ABB modems string together the world’s busiest city
There’s life in $^{29}\text{Cu}$ yet
With a population of seven million people, Hong Kong is among the most densely populated places on the planet. Rows of tower blocks, terraced together into a single monolith, pack millions of people into the world’s most valuable real estate, and place an enormous strain on electrical infrastructure.

Despite the challenges involved, Hong Kong utilities still deliver world-beating performance. A typical Hong Kong customer would experience no more than 2.6 minutes of power outages a year, while those in New York, Sydney, or London, could expect to lose power for between 19 and 40 minutes every year.

Maintaining that performance requires constant investment, but when digging up roads isn’t an option and the modems start failing, a better approach is needed to ensure reliability. This is where modems and flexibility of ABB’s RTU500 series come into play.

The legacy architecture of the existing network in Hong Kong was based around modems, extending pilot wires to provide remote sensing. The topology was based on a star configuration, with modems being used as repeaters on very long lines – some more the 20 kilometers in length. The system was getting old, and the reliance on individual modems provided single points of failure, which the utility wanted to avoid. They approached ABB and asked for a better solution.

Tight restrictions on space meant that new equipment had to be at least as compact as the units it would replace. Land in Hong Kong is amongst the most expensive in the world, so substations cannot be extended. Fortunately ABB has extensive experience fitting impressive performance into diminutive packages, and delivered more than 6,000 modems to Hong Kong.
Not only are the ABB modems ruggedized but, more importantly, 18 of them will fit into a 19-inch rack. Where racks aren’t available, the modems can be mounted on a DIN rail, and, with new transducers, the lightning protection of the equipment has been significantly enhanced.

But this is only the start of renovations in Hong Kong, as the local utilities have great plans for the future.

The next step may be to remove the single points of failure, not by laying new cables, but by creating a ring topology that provides a redundant route in case of component failure. In this scenario, the modems will continue to carry a pilot wire signal, but an Ethernet connection between the modems at each end will close a loop, ensuring that communication can’t be interrupted.

Once the loop is in place, and Ethernet signaling is providing increased bandwidth over the existing cables, then opportunities arise for other applications to use the same infrastructure. Meter reading is an obvious step, and automated commissioning, but video streams and other communications can be also be carried once this infrastructure is in place, creating a world of opportunity.

The size and shape of Hong Kong presents unique challenges to utilities. Another city would dig up a road, or push tunnels though the soil, but with tower blocks on every corner and streets already overwhelmed with traffic. That option isn’t available in Hong Kong. The alternative, as ABB has shown, is to squeeze more data and more reliability out of the existing infrastructure, replacing the equipment at the ends of the wire rather than along it. Copper in the ground still carries most of our telecommunications, and with solutions like ABB modems used in Hong Kong, it will continue to do so for decades to come.
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ABB AG
Power Systems Division
P.O. Box 10 03 51
68128 Mannheim, Germany
Phone: +49 621 381-3000
Fax: +49 621 381-2645
Email: rtu-sales-support@de.abb.com

www.abb.com/substationautomation