

PLC CHALLENGES AND PROSPECTS IN PAKISTAN'S MARKET

Overview – selection of communication technology

Being a corner stone for future smart grids, smart meters are being deployed all over the world. This intelligent technology is a combination of electronic meters and two way communication protocol for information, monitor and control known as an advanced metering infrastructure (AMI) system. Many communication technologies can answer the technical requirements of smart metering applications. The choice is usually a combination of several technologies derived from characteristics like urban vs. rural, ground topography, meters accessibility, coverage etc.

PLC as a communication protocol

One of the major challenges faced by decision makers is to select the appropriate technology for communication. In Pakistan, power line communication (PLC) is a popular technology that uses the existing power lines to transmit high speed (2-3 Mbps) data signals. In a typical PLC network, smart meters are connected to the data concentrator through power lines and data is transferred to the data center via cellular network technologies.

PLC can be considered as a favourable technology due to the fact that the existing electricity network decreases the installation cost of the communications infrastructure. It consists of many standards and technologies covering the spectrum of both narrowband and broadband communications. For smart grid applications, high data rate technologies are required. The hostile nature of the power line also demands a robust modulation technique. These requirements are addressed by the development of high data rate narrowband solutions such as

PRIME (PowerLine Intelligent Metering Evolution) and G3-PLC. These standards are bi-directional and use OFDM (orthogonal frequency division multiplexing) for sustained resilience against attenuation and interference.

Although PLC provides a cost effective structure for communication, it is associated with a number of issues which need to be critically considered for the multi-faceted applications of smart grids. These include noise disturbances, electromagnetic compatibility issues as well as varying channel characteristics and models (topologies). Also, it is dependent on the grid architecture i.e. number of meters per transformer and can prove to be a very expensive solution in terms of concentrators in addition to the bandwidth being too short for some applications.

Global trends

The European market has utilised PL in PLC in integration with cellular networks for certain areas mainly because of the strict regulations of RF spectrum in Europe which limit the access to frequencies used for RF based solutions. Secondly, the European architectural characteristics promote PLC as being less favorable for wireless communications. However the in the US, utilities have widely adopted RF Mesh solutions for a reason that the American electric grid characteristics i.e. the number of meters per transformer are much lower than in Europe and thus tend to make PLC too extensive with a technology that does not go through transformers.

Current market

For countries like Pakistan where most of the power lines are decades old causing

line losses and poor communication capabilities, distribution network is not suitable for implementing PLC technology. It requires an extensive rollout cost to change the power lines with a planned layout to minimize the losses and improve efficiency. There is enough electromagnetic interference especially in the narrowband PLC spectrum due to appliances installed in the current network. Also, it requires to install concentrators and filters for every group of 50-60 meters which eventually leads to a huge initial investment.

Secondly, PLC requires effective network management for which utilities in Pakistan are not currently skilled. Some initiatives are taken by global entities like the Asian Development Bank, which is investing in Pakistan to improve grid infrastructure and introduce the latest technology-based AMI solutions in the major cities of the country.

Pakistan has one of the best cellular networks in the world with GSM/GPRS services comparatively cheaper and readily available in almost every part of the country. While comparing the amount of initial investment with other technologies, although there is third party involvement in GSM based solutions, the initial investment is still less when compared to PLC. In parallel, RF communication technology with all its potential solutions is facing constraints because of limited coverage issues. Considering the scenario and economic conditions of Pakistan, GSM based communication for AMI is most feasible and sparingly viable for the country. However, this in return requires assurance from cellular companies to continue providing long term services at economical tariffs to maintain the business sustainability. ■



COMPANY DESCRIPTION

Established in 1992, MicroTech is a technology company owning distinctive solutions in diversified fields of power and communications. MTI produces an extensive variety of complete AMI solutions including RF, GPRS and PLC enabled smart meters, RF gateway and Meter Data Collection software that meets the needs of both utilities and consumers.

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