

SMART CITIES: A PATHWAY TO INCLUSIVE GROWTH

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With smart grids, growing cities can leapfrog into the heart of the future while simultaneously making their energy infrastructure stable, reliable and efficient. Such grids offer flexibility to match the demand for and supply of variable sources, and allow resources such as natural gas to be optimised for every generated unit of electricity and water, thus saving energy, minimising harmful emissions and creating a healthy city that can successfully compete at an international level.

At the core of a modern city, smart grids regulate multi-directional flows of energy and water that support power generation from different sources, centralised or renewable and/or dispersed. Although most consumers do not realise this, net metering and flexible tariffs for variable sources during different times of the day are the result. Accurate, online information flowing from the grid has the profound ability to enhance network management and raise the standard of service for citizens, small and medium enterprises (SMEs) and large corporations.

Smart grids will also provide greater access to electricity generation and storage systems, such as solar roof panels, cooling pumps and ultra-efficient heat pumps. In addition, advanced information networks will not only result in the more efficient use of the grid, but will also enhance transport systems by providing better access to low or zero emission vehicles (hybrid or electric). Incorporating advanced smart technologies into the grid and combining this with existing and new green buildings will also improve the network's resilience, efficiency and reliability. As the advantages are enormous, smart grid technology is forecast to become a multi-trillion dollar industry by 2050, accommodating a whole new landscape for start-ups and investors in all the utility sectors.

SMART MIDDLE EASTERN CITIES

The Middle East is on the brink of an energy transition that will affect all walks of life. Oil-

producing countries can no longer depend solely on hydrocarbons. In the long run, they will have to shift to more sustainable resources such as solar power or wind power. Modernised grids, SMEs, large corporations, cities and national jurisdictions will play a key role in this transition. Moreover, smart grids will not only improve network resilience and reliability, but also result in energy savings (especially natural gas) and have a positive effect on the efficiency of the present-day infrastructure. In the near future, they will also enhance the quality of life by creating a breeding ground for innovation, higher-level jobs, better education, transport and healthcare in a less polluted environment, and hence serve the current policy objectives of Arab states.

Due to abundant natural resources, governments and regulators in the Middle East used to be driven by a centralised producers' supply model that focused on expansion. Within the next 20 to 30 years, that dependency will come to an end. Not only will technically recoverable natural resources in the Middle East start to decline, but the existing electricity infrastructure also seems to be reaching its limits and will become unable to support continuing growth in demand. Power shortages are becoming more common. The export of natural resources and rising differences between the base load and peak demand put a strain on the infrastructure. A growing urban population will increase this effect.

Renewable energy sources such as solar power, solar cooling or ultra-efficient heat pumps could gain ground and are rapidly being implemented – but cannot provide enough electricity to fill this gap. Meanwhile, advances in wireless telecommunications technology are penetrating regional markets in the Middle East fast. Modern information technology will attract high profile workers. A recent study shows that connected cities (smart grid cities) with highly skilled, educated, innovative and entrepreneurial workers



have a higher GDP growth rate as well as lower unemployment and higher office occupancy rates.

These characteristics offer excellent prospects for cities in the Middle East. Although a smart grid infrastructure is in its infancy and two-way telecommunication and energy flow models have not permeated the hearts and minds of the citizens yet, the vast majority of the population – who are rich, highly educated and very mobile – want to be on the cutting edge. They are eager to use the best and latest technologies, not only to distinguish themselves as pioneers in the world but also to harvest the fruits of this first-mover advantage. It should not take much for civic leaders to convince consumers to adopt smart technologies and at the same time learn from international experience for maximum benefit.

THE WAY AHEAD

Middle East countries have the workforce as well as the investors to establish the world's first cost-effective smart city. Projects and trials on a small scale have already taken place, showing the potential of smart grid technologies.

Smart cities are, in a nutshell, all about interconnectedness in a constrained world.

In contrast with Europe and North America, Middle East cities do not have an ageing gas infrastructure. Cities like Dubai, Abu Dhabi and King Abdullah Economic City are modern and electricity-based. Regulators are forward-looking and municipalities have budgets for innovation. That being said, a cultural change is needed to

convince customers, suppliers and governments to transform smart grids into smart cities and maybe even a Power Matching Emirate in which all information about energy and water flows is interconnected.

Whereas customers must be made aware of the advantages of smart grids, leading to monitoring devices and iterative action, producers and suppliers ask for more reliability, lower energy losses and the expansion of the power grid. Cities in the Middle East can learn a lot from international experience and first-class examples and at the same time ensure that smart grids are adapted in the most cost-effective ways. If successfully introduced, smart cities offer far more than just operational excellence, environmental compliance, reliability, security of supply and consumer participation. They will create incentives for start-ups beyond the information, communication and utility sectors, they will boost commerce and investments, and they will provide clean transport and better access to healthcare. But above all, smart cities are the best way to reduce the tremendous strain on present-day infrastructure and enhance the quality of life in the hot climate of the Middle East. ■

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