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Innovative ways to build underground power cables and communication networks in strategic partnerships with utility pipe owners

JEYAPALAN J.K., Dr Jeyapalan & Associates, LLC, USA

**Abstract:** Most countries have long had the desire to move their overhead power lines to the underground. Cost and the underground already being crowded with other utilities have prevented us from realizing this goal. The communications industry is fighting for its survival because of last mile bottleneck. The end users craving for infinite bandwidth already have sanitary sewers, storm drains, waterlines, and natural gas lines reaching their premises. It makes all the sense in the world to locate the last mile optical fiber and power cables in these existing rights of way on sanitary sewers, storm drains, water mains, and gas pipes.

**Keywords:** power cables, pipelines, trenchless, optical fibers, communication cables

#### 1. Introduction

Out of over 350,000 km of distribution cables in Australia, mere 6% is underground [1]. In Germany this is about 50% of the total length of 600,000 km of distribution cables [2]. The amount of cables in the Swiss market is not known [3], just like in UK [4]. In France, this is about 25% in the ground out of the total 600,000 km of MV cable [5]. In Brazil there is over 1,000,000 km of LV and MV cables, and a mere 3 % is underground [6]. In Holland, all cables are underground [7]. In Korea this is about 8% of over 300,000 km of cable [8], while the data on Japan is not widely known [9]. In North America, a small percentage of the cables are laid underground [10]. More detailed analyses of the current installation practices are given in [11]. In Europe overall, as one moves more south, more and more cables are above ground.

A survey by the author indicates that most countries around the world would prefer to move their overhead power lines underground to cope with inclement weather, to have less frequent outages, and for better aesthetics. After the latest ice storm damage and power outage for unduly long periods, HydroQuebec in Canada has decided to move most of their cables to underground, but is doing at an enormous cost and a project execution time taking

**Résumé:** La plupart des pays ont le vœu d'enterrer les lignes aériennes. Le coût et l'encombrement ont souvent empêché d'atteindre ce but. L'industrie des communications combat pour sa survie en raison du goulot du dernier mile. Les utilisateurs désirant l'accès à la large bande ont déjà des égouts, des conduites d'eau, de gaz.... atteignant leur site. Il semble raisonnable d'intégrer la fibre optique du dernier mile et les câbles électriques dans ces couloirs existants.

**Mots clés:** les câbles électriques, canalisations, trenchless, fibres optiques, communication câble

several years. In most countries with the desire to move power cables below ground for the above reasons, the cost of construction and the lack of rights of way have prevented this from being implemented.

Similarly, a much bigger problem has been brewing within the communication industry and this is the last mile bottleneck. Because of this, none of the old and established rules for making money in the communications market would work anymore. The melt down among the stock values in the telecom space over the past few years is a proof of this concept. Therefore, the communications industry needs new ways of doing business. In the old set of rules, the optical cable and the power cable companies always thought in terms of having to make their permit applications to the city council, wait forever for approval, make open cuts of the highly trafficked roads in the busiest parts of our highly populated cities, and lay their cables in their own conduits at an enormous first time cost. These forced most cities to discourage new open cut excavations involved. The very governmental, commercial, and residential end users who are craving for infinite bandwidth through optical fiber networks coming into their premises already have sanitary sewers, storm drains, waterlines, and