

APUEA

Magazine

FUTURE CITIES



APUEA

Asia Pacific Urban Energy Association

Promoting Sustainable Urban Energy in Asia Pacific



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Editorial

Mikael Jakobsson

Executive Director,
Asia Pacific Urban Energy Association (APUEA)

IEA's Global Energy Review 2021, released in April 2021, suggests that the energy demand in 2021 will be 0.5% above the 2019 level and the CO₂-emissions 1.2% below the 2019 level, while the global economy is expected to have its largest post-recession recovery in 80 years. Despite this relatively good news, there are challenges ahead, and we have to speed up our climate actions to combat climate change.

Despite the ongoing endurance race against covid-19, economies across the Asia Pacific region take action and keep working towards carbon neutrality. Recently, Indonesia announced its ambition to start phasing out coal-fired power plants and become carbon neutral by 2060. A carbon tax is expected to be introduced in the coming years to support the transition towards carbon neutrality.

China is serious with its 'Double Carbon'-targets, reaching a carbon peak at 2030 and carbon neutrality by 2060. The national carbon market is days from being launched. We already see actions from provincial and municipal governments, and the Beijing District Heating Group has reached out to APUEA members for support with their 'Double Carbon Development Plan'. Furthermore, industrial parks and individual industries have significantly increased their focus on energy conservation, energy efficiency, and the integration of renewable energies.

Since the establishment of APUEA in 2017, our focus has been on promoting the development of sustainable and integrated urban energy systems, including district cooling, district heating, and multi-energy systems. Integrated urban energy systems are crucial to unlocking the potential in energy symbiosis, comprehensive energy efficiency, and supporting decarbonization and electrification of multiple sectors for sustainable cities.

The World Economic Forum (WEF) suggests a holistic approach for net-zero carbon cities defined as "systemic efficiency", including clean electrification, smart digital technology, and efficient buildings and infrastructure, along with a circular economy approach to water, waste, and materials.

The United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) and United Nations Environment Programme (UNEP) launched the Integrated Urban Systems Partnership in 2020, working on an integrated approach to urban infrastructure development seeking to optimize the synergies between energy, transport, building, and other sectors.

Being a member of both WEF's energy community and ESCAP and UNEP's Integrated Urban Systems Partnership, APUEA contributes with insights into the regional developments and know-how related to sustainable integrated urban energy systems.

Following the launch of APUEA Academy, we are glad to announce that Pune city (India) is the first out to benefit from our capacity-building activities. APUEA will provide capacity building on District Cooling Programme Management for Pune Municipal Corporation and related government agencies, in collaboration with Energy Efficiency Services Limited (EESL), Asian Development Bank (ADB), Overseas Environmental Cooperation Center of Japan (OECC), and the Heat Academy.



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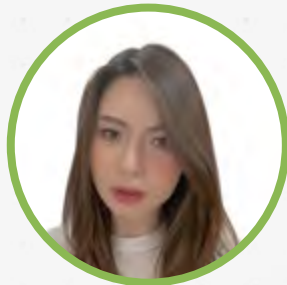
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ASIA PACIFIC URBAN ENERGY ASSOCIATION



APUEA

Asia Pacific Urban Energy Association

For more information about APUEA and how to become a member, contact info@apuea.org

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

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



ASIA PACIFIC URBAN ENERGY ASSOCIATION MEMBERSHIP



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

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

PREMIUM MEMBER

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

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

CORPORATE MEMBER

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

AFFILIATE MEMBER (Invitation only)

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

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

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

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SOUTHEAST ASIA'S CITIES CENTRAL TO DECARBONIZATION FIGHT

By Mitesh Patel, Black & Veatch and Yatin Premchand,
Black & Veatch Management Consulting



Mitesh Patel

Business Development Director and
Associate Vice President, Renewable
Energy, Asia, Black & Veatch



Yatin Premchand

Managing Director - APAC,
Black & Veatch Management
Consulting, LLC

SOUTHEAST ASIA nations are expanding renewable energy generation to ensure their power systems remain reliable, accessible and sustainable. One opportunity is to integrate renewable energy into urban energy systems.

Cities are central to decarbonization efforts. Globally, the United Nations (UN) Habitat estimates that while cities occupy less than two percent of the Earth's surface, they consume over three-quarters of the world's energy and produce over 60 percent of greenhouse gas emissions. The UN forecasts that another 2.5 billion people will reside in urban areas by 2050. Worldometer data indicates that currently half of Southeast Asia's population of 673 million is urban.

Key factors that cities will need to consider when deploying large-scale renewable energy include the availability of natural resources, land and project financing, and dense urban landscape.

Working with these considerations, many cities have turned to renewable energy technologies, such as rooftop and floating solar systems, to solve their challenges creatively.



BLACK & VEATCH



Indonesia, for instance, is developing rooftop solar power systems to meet its renewable energy mix target. The country is targeting buildings and facilities of State-Owned Enterprises, industry and business, households, state electricity corporation PLN's customers and social groups and government buildings.

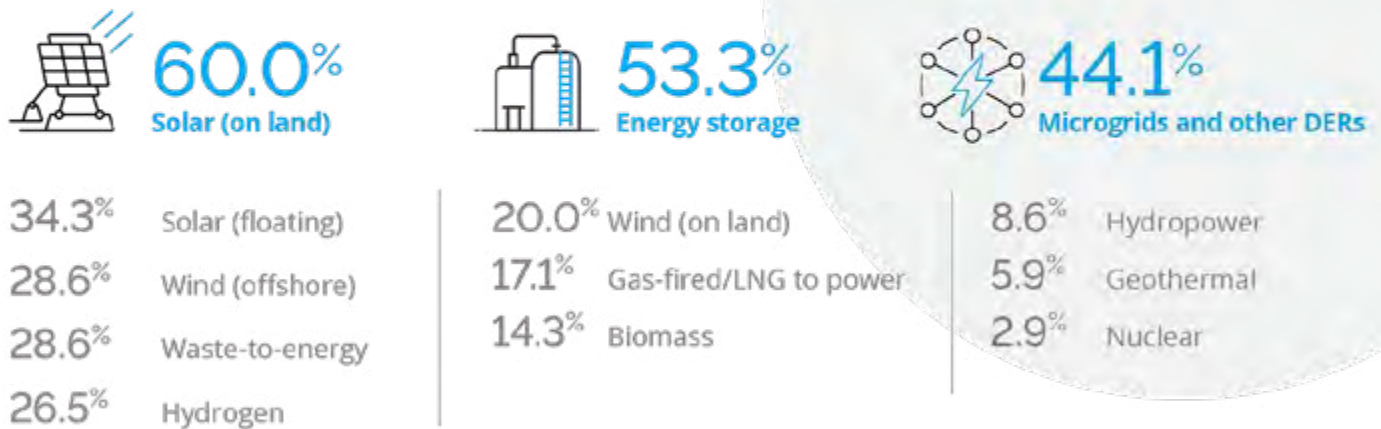


Vietnam has connected over seven gigawatts (GW) of rooftop solar capacity to the national power system. More than 100,000 rooftop solar systems have been deployed over residential, commercial and industrial premises across the country.



Meanwhile, Singapore is installing a 60 megawatt-peak (MWp) floating solar photovoltaic (PV) system on Tengeh Reservoir. When the project begins full commercial operations, the amount of clean energy generated will be sufficient to power national water agency PUB's local water treatment plants, offsetting seven percent of the agency's annual energy needs.

Those who identified 'much more investment' when asked, how do you expect new generation capacity investments to change over the next five years across categories.



Source: Black & Veatch

RENEWABLE ENERGY INTEGRATION

According to [Black & Veatch's Strategic Directions: Electric Industry Asia 2021 Report](#), the most significant investment growth in new capacity over the next three to five years is expected in renewable energy. Solar (land), energy storage, solar (floating), wind (offshore) and microgrids represent the top five categories.

Regional energy industry leaders cautioned that the introduction of too much variable renewable energy may threaten reliable grid operations and performance across Asian electricity markets.

To make renewable energy expansion possible, cities will need more integrated solutions across generation, transmission and distribution; as well as the expansion of gas-fired generation and energy storage, to improve grid efficiencies and stability. In the longer term, integrating hydrogen to support baseload generation will be critical.

Survey results show that [gas, often seen as a bridging fuel, will serve as baseload generation to stabilize the grid alongside an expected increase in battery energy storage system deployment.](#)

A significant part of the challenge posed by renewables lies in managing solar and wind's variable generation. When production is too high across multiple renewable energy sources on the grid, the risk of transmission congestion means grid operators mandate a curtailment of production. This leads to a loss of energy (and revenue) at renewable energy facilities.

Integrating ancillary technologies, like [energy storage systems, with renewable energy is one approach to increase efficiencies and reduce lost revenues.](#) Battery energy storage systems (BESS) captures excess energy and enable it to be sold back to the grid when energy demands are high and supply is limited. Selling the energy when the value of electricity is at a premium could generate greater revenue for the producer.

Renewable energy generation assets can also be built or repurposed to power electrolysis to create hydrogen.



IMPROVING OPERATIONAL EFFICIENCIES

With multiple moving parts in a regional energy transition increasing grid management complexities, investing in digital transformation will be crucial to improving operational efficiencies.

Dynamic load balancing technology, for example, will help to match power generation with consumption as the region faces supply intermittency due to increased variable renewable energy and Distributed Energy Resources (DERs) in the grid. Renewable energy installations and energy storage technologies are examples of DER. The dynamic load balancing technology will help to ensure grid resilience as load characteristics change.

Another approach that will help Southeast Asia meet its energy transition goals is Asset Performance Management (APM). One opportunity is to integrate APM software with existing building management systems (BMS) that are already embedded in operational and maintenance processes. This integration will provide asset owners with a deeper understanding of their asset portfolio's operational efficiency.

In turn, the ability to forecast equipment failure can provide a level of certainty that reduces operational risks and improves returns.

The ability to process, analyze and forecast the different possibilities that could occur will be critical to Southeast Asia's energy transition success. The industry will need partners familiar with every aspect of the lifecycle of generation, transmission and distribution assets. Such partners also need to be experts in integrating these assets – especially storage – to create a stable, efficiently functioning whole. The best partners will be able to marry technical expertise with the ability to navigate and influence regulations and advise on investment strategies along each point in the asset lifecycle.

Black & Veatch is an employee-owned engineering, procurement, consulting and construction company with a more than 100-year legacy of innovation in sustainable infrastructure. The company provides a full range of infrastructure lifecycle solutions, scaled and adapted for our clients in Asia.

Trusted for decades across the region, we are known for delivering safe, reliable and integrated generation, transmission and distribution solutions. Matched with agile delivery adapted to local markets, we bring the right experience at the right time from across our organization, resulting in higher quality outcomes, schedule certainty and cost control.

Our regional team, backed by global resources, helps clients stay ahead in times of change and embrace the energy transition, digitalization, and innovative technologies that create commercial success and a sustainable future.

The company's global power business offers new and operating asset services, as well as full engineering, procurement and construction (EPC).

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DISTRICT COOLING IS NOT AN INDULGENCE, IT IS A NECESSITY

BY MOHANNAD KHADER, COMMERCIAL & DEVELOPMENT DIRECTOR, QATAR COOL



Ever wondered what a city like Doha would look like if each building had its own individual diesel generator, producing electricity? Imagine a thick gray cloud hovering over the city, masking the daylight and causing an abundance of carbon dioxide pollution, putting Qatar's carbon footprint amongst the highest.



MOHANNAD KHADER

Commercial & Development
Director, QATAR COOL



AIR CONDITIONING IS NOT A LUXURY, IT IS A NECESSITY, THEREFORE DISTRICT COOLING NEEDS TO BE VIEWED AS A SERVICE TO THE SOCIETY AND NOT AN INDULGENT OPTION.

WHAT WAS CONSIDERED IN 2006 AS THEORIES WHEN DISTRICT COOLING COMMENCED IN DOHA, CAN NOW BE MEASURED AGAINST ACTUAL DATA, HELPING ANY DECISION MAKER TO FORM AN ACCURATE OPINION ABOUT THE VIABILITY OF DISTRICT COOLING IN A CLIMATE LIKE QATAR'S.

Unseen buildings and the constant presence of diesel tanks generating traffic and carbon dioxide and skyrocketing expenditures for operations, maintenance, and replacements. Unimaginable? The importance of power distribution companies is evident, and a necessity, particularly for real estate developers in the planning stage. Without power distribution companies our cities would be environmental threats decreasing the country's economy in the process.

Governments realize the importance of centralizing the power generation and distribution, therefore, the electrical power tariffs are subsidized, helping real estate developers and end users afford such services. Developers are not only required to connect to the power distribution, but they are also mandated to reduce the electrical power demand, reducing the load on the substations, and therefore optimizing the use of valuable natural resources. Research on the applicability of the renewable energy solutions such as solar and wind have undergone several experiments, yet district cooling remains on the sidelines for consideration. One of the means to reduce the electrical power demand in a city, is to use district cooling by generating the chilled water for air conditioning services. District Cooling is developing and advancing rapidly in the region. It is going through the same steps of electrical power evolution. One day, someone will ask a similar question to electrical power; what do you think a city like Doha would look like if each building had its own chiller or split unit?



It is worth analyzing the actual data surrounding the operations of a district cooling system to determine the cooling energy consumption, through the power consumption to generate the energy and the water required for operations. The data will reflect the energy consumption of a building using district cooling versus a building using conventional cooling. Review of such data would benefit the government's decision on whether district cooling is the optimum cooling service for the sustainability of the country, economic growth, and energy conservation.

If we look at the benefits in a macro level, gas consumption to produce the electrical power, which is as important as the micro level of cost of service for a building. The benefits outweigh the infrastructure costs of district cooling, there should be no hesitation to mandate district cooling for all dense areas with support in subsidizing the costs, like electricity and water. Air conditioning is not a luxury, it is a necessity, therefore district cooling needs to be viewed as a service to the society and not an indulgent option.

Conventional cooling would cost the government 300 million Qatari Riyal if it were used to produce 4 billion TR-HR, which was the cooling energy produced by Qatar Cool over the past twelve years. This equates to the emission of 1.6 billion KG of CO₂, which is the same as adding 300,000 cars to the roads. You would need 18 million trees to off-set the carbon emissions produced by conventional cooling.

What was considered in 2006 as theories when District Cooling commenced in Doha, can now be measured against actual data, helping any decision maker to form an accurate opinion about the viability of district cooling in a climate like Qatar's. We are confident that the numbers are in favor of the government, city urban planners, the environment, the economists, and the end users. District Cooling merits the support from all parties. With the recently announced approved draft law regulating the works and services of district cooling, district cooling may have the desirable opportunity to become a controlled and mandated for certain developments ensuring the implementation of sustainable technology and safeguarding Qatar.

Qatar Cool is the leading district cooling company's in Qatar. Since its inception, Qatar Cool has aimed for operational excellence in every aspect of its business. Over the past 18 years, the company has developed solid technical and operational experience and has refined its approach on both business-to-business (B2B) and business-to-consumer (B2C) fronts. Currently, Qatar Cool is the leading commercial provider of district cooling services in Qatar.

Qatar Cool currently owns and operates four cooling plants covering the West Bay and The Pearl-Qatar districts with the combined capacity of 237,000 tons of refrigeration.





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BY LIVING AND WORKING IN CITIES PEOPLE GENERATE HEAT IN THEIR DAILY LIVES, REFERRED TO AS URBAN HEAT SOURCES. THESE SOURCES ALONE COULD MEET 10% OF THE DEMAND FOR HEAT IN EUROPE BUT MERELY A FRACTION OF THEM IS SOURCED TODAY. LOW TEMPERATURE DISTRICT HEATING ALLOWS INCREASED COST EFFICIENCY IN USING RENEWABLE SOURCES FOR HEAT RECOVERY AND THEY ARE LOCALLY AVAILABLE IN ANY CITY.

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THE POTENTIAL OF RECOVERING WASTE ENERGY - CITY ACTIVITIES CAN BE USED TO GREEN THE CITY ITSELF

BY KRISTINA LYGNERUD

ENERGY DEPARTMENT MANAGER,
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The energy transition is global, but practical decisions boil down to the local level. This is why the work that cities do is so important, reflected by UN goal #11 of “Sustainable Cities and Communities” and different initiatives like the “100 Climate-neutral Cities by 2030 by and for the Citizens” launched by the EU in 2020. One important way forward is efficient climate goals with enlarged shares of renewables in the energy mix, active disinvestment plans for fossil-powered units, and increased energy efficiency (reflected, for example, in the ambitious Climate Plan of Copenhagen and the Sustainability Goals of Singapore). It is, however, not uncommon that goals are difficult to meet because existing legislation tends to be based on current operations rather than on facilitating new and future solutions.

One example is waste heat from different processes. In Europe, there is no consensus on how to assess or view waste heat, and there is no incentive scheme in place to harvest this valuable source of energy. It is not uncommon that waste heat investments compete with incentivized investments in renewables.

There is an ongoing urbanization worldwide, and it is predicted that 68% of the world population will live in an urban area by 2050¹. By living and working in cities, people generate heat in their daily lives, referred to as urban heat sources. These sources alone could meet 10% of the demand for heat in Europe², but merely a fraction of them are sourced today. Low-temperature district heating allows increased cost efficiency in using renewable sources for heat recovery³, and they are locally available in any city.

Just imagine the volumes of urban waste heat generated in megacities like Tokyo, Shanghai, and Dhaka. Is it not a shame that these cities are not using the heat generated by people living and working in them?



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“ ”

THE MAIN ADVANTAGE OF THE LOW-TEMPERED DISTRICT HEATING SYSTEMS IS THAT THEY ALLOW COST-EFFICIENT USE OF RENEWABLE SOURCES LIKE SOLAR, GEOTHERMAL, AND WASTE HEAT. IN COMBINATION WITH HEAT PUMPS INSTALLED, THEY CAN MEET BOTH HEATING AND COOLING DEMANDS IN NEW AS WELL AS IN EXISTING BUILDING STOCK.

In combination with reversible heat pumps, the urban heat sources can be used to meet desired temperature levels for heating and to supply cooling depending on what is in demand. If the heat pumps are run on green electricity, or possibly by solar directly⁴, it could be a match made in heaven. Apart from reduced usage of fossil fuels for heating and cooling, the volumes of inbound transport of fuels in urban areas can be reduced.

This March, a city-level competition ended; it was the Helsinki Energy Challenge where the city launched a competition for obtaining input on how to transform its current district heating system to a future system without replacing fossil fuels with biomass. The contestants were asked to generate solutions leapfrogging the step that conventionally has been efficient to district energy companies: the step of biomass.

I led a team, the CarbonHelSinki team⁵, which became a finalist in the competition. Our idea was to make use of all existing waste heat sources in the city and to harvest them when most efficient to do so by introducing seasonal heat storages. We built our solution around an energy system model of the city of Helsinki and presented a solution where coal was completely phased out by 2029, resulting in the annual CO₂ emissions of heat generation decreasing 15-fold, i.e., from above 2500 ktCO₂ in 2020 down to around 150 kt CO₂ in 2030. The Challenge was very interesting, and my team and I learned a lot during the way. One main key takeaway was that it is possible to make radical change within a decade and that waste heat is an important resource for future urban energy systems.

On April 21, there was a first agreement for a European climate law by the EU. This is great news and much needed for continuous work towards carbon neutrality. The EU foresees to be climate neutral by 2050, which is achievable if ambitious targets are met during the way like the revised EU 2030 reduction target of at least 55% for the EU carbon dioxide emissions. The new reduction target increases the required rate of reduction by more than five times compared to the previous 2020 target. Hence, in the nine years that come, there must be an increased activity for decarbonization.

This means that heat sources in cities become increasingly important. This summer, a book will be released on how to implement low-temperature district energy solutions. It has been co-authored by 17 international researchers under the umbrella of the International Energy Association's (IEA) district energy umbrella (IEA-DHC, Annex TS2).

In the book, answers are given on what to do on the building side, in the district energy system, and in terms of economy and competitiveness. Also, there are district heating cities that have already initiated their transition, both small and large ones like Gleisdorf with an urban population of 10,000 inhabitants and Munich with approximately 1.5 million inhabitants.

One common feature of the transition

cities studied in the book is that they work with low district network temperatures. The main advantage of the low-tempered district heating systems is that they allow cost-efficient use of renewable sources like solar, geothermal, and waste heat. In combination with heat pumps installed, they can meet both heating and cooling demands in new as well as in existing building stock.

The main barrier to low-temperature district energy implementation in cities is not technology. Rather, it is to combine stakeholders that do not usually work together in new configurations and to ensure that the cost of carbon is set at a level reflecting its true damage costs.

In sum, low-temperature district heating is a technology for a fossil-free future, and it is ready to be built today. For further information on the book, please contact me directly or view the IEA-DHC homepage³.

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1. www.un.org



2. Accessible urban waste heat, Deliverable 1.4, Reuseheat project, www.reuseheat.eu



3. Annex TS2, Implementation of low-temperature district heating systems, www.iea-dhc.org



4. www.sunhorizon-project.eu



5. www.energychallenge.hel.fi/carbonhelsinki



IVL Swedish Environmental Research Institute has a wide environmental profile. We combine applied research and development with close collaboration between industry and the public sphere. Our consultancy is evidence-based, and our research is characterized by interdisciplinary science and system thinking.

IVL was jointly founded in 1966 by the Swedish state and national business interests to carry out research on industrial air and water issues. Today we are an environmental agency concentrating on much more. Common to all of our assignments is the interaction between ecological, economic and social perspectives. We employ 300 engineers, behavioral scientists, chemists, marine biologists, biologists, political scientists, journalists, business developers and economists – to name only a few. We also possess exceptional specialist skills – a fourth of our employees have doctorates.

Our core values are credibility, foresight and a holistic perspective. Our vision is a sustainable society. We are pushing the transition to a sustainable society by taking science to society, turning environmental problems into opportunities and bending linear processes into a circular economy.



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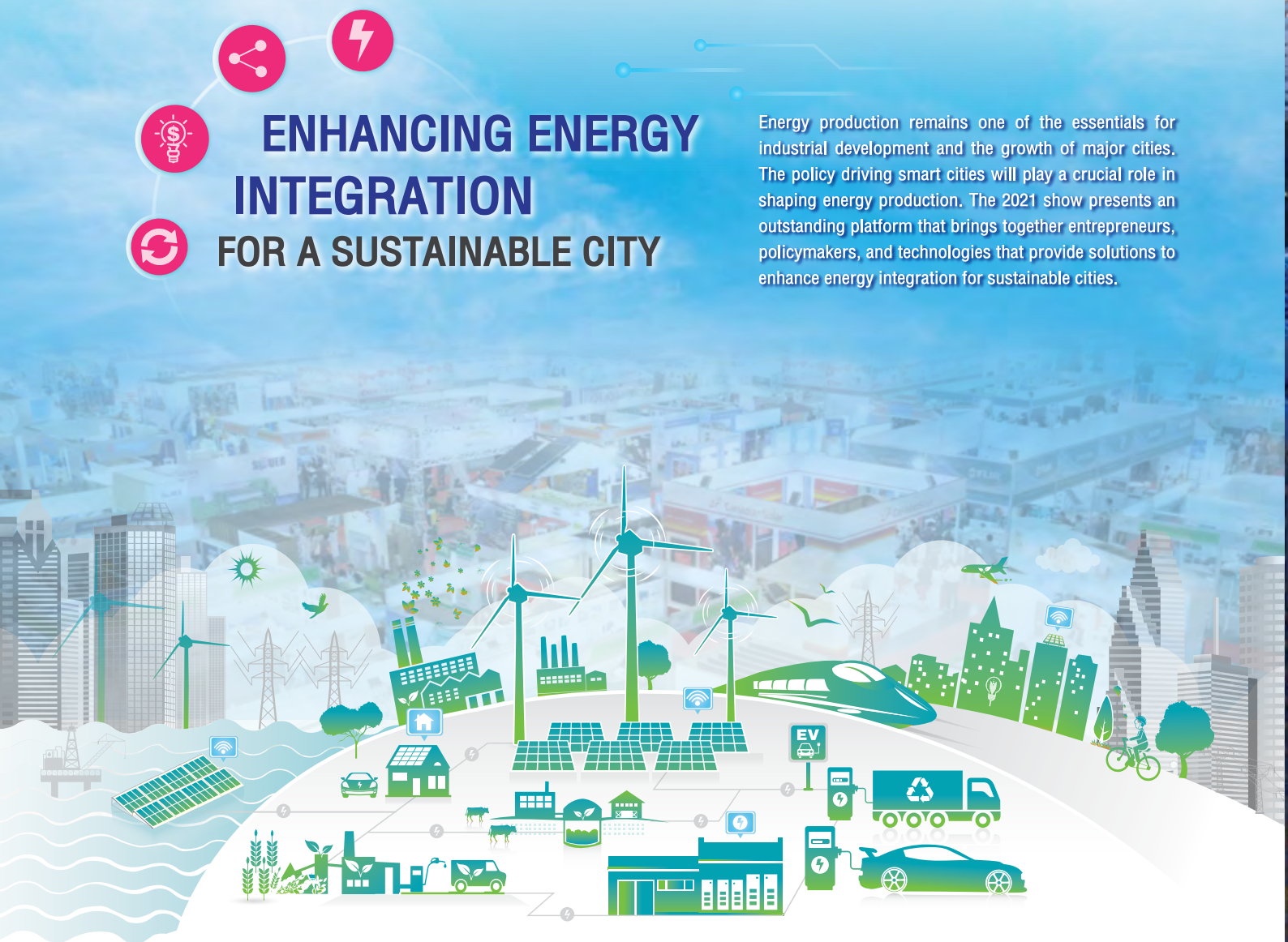


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🕒 11 - 12 November 2021 📍 Grand Mercure Hotel, Bangkok, Thailand

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



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

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



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TO HARNESS THE POWER OF SMART CITIES, WHILE MEETING INCREASED ENERGY AND LIVING DEMANDS, IT IS IMPORTANT THAT WE BUILD SUSTAINABLE COMMUNITIES FASTER. TO ACHIEVE THIS, THERE ARE THREE CORE PILLARS TO SUCCESS; INTELLIGENT GRID, SMART BUILDING MANAGEMENT AND BROADER ADOPTION OF E-MOBILITY SOLUTIONS.



COULD SMART CITIES DRIVE DOWN EMISSIONS DESPITE URBANIZATION AND POPULATION GROWTH?

By Wai Tai Yeap, Head of ABB's
Electrification business in Singapore

This year marks a pivotal point in our collective ability as innovators, policy makers and visionaries, to drive down emissions in our cities, save energy and speed up the transition to renewables with smart city technologies such as intelligent grids, smart building management and e-mobility solutions.

As we begin to realise the vision for smart cities, it is important to consider the ongoing impact of urbanization and population growth on our planet. Over half of the global population now lives in cities ¹, with urbanization on the rise in every continent and figures set to climb close to 70 percent by 2050 ².

Rapidly expanding urban communities are increasing energy demand and at the same time, putting pressure on governments to not only make cities more liveable, workable and sustainable, but to also meet their greenhouse gas reduction promises and move towards the end goal of net zero.





Here, Wai Tai Yeap, Head of ABB's Electrification business in Singapore, explores how smart city strategies and future ready technologies could hold the key to building sustainable communities despite the rapid increase in urban population:

Evolving our growing cities towards worldwide net zero targets, whilst meeting increasing regional energy demands requires the coming together of people and technology.

In doing so, communities can comfortably accommodate growth without having to sacrifice the many appealing benefits smart, connected cities will bring. These include positives such as increased wellbeing, a reduction in crime, shorter commutes, reduced health burden and of course, cuts in carbon emissions. These are all quality-of-life indicators that can be improved by between 10 and 30 percent³ using smart city infrastructures and technologies.

Furthermore, leveraging smart city technologies early in a region's development can improve its chances of keeping up with rapid growth. When a city grows at a manageable rate, which is often considered one percent annually, its infrastructure can keep up with an increasing population and the demands that come with it.

Beyond that, infrastructure, sewers and water treatment facilities, schools, housing and energy needs cannot expand fast enough to keep up with demand.

If that city is already well on its way to becoming connected, smart city technology can leverage **Geographic Information Systems (GIS)** for planning and mapping purposes, making planning, developing and ultimately expanding more efficient. To put it simply, the smarter the city, the easier urbanization becomes.

THE THREE CORE PILLARS FOR BUILDING SUSTAINABLE COMMUNITIES, FASTER

To harness the power of smart cities, while meeting increased energy and living demands, it is important that we build sustainable communities faster. To achieve this, there are three core pillars to success; intelligent grid, smart building management and broader adoption of e-mobility solutions.

INTELLIGENT GRID AND SMART ENERGY MANAGEMENT

A rapidly growing energy demand requires a grid that can carry more high-quality energy to more consumers more efficiently than ever before. This is where intelligent grids come into play. Governments investing in intelligent grid technologies see returns through the integration of operational technologies (OT), such as the equipment and systems controlling the grid, with communications and the IT used by utilities for enterprise level applications.

Benefits of an intelligent city grid include a 33 percent time saving on restoration time through fault detection, isolation and restoration (FDIR), improved capacity and reduced peak demand.



SMART BUILDING MANAGEMENT

When it comes to intelligent buildings, ABB is committed to a future where cities become safe, smart and sustainable, with the opportunity for more home and building owners to harness and control their own energy usage.

Smart building technology has already helped many thousands of buildings and homes consume energy more efficiently. For example, ABB recently supported the construction of the **New Development Bank (NDB) Headquarters in Shanghai** by installing an intelligent and integrated building controls system to manage indoor lighting, electric curtains and windows that involve more than 8,000 control circuits, resulting in energy savings of more than 15 percent (compared to conventional systems).

As emerging technologies continue to develop, more opportunities arise for buildings to leverage new technological processes and data sources. The concept of using technology to improve our cities and buildings is not a new one, but what is different is that IoT is now enabling us to connect an increasing number of devices which were not connected before.

In our opinion, this connectivity is the key to unleashing the true potential of intelligent buildings, unlocking opportunities for new information from infinite sources to be analyzed and combined, for a new level of intelligence. Another great example of smart city technology in action can be found in **Hanoi, Vietnam** where ABB recently completed a project to support the largest Vietnamese multinational telecommunication service, **Viettel Group**, achieve their green objectives. Viettel wanted their headquarters in Hanoi to be a symbol of innovation and to set the standard for the rest of their buildings around the world.

Viettel enrolled ABB to supply a range of smart building technology, including the **ABB i-bus® KNX** system, with all devices in the building, from lighting and shutter control to heating, ventilation, security and energy management communicating with one and another via a single bus interface. This technology saved the company up to 20 percent in energy costs while ensuring a comfortable and secure working environment.

E-MOBILITY

The transportation sector is one of the largest contributors to greenhouse gas emissions, according to an annual report for the Convention of Climate Change, with an average of 24 percent of all emissions coming from this sector.⁴ Governments the world over are moving at pace to end the sale of internal combustion engine vehicles, favouring an irreversible move towards electric vehicles (EVs) instead.

EVs are set to decarbonize the transportation sector, including traditional sub-sections like rail and public transport. Working alongside a skilled electrification partner such as ABB, cities can benefit from an intelligent charging infrastructure that maximises renewable energy generation and battery energy storage systems (BESS) to dramatically reduce CO2 emissions.

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ABB (ABBN: SIX Swiss Ex) is a leading global technology company that energizes the transformation of society and industry to achieve a more productive, sustainable future.

By connecting software to its electrification, robotics, automation and motion portfolio, ABB pushes the boundaries of technology to drive performance to new levels. With a history of excellence stretching back more than 130 years, ABB's success is driven by about 105,000 talented employees in over 100 countries.

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SMART DISTRICT HEATING IN SANMENXIA, P.R. CHINA

BY NXITY

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NXITY'S SEAMLESS ANALYSIS, DOES NOT ONLY COVER THE PIPELINE NETWORK, BUT INCLUDE DETAILED MODELING OF ALL MAIN FACILITIES INCLUDING CHP PLANT, HOB PLANT, PUMP STATIONS, BYPASS VALVES, VALVE CHAMBERS, HOLDING PRESSURE FACILITIES ETC. IN ORDER TO PROVIDE RELIABLE RESULTS (COMPARED TO SIMPLIFIED MODELS MADE IN TRADITIONAL SIMULATION TOOLS).

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Sanmenxia is located in western Henan, P.R. China, next to the Yellow River. The city has a population of approximately two and a half million people. Winters are moderately cold with a daily average temperature of just below 0 °C in January. EDF, the French originated multinational energy utility company, operates the district heating system supplying heat to the citizens of Sanmenxia.

The heat is supplied via a 65 kilometer long district heating network, covering a heating area of 3.9 million m² including residential buildings, commercial buildings, educational campuses, and industrial sites.



The Sanmenxia district heating system is complex, with long distances and elevation differences, and consumers with extraordinary requirements on heat supply quality and availability.

EDF applies multiple data-driven technologies for O&M optimization and to ensure safe and reliable heat supply in Sanmenxia. The system is one of few district heating systems in China being recognized as a 'District Heating 4.0'-system.

EDF's district heating system in Sanmenxia is among the most efficient in China (evaluated and recognized by China District Heating Association) while providing heat to all consumers at all times with the right quality and quantity.

Empowered by NXITY

The Swedish-originated company NXITY, with head office in Beijing (and local offices in Hong Kong, Bangkok and Stockholm), has been engaged by EDF to support the development of Sanmenxia district heating system. NXITY has carried out detailed seamless thermal, hydraulic steady-state and hydraulic transient-state system analysis to identify optimization potential, both for system modernization and operation optimization.

NXITY's seamless analysis, does not only cover the pipeline network, but include detailed modeling of all main facilities including CHP plant, HOB plant, pump stations, bypass valves, valve chambers, holding pressure facilities etc. in order to provide reliable results (compared to simplified models made in traditional simulation tools).

NXITY's unique system analyses have provided basis for the development of Sanmenxia district heating system and design of innovative safety solutions, modernization and ICT solutions applied.

Solutions

The heat transportation time (more than 12 hours) due to the long distance between CHP and the most remote consumers, and strict requirements from the consumers, makes it challenging (not to say impossible) for the O&M personnel to plan the heat supply and decide the suitable supply temperature at any given time. In the heating season of 2020/2021, NXITY helped EDF implementing Heat Solutions™, an adaptive heat load forecasting and temperature optimization software based on Machine Learning to overcome these challenges.






In order to ensure safe heat supply, NXITY has developed safety solutions for Sanmenxia district heating system, including mobile hydraulic safety station for the high elevated area, modernization of the district heating loop in the CHP, upgrade of holding pressure facility, among other solutions.

EDF is using the Novade smart field management system in Sanmenxia, for safety and maintenance purposes, which in combination with SCADA system, performance management system and other innovative ICT solutions provide preventive and predictive maintenance features.



Heat Solutions™

-  **Aggregated and locally calibrated weather forecast**
-  **World leading adaptive load forecast**
-  **AI-based temperature optimization**

Heat Solutions™ is a forecasting and optimization software solution for district heating networks. The software is developed by the Danish company ENFOR, market leading within its segment. The software is fully automatic with low maintenance and low operational costs. Heat Solutions™ contains four software modules: 1) MetFor™ - Locally optimized weather forecasts, 2) HeatFor™ - Heat demand forecasting, 3) HeatTO™ - Temperature optimization, and 4) HeatPO™ - Production optimization.

The software uses Artificial Intelligence technology in the form of machine learning to self-calibrate and continuously produce accurate heat demand forecasts and temperature control data to the heating network. Using multiple weather forecasts, aggregating the data, and further calibrating with a local weather station, provides an outstanding weather forecast for accurate heat demand forecasting, temperature optimization, and production optimization.

Novade Smart Field Management

Novade smart field management platform is a cloud-based solution for digitizing all field processes and capture data to optimize operations. The platform offers a wealth of features including Mobile field tools, Document Management, Forms & checklists, and Reporting integration. The software is module-based and comprises a full range of modules for the projects. The modules are built on a common platform, enabling access and synchronization on all devices.

The Maintenance module, the most popular module for energy utilities, is utilized to optimize the maintenance activities. The module provides a digitized maintenance solution that reduces operational costs. The maintenance engineers, can with a handheld smartphone or tablet, get access to maintenance data like asset register, certifications, contracts, spare parts, inspections, and repair jobs. Meter readings from IoT-enabled sensors in the network are automatically imported into the software database. The software has the combability to integrate with thermal scanners to provide a more COVID-19 safe work environment.



Novade Platform Functionalities Overview

One analytical module for all projects & all modules



NXITY, with its origin in Scandinavia, provides project development, design optimization, project implementation, and operation optimization services and ICT solutions for District Energy schemes across Asia Pacific. NXITY's personnel have developed and optimized more than 100 District Energy projects in the region.

www.nxity.com



THE FUTURE OF OPERATION & MAINTENANCE

BY BRUNO LHOPITEAU
MANAGING DIRECTOR, SIVECO CHINA

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PREDICTIVE MAINTENANCE IS OFTEN SAID TO BE THE LOW HANGING FRUIT OF INDUSTRY 4.0. YET TO MAINTENANCE PRACTITIONERS IT IS NOTHING NEW. TECHNOLOGY HAS IMPROVED, BUT THE IMPLEMENTATION CHALLENGES WE MET IN THE 1990S STILL EXIST TODAY.



Media hype has led us to believe that technology would soon revolutionize maintenance. Dreams of flying robots, video game-like smart glasses, flashing digital twins, often hold the sad promise of getting rid of maintenance people altogether. The reality remains that the more automated, the more sophisticated the systems, the more demands are put on maintenance people and their skills. The problem is compounded when this glorious technology did not address actual needs.

Predictive maintenance is often said to be the low hanging fruit of Industry 4.0. Yet to maintenance practitioners it is nothing new. Technology has improved, but the implementation challenges we met in the 1990s still exist today: a maintenance strategy that utilizes predictive maintenance must be defined, relevant measurement points and corresponding actions established, people trained.

The idea to use 3D BIM models in operation has also emerged. We have all seen movies showing a technician using a tablet to view “behind the walls”, almost knocking his head on the pipes, breaking half a dozen safety rules in the process of demonstrating this unnecessary usage of BIM. Luckily, this seldom passes the Proof-of-Concept stage. The company could not afford all the broken iPads.

The Covid-19 pandemic has seen many large companies slashing their innovation budgets, while paying lip service to the transformative nature of innovation in times of crisis. Yet, it has also accelerated certain trends. The use of smart glasses for remote support is perhaps the most striking example, paralleling the growth of video conferencing apps. In fact, this usage of “smart” glasses is often nothing more than portable, head-mounted, video conferencing...

At a recent conference, we were shown a fantastic 3D application combining all promises into one. Operators could navigate a hyper-realistic plant model, walk to the location of a meter, view the current meter value (captured from the SCADA), before walking to the next point. This was billed as a virtual meter-reading solution. Most people in the room were very impressed by this beautiful demo of how an otherwise perfectly functional engineer could waste his time walking around a 3D model (at approximately the same speed as in the real world) when a traditional SCADA could do a much better job, displaying in the control room all the meter values, or – here is the real improvement – only displaying abnormal readings on a simple plant or process layout. Whatever happened to common sense?

No amount of in-house and vendor-awarded innovation trophies can change the reality: this is not the future of Operation & Maintenance!

The main challenge of O&M is not its lack of efficiency, as technologists seem to believe. Instead, it is to address strategic needs, O&M risks, compliance. And doing so efficiently, of course. One of our strategic needs is also to enable workers with limited skills to deal with increasing sophisticated assets, in an increasingly complicated, regulated, risky world. Most of the tech touted by vendors and consultants ignores all that.

Standards such as ISO 55000 Asset Management, itself closely related to ISO 31000 Risk Management, offer a useful framework to address this need. I recommend its practical usage as guideline for the design and implementation of O&M technologies that make sense for your business. This naturally leads to redesigning most of the examples given above, as we have done at Siveco China with clients all over Asia. As a result, the O&M technician takes the central place in the smart project. His role is promoted, his skills enhanced, his motivation increased.

Real experience

Global automotive and industrial supplier **Schaeffler** has embedded Siveco China's Smart O&M technologies in its SmartLink condition monitoring solution, and vice-versa: SmartLink is also directly accessible from the bluebee® app "for the worker of tomorrow", enabling the engineers to drill down to specific measurements and vibration profile to support their analysis. All information can be seen in context: failure history, past diagnosis, next maintenance visit, trends for a better decision.



In the **Sanwai Sewage Treatment Works project** in Hong Kong, Siveco China ensured handover of technical data from construction to maintenance through the implementation of its BIM for Asset Management solution. Once the plant started operation, the O&M team uses the Smart O&M suite for their daily work, which provides easy navigation into complex technical data, including when needed to the BIM model itself, for example to establish safety procedures or coordinate complex work with contractors. Altogether the system forms a true Lifecycle Digital Twin.





Hong Kong Airport Authority has taken the Smart Glass beyond glorified videoconferencing, to conduct the inspection of critical assets using the bluebee® mobile app plugin for smart glasses, with the objectives of providing a hands-free, convenient and safe wearable device for O&M technicians, while standardizing the technical inspection process. Technicians view step-by-step work instructions, interact with the app using voice commands and hand gestures, record their work as required.

Organica, a provider of innovative wastewater treatment solutions, also supports O&M teams with highly practical, non-nonsense, Digital Twin solutions based on proven technology. The solution integrates the plant's 3D BIM model and real-time data from the SCADA, both designed by Organica, into Siveco China's Smart O&M platform. Relevant SCADA values are shown in the mobile, together with related maintenance instructions, for the technicians in the field.

Siveco China (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 China helps facilities owners, in particular, energy and environmental utilities, to optimize assets lifecycle and ensure regulatory compliance.

Siveco China has its Asian headquarter and R&D center in Shanghai. It is the only company in Asia to be ISO 9001-certified for this scope of business.





REALISING THE CLEAN ENERGY OPPORTUNITY THROUGH CITY-SCALE COVID-19 RECOVERY PLANS



BY C40 CITIES CLIMATE LEADERSHIP GROUP, C40 KNOWLEDGE HUB

“ SINCE THE START OF THE PANDEMIC, RENEWABLES HAVE BEEN COPING BETTER THAN ANY OTHER ENERGY SOURCE WITH THE CHANGE IN ENERGY DEMAND PATTERNS.⁴ THE INCREASED SHARE OF RENEWABLES SEEN IN ENERGY GRIDS HAS BEEN ACHIEVED WITHOUT SIGNIFICANT CHALLENGES FOR GRID OPERATORS, DESPITE LIMITED GRID FLEXIBILITY AVAILABLE. THIS PROVES THAT RENEWABLES CAN SUPPORT A FLEXIBLE AND RELIABLE ELECTRICITY GRID WITHOUT A BASE LOAD OF FOSSIL FUELS,

”
During the COVID-19 pandemic, response measures to contain the virus have resulted in changing energy-use patterns in cities and countries around the world. Renewables met a higher share of electricity demand than usual, with many countries breaking records for clean energy shares – demonstrating the feasibility of a renewables-based grid.¹ We now have an unprecedented opportunity to accelerate the transition from fossil fuels to renewable energy.

Smart decisions need to be made now to ensure that stimulus packages are designed to realise this opportunity rather than to prop-up fossil-fuel companies. As well as putting cities on a path to limiting the rise in global temperatures to 1.5°C, clean energy investments in COVID-19 stimulus packages will put people back to work quickly, boost economies and create cleaner living conditions and improved welfare for all.² This article outlines what cities can do to ensure that these benefits become reality.



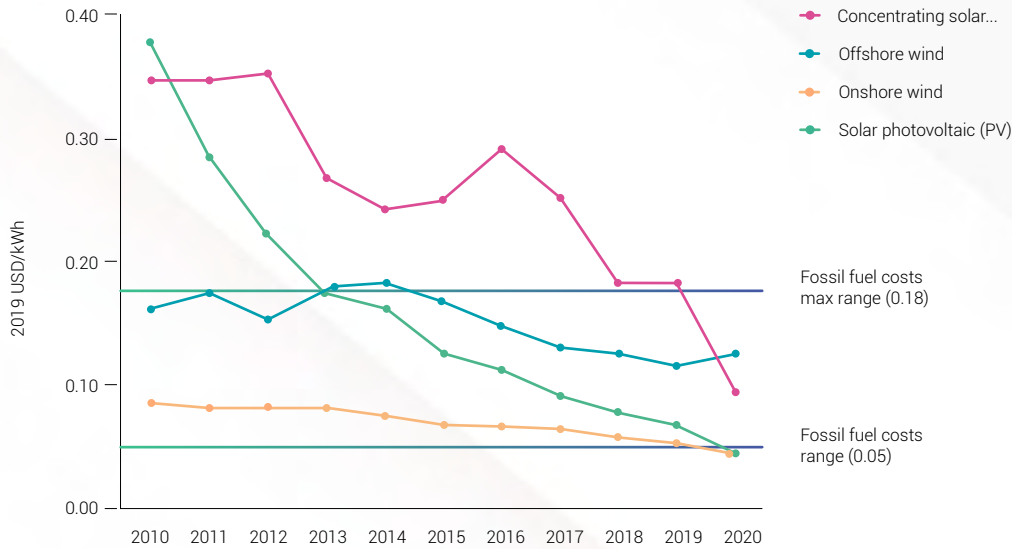
Make the case: The arguments for post-pandemic clean energy investments

The altered energy demand patterns seen during emergency response periods have provided new insights, evidence and arguments that cities can use to make the case for clean energy locally and to lobby effectively for clean energy investments by national governments and utilities.

These are:

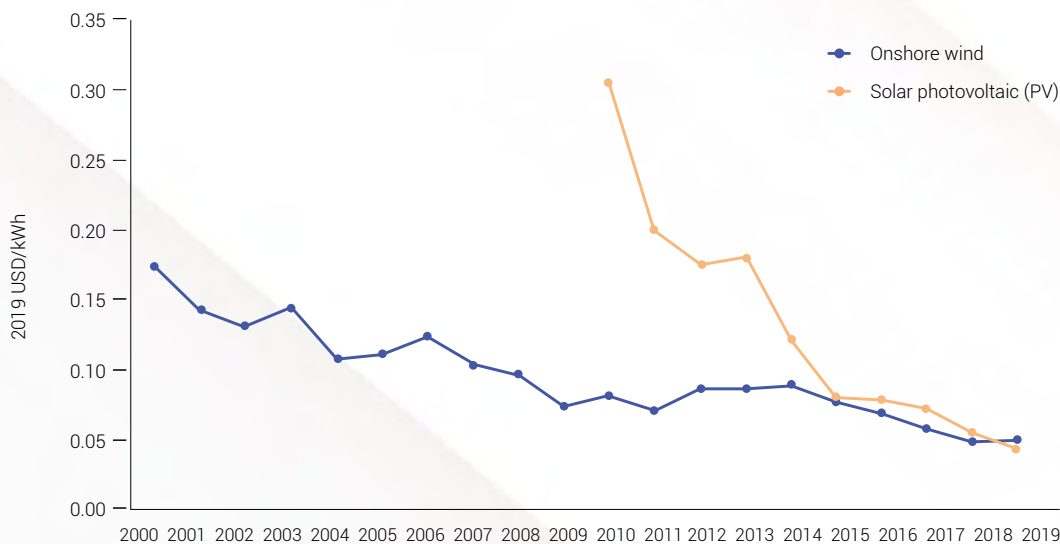
Clean energy projects are competitive, stable investments. Governments have an unmissable opportunity to invest in clean energy while interest rates are low due to the pandemic. Clean energy projects have high capex needs, but proven long-term, stable returns – a good match for a low-interest-rate economic environment. In addition, **renewables are now the cheapest form of new energy in most countries** investments in clean energy infrastructure now will secure affordable energy for years to come.³

Global weighted average cost of electricity per technology



This chart displays the global weighted-average LCOE (levelised cost of electricity) and Auction/Power Purchase Agreement price learning curve trends for solar PV, concentrating solar power, onshore and offshore wind, 2010 – 2020. The year corresponds to the completion year for each committed project. Data source: IRENA © (2020), Renewable Power Generation Costs in 2019, International Renewable Energy Agency.

Country weighted average cost of electricity for: India



This chart displays the global weighted-average LCOE (levelised cost of electricity) of commissioned onshore wind projects (2010 – 2020) and utility-scale solar PV (2010 – 2019) in selected countries. Data source: IRENA © (2020), Renewable Power Generation Costs in 2019, International Renewable Energy Agency.

The feasibility of a flexible, renewables-based electricity system has been proven. Since the start of the pandemic, renewables have been coping better than any other energy source with the change in energy demand patterns.⁴ The increased share of renewables seen in energy grids has been achieved without significant challenges for grid operators, despite limited grid flexibility available. This proves that renewables can support a flexible and reliable electricity grid without a base load of fossil fuels, contrary to arguments sometimes heard from the fossil-fuel sector. The COVID-19 response period has provided invaluable data about what grids would look like with a higher renewable share and identified gaps in these systems. Governments should use these data to inform energy infrastructure investments to bolster the grid and enable greater renewable use. This includes investment in interconnectivity, distributed storage and accelerating the electrification of other sectors, such as heating, transport and industry.^{5, 6}

Clean energy investments will create more local jobs than fossil-fuel investments. Clean energy infrastructure projects are highly labour-intensive, and create jobs all along the supply chain. These projects create more local and higher-quality jobs than fossil fuels. Every US \$ 1 million investment in fossil fuels creates only 2.65 full-time equivalent (FTE) jobs, while the same amount of spending on renewables and energy efficiency generates 7.49 and 7.72 FTE jobs, respectively.⁷ Research published by McKinsey to inform government stimulus spending suggests that government expenditure on renewable energy technology creates 50 more jobs per US \$ 10 million invested than spending on fossil fuels.⁸ Every US \$ 1 invested would also bring a payback of between US \$ 3 and 8 in reduced environmental and health costs.⁹

There has never been a better time to stop fossil-fuel subsidies. With heightened public interest in clean air and a growing number of institutional investors already shifting assets out of fossil fuels, national governments could use stimulus funding for appliance replacement programmes that would reduce energy consumption, enabling them to stop fossil fuel subsidies. Already, in response to falling government revenues and oil prices, countries including **Nigeria** and **Tunisia** reduced fuel subsidies, while the **Indian** government raised excise duties on gasoline and diesel.^{10, 11}

Invest directly in local clean energy as part of city-scale recovery plans

By expanding local clean energy generation as we live with COVID-19 and as part of recovery plans, cities can reap short-term economic benefits as well as the longer-term rewards – read more about those rewards in [How to win support for local clean energy](#). Priorities for investment should be informed by energy access, demand and a city's regulatory powers. In addition to the Knowledge Hub articles and examples linked below, resources that can inform priorities and approaches include: REN21's [Renewables in Cities 2021 Global Status Report](#), which provides an overview of targets, policies and actions taken by cities on renewable energy from all over the world; the International Renewable Energy Agency's (IRENA) [Global Renewables Outlook](#), which highlights investment options to 2050 and the policy frameworks needed to manage the transition; the [Clean Energy Solutions Center](#), which helps governments design and adopt

policies and programmes that support the deployment of clean energy technologies; and the American Cities Climate Challenge Renewables Accelerator, which provides guidance for local governments (primarily in the United States, but is more broadly applicable) on how to procure and scale up clean energy.

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Cities can:

Adopt ambitious targets for 100% renewable electricity by 2030 and 100% renewable energy usage by 2050 across the city.

Targets send a strong signal to suppliers, developers, regulators and other stakeholders about the direction of travel. It provides the policy certainty they need to proceed with long-term investment decisions, reducing financing costs and sustaining a dynamic renewable energy market. Cities can also commit to deploying a certain amount of onsite renewable capacity within city boundaries to help spur markets. [Read Why your city should aim for 100% clean energy by 2050](#) for more.

Leverage municipal procurement and support innovation to accelerate the roll-out of clean energy technologies.

City governments can install solar photovoltaic (PV) cells on schools, government offices and other municipal buildings to increase the city's use of clean energy, encourage innovation and support local small and medium-sized businesses, such as installers, which are likely to be hard hit by the pandemic. Communication is key to strengthening the influence of such initiatives, increasing their impact as demonstration projects, showcasing what is possible and the benefits to be gained. Cities can further support innovation hubs, competitions and projects to catalyse innovation, such as [London's Better Futures](#) technology hub. Cities can also wield their influence as major energy consumers to increase the level of renewable power generation in the grid by signing local power purchase agreements (PPAs), on their own or, as [Melbourne](#) has done, together with large institutions. Read more in [How to install solar panels on city-owned property](#) and [How cities can create demand for large-scale clean energy generation](#).

Incentivise residents and businesses to deploy building-scale renewables, such as solar PVs, solar water heaters or heat pumps.

There are a number of ways in which cities can encourage consumers to take a step towards renewables. They can use building codes, grants or other financial schemes; draw on policy enablers, such as net metering or streamlined planning processes; facilitate actions, such as aggregation platforms - or work with or advocate for the relevant authorities to develop clear, easy-to-navigate policy frameworks if they don't have the regulatory powers to do so. Read [How to encourage residents and businesses to install building-scale clean energy](#), and [How to decarbonise your city's heating and cooling systems](#).

Support the development of decentralised, off-grid energy systems.

This is most relevant where energy access is limited, particularly in [Global South cities](#). Deployment of off-grid renewable technologies, such as renewable mini-grids and building-scale solar systems, can be targeted to support emergency services and health providers, or to reach communities un- or underserved by the grid. As well as enhancing energy access, investment in these systems will boost local economies in communities by offering potential sources of additional income.¹² Examples of decentralised renewable energy projects include [Cape Town's Small-Scale Energy Generation](#) programme. Again, where cities are not able to directly support the expansion of decentralised clean energy technologies, they can advocate for national-level investment. Countries including **Nigeria, Kenya and Ghana** are already turning to solar power to rapidly enhance energy access during the pandemic.¹³

Sources of support for energy access during the pandemic

Sustainable Energy for All has launched initiatives to advance energy access for health facilities and the off-grid energy sector to support the global COVID-19 response.

The Covid-19 Energy Access Relief fund is a EUR 100 million concessionary debt fund that will provide bridging loans across the sector.

The Rockefeller Foundation, Sustainable Energy for All and RMI have launched [Electrifying economies](#), an initiative to unlock affordable, reliable power as part of a green recovery from the COVID-19 pandemic.

Install and upgrade district-scale heating and cooling systems. Private investors at building scale are not typically able to implement district-scale systems. Cities can use stimulus packages to kickstart these clean and highly efficient projects and to explore new approaches to thermal decarbonisation, such as the use of large-scale heat pumps. Examples of these projects include [Hong Kong's](#) seawater-based district cooling system and [Stockholm's](#) district heating network, which pumps heat from data centres. Read more in [How to decarbonise your city's heating and cooling systems](#).

Mobilise institutional investors to shift assets from fossil fuels to clean energy. Climate change and extreme weather events pose material risks to investment portfolios, and there is a real risk of stranded assets in high-carbon industries as action to limit emissions gains momentum. Divesting from fossil fuels and increasing sustainable investments, or 'divest-invest' action, is an effective way for cities, pension funds and other investors to protect their assets and take advantage of the economic opportunities presented by the transition to renewable energy. Promoting this shift as part of stimulus packages will help to close city financing gaps and create new jobs and opportunities in the clean energy sector. [Spotlight On: Cities Divest-Invest](#) includes resources about the benefits of divest-invest action, a toolkit for cities and more.

Retrofit buildings to reduce energy demand, accelerate economic growth and deepen the recovery. To create jobs and inject money into local supply chains – as well as to reduce energy demand – cities can kickstart retrofit investments in municipal buildings, including social housing, and accelerate the scale and pace of commercial and residential retrofits. Read more in [How cities can strengthen local economic recovery through building retrofits](#).

Also read:

International Renewable Energy Agency's (IRENA) [Post-COVID recovery: an agenda for resilience, development and equality](#), which offers practical advice on key investment and policy decisions for the recovery period.

International Energy Agency's (IEA) [Sustainable Recovery Plan](#), a World Energy Outlook special report providing an energy sector roadmap for governments to spur economic growth, create millions of jobs and put global emissions into structural decline.

[A Renewable Energy Roadmap for African Cities](#), which draws on the experience of cities in sub-Saharan Africa and particularly eThekweni, South Africa.




Lobby for investment in grid-scale clean energy as part of national stimulus packages


As cities often do not have full control over the grid, to achieve a grid-scale clean energy transition they also need to work with national governments and utilities to accelerate the deployment of large-scale renewable capacity, such as onshore and offshore wind, and utility-scale solar farms. In addition, city governments need to push to accelerate or bring forward investments in grid upgrades for electricity and gas. Upgrades to the transmission network are needed to enable greater uptake of electricity produced by variable, distributed renewable energy sources, and to increase resilience to future shocks and stresses. Cities should also work with utilities or grid operators to upgrade local distribution systems, and seek increased research and development spending by national governments in renewable energy technologies. Together, grid upgrades, the building of additional capacity and research and development spending would give a significant boost to economies following the COVID-19 crisis if included in stimulus packages.







Several national governments are already promoting renewables in their post-COVID stimulus packages:

 **Japan's** stimulus package aims to accelerate renewables uptake by the private sector through regulatory changes that will enable onsite PPAs.¹⁴


 **Portugal** is reviving a delayed large-scale solar auction and has confirmed plans to build a green hydrogen plant.¹⁵

 **Nigeria** has electrified four COVID-19 health facilities with solar hybrid mini-grids in Abuja and Lagos, through the country's Rural Electrification Agency.¹⁶ The Government has included a 'solar power strategy' in its Economic Sustainability Plan that will support 250,000 jobs and provide up to 25 million people with power through solar home systems.¹⁷


 **South Korea's 'Green New Deal'** includes specific funding for digital and green


initiatives to put the country on a path to a net-zero emissions society. This includes funding for renewable energy and low-carbon industrial clusters that will help to create 650,000 jobs.¹⁸ The new government aims to end coal financing, make large-scale investments in renewable energy, introduce a carbon tax, phase out domestic and overseas coal financing by public institutions and create a Regional Energy Transition Centre to help workers transition to green jobs.¹⁹

 **Israel** has announced a new energy and water infrastructure plan to help the country's economy recover from the impact of COVID-19, which includes 2GW of new solar power, with an ILS 6.5 billion investment.²⁰

 The **EU** has adopted a large 'Next Generation EU' recovery stimulus package of

€ 750 billion, which includes a large focus on renewable energy deployment, innovation, and energy efficiency improvements. An example is the €998 million grant allocation to ten key European energy infrastructure projects in the Baltic region relating to electricity markets integration, improving electricity transmission, funding smart electricity grids and exploring the development of offshore wind in the region.²¹

 **Denmark** is dedicating US \$ 480 million to measures targeting household energy consumption, including phasing out gas boilers and developing electric infrastructure.²²

 **Colombia** will provide funds to accelerate 27 renewable energy projects, including nine transmission lines, that will create 55,000 jobs.²³

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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.



RECENT APUEA ACTIVITIES

One of APUEA's main activities is to provide meeting platforms where our members and the energy community can discuss, share ideas and knowledge, and hopefully initiate new projects to speed up the development of Sustainable Urban Energy in the Asia Pacific region. Since March 2021, APUEA has hosted and participated in six webinars, including three webinars during the Asia Clean Energy Forum (June 2021) and during the ASEAN Sustainable Energy Week Webinar Series (May 2021), Euroheat & Power Congress Warm-Up Series (April 2021) and the 4 DH International Online Forum (March 2021). More details of these webinars can be found in the text below.



Session Objectives:

- Provide insights into the challenges which cities are facing in the energy transition.
- Share perspectives on Sustainable Urban Energy developments in cities.
- Discuss opportunities and challenges to accelerate the low carbon transition post COVID-19.
- Disseminate regional experiences and international best practices.
- Bridge public and private stakeholders, stimulating partnership and project developments.

ASIA CLEAN ENERGY FORUM 2021
ACCELERATING THE LOW CARBON TRANSITION IN ASIA AND THE PACIFIC
15-16 June 2021 | www.asiacleanenergyforum.org

DEVELOPING URBAN ENERGY FOR A CARBON NEUTRAL FUTURE
Tuesday, June 15, 2021 | 08:00 - 09:30 PM (Manila Time GMT+8)

KEYNOTE SPEAKERS:

- PETER LUNDBERG**, APUEA President
- MIKAEL JAKOBSSON**, Executive Director, APUEA
- ARJIT SENGUPTA**, Bureau of Energy Efficiency, Ministry of Power, Government of India
- DR. SATISH KUMAR**, Alliance for an Energy-Efficient Economy (AEEE)
- KEERTHI KUMAR CHALLA**, Asian Development Bank (ADB)
- SAM SCUPHAM**, Black & Veatch
- KSENIA PETRICHENKO**, UN ESCAP

APUEA Alliance for an Energy-Efficient Economy

ASIA CLEAN ENERGY FORUM 2021 DEVELOPING URBAN ENERGY FOR A CARBON NEUTRAL FUTURE

On June 15, As part of the 2021 edition of the Asia Clean Energy Forum, APUEA and Alliance for an Energy-Efficient Economy (AEEE) hosted a webinar on the topic: "Developing Urban Energy for a Carbon Neutral Future". Building on the ACEF 2021 theme, "Accelerating the Low Carbon Transition in the Asia and the Pacific", the session aimed to explore and discuss challenges and opportunities that cities in the Asia Pacific are facing to develop sustainable and carbon-neutral urban energy systems and how it is possible to accelerate the transition to a low carbon society post Covid-19. The full workshop program can be seen below.

TIME	ACTIVITY
20.00 - 20.05	Opening remarks and session introduction Peter Lundberg, Asia Pacific Urban Energy Association (APUEA)
20.05 - 20.15	Urban Energy for a Carbon Neutral Future Mikael Jakobsson, Executive Director, (APUEA)
20.15 - 20.25	Developing sustainable and efficient cooling solutions for cities in India Markus Wypior, German Corporation for International Cooperation GmbH (GIZ)
20.25 - 20.35	Supporting India's energy transition to meet national (NDC) and international sustainability goals (SDG) via Sustainable Cooling in Built Environment & Cold Chain Tarun Garg - Alliance for an Energy-Efficient Economy (AEEE)
20.35 - 21.15	Panel: Accelerating the low carbon transition in APAC post COVID19 Moderator: Mikael Jakobsson, APUEA 1. Arijit Sengupta, Bureau of Energy Efficiency, Ministry of Power, Government of India 2. Dr. Satish Kumar, Alliance for an Energy-Efficient Economy (AEEE) 3. Keerthi Kumar Challa, Asian Development Bank (ADB) 4. Sam Scupham, Black & Veatch 5. Ksenia Petrichenko, UN ESCAP
20.15 - 20.30	Q&A - Audience
20.15 - 20.30	Closing remarks



RE-WATCHED WEBINAR HERE:
DEVELOPING URBAN ENERGY FOR A CARBON NEUTRAL FUTURE





ASIA CLEAN ENERGY FORUM 2021 SUSTAINABLE AIR CONDITIONING WITH DISTRICT COOLING SYSTEMS

On June 16, APUEA co-hosted the Deep Dive Workshop on Sustainable Air Conditioning with District Cooling Systems together with India Smart Grid Forum and Global Smart Energy Federation.

The objective of the workshop was to present international experiences with District Cooling projects, including existing challenges with both green field and brown field District Cooling projects. Another objective was to discuss and present innovative financing models for providing Cooling-As-A-Service against monthly payments. The session also addressed the policy and regulatory support for implementing sustainable District Cooling projects in developing countries.

TIME	ACTIVITY
20.00 – 20.10	Welcome Address and Introduction to District Cooling Systems (DCS)
20.10 – 20.40	Session 1: Experiences with DCS Projects
20.40 – 21.20	Session 2: Policy, Regulations and Implementation Challenges in DCS
21.20 – 21.30	Closing Remarks and Vote of Thanks



RE-WATCHED WEBINAR HERE:
SUSTAINABLE AIR CONDITIONING WITH DISTRICT COOLING SYSTEMS



ASIA CLEAN ENERGY FORUM 2021 FROM RHETORIC TO REALITY: TRACKING THE GLOBAL PROGRESS OF RENEWABLES

On June 16, APUEA's Peter Lundberg participated as a panelist at the ACEF webinar: From Rhetoric to Reality: Tracking the Global Progress of Renewables hosted by REN21. The objective of this session was to discuss key renewable energy trends and developments globally and across Asia, the role of renewable energy in achieving socio-economic benefits in Asia and, how the share of renewable energy can be used to track progress. The session also showed the status of the energy transition to renewables globally and in Asia and the Pacific. The session gathered participants from government, industry, civil society, and research to discuss the main political and social barriers to clean energy systems in Asia. The session also discussed the way measuring how much energy is supplied by renewables can be a KPI for tracking progress.

TIME	ACTIVITY
20.00 – 20.05	Opening Statement & Context Setting: David Elzinga - Asian Development Bank Ksenia Petrichenko - UN Economic and Social Commission for Asia and the Pacific (ESCAP)
20.10 – 20.35	Presentation and Q&A: What happened in 2020: Key Findings from Renewables 2021 Global Status Report. Presented by Rana Adib, Executive Director, REN21
20.25 – 20.35	Question & Answer
20.35 – 20.55	Panel Discussion: Measuring the Energy Transition Moderated by Ksenia Petrichenko - ESCAP Ayu Abdullah - Energy Action Partners (Panellist) Peter Lundberg - Asia Pacific Urban Energy Association (Panellist) Mika Ohbayashi - Renewable Energy Institute (Panellist)
20.55 – 21.25	Audience Discussion in Breakout Groups
21.25 – 21.30	Closing



RE-WATCHED WEBINAR HERE:
FROM RHETORIC TO REALITY: TRACKING THE GLOBAL PROGRESS OF RENEWABLES





ASE WEBINAR SERIES#7: THE POTENTIAL OF DISTRICT COOLING IN THAILAND

APUEA is a conference partner for the ASEAN Sustainable Energy Week 2021 and will co-host several sessions during event in Bangkok, 14-16 October. As a pre-event to the 2021 edition of the ASEAN Sustainable Energy Week, APUEA and Informa Markets hosted a webinar on District Cooling, focusing on Thailand.

Thailand has a population of 70 million and is the second-largest economy in Southeast Asia after Indonesia. With its tropical climate and economic growth, the country has a large potential for District Cooling systems. This webinar aimed to introduce the status and development potential for District Cooling in Thailand.

TIME	ACTIVITY
	Chair: Peter Lundberg, Asia Pacific Urban Energy Association (APUEA)
14.10 - 14.05	Opening remarks Informa Markets
14.05 - 14.10	Session introduction & Setting the scene Peter Lundberg, Asia Pacific Urban Energy Association (APUEA)
14.10 - 14.30	Introduction to District Cooling in Thailand Dr. Pongpan Vorasayan, Ministry of Energy - Department of Alternative Energy Development and Efficiency
14.30 - 14.50	Case Study: The Forestias Project Kamol Tanpipat, EEC DT Green Power
14.50 - 15.10	International Experiences for the District Cooling Market in Thailand Mikael Jakobsson, Asia Pacific Urban Energy Association (APUEA) / NXITY
15.10 - 15.30	Q&A Audience
15.30	Workshop conclusion APUEA & Informa Markets



RE-WATCHED WEBINAR HERE:
THE POTENTIAL OF DISTRICT COOLING IN THAILAND



2021 EUROHEAT & POWER CONGRESS WARM UP SERIES, EPISODE 6 - LET'S START WITH THE ASIA PACIFIC:

On April 8, APUEA and Euroheat & Power co-hosted episode 6 of the Virtual Thursdays Warm-up series ahead of the Euroheat & Power Congress 2021.

The Asia Pacific District Energy market is immense, with a long tradition of district heating in Central and East Asia and fast-growing district cooling markets in East, South, and Southeast Asia as a result of the world's largest cooling demand growth. As more countries commit to a carbon-neutral future, district heating and district cooling will play an important role in the future integrated energy systems in the region. The session provided an overview of District Energy in the region, including the developments in India and Thailand!



RE-WATCHED WEBINAR HERE:
LET'S START WITH THE ASIA PACIFIC



4DH INTERNATIONAL ONLINE FORUM

On March 25, APUEA's Peter Lundberg participated at the 4DH (4th Generation District Heating) Forum arranged by the Institute for Sustainable Energy Policies (ISEP) and co-hosted by the Japan Community Power Network. The session discussed domestic and international initiatives and prospects on the theme of next-generation district heating and smart energy systems to promote decarbonization and transition to renewable energy.

The seminar included a video presentation and discussion on the latest joint report by REN21 / IRENA / IEA on the use of renewable energy in the field of thermal energy. The session also included an outlook on District Energy trends in the Asia Pacific region by APUEA.



RE-WATCHED WEBINAR HERE:
4DH INTERNATIONAL ONLINE FORUM





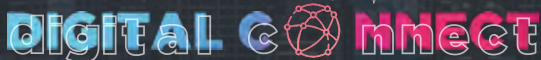
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Physical Exhibition

» New Date

10 – 12 November 2021

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NXITY, with its origin in Scandinavia, provides project development, implementation, and operation optimization services and ICT solutions for District Energy schemes across Asia Pacific.

- 10 District Cooling projects developed and optimized in Asia
- 50 District Heating projects developed and optimized in Asia

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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

07
JULY
FUTURE URBAN ENERGY IN ASEAN
Webinar
(Co-hosting organization)
07 JULY 2021

09
JULY
THE POTENTIAL OF DISTRICT
COOLING IN VIETNAM
Webinar (Co-hosting organization)
09 JULY 2021

AUGUST
THE POTENTIAL OF DISTRICT
COOLING IN MALAYSIA
Malaysia : Webinar
(Co-hosting organization)
AUGUST 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

06 - 07
JULY
ASEAN ENERGY AND UTILITIES
DIGITAL WEEK
Bangkok, Thailand
(Supporting organization)
06-07 JULY 2021

07 - 10
JULY
HVACR VIETNAM
Ho Chi Minh, Vietnam
(Supporting organization)
07-10 JULY 2021

28 - 30
SEPTEMBER
ENLIT ASIA 2021
Jakarta, Indonesia
(Supporting organization)
02-05 MARCH 2021

7TH GLOBAL DISTRICT
ENERGY CLIMATE AWARDS &
ASIA URBAN ENERGY ASSEMBLY

11-12 NOVEMBER 2021
BANGKOK THAILAND





MEMBER DIRECTORY

PREMIUM MEMBERS



ABB



Engie



Johnson Controls

MEMBERS



International District Energy Association (IDEA)



International Institute for Energy Conservation (IIEC)



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



Tera



Kamstrup



SIVECO China



Fengxi New Energy



Euroheat & Power (EHP)



NXITY



Alliance for an Energy Efficient Economy (AEEE)



Asia LEDS Partnership



Black and Veatch

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





APUEA

Asia Pacific Urban Energy Association

APUEA Magazine

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