

The Israel Electric Corporation uses Automated Meter Reading as part of Roadmap for the Future

The Israel Electric Corporation (IEC - www.iec.co.il) is the sole integrated electric utility in the State of Israel. It generates, transmits and distributes substantially all of the country's electricity. In 2006 it served a population of 7.1 million, with 10,899 MW of capacity and a peak demand of 9,450 MW.

Like many large utilities, IEC plans to transition to Automated Meter Reading (AMR) for a variety of reasons, from future readiness to offer prepaid services and remote shutoff to labour savings and theft prevention. IEC was looking for a fully on-line remote Automated Meter Reading solution using a fixed network, with wireless cards connected to meters.

Israel is a highly urbanized country characterized by high-rise buildings in dense urban environments. Any wireless solution had to contend with these challenges, which include the ability to install meters with wireless components in multi-story, multi-tenant buildings, as well as the ability to overcome RE interference associated with these installations. The radio signal has to pass walls and floors. Gateway units can only be installed at points that the electric company controls: other meters or street-level pillars. This results in a network that is fully owned and controlled by the electric utility.

To evaluate the feasibility of AMR, IEC decided to install 100 AMR units in one of the neighbourhoods of Rishon Le'Zion. This dense city of 230,000 is located south of Tel Aviv and grows at a healthy annual rate of 5%.



Figure 1: *Aerial picture of Rishon Le'Zion*

Motorola Israel acted as the system integrator for the pilot. Motorola chose Virtual Extension's product since it met the three main requirements of the IEC:

1. Range: the range between the units (nodes and gateway) should to be enough to offer a feasible solution. Most AMR solutions are severely range limited, and at 50 meters or less, become non-economical. Conversely, Virtual Extension solution was installed at the pilot with a range of 220 meters.

(continues on next page)

2. Coverage: even with the farthest distance between units, the probability of coverage, i.e. a robust radio signal, even between floors in a building, has to be 100%. Otherwise, the IEC cannot roll out the solution – losing signals will require expensive revisits and ultimately, the combination of another technology solution, such as wires or repeaters. 90% coverage or low range do not mean a 90% solution; they mean no solution.
3. Ownership: all aspects of cost of ownership should be addressed - from a low installation effort both by field staff, and little or no IT effort related to routing or provisions, through to the ability to keep the network to street pillars, thus avoiding the need to install at third party sites and meters, as well as the ability to use the free unlicensed frequency band, without the need to pay for cellular or frequency licensing.

Virtual Extension solution resolves these challenges by an innovative approach designed specifically for mesh radio networks. Instead of investing in computing power to choose the best radio path and route data between nodes, Virtual Extension takes a simpler and more robust approach based on Diversity Path Mesh technology, resulting in space diversity.

Rather than transmitting in one or two radio paths, the system transmits in a multitude of radio paths, actually all possible radio paths simultaneously, thus increasing range and bringing coverage to 100%. This simple method creates a robust network. The installation requires no trained staff, since the only thing that needs to happen at installation is for the node to be turned on.

In August 2005 IEC began installing meters with Virtual Extension's wireless cards. The meters installed were AMPY meters integrated with a Virtual Extension card. A total of 100 such meters were installed at ten eight and four-story buildings. Untrained IEC staff installed the units, since the network requires no configuration and the wireless card indicates it is on the network within minutes of operation. The farthest building in the AMR pilot stands 220 yards from the gateway which is installed at an IEC pillar at street level.

The meter units are polled every three minutes. Data is then wirelessly transmitted through the gateway to the IEC backbone, using a Motorola point-to-point radio.

Since then, the system has been operating flawlessly, without any reported problems, despite frequent periodical tests.

Key solution system information:

- Operates at 870/915 MHz
- Standard single phase Ampy meter
- Frequency Hopping Spread spectrum (FHSS)
- Wireless RS 232/485
- 100 mW output power.



Figure 2: AMR Meters in use in Rishon Le'Zion

June 4, 2008