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Reducing the Carbon Footprint of the UAE



How much money are your buildings wasting?
If you think this question doesn't merit an answer, think again. Did you know that for the past four years, the electricity tariff has gone up by more than 100 per cent in Dubai for big facilities?

For a better perspective on the subject, consider these facts: the UAE has one of the highest per capita commercial energy consumption rates in the world. Globally, approximately 60 per cent of energy is consumed by buildings which contribute to over one-third of greenhouse gas (GHG) emissions. Buildings are thus the single largest source of GHGs produced by human activity.

For the last five years, the UAE has consistently held the bottom spot in World Wildlife Fund (WWF) league tables

of world per capita energy consumption chiefly due to its reliance on fossil fuels to run cooling systems all year round and use of desalination plants to produce drinking water.

The country's electricity demand has doubled over the last decade from 35 billion kilowatt hours (kWh) to over 70 billion kWh, which represents a huge increase in per capita energy use. Not surprisingly, the built environment plays a major role in this growth in per capita consumption; with up to 60 per cent of its electricity consumption used either in cooling or lighting buildings.

According to Sougata Nandi, Chief Executive Officer, Pacific Control Systems LLC, Dubai, "Improving our built environment is probably the single greatest opportunity to protect and enhance the natural environment. Steps taken to measure, monitor and control energy consumption can lead to efficiency improvements that translate into real economic savings. Cutting energy costs not only boosts your building's annual net operating income, it also raises the value of your building."

The United Nations Environment Programme (UNEP) states that 'no other sector has such a high potential ▶



for drastic emission reductions as buildings. While relying on tactics such as reducing air conditioning usage or turning off lights when not in use have only a minimal impact and could also sacrifice one's comfort level, the real need of the hour is to achieve large scale emissions reductions by optimising energy use through advanced control techniques.

This is precisely the rationale behind the launch of a nationwide project in the UAE late last year to cut power use in buildings. Called the Emirates Energy Star Program, this initiative - developed in partnership with Etisalat and Pacific Controls, a company renowned for its innovative solutions in building automation and control systems - seeks to connect all buildings in the country through a technology that will effectively help reduce the carbon footprint of the country through efficient energy consumption management.

The Emirates Energy Star project harnesses the Information, Communication, Technology (ICT) enabled M2M (machine-to-machine) technology of Pacific Controls, to substantially reduce energy consumption for organizations, with an aim to bring down the carbon footprint of the country by 20 per cent by 2015.

"There are several ongoing initiatives both in the UAE and across the world to achieve global reduction emissions but you need technology to rapidly deploy the concept that will enhance the number of projects and

thereby accelerate whole penetration into the market," says Nandi. "Thus instead of working on five buildings at a time, you need to literally work on 5,000 simultaneously."

Assuming there are 100,000 buildings in the UAE that can benefit from the Emirates Energy Star program, linking each one to the program within a span of five years would require tremendous manpower and time if the project were to be executed building by building. Instead, he explains, "if we could connect those buildings and bring them all into one central location at Pacific Controls, it becomes very easy to optimize the operation of these buildings using limited manpower and a reliable software platform."

The life cycle operational management of the project is supported by Galaxy, a software platform developed by Pacific Controls that works in tandem with the connectivity enabled by Etisalat's extensive network. "We go into a building, identify the key energy consuming equipment and hook them up into a remote monitoring panel," elaborates Nandi.

"Through the Etisalat network, we pull that information using a SIM card to the Global Command Control Centre (GCCC) at the Pacific Controls headquarters in Jebel Ali and we then get virtual control of the building. The Galaxy analysis provides all the information required to reduce energy consumption. It also allows for predictive maintenance programs. Once a building has been enrolled in the ▶

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Emirates Energy Star program, in the early stages of monitoring, operational issues will be identified and used to develop a maintenance plan designed to maximise energy efficiency and minimise costs,” he says.

“On average, we mostly come across buildings consuming energy worth Dh1 million to Dh2 million annually and a single big hotel in Dubai consumes energy worth Dhs 40 million annually,” he adds. “With the full implementation of this project, these will be dramatically reduced.”

Retrofitting existing commercial and government buildings with energy saving controls systems are leading to savings of 10 to 35%, says Nandi.

“When these results are shown to the building owner, he begins to see a completely different picture of his own building. He now has data that is in real time which is much more tangible to him. Before linking to the

failures and increase equipment life and building value.

Linking buildings to the Emirates Energy Star program makes it possible to reduce energy consumption by up to 30 per cent, says Sougata Nandi. “Of all operating costs, energy use is the most controllable one. Every kilowatt hour saved helps reduce an equivalent value of carbon emission particularly in the UAE where every kilowatt hour is fossil fuel-generated. Being part of this program will enable companies to help the UAE meet its targets set in the Kyoto protocol and thereby support global change initiatives.”

The target is to connect 100,000 buildings in Dubai to the system within five years, he adds.

Under the program, buildings are also rated using a star scheme based on the levels of savings achieved and this widely-recognized star rating can be used to gain credibility as a



“Improving our built environment is probably the single greatest opportunity to protect and enhance the natural environment.”

program, most landlords do not really know what the energy consumption of their building is on a daily basis. But now, users can access these real-time trend reports, identify important data profiles and view performance issues,” he explains.

Amongst the immediate benefits of joining the Emirates Energy Star program is a reduction in energy use and therefore, lower utility bills. Participating companies also gain recognition for supporting a green initiative.

In addition to saving money on utility bills, joining the program can improve customer and staff comfort and satisfaction levels; reduce maintenance costs and system

sustainable business and to make the building more attractive to potential tenants and customers.

This program can easily co-exist with existing standards and rating systems such as Leadership in Energy and Environmental Design (LEED) and the Estidama rating system introduced in Abu Dhabi.

“This program is also significant in that it is the only one which enables us to manage hundred thousand buildings - all operating with entirely different systems – by using one software platform,” says Nandi. “Each building operates with different systems that talk multiple different languages. To get a ▶

program that enables us to talk to all those varied equipment, bring them to a platform which is readable and understandable by the owners of the building is one of the more unique features of the program.”

The key message here, he adds, “is that this is a program that can take the fight to climate change rather easily. There was a deficit of a program like this where you could implement energy conservation measures very rapidly across thousands of buildings using one unified program. The Emirates Energy Star program fills that void very nicely.”

Currently, 20 organisations in the UAE have been connected under the program. These include Etisalat, Dubai Municipality, Sheikh Khalifa Medical City, Al Ansari Real Estate, First Gulf Bank, Jumeirah Plaza, and Danat Al Nahda.

“You cannot fight climate change solely by implementing comprehensive energy conservation programmes in one building at a time,” concludes Nandi. “What you need is a program like Emirates Energy Star that instantly reduces hundreds of thousands of CO2 emissions each year.” ■

Case Study: DP World- Lob 17, Dubai

The energy saving of 12% predicted from the first of two stages was achieved as targeted.

Approach taken for energy optimization

Pacific Controls surveyed the building and proposed a staged energy management solution as follows:

Stage 1

Provide remote monitoring and control on the fresh air handling units, fan coil units by optimum start stop and temperature reset based on occupancy schedule. Sensor based lighting control system for lighting circuits.

The projected savings from Stage 1 is up to 20% against the existing baseline.

Stage 2

The temperature of the chilled water and each individual chiller will be varied based on the building load and scheduled based on occupancy. The projected savings from Stage 2 is up to 23% against the existing baseline.

Summary of Benefits Obtained

1. Unnecessary Running Hours reduced, increase in equipment life and decrease in equipment life cycle cost
2. Reduction in the Chiller demand and energy consumed indirectly by scheduling FAHU
3. Continuous Savings achieved as measured by the comparison to the baseline.
4. Real savings of up to 20% achieved.
5. Return on investment – 24 months.

“ Emirates Energy Star program aims to connect 100,000 buildings in Dubai to the system within five years. ”

