

# APUEA

**Magazine**

URBAN  
ENERGY  
TRENDS 2022





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# Editorial

Mikael Jakobsson

President,  
Asia Pacific Urban Energy Association (APUEA)

**As if climate change** and the COVID-19 pandemic weren't challenging enough for humanity, Russia's full-scale war and invasion of Ukraine has been going on for two months by now, with both direct and indirect impacts on the Asia Pacific region. There are always two sides of a coin, and there are many reasons for conflicts. However, respecting human rights and state's sovereignty are fundamental. Anything else is unacceptable.

The conflict is resulting in increased oil and gas prices globally, and is impacting the energy sectors across the Asia Pacific. In addition, since the oil crisis in the 70s, the importance of energy security hasn't been more evident than now. Considering fossil fuels being subject to blockade and embargo resulting in increasing global prices and, in the worst-case shortage, it is safe to say that the world would have been much better off by following our constant preaching for increasing and accelerating the development of sustainable integrated energy systems.

Energy conservation and energy efficiency. Utilization of local clean resources. System integration, including both sector coupling, integration of energy systems, and municipal utilities for energy symbiosis. Transition to clean energy supply. These actions contribute to systemic efficiency, including energy efficiency, decarbonization, and energy security – all enabled by District Energy schemes.

One of the core benefits of District Energy systems, besides enabling systemic efficiency, is the feature of being future proof to energy sources. Once the infrastructure is in place, it is possible to change cooling, heating, and/or electricity generation method, and one is not necessarily locked to a certain technology as in the case with individual ACs or heaters. Furthermore, District Energy systems unlock the potential for cost-effective renewable energy integration, energy storage, co-, and tri-generation. An extraordinary heatwave has just hit India. March was the hottest in a century,

and with temperatures reaching 50 degrees, April was the third hottest in more than a century. The peak power demand reached a record high of close to 210 TW. The extreme heat has already resulted in both fatal heat strokes and reduced wheat yields. Extreme heat requires sustainable cooling – both energy efficient and driven by renewable energies. District Cooling isn't always feasible, but when it is it should be the choice of cooling technology as the efficiency gains and system benefits are outstanding. We cannot stress enough the importance of energy (cooling) planning and sound feasibility studies to take any opportunity possible to apply District Cooling.

Besides sustainable urban energy, APUEA is also supporting decarbonization and energy efficiency in industrial parks, with a focus on industrial energy symbiosis, distributed generation, and district energy. In addition to industries' ambitious sustainability targets, NDCs (and related policies), and increasing energy prices have accelerated industrial energy efficiency projects in the course of the year. APUEA will increase its industrial energy activities, as a response to direct requests from members and industries. Travel restrictions are now being relaxed in most economies across the region, and while we see more physical activities taking place, we can also sense a surge for more actions from both the public and

private sectors. The APUEA secretariat is planning some twenty events in 2022, almost doubling its activities compared to a normal year. Besides more seminars and workshops, APUEA Academy activities are also expected to increase during the year.

We are looking forward to hosting the 2nd Asia Urban Energy Assembly and the 7th Global District Energy Climate Awards, 15-16 September 2022 in Bangkok Thailand. The event will be held in conjunction with the ASEAN Sustainable Energy Week – the largest energy event in the region, in collaboration with Informa Markets. With relaxed travel restrictions, we are happy to welcome sustainable energy fellows, government officials, professionals, and academia to Thailand in September. In this issue of the APUEA Magazine, you can read articles on decarbonization and sustainable urban energy trends after COP26. We want to thank Applied Energy, Black and Veatch, C40 Cities, NXITY, REN21, Tabreed, and UNEP-YEA Green Jobs Initiative for contributing to this issue of APUEA Magazine.





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# ASIA PACIFIC URBAN ENERGY ASSOCIATION



## APUEA

Asia Pacific Urban Energy Association

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

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



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

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



# ASIA PACIFIC URBAN ENERGY ASSOCIATION MEMBERSHIP



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

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

## PREMIUM MEMBER

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

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

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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.

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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		

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# WORKFORCE READINESS FOR THE GREEN ECONOMY: HELPING CLEAN ENERGY EMPLOYERS

By Debra Rowe

President, US Partnership for Education for Sustainable Development; Co-facilitator, UNEP-YEA Green Jobs Initiative

Amanda Lange Salvia

International Fellow, US Partnership for Education for Sustainable Development; Member of the Green Office UPF, University of Passo Fundo





**OVER 220 MILLION STUDENTS ARE CURRENTLY ENROLLED IN THE TERTIARY EDUCATION SYSTEM AND THIS NUMBER IS EXPECTED TO DOUBLE BY 2030. DESPITE THIS, AROUND 70 MILLION UNEMPLOYED YOUTH ARE CURRENTLY STRUGGLING TO FIND A JOB, A SITUATION THAT WAS CERTAINLY AGGRAVATED BY THE COVID-19 PANDEMIC.**

Another challenge seems to be the lack of support to students in terms of career advising and preparation for the market demands. How can we address the need for increased employment opportunities and better prepare students for the market? The solution is definitely connected to the transition to a more sustainable, fair, low carbon and resilient economy. The transition to a **green economy** is expected to add 60 million new jobs to the market throughout this decade. These green jobs<sup>1</sup> are not only covering several areas (from clean energy, agriculture and fisheries management to all infrastructure services) but are also globally growing more quickly than other jobs. Supporting a green transition represents a strategy to improve employment opportunities while supporting environmental protection, in addition to increasing economic vibrancy and strengthening human well-being.



**HESI HIGHER EDUCATION SUSTAINABILITY INITIATIVE**





**The Global Guidance provides insights into how to prepare the workforce for the growth of green jobs with connections to many resources regarding knowledge, skills and opportunities.**

**It includes key actions for educators to prepare students to participate in the just transition to a green and more inclusive economy.**

1 The International Labour Organization defines green jobs as decent jobs that contribute to, preserve, or restore the environment, whether they are in traditional sectors such as manufacturing and construction, or in newer and quickly growing green sectors such as renewable energy and energy efficiency

([https://www.ilo.org/global/topics/green-jobs/news/WCMS\\_220248/lang-en/index.htm](https://www.ilo.org/global/topics/green-jobs/news/WCMS_220248/lang-en/index.htm)).



This article was published in the APUEA Magazine issue 13 May 2022. [www.apuea.org](http://www.apuea.org)

On the other hand, shifting to a green economy demands the workforce to be prepared for the new market demands and have relevant skills and training to support this transition. To create a sustainable future, companies need a strong supply of workers with the appropriate knowledge, skills and competencies. Companies also need an efficient and streamlined process for hiring from universities, technical education, and other training providers. An additional challenge refers to how green employers could connect with educational institutions and provide inputs on the training needs and job placement processes.

The Green Jobs initiative by UNEP-YEA and supported by the Higher Education Sustainability Initiative (HESI) aims to address these urgent needs and support the processes of updating curricula and research, career advising and job placement and to build the workforce much needed for the green economy. Among the outcomes of the Green Jobs initiative is the publication of the [Global Guidance for Education on Green Jobs: Connecting Higher Education and Green Opportunities for Planetary Health](#) and development of the [Green Workforce Readiness Global Initiative](#), with the first focus dedicated to the Clean Energy Transition.

**Global Guidance for Education on Green Jobs**

The Global Guidance provides insights into how to prepare the workforce for the growth of green jobs with connections to many resources regarding knowledge, skills and opportunities. It includes key actions for educators to prepare students to participate in the just transition to a green and more inclusive economy. The primary audience for this document is the higher education community; however, other educators, NGOs,

governments, employers and youth organizations will find it useful for strategic planning and collaboration with higher education and each other.

In addition to exploring the green economy and its connections with three key actions covering knowledge enhancement, skills and competency development, and job opportunities, the Global Guidance represents a framework for action and a compilation of more than 80 vetted resources – from reports to learning platforms, and from networks to interactive tools.

**Green Economy Workforce Readiness Global Initiative**

The Workforce Readiness is a global initiative dedicated to developing events and supporting communities and solution summits to assist green economy employers and technical vocational educators and university educators. With a first focus on clean energy, this initiative will then be expanding to other sectors of the green economy.

Among its actions is the creation of a [virtual community](#) to promote interactive discussions and improve the process of updating curricula, adjusting skills gaps and offering better career guidance. The benefits of joining the virtual community include the opportunity to learn from others, participate in Solutions Summits with employers, vocational training organizations and universities, improve connections and communication between employers and educators, and provide input into curricular updates in all areas. Additionally, the community is also expected to develop an important role in sharing solutions to barriers, best practices and successful precedents, and opportunities for peer support, mentoring and career-building. Even if you do not have time for the community, signing up will keep you informed about useful resources and opportunities to enhance and streamline your efforts.



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# COP26: WHAT THE GLASGOW CLIMATE PACT MEANS FOR CITIES

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**C40**  
**CITIES**  
CLIMATE LEADERSHIP GROUP

This article was originally published by the C40 Knowledge Hub.





**THE UNITED NATIONS COP26 CLIMATE TALKS IN GLASGOW SAW REPRESENTATIVES FROM ALMOST 200 COUNTRIES MEET TO NEGOTIATE OUR FUTURE. AMONG THE DELEGATES WERE MAYORS FROM LEADING CITIES, THERE TO SHOWCASE THEIR OWN PROGRESS AND DEMONSTRATE WHAT'S POSSIBLE TO PUSH NATIONAL GOVERNMENTS TO TAKE MORE AMBITIOUS CLIMATE ACTION.**

More than 1,000 cities also joined [Cities Race to Zero](#) before the conference, pledging actions to cut greenhouse gas (GHG) emissions in line with the Paris Agreement.

The eventual Glasgow Climate Pact adopted at the conference received mixed reviews, with some praise alongside bitter disappointment at the missed opportunity to bring a 1.5°C future closer to reality.

So what came out of the COP26 negotiations, and what does it mean for urban policymakers?

**The next year is a crucial opportunity for cities to accelerate climate action**

Neither the pact agreed at COP26 nor the Nationally Determined Contributions (NDCs) that Parties previously submitted will cut greenhouse gas (GHG) emissions quickly enough to avert the climate crisis. However, Parties agreed to revise and enhance the targets of their NDCs by the end of 2022 to close the gap to 1.5°C. Originally, Parties were only expected to revise their NDCs every five years.

There is no guarantee that countries will improve them sufficiently. In the year ahead, cities can play a crucial role in holding national governments accountable and ensuring that they develop enhanced targets and plans. Cities should strive to engage in their country's NDC process and demonstrate the feasibility and benefits of effective climate action on the ground. The [Global Covenant of Mayors' Multilevel Climate Action Playbook for Local and Regional Governments](#) gives advice that can help cities achieve this, including through Regional and Local Contributions – climate plans designed to integrate with, and raise the ambition of, NDCs.

Here's [why city diplomacy is vital](#) and [how your city can use it](#) to advance climate action.





Mayor of London and C40 Cities Chair Sadiq Khan speaks with Secretary-General of the United Nations António Guterres. 11 November 2021. Credit: Kiara Worth / UNFCCC via Flickr (CC BY-NC-SA 2.0).

### The Pact marks a major step forward in the recognition of cities in the COP process

Considered an official Observer, cities do not have a formal role in the UNFCCC process, though language in COP decisions over the years has slowly recognised their contributions. The Glasgow Climate Pact goes further than

any other COP text in recognising the “important role of... local and regional governments”. The Pact expresses “appreciation... for the increased targets and actions announced and the commitments made to work together and with non-Party stakeholders to accelerate sectoral action by 2030”, and encourages “the effective participation of non-Party stakeholders in the global stocktake”.<sup>1</sup> This is an important shift towards a more formal inclusion of cities in the processes of the Paris Agreement, and lays the foundation for city advocacy in relation to the 2023 Global Stocktake and the next round of NDCs.

Glasgow also celebrated the work of the [Marrakech Partnership for Global Climate Action](#) and the High-Level Champions in bringing together cities, regions, businesses and other stakeholders to drive action alongside the negotiations. These formal areas of cooperation will continue and be strengthened in the next phases of the Paris Agreement.

### National governments failed to agree on coal phase out

One of the most significant battlegrounds at COP26 was the future of coal. The final text included landmark recognition of the need for action on fossil fuels, but last-minute interventions weakened the pact’s language from escalating the ‘phase out’ of unabated coal to ‘phase down’. In the absence of a more ambitious coal phase out agreement, cities can lead from the front by [leaving coal behind](#) and [promoting clean energy](#).

### Sector-specific deals were struck, which cities can help to translate into policies

Several breakthroughs were struck on sector-specific issues, including a deal on the [protection of forests](#), a [Global Methane Pledge](#), and a commitment by 20 countries to stop fossil fuel financing abroad.<sup>2</sup> These agreements and the funding that follows them have significant potential for cutting emissions. Cities can help turn the targets into concrete actions – such as by pursuing [nature-based solutions](#) such as urban forests, transitioning from [gas to renewables](#) in buildings, shifting [food consumption](#) toward the Planetary Health Diet, and collecting and [treating organic waste](#).



Moderator Cassie Sutherland, Programme Director of C40 Cities, at the Ministers and Mayors on Buildings as Critical Climate Solution event at COP26. 11 November 2021. Credit: Justin Goff / UK Government via Flickr (CC BY-NC-ND 2.0).





The Global Guidance provides insights into how to prepare the workforce for the growth of green jobs with connections to many resources regarding knowledge, skills and opportunities.

It includes key actions for educators to prepare students

### The groundwork was laid for more climate finance for cities, including through carbon markets

Significant steps were taken at COP26 towards more finance being available for cities to advance climate action. Perhaps most significantly, the Glasgow Climate Pact set out rules for carbon markets under Article <sup>6</sup> of the Paris Agreement, which has the potential to make trillions of dollars available for climate action.<sup>3</sup> Banks and asset managers accounting for 40% of global financial assets, or US \$130 trillion, also pledged to put climate change at the centre of their work through the Glasgow Financial Alliance for Net Zero.<sup>4</sup>

City finance was referenced more specifically in a joint statement issued by 10 multilateral development banks (MDBs) at COP26. The statement underlined the MDBs' willingness to support the NDCs in the Global South and highlighted their work to "accelerate climate finance for cities, reflecting their key role in developing and implementing climate action at the local level".<sup>5</sup>

### 'Loss and damage' is finally on the map, but without firm commitments

A major theme of the COP26 discussions was 'loss and damage': meaning the compensation given to vulnerable and poorer countries for the damages they already experience from the climate crisis on lives, livelihoods and infrastructure. Although no firm outcomes were achieved beyond a process for further dialogue, the issue gained recognition – underlining the need for cities to collaborate and engage on this key problem of international climate justice.<sup>6</sup> Global North countries also agreed to double funds for adaptation for developing nations in 2025 compared to 2019.<sup>7</sup>

For a more in-depth look at the key outcomes at COP26 (including those not specific to cities), you can also read Carbon Brief's detailed summary.



Conclusion of the C40 Cities event 'Our Last, Big Chance: Why our future depends on action taken today in the world's cities' at COP26, 2 November 2021. Photo © Maurizio Martorana.

This article was originally published on the C40 Knowledge Hub. Visit the online library for more cutting-edge insights on climate action in cities.



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#### About C40 Cities

Around the world, C40 Cities connects 97 of the world's greatest cities to take bold climate action, leading the way towards a healthier and more sustainable future. Representing 700+ million citizens and one quarter of the global economy, mayors of the C40 cities are committed to delivering on the most ambitious goals of the Paris Agreement at the local level, as well as to cleaning the air we breathe.

This article was originally published by the C40 Knowledge Hub.





# APUEA Academy

## PROFESSIONAL TRAINING

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

- Introductory training
- Concepts and Technologies
- Advanced training

## VOCATIONAL TRAINING

Is provided in collaboration with educational institutions.



**APUEA**  
Asia Pacific Urban Energy Association



FOR MORE INFORMATION  
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WHILE DECARBONIZATION PRESENTS NEW CHALLENGES FOR GOVERNMENTS, REGULATORS AND DEVELOPERS ACROSS ASIA, THE OPPORTUNITIES IT BRINGS ARE VAST: ASIA'S RENEWABLE ENERGY POTENTIAL CAN FACILITATE THE DEVELOPMENT OF WIND FARMS, GRID SCALE SOLAR PARKS AND GREEN HYDROGEN FACILITIES.



# INTEGRATION IS CRITICAL TO ASIA'S DECARBONIZATION

## GLOBAL ENERGY LEADERS ATTENDING THE INTERNATIONAL ENERGY AGENCY'S (IEA) 2022 MINISTERIAL MEETING IN MARCH WERE FIERCELY UNITED ON THE NEED TO STRENGTHEN ENERGY SECURITY, REDUCE MARKET VOLATILITY AND ACCELERATE CLEAN ENERGY TRANSITIONS WORLDWIDE.

Acknowledging that recent volatility in markets has placed a burden on consumers at a critical moment of economic recovery, ministers from the agency's [31 Member Countries](#), including Australia, Japan, Korea, New Zealand and United States, highlighted the need to accelerate the energy transition and further diversify the energy system towards net zero solutions in accordance with the goals of the Paris Agreement.

The energy ministers recognized that in addition to securing supplies of gas and oil, low emissions technologies are critical to long-term energy security.

While decarbonization presents new challenges for governments, regulators and developers across Asia, the opportunities it brings are vast: Asia's renewable energy potential can facilitate the development of wind farms, grid scale solar parks and green hydrogen facilities.

On the other hand, it will be prudent to note that solving this transition is complex, particularly in regions, like Asia, still dependent on coal to meet its base load energy demand.

Having a clear sense of how existing and emerging technologies could work together while embracing a 360-degree view of the energy mix and necessary grid infrastructure assets will be critical in achieving net-zero strategies and will underpin the power market's efforts to decouple fossil fuels from the provision of affordable, reliable and resilient power supply.



By Narsingh Chaudhary  
Executive Vice President &  
Managing Director, Asia Pacific



A growing awareness of the importance of integration is the most prominent finding to emerge from the *Black & Veatch 2022 Asia Electric Report*.

Specifically, integrating variable renewable energy into traditional grid structures was identified as the single biggest challenge the industry was facing, according to respondents (Figure 1). Growing acceptance of renewable technology and cost parity have been achieved. Now, integration is the challenge.

**From your perspective, what are the most challenging issues facing the electric industry in your region today? (Select the top three)**

Source: Black & Veatch

Renewable integration	35.1%
Economic regulation (i.e., rates)	24.6%
Uncertainty of investment	24.6%
Market uncertainty due to the pandemic (i.e. COVID-19)	24.6%
Energy storage	21.1%
Planning/forecasting uncertainty	21.1%
Environmental regulations	17.5%
Aging infrastructure	14.0%
Distributed energy resources (DERs) integration	14.0%
Distribution system upgrades and modernization	14.0%
Access to capital investment	14.0%
Market structure	12.3%
Lack of skilled work force	8.8%

Figure 1

**Paving the Way for More Distributed and Connected Regional Grids**

As the world adjusts to the consequences of the COVID-19 pandemic, systems integration surpasses last year's top concern around investment uncertainties.

It also reflects an acceptance of the electric grid's shifting complexities: the structure will no longer center around a few large baseload facilities, but instead will embrace a more distributed, digitalized array of generation sources equipped to accommodate the electrification of everything.

What remains the same is the goal of any electricity provider

– reliable and resilient grid operations and service. The survey shows this core business is threatened most by government policies that continue to evolve and, in the wake of 2021's COP26, have pushed decarbonization goals sharply over the past 12 months.

These policy challenges are compounded by an underinvestment in transmission systems and insufficient energy storage capacity, systems that help mitigate renewable variability while traditional conventional generation capacity is reduced (Figure 2).

**What are the biggest threats to reliable grid operations and performance in your region? (Select up to three)**

Source: Black & Veatch

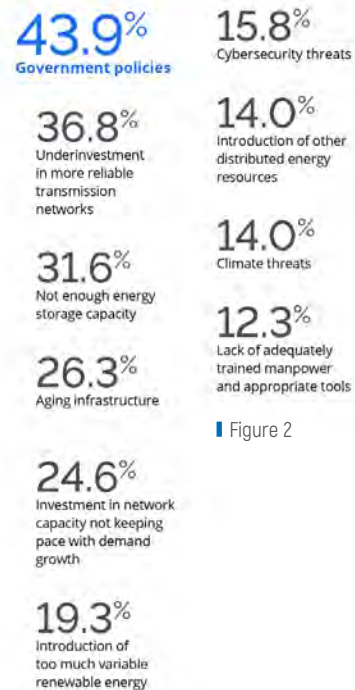


Figure 2



## Planning for and Integrating Emerging Technologies

Such practicalities have coincided with increased interest in and debate about the use of hydrogen as an energy carrier. Hydrogen can be used as an exportable, seasonal energy storage method to respond to the variability of wind and solar, and as a fuel for existing gas turbine facilities.

While the production of hydrogen via electrolysis scales – and corresponding cost barriers decrease – adoption can be encouraged through gateway approaches that combine hydrogen production from fossil fuels

with carbon capture. In parallel with incentivized investment in green hydrogen production, these approaches together can bring scale to a hydrogen economy and help lower the cost per kilogram over time of green hydrogen.

Asia's energy industry is clearly optimistic, with three out of four respondents believing that, beyond 10 years, hydrogen will help meet emissions reduction and clean energy goals. This is significantly more than any other technology over the mid-term (Figure 3).

Furthermore, only 8 percent of respondents believe there is no future for hydrogen as a feasible, clean and affordable alternative to natural gas (Figure 4).

**When do you think hydrogen generation will take off in your region of business as a clean and affordable alternative to existing gas generation? (Select one)**

Source: Black & Veatch

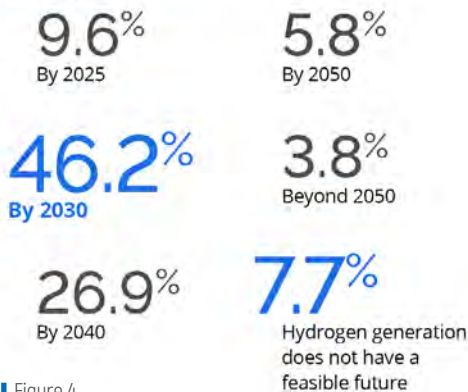


Figure 4

China is one country moving decisively towards a hydrogen economy. Its economic regulator, The National Development and Reform Commission, in association with the National Energy Administration, has unveiled the country's first medium- to long-term (2021-35) plan to promote high-quality development of the hydrogen industry.

Under the plan, China will seek to have around 50,000 hydrogen-fueled vehicles and a batch of hydrogen fueling stations by 2025. By that year, the country aims to produce 100,000 metric tons to 200,000 tons of hydrogen generated from renewable energy sources a year, reducing carbon dioxide emissions by 1 million tons to 2 million tons a year.

**Which of the following methods do you expect will be included specifically to help meet your carbon/emissions reduction and/or clean energy goals? (Select all that apply)**

Source: Black & Veatch

	Beyond 10 years
Hydrogen	73.0%
Retiring traditional fossil-fueled generation sites	51.4%
Battery energy storage	43.2%
Combined cycle	27.0%
Wind	27.0%
Natural gas	24.3%
Making traditional fossil-fueled generation more efficient	18.9%
Power purchase agreements (PPAs)	18.9%
Solar	18.9%

Figure 3

China intends to form a relatively complete hydrogen industry technology innovation system as well as the clean energy-based hydrogen production and supply system by 2030, which will help in meeting its carbon peak goal.

Despite these and other emerging challenges, industry respondents are overwhelmingly positive, recognizing the importance of the region's energy transition.

A mere 2 percent of respondents disagree that investments are being channeled to clean energy (Figure 5).

**To what extent do you agree or disagree with the following statement: We are directing our capital towards clean energy.**

Source: Black & Veatch

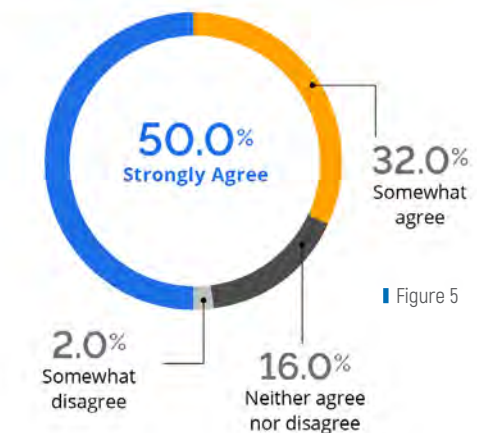


Figure 5

Another critical shift observed in this year's findings is the change in investment influences. While government policy continues to be critical for electric utilities, we're seeing a rise in shareholders' and large customers' influence on investment.

## The Energy Transition Calls for Integrated Decarbonization Planning

Compared with 2021, this year's data points to the potential long-term softening of natural gas as part of generation portfolio development. Forty-six percent of industry respondents see a role for gas beyond 2035, which falls from about two out of three respondents in last year's survey (Figure 6).

Is there a future for fossil fuel generation (utility-scale coal and gas generation) in your region(s) of operation beyond 2035? (Select the scenario that best applies)

Source: Black & Veatch

	2020	2021
Yes, both coal and gas will remain important components of the grid beyond 2035	18.2%	15.4%
Yes, investment in gas will remain long term, however, coal will be gradually phased out with little new development	48.5%	30.8%
We will see limited investment in coal and gas investment will focus mostly on upgrading existing facilities only	12.1%	25.0%
No, we will see limited investment in both gas and coal	9.1%	3.8%
No, we will see limited investment in gas and we will also start seeing increased decommissioning of coal facilities	12.1%	23.1%
No, we will see increased decommissioning of both gas and coal facilities	0.0%	1.9%

Figure 6

Do you have a decarbonization roadmap in place? If so, what timeframe(s) for investment decisions are included?

Source: Black & Veatch

**35.4%**  
No, we do not have a decarbonization roadmap

**33.3%**  
Yes, for the next 10 years

**18.8%**  
Yes, for the next five years

**14.6%**  
Yes, extends beyond 10 years

Figure 7

Notably, views appear to have shifted to investment in existing gas-fired facilities, signaling interest in energy transition solutions that include upgrading to more efficient and advanced turbines, integrating battery energy storage systems, and planning for the eventual use of hydrogen in lieu of natural gas.

The energy transition will require the development of prioritized decarbonization roadmaps, essentially the detailed, yet flexible plans that electricity providers will use to maximize returns on their asset investments and realize their sustainability goals.

What is concerning is that one in three do not have decarbonization roadmaps in place today, highlighting a significant financial risk. Such technology and investment blueprints help electricity providers plan out capital investment over 10 years or longer horizons. Only 15 percent of respondents claim to have such robust investment roadmaps in place, indicating there is much room to prioritize and optimize ongoing clean energy investments in the years ahead (Figure 7).

### Conclusion

This combination of challenges facing Asia's power industry highlights the importance of integration on a number of levels from planning to technologies, and across industry, government and customers. To help realize an affordable and successful energy transition, the industry must align with all stakeholders and embrace holistic planning and design of generation, transmission and distribution systems.

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# Asia Urban Energy Assembly

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- DIPLOMATIC PANEL
- CITY PANEL
- The Importance of District Energy in the Energy Transition



### DISTRICT ENERGY WORKSHOPS



### GALA DINNER



### SITE VISIT

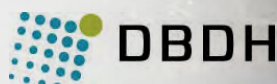
#### Urban Energy Disciplines

- ✓ 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







## TABREED-IFC'S VISION TO HELP REDEFINE SUSTAINABILITY IN INDIA'S REAL ESTATE SECTOR

Pooling competencies to build world-class cooling solutions, the partnership is committed to creating green infrastructure to further the country's climate goals



By Sudheer Perla- Country Head  
Tabreed - India



**EVEN** as nations and economies advance, there is a simultaneous surge in their demand for cooling. India's growing economy and increasing prosperity has fuelled a sharp rise in the demand for individual as well as institutional air conditioning over the years. The country's rapidly growing cooling demand is also a key factor in its decades-long carbon intensity and energy consumption. While the demand for cooling and the resultant climate impact is increasing by the year, the country's stiff climate goals necessitate urgent action to not only cut emissions but also switch to energy-friendly and clean technologies for long-term sustainability.





CONSIDERING THE MASSIVE CONSTRUCTION ACTIVITY UNDERWAY AND ON THE ANVIL IN INDIA, THERE IS TREMENDOUS POTENTIAL FOR INDIA'S BOOMING REAL ESTATE SECTOR TO MAKE CLIMATE CONSCIOUS INVESTMENTS IN ENERGY-EFFICIENT TECHNOLOGIES.



**A** recent Deloitte [report](#) reveals that the real estate sector contributes nearly 40% of the global carbon emissions through the construction and operation journey, and a notable volume of these emissions are attributable to conventional cooling systems in these buildings.

Considering the massive construction activity underway and on the anvil in India, there is tremendous potential for India's booming real estate sector to make climate conscious investments in energy-efficient technologies. This will enable decarbonizing of the economy as well as augment the achievement of the country's climate goals.

An effective effort on this front would be to adopt sustainable cooling solutions like district cooling at the planning and development phase of new green field projects, which would ensure significantly lower CO2 emissions, while delivering enhanced operational and economic efficiencies.

Given the current low per capita cooling consumption and the rapidly growing cooling market across all sectors,

adopting of district cooling is imperative for India to meet its ambitious climate goals.

District cooling pioneers like Tabreed can play a crucial role in providing eco-friendly district cooling solutions that deliver efficient and cost-effective cooling, while driving sustainable synergies in the Indian real estate sector.

### Partners in Progress

Even as the Indian real estate sector embarks on a new wave of expansion, investment in sustainable technologies can enable achievement of significant climate and environmental targets, as well as economic outcomes. While governments and civic bodies can encourage the adoption of sustainable technologies like district cooling solutions through comprehensive long-term policies, investors and developers can avail of the incentives to collaborate and implement such initiatives. Dedicated long-term funding by investors will be integral in enabling the transition of the real estate sector from being one of the largest sources of GHGs to a green industry with sustainable, carbon

net-zero buildings. For a tropical country like India, besides the usage of energy-efficient materials and technologies, cooling is one area with huge potential for sustainability-driven synergies and savings.

Pooling synergies to pursue a mutual vision, Tabreed has entered into a strategic partnership with the International Finance Corporation (IFC), a member of the World Bank Group and the largest global development institution focused on the private sector in emerging markets. Since its establishment in 1956, IFC has invested more than \$321 billion in emerging markets. Through this partnership, Tabreed and IFC will provide more energy-efficient, end-to-end cooling solutions through an outsourced utility model for real estate developments, new urban master plans, and ongoing redevelopments.

The mandate is to invest in projects of up to USD 400 million over the next five years, targeting a portfolio of approximately 100,000 refrigeration tonnes (RT), servicing industrial, commercial and retail developments across India and eventually across South-East Asia.

## Paving the Pathways

The Tabreed-IFC partnership comes in the wake of the Indian government's continued commitment to encouraging green infrastructure and its focused initiatives in the Union Budget 2022-23, like the issuance of green bonds for use in projects that reduce carbon intensity. Even as the government's emphasis on sustainable urban development through holistic and integrated approaches is a significant step forward, private players like Tabreed-IFC can contribute significantly towards the advancement of green infrastructure projects in the country.

These public-private partnerships, coupled with the private sector's ability to raise green finance and rapidly execute infrastructure projects will facilitate a new era of sustainable development in the country. Leading the charge, we at Tabreed have been actively supporting these government initiatives and engaging with several top tier real estate developers across the country to evaluate project opportunities and incorporate sustainability measures in the sector.

## The Way Forward

Even as the Government of India is taking initiatives to adopt sustainable cooling systems, its India Cooling Action Plan (ICAP) has identified district cooling as a key initiative to be adopted.

The UNEP-EESL study estimates potential for 274 district cooling systems in India by 2038, meeting 9-mn refrigeration tons of cooling demand. With an investment potential of \$35 billion, this will shave 6GW of energy demand and cut 6.6-mn tonnes of annual CO2 emissions, while saving \$10.5 billion in capex for DISCOMs.

Waking to the potential, Indian government bodies and smart cities are now increasingly evaluating the incorporation of district cooling into urban master planning.

District cooling utilities will provide efficient, cost effective, low-carbon pathways for real estate developers to meet their energy needs, while accelerating the development of green buildings and carbon net-zero buildings. Focused investments in sustainable cooling solutions will yield rich ecological and economical dividends for all stakeholders, and Tabreed-IFC is firmly on course to make a key contribution in this endeavour.

## 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.



The UNEP-EESL study estimates potential for 274 district cooling systems in India by 2038, meeting 9-mn refrigeration tons of cooling demand.









United Nations  
Climate Change



Mr. Patrick Espinosa  
Executive Secretary



Mr. Alok Sharma  
COP 26 President





# BEYOND COP 26, TOWARDS THE ENERGY TRANSITION?

By Lea Ranalder, REN21

The world is burning more fossil fuels than ever. Since 2009, the share of fossil fuels in final energy consumption has remained the same (80.3% in 2009 vs 80.2% in 2019), while global energy demand has expanded around 20%. Renewable energy meets just over 11% of global final energy demand – a slight increase from around 9% a decade ago. The world is clearly not on track to limit the average global temperature rise to 1.5°C, as stipulated in the Paris Agreement.

**COP26 WAS SEEN AS A CRITICAL MOMENT FOR COMMITMENTS AND ACTIONS AFTER THE FAILURE TO RAISE USD 1 BILLION ANNUAL CLIMATE FUNDING TO SUPPORT VULNERABLE COUNTRIES IN THEIR EFFORTS TO STAYING BELOW 1.5°C. IT WAS WIDELY REPORTED TO BE THE LAST BEST CHANCE TO ADDRESS THE CLIMATE CRISIS AND ACCELERATE ACTION TOWARDS THE PARIS AGREEMENT.**



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Ms. Lynn Davidson  
Spokesperson, UK



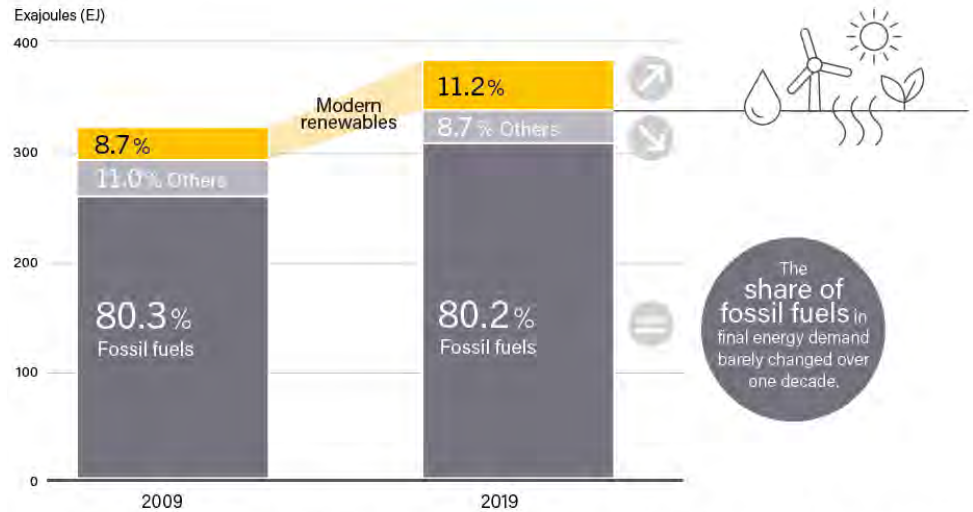
United Nations  
Climate Change

The logo for REN21, consisting of a stylized globe icon made of colored dots followed by the text 'REN21' in a bold, sans-serif font.

## A FRAGILE WIN

COP26, the UN climate conference, which took place in November 2021 in Glasgow after being postponed by a year due to the COVID-19 pandemic was highly anticipated. The meeting was seen as a critical moment for commitments and actions after the failure to raise USD 1 billion annual climate funding to support vulnerable countries in their efforts to staying below 1.5°C. It was widely reported to be the last best chance to address the climate crisis and accelerate action towards the Paris Agreement.

**Estimated Renewable Share of Total Final Energy Consumption**  
2009 and 2019



Note: Totals may not add up due to rounding. This figure shows a comparison between two years across a 10-year span. The result of the economic recession in 2008 may have temporarily lowered the share of fossil fuels in total final energy consumption in 2009. The share in 2008 was 80.7%. Source: Based on IEA data.

REN21 RENEWABLES 2021 GLOBAL STATUS REPORT



POST-COP, A RECORD NUMBER OF 131 COUNTRIES, IN ADDITION TO REGIONS, CITIES AND COMPANIES PLEDGED TO REACH NET-ZERO BY 2050 OR LATER. AMONG THESE ARE BIG EMITTING COUNTRIES, INCLUDING CHINA WHICH HAS PLEDGED TO CARBON NEUTRALITY BY 2070 AND EU, BRAZIL AND THE UNITED STATES WHICH HAVE SET NET-ZERO TARGETS BY 2050.

Given the high expectations, the outcome was mixed and the result, the adoption of the Glasgow Climate Pact, deemed a “fragile win”. This document called for countries to revisit and strengthen their climate pledges by the end of 2022 and revisit them annually, set up processes towards delivering a global goal on adaptation and committed to higher climate finance for nature loss and damage. Countries also called to phase down unabated coal power and phase-out of inefficient subsidies. Although in the final text language was watered down from “phase-out” to “phasedown”, this marks the first time in COP countries acknowledge the need to reduce fossil fuels. In the words of Fiji’s prime minister, Frank Bainimarama, the Paris 1.5°C target leaves the COP26 negotiations “battered, bruised, but alive”.

## RENEWED HOPE

The steps made in Glasgow gave a little bit of renewed hope. In the lead up to the negotiations, momentum has been gathering for net-zero and carbon neutrality pledges. Post-COP, a record number of 131 countries, in addition to regions, cities and companies pledged to reach net-zero by 2050 or later. Among these are big emitting countries, including China which has pledged to carbon neutrality by 2070 and EU, Brazil and the United States which have set net-zero targets by 2050.

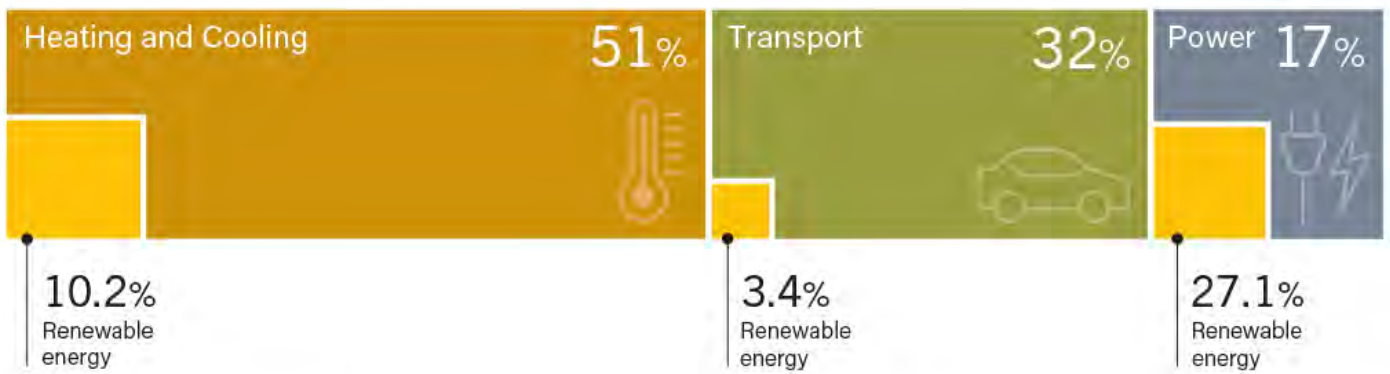
These growing commitments highlight a rising tide of awareness of the urgent action needed to address climate change and air pollution and accelerate sustainable development. Yet these pledges also need to be anchored in policy documents and supported by concrete actions to be meaningful.

Renewable energy is central to the solution and the road to net-zero, to continue to fight climate change at scale as well as overcoming post-pandemic economic recession. This requires a structural shift from fossil fuels to renewables. Such a shift means transitioning from fossil fuels to a renewable based system in all societal and economic activities





## Renewable Energy in Total Final Energy Consumption by Final Energy Use, 2018



Note: Data should not be compared with previous years because of revisions due to improved or adjusted methodology.

Source: Based on IEA data.

## MAKING RENEWABLE ENERGY THE NEW NORM

Renewable energy is central to the solution and the road to net-zero, to continue to fight climate change at scale as well as overcoming post-pandemic economic recession. This requires a structural shift from fossil fuels to renewables. Such a shift means transitioning from fossil fuels to a renewable based system in all societal and economic activities. This requires a multi-faced approach, including:



### Renewable energy targets.

Most countries and the greatest emitters of greenhouse gases lack clear, economy-wide objectives to shift to renewables in all sectors. Governments must set targets in all sectors and build on them with new, bolder goals by the time they meet the original target.



### Phase out of fossil fuels.

Policies for renewable energy alone are not enough, there is also the need to end fossil fuel subsidies. COP26 has signalled the end of the coal era. Governments now need to hear this signal and actively phase out the use of fossil fuels and fossil fuel subsidies.



### Policies to support renewable energy.

Targets have to be backed by policies that support the uptake of renewables by incentivising and/or mandating their use across all sectors.



### Renewable Energy Investment.

To reach global climate and sustainable development goals, annual investment in renewables must at least triple by 2030. This requires channelling funding from fossil fuels to energy conservation, energy efficiency and renewable energy.



## BUILD ALLIANCES WITH PARTNERS

Governments cannot achieve the goals of the Paris Agreement alone. They need to work with partners and stakeholders across all levels of society and economy. Cities, as well as companies and communities can be strategic allies in accelerating the development of renewables in all sectors, in driving an economy-wide decarbonisation, and in building societal support for the transitions.

Collectively, these actions can support national decarbonisation efforts, NDCs and contribute to achieving global climate commitments, most notably limiting the average rise in global temperatures to 1.5°C, as stipulated under the Paris Agreement and in line with what is needed to achieve the Sustainable Development Goals.



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 3,000 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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# PART OF THE SOLUTION FOR DECARBONISING ASIAN CITIES IS ALREADY RIGHT UNDER YOUR FEET.

By: Nick Meeten, Managing Director, Applied Energy  
John Jakobsson, Managing Director, NXITY Energy ICT Solutions

**T**he climate crisis which has been recently clearly documented in the IPCC report, is being driven by unabated use of coal, gas & oil. Solving this crisis within the very short time window still available, will require a change in thinking about where energy comes from and how it is used. We need to act with the urgency that the limited time requires. We need to bring every bit of potential out of the energy and resources we already have at our disposal, because we do not have the luxury of time to wait for a magic solution to appear. There is no magic solution!

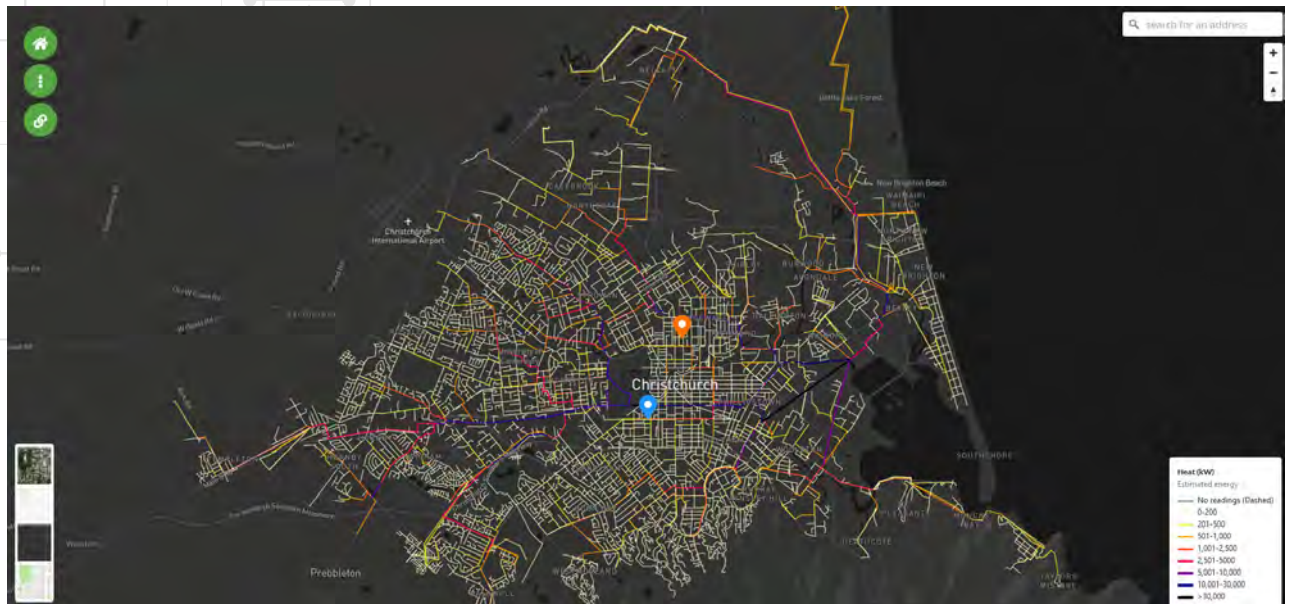
Heating and cooling for homes, buildings and industries is a large part of the energy usage in many regions of the world, and the proposed strategy by the IPCC is to electrify heating via a massive transition to heatpumps over the next few years. In Asia, cooling is of equal, if not greater, concern. The IEA Southeast Asia energy outlook 2019 states

“ ”

ON THE DEMAND SIDE, ELECTRICITY CONSUMPTION IN SOUTHEAST ASIA DOUBLES TO 2040; THE ANNUAL GROWTH RATE OF NEARLY 4% IS TWICE AS FAST AS THE REST OF THE WORLD. THE SHARE OF ELECTRICITY IN FINAL ENERGY CONSUMPTION IS 18% TODAY BUT THIS RISES RAPIDLY TO 26% IN 2040 AND REACHES THE GLOBAL AVERAGE. SPACE COOLING IS ONE OF THE FASTEST GROWING USES OF ELECTRICITY TO 2040, PROPELLED HIGHER BY RISING INCOMES AND HIGH COOLING NEEDS. FOR THE MOMENT, LESS THAN 20% OF HOUSEHOLDS ACROSS THE REGION HAVE AIR CONDITIONING: IN INDONESIA, THE MOST POPULOUS ASEAN COUNTRY, AROUND 10% DO. IN OUR PROJECTIONS, APPLIANCE OWNERSHIP AND COOLING DEMAND SKYROCKET, NOT ONLY RAISING OVERALL ELECTRICITY DEMAND BUT ACCENTUATING STRAINS ON POWER SYSTEMS AS THE SHARE OF COOLING IN PEAK POWER DEMAND RISES TOWARDS 30%.



So using wastewater as a thermal source allows electrification of more buildings to be achieved, using less electricity, thus helping manage the rapidly growing demands on the electrical generation and distribution infrastructure.



Wastewater Network Heat Map for Christchurch City

This transition to electrification of heating and increase of cooling will place new demands on electrical generation capacity and city electrical networks, coming at the same time as electrification of transportation (cars, bikes, light commercial etc.) is also placing new demands on city electrical networks. Planning and management of these competing electrical energy demands will be difficult.

But all cities have wastewater networks right under your feet, carrying huge amounts of free heating and cooling capacity. This heat energy is reliable, predictable and stable. This heat energy is already in the city where it is needed by buildings, and the infrastructure collecting and transporting this heat capacity (the sewer network) is already built and available. Sadly, at the moment this thermal energy is typically just ignored and flushed away every day.

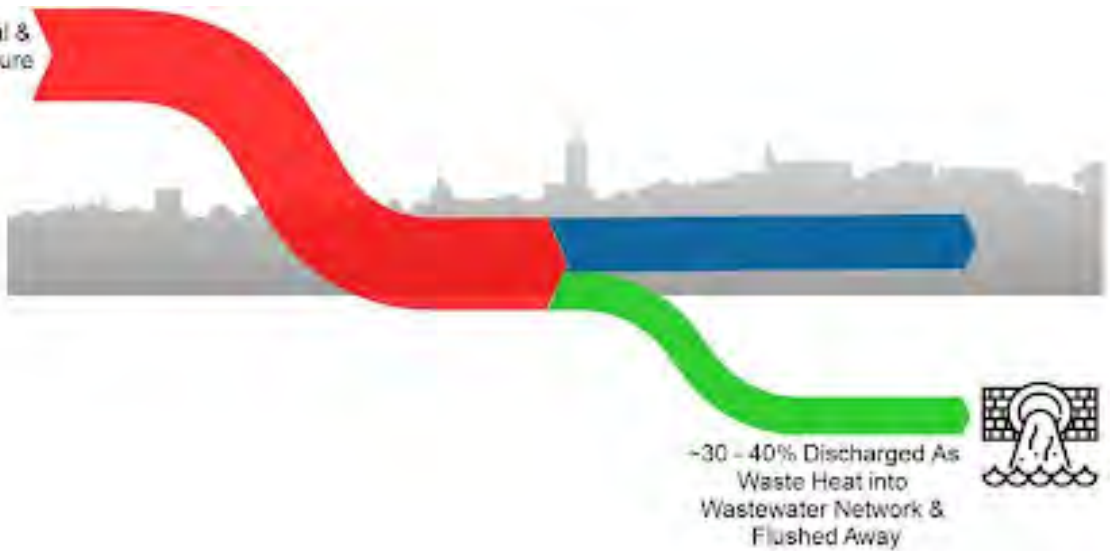
The favorable temperatures of wastewater (typically wastewater is warmer than air in the winter and cooler than air in the summer) allow wastewater source heatpumps to operate more efficiently

than air source heatpumps (whether in heating and/or cooling modes), roughly twice as efficiently is common. So a city can then heat/cool two buildings by using wastewater as the heating/cooling source while only using the same electricity as would be needed to heat one building using air source heatpumps. So using wastewater as a thermal source allows electrification of more buildings to be achieved, using less electricity, thus helping manage the rapidly growing demands on the electrical generation and distribution infrastructure.

The amount of thermal energy available within wastewater is enormous – typically 20%-35% of total housing energy (figures from UK, China and New Zealand) and up to 40% of low-temperature heat used in commercial and industrial sectors gets turned into hot water, which is used once and then goes down the city sewers, and it's simply flushed away, every single day.



Residential, Commercial & Industrial Low Temperature Heat Energy Input



## Pros & Cons

Compared to air source heatpumps and chillers, a wastewater heat recycling system will normally be more expensive to install. This is due to the cost of civil works needed to connect to the sewer network. However, on top of the energy efficient benefits mentioned earlier, there are also other benefits of wastewater heat recycling heatpumps which are particularly relevant within cities locations. These include:



**Improved air quality:** By electrifying heating systems that currently use fossil fuels, the associated air pollution from burning the fossil fuels is removed. Step by step as more fossil fuel boilers are replaced, this will improve the air quality within the city.



**Reduce Seismic Risks:** For cities in seismic regions, using wastewater as a heating and/or cooling source might allow you to remove heavy heat exchangers or cooling towers from the roof of your building. This reduces the weight of equipment on the roof of your building and reduces the seismic loads that the building must cope with in an earthquake.



**Reducing Urban Heat Island:** Typically, air conditioning systems discharge heat into the air within cities. When many air conditioning systems are all doing this, it adds to the 'urban heat island' issue affecting more and more cities. By using wastewater as a cooling source instead of discharging it into the air, this helps to reduce the urban heat island problem.



**Smaller Equipment:** Sometimes inner-city buildings simply do not have enough space to accommodate air source heat pumps or chillers (these are typically mounted on the roof of a building). The size of wastewater heat recycling equipment is normally smaller and installed within the basement or just outside the building.



**Saving Water:** Wet cooling towers use a lot of water! By using wastewater as your cooling source instead of wet cooling towers, you can save precious water as well as reduce the maintenance costs of wet cooling towers.



**Noise Generation:** Air source heatpumps require fans to move air through the outdoors heat exchanger. Naturally these fans create some noise which can be problematic in urban locations where there might be people sleeping or working/learning. Wastewater heat recycling systems do not have fans. The equipment is all mounted within the basement or plantroom and so noise is contained.

## Why is this not being used more?

Our experience is that the barriers to recycling of this heat energy are:

1. Lack of awareness - many people just don't know about wastewater heat recycling. So, it does not get included in policy development and energy planning processes. Also building designers often view this as a risky solution because they are not familiar with it, and so the possibility is simply not considered.
2. Disconnects between different sectors. There are different sectors (we like to call them 'worlds') that need to come together to help each other and stop this tragic energy wastage. These worlds can be described as:
  - The water sector and the buildings sector
  - The below ground infrastructure sector and the above ground infrastructure sector
  - The public sector and the private sector

Put simply, the water world has this free heat energy supply available, but they do not really have uses for it. The buildings world has uses for the energy but doesn't know where it is located or how much there is available. Energy policy planners typically ignore it in their planning processes.

## Energy planning

In order to connect different sectors, energy planning is of great importance. Despite lack of energy planning practices in many economies across the Asia Pacific region, there are some good examples where municipalities have taken own initiatives to have heating and cooling plans up-to-date.

When conducting energy planning, a holistic approach shall be applied, aiming for systemic efficiency, including integration to urban systems such as wastewater infrastructure. Taking departure from energy efficiency and energy conservation, utilisation of local resources is the natural next step followed by system integration. Wastewater utilisation for heating and cooling purposes falls under both local resources and system integration. Applied Energy and NXITY have conducted numerous energy plans across the region, working for utilities and local government agencies.

## Capacity building and awareness rising

In collaboration with the APUEA Academy, Applied Energy and NXITY provides training on energy planning and wastewater heat recovery for heating and cooling purposes. The capacity building activities comprises both professional training for municipalities and planners, as well as vocational training in collaboration with academia.

## How do we start using this free heat?

So how do cities integrate wastewater heat energy into their policies and planning? The first step is mapping the heating/cooling capacity within the wastewater networks. A wastewater network heat map makes this invisible heating/cooling visible. With this information, policy makers have another energy resource available for them to integrate into planning policies. If this information is made available on a web-map, the private sector and building designers will all be able to see how much heating/cooling energy is available within the wastewater network and how it is distributed throughout the city. And this heating/cooling energy and the collection infrastructure is available today, time is not a constraint to utilize it.

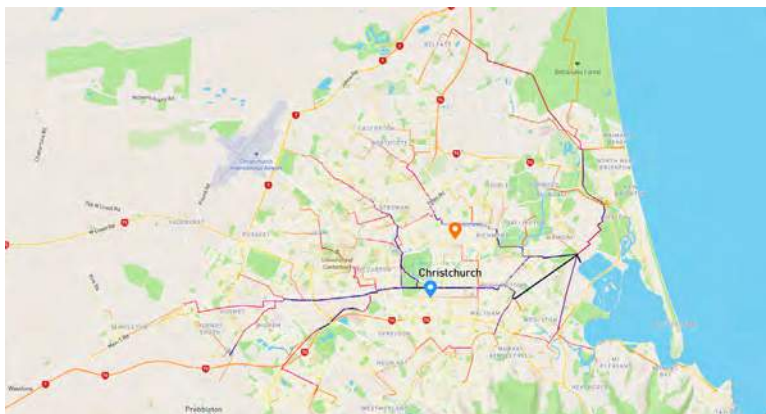
The Water Research Foundation Report '[State of the Science and Issues Related to Heat Recovery from Wastewater](#)' says this about wastewater network heat mapping: "**The mapping process is an essential tool for policy makers. It allows the governing community and the developer community to conceptualize the resources available and how to connect them to needs.**" Heat maps provide a bridge between the different sectors described above, no matter what language you speak.

Recently an information portal has been launched to provide easy to understand information about wastewater heat recycling, and to provide a global webmap to display wastewater network heat maps. The portal is at [wastewaterheat.online](http://wastewaterheat.online) Currently there are three cities with wastewater network heat maps displayed and these cities are all located in New Zealand. This information can and should be generated for every city.



The costs involved in heat mapping a city wastewater network are normally not expensive and the value the resulting information offers is very large. The network of companies behind this portal include people based in Asia and they can provide wastewater network heat mapping services for cities in Asia, as well as providing training/capacity building and technical support.

'Below are shown snips from Dunedin city (which does have a wastewater network heatmap) showing an example of the available heat within a wastewater pipe, 4.7MW in this example.'



The portal has dedicated information pages for energy policy makers, building designers and wastewater utilities, to help each of these sectors with their specific needs. There is also a selection of 27 case studies from around the world, to show a range of actual operating buildings already using wastewater heat recycling.

## What are good opportunities for wastewater heat recycling?

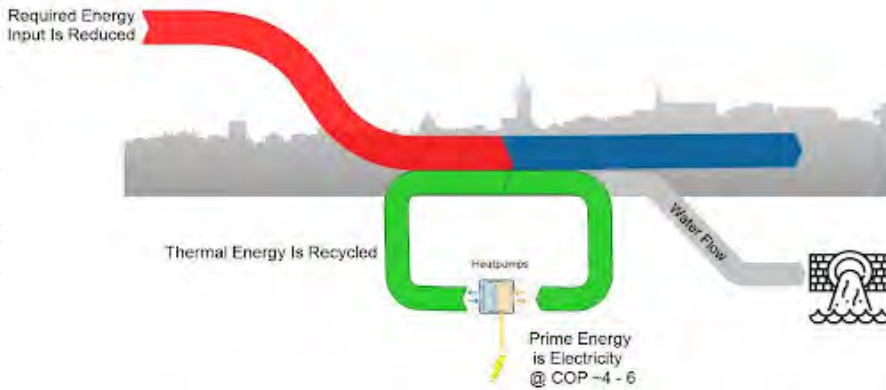
Generally, wastewater heat recycling is suited to projects with some scale such as larger commercial buildings, industrial processes and district heating systems for precincts, campuses or multiple houses.

As guidance, the following generalizations can be made for what are likely to be good opportunities for using wastewater heat recycling:

- Installations into new buildings are more cost effective than retrofitting into existing buildings.
- A large installation is more cost effective than a small installation. E.g. a large building such as a hospital, swimming pool centre or large retail mall is normally more financially feasible than a small office building. Equally a single wastewater thermal energy centre which provides heating/cooling via a small-scale district energy system to a number of buildings (in a city block or a campus) is normally more financially feasible than each building providing their own small wastewater heat recycling installation.
- Installations with long utilization periods are more feasible than projects with short utilization. For example, buildings such as hospitals, swimming pool centres or some industrial facilities have a demand for heating and/or cooling all year around and so the thermal system is fully utilized for 12 months per year. This makes a much better business case than a building which requires heating and/or cooling only for only a few months of the year.
- If a city is planning to renew existing wastewater pipes or install new wastewater networks, that is the time to plan ahead and install access points into the wastewater network to allow the heat energy within the wastewater to be recycled. Perhaps the energy might not be used for some years, but if the access is already easy it is more likely to happen and it is significantly more cost effective to install access points while the wastewater network is anyway being constructed than coming back later and retrofitting access points.

What about maintenance costs? The routine maintenance needed for the specialised wastewater energy equipment varies from one equipment supplier to the next, but in general terms the amount of maintenance needed is similar to other normal commercial building HVAC plant or wastewater equipment. Typically, commercial HVAC equipment should all have a minor service every 3 or 6 months (depending on equipment supplier) and a 12 monthly annual service. It is the same for wastewater energy equipment.

When buildings capture and recycle wastewater heat using heatpumps, it allows them to stop burning fossil fuels to make heat and electrification of heating for more buildings can be achieved using less electricity (so helping manage the growing demands on the electrical infrastructure). Win/Win/Win for the environment, the buildings and electrical authorities.



## Don't throw out the clean energy with the dirty water!

There is an old saying in English that goes "Don't throw the baby out with the bathwater", which means 'Don't discard something valuable along with something undesirable'

This saying fits perfectly with wastewater heat recycling. The water may be dirty, but the heat energy within it is clean!



NXITY, with offices in Thailand, China and Sweden, provides project development, implementation and optimization services for District Energy, Thermal Power and Sustainable City developments. NXITY is engaged by cities, utilities, investors and solution providers across the region, empowering client and project organizations by adding value, filling management and engineering gaps, and providing quality assurance along the entire project value chain. Contact: John Jakobsson, Managing Director, NXITY Energy ICT Solutions [john.jakobsson@nxity.com](mailto:john.jakobsson@nxity.com)

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



Applied Energy span the sectors of Buildings/Water/Energy and bring them all together under the common umbrella of Sustainability. Our origins are in New Zealand but our perspective and network is global. At Applied Energy, we do not try to do everything. We prefer to focus on what we are passionate about. Because we are focused in this way, we offer specialist expertise which is rare. Our special expertise is mapping and planning for the recycling of wastewater heat for heating/cooling buildings, industrial processes or district heating/cooling. We are one of the founders of [wastewaterheat.online](http://wastewaterheat.online) and we have been selected as an ambassador for the European ActionHeat programme (notably we are the only ambassador who is not based in Europe). Contact: Nick Meeten, Managing Director [nick@appliedenergy.co.nz](mailto:nick@appliedenergy.co.nz)

[www.appliedenergy.co.nz](http://www.appliedenergy.co.nz)



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

**NXITY**   
**SERVICES**



### PROJECT MANAGEMENT

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



### BUSINESS CONSULTING

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



### ENERGY ICT SOLUTIONS

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



#### GREENFIELD

Developing optimal energy schemes by localizing international best practises



#### BROWNFIELD

Developing efficient energy schemes suitable to meet old and new requirements



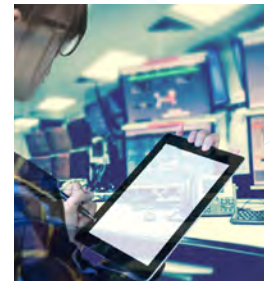
#### EXPANSION

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



#### OPTIMIZATION

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



#### MODERNIZATION

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

ADDING VALUE

FILLING THE GAPS

QUALITY ASSURANCE

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



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

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

# RECENT APUEA ACTIVITIES

So far in 2022, APUEA has hosted, supported, and participated in five webinars including the Energy Efficiency Day 2022 (The Philippines), Clean Tech Opportunities in Thailand, District Cooling Systems at Indonesia's New Capital City "Nusantara", India Smart Utility Week, and Fostering Health and Wellness of Buildings Today. More details about these events can be found in the sections below.



## ENERGY TRANSITION'S FIRST FUEL - ENERGY EFFICIENCY DAY 2022

**Energy Transition's FIRST FUEL**  
Energy Efficiency Day 2022  
APRIL 20 - 21, 2022  
1-5:30 PM PHT (GMT+8)

**Speakers:**

- Sen. Carlos G. Domingue, Department of Energy, Climate Change Commission (CEC)
- Sen. Wm Galambos, Chairman, Committee on Energy, Senate of the Philippines
- Asst. Govt. Silvano, Royal Danish Embassy Manila
- Amy Kelly Wilton-B. Farnsworth, Senior Undersecretary, Department of Energy (DOE)
- Ma Corason Halli Debesa, Exec. Director, Industry Development Services, Board of Investments (BOI)
- Dr. Prithwita Wisawanta, Chief of Energy Sector, Central Asian Development Bank (CADB)
- Melanie Stale, Senior Program Manager, International Energy Agency (IEA)
- Peter Lundberg, Executive Director, Asia Pacific Urban Energy Association
- Michael Linder, Technology Analyst, Research Unit of Advisory and Climate Action Development, Energy, Industry, Innovation and Technology
- Dr. Svenn Lützen, Chair, Global DECENetwork
- John Robert Cotton, Senior Program Manager, Southeast Asia Energy Association (SEA-EA)
- Alexander Albers, President, Philippine Energy Efficiency Alliance (PE2)

**Gold Sponsors:** Climacore, CONCEPCION-CARRIER, DAIKIN, Shell

**Event Partners:** GLOBE EVENTS, Build PH

**Bronze Sponsors:** HI-COOL, AMERICO, ASERV, UGEP, WESTCO

**Supporting Organizations:** ADVANTAGE ALUSTON, APUEA, ECCP, MAP, BSC, APEIA

APUEA was a supporting partner of the Energy Efficiency Day 2022 hosted by the Philippine Energy Efficiency Alliance (PE2), 20-21 April. Launched in April 2021, the Energy Efficiency Day celebrates the anniversary of passing the EE&C Act in the Philippines by raising multi-sectoral awareness of the new law, and the need for the increased and accelerated compliance of all sectors, especially during the summer months of April-June, when power sector reserves are critically low.

This year's theme is "Energy Transition's First Fuel" aimed to remind all sectors about the importance and potential of Energy Efficiency in the clean energy transition. While Renewable Energy gets a lot of attention and investment the potential for Energy Efficiency is huge in the Philippines and it is important to remember that decarbonizing the energy sector requires both scaling up Renewable Energy but also Energy Efficiency. The "first fuel" term for Energy Efficiency was echoed by IEA's Fatih Birol during the World Economic Forum in January 2022. APUEA also contributed to the event with a presentation by Executive Director, Peter Lundberg on the topic "Meeting the growing cooling demand in ASEAN with District Cooling".

### 20 April 2022, Technical Session II - Sustainable Cooling

TIME	ACTIVITY
	<b>Moderator:</b> Colin Steley, Member, PE2 Policy Committee
15:35 - 15:55	<b>Meeting the Growing Cooling Demand in ASEAN with District Cooling</b> Peter Lundberg, Executive Director, Asia Pacific Urban Energy Association
15:55 - 16:15	<b>Achieving Energy Efficiency through Carrier's AdvanTEC Solutions</b> Niño C. Falamig, Head, Service AdvanTEC Operations, Alstra Climate Control Solutions, Concepcion-Carrier Air Conditioning Co.
16:15 - 16:35	<b>Pushing the Efficiency Boundaries of Variable Refrigerant Flow Systems</b> Wesley Andre Chu, Deputy Division Manager, Daikin Airconditioning Philippines
16:35 - 16:55	<b>Q&amp;A / Open Forum</b>



HOSTED BY: **APUEA** **INDONESIA** **ELECTRIC & POWER INDONESIA** **BUILDING SYSTEMS & AUTOMATION** **RUGGED MONITORING**

ENERGY TALK IS PART OF:

SPONSORED BY:

**ENERGY TALK SERIES 13**

# DISTRICT COOLING SYSTEM AT NEW CAPITAL CITY (IKN) NUSANTARA

17 MARCH, 2022  
14.00-16.30 JKT TIME



**KEYNOTE**  
**LUH NYOMAN PUSPA DEWI**  
Director of Energy Conservation, Director General of New Energy, Renewable Energy & Energy Conservation - Ministry of Energy & Mineral Resources RI

**WELCOME REMARKS**  
**EDDIE WIDIONO**  
Founder of Indonesia Smart Grid Initiative (ISGI)

**WELCOME REMARKS**  
**PETER LUNDBERG**  
Executive Director Asia Pacific Urban Energy Association (APUEA)

**SPEAKER**  
**DINDA ALAMSYAH**  
Vice President Power Plant Asset Management State Electricity Company - PT PLN (Persero)

**SPEAKER**  
**FAJAR EKO ANANTO**  
Upstream Operations Officer International Finance Corporation (IFC) - World Bank Group

**SPEAKER**  
**DE NANGSI HARIYANTO**  
Head of Electric Power System (EPS) IIR and Co Deputy Chairman of IIR and Task Force team of aspects on infrastructure development in Indonesian Capital City - Nusantara

**SPEAKER**  
**MOHIUDDIN SHAIKH**  
Technical Manager - Qatar Cool

**SPEAKER**  
**RANA YUSUF NASIR**  
Vice Chairman of Expert Board of Masyarakat Konservasi dan Efisiensi Energi Indonesia (MASKEEI)

**MODERATOR**  
**FATHOM SAULINA**  
President of SANA Total Energy Management (SOTEM)

This webinar is part of: Pamerindo Sustainability Programme.

**Free Registration:** [bit.ly/ET13Registration](https://bit.ly/ET13Registration)

## AGENDA

### Welcoming speakers:

- Peter Lundberg, Head of Operations, APUEA
- Eddie Widiono, Founder and Supervisory Board of PJCI and Director of State Electricity

### Keynote Speaker:

- Dr. Ir. Dadan Kusdiana M.Sc, Director General of New, Renewable Energy & Energy Conservation Ministry of Energy and Mineral Resources RI\*

### Session Speakers:

- Dinda Alamsyah, VP Power Plant Asset Management State Electricity Company / PT PLN (Persero)
- Fajar Eko Ananto, Upstream Operation Officer - International Finance Corporation (IFC)
- Habibie Razak, Expert Staff of Task Force for the Implementation of Infrastructure Development for the New National Capital/ Staf Ahli Satu Petugas Pelaksanaan Pembangunan Infrastruktur Ibu Kota Negara baru Nusantara (IKN)
- Mohiuddin Shaikh, Technical Manager, Qatar Cool
- Rana Yusuf Nasir, Chairman of Masyarakat Konservasi dan Efisiensi Energi Indonesia (MASKEEI)

### Moderator:

- Fathom Saulina, Clean Energy Enthusiast / Project Management Professional PT Sketsa Aliansi Kharisma Abadi

## DISTRICT COOLING SYSTEMS AT INDONESIA'S NEW CAPITAL CITY "NUSANTARA"

On 17 March, APUEA co-hosted the webinar titled "District Cooling Systems at Indonesia's new capital city, Nusantara in collaboration with Smart Grid Indonesia Initiative (PCJI) and Pamerindo Indonesia. Indonesia has a population of 273 million and the highest GDP among ASEAN countries. With a growing economy, and an increasingly warmer climate, the cooling demand in Indonesia is rising. Despite its tropical climate Indonesia has a low utilization rate of ACs (9%), compared to neighboring countries like Singapore (79%) and Malaysia (79%). Indonesia also has a growing urbanization rate, and the government plans to build a new capital in Borneo. District Cooling Systems (DCS) offers up to 50% savings in energy consumption and is suitable to use in urban areas with high energy density in hot climate zones. DCS can be a vital solution to mitigate energy consumption and reach climate targets in Indonesia and the ASEAN countries.

Indonesia is currently in the process of changing its capital from Jakarta to a new, purpose-built site named Ibu Kota Negara baru Nusantara (IKN). These changes may well be a long-awaited momentum in planning a more energy-efficient national capital in the country, and one way of achieving this is to utilize more efficient and greener cooling systems. The location of the new capital is on the island of Borneo with an average of 26 degrees celsius during wet seasons and around 36 degrees during drier ones. The new capital is expected to become a new market hotspot for Air Conditioning and District Cooling systems. With climate change in hand, designing a climate-resilient, greener, and more carbon-free city should become the main concern in constructing new cities (especially a new capital).



RE-WATCHED WEBINAR HERE:

[District Cooling Systems at Indonesia's New Capital City "Nusantara"](https://bit.ly/ET13Registration)



## CLEANTECH OPPORTUNITIES IN THAILAND

On 24 March, APUEA co-hosted the webinar titled "Cleantech opportunities in Thailand" together with the Royal Danish Embassy in Thailand, Energy Cluster Denmark (ECD), Danish Board of District Heating (DBDH), and NXITY. The webinar focused on how Danish cleantech providers can get involved in Building Energy Efficiency, Industrial Energy Efficiency, and District Cooling projects in Thailand.



## WEBINAR CLEANTECH OPPORTUNITIES IN THAILAND

Industrial and Building Energy Efficiency, and District Cooling opportunities for Danish cleantech service and solution providers

Explore cleantech market opportunities in Thailand with a focus on Building Energy Efficiency, Industrial Energy Efficiency, and District cooling. Based on the findings from market research conducted by consulting firm NXITY, participants will get a comprehensive overview of the selected cleantech areas in Thailand and its trends, introduction to potential project opportunities, and hear from potential partners in the local market.

HOSTED BY



EMBASSY OF DENMARK  
Bangkok

energy CLUSTER DENMARK



DBDH

APUEA  
Asia Pacific Urban Energy Association

Moderated by  
**Peter Lundberg**  
EXECUTIVE DIRECTOR OF APUEA

Mikael Jakobsson  
CEO OF NXITY



24 March 2022

08:30 - 10:30 / DK TIME



**SIGN UP NOW**

SIGN UP BY SENDING AN E-MAIL  
TO [BKKAMBTC@UM.DK](mailto:BKKAMBTC@UM.DK)



APUEA was a supporting partner to the 8th edition of the India Smart Utility Week 2022 which was held virtually from 2-4 of March 2022. On March 4th, APUEA's Executive Director hosted a round table discussion on the topic "Roundtable 5 - ADOPTION OF DISTRICT COOLING SYSTEMS IN INDIA".



RE-WATCHED WEBINAR HERE:  
India Smart Utility Week 2022



The India Cooling Action Plan (ICAP) includes targets to increase the energy efficiency of equipment to reduce the cooling demand by 25-30% by 2037-38. However, due to the growing cooling demand in the country, this target is likely to be missed due to the increase in the number of air conditioners. The growing cooling demands in India are caused by economic development, but also the climate change which leads to a warmer climate, and extreme heat with summer temperatures at nearly 50°C. High temperatures are already affecting people's ability to work, and health, especially in low-income communities with no access to cooling.

There is an urgent need for innovative solutions to address the growing cooling demand in India, and District Cooling System (DCS) offers many benefits compared to conventional cooling systems, including high efficiency, low environmental impact, reduced need for installed capacity, low life-cycle costs and are scalability. District energy systems are being successfully implemented in many parts of the world has evolved as a matured technology. This session discussed the potential of District Cooling in an Indian context, and how it presents an opportunity to address the space cooling challenge in the country.

**AGENDA: ROUNDTABLE 5 - ADOPTION OF DISTRICT COOLING SYSTEMS IN INDIA**

**Welcome Address:** Reji Kumar Pillai, President, India Smart Grid Forum

**Inaugural Address:** Kunal Kumar, Joint Secretary, Ministry of Housing and Urban Development

**Chair:** Arijit Sengupta, Director, Bureau of Energy Efficiency

**Moderator:** Peter Lundberg, Executive Director, APUEA

- Panelists:**
1. Rajeev Sharma, VP Engineering & Construction, GIFT City
  2. Ritika Jain, Senior Program Manager - Energy Efficiency, Shakti Foundation
  3. Ganesh Das, Chief Collaboration, Innovation and R&D, TPDDL
  4. Markus Wypior, GIZ
  5. Vikram Murthy, Chair-Districting Cooling, ISHRAE
  6. Rahul Agnihotri, Coordinator, UN Environment, District Energy in Cities Initiative
  7. Prameet Gupta, Lead, Business Development India, Tabreed



**FOSTERING HEALTH AND WELLNESS OF BUILDINGS TODAY**

On 24 February, APUEA's Executive Director, Peter Lundberg participated in the webinar titled "Fostering Health and Wellness of Buildings Today" hosted by the International Real Estate Federation (FIABCI). The session included presentations and discussions on the topic from three speakers:

- Holger Adam | Head of Real Estate Development, Clifton Homes | Ghana
- Peter Lundberg | Executive Director, Asia Pacific Urban Energy Association (APUEA) | Thailand
- G.J. Teunissen | Consultant, TRAJECT Adviseurs & Managers | The Netherlands



RE-WATCHED WEBINAR HERE:  
Fostering Health and Wellness of Buildings Today







# EVENT CALENDAR



## FOCUS EVENT

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



# 15-16

LIVE EDITION

SEP 2022

📍 Bangkok, Thailand

## APUEA EVENTS

25  
MAY

### EV CHARGING INFRASTRUCTURE ECOSYSTEM IN INDONESIA

WEBINAR (Co-hosting organization)

📅 25 MAY 2022

26  
MAY

### INDUSTRIAL ENERGY EFFICIENCY CHINA, WEBINAR

(Co-hosting organization)

📅 26 MAY 2022

7  
JUNE

### DISTRICT COOLING: ACCELERATING VIETNAM'S TRANSITION TOWARDS A SUSTAINABLE GROWTH WEBINAR (Co-hosting organization)

📅 7 JUNE 2022

9  
JUNE

### SMART DISTRICT COOLING CHINA WEBINAR

(Co-hosting organization)

📅 9 JUNE 2022

14 - 17  
JUNE

### ASIA CLEAN ENERGY FORUM WEBINAR

(Co-hosting organization)

📅 14 - 17 JUNE 2022

21  
JUNE

### ACCELERATING DISTRICT COOLING DEVELOPMENTS IN THAILAND WEBINAR (Co-hosting organization)

📅 21 JUNE 2022

## APUEA SUPPORTED EVENTS

24 - 26  
AUGUST

### MAINTENANCE, INDUSTRIAL, ROBOTICS, AND AUTOMATION MIRA

Pattaya, Thailand (Supporting organization)

📅 24-26 AUGUST 2022

07 - 09  
September

### HVACR VIETNAM

Ho Chi Ming City, Vietnam

(Supporting organization)

📅 07-09 SEPTEMBER 2022

14 - 16  
SEPTEMBER

### ASEAN SUSTAINABLE ENERGY WEEK

(Conference partner)

📅 14-16 SEPTEMBER 2022

14 - 17  
SEPTEMBER

### ELECTRIC & POWER INDONESIA

Jakarta, Indonesia

(Supporting organization)

📅 14-17 SEPTEMBER 2022

08 - 10  
NOVEMBER

### ASEAN SUPER 8

Kuala Lumpur, Malaysia

(Supporting organization)

📅 14-17 NOVEMBER 2022

22 - 24  
MARCH

### PHILENERGY

Manila, The Philippines

(Supporting organization)

📅 22-24 MARCH 2023





# MEMBER DIRECTORY

## PREMIUM MEMBERS



ABB



Engie



Johnson Controls



Keppel DHCS

## MEMBERS



International District Energy Association (IDEA)



NXITY



Alliance to Save Energy



Qatar Cool



China District Heating Association (CDHA)



Danish Board of District Heating (DBDH)



Northeast Clean Energy Council (NECEC)



IVL Swedish Environmental Research Institute



District Energy in Cities Initiative



DEVCCO



Thai ESCO Association



Overseas Environmental Cooperation Center (OECC)



Institute for Sustainable Energy Policies



tabreed



Chongqing Renewable Energy Society



Tera



Kamstrup



SIVECO China



Fengxi New Energy



Euroheat & Power (EHP)



Alliance for an Energy Efficient Economy (AEEE)



Asia LEDS Partnership



Black and Veatch



KJTS Group

## PARTNERS AND SUPPORTING ORGANIZATIONS

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



# APUEA REGISTRATION FORM - MEMBERSHIP

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

You can print out your registration  
and entry form below.



## 1 ORGANIZATION / COMPANY DETAILS:

Organization name.....

Marketing name and/or Abbreviation.....

Street .....

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

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

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

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

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

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

Association / Federation

Manufacturer / Equipment Supply

NGO

Utility / Operator

Academic

Media company - Press / Journalist / Advertisement

Advisor - Financial / Legal / Banking

Building Sector

Consultancy - Engineering / Design / Technical

Other

Specify:.....

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

Billing Address:.....

.....

.....

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

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

## 5 PAYMENT METHOD:

Bank Transfer

Credit Card

Paypal

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

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



# APUEA

Asia Pacific Urban Energy Association



## APUEA Magazine

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