

SMART GRID OFFERS SMARTER ALTERNATIVE

By Roy Hodges

The effective management of energy resources has never been so critical. With fuel prices once again on a strong upward trend, concerns about pollution and the environment and a new fear of nuclear energy triggered by events in Japan, the need to optimize our finite energy resources has driven producers and consumers alike in the Middle East to seek out solutions to address the problem.

Electricity authorities in the Middle East face oil deficits, budget cuts, decreases in natural resources and political disputes leading some of them to do the unthinkable - cutting domestic power supplies as a way of power rationing.

Restricted energy supply has already led to problems across the region. Lebanon suffers from a lack of fuel that makes it impossible to manage reliable power supplies: power outages from 1 to 20 hours a day plague in its southern regions. In other countries, like Iraq, the traditional grid does not even have the capacity for domestic use, leading to power outages in many areas where electricity is only available for a few hours a day.

Egypt, which has become a topic of the moment for reasons other than its energy needs, has also recently experienced the regional energy crisis, choosing to stick with a traditional grid solution and setting out a federal plan to increase its grid by 500 megawatts at huge cost to the country. And even the UAE, an affluent oil producing nation, has suffered power cuts in the hot summer months.

Even as the GCC adds more countries to its regional grid to enable it to share excess power between countries, power consumption continues to rise and electricity crises in Iraq, Palestine, Egypt, Lebanon and others are still becoming more of a problem. Coupled with the increased cost and scarcity of energy sources available to countries, the need for a solution that manages demand, minimizes loss and encourages sensible consumer behavior is now more critical than ever.

Smarter management

The two biggest problems for utility companies, when distributing energy, are managing peak demand and minimising energy wastage. Electricity can't really be stored, so if you need it now, you have to make it now, and when you make it, you use it or lose it. Continued expansion of generation capacity is essential to meeting long term demand growth and ultimately involves building more expensive power stations and widening the distribution grid. Recent technology advances can mitigate this requirement by using a smarter solution - one that can manage the entire utility supply chain from generation, through transmission and distribution to consumption by the end user, and all in near real time.

A Smart Grid upgrades grid communications infrastructure to enable real-time management of the electricity grid and its components. Being able to read electricity meters every 15 minutes instead of once a month, for example, allows a far greater understanding and forecasting of user demand. Extending this capability to the end users themselves, via an Internet portal, allows customers to monitor their usage by time of day and even by type of device, increases conservation awareness and saves customer costs with adjusted usage patterns. Remote immediate disconnect and reconnect improves customer service and satisfaction. Real time feedback of the entire distribution system allows better outage management for the utility, while reducing downtime and enhancing customer communications.

A service area-wide Smart Grid network is a complex "network of networks" infrastructure that invariably requires multiple communications layers and technologies such as fibre and metro-scale wireless infrastructure. It has to have "utility grade" resiliency, security and reliability, and must deliver complete connectivity to all grid components, including customer meters located throughout the service area. Fortunately, such technology is now available, proven and cost effective, with many deployment examples around the world, including in the Middle East.

The business case for building such networks is now becoming inescapable, with the network infrastructure and deployment costs and schedules normally being a fraction of the cost of the new power generation facilities they can save. Utilities can often leverage important current assets, such as sub-station buildings and existing fibre infrastructure to accelerate deployment schedules and minimize costs. The network infrastructure can be multi-use, allowing the deployment of multiple Smart Grid applications such as metering, SCADA control and mobile workforce automation over the same infrastructure. Each application is provided with specific bandwidth, service quality and appropriate security policies up to the most stringent, military grade security if required. Delivering true broadband data rates, properly designed Smart Grid networks have sufficient capacity to even support non-utility applications such as WiFi Internet, totally independently and securely over the same infrastructure.

Smarter consumers?

Nearly all utilities have a small but significant percentage (up to 5% or so) of their generation capacity standing idle for all but a few days a year of peak demand. Clearly, if demand can be leveled out to eliminate this peak, better use can be made of all generation plant, and expansion plans can be deferred - a significant saving. Smarter consumer and business usage behavior can achieve this saving. So customers must be encouraged to play an active role in saving electricity, normally via the stick-and-carrot approach of variable "time-of-use" tariffs, currently being considered by many regional utility companies, coupled with conservation awareness, education and incentives. In other words, it is important for consumers to understand that whilst a Smart Grid promises savings for responsible usage, irresponsible usage may come at a premium. For some, the cost of energy usage could go up.