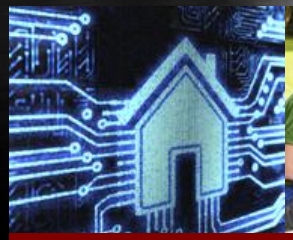
Connected Living





Smart Energy for Smart Cities Webinar

28 March 2012

Andy Wood, Director, Business Development, Smart Energy & Home Security and Automation, Qualcomm

3G Cellular Technology for Smart Grid Communications

Andy Wood
Director, Business Development
March 28, 2012

Smart Energy & Home / Building Opportunity

Top Ten Connected Applications in 2020	Value to the Connected Life
Connected Car	US$600 billion
Clinical Remote Monitoring	US$350 billion
Assisted Living	US$270 billion
Home and Building Security	US$250 billion
Pay-As-You-Drive Car Insurance	US$245 billion
New Business Models for Car Usage	US$225 billion
Smart Meters	US$105 billion
Traffic Management	US$100 billion
Electric Vehicle Charging	US$75 billion
Building Automation	US$40 billion

>1T US$

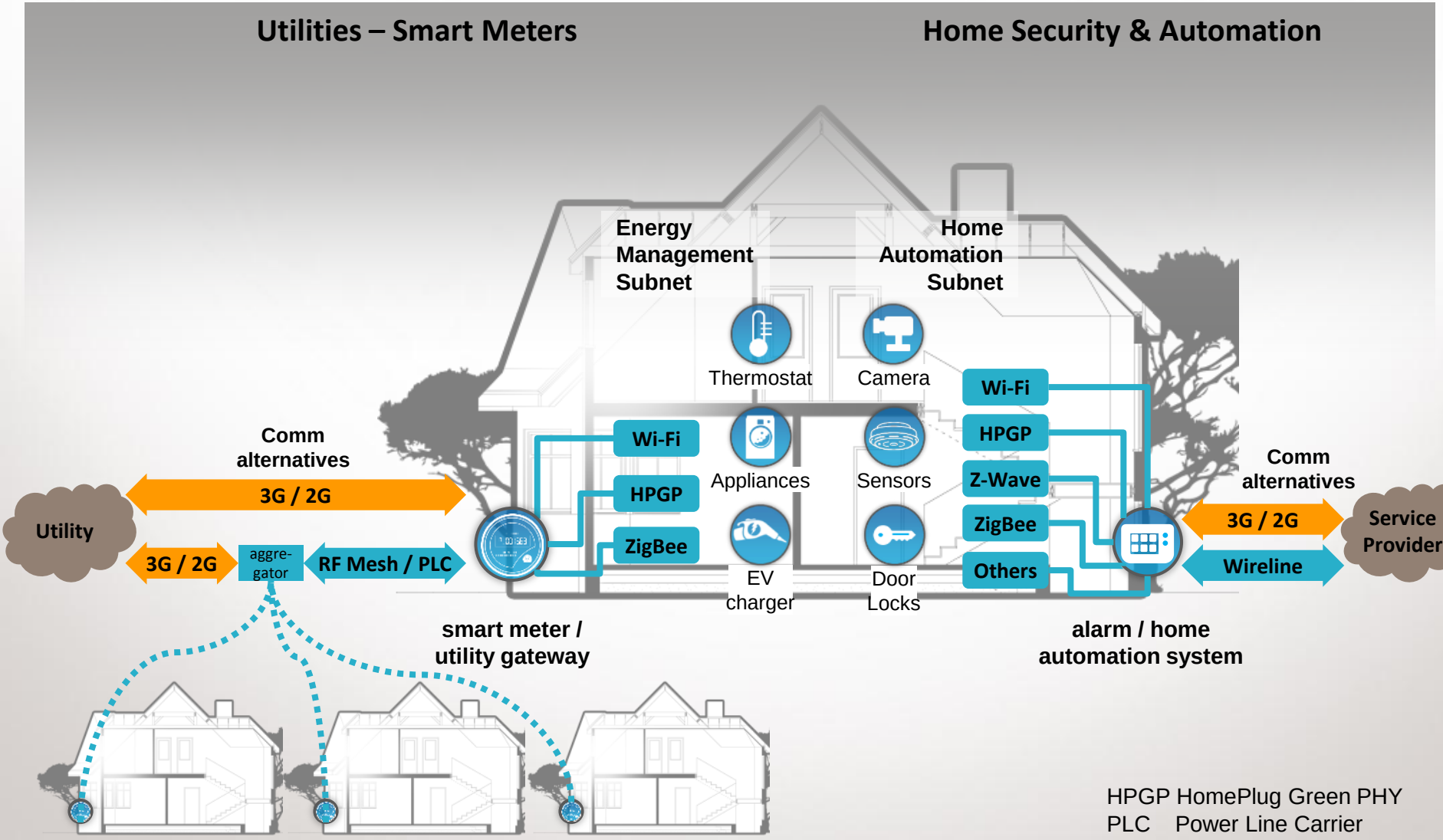
Source: GSMA / Machina Research

"Smart energy, specifically cellular connectivity to smart meters and data concentrators, will represent more than $7.5 billion in 2016" – ***ABI Research***

"By 2020 there will be 1.5 billion M2M connections in the utilities business, the vast majority being smart meters" – ***Machina Research***

Smart Energy in the Intelligent Home

Application Processing and Always Connected – From the Grid to the Home



HPGP HomePlug Green PHY
PLC Power Line Carrier

Why 3G for Smart Grid?

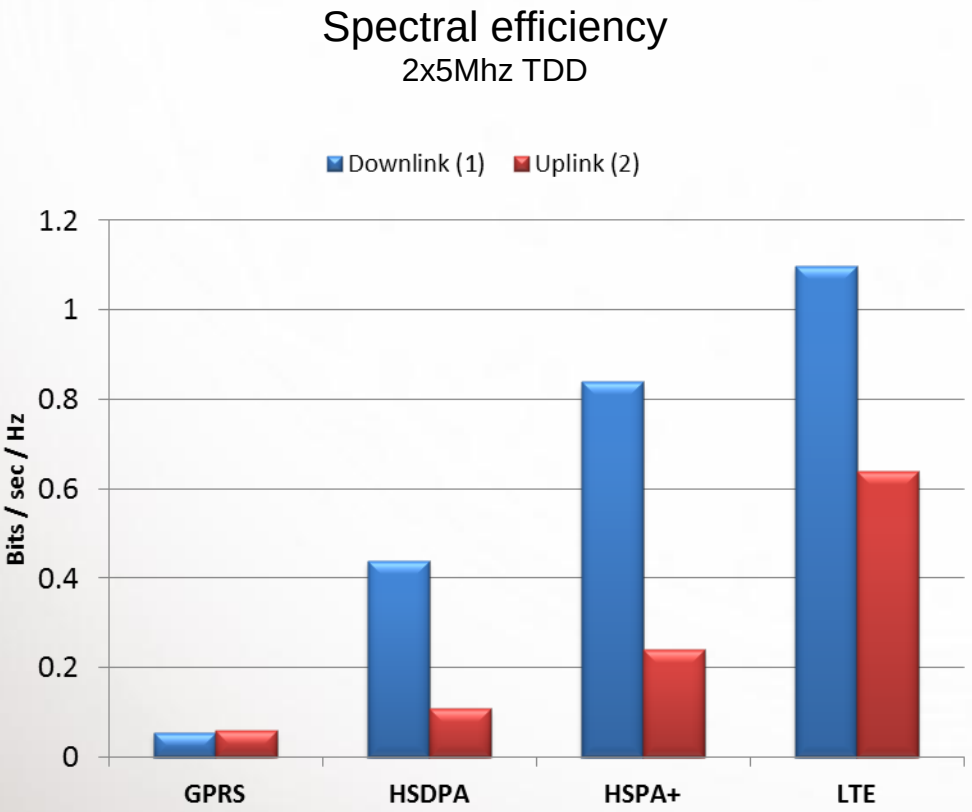
Smart Grid can benefit from the economies of scale, low cost of deployment, technology evolution path, reliability, ease of use, security

Ubiquitous coverage	- HSPA in 135 countries. On course to reach 1B connections in 2012(1)
High reliability	- Redundant network design with >99% availability(2)
Robust security	- Built-in security features; used in government & finance sectors
Low cost of ownership	- Large established ecosystem provides economy-of-scale
High performance	- High throughput with average latency of milliseconds(4)
High scalability	- Millions and even billions of connections worldwide(3)
Standard-based	- Seamless interoperability; backed by global standards

(1) Connected Life – GSMA Position Paper; GSMA; October 2011
(2) NIST, “Consolidated NIST Wireless Characteristics Matrix V5”, 10/25/2010
(3) Wireless Intelligence estimate
(4) C; “Mobile Broadband Comparison”; March 2008

HSPA and LTE optimize use of spectrum

M2M can access globally ubiquitous high bandwidth, low latency networks



Source: Mobile Broadband Comparison; CDG; 2008.

(1) Assumptions 5 MHz FDD, WCDMA assumes no DSCH. HSDPA assumes 1x1 SISO, HSPA assumes 1x2 SIMO; HSPA+ includes 1x2 SIMO and equalizer: LTE includes 2x2 MIMO

(2) Assumptions, 5 MHz FDD, HSPA+ and LTE includes 1x2 SIMO. HSPA+ includes no IC, HSPA = Rel. 6. HSPA+ = Rel. 7

HSPA

Deployed in **135** countries

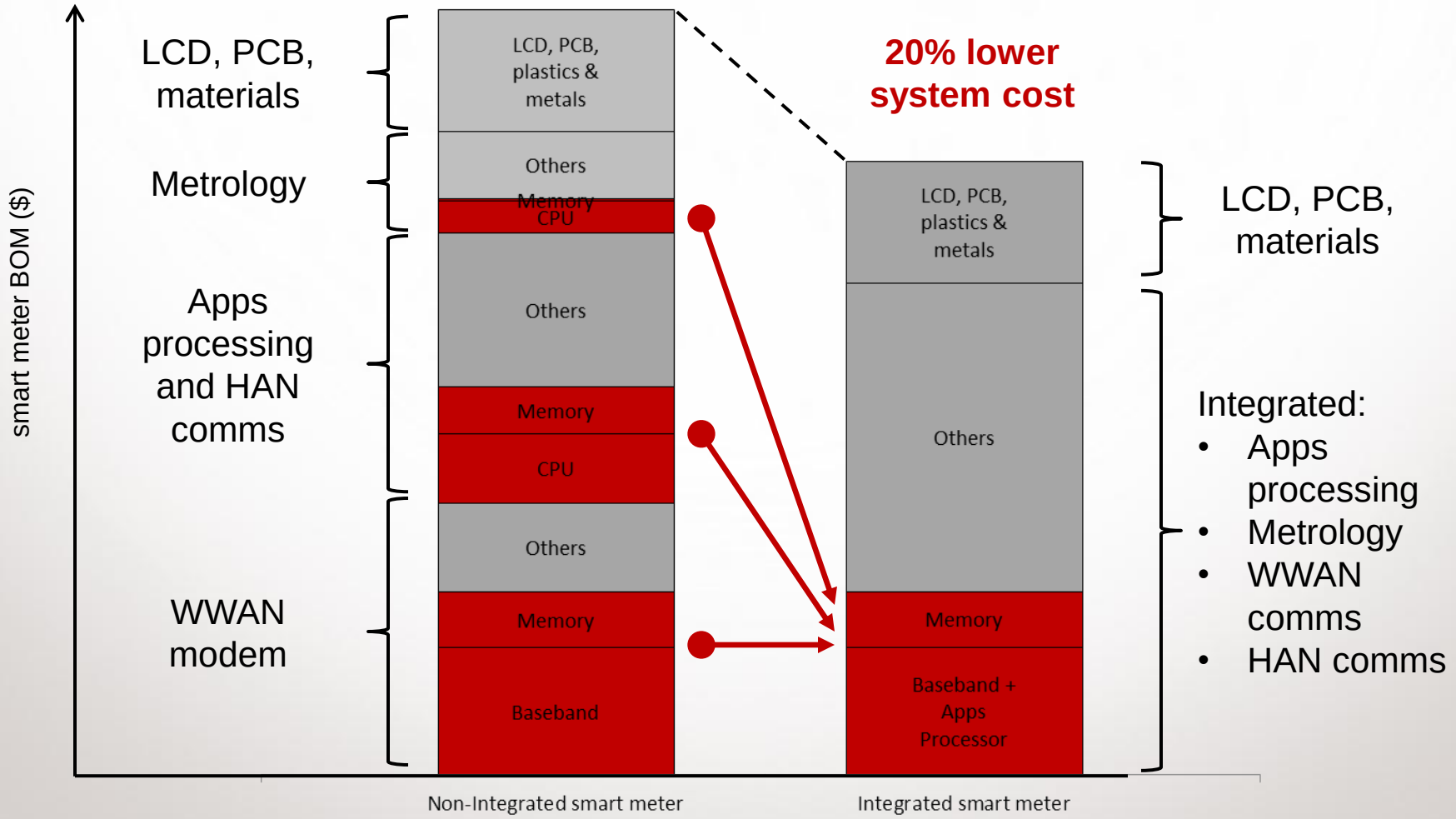
On course to reach **1 billion** connections in 2012

Mobile operators to invest **US$100 billion** in HSPA, HSPA+ and LTE over next 5 years

Source: Connected Life – GSMA Position Paper; GSMA; October 2011

Integration optimizes total system cost

Example: A Smart Meter – before and after integration



Technology Selection Considerations

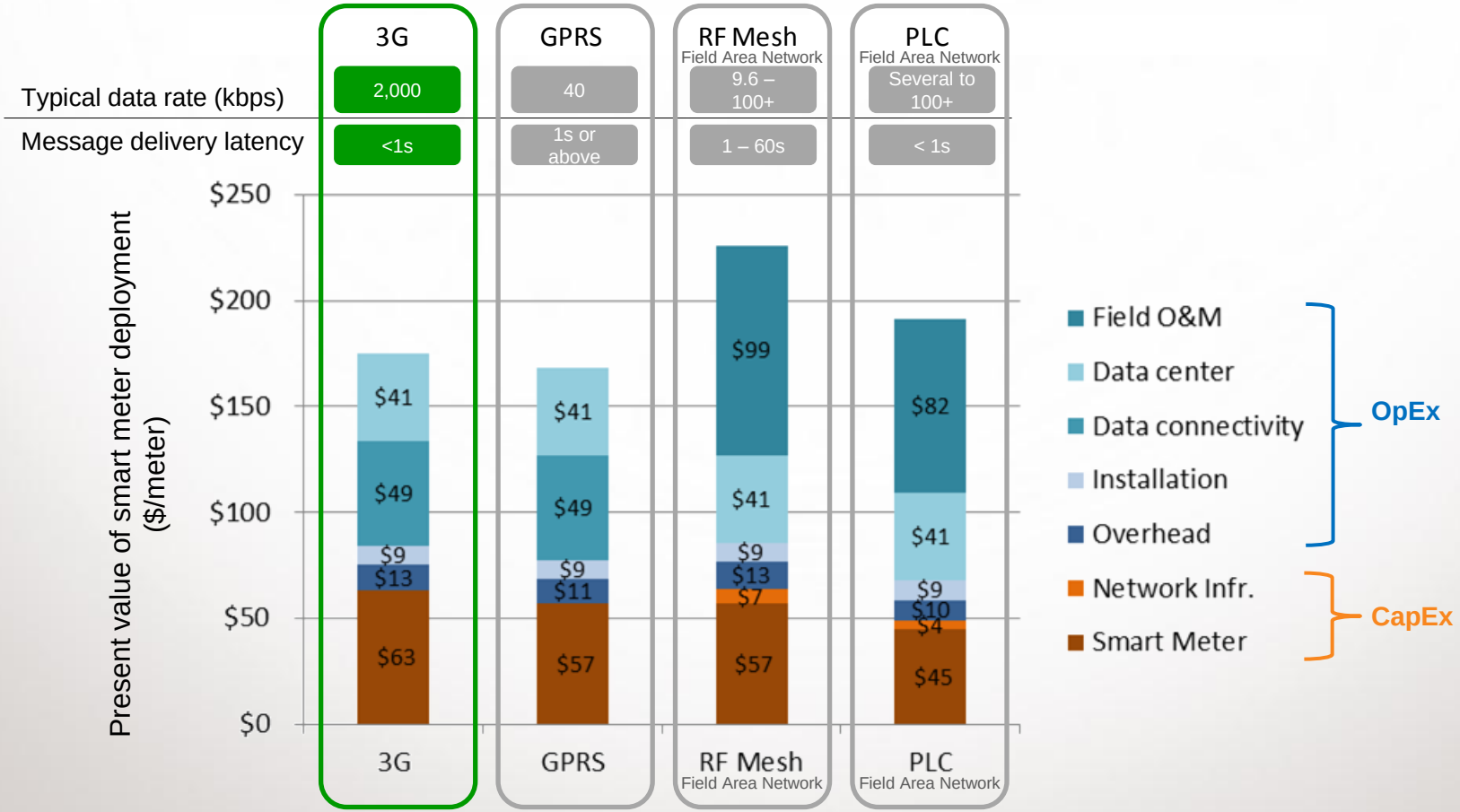
	3G	GPRS	RF Mesh (Field Area Network)	PLC (Field Area Network)
Ease of network deployment and operation	• Deployed and maintained by cellular operators. • Strong ecosystem that drives cost lower.	• Same as 3G.	• Utilities responsible for network deployment and maintenance. • Requires new network. • Lack of global unlicensed 900MHz bands may require use of higher frequencies with poor link budget.	• Utilities responsible for network deployment and maintenance.
Lifetime	• Mature technology with >300 networks worldwide. • Still in deployment in various regions.	• Cellular operators refarming 2G spectrum for higher speed 3G / 4G networks.	• Limited vendor support. • Proprietary point solution with no other known scalable use-cases.	• Dependent on long-term technology traction.
High capacity and performance	• High capacity with 2+ Mbps data rate today. • Superior latency performance for real-time applications.	• Low data rate. • Capacity/performance depends on voice traffic sharing the same RF carrier.	• Low capacity/data rate. • Performance highly dependent on network configurations.	• Low data rate that degrades as distance between end points increases.
Low interference with other networks	• Use licensed spectrum that is protected from interference.	• Same as 3G.	• Use unlicensed spectrum shared by cordless phones, baby monitors, walkie-talkies.	• Operates in unsealed power cables. • Might interfere with wireless technologies.
Available voice and data services for field operations	• Can utilize existing network service agreement to obtain voice/data services.	• Same as 3G.	• Must obtain voice/data services from an alternate network.	• Must obtain voice/data services from an alternate network.

Support the feature Partially support the feature Do not support the feature

Full report available at www.qualcomm.com/smart energy

Total Cost of Ownership

- Business case of 3G-enabled smart grid systems is very competitive while delivering superior performance



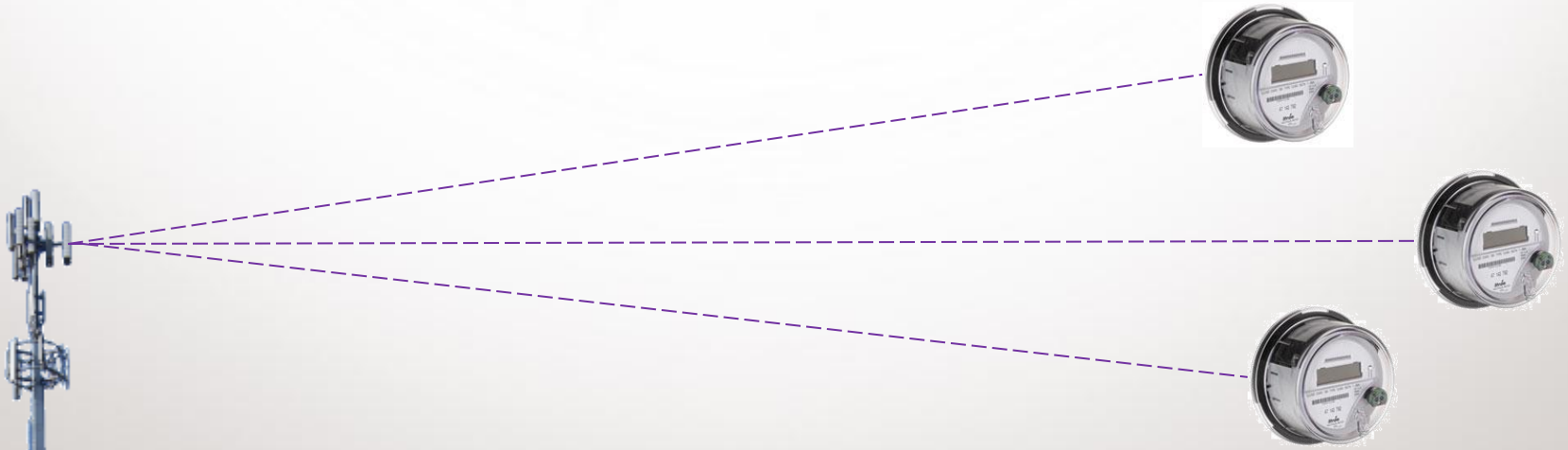
[1] Source: Qualcomm economic model, approximate values for a typical smart meter deployment in the United States with a lifetime of 25 years.

Case Study: Consumers Energy

Technology supplier: SmartSynch

3G Cellular technology embedded into Smart Meters

- To deploy 1.8 million smart meters
  - Cellular embedded into every meter
  - No major new network infrastructure
  - Previous pilot from SmartSynch proved 99.96% average daily read rate



Sources: http://www.consumersenergy.com/News.aspx?id=5013&year=2011
http://smartsynch.com/news/archive/20100504.php

Key points from this presentation

3G Networks provide an advanced and cost-effective solution for Smart Energy/Home WAN Communications

- Strong commitments from operators and vendors on Smart Grid applications.
- Strong ecosystem enables cost-effective deployment & operation.
- Mature technology supported by global standards.
- Highly reliable services with ubiquitous coverage.

Thank You

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