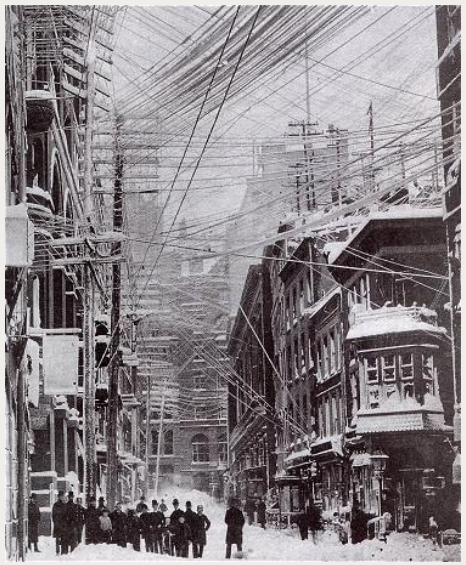
Paris Session 2022

Innovative markets for mutual sharing assets of electric distribution power and data transmission in fiber optic infrastructure

Study Committee Electricity Markets and Regulation C5
PS3-Q2

C.Nascimento - Brazil

1-Introdution of Synergic Network



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Three dimensions of main gains desired in of Electricity Markets of Synergic Network.

Dimension of gain desired
decrease the cost of Electricity Energy: The evolution of energy and telecommunication technologies in synergy way accelerates the optimization of O&M procedures. The Synergic Network shares its assets causing huge financial gains the Electricity Market.
increase the number of suppliers and clients into the Electricity Markets: Open the electricity market for improve competition.
sector regulation and tariff design opportunities in the face of technological disruption: The smart grid network needs to be implemented faster than now in order to expand Electricity Market in the electricity sector.

Optical Phase Conductor - OPPC

2-Synergic Network Model

$$DCF = \sum_{t=1}^{n} \frac{b_t - g_t}{(1+j)^t}$$

Normalize DCF of MV Implementation and O&M of SN (Urban and Rural).

DCF(28 years)	Conventional Distribution Network	Synergist Network configuration	Synergist Network scenario 1 (dedicated fiber to energy)	Synergist Network scenario 2 (shared 10 fibers in Urban to data)
New MV (Urban + Rural)	new MV + F.O. cables in pole shared space (1.00)	single-phase	(0.75)	(0.41)
		three-phases	(0.94)	(0.61)
Exist MV (Urban + Rural)	install F.O. cables in pole shared space (0.79)	replace single-phase	(0.68)	(0.35)
		replace three-phases	(0.98)	(0.64)

Simulated scenarios basically differ in the sharing or not of the excess of 10 optical fibers;
The normalized value “1.00” represents the simulated total cost of CAPEX and OPEX of Conventional Distribution Network plus fiber optical cable installed in the pole shared space

3-Conclusion

• SN Networks less subject to vandalism, especially in MV where the optical fibers are inside of MV cables;

• Alternative for large centers that have totally polluted poles and no space for new conventional fiber optical networks;

• High performance network and availability when compared to others smartgrid technologies;

• Critical System - The use of optical networks in transmission and distribution network has been gradually recognized by energy industry experts as the next big step in electrical network digitization;

• Optical fiber is an excellent data transmission way to meet Smart Grid's communication requirements.