, O&M personnel and managers. Ola Rossing, the founder of Hydroram and partner of NXITY, has a background as lecturer at Chalmers Technical University. Below examples of capacity building courses offered by NXITY are presented.

COURSES	LEVEL
District heating systems	Basic
District cooling systems	Basic
District energy system dynamics	Intermediate
Hydraulics in pipeline systems	Basic
Hydraulic transients	Advance
PFC Pro introduction	Basic
PFC Pro advanced	Intermediate
Tailor-made on demand	As required

NXITY's District Energy courses can be purchased with discounted fees through the APUEA Academy.





# Carbon reduction at scale – CO2 emission reduction of almost 3 million tons annually through two (2) of NXITY’s many District Energy projects in P.R. China.

PFC has been used to support project development, design, implementation, commissioning and O&M of large-scale complex district heating projects saving tens of millions ton CO2 emissions. Without a tool like PFC it is not possible to ensure safe and reliable operation of these projects. The district heating projects often have the characteristics of pool operation, heat recovery and supply from remote sources (often with high elevation differences), and different temperature and pressure levels.

In the period 2019-2021, NXITY has supported Beijing District Heating Group with design optimization and implementation of a district heating project in Datong comprising i) 2 000 MW heat recovery from a remote power plant, ii) construction of a 40 km long DN1400 district heating transmission pipeline with an elevation difference of 200m, and iii) de-commissioning of local coal-fired boilers. The Datong project will result in CO2-emission reduction of approximately 1.5 million tons annually.

In the period 2016-2021, NXITY has supported Hohhot City Chengfa Heating Company with design optimization and implementation of a district heating project in Hohhot comprising i) expansion, merging and modernization of 2900 MW district heating system ii) 650 MW heat recovery from a remote power plant, iii) construction of a 35 km long DN1400 district heating transmission pipeline with an elevation difference of 60m, iv) integration of curtailed wind power-based electrical boilers, and v) de-commissioning of local coal-fired boilers. The Hohhot project will result in CO2-emission reduction of approximately 1.4 million tons annually.

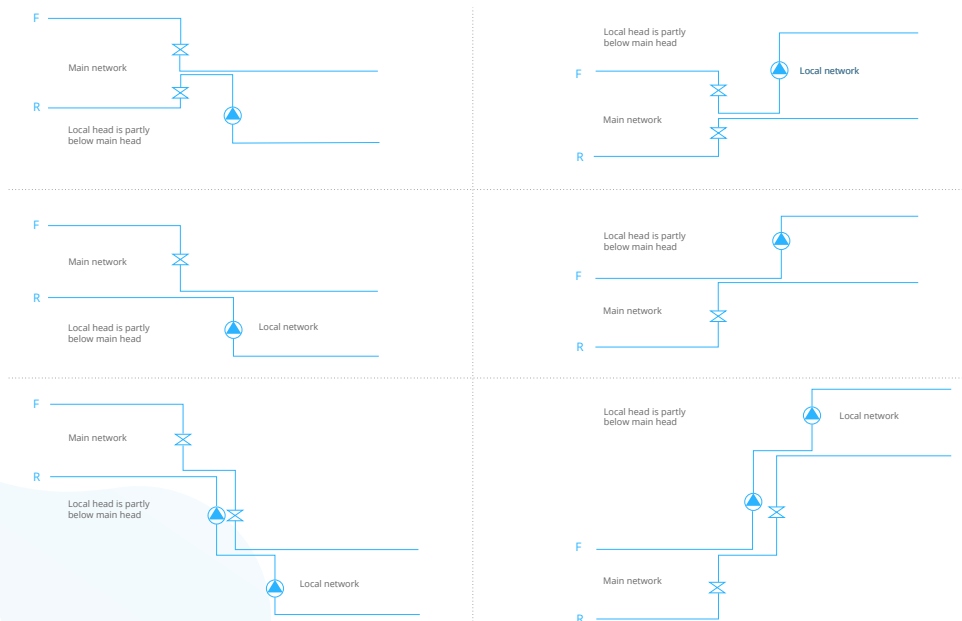
CO2-emission reduction at such scale, as in the complex Datong and Hohhot projects, can only be achieved with the experience, specialist knowledge and tool as offered by NXITY, while ensuring safe and reliable operation. In addition to the above-mentioned projects, NXITY has dozens other district heating and district cooling references across Asia Pacific making a tremendous impact reducing carbon emissions globally.

## Safety solutions – reducing capital expenses by tens of millions USD supported by PFC

PFC has been used to support project development, design, implementation, commissioning, and O&M of large-scale complex district heating projects saving tens of millions USD in investment. Without a tool like PFC it is not possible to ensure safe and reliable operation of these projects.

In 2021, NXITY was engaged to develop a safe pump and throttle station as a substitute to a 780 MW heat exchanger station in Wuhai, P.R. China. The facility ensures safe and reliable operation both in normal conditions, but also in case of pump trips or other unintended operational events. The CapEx reduction counts to 5 million USD and the OpEx reduction to 2 million USD per year.

Over the years, PFC has been used to develop pressure separators, replacing substation in both district heating and district cooling systems worldwide. The pressure separator ensures hydraulic safety, while reducing operational and capital expenses compared to a heat exchanger. For district cooling systems, where temperature losses are critical, the pressure separator avoids the temperature drop which otherwise is unavoidable with a heat exchanger. Some would say that the pressure separator itself, is a game changer to improve the financial feasibility of district cooling schemes. The pressure separator is a patented solution by Hydroram, which has replaced heat exchanger investments of millions USD.



Simplified schematic of pressure separators, without details on safety arrangements

# System integration – District Energy schemes providing cross-sectoral benefits



Source: Stockholm Exergi AB

The Stockholm district energy systems have served the Stockholm energy sector well, providing distributed power generation to release the stress of the local electricity grid, while providing energy efficient and clean heating and cooling. The Stockholm district energy system recover heat from the wastewater, providing several hundred MW heating. Thanks to the local conditions, the water from the Baltic Sea can be used as 'free cooling', providing energy efficient cooling, in the citywide district cooling system. Furthermore, the municipal solid waste is sorted, handled, and incinerated in the local Waste-to-Energy plants. Recent years, a Bio-CCS has been developed, supporting the Stockholm district energy system to become carbon negative or climate positive.

These are a few examples of innovative technologies applied in the Stockholm District Energy system.

Besides in substations, heat exchangers have been avoided to a large extent in the Stockholm district heating system. By replacing heat exchanger stations with safe pressure separators, pump and throttle stations, and other solutions, the temperature level in the systems can be reduced. A reduced temperature level result in reduced heat losses, increased efficiency of flue gas condensation, power generation through steam turbines, heat-pumps, and improve the safety for personnel and the public. To replace heat exchanger stations and thereby reduce CapEx and OpEx requires a tool like PFC in order to ensure a safe and reliable operation.

## NXITY – A local trusted partner in Asia, with roots from Scandinavia

NXITY is engaged by the largest and most progressive utilities, investors and industries active in the Asia Pacific region. NXITY provides localized international specialist engineering and management consulting services for district energy, thermal power, and industrial energy efficiency schemes. NXITY also provides state-of-the-art digital solutions for district energy schemes. With decades of international experience, specialist know-how, and localized international teams, NXITY is a solid partner in the local urban energy markets.

As consultant, NXITY develops, implements, and optimizes district energy, thermal power and industrial energy efficiency projects across Asia Pacific. NXITY is engaged by government agencies,

investors, utilities and industries as project managers, owner's and lender's engineers, engineering specialists and management consultants.

As an energy ICT solution integrator, NXITY develops, sells, implements, maintains, and supports design and O&M optimization tools for district energy systems. The systems are world-leading and applied in dozens district heating and district cooling systems around the world.

NXITY optimize the financial performance and economic benefits, maximizing technical performance and energy efficiency, while minimizing the environmental impact.



### PROJECT MANAGEMENT

Client representative and multisector project management services to support your business objectives while delivering projects that meets quality, cost, and timeline.



### BUSINESS CONSULTING

Multidisciplinary business consulting services to empower your organization and projects while adding value and filling management and engineering gaps.



### ENERGY ICT SOLUTIONS

ICT solutions for District Energy and Thermal Power systems to support decision making along the entire project value chain and optimize O&M across entire system value chain.

For more information on PFC Pro functionalities, release dates, quotations, partnerships, and others, contact **John Jakobsson** at [john.jakobsson@nxity.com](mailto:john.jakobsson@nxity.com).



NXITY, with its origin in Scandinavia, provides project development and optimization services for cities, utilities, investors and solution providers within District Energy, Thermal Power and Sustainable City developments. In 2021, NXITY joined forces with Hydroram. Contact: John Jakobsson, Managing Director, NXITY Energy ICT Solutions at [john.jakobsson@nxity.com](mailto:john.jakobsson@nxity.com)

[www.nxity.com](http://www.nxity.com)

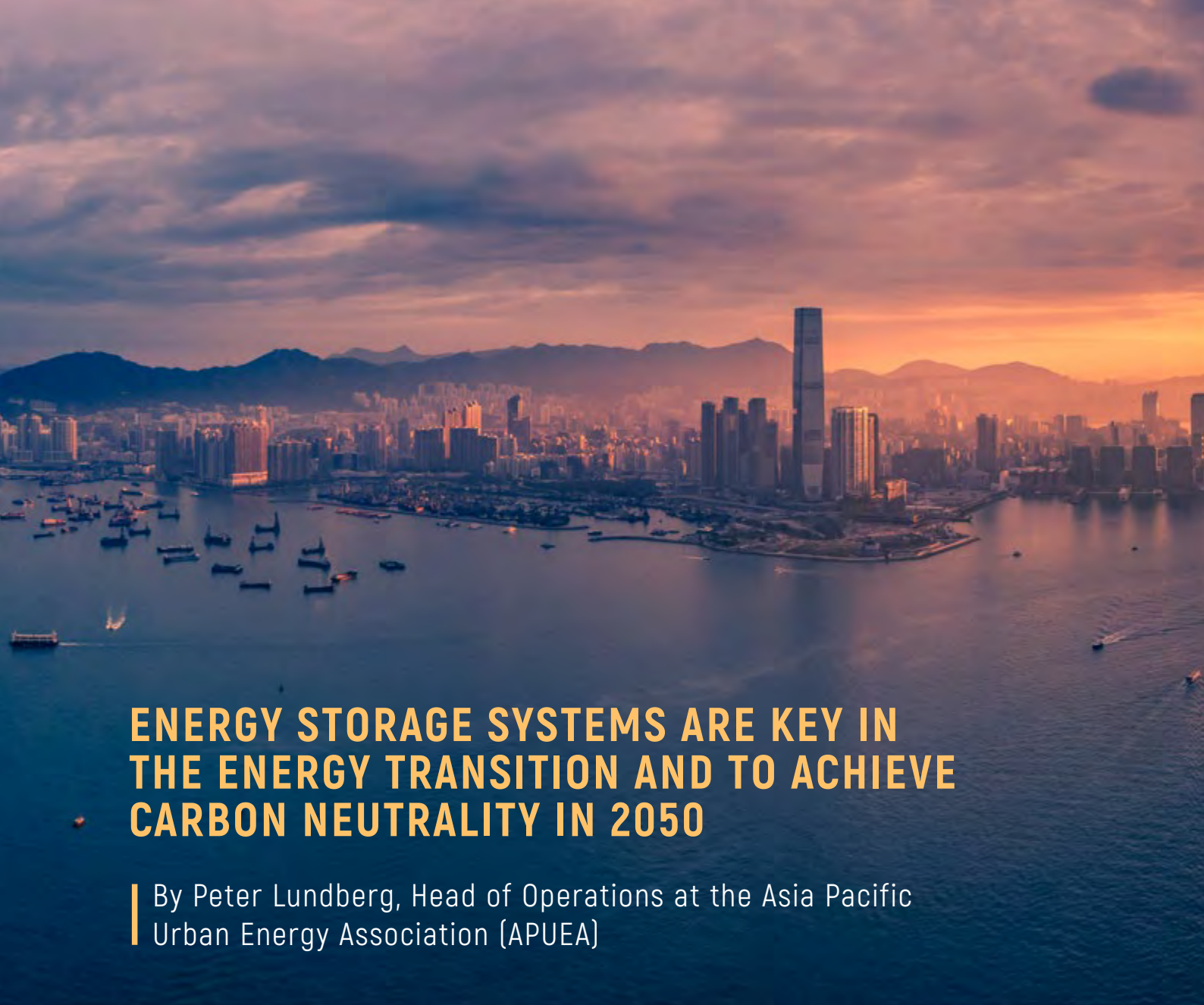


Iglu provides wide range of services for cloud-based software development projects and IT talent staffing. Headquartered in London, Iglu offers services remotely globally, with local offices in Thailand, Vietnam, Estonia, Hong Kong and the UK.

Read more about Iglu: <https://iglu.net>.

Contact: Toni Willberg, Head of Cloud Business Unit at Iglu: [toni@iglu.net](mailto:toni@iglu.net)





# ENERGY STORAGE SYSTEMS ARE KEY IN THE ENERGY TRANSITION AND TO ACHIEVE CARBON NEUTRALITY IN 2050

By Peter Lundberg, Head of Operations at the Asia Pacific Urban Energy Association (APUEA)

In the light of the COP26 and the overwhelming evidence that human activities contribute to high levels of CO<sub>2</sub> in the atmosphere leading to climate change, with potentially severe consequences to our society and all life on Earth, it is clear that we need to act now to transition away from the use of fossil fuels to mitigate and stop the most severe and dangerous effects of climate change.

“

IT IS ESTIMATED THAT WIND FARMS CAN PRODUCE UP TO 40 TIMES OF THE WORLD'S ELECTRICITY CONSUMPTION AND MORE THAN SIX TIMES OF THE WORLD'S TOTAL ENERGY SUPPLY

”



The good news is that there is an abundance of Renewable Energy available on Earth. For example, an area of around 300,000 square kilometers covered with Solar PV panels would power the entire world with electricity. Of course, this number is huge, but it is only about 3 percent of the Sahara Desert. If looking at wind power, it is estimated that wind farms can produce up to 40 times of the world's electricity consumption and more than six times of the world's total energy supply. It is clear that the potential for renewable energy is huge and largely undeveloped.

With dropping prices for solar and wind, there are still challenges to overcome to transition from traditional fossil fuels to renewable energy-based energy systems. Maybe the biggest challenge and argument why it is not possible to rely too much on renewables, such as solar and wind energy, is what to do when the sun is not shining, and the wind is not blowing, and that energy system needs to a large extent to be based on dispatchable energy production that can be switched on or off when needed. It is true that many traditional energy production systems based on fossil fuels like oil, gas, or coal can be turned on or off relatively easily to match the energy consumption. But how much work is needed to make these fossil fuel energy systems ready to be used?

If we take oil as an example, it needs to be found, extracted, transported to, and refined in an oil refinery. The refined oil products are then transported to gas stations and power plants, where they will be stored until consumed. Even if the preparation process for oil, coal, and natural gas varies, this example shows that fossil fuels require a lot of work and preparation before being consumed. We also have to remember all the infrastructure that exists today to extract, move, transport, and store oil, coal, and natural gas, has been built over decades, and it is easy to forget that it has not always existed. If we discovered oil today, it would take many decades to scale up this infrastructure to its size today.

So, how can the world build new energy infrastructure to use the potential that renewable energy sources bring and solve the problem with intermittent energy production and better match the energy production with consumption? The answer to this question is utilization of Energy Storage Systems:

## Batteries

Batteries are maybe the most discussed type of energy storage and can be used to store electricity to be used during peak demand and to stabilize power grids to avoid the use of expensive reserve power plants. There are many battery technologies available, and new types are under development. Battery energy storage works on a grid level, in buildings and houses, cars, trucks, buses, ships, and airplanes. The upside with battery energy storage is its flexibility and high efficiency. It is also possible to recycle and reuse 95 percent of the metals used in batteries. The downside is price, charging time, and the relatively low energy density, which makes batteries unsuitable to use, for example, for long haul flights. However, prices are falling, and large resources are spent developing new battery technologies with improved energy density and charging capacity.

## Hydrogen Energy Storage

Another energy storage technology discussed frequently is Hydrogen Energy Storage. The idea is to produce Hydrogen with renewable electricity by using water electrolysis. Hydrogen can, when needed, be converted back to electricity, for example, by using fuel cells or gas turbines. A smaller amount of Hydrogen can also be mixed into existing natural gas pipelines. Hydrogen can also be used as feedstock in the chemical and steel industry. Two examples of ongoing projects to develop fossil-free steel using green Hydrogen can be found in northern Sweden, Hybrit and H2 Green Steel. Green Hydrogen, together with nitrogen, can also be used to make Green Ammonia which can be used as energy storage (easier to store and transport compared to Hydrogen), or as zero-carbon fuel, for example, in the shipping industry (can be burned in engines instead of oil). Green Hydrogen can also be used, together with Carbon dioxide, to produce e-fuels, including Methane, Methanol, and FT-liquids, that can be

used as carbon neutral drop-in fuel for the transportation sector, including cars, ships, and aviation. The downside with re-electrifying Hydrogen is low efficiency, but Hydrogen can become a vital component to utilize renewable energy as it can be adapted to suit numerous industries and applications.

## Thermal Energy Storage in District Energy Systems

Heating and Cooling stands for 51 percent of the world's total final energy consumption (followed by the transportation sector at 32 percent, and the power sector at 17). Only 10,2 percent of heating and Cooling in the world is renewable energy, so this sector is very important to consider when decarbonizing our society. Heating and cooling systems also offer excellent opportunities to integrate renewable energy to be dispatched either directly or stored to be used later. Thermal Energy Storage systems are commonly used in modern District Heating and District Cooling systems. They work basically like a thermos and keep the temperature of the heated or cooled water until it is needed. Renewable electricity from, for example, wind and solar can during periods of excess production (meaning when the energy production is larger than the energy consumption) be converted to heating or cooling for use either directly or stored in a Thermal Energy System for later use. One example of this can be seen in Berlin, where the Energy Utility Vattenfall has built Europe's largest Power-to-Heat facility (120 MW E-boiler) to the city's District Heating network. Vattenfall is also planning an even larger Power-to-Heat facility (150 MW E-boiler) to produce renewable heat from wind power to Amsterdam's District Heating network.

## Pumped Hydro Power

A Pumped Hydro Power System is basically a Hydropower Plant with the added function to pump water back to the reservoir, or dam, during times with low electricity demand, low prices, and when excess renewable electricity is available. This way, the system can be "charged" with energy that can be stored and used later during peak load and high electricity prices. Pumped Hydro Systems are equipped with generators and turbines that also function as motors and pumps. These systems are net electricity consumers due to losses when in pumping mode, but the round-trip efficiency is still quite high, typically higher than 80 percent. Pumped Hydro Power systems offer valuable features to balance power grids and are often very economical due to peak and off-peak price differentials and other grid services. In recent years, discussions have emerged to use old and discontinued underground mines as a type of Pumped Energy Storage.

## Mechanical Energy Storage

Mechanical Energy Storage systems can store energy by taking advantage of kinetic or gravitational forces. These systems include Fly Wheel Energy Storage Systems and different kinds of Compressed air Energy Storage. While Fly Wheel systems are mainly used to maintain the power quality and reliability of power systems, Compressed air systems can be scaled to function in both small and large applications and functions similar to Pumped Hydro Power Systems. Recently, new types of Mechanical Energy Storage systems have been under development. One example of this is creating systems that lifts, store, and release weights, by utilizing gravity to store energy. One example of this is the company Energy Vault, which is developing a modular, gravity-based energy storage system designed to optimize the use of renewable electricity.



HEATING AND COOLING STANDS FOR 50 PERCENT OF THE FINAL ENERGY CONSUMPTION, BUT ONLY 10 PERCENT OF THE ENERGY SUPPLY TO THIS SECTOR IS RENEWABLE. THERMAL ENERGY STORAGE SYSTEMS OFFER EXCELLENT OPPORTUNITIES TO DISPATCH MORE RENEWABLE ENERGY AND DECARBONIZE THE SECTOR.



## Conclusion

There is an abundance of renewable energy available on Earth, and Solar and Wind Power alone could supply all of the planet's energy needs. If there is an abundance of renewable energy available and the costs for renewable energy are already in many cases competitive with fossil fuel-based energy systems. With the risk associated with fossil fuels, what is the catch to switching to a fully renewable energy-based world already today? This is, of course, a complicated question.

Still, a simplified answer is that the world needs to develop an infrastructure to bridge the gap between the production

and consumption of renewable energy so that we maximize the production of renewable energy and then convert it to various forms that can be used in different applications or be stored and used at a later time. Here is where Energy Storage Systems comes in.

Many types of energy storage systems are available today, and many are also under development. Batteries and Hydrogen are probably the two technologies discussed the most today and will have important roles in decarbonizing the transportation and industry sectors. Heating and Cooling stands for 50 percent of the final energy

consumption, but only 10 percent of the energy supply to this sector is renewable.

Thermal energy storage systems offer excellent opportunities to dispatch more renewable energy and decarbonize the sector. We now have a few decades to scale up both renewable energy production and the energy storage infrastructure needed to achieve carbon neutrality by 2050. It is a huge challenge, maybe the biggest yet for humankind, but the alternative is much too risky, expensive, and potentially catastrophic, so we really have no other choice.

### Sources:

[www.axionpower.com/knowledge/power-world-with-solar/#How\\_Many\\_Solar\\_Panels\\_Would\\_It\\_Take\\_To\\_Power\\_The\\_World](http://www.axionpower.com/knowledge/power-world-with-solar/#How_Many_Solar_Panels_Would_It_Take_To_Power_The_World)

[www.windpowerengineering.com/how-many-wind-turbines-would-it-take-to-power-the-world](http://www.windpowerengineering.com/how-many-wind-turbines-would-it-take-to-power-the-world)

<https://group.vattenfall.com/press-and-media/pressreleases/2021/vattenfall-to-build-europes-largest-e-boiler-in-amsterdam>

<https://energystorage.org/why-energy-storage/technologies/pumped-hydropower>

[www.ren21.net/gsr-2021/chapters/chapter\\_01/chapter\\_01](http://www.ren21.net/gsr-2021/chapters/chapter_01/chapter_01)

[www.energyvault.com](http://www.energyvault.com)

# GLOBAL DISTRICT ENERGY CLIMATE AWARDS 2021: WINNERS

By Dr. Robin Wiltshire, Chairman of the Evaluation Panel, Global District Energy Climate Awards

The Ceremony for seventh edition of the Global District Energy Climate Awards took place in November 2021 in Bangkok, hosted by the Asian Pacific Urban Energy Association (APUEA). As well as announcing the following Awards of Excellence, the assessment panel reported that the standard of submission was the highest ever. Full details can be found at:

[www.districtenergyaward.org/winners/winners-2021](http://www.districtenergyaward.org/winners/winners-2021)



More information:  
[www.districtenergyaward.org/2021-bangkok-thailand](http://www.districtenergyaward.org/2021-bangkok-thailand)



## DHC IN DEVELOPING COUNTRIES AWARD OF EXCELLENCE: THE GOVERNMENT COMPLEX COMMEMORATING HIS MAJESTY THE KING'S 80TH BIRTHDAY ANNIVERSARY, 5TH DECEMBER, B.E. 2550 (2007) | BANGKOK, THAILAND

By 2030, Thailand aims to reduce GHG emissions by 20%. To meet this goal, DAD (Dhanarak Asset Development Co., Ltd.) aims for the development and management of The Government Complex to be green, low-carbon, and sustainable. This 929,900m<sup>2</sup> Government complex is designed to minimise energy demand and has a District Cooling System (DCS) with 14,000m<sup>2</sup> chilled water storage, charged at night, which reduces electricity demand by around 107,305 MWh and CO<sub>2</sub> emissions by nearly 47,000 tons. A special feature of the DCS is a cooling pond one kilometre in circumference which reduces condenser water temperature from about 31°C to 25°C by evaporation, increasing the chiller efficiency accordingly.





More information:  
[www.districtenergyaward.org/alexandra-district-energy-utility-richmond-canada](http://www.districtenergyaward.org/alexandra-district-energy-utility-richmond-canada)



## EMERGING DHC MARKETS AWARD OF EXCELLENCE: ALEXANDRA DISTRICT ENERGY UTILITY (ADEU), RICHMOND, CANADA

First established in 2012, the Alexandra District Energy Utility (ADEU) in the city of Richmond is a low carbon district energy system that utilises ground-source technology for heating, cooling and domestic hot water pre-heating. Winning in the category of Emerging District Energy Markets, ADEU comprises an ambient temperature system that draws heat from more than 700 closed-loop boreholes, connects to more than 2,200 dwellings and more than 2.3 million square feet of floor space, using heat pumps in the buildings to elevate the temperature for heating or reject heat for cooling.



More information:  
[www.districtenergyaward.org/low-temperature-district-heating-in-brunnshog-lund-sweden](http://www.districtenergyaward.org/low-temperature-district-heating-in-brunnshog-lund-sweden)



## NEW SCHEME AWARD: LOW TEMPERATURE DISTRICT HEATING IN BRUNNSHÖG, LUND, SWEDEN

2009 was a very important year for the city of Lund. Two large new research facilities were confirmed and would form the core of a new city district called Brunnshög. Set to be a leading example of sustainable city development with very high standards of insulation, heating is nevertheless still required during the cold months, and there is a year-round need for hot tap water. Consequently, a next-generation low temperature district heating, the world's largest, was inaugurated in autumn 2019, using residual heat from the research facilities. Innovative technical solutions also include special new pipes requiring far fewer joints, leading to a significant reduction in cost.



More information:  
[www.districtenergyaward.org/district-heating-system-of-bolzano-bozen-south-tyrol-italy](http://www.districtenergyaward.org/district-heating-system-of-bolzano-bozen-south-tyrol-italy)



### MODERNISATION AWARD: DISTRICT HEATING SYSTEM OF BOLZANO-BOZEN, SOUTH TYROL, ITALY

Alperia EcoPlus, owner of the district heating system in Bolzano, began a modernisation programme from 2013. Now with heat sources that include biomass (60% of which is local), residual heat from industrial processes and Bolzano's waste-to-energy plant, this resulted in the expanded heating plant having 5.600m<sup>3</sup> buffer storage and a new, high efficiency pump system supplying the existing city, hospital and industrial zone. The network continues to expand; currently, 262 apartment blocks are connected in the city, and another 250 will be connected by 2025. When the investment plan for Bolzano is completed, the annual reduction of CO<sub>2</sub> emissions will be approximately 15,000 tonnes.



More information:  
[www.districtenergyaward.org/district-cooling-central-plants-qatar-foundation-doha-qatar](http://www.districtenergyaward.org/district-cooling-central-plants-qatar-foundation-doha-qatar)



### EXPANSION AWARD: DISTRICT COOLING CENTRAL PLANTS, QATAR FOUNDATION, DOHA, QATAR



Established in 1995 as a non-profit organisation, The Qatar Foundation began with primary education, and has since expanded so that Qatar's Education City now comprises a 12km<sup>2</sup> complex with universities and research facilities, as well as both primary and secondary schools. The first district cooling plant was commissioned in 2003 and was followed over the next ten years with 5 more district cooling plants growing from an initial capacity of just under 40MW to more than 500MW. Along with the expansion of the system, the performance of the internals of older buildings have been improved. The latest expansion at the complex is the Education City World Cup Stadium, served by state-of-the-art equipment and completed in September 2020.

## OUT-OF-THE-BOX



The Out-of-the-Box category caters for submissions which do not readily fit with any of the above categories. While not making an outright Award of Excellence in this category, the assessment panel decided to award Certificates of Merit for two particularly enterprising systems. These were the Floating Office in Rotterdam, the Netherlands, and the Zakito District Cooling system in Curacao, in the Dutch Caribbean.



More information:  
[www.districtenergyaward.org/floating-office-rotterdam-netherlands](http://www.districtenergyaward.org/floating-office-rotterdam-netherlands)


More information:  
[www.districtenergyaward.org/zakito-district-cooling-curacao-dutch-caribbean](http://www.districtenergyaward.org/zakito-district-cooling-curacao-dutch-caribbean)




# APUEA Academy

## PROFESSIONAL TRAINING

Is provided to Government agencies and Public institutions, including the following training module categories:

- Introductory training
- Concepts and Technologies
- Advanced training

## VOCATIONAL TRAINING

Is provided in collaboration with educational institutions.



# APUEA

Asia Pacific Urban Energy Association



FOR MORE INFORMATION

✉ [MJAKOBSSON@APUEA.ORG](mailto:MJAKOBSSON@APUEA.ORG)

[www.apuea.org](http://www.apuea.org)



DISTRICT COOLING | DISTRICT HEATING | INDUSTRIAL ENERGY EFFICIENCY | MULTI-ENERGY SYSTEMS

**NXITY**   
**SERVICES**



### PROJECT MANAGEMENT

Client representative and multisector project management services to support your business objectives while delivering projects that meets quality, cost, and timeline.



### BUSINESS CONSULTING

Multidisciplinary business consulting services to empower your organization and projects while adding value and filling management and engineering gaps.



### ENERGY ICT SOLUTIONS

ICT solutions for District Energy and Thermal Power systems to support decision making along the entire project value chain and optimize O&M across entire system value chain.



#### GREENFIELD

Developing optimal energy schemes by localizing international best practises



#### BROWNFIELD

Developing efficient energy schemes suitable to meet old and new requirements



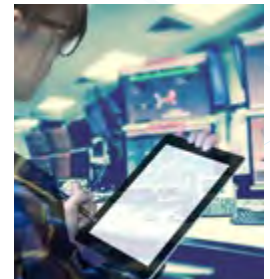
#### EXPANSION

Expanding energy systems cost-effective by introducing innovative solutions and timely implementation



#### OPTIMIZATION

Systemic technical and financial optimization while building capacity and improving efficiency, reliability and safety



#### MODERNIZATION

Improving technical and financial performance while introducing new technologies, building capacity and adding new features

ADDING VALUE

FILLING THE GAPS

QUALITY ASSURANCE

[www.nxity.com](http://www.nxity.com)



 [info@nxity.com](mailto:info@nxity.com)

 [nxity](https://www.linkedin.com/company/nxity)

# RECENT APUEA ACTIVITIES

APUEA continues its mission to support the development of sustainable urban energy in the Asia-Pacific by supplying international knowledge platforms where the world's energy community can meet, influence, share experience and get inspiration. Since October 2021, APUEA has hosted five workshops as part of two large digital events, the Asia Urban Energy Assembly, and ASEAN Sustainable Energy Week. The theme of these workshops were District Energy, Integrated Urban Energy, and Future Energy systems. More details of these events, including video links can be found in the sections below.



**ASEAN SUSTAINABLE ENERGY WEEK** | **APUEA** Asia Pacific Urban Energy Association | **EUROHEAT & POWER**

**7<sup>TH</sup> GLOBAL DISTRICT ENERGY CLIMATE AWARDS & ASIA URBAN ENERGY ASSEMBLY** | **11 NOVEMBER 2021** 09:30 – 18:00 PM © INDOCHINA TIME

**SESSION 1: THE IMPORTANCE OF DISTRICT ENERGY IN THE ENERGY TRANSITION**  
09:30 – 12:30 PM INDOCHINA TIME

**SESSION 2: DISTRICT ENERGY DEVELOPMENTS IN THE ASIA-PACIFIC**  
13:30 – 16:00 PM INDOCHINA TIME

**SESSION 3: 7<sup>TH</sup> GLOBAL DISTRICT ENERGY CLIMATE AWARDS VIRTUAL CEREMONY**  
16:00 – 18:00 PM INDOCHINA TIME

**ANH-HA DE FOUCAULD**  
Head of Mixed-Use Retail and High-Rise Commercial  
PWC South East Asia

**LARS HUMMELMOSE**  
Managing Director  
CBDR

**MOHAMMAD KHADER**  
Commercial & Development Director  
Gulf Cool

**DR. MOHD HAFIZ IBRAHIM**  
President at the Malaysian District Cooling Association (MDCA)

**QATAR COOL** | **DBDH**

## ASIA URBAN ENERGY ASSEMBLY AND 7TH GLOBAL DISTRICT ENERGY CLIMATE AWARDS

On 11 November, APUEA co-hosted the virtual edition of the newly established Asia Urban Energy Assembly together with ASEAN Sustainable Energy Week and Euroheat & Power. As an integrated part of the Asia Urban Energy Assembly, the 7<sup>th</sup> Global District Energy Climate Awards recognizing world-leading district energy projects while highlighting how district energy systems help cities and communities transition towards a carbon-neutral future. The event included three sessions:

**Session 1: THE IMPORTANCE OF DISTRICT ENERGY IN THE ENERGY TRANSITION**

**Session 2: DISTRICT ENERGY DEVELOPMENTS IN THE ASIA-PACIFIC**

**Session 3: 7TH GLOBAL DISTRICT ENERGY CLIMATE AWARDS VIRTUAL CEREMONY**

The event gathered 200 participants from 39 countries. More details of each session can be found in the sections below. The in-person version of this will event will be held as an international two-day event, 15-16 September 2021 in Bangkok Thailand.

**7<sup>TH</sup> GLOBAL DISTRICT ENERGY CLIMATE AWARDS & ASIA URBAN ENERGY ASSEMBLY**  
**SESSION 1: THE IMPORTANCE OF DISTRICT ENERGY IN THE ENERGY TRANSITION**  
 09:30 – 12:30 PM INDOCHINA TIME

**MODERATOR**  
**MUHAMMAD ALI**  
 Australasia Advisor, APUEA

**SPEAKERS**  
**MIKAEL JAKOBSSON**, Executive Director, APUEA  
**SATCHAI NOOMBUNNAM**, Country General Manager, Informa Markets Thailand  
**FRANK EARLING CRONHOLM**, Head of Market, Euroheat & Power  
**PETER LUNDBERG**, Head of Operations, APUEA  
**ANH-HÀ DE FOUCAULD**, Managing Director, ENGIE  
**PAUL VOSS**, Managing Director, Euroheat and Power  
**LARS HUMMELMOSE**, Managing Director, DBDH  
**TAN CHIN HONG**, Managing Director, KJTS Group

RE-WATCHED WEBINAR HERE:  
**SESSION 1: THE IMPORTANCE OF DISTRICT ENERGY IN THE ENERGY TRANSITION**

## SESSION 1: THE IMPORTANCE OF DISTRICT ENERGY IN THE ENERGY TRANSITION

This session focused on how District Energy Systems and Networks, including District Heating and District Cooling Systems, can play an important role around to world to help cities in the transition to sustainable energy systems and meet global climate targets. The session includes presentations and a panel discussion on international District Energy Developments with the purpose to inspire, share knowledge, and best practices that could be applied to District Energy projects in the Asia-Pacific region. The full session agenda can be seen below.

TIME	ACTIVITY
10:00 - 10:10	<b>Moderator:</b> Muhammad Ali, Australasia Advisor, APUEA
10:10 - 10:20	<b>Welcome Remarks</b> Mikael Jakobsson, Executive Director, APUEA Sanchai Noombunnam, Country General Manager, Informa Markets Thailand
10:20 - 10:35	<b>Session Introduction</b> Peter Lundberg, Head of Operations, APUEA
10:35 - 10:50	<b>Towards an affordable, reliable and sustainable energy transition</b> Anh-Hà de Foucauld, ENGIE
10:50 - 11:05	<b>District Energy from a European Perspective</b> Paul Voss, Managing Director, Euroheat and Power
11:05 - 11:25	<b>District Energy - an Important part of a Sustainable Future</b> Lars Hummelmoose, Managing Director, DBDH
11:25 - 12:00	<b>District Cooling Systems from an ASEAN perspective</b> Tan Chin Hong, KJTS Group
	<b>Panel Discussion including Q&amp;A</b> Lars Hummelmoose, DBDH, Tan Chin Hong, KJTS Group Frank Grundholm, ABB, Pär Dalin, Devcco

**7<sup>TH</sup> GLOBAL DISTRICT ENERGY CLIMATE AWARDS & ASIA URBAN ENERGY ASSEMBLY**  
**SESSION 2: DISTRICT ENERGY DEVELOPMENTS IN THE ASIA-PACIFIC**  
 13:30 – 16:00 PM INDOCHINA TIME

**MODERATOR**  
**PETER LUNDBERG**  
 Head of Operations, APUEA

**SPEAKERS**  
**MIKAEL JAKOBSSON**, Executive Director, APUEA  
**DR. PONGPAN VORAYASAN**, Senior International Energy Engineer, Department of Energy Policy, Planning and Efficiency, Ministry of Energy, Royal Thai Government  
**DR. MOHD HAFIZ IBRAHIM**, Executive Director, MDCA  
**PRAMEET GUPTA**, Energy Specialist, Tabreed  
**ZHUOLUN CHEN**, District Energy in Cities Initiative, UN Environment  
**JOHANN KHADER**, Managing Director, Qatar Cool

RE-WATCHED WEBINAR HERE:  
**SESSION 2: DISTRICT ENERGY DEVELOPMENTS IN THE ASIA-PACIFIC**

## SESSION 2: DISTRICT ENERGY DEVELOPMENTS IN THE ASIA-PACIFIC

The District Energy markets in Asia-Pacific are huge and are growing rapidly and, for example, India and China are in 2050 expected to have the two largest cooling markets in the world. This session includes presentations and a panel discussion on current and future District Energy Developments in Thailand, Malaysia, India, China, and Qatar. The purpose of the session is to give insights into the huge, and fast-growing District Energy markets in the Asia-Pacific region. The full session agenda can be seen below.

TIME	ACTIVITY
14:00 - 14:05	<b>Moderator:</b> Peter Lundberg, Head of Operations, APUEA
14:05 - 14:20	<b>Session Introduction</b> Mikael Jakobsson, Executive Director, APUEA
14:20 - 14:35	<b>District Cooling Developments in Thailand</b> Dr. Pongpan Vorayasan, Ministry of Energy, Thailand
14:35 - 14:50	<b>District Cooling Developments in Malaysia</b> Dr. Mohd Hafiz Ibrahim, Malaysian District Cooling Association (MDCA)
14:50 - 15:05	<b>District Cooling Developments in India</b> Prameet Gupta, Tabreed
15:05 - 15:15	<b>District Energy Developments in China</b> Zhuolun Chen, District Energy in Cities Initiative, UN Environment
15:15 - 15:40	<b>Reducing carbon emissions using District Cooling</b> Mohannad Khader, Qatar Cool
	<b>Panel Discussion including Q&amp;A</b> Audience



### SESSION 3: 7<sup>TH</sup> GLOBAL DISTRICT ENERGY CLIMATE AWARDS

The 7<sup>th</sup> Global District Energy Climate Awards recognized world-leading district energy projects while highlighting how district energy systems help cities and communities transition towards a carbon-neutral future. The Global District Energy Climate Awards includes the awards categories, New Scheme, Modernisation, Expansion, Emerging Market, District Energy in Developing Countries, and Out of the Box. The event has previously been held in Copenhagen, Paris, New York, Tallinn, Doha, and Reykjavik. The full session agenda can be seen below.

TIME	ACTIVITY
16:00 - 17:30	<p><b>Moderator:</b> Mikael Jakobsson, Executive Director, APUEA</p> <p><b>Welcome Remarks:</b> Dr. Twarath Sutabutr, Inspector General, Ministry of Energy, Thailand</p> <p><b>Keynote address:</b> Paul Voss, Managing Director, Euroheat &amp; Power</p> <p><b>Awards Presentation:</b> Robin Wiltshire, Chairman of the Evaluation Panel</p> <p><b>Presentation of the Awards of Excellence</b></p> <ul style="list-style-type: none"> <li>- NEW SCHEME</li> <li>- MODERNISATION</li> <li>- EXPANSION</li> <li>- EMERGING MARKET</li> <li>- DISTRICT ENERGY IN DEVELOPING COUNTRIES</li> <li>- OUT OF THE BOX</li> </ul> <p><b>Award Winners Panel</b> Exchange with the Award winning projects</p> <p><b>Summary and Conclusion</b></p>



RE-WATCHED WEBINAR HERE:  
SESSION 3: 7<sup>TH</sup> GLOBAL DISTRICT ENERGY CLIMATE AWARDS



### ASEAN SUSTAINABLE ENERGY WEEK

Between 14-15<sup>th</sup> October, APUEA participated as a conference partner at the 2021 Virtual Edition of the ASEAN Sustainable Energy Week, which is ASEAN's largest international conference and exhibition with focus on Renewable Energy, Energy Efficiency, the Environment and EV Technology. During the event, APUEA co-hosted two webinars; i) The Potential of Integrated Urban Energy Systems (with Informa Markets), and ii) Future Energy Systems (with the Joint Graduate School of Energy and the Environment and Informa Markets) as a part of the International Conference; Clean Energy Transition for Post Covid Resilience in ASEAN. Read more of these two sessions below.



RE-WATCHED WEBINAR HERE:  
**The Potential of Integrated Urban Energy Systems**

## THE POTENTIAL OF INTEGRATED URBAN ENERGY SYSTEMS

On 15 October, APUEA co-hosted the workshop with the title; The Potential of Integrated Urban Energy Systems together with Informa Markets. The workshop included a discussion about the importance and potential of energy efficiency and integrated energy solutions in the energy transition. Energy efficiency plays a vital role for cities to become carbon neutral and can often be seen as “low hanging fruit” that could be addressed with solutions already available today. However, to maximize the benefits of energy integration, there is a need to take an overall approach to energy planning and allow all actors to participate in the planning process. The full agenda of the session can be found below.

TIME	ACTIVITY
	<b>Moderator:</b> Peter Lundberg, Head of Operations, APUEA
14:00 - 14:10	<b>Opening remarks and session introduction</b> Mikael Jakobsson, Executive Director, APUEA
14:00 - 14:30	<b>The Importance of Systemic Efficiency</b> Vincent Minier, World Economic Forum
14:30 - 14:50	<b>Integrating Renewable Energy to the Grid with Battery Energy Storage Systems</b> Parot Indradesa, Project Manager, Black & Veatch
14:50 - 15:10	<b>The Potential to recover Waste Energy</b> Kristina Lygnerud, Energy Department Manager, Swedish Environmental Research Institute (IVL)
15:10 - 15:30	<b>Supporting Energy Transition in Cities</b> Dr. Anis Zaman, Economic Affairs Officer, UN ESCAP
15:30 - 15:55	<b>Panel Discussion and Questions and Answers</b> Audience
15:55 - 16:00	<b>Session summary</b> Mikael Jakobsson, Executive Director, APUEA

RE-WATCHED WEBINAR HERE:  
**Clean Energy Transition for Post-COVID Resilience in ASEAN Session 2: Future Energy Systems**

## CLEAN ENERGY TRANSITION FOR POST-COVID RESILIENCE IN ASEAN SESSION 2: FUTURE ENERGY SYSTEMS

On 14 October, APUEA co-hosted the workshop on with the title; Future Energy Systems together with the Joint Graduate School of Energy and the Environment (JGSEE) and Informa Markets. The workshop was a part of the international conference; Clean Energy Transition for Post-COVID Resilience in ASEAN. The workshop included presentations and a discussion on Energy Systems that will have an important role in the ongoing energy transition. The full agenda of the session can be found below.

TIME	ACTIVITY
	<b>Chairman:</b> Peter Lundberg, Head of Operations, APUEA & Dr. Athikom Bangviwat, JGSEE, KMUTT
13:30 - 13:50	<b>Cross Border Electricity exchange in ASEAN</b> Mr. Keisuke Ueda, Economic Research Institute for ASEAN, and East Asia (ERIA)
13:50 - 14:10	<b>The Importance of Energy Efficiency</b> Maria Fedorovicha, Global Product Marketing Manager, ABB
14:10 - 14:30	<b>The Potential of Green Hydrogen</b> Dr. Thana Sornchamni, PTT Public Company Limited
14:30 - 14:50	<b>The Potential of District Cooling in Thailand</b> Dr. Pongpan Vorasayan, Department of Alternative Energy Development and Efficiency, Ministry of Energy
14:50 - 15:10	<b>ASEAN Energy Outlook</b> Dr. Nuki Agya Utama, ACE Executive Director ASEAN Center of Energy
15:10 - 15:25	<b>The Importance of PV Safety</b> Mr. James Higgins, General Manager, China & South East Asia, SolarEdge Technologies, Inc.
15:25 - 15:50	<b>Q&amp;A</b>



**CNBC CATALYST'S "THE ROADS TO CARBON NEUTRAL: EPISODE 7 - HYBRID ENERGY"**

Broadcasted in the fall of 2021, APUEA's Executive Director Mikael Jakobsson participated in a CNBC Catalyst produced tv series "The Roads to Carbon Neutral: Episode 7 – Hybrid Energy". This TV series discussed how the world can deliver carbon neutrality by 2050, and episode 7 focus on how hybrid energy, including District Heating and District Cooling, can accelerate the transition towards a more sustainable energy mix.



RE-WATCHED WEBINAR HERE:  
**CNBC Catalyst's "The Roads to Carbon Neutral: Episode 7 - Hybrid Energy"**



# Asia Urban Energy Assembly

## 7<sup>TH</sup> GLOBAL DISTRICT ENERGY CLIMATE AWARDS



# 15-16

LIVE EDITION

📍 BANGKOK

SEPTEMBER 2022

🇹🇭 THAILAND

- ✓ 30-60 Speakers
- ✓ 10-20 Exhibitors
- ✓ 6 Award Categories
- ✓ 200-500 Participants



### GLOBAL DISTRICT ENERGY CLIMATE AWARDS



### PLENARY SESSION

- DIPLOMATIC PANEL
- URBAN ENERGY POST-COVID 19
- CITY PANEL



### THEMATIC WORKSHOPS



### URBAN ENERGY EXHIBITION



### SITE VISIT

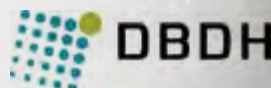
#### Urban Energy Disciplines

- ✓ District Cooling
- ✓ District Heating
- ✓ Thermal Energy Storage
- ✓ Multi-Energy Systems
- ✓ Industrial Symbiosis

#### Participants

- ✓ Government Agencies
- ✓ Intergovernmental organisations
- ✓ Utilities
- ✓ Investors
- ✓ Solution Providers

- ✓ Academia
- ✓ Real estate developers
- ✓ Planning institutions
- ✓ Engineering firms
- ✓ Sector Associations



# EVENT CALENDAR



## FOCUS EVENT

### 7<sup>TH</sup> GLOBAL DISTRICT ENERGY CLIMATE AWARDS & ASIA URBAN ENERGY ASSEMBLY



15-16

LIVE EDITION  
SEP 2022

📍 Bangkok, Thailand

## APUEA EVENTS

17  
MARCH

### DISTRICT COOLING IN INDONESIA WEBINAR

(Co-hosting organization)

📅 17 MARCH 2022

01 - 05  
MARCH

### INDIA SMART UTILITY WEEK New Delhi, India

(Supporting organization)

📅 01-05 MARCH 2022

21  
APRIL

### EV DEVELOPMENTS IN INDONESIA WEBINAR

(Co-hosting organization)

📅 21 APRIL 2022

JUNE

### ASIA CLEAN ENERGY FORUM

(Co-hosting organization)

📅 JUNE 2022

14 - 16  
SEPTEMBER

### ASEAN SUSTAINABLE ENERGY WEEK VIRTUAL EDITION

(Co-hosting organization)

📅 14 - 16 SEPTEMBER 2022

## APUEA SUPPORTED EVENTS

07 - 09  
MARCH

### MIDDLE EAST ENERGY DUBAI Dubai, UAE

(Supporting organization)

📅 07-09 MARCH 2022

14 - 17  
SEPTEMBER

### ELECTRIC & POWER INDONESIA Jakarta, Indonesia

(Supporting organization)

📅 14-17 SEPTEMBER 2022

08 - 10  
NOVEMBER

### ASEAN SUPER 8 Kuala Lumpur, Malaysia

(Supporting organization)

📅 08-10 NOVEMBER 2022

22 - 24  
MARCH

### PHILENERGY Manila, The Philippines

(Supporting organization)

📅 22-24 MARCH 2023

### 7<sup>TH</sup> GLOBAL DISTRICT ENERGY CLIMATE AWARDS & ASIA URBAN ENERGY ASSEMBLY



15-16

LIVE EDITION  
SEPTEMBER 2022  
📍 BANGKOK — THAILAND



# MEMBER DIRECTORY

## PREMIUM MEMBERS



ABB



Engie



Johnson Controls

## MEMBERS



International District Energy Association (IDEA)



NXITY



Alliance to Save Energy



Qatar Cool



China District Heating Association (CDHA)



Danish Board of District Heating (DBDH)



Northeast Clean Energy Council (NECEC)



IVL Swedish Environmental Research Institute



District Energy in Cities Initiative



DEVCCO



Thai ESCO Association



Overseas Environmental Cooperation Center (OECC)



Institute for Sustainable Energy Policies



tabreed



Chongqing Renewable Energy Society



Tera



Kamstrup



SIVECO China



Fengxi New Energy



Euroheat & Power (EHP)



Alliance for an Energy Efficient Economy (AEEE)



Asia LEDS Partnership



Black and Veatch



KJTS Group

## PARTNERS AND SUPPORTING ORGANIZATIONS

- Asian Development Bank (ADB)
- International Energy Agency (IEA)
- United Nations Environment
- Asian Infrastructure Investment Bank (AIIB)
- REN21
- C40 Cities

# APUEA REGISTRATION FORM - MEMBERSHIP

WE, THE UNDER-MENTIONED ORGANISATION / COMPANY,  
HEREBY APPLY TO BECOME A MEMBER

You can print out your registration  
and entry form below.



## 1 ORGANIZATION / COMPANY DETAILS:

Organization name.....

Marketing name and/or Abbreviation.....

Street .....

Postal code..... City..... Country.....

General Phone..... General Fax.....

General E-mail..... Web.....

Primary Contact: First name..... Surname.....

Position..... Direct Phone..... E-mail.....

## 2 ORGANISATION CATEGORY (please check as appropriate below):

Association / Federation

Manufacturer / Equipment Supply

NGO

Utility / Operator

Academic

Media company - Press / Journalist / Advertisement

Advisor - Financial / Legal / Banking

Building Sector

Consultancy - Engineering / Design / Technical

Other

Specify:.....

## 3 BILLING INFORMATION (if different from above):

Billing Address:.....

.....

.....

## 4 MEMBERSHIP CATEGORY (please check as appropriate below):

Member Category	Employees		
	≤ 1,000	1,000 - 10,000	≥ 10,000
Premium Member	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Corporate Member	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Affiliate Member	<input type="radio"/>		

## 5 PAYMENT METHOD:

Bank Transfer

Credit Card

Paypal

Please indicate preferred payment method. Payment instructions will be provided following confirmation of membership.

Please complete the form, and send a scanned version  
to [info@apuea.org](mailto:info@apuea.org)



# APUEA

Asia Pacific Urban Energy Association

## APUEA Magazine

No.12 / January 2022

