According to UN Environment, a United Nations agency, a transition to these systems can help cities to reduce their primary energy consumption for heating and cooling by up to 50 percent. They also form the central infrastructure for many cities’ 100 percent renewables or carbon neutral targets. Unlike conventional air-conditioning and heating systems, district energy systems consist of a network of underground pipes that pump hot or cold water to multiple buildings in a district, neighbourhood or city. They are able to use larger sources of heating and cooling, such as waste heat from power stations, which cannot be connected to a single building. District cooling (DC) provides reliable cooling services, energy savings, emission reductions, financing gains, all in an integrated, scalable system that provides incentives for all stakeholders.

Today, DC projects are becoming more prominent in Asia Pacific and other regions as their energy saving and price stabilizing performance is increasingly recognized. UN Environment-led global District Energy in Cities (DES) Initiative, through collaborations with 43 global energy leaders, is working to enhance the region’s carbon cutting capacity further with DC systems through sparking investment and offering technical assistance for cities interested in strengthening and stabilizing their energy supply while reducing their carbon footprint. The Initiative has been helping the cities and countries unlock investments, such as those from European Bank for Reconstruction and
However, without local government support, DC could never reach its full potential. For that matter, the local government in Thane is highly engaged, rallying potential consumers and raising awareness on the possibilities of DC. At the same time, the city is making land available for a DC plant and exploring possibilities to guarantee low-cost solar power to the DC network in recognition of the superior efficiency of DC. By demonstrating a city-led approach to DC in Thane the Initiative hopes that DC can move into the mainstream in India and ensure the country’s inevitable cooling demand growth can be delivered as sustainably as possible.

Malaysia has teamed up with UN Environment to boost the use of district energy in Iskandar, a growing metropolitan region in southern Malaysia, as well as around the nation, helping 30 million people gain better access to energy. Malaysia now has several DC systems, including its largest one in Cyberjaya, a town with a science park in the west coast state of Selangor. That system, the Megajana District Cooling System, was built by ENGIE and Malaysia’s subsidiary of the tech hub enabler Cyberview.

In the coming decades, India will experience the fastest growth in building energy consumption out of all regions of the world and more than two-thirds of this energy will be from grid-based electricity, predominantly from coal power. The environmental implications of such growth are significant and low-cost and sustainable measures to reduce demand and shift supply to sustainable sources are urgently required. A fundamental driver of this growth will be from demand for space cooling which is accelerating dramatically due to improving lifestyles, rapid urbanization and India’s often hot and humid climate. Such growth is straining India’s electricity system with grid stress particularly felt in Indian cities, where 40 percent of electricity demand can be for cooling and some utilities struggle to meet summer peak electricity demand.

The DES Initiative is working with the pilot city of Thane and four additional cities to demonstrate a city-led approach to delivering investments in district cooling with supportive local policies and local government engagement. Assessments of the five cities have identified at least $600 million of DC opportunities in the next decade as cities expand with new commercial townships and smart city areas. In Thane, the Initiative is undertaking feasibility assessments of two high potential projects, one in the city’s main commercial district and another in an upcoming integrated township on Thane’s periphery. Due to high electricity prices and demand for cooling in Thane, initial findings indicate that DC can deliver financial returns that will attract private investment while delivering cost savings to consumers. The Initiative has teamed up with the publicly-owned ESCO, Energy Efficiency Services Limited (EESL) which has already revolutionized India’s energy efficiency sector, to help transform these studies into investments.
Since 2012, when the system’s second DC plant was completed, it has helped the town to reap the equivalent of 8.2 gigawatt hours in electricity savings and avoid 4,100 tonnes of carbon dioxide emissions.

Experts from the DES Initiative are contributing with expertise in barrier and opportunity analysis, technical assessment, identification of regulatory gaps and development of initial strategies to unlock Iskandar and Malaysia’s district energy market and outline the technology’s potential use. The DES Initiative also helps the Iskandar Regional Development Authority (IRDA) to explore international funding opportunities to finance and support local DC studies, energy master planning and policy development.

One high potential project identified in Iskandar is the Medini development which will consist of a variety of facilities, including a hospital, malls, hotels and residential blocks. In Medini, DC development could reduce electricity consumption over 35%, while reducing bills and delivering a more reliable service.

According to a 2013 report by the Asian Development Bank, Malaysia could triple the scale of its DC industry to a built-up capacity of 575,000 refrigerant tonnes, the equivalent cooling load of up to 12 million square metres of commercial floor space. With the pace of Malaysia’s real estate market growth, and the numerous successful DC systems being commissioned across the country, this potential could be even higher.

Furthermore, district energy systems could help Malaysia to achieve its Paris Agreement pledge to reduce its greenhouse emissions by 45 percent by 2030, and cut 32 million tonnes of carbon emissions by 2020.

In China, DES Initiative is partnering with one of the leading educational institutions, the South China University of Technology (SCUT), to set up a joint centre for district energy technical research and engineering applications.

SCUT is public research-intensive university directly governed by the Chinese Ministry of Education. As one of the top Chinese universities in the fields of architecture and engineering, SCUT has the State Key laboratory of Subtropical Building Science for academic research and the A-level Architectural Design Institute for engineering applications.

The district energy studio under the Institute has been active in China and nearby surrounding regions and countries since 2002. Since their founding they have developed, consulted and designed more than 40 district heating/cooling or combined cooling, heating and power (CCHP) projects in China, which supply energy for over 100 million square meters of different kinds of buildings of diverse urban environments.

The joint centre will work closely with the Initiative to support the further development of district energy systems, including but not limited to district heating and cooling, green building and building energy efficiency in China and neighbouring regions. The joint centre will be formed by a joint team of SCUT researchers and experts of UN Environment’s DES Initiative.

The Initiative is also developing several case studies in China on DC, in areas like Zhuhai, Zhengzhou and Qianhai. In Qianhai, highly efficient district energy systems are integrated in the development, construction and operation of the whole region. The chilled water from DC systems is part of the public services package, together with water and electricity supply, demonstrating the regions commitment to these technologies in their development.

As measured in the year of 2017, comparing to label-1 standalone cooling systems in buildings, the district energy system in Qianhai can save up to 150 GWh electricity annually, which accounts for 12% of energy saving. In other words, DC can save up to 16,000 tons of coal used for electricity and reduce CO₂ emission of 130,000 tons.

District energy is not a new idea, but it has found new relevance in a world seeking practical solutions for the transition to clean energy and climate change, by simultaneously reducing emissions and boosting the uptake of renewables, while developing local economies, providing green jobs, and making urban air cleaner. DES Initiative works to assist developing countries and cities to accelerate their transition to lower-carbon and climate resilient societies through promoting modern district energy. The Initiative’s work is done through a network of partners including manufacturers, operators, academia, NGOs, international organisations and finance institutions that have committed to provide international expertise. More information about the UN Environment’s District Energy in Cities Initiative and its work can be found on http://www.districtenergyincities.org/. The District Energy in Cities Initiative is proudly supported by the Global Environment Facility (GEF), the Danish International Development Agency (DANIDA), and the Italian Ministry of the Environment and Protection of Land and Sea.