

APUEA

Magazine

SMART URBAN ENERGY

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Promoting Sustainable Urban Energy in Asia Pacific



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Editorial

The Special Report on Global Warming of 1.5 °C was approved by the Intergovernmental Panel on Climate Change (IPCC) on 8 October 2018 in Incheon, Republic of Korea. The report describes the impact of global warming and compares the consequences of temperature increase of 1.5 °C and 2.0 °C, respectively (above pre-industrial levels).

It is reported that human activities have accounted for a global temperature rise of approximately 1.0 °C, and is expected to reach 1.5 °C between 2030 and 2052. In order to limit the increase to 1.5 °C, sustainable urban planning and extensive and rapid transitions in energy, transport, building, and industrial systems are required.

Multilateral and bilateral collaborations, global and regional initiatives and other efforts are required to combat climate change; and the public's awareness of the importance of developing sustainable societies and livable cities is increasing. However, as indicated through many reports recently, the efforts to date are not sufficient to fulfill the commitments to the Paris Agreement on a global level. As a regional sector association promoting the development of sustainable urban energy, Asia Pacific Urban Energy Association (APUEA) is calling for more collaboration, especially between cities and local governments around the world.

It is of great importance not limiting collaborations to combat climate change to national or even bilateral initiatives. Cities across the world are likely to find common ground with other cities facing similar challenges while developing sustainable urban energy. Invaluable experiences can be exchanged, and innovative solutions to common problems can be explored. Global warming is an international challenge, with international solutions.

The recent Sino-Asia Pacific Urban Energy Conference in Xian, co-hosted by Fengxi Energy, Xian District Heating Company and APUEA, highlighted the great need of gathering national and international representatives from local governments, utilities, financial institutions, solution providers, planning institutes and academia. By sharing experiences and best practices from around the world, APUEA and its member organizations unlocked invaluable knowledge exchange among the participants.

In this issue of the APUEA Magazine, you can read about the importance of undertaking a holistic, city and region-level approach to ensure that urbanization remains sustainable,

including Engie's collaboration with cities and regions while providing solutions to achieve sustainable development goals. The other contributions include an introduction to the development of the green and livable Fengxi New City in Xian (China), ABB's approach to the development of Future Smart Cities; and Johnson Controls' insight in how they advance Smart Green Buildings in the Asia Pacific, being a cornerstone of Smart Cities. In addition, there is information on Euroheat & Power's Digital Roadmap for District Energy, which plays a vital role in the development of sustainable urban energy in Smart Cities. APUEA provides an Energy Outlook of Bangkok, being one of the megacities in the Asia Pacific.

Finally, we would like to express our appreciation to our Founding Members ABB, Engie and Johnson Controls, and our Active, Allied and Affiliate members for the collaboration in 2018 supporting the development of sustainable urban energy in the Asia Pacific, and their contribution to the successful development of APUEA over the course of the year.



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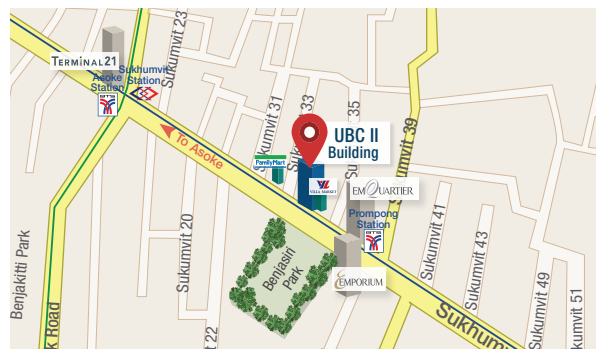
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ASIA PACIFIC URBAN ENERGY ASSOCIATION MEMBERSHIP

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.

APUEA Membership categories are:



ACTIVE MEMBER

Member that benefits from the Association and take an active role in the Association in terms of its governance and operation. An Active Member will be able to influence the scope of APUEA publications and will be recognized in published material from the Association.

ALLIED MEMBER

Member that benefits from the Association and chooses not to take an active role in the Association in terms of its governance and operation.

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:

Member Category	Employees		
	≤ 1,000	1,000 - 10,000	≥ 10,000
Active Member	USD 4,000	USD 5,500	USD 7,000
Allied Member	USD 3,000	USD 4,500	USD 6,000
Affiliate Member	N/A		

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A Brand New Chapter in Smart Green Buildings: Johnson Controls' Advancing in Asia Pacific

By Harry Rao, Manager, Energy and Sustainability, Building Technologies and Solutions, Johnson Controls, China

“

JOHNSON CONTROLS' ASIA PACIFIC HEADQUARTERS, FROM ITS DESIGN TO ITS CONSTRUCTION AND OPERATION, IS BUILT ENTIRELY AROUND GREEN BUILDING PRINCIPLES. ITS SUSTAINABLE DESIGN IS EXPECTED TO GENERATE 44 PERCENT SAVINGS IN OVERALL ENERGY CONSUMPTION COMPARED TO THE LOCAL MARKET STANDARD.

”

Johnson Controls, a global diversified technology and multi-industrial leader, believes that smart green buildings should include three characteristics. First, they should provide a safe, comfortable and healthy environment for occupants during their entire lifespan. Second, they should save energy and reduce the impact that the building's energy consumption has on the environment, while reducing operational costs. Third, the building's technology systems should integrate with other IT systems and applications providing occupant convenience additional smart capabilities. With this in mind, Johnson Controls announced on June 22, 2017 the opening of its Asia-Pacific headquarters in Shanghai. The headquarters sets a new standard for smart green buildings, being the first in China to be triple certified: IFC-World Bank Group's EDGE (Excellence in Design for Greater Efficiencies) Certification, U.S. Green Building Council's LEED (Leadership in Energy and Environmental Design) Platinum Certification, and the China Green Building Design Label Three Star Certification.

Situated between the Hongqiao Transportation Hub and Suzhou River in Shanghai's Chang'ning district, the 44,300-square meter building is located in heart of the Linkong Economic Zone. The Zone acts as a portal to the China Yangtze River Delta's key transportation arteries and is headquarters to several leading multinational companies. This showcase facility underscores the company's commitment to the China and wider Asia-Pacific markets.

A Showcase for Energy Saving Buildings with Innovative Technologies

Johnson Controls' Asia Pacific headquarters, from its design to its construction and operation, is built entirely around green building principles. Its sustainable design – which includes a highly efficient central plant, smart light control and lighting systems, energy efficient underfloor air distribution system, renewable energy systems, energy management and building automation systems and other advanced technologies – is expected to generate 44 percent savings in overall energy consumption compared to the local market standard. Additionally, the building is expected to reduce water usage by 42 percent via its grey water recycling and storm water recapture facilities, and to reduce embodied energy in materials and construction by 21 percent.

Equipped with 2,000 square meters of solar photovoltaic panels, the office building is able to generate over 200,000 kilowatt hours of electricity per year. The generated solar energy is utilized to charge electric vehicles and offset other electrical loads through a 182 kilowatt hour distributed energy storage system. Rain water is captured for recycling, flushing the toilets, washing the car park and other miscellaneous uses, saving a total of 4,800 square meters of water each year.

The office building's superior performance is also reflected in the measurement and control of indoor air quality for its employees. An air scrubber, combined high efficiency particulate filtration control the indoor PM2.5 concentration levels below 30, even lower than China's standard of excellent quality at 35.

Enabling Fully-integrated Smarter Buildings

As the building's 'invisible housekeeper', Johnson Controls' Metasys® building automation system allows the remote operation and adjustments of the mechanical, lighting, plumbing, power and elevator systems. It collects and analyzes data to provide control and recommendations that enhance building energy and operational efficiency. Since



launching in the 1980s, Metasys® is now available in its upgraded version 10.0, which is fully optimized for mobile devices, helping the building management teams easily control the building's operation.

The building's Central Plant sends hot water generated through the water cooling process and data center diverting it into the Water to Water Heat Pump which, combined with solar water heating systems, provides a renewable source of hot water.

The Central Plant also integrates advanced Ice Storage System. Basically, it produces ice at night when utility rates are much lower and then uses it the following day to cool the building and avoid running chillers during peak electrical demand periods. This strategy can reduce operational costs by between 30 and 50 percent while generating up to 45 percent of peak building cooling requirements.

The building also uses Johnson Controls' flagship chiller - the YORK® YMC² magnetic drive centrifugal water-cooled chiller. YMC² combines Johnson Controls' most advanced variable frequency drive, noise control, magnetic bearings and permanent magnet motor technology. Its noise reduction technology reduces operational noise by about 70dB at full load. In addition, the unit has less components, lower mechanical wear, reduced maintenance costs and industry leading energy-efficient operation.



YORK® YMC² magnetic drive centrifugal water-cooled chiller

A New Driving Force in Asia Pacific Development

It is worth mentioning that, Johnson Controls' Asia Pacific headquarters building has not only become a new benchmark for the smart green building industry, it also represents a regional hub for the company's strong local R&D and manufacturing capabilities. The building's YMC² magnetic drive centrifugal water-cooled chiller and YSM series of modular air handling units were all produced in Johnson Controls' Wuxi and Guangzhou factories.

The opening of the new headquarters marks an important milestone for Johnson Controls' sustainable development in Asia and its global strategic expansion. The headquarters

building brings together Johnson Controls employees from different functions and businesses that were scattered across multiple locations in Shanghai. This will allow for closer teamwork and a high-performance corporate culture to respond to customer needs faster and more efficiently. The headquarters building also features a Customer Showcase exhibition room, a world-class customer experience platform which offers visitors to the building a first-hand look at the company's innovative technologies with highly customizable product demonstrations. This will help Johnson Controls to more efficiently meet the needs of its customer in the China and Asia Pacific markets, and ultimately help Johnson Controls accelerate on its 'new journey' in the Asia-Pacific region.



Johnson Controls is a global diversified technology and multi-industrial leader serving a wide range of customers in more than 150 countries. It has more than 120,000 employees creating intelligent buildings, efficient energy solutions, integrated infrastructure and next generation transportation systems that work seamlessly together to deliver on the promise of smart cities and communities. Johnson Controls' commitment to sustainability dates back to its roots in 1885, with the invention of the first electric room thermostat. The company is committed to helping its customers win and to creating greater value for all of its stakeholders through a strategic focus on buildings and energy growth platforms.



FT CLIMATE FINANCE ASIA SUMMIT

Harnessing Opportunities in Asia's Low-Carbon Transition



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Zhang Jianyu
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Assaad Razzouk
Group CEO, *Sindicatum*
Sustainable Resources

21 November 2018 | Four Seasons Hotel, Hong Kong

The Financial Times is delighted to announce the inaugural **FT Climate Finance Asia Summit** taking place on 21 November at the Four Seasons Hotel Hong Kong.

This one-day summit brings together leading Asia companies, investors and financiers to explore the developing trends and emerging opportunities in Asia's low-carbon transition - from the rise of sustainable investment in Asia to challenges of translating Nationally Determined Commitments (NDCs) into projects and the growth of green bonds as an important new source of finance for companies across the region.

APUEA members are entitled to a 20% off the ticket, using the discount code APUEA.

For more information or to register, please visit:

live.ft.com/ClimateFinanceAsia

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Feng Xi New City, Xixian New Area, Shaanxi Implementing the Concept of Green Development by Building a Liveable Ecological City

By Yang Xiaofang, Commissioner for International Cooperation, Fengxi New City Energy Development Co, Ltd

“

THE CITY ACTIVELY PRACTICES GREEN DEVELOPMENT CONCEPTS, IS ADOPTING A GREEN LOW-CARBON CITY CONSTRUCTION MODEL, AND STRIVES TO PROVIDE VALUABLE EXPERIENCE FOR CHINA'S PRIORITY AREA OF NATIONAL GREEN AND LOW-CARBON DEVELOPMENT

”

Xixian New Area in Shaanxi Province is the first state-level new area in China that combines the theme of innovative urban development with being a national “climate adaptive” city. The Xixian New Area is located between the main urban areas of Xi’an and Xianyang, and it covers a total area of 882 km², with more than one-third [272 km²] involving buildings, facilities, and infrastructure. It comprises Airport New City, Fengdong New City, Qinhan New City, Fengxi New City, and Jinghe New City.

Fengxi New City has a total area of 143 km², and is positioned as the Great Xi’an Center, with an industry cluster for Science Technology and Innovation. Fengxi New City is expected to accommodate a future population of more than 600,000 inhabitants. The city actively practices green development concepts, is adopting a green low-carbon city construction model, and strives to provide valuable experience for China’s priority area of national green and low-carbon development.

Since the beginning of the construction phase of Fengxi New City, the green concept has been utilized in all aspects, including more than 60 planning layers such as the city green base, which includes the construction of green areas every 150 meters and gardens every 30 meters, to provide green areas of

more than 15 m² per capita. Fengxi New City is also investing in the information technology (IT) industry and is developing green industrial systems dominated by organizations that work in cloud computing and big data. In addition, the city promotes a green low-carbon lifestyle and is meant to serve as a model for the construction and operation of a green smart city.

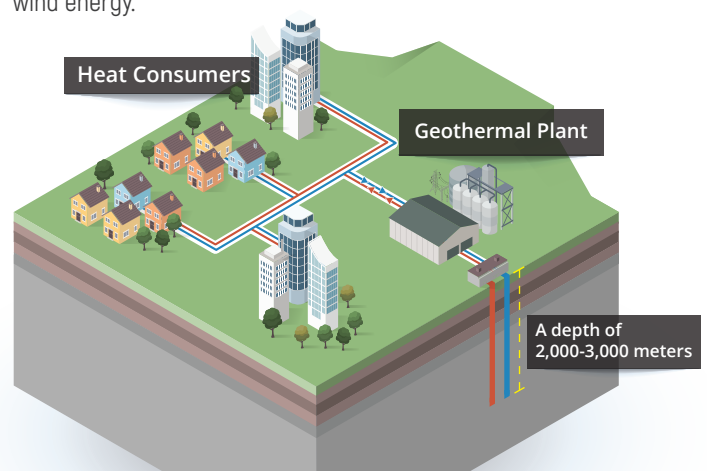
Since 2012, Fengxi New City has been exploring the practice of "low-impact" development technologies. One example is the concept of regional rainwater management called Sponge City. This concept is a multi-level open space and urban system with distinct structures, such as a river network water system, central green corridor, central park, an urban green ring, a community park and green street space. In 2015, with Fengxi New City as an example, Xixian New Area was approved as one of the first batches of Sponge City pilot projects in China. Fengxi New City, which is the only Sponge City pilot in the northwestern part of China, has set up a technical research center and has carried out research on key issues concerning water, building materials, soil, plants, meteorology, and other related topics. Several years of research and practice have resulted in a set of comprehensive management and control mechanisms, including technical standards and specifications. The technical standards and specifications of land characteristics can be a model for the construction of Sponge Cities in other parts of China.

To solve the problems associated with clean heating in northern China, and to fulfil the goal of building a "coal-free city", Fengxi New City has introduced a medium-depth deep geothermal clean heating technology. With the 56,000 m² of heated space, Tongde Jiayuan has been experimenting with this innovative technology, and has constructed first clean heating PPP (Public Private Partnership) project in the country. This technology has overcome the limitations and shortcomings of air-source, soil-source and water-source heat pump technologies; and when in use, the indoor temperature during winter is around 23 °C, the economic efficiency is significant, and the heating supply is adequate and stable. The system involves drilling holes to a depth of 2,000-3,000 meters, where a closed metal casing heat exchanger is installed and the underground heat energy is transferred through the heat exchangers via heat pumps to the buildings through a pipe distribution system. With this approach, the developer has been able to provide heating using 30% less energy compared to traditional shallow-ground-source heat pump technologies.



If 20 million m² of buildings used medium-deep geothermal energy instead of energy from coal-fired boilers during a heating season of 4 months, it would reduce CO₂ emissions by an estimated 860,000 tons, while also reducing significant amounts of polluting SO₂ and NO_x emissions. The resulting reduction of atmospheric pollutants is equivalent to the annual coal consumption of a small coal-fired power plant or a medium-sized coal-fired heating station. In terms of CO₂ emissions, it is also equivalent to planting 712 million trees.

At present, based on the principle of multi-energy systems and integrated optimization, Fengxi New City has constructed a green energy interconnecting system centered on a smart grid. The system is dominated by the deep underground and shallow geothermal energy and supplemented by solar and wind energy.



The figure shows the main principle of the medium depth geothermal clean heating technology.



In the future, 12 distributed green energy stations are planned in the city. Each energy station will integrate energy systems such as medium-depth geothermal energy, solar energy, energy storage technology together with an intelligent monitoring and control system. The purpose of the stations is to create a multi-energy supply that can provide electricity, heating, cooling and domestic hot water for the district, as well as reducing the consumption of primary energy. The stations will also create an interconnection between the energy supply and demand sides, with the aim to achieve a stable, dynamic energy balance, which increase the overall energy efficiency and contribute to overall grid flexibility.



Fengxi Energy Company is responsible for a comprehensive regional energy supply, including the planning, development, and construction of new energy systems based on renewable energy sources, smart energy finance, and smart grids. The company actively promotes the ongoing energy revolution, and is constantly creating new models of energy utilization, contributing to the establishment of the green and low-carbon demonstration city of Fengxi New City

Promoting Sustainable Urban Energy in Asia Pacific

Asia Pacific Urban Energy Association (APUEA)



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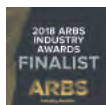
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ABB Writing the Future of Smarter Cities

By Michael Lotfy, Global Marketing & Sales Manager for Building Automation, ABB



SMART BUILDINGS DON'T JUST REACT TO YOUR NEEDS, BUT PREDICT THEM. WHETHER THIS BE AT HOME, IN THE OFFICE OR WHILST STAYING IN A HOTEL; ABB'S PRODUCTS AND SOLUTIONS ARE FULLY NETWORKED AND CONNECTED, ENABLING EASY AND SAFE CONTROL



With cities being the engines of the global economy, today's focus is on existing urban centres. Problems such as population growth, transport congestion, pollution, creaking infrastructure and growing energy consumption are common challenges.

The smart city concept has been evolving for a long time now: from the futuristic visions of the 1960s to the innovations brought by space travel and the ICT revolution. While the focus was once on new model cities, today's thinking is driven by the need to make existing cities more livable, workable and sustainable, with a focus on critical challenges of renewable energy integration and decarbonization. There is no shortage of global technology vendors, engineering giants, consultancies and related networks ready to engage with smart city projects; and there is no lack of will amongst city leaders - or citizens - about getting started. We also have to look at the mega trends that influence the world and in this era it is all about: individualization, urbanization, personalization and digitalization

There is a sense of urgency across the globe, and a feeling that the 2020s is the most critical decade in the evolution of smart cities. Smart cities comprise:

- **Smart industry:** with a particular focus on digitalization, grid automation and renewable power generation.
- **Smart transportation and infrastructure:** using smart and sustainable technologies such as flash charging for buses, ev charging infrastructure and autonomous metro systems.

- **Smart utilities:** including smart grids, micro-grids and reliable, renewable energy generation.
- **Smart buildings:** in order to drive security, convenience, energy and cost savings, from sub-station to socket.
Smart Buildings don't just react to your needs, but predict them. Whether this be at home, in the office or whilst staying in a hotel; ABB's products and solutions are fully networked and connected, enabling easy and safe control.

Welcome home

With the new generation of ABB home control, your home anticipates and flexibly responds to your various requirements no matter whether it is about improving energy efficiency, individual comfort or sense of well-being. The innovative operating concepts make it possible to intuitively create a completely new culture of experience and presents your house in a very personal light. And ABB wiring accessories bring elegance and ease to illuminating every room.

ABB-free@home® provides home automation for those who want freedom. It transforms the house or the apartment into an intelligent home. Whether blinds, lights, heating, air-conditioning or door communication – comfort, safety and efficiency can finally be controlled remotely; via a switch on the wall or with a smartphone. ABB-free@home® users will also be able to control these elements through Amazon's cloud-based voice service, simply by telling Alexa what they would like to do. For instance: "Alexa, turn on the ceiling light", "Alexa, set the temperature to 22 degrees", or "Alexa, open the blinds". All the user needs to do is link their Amazon account to their myABB Living Space® account using the Alexa app and Alexa will be activated.

Office space

Imagine the building of tomorrow shaped by ABB Ability™ technology of today. We are working together to create workplaces where anything is possible. Through intelligent and automatic lighting, air-conditioning, heating and movement detection, we make greater energy efficiency and increased security easier than ever. With digital solutions everything can even be controlled remotely, giving you complete control wherever you are, whenever you need it most.

Every building has unique requirements, therefore, our innovative portfolio provides the flexibility in designing and implementing building solutions that adapt easily to individual needs. Moreover, your investment is secured for future modifications and extensions, especially when the building is to be used for a different purpose.



Heating, ventilation, air conditioning and refrigeration put high demands on components such as compressors, fans and pumps. ABB can help you protect and extend the lifespan of the electrical system for components such as air handling units, chillers, heat pumps or ventilation systems. From circuit-breakers, contactors, relays and switches to surge protection and residual current devices, our high performance products reduce installation space and improve safety for operators. With ABB control and protection devices you can be assured – that no matter where you build, install or operate your equipment – our products meet worldwide electrical standards as well as all major global certifications.



ABB Tacteo Glass touch panel

A 5* experience

In today's world the hospitality industry is ever evolving and so are its guests. Hotel operators are increasingly focused on reducing their energy consumption and enhancing the customer experience for discerning guests, who expect to tailor their own environment.

First impressions count and guests not only judge their experience on how the comfortable the bed is but how personalized their stay is. And thanks to the KNX standard, of which ABB products are proven, everything which uses energy can be controlled precisely, automated in a complex way and consistently checked. The KNX technology covers the complete spectrum of applications: from lighting and blind control to heating, ventilation, air conditioning, energy management, security and surveillance; and offers its users uncompromised comfort and flexibility. Nowadays, guests expect to select their own preferences and enter into the same bespoke environment each time they frequent the property.

With ABB's portfolio of Building Automation solutions, it allows you to intelligently network your building - providing increased levels of comfort, flexibility, safety and energy savings. Energy efficiency has become a top priority for the hospitality industry as hotels are high energy consumers and have to cope with the new rules for energy efficiency in buildings. Guests are looking for maximum benefits and the best possible experience, whereas the management want everything to run smoothly and the investors focus on the income.

Building Automation by ABB is governed by its core values and meet the highest requirements in terms of technology, management and the end user. These values are: Economic efficiency, safety, Energy efficiency, Durability, Design and Sustainability; all of which play an important part in creating the perfect hotel.

E-mobility

ABB is leading the e-mobility revolution by offering a complete solution to enhance your business: charging infrastructure for any location combined with connected services.

ABB supports all currently available open charging standards, which enables providing charging services to widely available electric vehicles. All chargers can be combined with comprehensive solutions for user authorization, payment and network connectivity.

Michael Lotfy, Global Marketing & Sales Manager for Building Automation says "Sustainability is key, and smart buildings can provide this in an energy-efficient way. The smart concept is necessary to reduce environmental impact and preserve our future and as the public become more and more educated about sustainability, there will be additional pressure on businesses to commission companies like ABB to help build a greener world.

Cyber Security is also big focus for ABB now and this covers shopping malls, airports, hotels, hospitals and residences. All of which need both physical security and virtual. It's about ensuring anonymity and data protection in a world where people constantly publish their thoughts and movements online."



ABB (ABBN: SIX Swiss Ex) is a pioneering technology leader in electrification products, robotics and motion, industrial automation and power grids, serving customers in utilities, industry and transport & infrastructure globally. Continuing a history of innovation spanning more than 130 years, ABB today is writing the future of industrial digitalization with two clear value propositions: bringing electricity from any power plant to any plug and automating industries from natural resources to finished products. As title partner of Formula E, the fully electric international FIA motorsport class, ABB is pushing the boundaries of e-mobility to contribute to a sustainable future. ABB operates in more than 100 countries with about 147,000 employees.



QINGDAO LOW-CARBON DISTRICT ENERGY WORKSHOP

Multi Energy Systems and Energy Efficient Gas solutions

Qingdao, P.R. China
12 December 2018

To meet challenges of global warming and air quality and simultaneously coping with population growth, increasing energy demand and maintaining economic growth, City Governments are looking for energy systems that can fulfil both global and local requirements, and supply clean, cheap and reliable energy to its consumers.

Qingdao, a coastal city and a major economic hub in the Shandong Province, is going through a transformation of its energy infrastructure as the local government is aiming to replace the previously dominant energy source of coal with natural gas. At the same time, the government has ambitious targets to modernize the energy infrastructure to maximize its benefits such as efficiency, cost and reducing emissions and particles to minimize air pollution that contribute to global warming.

Qingdao Energy Company, NXITY, and Asia Pacific Urban Energy Association (APUEA) are hosting the "Qingdao Low-carbon District Energy Workshop," in Qingdao on 12 December 2018. The theme of the workshop is "Multi Energy Systems and Energy Efficient Gas solutions," and will cover heat recovery technologies, regulatory frameworks, distributed energy, tri-generation, O&M and asset management, smart district energy, investment strategies, among other topics.

The workshop in Qingdao will feature leading international and national experts from the industry, sharing experiences from real-world cases, enabling an excellent opportunity to share ideas, get intelligence and discuss relevant topics and business opportunities. The expected audience will include government officials, planning agencies, utility executives, financial and legal experts, planners, developers, design institutes, investors, academia and domestic and international sector associations.



For sponsorship and registration please contact Peter Lundberg at plundberg@apuea.org



Digital Roadmap for District Energy

By Alessandro Provaggi, Head of the DHC+ Technology Platform at Euroheat & Power



Digital technologies are believed to make the whole energy system smarter and to boost the integration of more renewable energy sources. IoT, automation, AI, and big data hold big promises, but they also come with pitfalls and raise new challenges, such as security and privacy as well as questions about data ownership. New business models and policy interventions require market actors to adapt. The pace of change is fast and it is challenging both industry players and regulators.

In recent years, Euroheat & Power has become increasingly more aware of the radical change that digitalisation brings to the industry and to the energy sector as a whole. In consequence, it decided to take a step forward and bring together all key actors with a view to have a shared vision on digitalisation and what is needed to make it part of the successful district energy transformation. Writing a Roadmap came as a first natural step. The work was mainly carried out by the DHC+ Technology Platform members' community. DHC+, part of Euroheat & Power, is the European hub for research and development in district energy.

The Digital Roadmap for District Heating & Cooling offers insights on how digitalisation impacts the industry, showcases the current state of the art, identifies barriers and presents objectives, targets and recommendations. The process was driven by the Horizon 2020 research and innovation project STORM funded by the European Commission.

The first version of the Roadmap was launched in May 2018 at the Digital Heat event in Brussels. The main aim of the event was to "trigger a movement" on digitalisation. By bringing utilities, technology providers, researchers and policy-makers in the same room, Euroheat & Power created the space for all these actors to interact and positively challenge each other to make innovation reality.

Simply put, digitalisation is about more and better communication, optimisation and flexibility. Going more in details, the Roadmap addresses each of the following key topics:

1 Production Level

Digitalisation is not a goal per se but a very interesting means to get a more renewable and efficient system while saving costs. Advanced solutions such as smart network controllers integrate fluctuating sources such as solar heat. While excess heat from industry might be more controllable, it is unlikely that companies would adjust their production process to optimise the heat delivery to the heat networks. After all, excess heat is a by-product. It is through smart control of the controllable heat sources that those sustainable uncontrollable sources can be maximally utilised.

A second important point is that the sustainable energy source of heat networks is not dimensioned on the peak demand of the heat network, since it does not pay off to design a rather expensive heat source for a limited number of operational hours. The peaks are often covered by cheap, often fossil fueled boilers. Peak shaving, a form of smart control, can however maximise the operation of the sustainable source.

2 Distribution Level

Cost efficient, robust and scalable data collection and communication systems will enable the management of real-time data, which in turn will fuel machine learning and data mining technologies. This plays a key role in optimising the energy distribution and in maximising the performance in relation to temperatures, flow, pressure levels, thermal demand and leakage situations throughout the grid.

3 Building Level

Modern district energy systems are demand driven. The building level, manifested by the substation, establishes this demand. At the same time, building and apartment level solutions can help mitigate supply side challenges such as the case of intermittent production. From a technical point of view, the building acts as the mediator between the grid (satisfying demand) and the indoor climate (creating demand).

By using smart meter technologies and remote control devices, high temporal resolution of data is possible. Bi-directional data flow between the district heating operator and customers is key to operational excellence and facilitates reaching the next level of comfort for the end consumer.

Real-time operation and prediction of demands allows for identifying usage patterns as well as for correcting

periods of inefficient use of thermal energy (faulty installations, building side leakages, anomalous consumption etc.) or moments of demand resulting in an inefficient use of resources (peak loads). This can be achieved by analysing the heat consumption and temperatures from individual heating substations using pattern analysis (automated using machine learning) as well as by shifting demand patterns where necessary and possible. Root cause analysis can be performed in order to clarify the underlying issues e.g. a high return temperature.

4 Consumption Level

Digitalisation gives an opportunity to engage end-users in the awareness of their energy use. By means of visualisation tools using real data on e.g. hourly interval, they get an insight into their energy use, benchmarking to other consumers becomes possible and energy savings can be suggested. Tools for customers helping to control and monitor energy usage may streamline and help the customers to make district heating much more efficient and allow 4th generation district heating.

5 Design & Planning

The planning process of those systems (i.e. evaluation of the status-quo, development of technology scenarios and final decision making) is challenged by the fragmented and not consistent planning processes of the individual stakeholders and the various tools used. The planning process of DHC networks can be optimised through development and application of different digital solutions, including big data approaches for data analysis (e.g. utilization of metering data for design processes), mapping algorithms (e.g. renewables, retrofitting potential), process planning tools, sophisticated optimisation and co-simulation methods etc.

6 Sector Coupling & Integration of Multiple Sources

Traditionally electricity, heat/cold, transport and industry are treated as individual sectors. The ongoing decentralisation trend leads communities to consider their territory as an entity to be optimised as such. Local networks and energy sources can therefore now be considered as building blocks of a different business model, with new opportunities for local stakeholders and evolving at the pace of the territory planning.

Traditionally electricity, heat, cold and gas networks are treated as individual sectors. Opportunities to optimise the overall energy system lie in the combination of these networks. By coupling these networks, the district heating network can support the balance in the electricity grid and reduce curtailment of valuable renewable energy sources.



As the focus of the overall energy transition perspective has shifted to local systems over the last years, DHC grids, together with associated production and service activities, are gradually perceived as the backbone of this local energy transition, thanks to their sector coupling abilities.

The Roadmap is publicly available in the Publications section of the Euroheat & Power website www.euroheat.org.



Euroheat & Power is the international network for district energy, promoting sustainable heating and cooling in Europe and beyond.

We are a non-for-profit association headquartered in Brussels, Belgium, which unites the district energy sector. Our members come from over thirty countries around the globe and include national district heating and cooling associations, utilities operating district energy systems, industrial associations and companies, manufacturers, universities, research institutes and consultancies active in the sector.



Promoting Sustainable Urban Energy in Asia Pacific

Asia Pacific Urban Energy Association (APUEA)





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A Smarter Way Forward for Sustainable Urban Growth

By Engie

“

AS ASIA'S ECONOMIC GROWTH CONTINUES TO PROPEL RURAL TO URBAN MIGRATION, THERE IS AN URGENT NEED TO LOOK AT HOW TECHNOLOGY AND SMART CITY PLANNING CAN BE HARNESSSED TO ENSURE URBAN GROWTH REMAINS SUSTAINABLE.

”

Urbanisation, the gradual move of human populations from rural to urban areas, is perhaps one of the greatest migration patterns in human history. According to the United Nation's Department of Economic and Social Affairs, as the world's human population continues to grow, an additional 2.5 billion people will live in urban areas, with close to 90% of this increase taking place in Asia and Africa. While urban growth provides more economic opportunities to city dwellers, it must be carefully managed to mitigate the many negative externalities that comes with it – traffic congestion, pollution and decrepitude.

As the most populous region in the world, Asia represents ground zero as the world attempts to address the social and environmental stresses that rapid urban growth brings. The United Nation estimates that over half of Asia's 4.5 billion residents will live in cities by 2026 and this means energy demand in the region will continue to grow unabated. As Asia's economic growth continues to propel rural to urban migration, there is an urgent need to look at how technology and smart city planning can be harnessed to ensure urban growth remains sustainable.

Smarter cities – the key to sustainable urbanization

The challenges facing Asia may seem daunting, but this also means that there is an opportunity for countries in this region to raise the living standards of billions through sustainable infrastructural and economic growth. Many local authorities are exploring ways through which they can strengthen their management of energy supply and land use to provide customised and high-quality services for citizens.



Didier Holleaux, Executive Vice-President at ENGIE, sharing his viewpoints on smart city technologies during the World Cities Summit 2018 in Singapore

This can perhaps be best explained by three major factors – the ongoing decentralisation of decision-making processes, the growing willingness to “decarbonise” the economy and the emerging digitalisation of services and data. ENGIE believes that this is where technology plays a pivotal role in ensuring that Asia’s continued growth does not come at the cost of livability if emerging technology can be leveraged to grow along with broad societal transformations.

With a firm eye on building energy performance into the cities of tomorrow, especially in Asia, ENGIE works with our stakeholders to embed innovative solutions that allow for the controlled local use of energy, real-time management of connected devices and grid flows in sustainable cities. By having an integrated infrastructure, efficient services and smart digital solutions, designed and built at the earliest-possible stage of major urban development projects, the cities of tomorrow will ensure inhabitants reap the full benefits urbanisation has to offer, without much of the associated negative effects.

A new way forward for urban growth

Urbanisation is driven by a multitude of factors involving different segments of society. The sheer complexity of urban growth makes it a challenge to manage from the perspective of city planners. A holistic, city and region-level approach must be undertaken to ensure urbanisation remains sustainable.

In this instance technology can be harnessed to tear down silos that exists between different industries and verticals, allowing for the decentralization of resource production that will be customised for the unique requirements of the different industries. The decentralisation process will also create new services that will help synergise resource production for better energy management.

Better energy management is just one step towards sustainable smart city development, there are still other areas that will need addressing and these include: public safety, green mobility, the quality of life and cost efficiencies. These are complex issues that are intertwined, and technology alone will not be enough to address them effectively. A comprehensive solution involving infrastructure, digital technologies and services will need to be adopted to ensure integrated solutions can be built into cities – putting the ‘smart’ into smart cities.

Building the cities of tomorrow today with ENGIE

As a global leader in low-carbon power generation, ENGIE collaborates with cities and regions to provide them with customised, outcome-based solutions that help them achieve their sustainable development goals. ENGIE’s deep portfolio of expertise and solutions are designed with customers to meet their specific needs in the context of individual cities and regions. Some of our core competencies include:

- District cooling – highly efficient solutions that can help substitute, fossil fuels with low and non-carbon renewables in city centers.
- Digital systems and platforms including city dashboards, traffic management systems and e-health systems.



[L-R] Dr. Beh Swan Gin, Chairman of the Singapore Economic Development Board (EDB), seen here with Isabelle Kocher, Chief Executive Officer, ENGIE during the launch of ENGIE’s Centre of Expertise in Singapore

The breadth and depth of our solutions have been adapted in Asia to help our customers meet their sustainability goals. As an example, we announced a S\$80 million investment in Singapore this year to develop ENGIE’s Centre of Expertise for District Cooling to help support the development of new district cooling projects in Singapore and in the Asia Pacific region.

District cooling is particularly important to the tropical climates of Southeast Asia, where it is set to help cities manage their energy resources in a much more efficient manner. The principle of district cooling systems is to produce air conditioning in a centralised place and to circulate the cooled fluid through a network of pipelines, providing cooling to a network of buildings within the city. This is a much more efficient way to cool several buildings together at the same time, saving 50% more energy as compared to standalone cooling systems while consuming less water and coolant at the same time.

In Malaysia, Megajana, a joint venture between Cyberview Sdn Bhd and ENGIE Services Malaysia Sdn Bhd, has been providing chilled water for air conditioning to 48 buildings in the Cyberjaya township since 2013. This has resulted in an improvement to the electrical Coefficient of Performance (COP) by 13%, an overall reduction of electrical peak demand by 18%, while saving close to 4,100 tons of CO₂ emission.

In addition to district cooling, ENGIE is also rolling out digital solutions and services across Asia Pacific, from Singapore, to harness real-time data and insights. These include:

- VRIL Digital which is a digital platform that can provide initial and predictive analysis to manage efficiency of data centres.
- Digital Internet of Things (IoT) and remote monitoring platforms which will provide real time data reporting and insights on the environmental conditions of critical facilities such as hospitals, hotels or airports, to create optimal comfort and improve energy efficiency.
- ENGIE iBMS which is an integrated building management system providing real-time data on all equipment and condition such as room temperature and quality of air.
- Connected building solutions that makes it possible to automate, manage and optimise the consumption of power in buildings over their lifetime.
 - An example of this is the Powerzee application that was built by ENGIE and implemented in the National University of Singapore, helping raise awareness of eco-responsibility behaviours amongst students.

Given the increasing connectivity across cities and regions, digital technologies are crucial in energy management across homes, industries and cities. It is with this in mind that ENGIE is working with Sigfox and UnaBiz to support the deployment an IoT network to support over 100 million connected devices to improve energy efficiency, facility management and customer-centred solutions for businesses. The scalable and cost-effective solutions will help address the challenges that industries and Smart Cities face. ENGIE, Sigfox and UnaBiz have deployed the first Internet of Things (IoT) network in Singapore, achieving 99% outdoor coverage across the island. The network, which is the first of its kind in Southeast Asia, optimises energy efficiency by remotely monitoring connected devices, such as boilers, heating and lighting systems.

In addition, ENGIE is also installing their inteliLIGHT smart lighting control across major cities around the world. inteliLIGHT is a smart street lighting control solution that offers detailed lamp-level management capabilities over multiple IoT communication technologies. This technology is currently integrated into the Smart City management platforms in various cities such as Dubai (UAE), Penang (Malaysia), and Athens (Greece), reducing energy loss and helping these cities better maintain their lighting systems with inteliLIGHT's advanced maintenance optimisation tools.

Taking the first step towards sustainable urban growth

As with most infrastructural projects, the first project in any city is often the most challenging as scalability is a common concern – public spending must be justifiable, and projects would need to demonstrate that they can achieve the critical mass needed to reach the profitability threshold.

In this case, city officials will need to muster political will to make the first move that will kickstart the virtuous cycle of green infrastructural projects. Extensions and improvements to completed projects will come at a marginal cost and public demand will also help drive policy makers to embrace smart city projects that will enhance the quality life of city dwellers.

An example of this is the Northgate project that ENGIE undertook with its partners in the Philippines, converting the industrial park into a green district. The project was commissioned in July 2017 and provides 42 MWcool / 410,000 m² to 11 existing buildings with 7 new buildings planned by 2020. District cooling systems in industrial parks are attractive to companies looking to set up their operations there and following the success of this project, the extension of district cooling for hotels and commercial malls in the area are currently under consideration.

Harnessing innovation to power the future of Asia's smart cities

Innovation underpins the technology-intensive nature of our solutions and ENGIE believes that innovation will serve as a compass that will help drive us towards a more sustainable Asia. In supporting innovation, ENGIE has adopted an ecosystem approach to build new technologies and solutions that will help cities in Asia achieve their sustainability goals. Therefore, we have established ENGIE Factories, hybrid platforms that help accelerate startups that will help shape the future of energy in smart cities around the world. In the Asia Pacific region, ENGIE Factory Singapore will develop the infrastructure and processes to attract talent and accelerate energy startups whose solutions can then be scaled across the region.

ENGIE is fully committed to helping cities achieve their sustainability goals and we design our solutions based on our commitment to help cities transform into ideal environs for people to live, work and play in. By harnessing emerging digital technologies such as AI and data analytics, we build fully integrated solutions for city infrastructures, so city planners can design and create harmonious environments for their residents.

With emerging technologies having profound impacts on our lives, cities will be at the forefront of energy management and sustainable urban growth. The cities of tomorrow must balance economic development, public safety and energy balance to achieve true sustainable growth. With ENGIE's track record of providing infrastructure, services and technology for smart cities, we are well positioned to be the architect of Asia's smart city revolution and we are committed to building the cities of tomorrow today right here in Asia.



ENGIE is committed to taking on the major challenges of the energy revolution, towards a world more decarbonised, decentralised and digitalised.

ENGIE Services APAC is a leading provider of integrated services across various customer segments: aviation, healthcare, education, government, commercial, industrial, hospitality, transportation, etc. With a focus on mission-critical facilities in Singapore, Malaysia, Thailand, Philippines and Australia/New Zealand, we offer integrated solutions in:

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- District Cooling
- Transportation and Green Mobility
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Asia Pacific Urban Energy Outlook – Bangkok, Thailand

By Asia Pacific Urban Energy Association (APUEA)



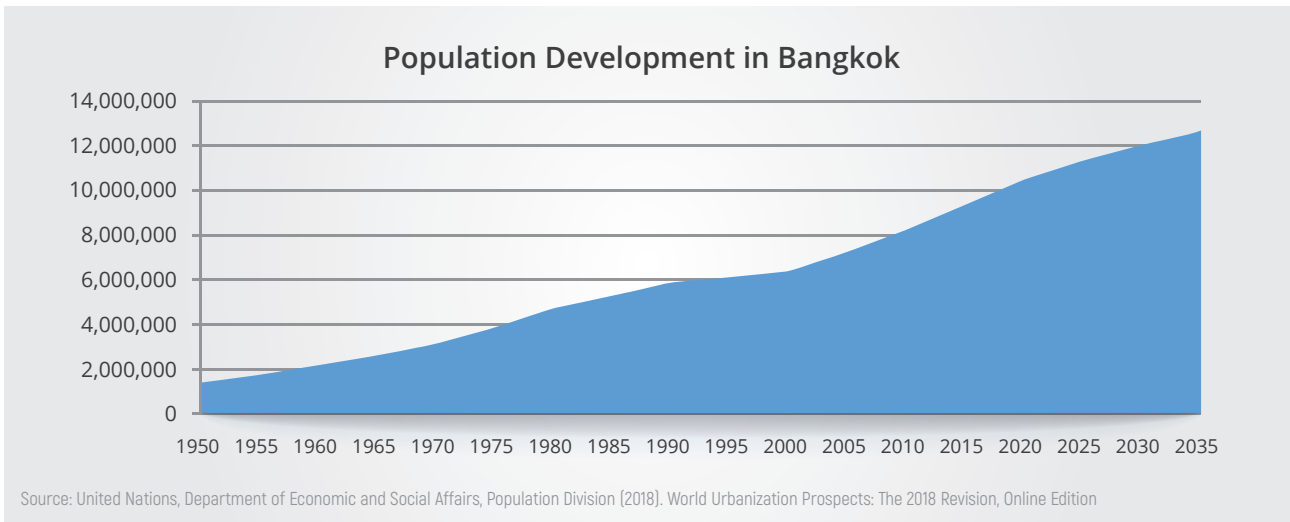
Population (Thousands)	10,156 ¹ (2018)
GPP (Million Baht)	3,975,275 ² (2013)
Energy Consumption (TWh)	149 ³ (2015)
Electricity Consumption (TWh)	36 ³ (2017)

Population ¹

Bangkok, known in Thai as Krung Thep Maha Nakhon, is the capital and most populous city of Thailand. Bangkok is located in the Chao Phraya River delta in the central part of the country and currently has a population of 10.1 million which is around 15% of Thailand’s total population. Like many other countries in the world, Thailand is undergoing rapid urbanization, and being the biggest city in the country, Bangkok is no exemption. Since 1950 the population in Bangkok has grown from 1, 4 million to over 10 million in 2018. The urbanization trend is expected to continue, and the UN projects that Bangkok will have a population of more than 12.7 million in 2035.

¹ United Nations, Department of Economic and Social Affairs, Population Division (2018). World Urbanization Prospects: The 2018 Revision, Online Edition.

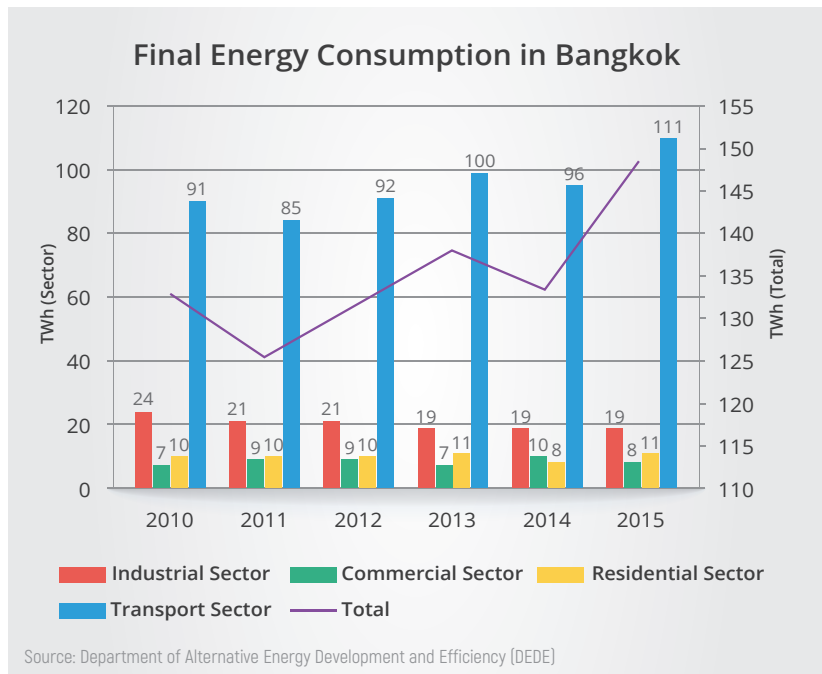
² Bangkok Metropolis: Office of the National Economic and Social Development Board (2013). Source: http://www.nesdb.go.th/nesdb_en/more_news.php?cid=156&filename=index



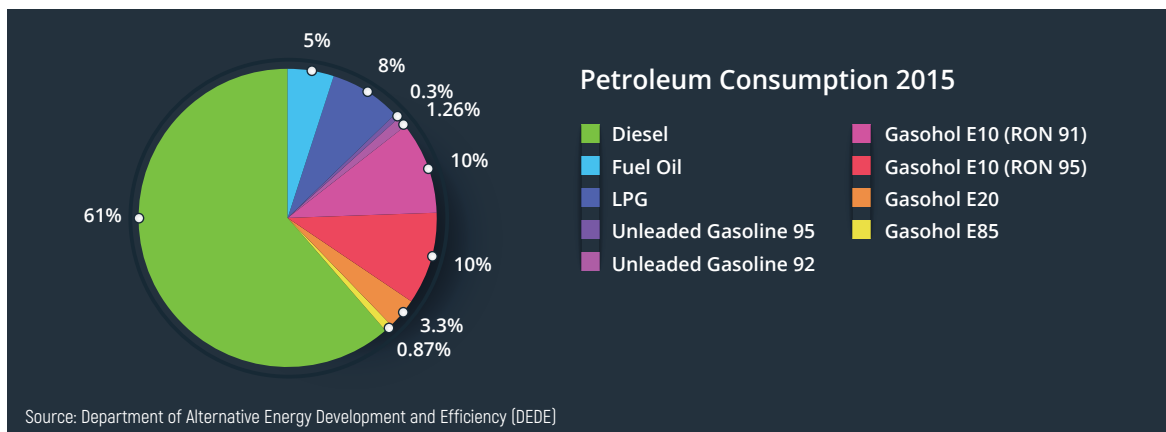
Energy Consumption ³

The energy consumption in Bangkok consists of four categories, electricity, lignite/coal, natural gas, and oil. In 2003, the distribution of these categories was, **electricity (21%), lignite/coal (10%), natural gas (13%)** and **oil (56%)**. The energy consumption in Bangkok can also be divided into five main sectors, industrial, commercial, residential, transport and agriculture; and, as shown in the graph on the right, the transport sector is the dominant energy consumer.

The total energy consumption has been increasing from 2010 to 2015 primarily due to the impact of the transportation sector which stood at 74% in 2015. However, the industry sector has shown a marginal decrease while the energy consumption in the commercial and residential sectors have remained relatively stable during this period.

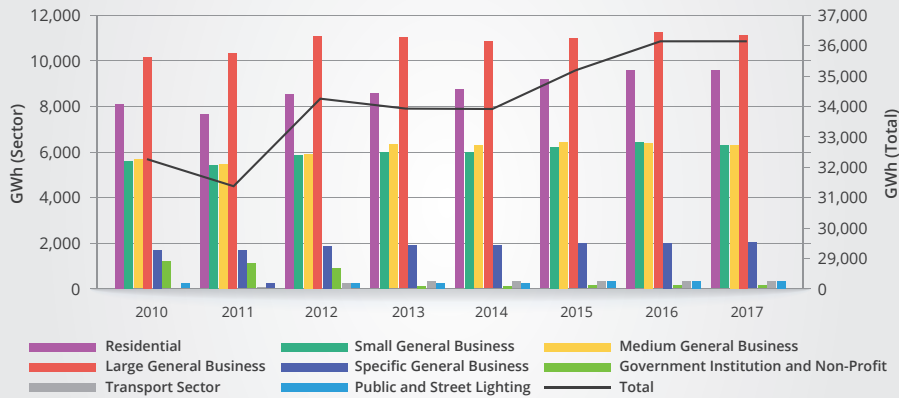


As oil consumption is the largest category and the transportation sector is by far the largest energy consuming sector in Bangkok (74% in 2015), it is interesting to look into the petroleum consumption. The petroleum consumption in Bangkok is dominated by fossil fuels such as diesel, gasohol and LPG fuel. It is clear that the transportation sector offers high potential for improvements in efficiency through promotion of new technologies such as electrification and biofuel; and resulting in lower emissions.



³ Department of Alternative Energy Development and Efficiency (DEDE)

Electricity Consumption in Bangkok



Source: Department of Alternative Energy Development and Efficiency (DEDE)

The electricity consumption in Bangkok increased with 10% from 2010 to 2017 and is dominated by the business (commercial) and residential sectors. This trend is likely to continue due to the population growth and increasing living standards (for example, more use of air conditioning units.) To mitigate the negative effects caused by the increasing demand for electricity, it is important to promote energy efficient products and solutions as well as increasing the use of renewable resources for the electricity production.

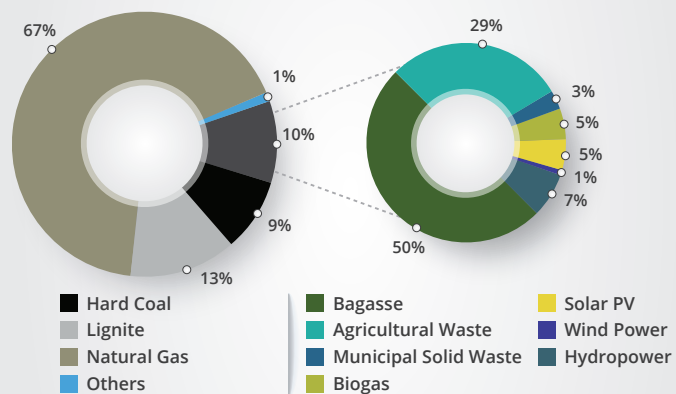
Current Energy Policies and Regulation

The Bangkok Metropolitan Administration (BMA) is responsible for the management of Bangkok. In 2007, BMA adopted the "Bangkok Declaration on Mitigation of Climate Change", in cooperation of 35 institutional stakeholders, and started activities related to climate change policies⁴. BMA initiated and prepared the Action Plan on Global Warming Mitigation 2007 - 2012⁵ to reduce GHG emissions from the city by at least 15% of the total GHG emission anticipated in the year 2012 under business-as-usual (BAU) projection and to participate in the global effort to mitigate global warming problems, which comprises of 5 initiatives:

1. Expand the Mass Transit Rail System within Bangkok Metropolitan Area;
2. Promote the Use of Renewable Energy (Promote the use of biofuels);
3. Improve Building Electricity Consumption Efficiency (Improve building energy consumption efficiency and electricity conservation campaign for Bangkokians);
4. Improve Solid Waste Management and Wastewater Treatment Efficiency; and
5. Expand Park Area.

In addition, BMA has developed a Master Plan on Climate Change 2013-2023⁶ under a technical cooperation project of the Japan International Cooperation Agency (JICA) which was approved in July, 2015 by the Governor of Bangkok. The scope of the Master Plan include: (1) Environmental Sustainable Transport; (2) Energy Efficiency and Alternative Energy; (3) Efficient Solid waste management and Wastewater Treatment, (4) Green Urban Planning; and (5) Adaptation planning. The master plan would support the national climate change policy where Thailand aim to reduce the GHG in the range of 7 to 20% below the BAU in energy and transport sectors in 2020 through the framework of Thailand's Nationally Appropriate Mitigation Actions (NAMA)⁷.

Thailand's Electricity Generation by Fuel, 2016 (Based on data from EGAT)



Source: IRENA (2017), Renewable Energy Outlook: Thailand, International Renewable Energy Agency, Abu Dhabi

The BMA's strategic plan, called "the 20-year Development Plan for Bangkok Metropolis 2013 - 2032 (the Bangkok 2032 vision)⁸", includes a vision on "Bangkok as a green and convenient city" that aims to promote clean energy and public transportation to reduce carbon footprints. The BMA has introduced various campaigns for the effective use of energy, for example, the promotion of alternative energy through the use of gasohol instead of benzene and biodiesel instead of diesel. In addition to its operational plans for climate change mitigation, the BMA has established measures to improve its mass transit and traffic systems through the development of more effective road-, rail- and river- based systems in order to reduce energy consumption

⁴ http://www.env.go.jp/earth/coop/lowcarbon-asia/english/project/data/07eng_THA_H27_07.pdf

⁵ Bangkok Metropolitan Administration Action Plan on Global Warming Mitigation 2007 - 2012 http://www.mcrit.com/ADJUNTS/ciutats_sostenibles/bangkok2.pdf

⁶ http://resilientcitiesasiapacific.iclei.org/fileadmin/user_upload/Presentation/A3_Supachai_Tantikom.pdf

⁷ https://www.matec-conferences.org/articles/mateconf/pdf/2016/33/mateconf_icmit2016_11001.pdf

⁸ Bangkok Vision 2032 / Bangkok Vibrant of Asia. The six-dimension vision comprises: 1) Bangkok as a safe city; 2) Bangkok as a green and convenient city; 3) Bangkok as a city for all; 4) Bangkok as a compact city; 5) Bangkok as a democratic city; 6) Bangkok as an economic and learning centre. Another aspect of the vision that has been added to the strategy is Management Strategy, which involves laws, Planning and assessment, human resource management, finance and budget, an information technology.

<http://www.bangkok.go.th/upload/user/00000130/Logo/Vision%202475/1summary%20Eng.pdf>



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Recent APUEA Activities

By Asia Pacific Urban Energy Association (APUEA)



THE CONFERENCE BROUGHT TOGETHER MORE THAN 200 EXPERTS FROM 30 COMPANIES, UNIVERSITIES AND ORGANIZATIONS IN THE ENERGY FIELD, DEMONSTRATING THE HIGH LEVEL OF INTEREST IN THE GROWING MARKET FOR SUSTAINABLE URBAN ENERGY IN XIAN



Sino-Asia Pacific Urban Energy Conference 2018

APUEA co-hosted the first Sino-Asia Pacific Urban Energy Conference in Fengxi New City in Xian, China, during 12-13 September 2018. The conference, which was a collaboration between APUEA, Fengxi Energy Company, and Xian District Heating Company, had the theme "Regional and International District Energy Experiences", and attracted more than 200 international and national experts in district energy systems, planning, and implementation.

The central government of China has high expectations that Xian, the Capital of Shaanxi province, will be a pivot of the Silk Road Economic Belt, the Hub of China's "Opening to the West Strategy," and an engine of China's western development. The government in Xian has ambitious targets to develop sustainable urban energy schemes including, district heating, district cooling, and smart grids. The Sino-Asia Pacific Urban Energy Conference was aimed at gathering national and international district energy experts to present, discuss and share their experiences, while fostering new connections that can contribute to the growth of sustainable urban energy systems in Xian, Shaanxi Province, and in China more broadly.

- 🕒 **Day 1: 12 September 2018**
- 📍 **Regional and International Experiences**

MORNING SESSION

The conference was opened by Mr. Mikael Jakobsson (Executive Director of APUEA), who welcomed all the participants and introduced the conference program. Xian District Heating Company was recognized as a new member of APUEA and received their membership certificate in a special

ceremony. The conference began with discussions of national urban energy development in China, followed by presentations on the local situation in Xian municipality and Fengxi New City (in Xian)

The First speaker was Professor Xia Jian Jun from Tsinghua University (a member of APUEA Advisory Board), who presented challenges and opportunities to develop clean energy schemes in China, and locally in Xian. Subsequently, Mr. Wang Jun (Vice General Manager of Xian District Heating Company) introduced the district energy scheme in Xian and described the impressive ongoing transition from coal to gas.

Mr. Li Liancal from the Urban Planning & Design Institute of Shenzhen provided an overview of urban planning for Fengxi New City, followed by Mr. Liu Hong Tao (General Manager of Fengxi Energy Company) who presented the sustainable energy planning and clean energy technologies applied in Fengxi New City.

After this comprehensive introduction of local conditions in Fengxi New City, the conference shifted to review international and national experiences of developing sustainable urban energy systems. Ms. Lipeng Zhang from UN Environment's District Energy in Cities Initiative, described how they take advantage of international experience to develop feasible district energy projects worldwide. The morning session was concluded by Mr. Steve Benz, Director of Global Thermal Storage and District Energy, Evapco. Mr. Benz presented his vast experiences and best practices for district cooling utilizing ice storage technology.

AFTERNOON SESSION

The afternoon session focused on development, modernization and management of sustainable urban energy schemes and included the following presentations: Clean Heating Solutions with Heath Recovery Technology by Mr Terry Deng (Product Manager) from Johnson Controls; Green Energy Management by Mr Frederic Guilloux (Managing Director)



from Adenergy; Modernization of District Energy Systems by Cheng Jie (Senior Project and Market Manager) from NXITY; BIM-oriented Smart Asset Life Cycle Management by Mr Paul Wang (Vice President) at Siveco; and Leak Detection in District Energy Systems by Mr Håkan Klarin (CEO) from PG Monitoring / Tianjin Euro Energy Technologies (TEET).

The conference ended with a panel discussion on "Experiences in Developing and Financing District Energy Projects" with representatives from Shaanxi Financial Holding Group, UN Environment, Qingdao Energy Group, and Chengfa Hohhot District Heating Company. [The panel was moderated by Mr. Mikael Jakobsson of APUEA.]



Group Photo of The Conference Participants



🕒 Day 2: 13 September 2018
📍 Site Visits and Business Meetings

The second day included productive business meetings between participating enterprises and visits to four different project sites in Fengxi New City. The following sites were included in the tour:

1. Medium and deep geothermal heating projects
2. Fengxi New City Headquarters Economic Zone – Energy Station Project
3. Sponge City
4. Big Data Application Exhibition Hall



CONFERENCE CONCLUSION

The conference brought together more than 200 experts from 30 companies, universities and organizations in the energy field, including executives, managers, engineers, government officials, planners, developers, sales and marketing managers, business and project developers. The robust turnout demonstrates the high level of interest in the growing market for sustainable urban energy in Xian. It also reveals the important role that APUEA can play in bridging discussions and exchanges among stakeholders in the Shaanxi region of China, along with international and regional experts.

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Event Calendar

05 NOV 2018	<p>🕒 5 - 10 November 2018</p> <p>📍 Shanghai, P.R. China</p> <p>Sino-Europe Clean Heating Conference/Sino-Denmark Clean Heating Forum</p> <p>APUEA Activity: Supporting organization</p>
21 NOV 2018	<p>🕒 21 November 2018</p> <p>📍 Hong Kong</p> <p>Financial Times Climate Finance Asia Summit</p> <p>APUEA Activity: Supporting organization</p>
09 DEC 2018	<p>🕒 9 - 11 December 2018</p> <p>📍 Dubai, UAE</p> <p>District Cooling 2018 - Efficient Energy for Smarter Cities</p> <p>APUEA Activity: Participating</p>
12 DEC 2018	<p>🕒 12 December 2018</p> <p>📍 Qingdao, P.R. China</p> <p>Qingdao Low-Carbon District Energy Workshop</p> <p>APUEA Activity: Co-hosting the workshop together with Qingdao Energy and NXITY</p>
MAR 2019	<p>🕒 March 2019</p> <p>📍 Bangkok, Thailand</p> <p>Thai-Nordic Urban Energy Summit</p> <p>APUEA Activity: Co-hosting the Summit together with the Thai-Nordic Chambers of Commerce</p>
6 MAY 2019	<p>🕒 6-8 May 2019</p> <p>📍 Nantes, France</p> <p>Euroheat & Power Congress</p> <p>APUEA Activity: Participating</p>
24 JUN 2019	<p>🕒 24 - 27 June 2019</p> <p>📍 Pittsburgh, USA</p> <p>IDEA 2019 Annual Conference and Trade Show</p> <p>APUEA Activity: Participating</p>



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Tianjin Euro Energy Technologies Co., Ltd. (TEET)



China District Heating Association (CDHA)



Danish Board of District Heating (DBDH)



International Institute for Energy Conservation (IIEC)



Northeast Clean Energy Council (NECEC)



International Partnership for Energy Efficiency Cooperation (IPEEC)



District Energy in Cities Initiative



DEVCCO



Xian District Heating Company



Thai ESCO Association



Overseas Environmental Cooperation Center (OECC)

Partners and Supporting Organizations

- Sustainable Energy for All (SEforALL)
- Asian Development Bank (ADB)
- International Energy Agency (IEA)
- UN Environment

APUEA Registration Form - Membership

We, the under-mentioned organisation / company, hereby apply to become a member of APUEA:

1 ORGANIZATION / COMPANY DETAILS:

Organization name

Marketing name and/or Abbreviation

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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
Active Member	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Allied 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 membership@apuea.org

