

Le reti di trasporto wireless a banda larga in ambito M2M consentono di erogare servizi ad alto consumo di banda ed aprono nuovi orizzonti applicativi: alcuni casi concreti



Cambium Networks

Alessio Murrone

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Assago – M2M – 14/05/2013

Who is Cambium Networks?

- 10+ Years of technical innovation and market leadership
- Focused exclusively on Fixed Wireless Broadband
 - PTP (“Orthogon”)
 - PMP (“Canopy”)
- A Mission Critical Heritage
 - Application Requirements
 - Product Quality and Reliability
 - System Architecture
- Global
 - Installed in 120+ countries
- 240+ Associates
 - Rolling Meadows, Illinois
 - Ashburton, England



Cambium Networks

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Why Cambium Networks



Orthogonal Point-to-Point (PTP) Access and Backhaul Links

- Market leader in unlicensed Cognitive Radio Technology
- Spectrally agile using Dynamic Spectrum Optimization™
- Used for the most challenging links globally!

Canopy Point-to-Multipoint (PMP) Access Networks

- Market leader in unlicensed & licensed PMP
- Ideal for enterprise access
- Voice, video and data capable

Global Customers

Industrial Communications



bp



Enterprise Connectivity



State & Local Government



Federal Defense



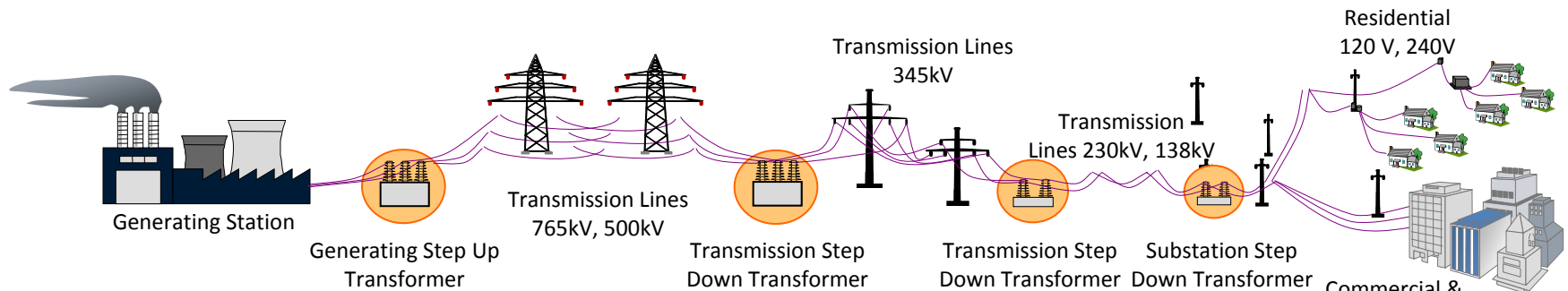
What we are currently seeing:

- A majority of the current utility marketplace telecommunication spend is with electric utilities rather than gas and water. This could change as AMI deployments in gas and water utilities grow.
- It is widely assumed that electric utilities will continue their significant telecommunications expansion over the next 10-15 years.
 - The electric industry has significantly greater potential for growth when compared to water and gas
 - The key reason is that storage of electricity is difficult and the benefits of two way SCADA of the network have greater benefits for electric utilities than gas and water.



Today's Electric Grid

Smart Grid Overview



Generation

Centralized Electric Generation (Coal, Gas, Oil, Hydro, Wind)

Transmission

Closely monitored at the substation and sources

Distribution

No monitoring after the substation

Load studies once every few years on distribution circuits

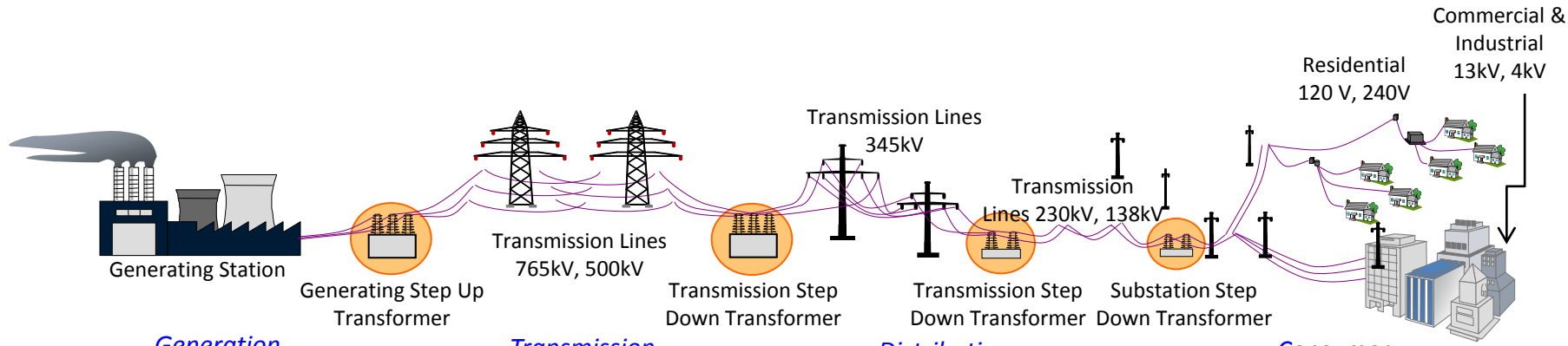
Consumer

Residential flat energy (kWh) pricing

C&I demand (kW) incurred and energy (kWh) consumed

Large Industrial like C&I, but with power factor correction

Tomorrow's Smart Grid overview



Generation

Centralized electric generation (Coal, Gas, Oil, Hydro, Wind)

Decentralized electric generation (and addition of Solar, Geothermal, Biomass, Wave-action)

Controlling remote customer generation

Transmission

Closely monitored at the substation and sources

Synchrophasors monitor phase variation under system disturbances and allow for time to balance load before failure can occur

Monitoring for improved reliability

Distribution

No monitoring after the substation

Close monitoring of substations and feeders

Load studies on distribution circuits conducted hourly rather than yearly

Lower Electric losses, saving 1%-3% in energy and 2%-4% in demand

Improved monitoring & control for savings

Consumer

Advanced Rates:
Time of Use, Critical Peak Pricing, Real-time pricing

Customers usage history

Customer Pricing signals when price changes


Home Area Network Devices

Empowering Customers through knowledge transfer

Key Utility Communication Applications

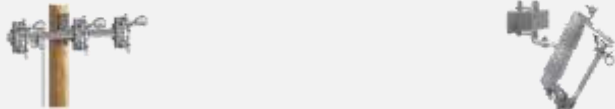
Analysis of Utility Applications

Advanced Metering Infrastructure (AMI)



This block contains five icons representing AMI: a smart meter with a display, a traditional round meter, a green smart car, a green smart home icon, and a smart meter panel.

Distribution Automation (DA)



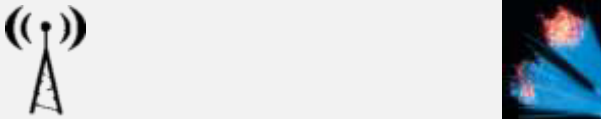
This block contains two icons representing DA: a utility pole with cross-arms and a distribution transformer.

Substation Automation (SA)



This block contains two images representing SA: a substation under construction with scaffolding and a completed substation.

Telecom Backbone



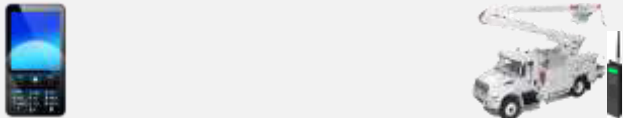
This block contains two icons representing Telecom Backbone: a radio antenna tower and a fiber optic network.

Enterprise Communications



This block contains two icons representing Enterprise Communications: an office telephone and a server rack.

Mobile Data



This block contains two icons representing Mobile Data: a smartphone and a utility truck with a mobile antenna.

Mapping Utility Applications to Communication Solutions

Tier 1 – Core Network (Backbone) Tier 2 – Backhaul Network
 Tier 3 – Access Network Tier 4 – Home Area Network (HAN)

Analysis of Utility Applications

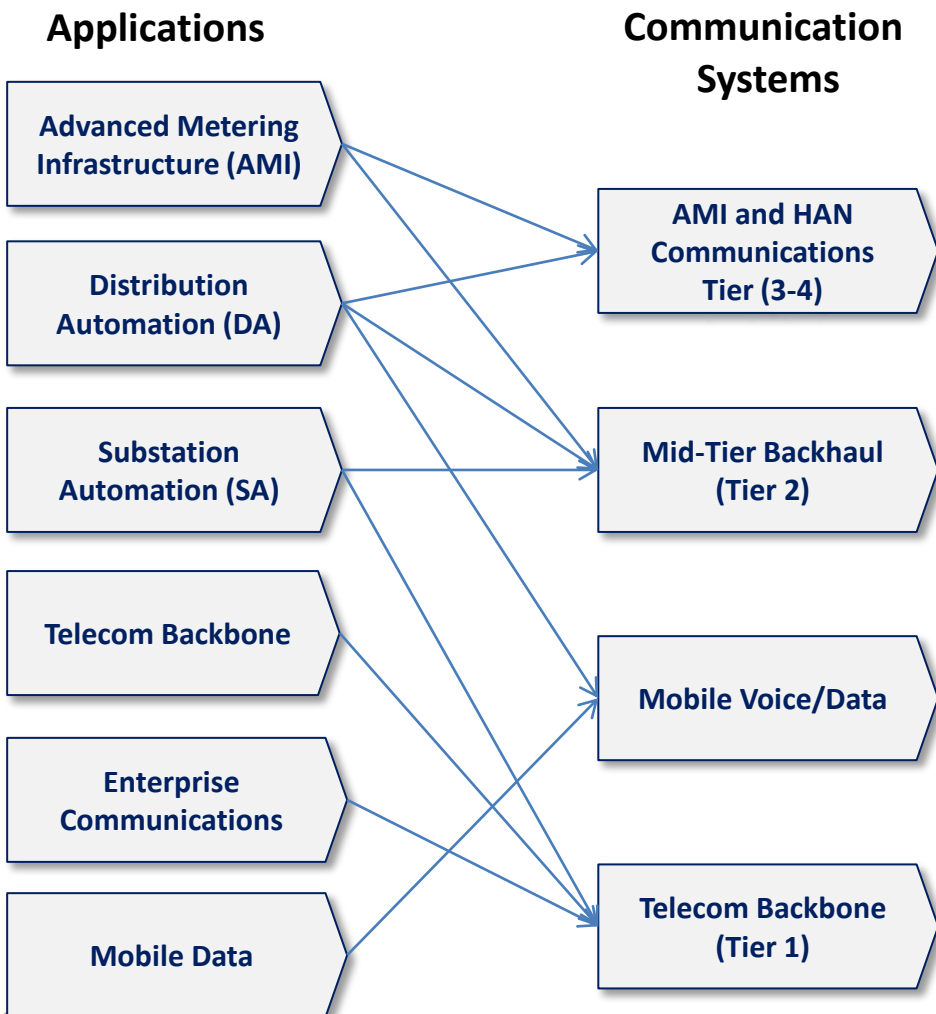
Communication Systems Characteristics

- ◆ Coverage of >99% of Meters
- ◆ Higher Latency, Excellent Coverage
- ◆ Typically Need Mesh Capability between Meters and HAN Devices

- ◆ Low Latency Broadband
- ◆ Good Uplink Capacity for Video
- ◆ Coverage across Service Territory
- ◆ Power Generation Back-up

- ◆ Mission Critical Voice/Data
- ◆ Wide Band Mobile Data
- ◆ Can be used for DA Communications
- ◆ Coverage across Service Territory
- ◆ Power Generation Back-up

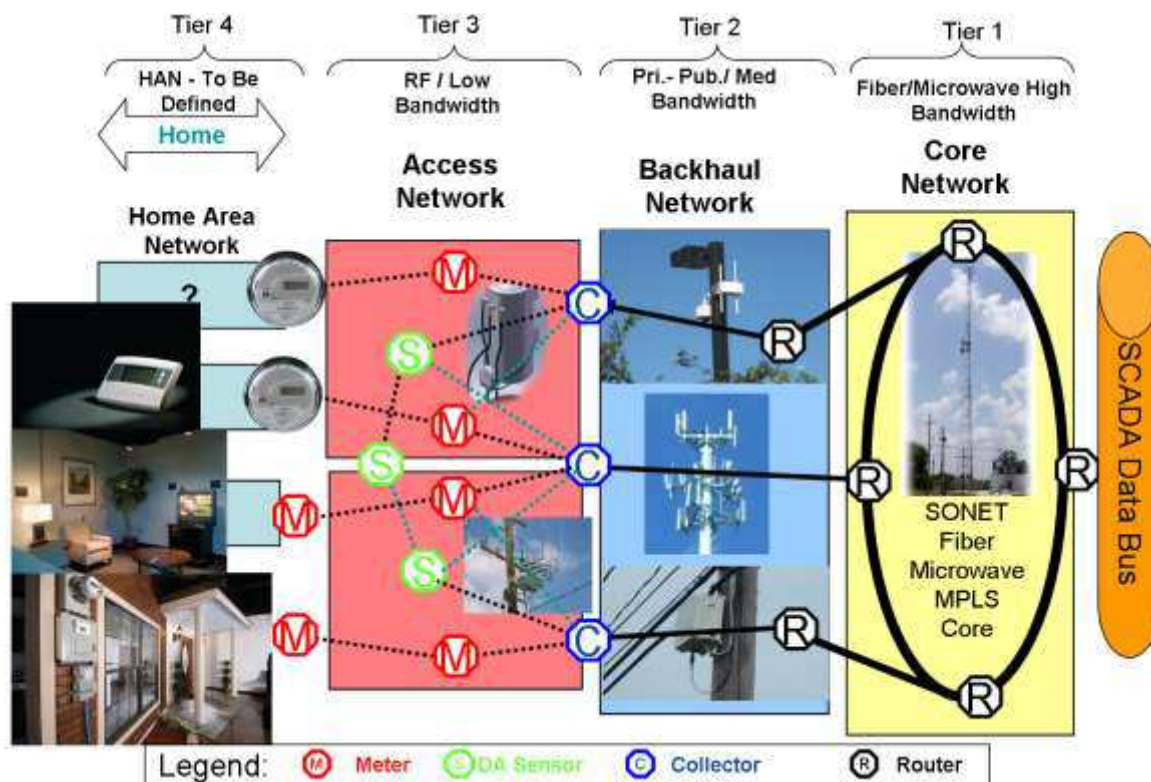
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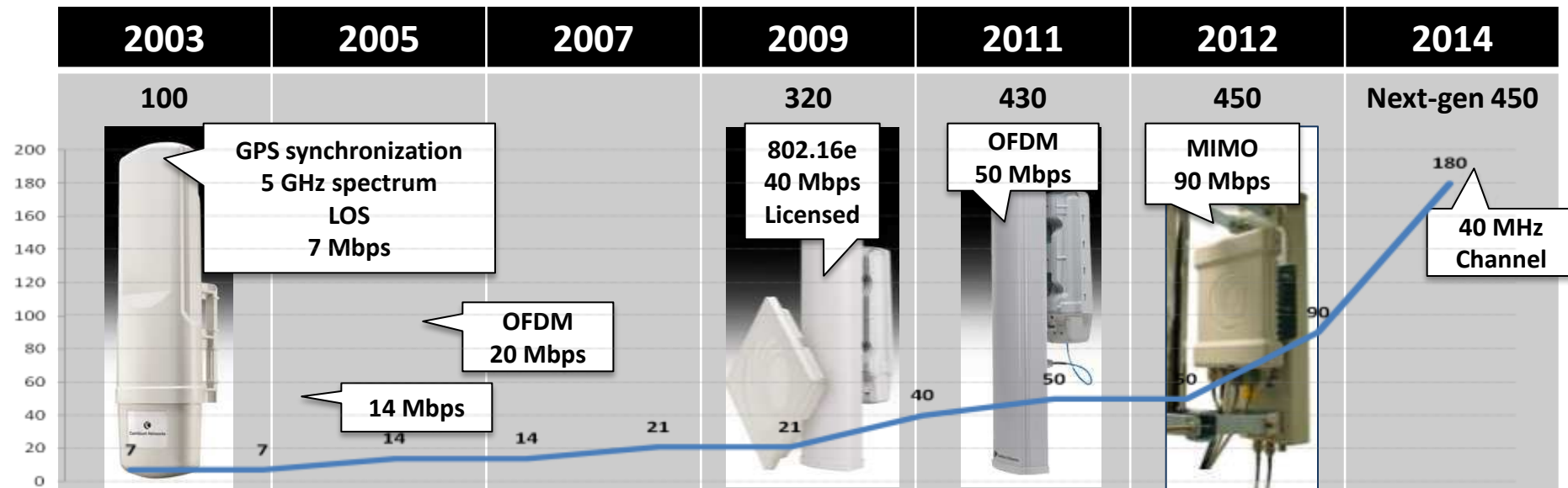
Telecommunication Tiers

Analysis of Utility Applications

- Tier 1 – Core Network (Backbone)
- Tier 2 – Backhaul Network
- Tier 3 – Access Network
- Tier 4 – Home Area Network (HAN) (N/A for Cambium and excluded from analysis)



PMP Pioneer and Ongoing Market Leader






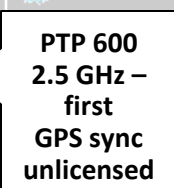
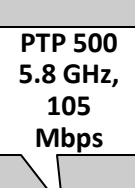


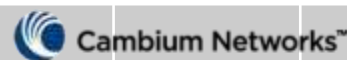





AP Mbps Throughput

- ★ Part-15 Manufacturer of the Year
- ★ TIA SuperQuest Award
- ★ RURALiTiC Award
- ★ Network Computing Editor's Choice
- ★ Public Technology Institute
- ★ Network Computing Well Connected Award
- ★ Wireless Broadband Innovation Award
- ★ WISPA Manufacturer of the Year

Modules shipped	2M	3.5 M	4M	
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PTP Innovator and Market Leader

2003	2004-5	2006	2007	2008	2009	2010	2011	2012	2013
  <p>OS-Gemini 5.8 GHz first unlicensed radio with MIMO & iDFS, 43 Mbps</p>	 <p>OS-Spectra 5.8 GHz first 300 Mbps radio; exceed 10bps/Hz; (Telmex)</p>	 <p>PTP 600 5.4 GHz unlicensed; 4.5 / 4.9 GHz licensed</p>	  <p>PTP 600 2.5 GHz – first GPS sync unlicensed radio</p>	 <p>PTP 500 5.8 GHz, 105 Mbps</p>	 <p>PTP 800 Licensed Microwave 6-38 GHz 368 Mbps full duplex</p>	<p>CERT's & VALID's FIPS 140-2 MEF9 ATEX- HAZLOC</p> 	  <p>PTP 800i Licensed Microwave All-Indoor 6 & 11 GHz 236 Mbps full duplex</p>	 <p>PTP 810 Licensed Microwave TDM/ETH on one Platform 6-38 GHz 700 Mbps</p>	 <p>PTP 650</p>

- ★ Queen's Award – Enterprise: Innovation
- ★ NXT Comm Awards
- ★ Network Computing Editor's Choice Award For Best Fixed Wireless
- ★ Queen's Award – Enterprise: International Trade
- ★ WiMAX World - Europe
- ★ Network Computing Well-Connected Award

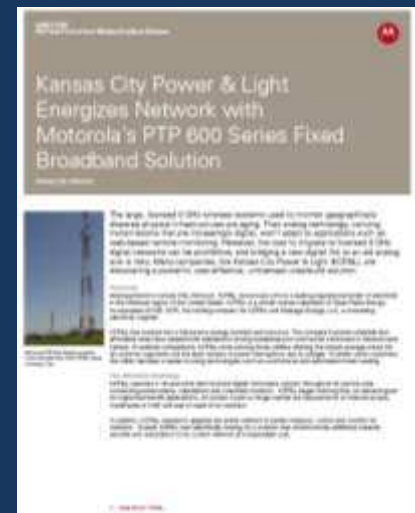
Links Shipped	1K	10K	50K
Field Hours		100M	1B 2B

Case Study – Kansas City Power & Light



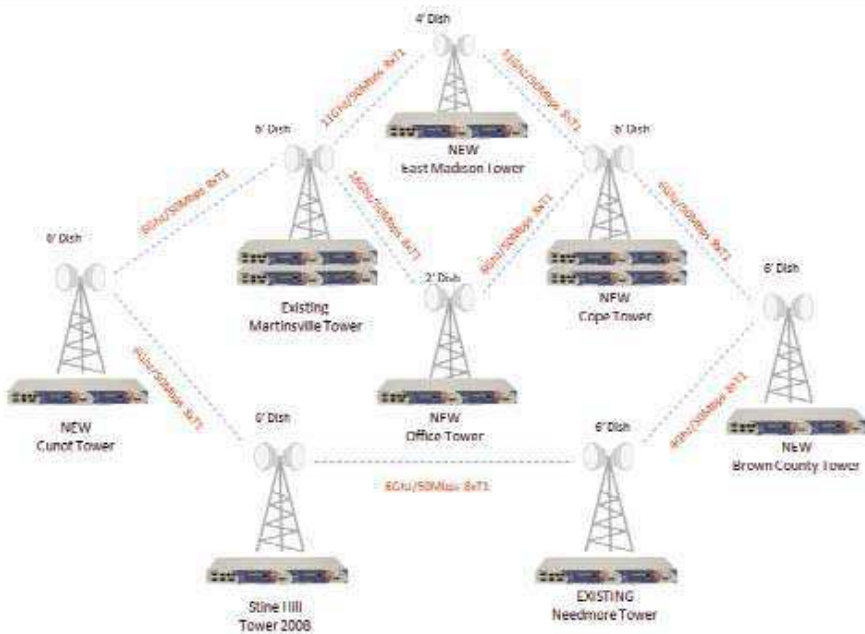
“KCP&L’s commitment to using technology has helped us achieve top-tier operating performance, resulting in an outstanding record of reliability and high customer satisfaction.”

— John Marshall, Senior Vice President, Delivery, KCP&L



- Point-to-Point backhaul network
- Monitoring and control functions
- Internet access, multimedia and VoIP applications
- Complement existing 6 GHz licensed network

Case Study – MapleNet Indiana



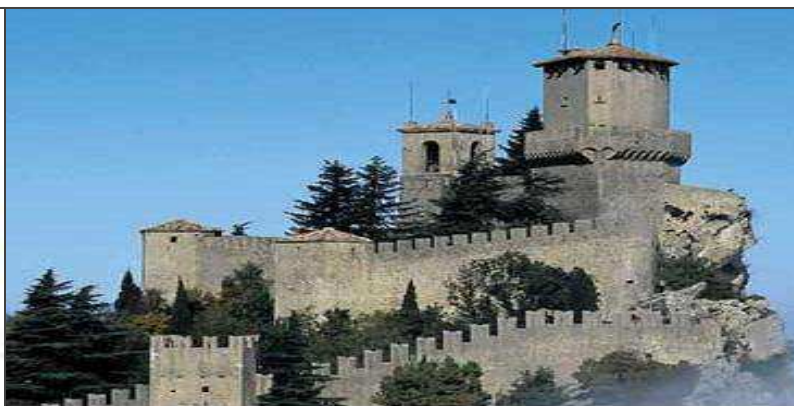
“The Cambium network was chosen because it was affordable and accessible, but also because it provided a full range of frequencies, a common management platform and the capacity for being much more than a backhaul system.”

- Steve Carrender, MapleNet Wireless



- Serving 35,000 customers
- PTP and PMP used for AMI backhaul
- Leveraging network for SCADA and video security
- Proven high reliability
- Expanding network

A.A.S.S. – Repubblica di San Marino



•L'Azienda Autonoma di Stato per i Servizi pubblici ha realizzato una rete wireless broadband PuntoPunto e PuntoMultiPunto per il telecontrollo remoto delle reti di distribuzione del servizio elettrico, idrico e gas.

•Nella rete sono presenti dei punti di controllo (cabine elettriche, serbatoi, pozzi dell'acquedotto, punti di smistamento gas, ecc.) dotati di tecnologie PLC che permettono di monitorare e correggere i parametri funzionali;

•La rete viene utilizzata anche per il trasporto dei dati provenienti dalla lettura dei contatori

- 60 Km² di copertura
- 8 Sedi connesse
- 4 Punti di diffusione
- Oltre 80 punti periferici connessi

- AMI
- Distribution Automation
- TVCC
- VoIP

*Cambium Networks offers **secure, highly reliable and cost effective** wireless broadband communications networks for Smart Grid backbone applications, including **AMI backhaul, Distribution Automation, SCADA and video surveillance.***

Thank You!



Cambium Networks

www.cambiumnetworks.com