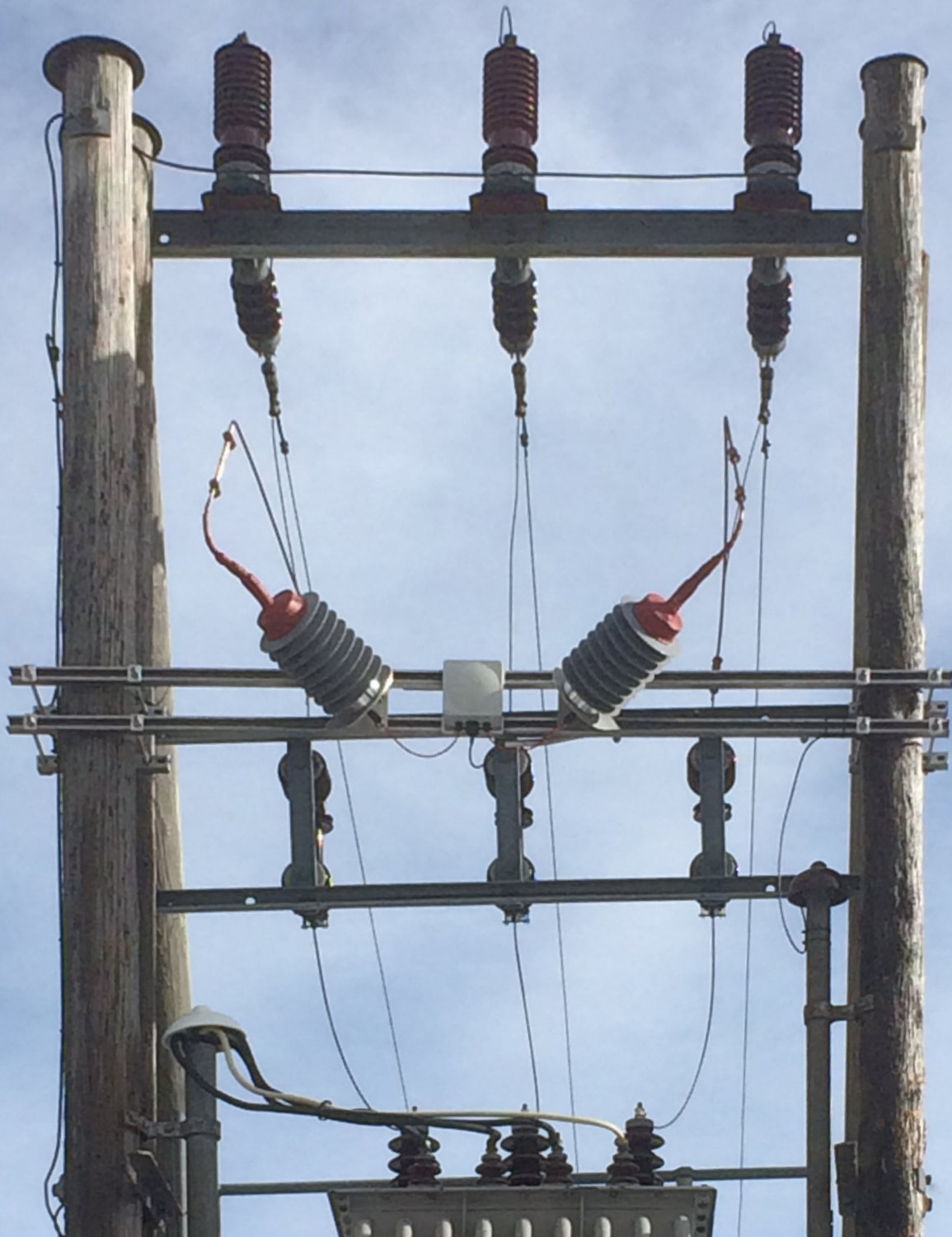


# Broadband Powerline Solutions for Medium Voltage Networks



# BPL for Medium Voltage Grids

**On medium voltage power lines Broadband Powerline (BPL) Communications offer a cost-effective platforms for smart grids. Using the existing infrastructure, and with the minimum of operational disruption, BPL devices can be installed everywhere on the medium voltage grid to provide secure, reliable data communications for smart grid operations and application.**

## Solutions for all MV networks

PPC has more than 15 years experience developing medium voltage BPL solutions, in underground and now in overhead networks. Now, both urban and rural environments can be connected with BPL.

Our new overhead line solutions are proven in the field, representing a major breakthrough in smart grid communications. TCP/IP communications throughout the entire grid are now available to network operators, even over long distances: up to 2km on underground and up to 4km on overhead lines - point to point - and even further with repeating.

The 4th generation of our BPL system is IEEE 1901 compliant and fulfils the need for stable, high performance communications for smart grids, combined with the low cost of powerline communications.

As well as being the most cost effective communications solution for major roll outs, BPL provides an easily scalable platform with low operating costs. It offers the best availability and accessibility to applications anywhere in the power network.

Broadband data transmission from devices to network operators' data centres:

- enables direct, two-way communications with all connected devices in real time,
- allows end-to-end encryption using advanced security standards such as TLS and AES 128,
- guarantees future proof communication according to IPv6 and IPv4 standard.

The broad frequency bandwidth (approximately 1,000 OFDM carrier frequencies) offers maximum robustness against interference, with plenty of bandwidth for Big Data applications.



Rugged BPL Modems transfer data via couplers to the MV Network

A BPL network automatically adapts to grid conditions, enabling easy automation and operation. The Network Management System enables detailed monitoring and status analysis of each BPL connection.

## Field of applications

MV BPL can serve as a backbone for Advanced Metering Infrastructures. It enables network monitoring, network automation, smart grid and all distribution automation applications, such as fault location and demand response.

# BPL on Underground and Overhead Power Lines

## BPL on MV overhead lines



Until recently, powerline communications on overhead lines was limited to narrow (PLC) bandwidths, only capable of intermittent data transmissions. PPC has developed an outdoor IP67 coupling solution that enables continuous broadband data transfer; bi-directional and in real time on overhead lines of 12kV and 24kV.

Built to withstand the rough conditions of the overhead network, the MV coupling solution is deployed in the field already in three countries achieving broadband data transfer distances many times further than was previously possible,

	Data rates	Distance
<b>Spain</b>	9.0 Mbps	1.65 km
<b>Germany</b>	5.3 Mbps	3.45 km
<b>Poland</b>	6.9 Mbps	5.10 km

representing a major breakthrough in MV data transmission.



Field proven

## BPL on MV underground cables, switchgears and substations



PPC's capacitive couplers have been developed for the transmission of broadband signals over 12 kV and 24 kV networks., connecting the electricity grid with BPL modems.

Their compact design makes them ideal for use underground, in compact gas and air-insulated switchgears and in substations where space is limited.



# Case Study: Middle East's largest MV BPL Installation

## Medium Voltage BPL in Doha, Qatar



**Siemens installed a medium voltage backbone infrastructure for middle eastern utility Kahramaa. The BPL network connects 1,000 MV/LV substations, serving more than 88,000 households.**

The BPL installation in the 12kV medium voltage network was carried out in a series of 'loops', each connected by a medium voltage link. Each section of the loop was isolated for installation without interrupting the power supply.

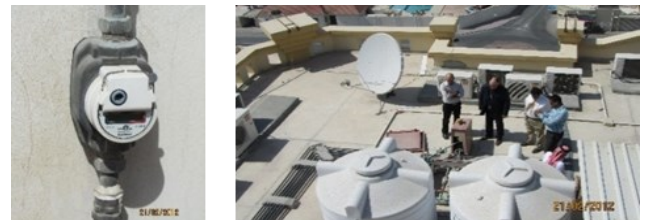
*"Uncomplicated data transmission over Broadband Powerline represents a crucial development for us and our customers. This is a very important milestone for us, and for Kahramaa."*

Junaid Mohammed, Project Manager, Siemens

The resulting broadband data availability, combined with Siemens EnergyIP software, means large volumes of data from Smart Meters can be automatically read, processed and submitted for billing, demand planning and future customer-facing applications.

BPL was the ideal choice because of its potential to carry real-time, two-way data traffic. It uses existing powerline infrastructures.

- Unlike wireless solutions, BPL can reach and decode signals from clusters of devices in diverse and hard-to-reach locations
- The critical devices are installed in the substation rather than on customer premises
- Installation in a meshed network could be achieved without down time



Overall an estimated 100,000 measurement points available to Kahramaa's AMR system, making it currently the largest deployment of MV BPL in the Middle East.

### Project Summary

<b>Goals</b>	Modernise the city's power grid communications to meet massive population and infrastructure growth
<b>Solution</b>	BPL Meshed network connecting 1,000 MV/LV substations, connecting more than 88,000 households
<b>Challenges</b>	Metering points in locations not readily accessible and exposed to extreme conditions
<b>Products</b>	Medium Voltage BPL Solution comprising Rugged Modems and BPL 12CC Capacitive Couplers
<b>Result</b>	Middle East's most extensive Broadband Powerline installation