



**Telecommunications: Explosive Growth = Investment.
Be part of the energy savings potential**



October 16, 2019

Presented by: **Steven Hiersche**

Telecom History Timeline

TELEGRAPH

Developed by Samuel Morse in the 1830's, Point to point messaging system using an electrical signal to pulse messages

COAST TO COAST

By 1861 both coasts are connected through 2250 telegraph offices. By 1866 first Transatlantic communications are established. In 1876 Alexander Graham Bell patents telephone.

POTS : Plain Old Telephone Systems

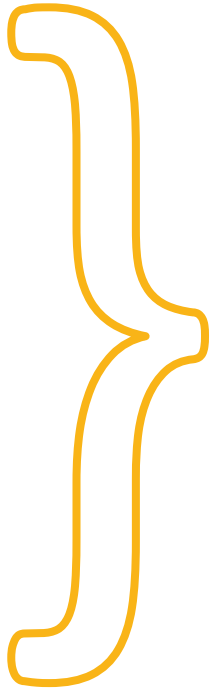
By 1900 there are over 856,000 telephones in service and 2,000 telcos in business. 1920's sees radio and television come into play and by the 1940's we see use of coax trunk line.

ENHANCED COMMUNICATIONS

Between the 1950's and 1980's development of computers, modems, and cellular communications. First video conferencing in 1968 Worlds Fair. Primary relay switching technology installed.

CELLULAR AND BROADBAND

In 1981 first cellular license awarded. In 1989 the World Wide Web is born. 1992-1995 first "Smartphone". In 1997 56k Rockwell modems are approved by the FCC for internet use. Modern "streaming" starts in 1998.



In 1915 with the use of the first direct telephone communications, Alexander Graham Bell in NY, greets his former assistant, Thomas Watson, in San Francisco, by repeating the first words ever spoken over a telephone, "Mr. Watson, come here I want you". Mr. Watson would reply that it would take him a week to get there.

Today

- Broadband infrastructure is in the midst of a revolutionary change
 - Smart Cities
 - Autonomous Vehicles
 - Smart Grid Technologies
 - Telemedical - virtual Doctors
 - Mass data streaming
 - Holographic interface / education
 - Cellular and Broadband demands

- GIGABITS of data transmission will be required by every home.



Opportunities Across the Industry

- With the migration of fiber and digital switching
 - Large “room size” copper based switches are replaced with rack size controllers based on fiber
 - Switch migrations reduce building demand requirements
 - Outdated rectifiers and UPS systems optimized
 - Airflow management
 - Economization
 - Real estate recovery (Edge computing expansion)



Case Studies

- Northern Wisconsin rural provider 2018
 - Major network upgrade from 10G to 100G
 - Network upgrade led to HVAC and power system upgrades at all 17 facilities
 - Provided 1G service to rural homes with fiber to home program
 - Connected program with supporting co-location for this customer
- National Cable provider launching national effort based on battery room savings in Illinois.
- Established relationships and solutions help facilitate faster startup times.



Ongoing Activities

- New industry standards and manufacturers driving change
 - New standards improving temperature and humidity requirements
 - Reduced loads with higher throughput (intel chipset)
- Australian provider Telstra utilizing solar and battery storage
 - <https://blog.powerbox.com.au/how-telcos-are-competing-with-utility-companies>



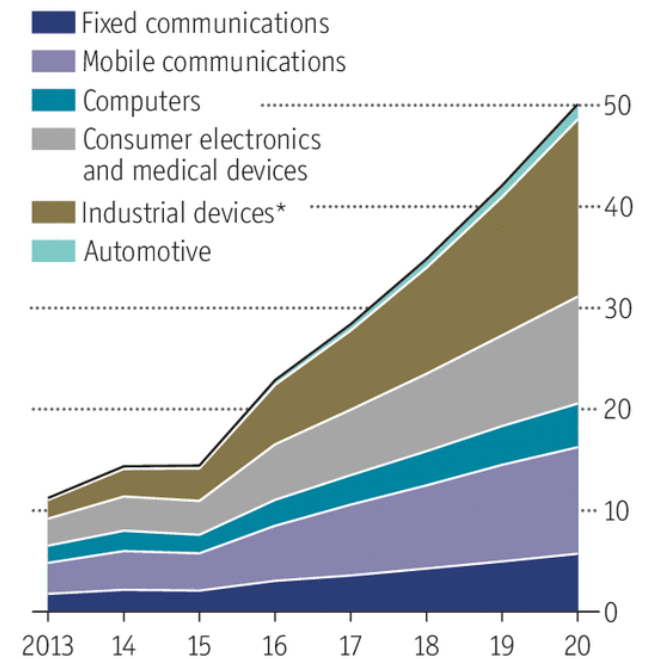
Where do we go from here?

- Connected devices and growth
 - 5G deployment
 - Next generation connected devices and system intelligence
 - Microgrids and battery storage (IT Equip is DC powered)
 - Less than 3% of measures deployed are related to lighting
- Challenges
 - 90+ percent of offered solutions are custom (Requires detailed technical knowledge for identification and realization)
 - Most providers deploy network related changes utilizing internal resources. (No external project costs)
 - Providers value customer service and reliability far above energy and financial savings (incentive rates)

The 50 billion question

5

Worldwide number of internet-connected devices, forecast, bn



Source: Cisco

*Includes military and aerospace

Questions ?

Thank You

