Mobile Energy Efficiency

Digicel group

Digicel Jamaica deploys next generation power saving software technology to cut radio access network costs

Serving two million customers, Digicel Jamaica is the flagship Digicel franchise in the Caribbean region. The company has committed itself to reducing energy costs and slashing its carbon footprint, taking numerous steps to become a truly green company. These efforts were significantly boosted by the deployment of eVolution Networks' Smart Energy Solution (SES) in May 2012, allowing Digicel Jamaica to reduce energy consumption across its network of base stations. The deployment of SES in May 2012 has already provided Digicel with an annual energy saving of $450 000, and the recent expansion in SES operation hours is expected to save Digicel up to $1.4 million annually, while simultaneously reducing the company's carbon footprint.

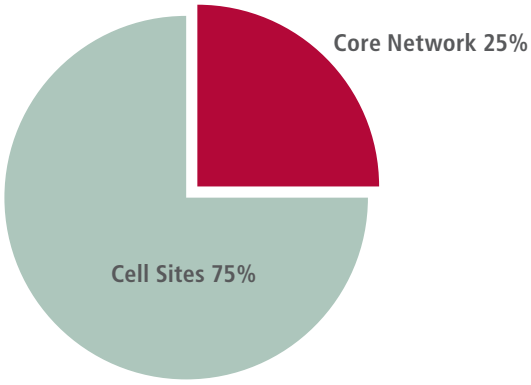
Background

With more than 13 million customers across 30 markets, the Digicel Group is one of the leading mobile telecom operators in the Caribbean, Central American and Pacific regions. Digicel is headquartered in Jamaica—one of its most important markets.

Electricity prices are very high in Jamaica—over twice that of most European markets—so Digicel Jamaica has always tried to aggressively manage its energy. The Company's new headquarters in Kingston incorporates solar power, wind power and energy efficient cooling systems. Its network already employs efficient cooling solutions and it has also implemented energy-saving software features provided by equipment vendors. Digicel Jamaica was therefore keen to test and implement eVolution Networks' innovative new software solution that promised significant additional energy savings by deactivating base stations during off-peak hours, while ensuring that subscribers are provided with continued high quality of service.

Over the last several years, Digicel Jamaica has significantly upgraded its network, adding numerous base stations across the country in an effort to better manage increased data traffic. While the larger network has allowed the company to increase its customer base and offer more services, it has also dramatically increased its energy costs. When combined with the already high price of energy in Jamaica, the cost of maintaining the network throughout the day has become very high for Digicel Jamaica. In response, the company has committed to significantly reducing its energy costs as well as slashing its environmental impact. When conducting an internal review of its energy expenditures, Digicel identified base station energy consumption as a natural target of action, as this accounts for 75 per cent total consumption, see Figure 1.

Figure 1: Energy consumption breakdown of Digicel Jamaica



Opportunity

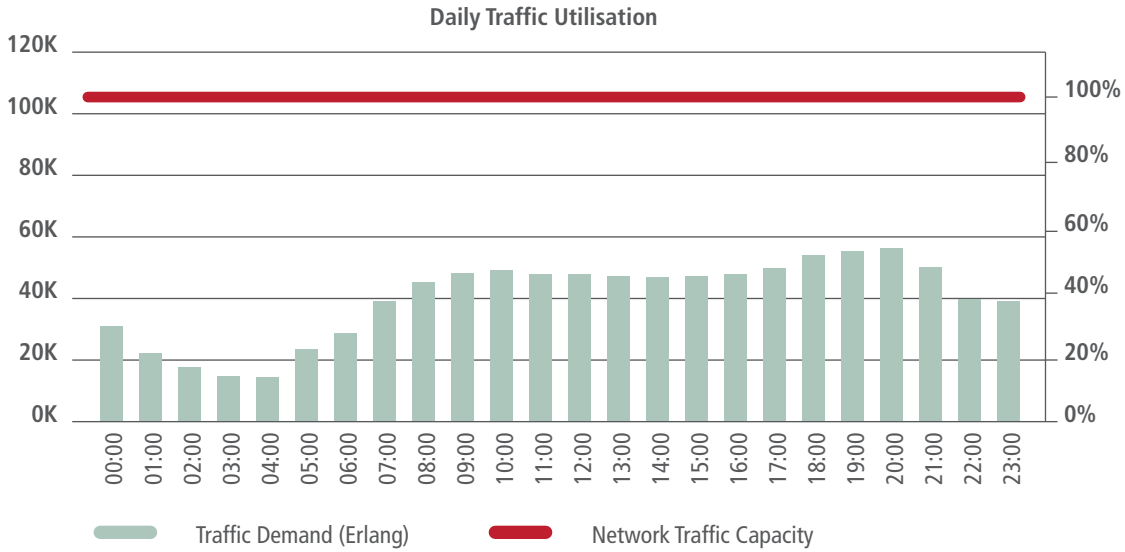
To assess the opportunity, Digicel Jamaica asked eVolution Networks to perform an in-depth analysis of the available traffic capacity of its network as well as the daily and hourly traffic demands at both the network and cell site level.

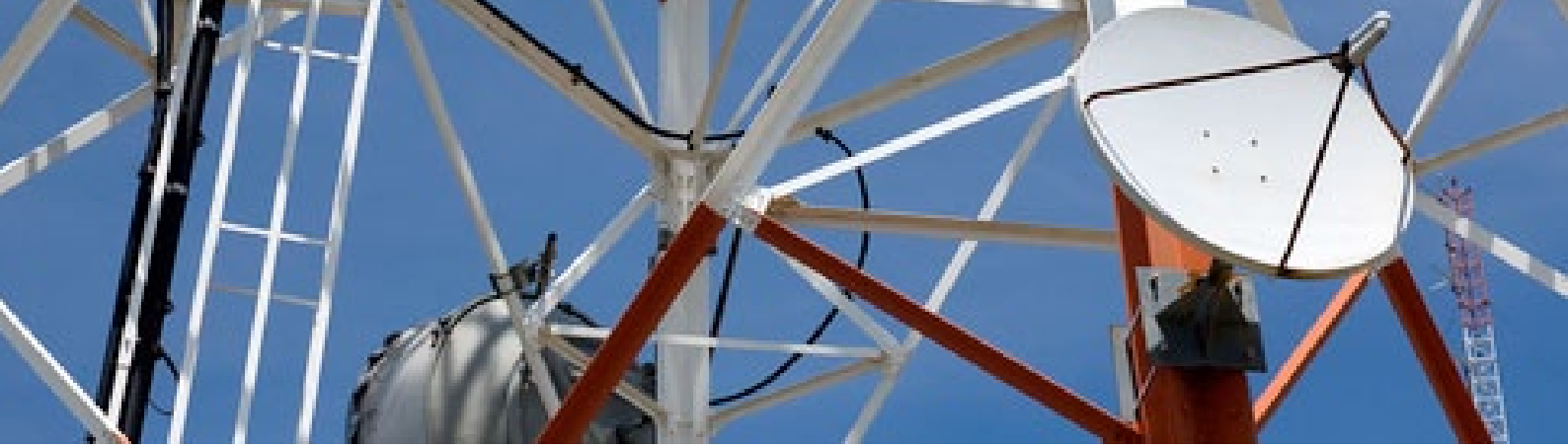
The traffic capacity analysis indicated that during the peak hours of most days, only 55 per cent of the radio network's available traffic capacity is actually used, see Figure 2.

This gap between traffic capacity and actual traffic demand must exist in any network that provides a high level of service, as networks must be built to handle unusually high traffic demand, for example during holidays or special events. However, maintaining this high level of traffic capacity on a 24/7 basis requires a great deal of electrical energy resources for the base stations.

At cell sites, the traffic analysis showed that some sites might have experienced traffic demands that almost exceed their offered traffic capacity, while others barely reached 30 per cent utilisation. To save energy consumption at the base station level, a viable solution was required that was capable of making real-time decisions regarding the deactivation or reactivation of a base station, based on up-to-the-minute traffic demands as well as Key Performance Indicators (KPIs) at both the base station and the coverage zone level.

Figure 2: Digicel Jamaica's network traffic demand versus available traffic capacity, Erlang





Solution

In order to reduce base station energy consumption, Digicel Jamaica deployed eVolution Networks' SES in May 2012 across 450 base stations, serving an estimated 1.2 million subscribers. As soon as it became operational on the Digicel Jamaica network, SES automatically conducted a thorough radio coverage analysis, as well as a deep study of typical daily traffic patterns, of every base station across the network. This enabled SES to create individual traffic profiles for each base station in Digicel Jamaica's network and to establish which base stations could be safely deactivated while still maintaining coverage and traffic integrity.

The system's built-in quality of service assurance module provides constant supervision, preventing the system from deactivating base stations in areas where there is a risk of service quality degradation or traffic congestion. This guarantees that Digicel Jamaica continues to provide uninterrupted, high quality service to its customers.

As SES is a fully-automated, intelligent software solution that fits seamlessly into any multi-vendor, multi-technology (2G/3G/4G) network, Digicel did not have to invest any additional capital in its base station hardware, allowing its engineers to continue working as usual without having to spend any time or attention on system maintenance.

Results

Initially, Digicel tested SES overnight in daily operation from midnight to 6am. Both Digicel and eVolution Networks engineers conducted a full KPI analysis of the network during nightly operation of SES and found that it had no impact on the network's KPIs and quality of service, which remained well within the acceptable levels. In order to measure and monitor the energy savings, Digicel used smart electricity meters installed in over 450 cell sites by the Jamaican electricity utility company, JPS. To establish a thorough study group, Digicel analysed the measurements of various base station models from different product generations (old and new base station models) with different configurations. Based on multiple readings over several weeks, the data showed that SES had successfully reduced the energy consumption of the base stations it deactivated between midnight and 6am by an average of 32 per cent, see Figure 3.

Based on the before and after measurements, Digicel has realised annualised savings of $450 000 of the energy costs of the 450 base stations tested just by operating SES between midnight and 6am daily.

In October 2012, Digicel started increasing the daily hours of SES operation, to boost network wide energy savings. Based on traffic analysis and system performance, Digicel expects that using SES on a 24/7 basis will save up to $1.4 million in energy costs every year, equivalent to 3.5 GWh of energy reduction and 1.9 $KTCO_2$ of carbon savings, realising a 23 per cent reduction in its cell sites' energy consumption.

Figure 3: Energy reduction before and after SES operation, 3 example cell sites

Cell Site Configuration	Energy Consumption (KWh)		SES Saved Energy	
	12am to 6am Without SES	12am to 6am With SES	6 Hours (KWh)	% Reduction
Ericsson RBS6201 Busy Suburban Monopole Site	41.75	26.75	15	36%
Ericsson RBS2106 Busy Suburban Roof-top Site	31.25	22.25	9	29%
Ericsson RBS2106 Small Town Roof-top Site	21.5	14.5	7	33%

The hardware-free SES system provides a rapid ROI to customers that begins to realise substantial energy savings from day one. Digicel Jamaica expects savings to increase as the price of energy continues to rise and despite increased subscriber demand.

"Since deploying eVolution's SES, we have been able to drastically reduce our energy consumption at the base station level. SES was simple to roll-out and we began to immediately recognise reductions in energy use. The solution fits seamlessly into our network and allows us to cut our carbon footprint while continuing to provide uninterrupted service at the highest levels of quality."

Stephen Curran, Network Design Director of Digicel Group

Digicel is one of 35 mobile operators participating in the GSMA's Mobile Energy Efficiency Benchmarking service.

For more information visit www.gsma.com/mee.