

# APUEA

Magazine

DISTRICT  
ENERGY





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# Editorial

## Mikael Jakobsson

Executive Director,  
Asia Pacific Urban Energy Association (APUEA)

Economies, sectors, businesses, and families have been hit hard by the pandemic in the course of the year, both in terms of economy and health. Projections suggest that the pandemic will result in a 5% decrease in global economic output.

Now, with extraordinary efforts by governments, businesses, and the public, we are on our way forward (not back) again. Studies suggest that global carbon dioxide emissions fell by 6.4% in 2020. While we expect the economy to recover, we have to work hard on the carbon emissions not to recover. Despite the pandemic, major economies and global enterprises have announced their commitment to becoming carbon neutral in the coming decades. This is great news! Carbon neutrality will require great multi-sectoral efforts while providing great opportunities to speed up the recovery of the global economy and secure a liveable planet for generations to come.

After a year of uncertainties, APUEA feels more motivated than ever, and together with our members, we have worked tirelessly to adapt while keeping momentum.

APUEA has experienced an increase in membership and collaboration requests in recent months, where Cities are reaching out for support, and businesses are eager to speed up to promote their innovative solutions and offer their services.

We are glad to announce the launch of APUEA Academy, established to address competence and capacity gaps in the region's urban energy sector. APUEA Academy is a program to support cities and local actors to build up capacity for developing and managing sustainable urban energy in the Asia Pacific. APUEA Academy is developed and launched in collaboration with The Heat Academy – an international training, collaboration, and innovation platform. The Heat Academy's capacity-building activities are well-proven and have been provided to relevant international stakeholders for a decade and attracted thousands of participants.

The Asia Urban Energy Assembly, APUEA's newly established flagship event, will take place during 11-12 November in Bangkok. During the event, APUEA is honoured to host the 7th Global District Energy Climate Awards (GDECA). Besides GDECA, Asia Urban Energy Assembly will feature a diplomatic panel, a city panel, seminars, workshops, exhibitions, and site visits.

For Urban Energy in general, and District Energy in particular, this is a must-attend event to meet government and city representatives, developers, solution providers, advisors, academia, and other actors active in the Asia Pacific urban energy sectors.

Don't forget to nominate your District Energy project for the Global District Energy Climate Awards in one of the following categories: New scheme, Modernisation, Expansion, Emerging market, District Energy in developing countries, or 'Out of the Box'.

In this issue of the APUEA Magazine, you can read articles about the importance of business ethics when developing sustainable energy projects, how District Energy provides the first steps towards Power-to-X, and get the latest insights into renewable energy policies for Heating and Cooling, and more.

We want to thank ENGIE, ABB, REN21, ISEP, Tabreed, and Siveco for contributing to this issue of APUEA Magazine.





# Secretariat



**Mikael Jakobsson**  
Executive Director



**Kullakant Chertchutham**  
Secretary



**Peter Lundberg**  
Head of Operations



**Wilaiwan  
Kunchansombut**  
Publications Manager



**Muhammad Ali**  
APUEA Australasia  
Advisor



**Ankit Kamra**  
India Representative



**Xiawen Fan**  
Marketing Manager




**Nathinee Roongsitong**  
Graphic Designer

## 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](https://www.linkedin.com/company/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 APUEA is an initiative of the International Institute for Energy Conservation (IIEC) that promotes 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. The Association's online portal serves 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 this portal, APUEA events, conferences, and continuous outreach to its members, the Association shares 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.

An APUEA membership will provide 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
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- ✓ Knowledge and Best Practices
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- ✓ Direct Assistance

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# IMPORTANCE OF BUSINESS ETHICS AND THE EVOLVING ROLE OF LEGAL TO DEVELOP SUSTAINABLE ENERGY PROJECTS IN THE ASIA-PACIFIC



Interview With

## JULIEN POCHET

General Counsel and Chief Ethics Officer at ENGIE Asia Pacific

by Peter Lundberg, APUEA

“

ENGIE HAS A CLEAR GOAL OF ACCELERATING THE TRANSITION TOWARDS A CARBON-NEUTRAL ECONOMY AND BRINGING TOGETHER THE COMPANY'S EMPLOYEES, CLIENTS, AND SHAREHOLDERS, WHO HAVE SHARED VALUES OF ECONOMIC PERFORMANCE WITH A POSITIVE IMPACT ON PEOPLE AND THE PLANET.

”

# WE

SINGAPORE, NOVEMBER 2020

live in a time with a growing focus on our environment and our resource usage. Climate change is clearly becoming a real threat to our society, and we have to act rapidly to avoid a climate disaster

in a couple of decades. The effect of human activities on the earth's climate is discussed not only by scientists but also among politicians, cities, energy companies, financial institutions, and more. At the same time, as the production of renewable energy technology expands, costs are dropping, and renewable energy is more competitive than ever. The increasing demand for sustainable products, like renewable energy, results in the financial market shifting its assets from fossil fuels to other renewable and sustainable energy sources and technologies. This shift in agenda also brings attention and broad discussion to business ethics, which today is closely interlinked with sustainability. One company with a strong presence in the Asia-Pacific region and a clear strategy on sustainability is the French-based energy and service company ENGIE, which changed its business strategy in 2016 to be the world leader of the energy transition focusing on decarbonization, decentralization, and digitalization. To learn how ENGIE works with business ethics and sustainability, we had a conversation with Julien Pochet, a regional General Counsel and Ethics Officer at ENGIE Asia Pacific. We discussed how ENGIE use business ethics to develop projects and business. We also discussed ENGIE's strategy in the region, how an ethical business strategy can give a market advantage and more.



## BASED IN SINGAPORE, JULIEN CAME TO THE REGION IN 2015 AND IS ONE OF 20 LAWYERS IN THE AREA (ENGIE HAS 500 LAWYERS GLOBALLY). JULIEN DESCRIBES HIS ROLE IN THE COMPANY AS TWOFOLD:

First is the legal aspect, where I consider our team as enablers of the business, helping ENGIE grow and find appropriate solutions. The other aspect is our responsibility to ensure the company is compliant with the regulations. So, we act in between these two sides to develop the business and protect the company. I am also the Chief Ethics Officer of the Asia-Pacific region, and together with the ethics officers' team across the region, we ensure that compliance with the ENGIE Ethics Charter and all the implemented policies, which are the foundation of our business ethics, are realized in our business practices.

## WHAT ARE THE SHORT AND LONG-TERM FUTURE STRATEGIES FOR ENGIE IN THE ASIA PACIFIC?

Starting with the long-term strategy, we are a company driven by purpose, and we want to lead the energy transition in all aspects. We also want to help stakeholders, including cities, governments, and commercial customers, to move towards low-carbon energy production. The short-term strategy is divided into three main components— (1) to accelerate our investment in renewable energy assets and renewable energy production capacity; (2) to invest in infrastructure, including decentralization, to transport energy; and (3) to invest in client solutions related to low-carbon power generation, energy efficiency, and other related services. All our strategies are connected to our “Decarbonization, Decentralization, Digitalization” vision.

Our efforts in **Decarbonization** are demonstrated by our divestment of roughly 8000 MW of coal-generation projects in the region. Today, our portfolio does not consist of any coal assets. **Decentralization** relates to decentralized energy production, often located at the sites of our clients. One example is Malaysia, where we have installed 3.2 MW of solar panels on the rooftop of a factory. In the Philippines, we have partnered with Filinvest to install solar rooftop systems on their real estate.

**Digitalization** refers to applying digital technologies to improve efficiency. This involves data collection and analysis to optimize energy production and consumption. Then, we have what we call a fourth “D,” **Decrease Energy Consumption**, where we develop solutions to decrease our customers' energy consumption, for example, by developing district cooling systems or improving the efficiency of data centers. District cooling (DC) reduces energy consumption by up to 40% and is critical to our strategy. In Southeast Asia, we are developing four district cooling projects:



Megajana in Malaysia with a capacity of 22,000 RT (77 MW) connecting 51 buildings.



Northgate in the Philippines with a capacity of 12,000 RT (42 MW) connecting 16 buildings (the first brownfield DC project in the Philippines).



Punggol Digital District in Singapore, combining two DCs with a total capacity of 30,000 RT (105 MW), connecting all buildings of a single integrated masterplan.

## CAN YOU GIVE AN INTRODUCTION TO BUSINESS ETHICS?

Business ethics is the application of our moral principles and standards to the company when carrying out its business. It is what defines a company's core value, both in terms of business value and who we are and what we want to be as a company. These principles are needed for a company to grow. One fundamental element in our business ethics is the zero-tolerance policy. For example, we do not accept any corruption or tolerate any breach of our ethical principles. This is part of a culture developed by the management, and Paul Maguire, our regional CEO and president, always conveys zero tolerance as essential during our meetings. Business ethics at ENGIE is defined by a charter with four main principles—

- 1 Be loyal.
- 2 Behave honestly and promote a culture of integrity.
- 3 Respect others.
- 4 Act in accordance with laws and regulations.

These four principles define our business ethics and how we want to conduct business through a number of policies. The culture of the company is very important and well-connected to business ethics. One example of our commitment to this way of working is that business aspects are always considered by our investment committees. We also organize workshops where we gather our business ethics officers, key business contacts, external representatives of our peers, potential clients, and partners to openly discuss ethics and reflect on the impact on our company.



Willogoleche Wind Farm, South Australia

There is a vast market opportunity for district cooling in the Asia-Pacific region. Therefore, we have developed a team that can deliver the complete value chain of a district cooling project, from design to operation.

ENGIE has more than 390 district energy projects worldwide, which are key to our global and Asia-Pacific regional strategies.

“ We are a purpose-driven company. Our purpose is incorporated in the articles of association of the company and includes a commitment to business ethics and our sustainability-focused business model. We use business ethics as an enabler to grow our business. ”

#### About ENGIE

We are a global reference in low-carbon energy and services. Our purpose (“raison d’être”) is to act to accelerate the transition towards a carbon-neutral world, through reduced energy consumption and more environmentally-friendly solutions, reconciling economic performance with a positive impact on people and the planet. We rely on our key businesses (gas, renewable energy, services) to offer competitive solutions to our customers. With our 170,000 employees, our customers, partners and stakeholders, we are a community of Imaginative Builders, committed every day to more harmonious progress.

Turnover in 2019: 60.1 billion Euros. The Group is listed on the Paris and Brussels stock exchanges (ENGI) and is represented in the main financial indices (CAC 40, DJ Euro Stoxx 50, Euronext 100, FTSE Eurotop 100, MSCI Europe) and non-financial indices (DJSI World, DJSI Europe and Euronext Vigeo Eiris - World 120, Eurozone 120, Europe 120, France 20, CAC 40 Governance).



Punggol District Cooling Campus, Singapore

### DESCRIBE THE IMPORTANCE OF BUSINESS ETHICS WHEN DEVELOPING SUSTAINABLE ENERGY PROJECTS.

From an economic point of view, renewable energy is becoming more competitive, which will help companies decide on the direction of the business. Nevertheless, the economic aspects are not sufficient. Business ethics is essential to define the kind of company you want to be and how to position and brand your company and to gain the endorsement of your stakeholders when developing new projects. Business ethics aligns with our sustainability agenda as you will not succeed by just stating that you want to work on sustainability through renewable energy development and create a better world without behaving ethically.

These two notions, ethics and sustainability, are interdependent and part of the journey. They are now more than ever part of the license to operate and define the acceptability of the project. For ENGIE, ethics goes through the whole value chain of a project, from design to the selection of partners and suppliers, throughout which we use our key principles and policies. I can also mention, as the director of the ENGIE Factory (the venture arm of ENGIE in the region), one example where renewable energy and business ethics came together to create a new business idea. We are the initial investor in a company called **billionBricks**—the developer of a self-financing solar home solution to give housing access to local communities while providing renewable energy— which will deliver a viable business model where ethics and sustainability are at the core.

### DO YOU THINK THERE IS A MARKET ADVANTAGE TODAY TO FOCUS ON SUSTAINABILITY AND ETHICS?

Yes, I truly think so. We were one of the first stakeholders in the region to exit coal. Looking back on how we have progressed since setting the goal to be a world leader in carbon neutrality energy transition, I feel that we have gained an ethical advantage, and it certainly helps to drive our strategy into the future. When customers choose us, they know that they will be working with a company with high ambitions for sustainability and ethics, which will also promote the sustainability of their business. This virtuous circle has certainly become more important since the COVID-19 pandemic. We now see other stakeholders following our decision; for example, some investors and banks have decided to turn their back on financing coal projects.

A current driver for our activities can be summarized with the elements—**Profit, People, and Planet**.



PROFIT



PEOPLE



PLANET

These elements, in which ethics play a vital role, are in our favor, helping our business and our positioning. ENGIE has a clear goal of accelerating the transition towards a carbon-neutral economy and bringing together the company’s employees, clients, and shareholders, who have shared values of economic performance with a positive impact on people and the planet. I believe that this “raison d’être” (purpose) is a founding element of our strategy, which has recently been written in our articles of association. This is unique, and we will be accountable to our stakeholders.





Springfield City, Queensland, Australia

## HOW HAS YOUR ROLE AS GENERAL COUNSEL EVOLVED OVER THE YEARS, AND HOW HAVE THE CUSTOMERS CHANGED IN TERMS OF BUSINESS ETHICS AND SUSTAINABILITY?

The view of business ethics has significantly changed since I started working, from being a rule you must follow to being an enabler for new business models. It has a value on the brand, and that value gives you access to new customers. When I arrived in the region, we were mainly driven by large IPP's (Independent Power Producers), meaning projects with high CAPEXs (Capital Expenditure). This work later shifted to involve smaller projects with access to different kinds of customers and stakeholders. From a legal point of view, smaller companies require a different approach than large companies. The contracts are now tailor-made for each customer, and we have to grasp a wider range of business models compared to before. An understanding of each market is also crucial.

The need for a local team has increased, unlike before. Today, one must comply not only with the law but also with the ethical principles, the spirit of the law, and the acceptability of a project with the various stakeholders. The local legal team has to contribute to such assessment and is certainly well-placed to do so, in particular for a foreign player like ENGIE.

## CAN YOU DESCRIBE HOW YOU WORK TO SUPPORT BUSINESS DEVELOPMENT?

The legal team works closely with the business development team to the extent that we can say that we co-develop projects. After identifying a lead, the business development team comes to us for legal support, and so begins our journey with them throughout the development of the project. In addition to completing the required legal documentation, we participate in the feasibility analysis and assessments of the risks and the mitigating factors.

We also participate in the internal decision process. As we create the solutions with the business team and the customers, a deep understanding of the "ins" and "outs" of the project, the customer needs, and the project's impacts on the stakeholders is required. Strong insights into local conditions and customs are also essential.

## WHAT IS YOUR OPINION ON DIFFERENT SUSTAINABLE CONCEPTS, SUCH AS SMART CITIES, ECO-CITIES, AND FUTURE CITIES?

It is a way forward, and urbanization is a megatrend. Today, 4.2 billion people live in cities, and the number is increasing. In 2030, another 100 million people will move to cities in Asia. I think the term "Smart City" referred initially to a city with a focus on digital solutions to increase efficiency, while it is now evolving to a sustainable city, which aligns with what we do at ENGIE. The components of a smart city include solutions like district cooling but larger-scale solutions for a whole city.

One example of this is our *Springfield project in Queensland, Australia*, where we have a 50-year contract to help build a sustainable city that meets all the targets for sustainability and, at the same time, grow the population. This kind of project is something we are interested in developing further. Another example is *the National University of Singapore*, where we recently signed an MOU (Memorandum of Understanding). We want to help build a smart, safe, and sustainable campus by implementing energy-efficient solutions. The solutions that we are developing with the university can also be used in other parts of the city. Another example is *the Punggol District in Singapore*, a digital district in which we signed a contract with the Singapore Institute of Technology to develop two district cooling systems that will provide chilled water for the whole area. District cooling, an efficient way to provide cooling, is part of an overall Smart City solution for the area. Data center development is another area where we can provide design solutions to reduce energy consumption significantly.

## FROM YOUR PERSPECTIVE, HOW HAS THE COVID-19 PANDEMIC CHANGED THE MARKET FOR RENEWABLE ENERGY PROJECTS IN THE ASIA PACIFIC REGION, AND HOW HAS IT CHANGED YOUR WORK REGARDING BUSINESS ETHICS AND REGULATORY FRAMEWORKS?

We are in the middle of the crisis, and in the short term, we see some light in the tunnel due to the new vaccines. However, the current situation still has a strong impact on the economy and energy consumption, which has decreased, largely due to telecommuting. The pandemic has also shown how vulnerable our society can be if we do not develop sustainably. I want to recommend the ENGIE publication, *the 2020 Energy Transition Dashboard*, which gives information on how the COVID-19 pandemic has impacted the energy market.

The crisis has also shown that it is possible to have a clean recovery, which ENGIE is working on at the moment. It is possible to reset and then build something better. The way of working has also changed—we work apart more and see each other less, but, on the positive side, we are more accessible through digital platforms. I can be contacted more easily on these platforms than in the office.

People are also more accustomed to online meetings now, which can be arranged quickly and held efficiently. However, there is a limit to virtual meetings, in particular when promoting a working culture that includes business ethics. This is especially important for new employees who have joined us since the crisis. We, therefore, look forward to being able to meet physically again.

Book Space Now!

ASEAN's Largest International Exhibition and Conference on Renewable Energy, Energy Efficiency, Environmental and Electric Vehicle Technology

# ASEAN SUSTAINABLE ENERGY WEEK

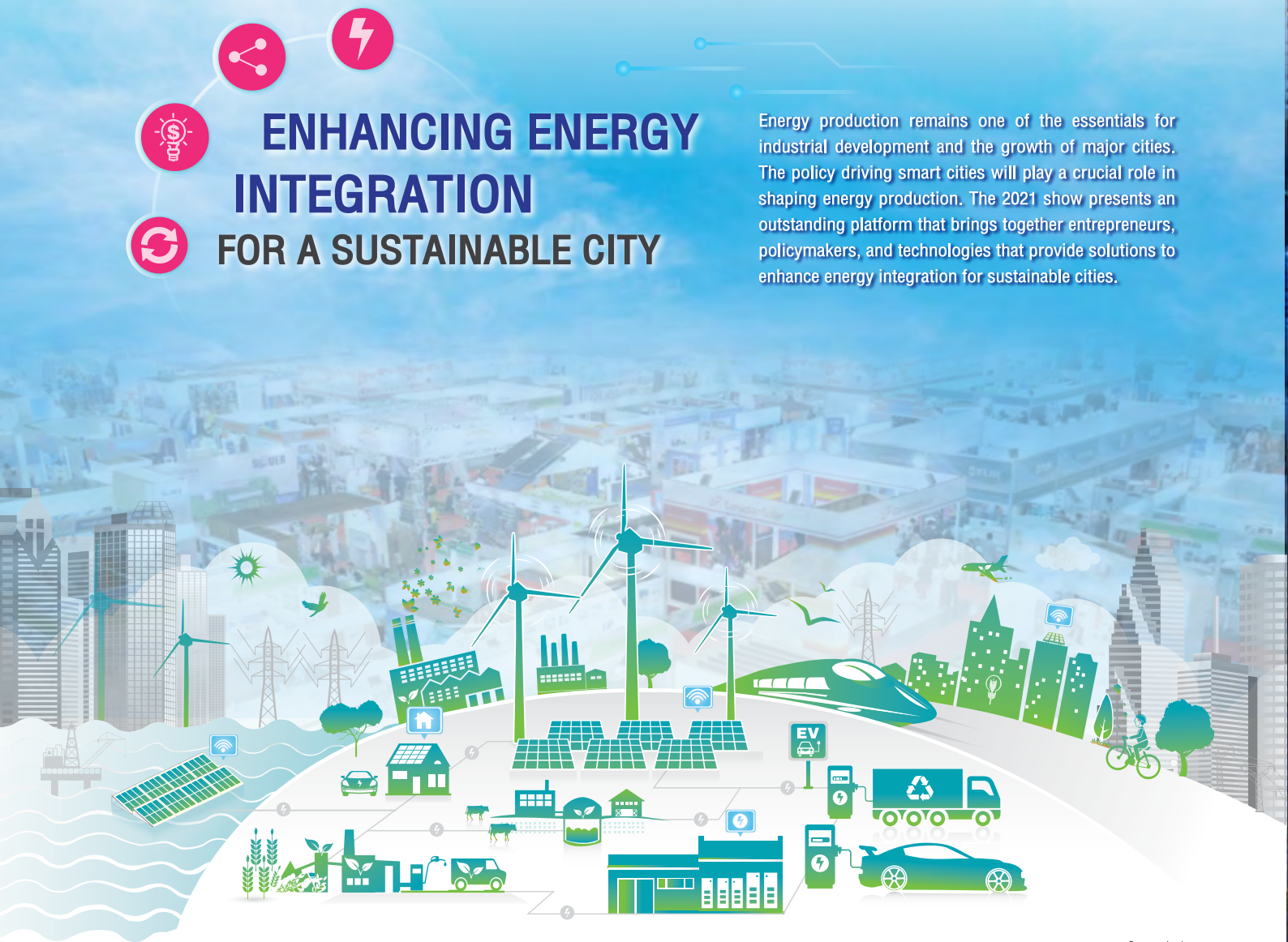


Thu. - Sat. (09.00-18.00 hrs.)  
**14-16 OCTOBER 2021**  
BITEC, Bangkok, Thailand

New Date!

## ENHANCING ENERGY INTEGRATION FOR A SUSTAINABLE CITY

Energy production remains one of the essentials for industrial development and the growth of major cities. The policy driving smart cities will play a crucial role in shaping energy production. The 2021 show presents an outstanding platform that brings together entrepreneurs, policymakers, and technologies that provide solutions to enhance energy integration for sustainable cities.



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# Asia Urban Energy Assembly

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

🕒 11 - 12 November 2021 📍 Grand Mercure Hotel, Bangkok, Thailand

- ✓ 30-60 Speakers
- ✓ 10-20 Exhibitors
- ✓ 5 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



# DISTRICT ENERGY

## First steps towards Power-to-X

By Frank Taaning Grundholm, Vice President,  
Global HVACR Sales, ABB Motion

**Power-to-X**, the concept of combining a number of electricity conversion, energy storage and reconversion pathways, makes effective use of surplus electricity production. It is creating great excitement among governments, non-governmental organizations (NGOs), and industry. This is especially because it offers a seamless approach to converting surplus energy for use in heating, cooling or even in electric vehicles (EVs). Therefore, it could reduce the use of fossil fuels and help address the global sustainability challenge.

However, while there is considerable discussion about the role that the hydrogen economy might play in these plans, there is another important aspect of Power-to-X that has a more immediate role to play. That is the capability for the coupling of various heating and cooling sectors, which is effectively the basis for district energy schemes.

According to the UN Environment Program, the Asia-Pacific is one of the most vulnerable regions to climate change and impacts are projected to become more intense in the future. It also accounts for nearly half of global greenhouse gas emissions. However, it is anticipated that the region will have an abundance of solar, as well as land and offshore wind power capacity by the end of the decade. Therefore Power-to-X, in the form of sector coupling, is very interesting to help meet climate change challenges.



### THE RENEWABLE ENERGY CONUNDRUM

All currently scalable renewable energy sources have the challenge that they are not controllable relative to the need for power. They produce power literally as the wind blows or the sun shines. This is often not when the energy is needed, and while energy storage is growing there is not yet sufficient capacity to allow effective "time-shifting".

In fact, it is quite common for the output of wind farms to be curtailed simply because there is too much electricity available relative to the demand at a given time. This results in less renewable power being used than is possible theoretically and is a waste of resources.

By making the right connections between different sectors, such as heating, cooling, fossil-fueled generation and renewables, there are several options for buffering the energy. District energy solutions could then be used in place of fossil fuels, or to offload the electrical grid from the load during peak consumption hours when less wind power is available.

As an example, it is feasible for a district heating utility using large heat pumps to run them at higher load than the heating network requirement and then store the heat in large ground pits - known as pit thermal energy storage (PTES) or in insulated tank thermal energy storage (TTES). This heat could then be used to reduce the power usage from the heat pumps when there is less available renewable energy. There is also new technology emerging, such as thermoelectric generators (TEGs) that can convert heat back into electricity, with an efficiency of around 60 percent.

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The ABB logo, consisting of the letters 'ABB' in a bold, red, sans-serif font.





## HEAT REUSE

District heating networks comprise a distribution system of insulated pipes that takes heat from a central source and delivers it to several domestic or non-domestic buildings. The heat source might be a facility that provides a dedicated supply to the heat network, such as a combined heat and power (CHP) plant. Or it could be waste heat that is recovered from industry, such as large data centers, or energy from metal processing or chemical plants. Heat networks provide an opportunity to exploit larger scale – and often lower cost – renewable and recovered heat sources that otherwise cannot be used.

District heating systems can vary in size, distributing heat just a few hundred meters or up to 50 kilometers and, at their largest, can encompass an entire city. The smaller communal heating systems will service a single campus or a village.

One of the benefits of district heating is that it is agnostic to the source. It can utilize whatever is available locally and can even be flexible over days or weeks. This is where digitalization comes in to optimize the process and also to allow operators to participate in the open power market. For example, if the system includes waste-to-energy plant that produces both electrical power and heat, it is possible to use the waste to generate more power in the period when the market price for electricity is high. On the other hand, when demand is low, the hot water for heating can be stored and used later, because storing energy as water is almost 100 times cheaper than storing it as electricity.

## EXPERIENCE THAT COVERS THE ENTIRE DISTRICT ENERGY VALUE CHAIN

Over the past 40 years, ABB has been involved in many district energy projects worldwide, including Europe, China and Mongolia. Our experience covers the whole value chain from production, operation, transmission and distribution to the end customer. The scope of supply is comprehensive, from the high-technology variable speed drives (VSDs) and motors that are essential for the energy-efficient operation of the multiple pumps at the heart of district energy schemes, right through to the SCADA systems that provide the over-arching control to balance production and demand.

“

**DISTRICT HEATING NETWORKS COMPRISE A DISTRIBUTION SYSTEM OF INSULATED PIPES THAT TAKES HEAT FROM A CENTRAL SOURCE AND DELIVERS IT TO SEVERAL DOMESTIC OR NON-DOMESTIC BUILDINGS. HEAT NETWORKS PROVIDE AN OPPORTUNITY TO EXPLOIT LARGER SCALE – AND OFTEN LOWER COST – RENEWABLE AND RECOVERED HEAT SOURCES THAT OTHERWISE CANNOT BE USED.**

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## PRACTICAL EXPERIENCE IN CHINA

ABB has supplied a complete district heating system to Dêqên Tibetan Autonomous Prefecture Heat Development in Shangri-La in the Himalayas, China. Shangri-La suffered badly from air pollution caused by wood-burning stoves that were the primary source of heat for its 50,000 residents. ABB supplied all equipment from the steam to water heat exchanger in the boiler room to the end-user installation. This included electrical and mechanical equipment needed to provide heat to the citizens.

ABB automation and electrical solutions interconnect and monitor the new heating plants for maximum efficiency, while air-source heat pumps have enabled the move from individual heat-only boilers and stoves to boilers based on electricity. The pumps boost the system's energy efficiency and help improve the quality of life substantially by reducing coal-fired emissions.

To meet the changing needs of the population, five local SCADA systems communicate with the central control and monitor the system to deliver heat most efficiently. The shift from stoves to the district heating systems has provided substantial environmental benefits. About 17,000 tonnes of coal is no longer burnt in Shangri-La every year, which is the equivalent of 105,000 tonnes in annual carbon dioxide emissions, and dust emissions is reduced by 460 tonnes.

In another project in China, the heating needs of Shuozhou, a city of 1.7 million people, are served by large numbers of coal-fired boilers, which also have efficiency limitations and contribute to carbon emissions. A new district heating project, supported by an ABB digital platform, will use surplus steam from an existing 2,000 megawatt (MW) power plant to generate heat. The heat will be piped to two heat transfer stations and distributed via an underground pipeline grid to all the houses and buildings in the city.

Substituting the existing heat generation source with the new district heating grid will help eliminate substantial amounts of greenhouse gas emissions – estimated at 2.88 million tonnes of carbon dioxide, 35,500 tonnes of sulfur dioxide, and 0.37 million tonnes of ash. It will also contribute to the conservation of natural resources, including 1.5 million tonnes of coal and two million cubic meters of water.

## DEVELOP FOR THE FUTURE OR IMPLEMENT TODAY?

The Asia Pacific region has a great deal to gain by investing in the deployment and development of district energy. In particular, using smart digital solutions to connect multiple heat sources and facilitate control and planning according to forecast availability will make it possible to start leveraging the available energy faster. To further the development of other technologies for the increased use of renewables and improved energy efficiency, it is sensible to run a number of pilot projects in parallel. These could include the generation of fuel from power. However, they are technologies for the future. There are still challenges with scalability and they will not have a significant immediate impact. Yet the pressing need to address climate change needs fully-commercialized and industrial-scale solutions right now. That is why the time for district energy has arrived.

### FOR FURTHER INFORMATION, ON DISTRICT ENERGY:

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



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# ABB

This article was published in the APUEA Magazine issue 9, March 2021. [www.apuea.org](http://www.apuea.org)

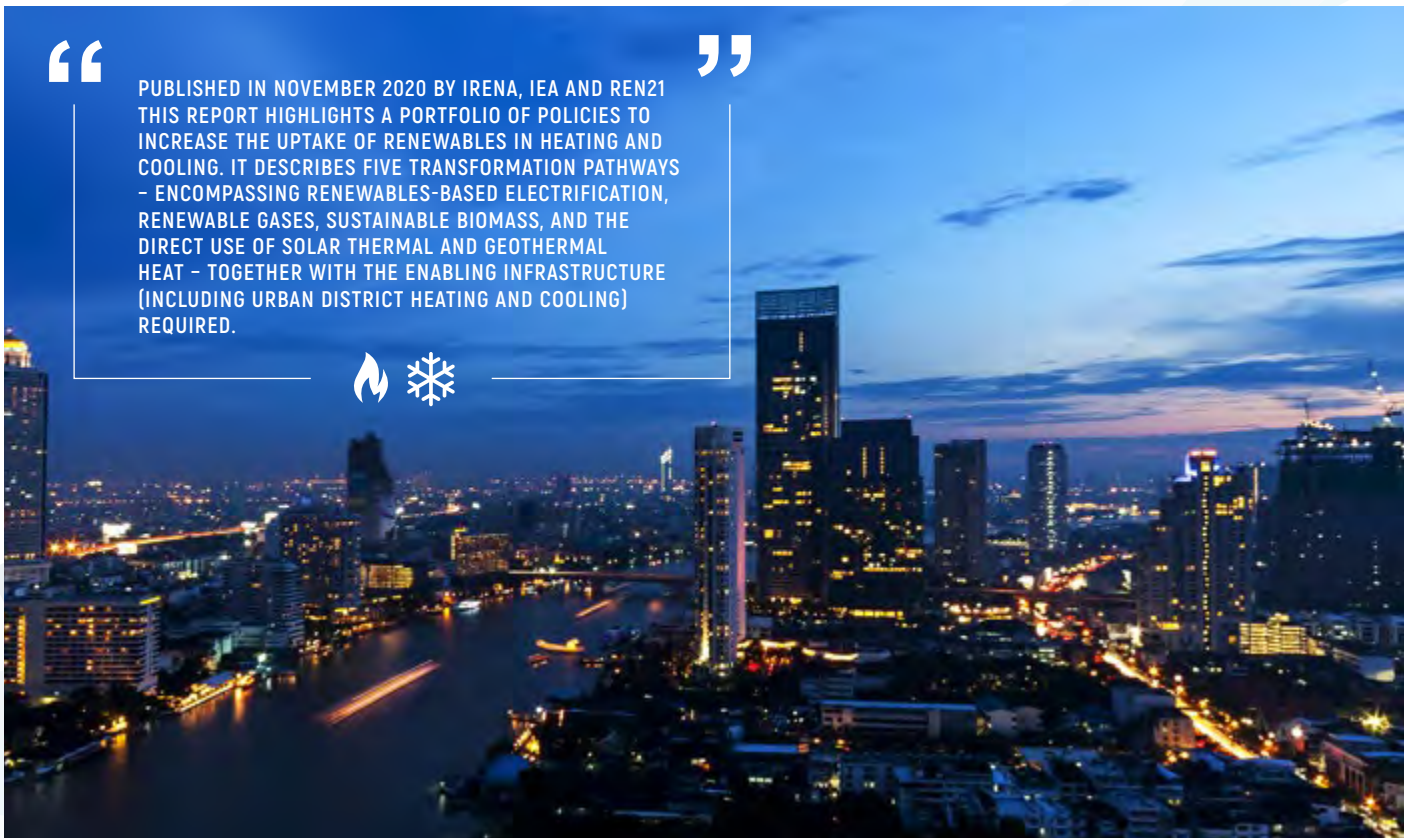


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PUBLISHED IN NOVEMBER 2020 BY IRENA, IEA AND REN21 THIS REPORT HIGHLIGHTS A PORTFOLIO OF POLICIES TO INCREASE THE UPTAKE OF RENEWABLES IN HEATING AND COOLING. IT DESCRIBES FIVE TRANSFORMATION PATHWAYS – ENCOMPASSING RENEWABLES-BASED ELECTRIFICATION, RENEWABLE GASES, SUSTAINABLE BIOMASS, AND THE DIRECT USE OF SOLAR THERMAL AND GEOTHERMAL HEAT – TOGETHER WITH THE ENABLING INFRASTRUCTURE (INCLUDING URBAN DISTRICT HEATING AND COOLING) REQUIRED.



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# RENEWABLE ENERGY POLICIES IN A TIME OF TRANSITION: HEATING AND COOLING

BY REN21

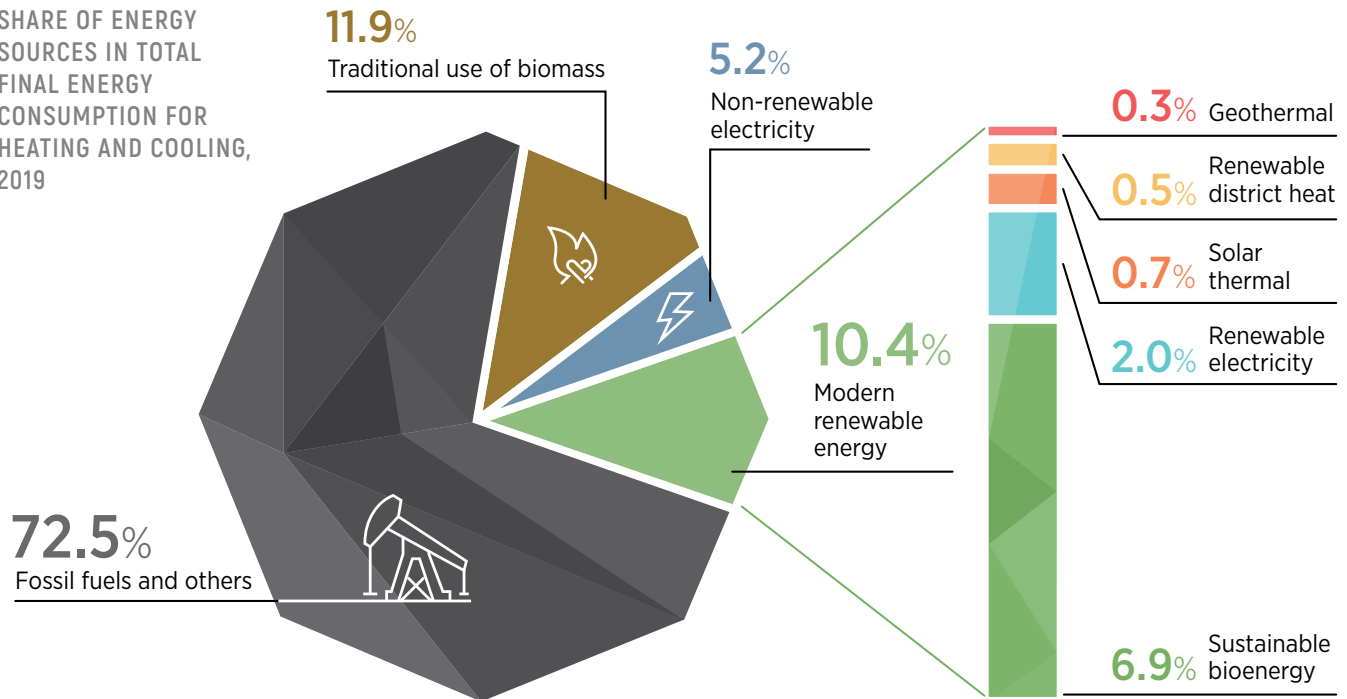
*The need for efficient heating and cooling services based on renewable energy sources is an urgent priority for countries striving to fulfil their climate commitments under the 2015 Paris Agreement on Climate Change and to achieve the Sustainable Development Goals set for 2030. At the same time, the transition to cleaner, more sustainable heating and cooling solutions offers the prospect of attracting substantial amounts of investment, creating millions of new jobs and driving a durable economic recovery in the wake of the global Covid-19 crisis.*

**Heating and cooling** demand accounts for around half of global final energy consumption. Of this, nearly 50% is consumed in industrial processes, while another 46% is used in residential and commercial buildings – for space and water heating and, to a lesser extent, for cooking. The remainder is used in agriculture, not only to heat greenhouses but also for drying, soil heating and aquaculture. Most of this energy comes either from fossil fuels or inefficient uses of biomass. Heating and cooling, consequently, is a major source of air pollution and accounts for over 40% of global energy-related CO<sub>2</sub> emissions.

The demand for heating and cooling is on track to keep growing. Cooling demand alone has already tripled globally since 1990, and as climate change increases the number and severity of heat waves, the urgency increases for supplying air conditioning and refrigeration to billions of people.

Most of the energy used for heating and cooling continues to be produced from fossil fuels. In 2019, fossil fuels and non-renewable electricity met more than 77% of heating and cooling demand, with the inefficient use of biomass meeting 11.9%. Renewable energy meets only around 10% of global demand for heating and cooling needs. The direct use of modern renewables – including sustainable bioenergy, solar thermal and geothermal heat – met 8% of demand for heating and cooling, with renewable electricity accounting for an additional 2%. Electricity supplied most of the cooling needs through residential air conditioning appliances and district cooling systems.

**SHARE OF ENERGY SOURCES IN TOTAL FINAL ENERGY CONSUMPTION FOR HEATING AND COOLING, 2019**



A carefully managed shift to renewable energy is critical to make clean, affordable and reliable heating and cooling available to the people who currently lack access to such energy services. In Africa alone, providing households and smallholder farmers with proper cooling technologies could prevent the spoilage of USD 4 billion worth of food annually. The switch from fossil fuels and inefficient use of biomass to modern renewable sources would also bring major reductions in indoor and outdoor air pollution, reducing respiratory infections and avoidable mortality caused by air pollution.

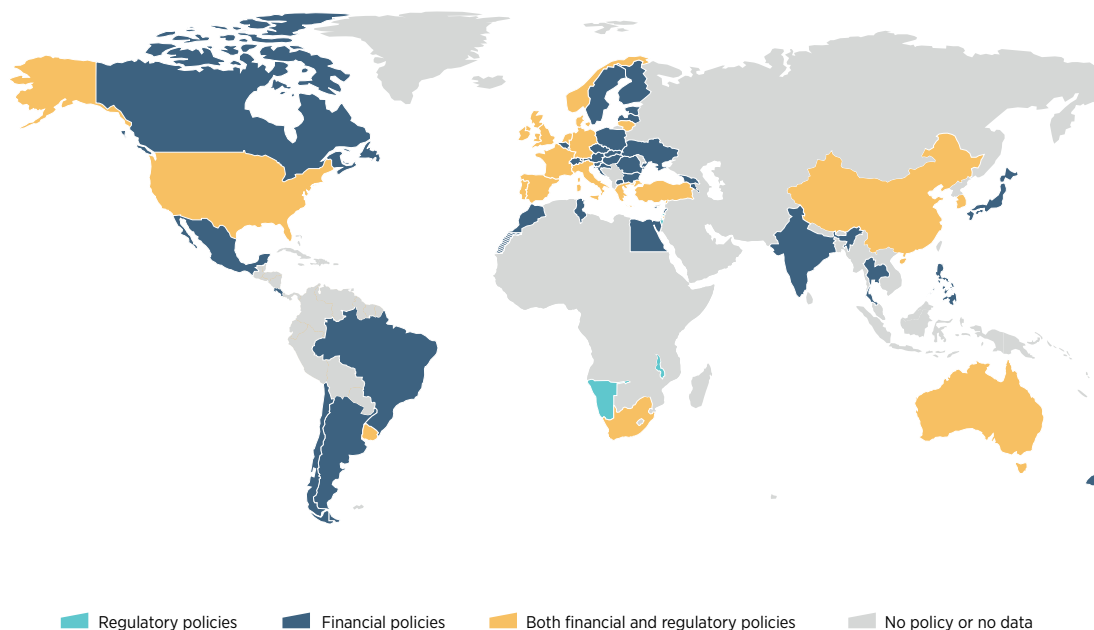
Such a transition would create jobs, stimulate local production and create further socio-economic benefits, while strengthening countries' energy security and independence. Where power grids are lacking or access to energy is otherwise inadequate, renewables-based solutions can provide vital services, reduce the time spent (mainly by women and children) in collecting fuels, and enable productive economic activities. Renewables-based heating and cooling, similarly, can stimulate economic activity and strengthen people's livelihoods and welfare.

Despite these benefits, policy makers have so far given limited attention to the policies required to accelerate the transition of heating and cooling to renewables. At the end of 2019, only 49 countries – mostly within the European Union – had national targets for renewable heating and cooling, compared with 166 having goals for renewable power generation.



**NATIONAL POLICIES FOR RENEWABLE HEATING AND COOLING, BY COUNTRY, 2019**

In addition, the number of countries that have adopted regulatory and financial policies for renewable heating and cooling has changed very little in recent years, except where local governments have adopted policies, often more ambitious than their national counterparts. As of mid-2019, thousands of city governments had adopted renewable energy targets and action plans globally, and more than 250 cities had reported at least one sectoral target for 100% renewable energy.





To decarbonise the energy used for heating and cooling, governments must implement comprehensive policy packages that prioritise efficiency and renewable energy while phasing out the use of fossil fuels. Urgent policy action is even more critical in the context of the Covid-19 pandemic, which has cut demand for heating and cooling services based on renewables and sapped the willingness of households and small businesses to invest in renewables-based solutions, while simultaneously worsening conditions for energy access in many developing countries.

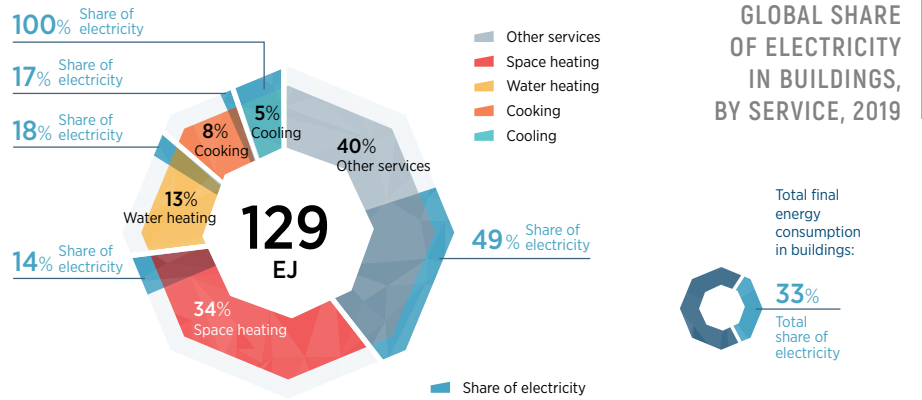
### RENEWABLE ENERGY POLICIES IN A TIME OF TRANSITION: HEATING AND COOLING

[www.ren21.net/heating-and-cooling-2020](http://www.ren21.net/heating-and-cooling-2020)



*Renewable Energy Policies in a Time of Transition: Heating and Cooling*, published in November 2020 by IRENA, IEA and REN21 highlights a portfolio of policies to increase the uptake of renewables in heating and cooling. It describes five transformation pathways – encompassing renewables-based electrification, renewable gases, sustainable biomass, and the direct use of solar thermal and geothermal heat – together with the enabling infrastructure (including urban district heating and cooling) required. In the course of analysing the barriers that stand in the way of each pathway, the report identifies and assesses the policy instruments that can be used to overcome those barriers and reap the enormous potential benefits of the transition.

There is no silver bullet. The combination of different policy instruments, options and technologies that works best in a given context will vary depending on local circumstances, such as climatic conditions, whether necessary infrastructure (e.g., district heating networks or gas grids) already exists, and whether resources (e.g., a local supply of biomass or geothermal heat) are available. The renewable solutions chosen will also vary depending on specific applications, which range from heating and cooling buildings to providing high-temperature heat for industrial processes.



### BARRIERS AND POLICIES FOR RENEWABLE HEATING AND COOLING

Decarbonising heating and cooling is a complex and diverse task, given the wide range of possible approaches and the need to tailor solutions to many different locales. Yet some of the barriers to decarbonisation are widely shared – and these barriers can be overcome with policies that support all available options.

Chief among the common barriers are high upfront costs, regulatory and institutional frameworks based on fossil fuels, consumer inertia, and technical hurdles. While renewable heating and cooling technologies often benefit from low operating costs, they are generally associated with higher upfront costs compared with fossil fuel-based options. For domestic heating systems, for example, the capital cost of a modern and efficient biomass boiler is USD 720–750 per kilowatt-thermal (kWth), against USD 80–120/kWth and USD 120–150/kWth for a gas or oil boiler, respectively. While those costs are expected to decline over time owing to economies of scale and technological improvements, they still constitute a major economic hurdle to the development of renewable heating and cooling.

Government support in the form of financial and fiscal incentives, such as tax credits, loan schemes, direct subsidies and accelerated depreciation can be crucial in overcoming the barrier of high upfront cost. For example, Germany's Market Incentive Programme has dedicated EUR 300 million (about USD 360 million) per year in grants and loans for small-scale renewable heat systems like heat pumps, resulting in the installation of over 1.8 million systems between 2000 and 2020.

Mandates, such as Spain's requirement that solar water heaters be used in new government buildings, are highly effective policy tools. Governments can also help accelerate the energy transition by setting specific targets – for example, for the use of a precise share of renewables by a certain date, for concrete emissions reductions for heating and cooling, and for net-zero emissions by sector or economy-wide. Near the end of 2020, more than 12 countries and the European Union had passed or proposed laws around net-zero emissions. Such targets demonstrate national commitments to the deployment and development of renewables and provide certainty for investors and consumers.

Another major barrier is the end-user price advantage that fossil fuels still hold over renewable alternatives because of a long history of favourable subsidies and energy regulatory frameworks. Direct and indirect subsidies were estimated to exceed 19 times the support provided for renewables, which came to approximately USD 166 billion in 2017. The use of fossil fuels has environmental and social costs that are not included in the current price of those fuels. These so-called negative externalities include health costs caused by air pollution and damage from the growing impacts of climate change.

A crucial first step towards realising the energy transition is therefore levelling the playing field by phasing out subsidies for fossil fuels and introducing fiscal policies such as carbon taxes or emissions trading systems. However, such interventions should be preceded by a careful assessment to ensure that they will not aggravate energy poverty among low-income households or have other socially regressive effects. Dedicated support can be provided for low-income consumers or other highly affected segments of society to help them shift

towards low-carbon heating and cooling solutions.

Other common barriers include consumer inertia and lack of awareness about the efficient, renewables-based solutions available, their effectiveness and their benefits. Information campaigns are a vital tool to fight inertia and raise awareness. Furthermore, the development of reliable supply chains for renewable fuels, such as sustainable biomass from agricultural residue, and related infrastructure, such as district heating and cooling networks, can in many cases be accelerated by streamlining permitting processes and making direct investments. Technical hurdles remain in some areas, including some industrial applications in which requirements for stable flows of high-grade heat are difficult to meet with some existing renewable solutions. Support for research and development, and for pilot and demonstration projects, can enlarge the field of application of renewable technologies.

Critical conditions for the uptake of renewable heating and cooling in buildings and industrial processes are energy efficiency policies such as stricter building codes, support for building retrofits, and appliance standards. Most are cost-efficient in the medium term and can improve the cost-competitiveness of renewable heating and cooling applications. The Scandinavian countries have coupled the shift to renewable heat with high energy efficiency standards in new buildings using building code requirements.

Tackling all the common barriers in addition to those related to specific pathways will require a conducive institutional structure built on strong coordination among sectors (e.g. power and heat) and different level of governance (e.g. national and city level).

## A CALL TO ACTION

Deployment policies must go hand in hand with integrating and enabling policies for renewables heating and cooling. Just as for overall energy use, a well-balanced policy package will allow countries to overcome barriers and maximise the socioeconomic footprint of the transition.

- Renewable heating and cooling requires proactive policies – both to level the playing field and keep costs competitive, as well as maximise the social, economic, environmental and other benefits.
- Measures to scale up renewable heating and cooling can and should be aligned with broad socio-economic policies and objectives. These can include improving conditions for vulnerable segments of the population, developing key economic sectors, setting long-term energy plans, and pursuing international climate and sustainability goals.
- National and local governments must coordinate to ensure that effective policy instruments at different governance levels are complementary.
- Long-standing networks for district heating and cooling can be adapted to accommodate growing shares of renewable energy.

Solutions are ready for the taking, as are the promised rewards. What has been lacking, however, are the political will and comprehensive planning for the long haul. The need for action is clear and urgent. Governments, civil society, consumers, research institutions and the private sector must come together to trigger the change.

The information presented here is just a snapshot of the detailed policy descriptions available in the report.

VISIT THE FULL VERSION  
ONLINE AT

[www.ren21.net/heating-and-cooling-2020](http://www.ren21.net/heating-and-cooling-2020)



*Disclaimer: This work is partially based on Renewable Heating and Cooling in a Time of Transition: Heating and Cooling developed by IRENA, OECD/IEA and REN21 but the resulting work has been prepared by REN21 and does not necessarily reflect the views of IRENA nor OECD/IEA. Neither IRENA nor OECD/IEA accepts any responsibility or liability for this work.*



REN21 is the only global renewable energy community of actors from science, governments, NGOs and industry. We provide up-to-date and peer-reviewed facts, figures and analysis of global developments in technology, policies and markets. Our goal: enable decision-makers to make the shift to renewable energy happen – now.

Our more than 2,000 community members guide our co-operative work. They reflect the vast array of backgrounds and perspectives in society. As REN21's eyes and ears, they collect information and share intelligence, by sending input and feedback. REN21 takes all this information to better understand the current thinking around renewables and change norms. We also use this information to connect and grow the energy debate with non-energy players.

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# THE CHALLENGE TOWARDS DECARBONIZATION OF URBAN DISTRICT ENERGY SYSTEMS IN JAPAN

BY HIRONAO MATSUBARA, INSTITUTE FOR  
SUSTAINABLE ENERGY POLICIES

## 1 INTRODUCTION

The utilization of renewable energy for urban district energy systems in Japan is a challenge towards decarbonization in the long-term roadmap to 2050. In the Tokyo Metropolitan area, there are about 90 areas with district heating and district cooling systems (DHC). At ISEP, we analyze these DHC districts to introduce more renewable energy and waste heat with the goal of decarbonization.



## 2 THE DISTRICT HEATING MARKET IN JAPAN

The market size of the district heating (DH) business in Japan is only 0.01%, which is a few hundredths of that of the gas market. In terms of the number of users and the scale of business, the number of users is 36,000, compared to 29 million for the city gas business, and the DH business is limited to a small number of large business users. The electricity market was fully liberalized from FY2016, including residential households, and the city gas market was liberalized from FY2017. The DH market was also liberalized in FY2016, but its effect is limited because the share of the big utilities is very large even after the liberalization.

Comparison of energy markets: electricity, city gas, LP gas, District Heating (DH)

	Electricity Market	City Gas Market	LP Gas Market	District Heat Market
Share of Supply Area	100%	6%	94%	0.01%
Number of consumers	84 million	29 million	24 million	36,000
Size of market	18 Trillion JPY	5 Trillion JPY		0.14 Trillion JPY
Total No. of Employee	130,000	32,400		2500
Total Length of grid		259,000 km	None	646 km
Liberalization of Retail	FY2016	FY2017	Liberalized	FY2016
Notes	10 Big Utilities Over 600 retail company	About 200 retail companies	About 21,000 retail companies	76 Companies, 134 Regions (As of 2017)

Source: METI document

## 3 DISTRICT HEATING BUSINESS IN JAPAN

In Japan, the district heating business is operated by private companies and is concentrated in urban areas where heat demand is high. In the supply to commercial facilities, the use of cooling accounts for more than half, 56% on a sales volume basis, and natural gas (LNG) is the majority heat source, about 70%. As for the supply of hot water, steam accounts for a large share, about 70%, but the supply of hot water from heat pumps and cogeneration (CHP) waste heat is also increasing. As for the use of renewable energy, incineration waste heat and heat from sewage, seawater, and rivers account for a large proportion, but the use of wood biomass is also beginning to increase.

Heat Supply of DHC in Japan(FY2017)

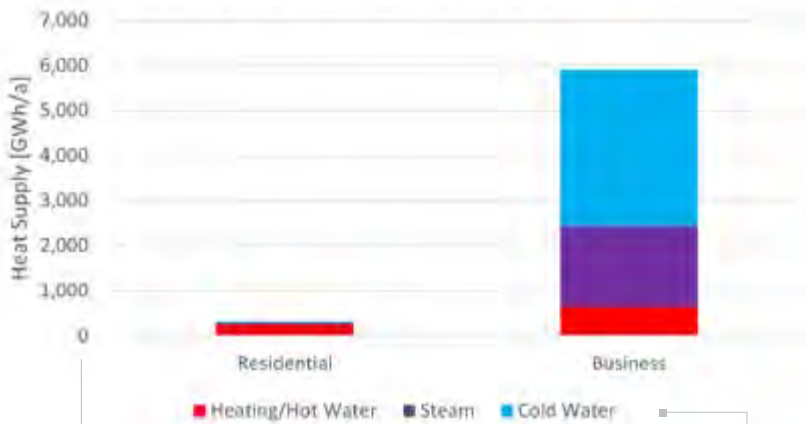


Figure 2: Heat Supply of DHC in Japan(FY2017)

Heat Source of DHC in Japan(FY2017)

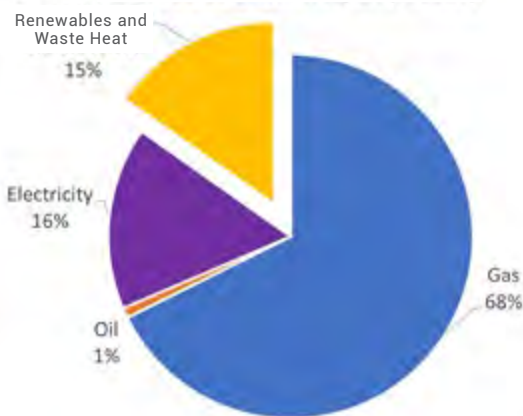


Fig 3: Heat Source of DHC in Japan(FY2017)  
Source: JHSBA(Japan Heat Supply Business Association) data

Renewables , waste heat for DHC in Japan

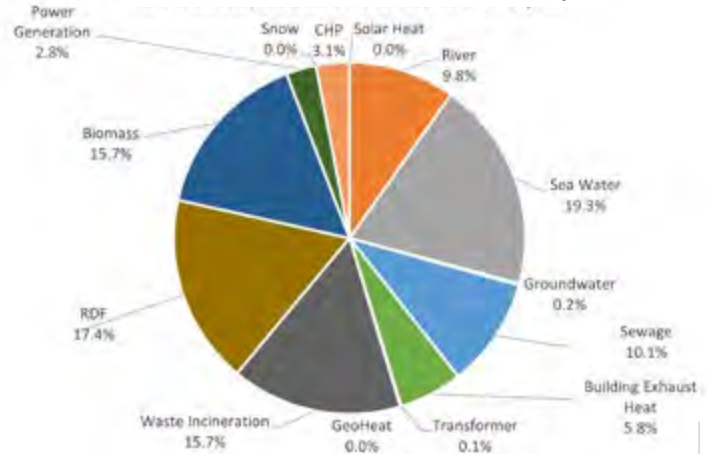


Fig4: Renewable, waste heat for DHC in Japan(FY2017)  
Source: JHSBA (Japan Heat Supply Business Association) data



## 4 ZERO EMISSION STRATEGY OF TOKYO METROPOLITAN GOVERNMENT

In December 2019, the Tokyo Metropolitan Government formulated the "Zero Emission Tokyo Strategy", declaring that it will achieve zero Emissions by 2050. The strategy sets a 30% reduction in CO2 emissions as the target for 2030 and states that the city will take actions to exceed the target by evolving and accelerating measures such as the diffusion and promotion of energy conservation and renewable energy.

The goal for 2050 is to achieve virtually zero CO2 emissions by introducing new social systems and next-generation

technologies and to offset the remaining emissions through forest absorption and the development of innovative technologies. Tokyo is a major consumer of energy, and in order to achieve a decarbonized society, it is necessary to decarbonize not only electricity but also thermal energy and promote local production and local consumption of energy. It is also stated that the goal for 2050 should be 100% decarbonization of energy use, and 100% decarbonization of electricity supply using renewable energy as the main power source.

The goal also states to use local production and local consumption of renewable energy, and it will be necessary to adjust the balance between renewable energy supply and demand.

In addition to decarbonization, this local production and local energy consumption are also important in strengthening resilience and energy security. It is necessary to establish a system to utilize local renewable energy, including the multifaceted energy use such as local heat supply.

## 5 DHC IN TOKYO METROPOLITAN AREA

The Tokyo Metropolitan Government has certified 89 DHC districts for planning DHC systems for effective energy use. Developers with a total area of more than 50,000 m2 should make an effective energy use plan to promote efficient energy use in large-scale development, evaluate district heating and cooling, and improve energy efficiency. It is important to promote climate change countermeasures in conjunction with urban development. Consideration of environmental issues at the planning and early design stages is necessary. For the DHC system, studies have begun to promote the introduction of renewable energy with the aim of decarbonization.

For FY2018, there were, in total, 82 operating DHC districts. The total area and floor area of these districts is 15 km2. The total floor area of these districts is 34 km2. The total maximum cooling demand is 1.6 GW, and the total maximum heat demand is 1.0 GW. The annual total heat supply of DHC in Tokyo is 3.8 TWh/year in FY2018, which is equivalent to about 10% of the commercial sector's heat demand in Tokyo. As shown in Fig.5, the maximum cooling demand is about twice the heating demand in the case of the DHC plants in Tokyo. Bubble size of the figure indicates amount of annual heat supply of each DHC plant.

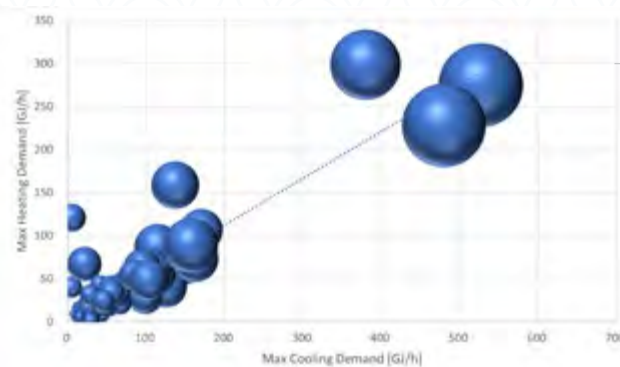


Fig5: Max heating demand and max cooling demand of DHC in Tokyo(FY2018)  
Source: Data of Tokyo Metropolitan Government

The average electrification rate is 36.5% for DHC districts in the Tokyo area. This electrification rate means the ratio of electricity to primary energy such as gas and electricity used by DHC plants. The higher the electrification rate, the higher the energy efficiency tends to be.

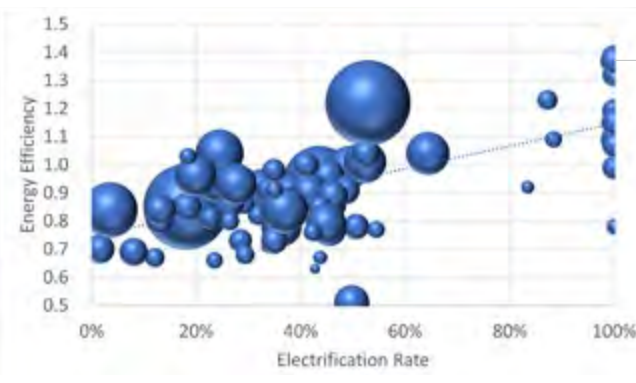


Fig6: Energy Efficiency of District Heating and Cooling in Tokyo (FY2018)  
Source: Data of Tokyo Metropolitan Government

As shown in Figure 7, the higher the ratio of renewable energy and unused energy, the higher the energy efficiency tends to be, but the overall average value is about 4% for DHC plants in Tokyo. Types of renewable and unused energy include heat from waste incineration, river heat, sewage heat, building waste heat, and geothermal heat.

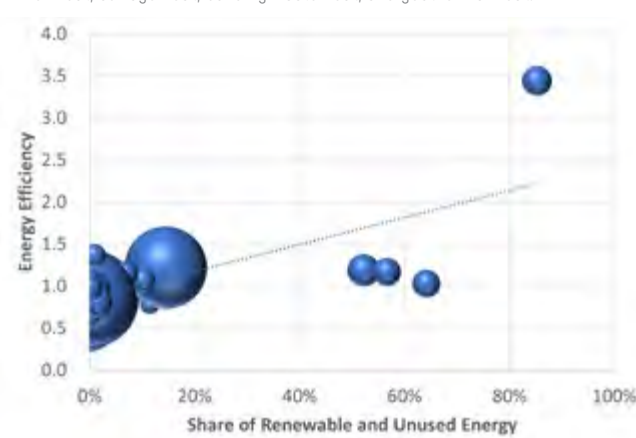


Fig7: Share of Renewable and Unused Energy of District Heating and Cooling in Tokyo (FY2018)  
Source: Data of Tokyo Metropolitan Government

## INSTITUTE FOR SUSTAINABLE ENERGY POLICIES (ISEP)

ISEP is an independent, non-profit research organization, founded in 2000 by energy experts and climate change campaigners. Through our work we aim to provide resources and services to realize sustainable energy society.



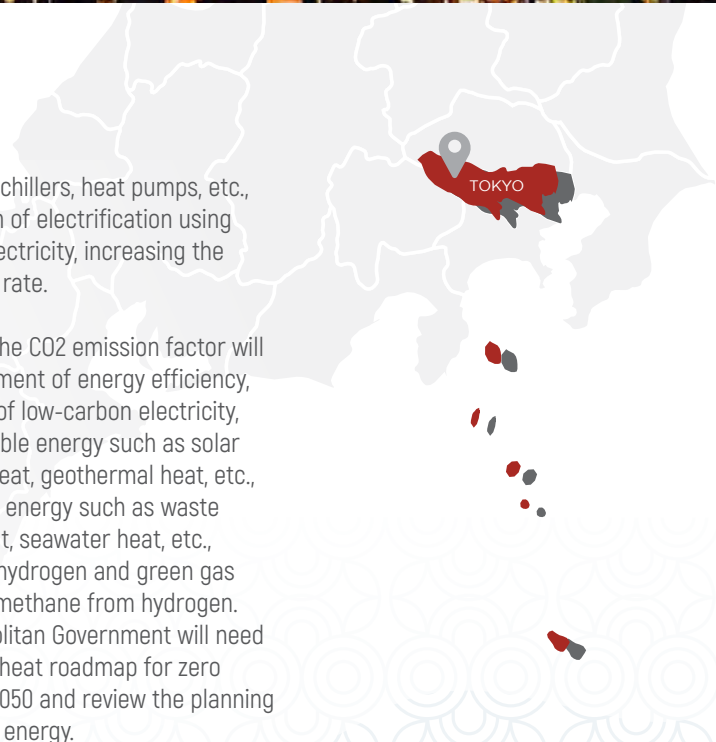
## 6 THE FUTURE DIRECTION OF DISTRICT HEATING AND COOLING IN TOKYO

The Tokyo Metropolitan Government's Climate Change and Energy Policy are promoting CO<sub>2</sub> reduction through both energy conservation and expansion of renewable energy use to realize a decarbonized society. Tokyo targets to reduce energy consumption by 38% and GHG by 30% compared to the year 2000 levels. The Zero-emissions Tokyo Strategy also promotes achieving Zero-Emissions by 2050.

Improvement of energy efficiency and reduction of CO<sub>2</sub> emission factors should be led by low-carbon heat suppliers. Improvement of energy efficiency will be promoted by introducing high-efficiency heat source equipment such as

electric turbo chillers, heat pumps, etc., and promotion of electrification using low-carbon electricity, increasing the electrification rate.

Reduction of the CO<sub>2</sub> emission factor will need improvement of energy efficiency, procurement of low-carbon electricity, use of renewable energy such as solar power, solar heat, geothermal heat, etc., use of unused energy such as waste heat, river heat, seawater heat, etc., and CO<sub>2</sub>-free hydrogen and green gas by producing methane from hydrogen. Tokyo Metropolitan Government will need to establish a heat roadmap for zero emissions in 2050 and review the planning for renewable energy.





# THE REGION'S COOLING PARTNER OF CHOICE

**NATIONAL CENTRAL COOLING COMPANY PJSC,  
TABREED**



Masdar City , P.O. Box: 29478, Abu Dhabi, UAE  
Tel : +971 2 2020400, Fax: +971 2 6455008, Email: info@tabreed.ae



## THE RISING DEMAND FOR DISTRICT COOLING ADOPTION IN INDIA

By Sudheer Perla  
Country Head Tabreed

“

BY 2050, THE INTERNATIONAL ENERGY AGENCY FORECASTS THAT INDIA IS LIKELY TO BE THE LARGEST CONSUMER OF SPACE COOLING IN THE WORLD, WITH SPACE COOLING RESPONSIBLE FOR 28% OF ELECTRICITY DEMAND AND 44% OF PEAK LOAD.

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At COP21, district energy continued to gain momentum as representatives of cities, national governments, and a diverse range of other organizations emphasized its importance in mitigating CO<sub>2</sub>, reducing air-pollution, and paving the way for fossil-fuel free cities and countries.

**India** has been selected among another three countries (Chile, China and Serbia) as a pilot country to build the know-how and implement policies that will accelerate investment in low-carbon and climate-resilient district energy systems. The technical support provided was part of the District Energy in Cities Initiative coordinated by the United Nations Environment Programme, along with a number of stakeholders.

The Initiative aims to double the rate of energy efficiency improvements for heating and cooling in buildings by 2030, helping countries meet their climate and sustainable development goals.

But Why India? According to India's Cooling Action Plan, demand for space cooling in buildings will grow by 11 times between 2018 and 2038. By 2050, the International Energy Agency forecasts that India is likely to be the largest consumer of space cooling in the world, with space cooling responsible for 28% of electricity demand and 44% of peak load.



**India's** rapidly growing cities will have a major share in this increasing demand, which will eventually lead to driving power shortages, water scarcity and increasing urban temperatures. In addition, the majority of space cooling solutions run on coal-based electricity and use environmentally-harmful refrigerants – aggravating local air pollution, ozone layer depletion and climate change.

In November 2017, the Initiative published a high-level analysis of India's national policy framework for district cooling and potential measures and incentives at the state and national level that could be used to kickstart take up of district cooling technologies in the country. Through Initiative publications, workshops, meetings and conferences, recognition of district cooling as a solution to India's potential cooling crisis has intensified. In February 2019, the government of India prioritized district cooling in the Indian Cooling Action Plan, a long-term country-wide strategy to provide thermal comfort for all citizens while minimizing negative impacts to the power sector and the environment.

Robust private sector participation is required to deliver the National Cooling Action Plan targets set by Ministry of Environment, Forest & Climate Change (MoEFCC) and for India to achieve several of its Sustainable Development Goals. Since 2015, Tabreed has been playing a key role as an active partner of the UNEP District Energy in Cities Initiative even before opening its wholly owned subsidiary and office towards late 2019. It has been involved in implementing rapid assessments to evaluate the potential of district cooling in 5 cities with clear commitment to develop projects through appropriate PPP models (public private partnerships).

Tabreed has also played a direct role in providing input to developing India's Cooling Action Plan- a comprehensive plan by the government to meet future cooling demand in a more sustainable manner, as well as developing a technical cell for district cooling to develop guides, training material and do further capacity building work, working closely with MoEFCC, Alliance for an Energy Efficient Economy (AEEE) and the Indian Society of Heating, Refrigerating and Air Conditioning Engineers (ISRAE).

In 2019, Tabreed signed the first PPP district cooling concession in India with Andhra Pradesh government to build, own, operate and transfer India's first district cooling system in the state's new capital Amaravati with a total cooling capacity of 20,000 RT, reducing electricity demand by 40 to 50%. As the first Indian replication city of the District Energy Initiative to realize investment, it provides a scalable model for designing, tendering and procuring district energy across the country.

**Tabreed has recently announced a major agreement with Energy Efficiency Services Limited (EESL), an energy services company (ESCO) under the administrative control of the Indian Ministry of Power, reinforcing its commitment to supporting India's objectives to reduce its energy consumption and GHG emissions.**

The parties agreed to work together to engage with various central, state or smart city administrations in India on ongoing greenfield, redevelopment or brownfield projects currently in progress, exploring the viability of district cooling and trigeneration system implementation as service offering for these projects. Despite both the private and public sectors efforts to increase the adoption of district cooling as the optimum sustainable cooling solution to the growing cities in India, challenges remain. Lack of awareness and inadequate understanding of district energy and its

benefits amongst key stakeholders; a lack of mandates to pilot district cooling business models and implement as per global best practices; and finally, a lack of policies and planning to fast track and enable market adoption. Working with our partners on the ground, Tabreed will continue to drive the development of the district cooling sector in India.

### About National Central Cooling Company PJSC (Tabreed)

Tabreed is a leading international district cooling developer based in the UAE providing energy efficient, cost effective and environmentally friendly year-round cooling solutions in the GCC, India, and beyond. Founded in 1998, and listed on the Dubai Financial Market, Tabreed's cooling infrastructure is an integral part of the region's growth. The company now delivers over 1.4 million refrigeration tons to major residential, commercial, government and private projects. Tabreed owns and operates 86 plants in its portfolio across the GCC, including 73 plants in the United Arab Emirates, three in the Kingdom of Saudi Arabia, and five in Oman, one in the Kingdom of Bahrain, and others in the region.



# PROVIDING SMART O&M SOLUTIONS FOR DISTRICT ENERGY SYSTEMS

## APUEA TALKS WITH BRUNO LHOPITEAU

Managing Director, Siveco Asia

By APUEA



“ We see District Energy as a segment of our main New Energy & Environmental business. ”

We target new, innovative, growing utility companies and assist them in defining and deploying O&M best practices across multiple sites.

### CAN YOU GIVE US AN INTRODUCTION TO SIVECO ASIA?

Siveco was one of the early players in the field of Computerized Maintenance Management Systems or CMMS, founded in France 1986 by industry pioneers. From the start, the company ran a very international business with clients in Europe, Africa and the Middle-East. Today, we operate as a global network of Siveco companies and certified partners.

We delivered our first projects in Asia in the late 1990s for Singapore MRT (metro). Siveco China was set up in 2004, aiming to help booming Chinese utilities to optimize assets lifecycle and ensure regulatory compliance, thanks to a combination of innovative IT solutions (what we now call Smart O&M) and specialized consulting services.

Our main offices are located in Hong Kong and Shanghai, with a regional project delivery team, engineering back-office and R&D center. We also maintain smaller teams in Beijing and Bangkok.



## WHAT IS THE GEOGRAPHICAL FOCUS OF THE COMPANY?

Based on the experience acquired during China's massive infrastructure build-up, we have grown a significant business in Southeast Asia and beyond, working alongside primarily Chinese and Korean EPC companies or directly with plant owner-operators. Thailand has been identified as a priority market: we have an existing customer base of manufacturers and utilities and see good growth potential to support the ongoing transformation of the Thai economy. We are increasingly active in ASEAN in general, with projects in Malaysia, Singapore, Indonesia and deals under discussion in Vietnam. Further away, we are talking to new utilities in India (where several international clients already use our systems) and have a sizable activity in Korea (with EPC firms).

When working with Asian investors and EPCs, we venture as far as Algeria (where we are delivering large projects with Korean and Turkish power plant EPCs), Brazil (where Siveco Brazil is located and Chinese power companies have been very active in recent years in particular with hydropower plants and high-voltage direct-current transmission lines), Papua New Guinea (recent hydropower project), to name a few. We run a very international business, in Asia and from Asia, which is rather unique in our field.



Siveco and Hanwha S&C team in Seoul

## WHAT EXACTLY IS "SMART O&M"?

At the heart of our solutions lies the maintenance system, the CMMS. Our flagship CMMS "Coswin 8i" is used all over the world to organize the management of corporate assets, improve technical teams' productivity, reduce costs and risks. A CMMS essentially provides a centralized, structured registry of all assets, making technical specifications, spare parts, maintenance instructions etc. easily accessible. All O&M activities are managed in this system: preventive maintenance, corrective maintenance, inspections, improvement and projects, as well as all the associated resources: employees and skills, contractors, facilities, tools and parts etc. During the past 16 years operating in China, a market where even today maintenance does not get much recognition, but where utilities face constant pressure to grow and modernize, while controlling industrial risks under strict regulatory oversight, we have taken our CMMS further. Our coverage, built around the core maintenance system, has expanded to Risk Prevention and O&M in general, which for us incorporate regulatory compliance, HSE, the activities of production teams and so on, so that we can better address the top concerns of companies' executives and government regulators. A few years ago, we came up with the term "Smart O&M" to try to reflect this expanded view, not strictly limited to maintenance.

## WHAT IS SIVECO ASIA'S EXPERIENCE IN DISTRICT ENERGY? DO YOU HAVE A GOOD CASE STUDY TO SHARE?

We see District Energy as a segment of our main New Energy & Environmental business. We target new, innovative, growing utility companies and assist them in defining and deploying O&M best practices across multiple sites. We also target government entities at the municipal, provincial or national level, for example an industry park that manage a portfolio of utilities, often under PPP schemes: waste-to-energy, water treatment, supply of industrial gases etc. For District Energy in particular, Siveco France had historically supplied CMMS solutions for the Paris district cooling system (456 GWh/year, 85km of network) and for many projects of French energy giant Engie.



In China, we have also worked with Engie, as well as with Singapore Power's District Cooling subsidiary Shirui Energy, which has built and now operates the HVAC system of Raffles City Chongqing, an iconic 1.1 million sqm real estate project. This was a typical project for us, as we involved from the early construction stage to design the O&M system, to prepare the technical data and to get the Smart O&M up-and-running in close cooperation with the Shirui team. Since the facility was commissioned, all technicians are using our "bluebee®" mobile solution to conduct their day-to-day work. Client reporting, based on contractual SLAs, is done through our system.

## CAN YOU DESCRIBE THE IMPORTANCE OF OPERATION & MAINTENANCE (O&M) FOR DISTRICT ENERGY SYSTEMS?

O&M is, of course, core business for District Energy systems and utilities in general, to ensure reliable supply to the client: how can the system reach and maintain its design performance without dedicated efforts in O&M? At the same time, we see that maintenance remains under-optimized in most projects. This is in fact excellent news, with untapped opportunities in particular during the crucial transition phase between construction to operation, and in the long run with continuous improvement.

Having said that, more efficient operations, time and cost savings are rarely the prime motivators for clients to initiate projects. Instead, the two main drivers behind our business are regulatory changes, in particular increasing environmental oversight, and the Industry 4.0 trends, with the promotion of new technologies. The two are often combined, as regulators increasingly mandate, for example, the use of BIM and sometimes of BIM for O&M, as we

see for example in Hong Kong or Singapore. In any case, stronger regulations require greater traceability of work done, statutory inspections, incidents and their resolution, etc. which our digital solutions can provide. Financial benefits remain a very significant side-effects: as a rule-of-thumb we are looking at ROI within a year of our system entering operations. In greenfield projects, we are looking at financial payback during commissioning.

## HOW DOES SIVECO ASIA POSITION ITSELF IN THE MARKET?

Our positioning is the result of our history. Thanks to our unusual blend of international and Chinese background, we have grown a rather unique business model combining O&M expertise and solutions that we ourselves develop.

Traditional CMMS competition come entirely from diversified IT firms without industrial maintenance know-how, which, in our view, negatively affects how they are able to design and implement solutions. New "Industry 4.0" type of solutions suffer from the same shortcoming, hence the often-disappointing outcomes. Our implementation approach derives from this background: we run our CMMS projects as industrial projects, structured around international standards [chiefly ISO 55000 Asset Management].

We involve as early as possible in projects, typically during the early construction phase, sometimes even earlier, to deliver the Smart O&M during the construction of the plant, ensuring smooth handover to the future maintenance organization. In contrast, with the traditional IT-driven approach, the CMMS comes online months, sometimes years, after start-up, a long period during which paper and Excel are often the main management tools. For this reason, we tend to target greenfield projects or larger utilities with a portfolio of existing and future plants, which can full benefit from our experience. The clients I listed earlier belong to this category, so are all our large clients in the region, such as environmental utility Suez, gas supplier Yingde Gases, Chinese water giant Capital Water, Hongkong's Drainage Services Department, Malaysian independent power producer Ranhill, Brunei's Department of Electrical Services or EPCs like Hyundai Engineering and Hitachi Power.

## UTILITY COMPANIES TEND TO BE HIGHLY DIGITALIZED ALREADY. IS THAT AN OBSTACLE TO YOUR DEVELOPMENT?

This is a most interesting question. First of all, surveys and audits conducted with Asian utilities reveal major gaps between their strategic O&M needs and the actual coverage achieved by IT systems that tend to focus on administrative aspects of less value for industrial improvement, such as time and cost tracking, approval workflows and the likes. This is simply because most projects are driven by corporate IT departments and IT vendors with limited understanding of maintenance. We see large utilities that already have two or three layers of IT systems for maintenance, yet engineers are not able access the technical data they need when in the plant, they do not have full traceability of work done, struggle to maintain their asset database up-to-date and require extensive manual work in Excel in order to produce management reports.

This opens up opportunities for us, in Southeast Asia in particular, where most utilities have experience two decades of the

traditional IT-driven CMMS approach and are becoming more open to try Smart O&M. As we tend to specialize in greenfield projects, they are able to select anew site to pilot this new approach, with very low project risk compared to corporate IT projects.



Typical coverage of "EAM" systems (achieved vs. objective in %)

## HOW DO THE NEW DIGITAL TWIN AND PREDICTIVE MAINTENANCE TECHNOLOGIES IMPACT YOUR BUSINESS?

Indeed, such "smart" topics have received increasing attention in the past few years. Digital Twin is a catch-all term meant to incorporate 3D BIM models, IoT and everything else that comes along. Predictive Maintenance is nothing new, but as everything else it can greatly benefit from new technologies in particular from the IoT. The terminology may be evolving, so is the technology, but Digital Twins and Predictive Maintenance have always been part of our business.

Historically, Siveco has always aimed to develop products that are easy-to-use and highly graphical. In the early 2000s, we developed integrated user interfaces allowing SCADA operators to seamlessly navigate from the SCADA to the CMMS, for easy access to maintenance data, a concept which we later expanded to other systems such as plant 3D models (not yet called "BIM"). This naturally came to incorporate IoT about 6 years ago. We explored these technologies long before most people did... and I will admit that perhaps we did it too early! Essentially, our Smart O&M with BIM and IoT integration, is a form of Digital Twin that goes deeper into operational management thanks to our mobile solution and the functional coverage offered. Today our Coswin 8i "Smart Generation" CMMS, complemented by the bluebee® ecosystem, incorporate all these aspects.

This is another area where we benefited from our China experience, as Chinese utilities tend to be less hindered by legacy technologies than their Western counterparts, which have computerized their business and defined corporate standards earlier.

## WHAT IS THE STRATEGY FOR SIVECO ASIA IN 2021? CAN YOU GIVE AN INSIGHT ON HOW SIVECO ASIA IS WORKING TOWARDS THE SOUTHEAST ASIA MARKET?

We greatly benefit from our corporate structure as a network of Siveco companies, so that we are able to independently define and implement our local strategy for the Asian markets. In terms of



commercial development for 2021, we continue to target energy and environmental utilities, as well as industrial groups with headquarters in Asia. We continue to operate primarily from our Hong Kong and Shanghai offices. Our capability to deliver projects remotely, which has always been part of our DNA, was successfully stress-tested during the Covid-19 pandemic when we delivered major projects without any onsite travel... In some countries, such as currently Thailand and Korea, we also cultivate partners that provide value-added, in the form of local capability, local language support, industrial expertise or complementary technology. Since the Covid-19 crisis started, we have also been on the lookout for potential acquisitions or other expansion opportunities in Southeast Asia.

2021 might see a return to more normal operations, although this is not what I expect... Instead, we are prepared to continue serving our clients in a market where the ongoing health and geopolitical crisis, combined with stricter regulations and digital trends, adds complexity to O&M. We provide simplicity, so this uncertain environment is in fact favorable to our business!

Siveco Asia ([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." Siveco helps facilities owners, in particular, energy and environmental utilities, to optimize assets lifecycle and ensure regulatory compliance. Siveco has its Asian headquarter and R&D center in Shanghai. It is the only company in Asia to be ISO9001-certified for this scope of business.



This article was published in the APUEA Magazine issue 9, March 2021. [www.apuea.org](http://www.apuea.org)

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

**11-12** NOVEMBER 2021  
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Enlit Asia is the unifying brand for Asia's premier events, POWERGEN Asia and Asian Utility Week, part of Clarion Energy's worldwide series. It is the regions only complete energy event, designed to bring clarity to Southeast Asia's energy transition and define the roles of all those involved in powering the next generation of the industry.

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# RECENT APUEA ACTIVITIES

Since, October 2020 APUEA has hosted a series of District Cooling Webinars with the focus on China and India. The space cooling demand in China and India is expanding rapidly and is driven by population and economic growth. In 2050, India and China are expected to become the two largest space cooling markets in the world (India:1350 TWh/China: 960 TWh), and there are huge opportunities to develop District Cooling projects to provide sustainable, efficient and affordable cooling to cities and communities. APUEA will continue to provide meeting platforms as well as market and technology intelligence to support and speed up development of District Cooling in the Asia-Pacific region.



## INDIA SMART UTILITY WEEK 2021 (ISUW 2021)

APUEA was a conference partner to the 2021 edition of the India Smart Utility Week and co-hosted a District Cooling workshop together with India Smart Grid Forum (ISGF). The event included key policy and decision makers from the Government of India, several State Governments, Utility Heads and Regulators, leaders and experts from the Industry, Academia and Research from 23



countries. ISUW 2021 was attended by over 2700 Conference Delegates and 457 Speakers, 564 Utility Officials and 2531 Exhibition attendees from India and Overseas.

## WORKSHOP ON DISTRICT COOLING SYSTEMS (WEBINAR)

ON MARCH 4<sup>TH</sup> 2021, APUEA co-hosted a District Cooling workshop with focus in the rapidly growing India cooling market together with the India Smart Grid Forum (ISGF). The session included presentations and discussions on policies, regulations, technology and business models. The session included speakers and

panellists from both public and private sectors and participating organisations included ISGF, APUEA, the Bureau of Energy Efficiency, the Ministry of Environment, Forest and Climate Change, Energy Efficiency Services Limited (EESL), International District Energy Association (IDEA), Tabreed, United Nations Environment Program (UNEP), Asian Development Bank (ADB), Tata Power DDL, Gift City, Carrier, Devcco, and the Shakti Foundation. The full program can be seen below.

TIME	ACTIVITY
11.00 – 11.30	<b>Inaugural Session</b> Welcome Address: Reji Kumar Pillai, President, India Smart Grid Forum (ISGF) Special Address: Abhay Bakre, Director General, Bureau of Energy Efficiency Inaugural Address: RP Gupta, Secretary, Ministry of Environment, Forest and Climate Change
11.30 – 12.15	<b>Session 1. Policy and Regulations and Implementation Plan</b>  Moderator: Martin Scheffler, Co-founder, Auroville Consulting  Speakers: Arijit Sengupta, Director, Bureau of Energy Efficiency SP Garnaik, Executive Director, EESL Laxmi Rao, Senior Director, IDEA Dmitry Bochkalov, Senior Director- Global Business Development, Danfoss Sudheer Perla, Country Head, Tabreed Mikael Jakobsson, Executive Director, APUEA Rahul Agnihotri, Coordinator, District Energy Initiatives South Asia, UNEP
12.15 – 13.00	<b>Session 2. Technology and Business Models</b>  Chair: Rejeev Sharma, Vice President, Gift City  Moderator: Peter Lundberg, Head of Operations, APUEA  Speakers: Teruhisa Oi, Principal Energy Specialist, ADB Ganesh Das, Head Innovation & R&D, Tata Power DDL Dhiraj Wadhwa, Director, Carrier India Prameet Gupta, Tabreed Laxmi Rao, Senior Director, IDEA Jakob Bjerregaard, Partner, Devcco Shubhashish Dey, Director, Climate Policy, Shakti Foundation
13.00 – 13.30	<b>Discussion</b>



RE-WATCHED WEBINAR HERE:  
**WORKSHOP DISTRICT COOLING SYSTEMS**





## WEBINAR SERIES ON DISTRICT COOLING IN ASIA

ON DECEMBER 2020, Asia Pacific Urban Energy Association (APUEA) and Danish Board of District Heating (DBDH) hosted four (4) webinars with focus on District Cooling in China and India. The webinars aimed to introduce the status and development potential for District Cooling in China and India. The speakers included city representatives, utilities, financial institutions and intergovernmental organizations.

### DISTRICT COOLING WEBINARS IN DECEMBER 2020:

#### 1. District Cooling in Shenzhen, China :

Tuesday, 8 December, 16:00–17:45 (CST)

#### 2. District Cooling in India :

Wednesday, 9 December, 14:00–16:00 (IST)

#### 3. District Cooling in Qingdao, China :

Tuesday, 15 December, 16:00–18:00 (CST)

#### 4. Developing District Cooling in India :

Thursday, 17 December, 14:00–16:00 (IST)

### DEVELOPING DISTRICT COOLING IN INDIA

ON DECEMBER 17<sup>TH</sup> 2020, APUEA hosted a webinar on the topic "Developing District Cooling in India together with the Danish Board of District Heating (DBDH). The energy demand for cooling in India will increase from 90 TWh in 2016 to 1350 TWh in 2050 thus making India the world's largest cooling market. In 2019, the India Cooling Action Plan (ICAP) was prepared by the India Ministry of Environment, Forest & Climate Change, providing a 20-year perspective and outlines actions needed to provide access to sustainable cooling. This webinar aimed to provide insights in how to develop District Cooling projects in India. The session included speeches from city representatives, utilities, IGOs, NGOs and other stakeholders active in the Indian District cooling market. Participating organizations included APUEA, DBDH, Energy Efficiency Service Limited (EESL), United Nations Environment Program (UNEP), India Smart Grid Forum (ISGF), Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) and the International Institute for Energy Conservation (IIEC). The full workshop program can be seen below.

TIME	ACTIVITY
14:00 - 14:05	<b>Welcome remarks</b> Lars Hummelose, Managing Director, DBDH
14:05 - 14:15	<b>Opening speech</b> S.P. Garaik, Executive Director, EESL
14:15 - 14:35	<b>UN DES District Cooling activities in India</b> Rahul Agnihotri, Advisor, UNEP
14:35 - 14:45	<b>District Cooling in an India Smart Grid context</b> Reji Kumar Pillai, President, India Smart Grid Forum
14:45 - 15:05	<b>Break</b>
15:05 - 15:35	<b>International District Cooling experiences (panel)</b> Rahul Agnihotri, Advisor, UNEP Jens-Ole Hansen, Business Developer, Ramboll Markus Wypior, Indo-German Energy Programme, GIZ Sonia Shukla, Senior Manager, IIEC Moderated by Mikael Jakobsson, Executive Director, APUEA
15:35 - 15:55	<b>Q&amp;A</b> Moderated by Lars Hummelose, APUEA
15:55 - 16:00	<b>Closing remarks</b> Lars Hummelose, Managing Director, DBDH



### WEBINAR: DISTRICT COOLING IN QINGDAO, CHINA

ON DECEMBER 15<sup>TH</sup> 2020, APUEA hosted a webinar on the topic "District Cooling in Qingdao, China" together with the Danish Board of District Heating (DBDH). The Energy demand for cooling in China will increase from 250 TWh in 2016 to 960 TWh in 2050, making China the world's second-largest cooling market after India. However, District Cooling developments suffer from scepticism as a result of unsuccessful developments decades ago. Now it's time to turn the tide. This webinar aimed to provide insights into the Qingdao District Cooling sector, with speeches from, utilities, solution providers, associations and other stakeholders active in the Qingdao District cooling market. Participating organizations included APUEA, DBDH, Qingdao Energy Group, Hofer, and ENGIE. The full workshop program can be seen below.

TIME	ACTIVITY
16:00 - 16:10	<b>Welcome remarks</b> Lars Hummelose, Managing Director, DBDH
16:10 - 16:20	<b>Opening speech</b> Li Yanshu, General Manager, Qingdao Energy Group
16:20 - 16:40	<b>District Cooling in Qingdao</b> Zhong Jiahua, Qingdao Energy Group
16:40 - 16:55	<b>District Cooling in Denmark</b> Mikkel Willum, Hofer
16:55 - 17:10	<b>International District Cooling experiences</b> Oscar Loza, Engie
17:10 - 17:20	<b>Accelerating the Development of District Cooling</b> Mikael Jakobsson, APUEA
17:20 - 17:50	<b>Q&amp;A</b> Moderated by Mikael Jakobsson, APUEA and Yao Danfeng, NXITY
17:50 - 18:00	<b>Closing remarks</b> Lars Hummelose, Managing Director, DBDH



RE-WATCHED WEBINAR HERE:  
**DISTRICT COOLING IN QINGDAO, CHINA**



RE-WATCHED WEBINAR HERE:  
**DEVELOPING DISTRICT COOLING IN INDIA**





## WEBINAR: DISTRICT COOLING IN SHENZHEN, CHINA

ON DECEMBER 8<sup>TH</sup> 2020, APUEA hosted a webinar on the topic “District Cooling in Shenzhen, China” together with the Danish Board of District Heating (DBDH). The Energy demand for cooling in China will increase from 250 TWh in 2016 to 960 TWh in 2050, making China the world’s second-largest cooling market after India. However, District Cooling developments suffer from scepticism as a result of unsuccessful developments decades ago. Now it’s time to turn the tide. This webinar aimed to provide insights in the Shenzhen District Cooling sector, with speeches from, utilities, solution providers, associations and other stakeholders active in the Shenzhen District cooling market. Participating organizations included APUEA, DBDH, China District Energy Association, Qianhai Energy, Siveco China, Danish District Heating Association, and DC Pro. The full workshop program can be seen below.

TIME	ACTIVITY
16:10 - 16:20	<b>Welcome remarks</b> Xu Wenfa, China District Energy Association
16:20 - 16:40	District Cooling in Shenzhen Wang Zhaohui, Technical Director, Qianhai Energy
16:40 - 17:10	International District Cooling policies and standards (panel) Bruno Lhopiteau, Siveco China John Tang, Danish District Heating Association George Berbari, DC Pro Moderated by Mikael Jakobsson, APUEA
17:10 - 17:40	<b>Q&amp;A</b> Moderated by Peter Lundberg, APUEA and Yao Danfeng, NXITY
17:40 - 17:45	<b>Closing remarks</b> Lars Hummelmoose, Managing Director, DBDH

RE-WATCHED WEBINAR HERE:  
**DISTRICT COOLING IN SHENZHEN, CHINA**




## WEBINAR: DISTRICT COOLING IN INDIA

ON DECEMBER 9<sup>TH</sup> 2020, APUEA hosted a webinar on the topic “District Cooling in India” together with the Danish Board of District Heating. The energy demand for cooling in Indian will increase from 90 TWh in 2016 to 1350 TWh in 2050, making India the worlds largest cooling market. In 2019, India Cooling Action Plan (ICAP) was prepared by the India Ministry of Environment, Forest & Climate Change, providing a 20-year perspective and outlines actions needed to provide access to sustainable cooling. This webinar aimed to provide insights in the India District Cooling sector, with speeches from city representatives, utilities, IGOs, NGOs and other stakeholders active in the Indian District cooling market. Participating organizations included APUEA, DBDH, IIEC, Tabreed, UNEP, Asian Development Bank (ADB), and ABB. The full workshop program can be seen below.

TIME	ACTIVITY
14:00 - 14:10	<b>Welcome remarks</b> Mikael Jakobsson, Executive Director, APUEA
14:10 - 14:25	<b>India Cooling Action Plan</b> Sanjay Dube, International Institute for Energy Conservation
14:25 - 14:45	<b>District Cooling in India</b> Sudheer Perla, Country Manager, Tabreed
14:35 - 14:45	<b>District Cooling in an India Smart Grid context</b> Reji Kumar Pillai, President, India Smart Grid Forum
14:55 - 15:10	<b>Financing District Cooling projects in India</b> Teruhisa Oi, Principal Energy Specialist, ADB
15:10 - 15:25	<b>Acting in the Indian energy market</b> Frank Grundholm, Vice President, ABB
15:35 - 15:55	<b>Q&amp;A</b> Moderated by Lars Hummelmoose, DBDH
15:55 - 16:00	<b>Closing remarks</b> Mikael Jakobsson, Executive Director, APUEA

RE-WATCHED WEBINAR HERE:  
**DISTRICT COOLING IN INDIA**






# Industrial clusters

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accenture

In collaboration with the World Economic Forum

APUEA was a contributor to the report, "Industrial clusters – Working together to achieve net zero" written by Accenture and World Economic Forum.

READ MORE:

[HTTPS://WWW.ACCTURE.COM/\\_ACNMEDIA/PDF-147/ACCENTURE-WEF-INDUSTRIAL-CLUSTERS-REPORT.PDF](https://www.accenture.com/_acnmedia/pdf-147/accenture-wef-industrial-clusters-report.pdf)



## IRENA POLICY TALKS 3: Heating and Cooling

ON NOVEMBER 30<sup>TH</sup> 2020, APUEA Head of Operations Peter Lundberg moderated a panel discussion during the IRENA Policy Talks 3 – Heating and Cooling.

READ MORE:

[HTTPS://IRENA.ORG/EVENTS/2020/NOV/IRENA-POLICY-TALK-3](https://irena.org/events/2020/nov/irena-policy-talk-3)



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## THE FUTURE ENERGY SHOW VIETNAM ★

ON NOVEMBER 18<sup>TH</sup> 2020, during the Future Energy Show Vietnam, APUEA Head of Operations participated and made a presentation on the topic, "The Potential of District Cooling". The presentation included an introduction to District Cooling, its benefits and international case studies.








# ICT SOLUTIONS



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### CONTACT US:

**John Jakobsson**  
Managing Director, NXITY ICT Solutions

 [John.jakobsson@nxity.com](mailto:John.jakobsson@nxity.com)

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# Accelerating the development of Sustainable Urban Energy Schemes

Asia Pacific Urban Energy Association (APUEA)



# EVENT CALENDAR



FOCUS EVENT  
**11-12**  
NOV, 2021

**ASIA URBAN ENERGY ASSEMBLY  
7TH GLOBAL DISTRICT ENERGY CLIMATE AWARDS  
APUEA ACTIVITY: CO-HOSTING ORGANIZATION**

11 - 12 November 2021  
Bangkok, Thailand

## APUEA EVENT

Q2

**DISTRICT ENERGY IN JINAN, CHINA**  
Jinan, China : Webinar  
(Co-hosting organization)

Q2 2021

08  
APRIL

**EUROHEAT & POWER  
CONGRESS WORLD TOUR**  
Webinar (Co-hosting organization)

08 APRIL 2021

18  
MAY

**DISTRICT COOLING IN THAILAND**  
Bangkok, Thailand : Webinar  
(Co-hosting organization)

18 May 2021

14 - 18  
JUNE

**ASIA CLEAN ENERGY FORUM**  
Manila, Philippines  
(Co-hosting organization)

14-18 JUNE 2021

Q3

**XIAN CLEAN DISTRICT ENERGY  
SUMMIT, Xian, China**  
(Co-hosting organization)

Q3 2021

14 - 16  
OCTOBER

**ASEAN SUSTAINABLE ENERGY  
WEEK, Bangkok, Thailand**  
(Co-hosting organization)

14-16 OCTOBER 2021

## APUEA SUPPORTED EVENT

02 - 05  
MARCH

**INDIA SMART UTILITY WEEK**  
New Delhi, India  
(Supporting organization)

02-05 MARCH 2021

04 - 05  
MAY

**EUROHEAT & POWER CONGRESS**  
Vilnius, Lithuania  
(Supporting organization)

02-05 MARCH 2021

28 - 30  
SEPTEMBER

**ENLIT ASIA 2021**  
Jakarta, Indonesia  
(Supporting organization)

02-05 MARCH 2021

**7<sup>TH</sup> GLOBAL DISTRICT  
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Alliance to Save Energy



Qatar Cool



District Energy in Cities Initiative



Danish Board of District Heating (DBDH)



Northeast Clean Energy Council (NECEC)



IVL Swedish Environmental Research Institute



China District Heating Association (CDHA)



DEVCCO



Thai ESCO Association



Overseas Environmental Cooperation Center (OECC)



Institute for Sustainable Energy Policies



tabreed



Chongqing Renewable Energy Society



Adenergy



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SIVECO China



Fengxi New Energy



Euroheat & Power (EHP)



NXITY

## 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

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