



UTC's

Legal / Regulatory / Standards Update

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Why is Smart Grid Important?

- **State of Industry**

- Demand expected to increase by >20% (down from 40+%)
- Many utilities dangerously near reserve margins
- New generation options have challenges
 - Siting, technology, cost, remote locations
- Congress imposing climate change requirements
 - Emissions, Renewable / Energy Efficiency Standards
- Utilities prepared to leverage investment for other uses
 - Water, gas billing and or control

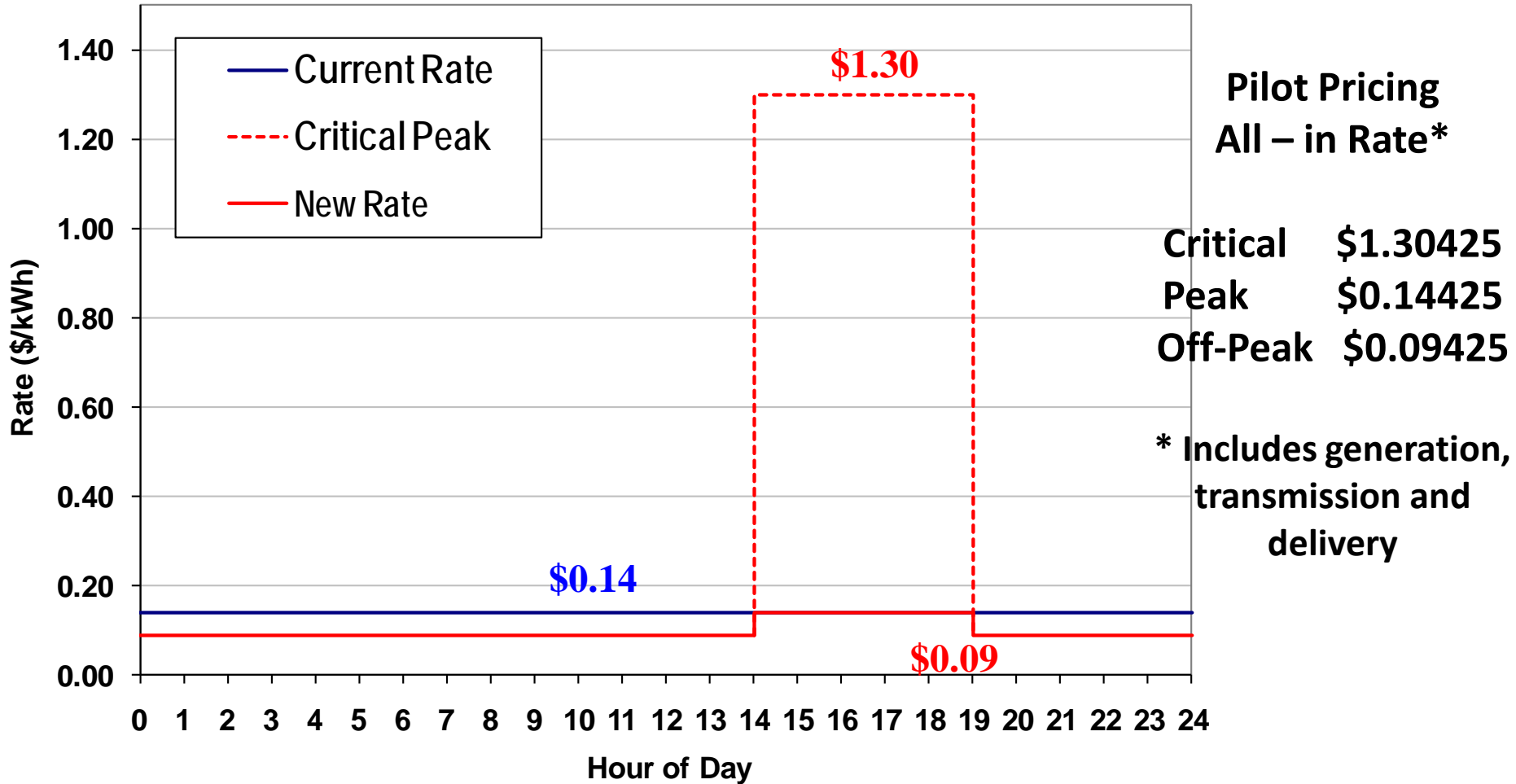
- **Future of Industry**

- Billions of smart devices, sensors, resources
- Utilities required to micro-manage supply and demand at fringes of grid to optimize all resources for the benefit of all consumers

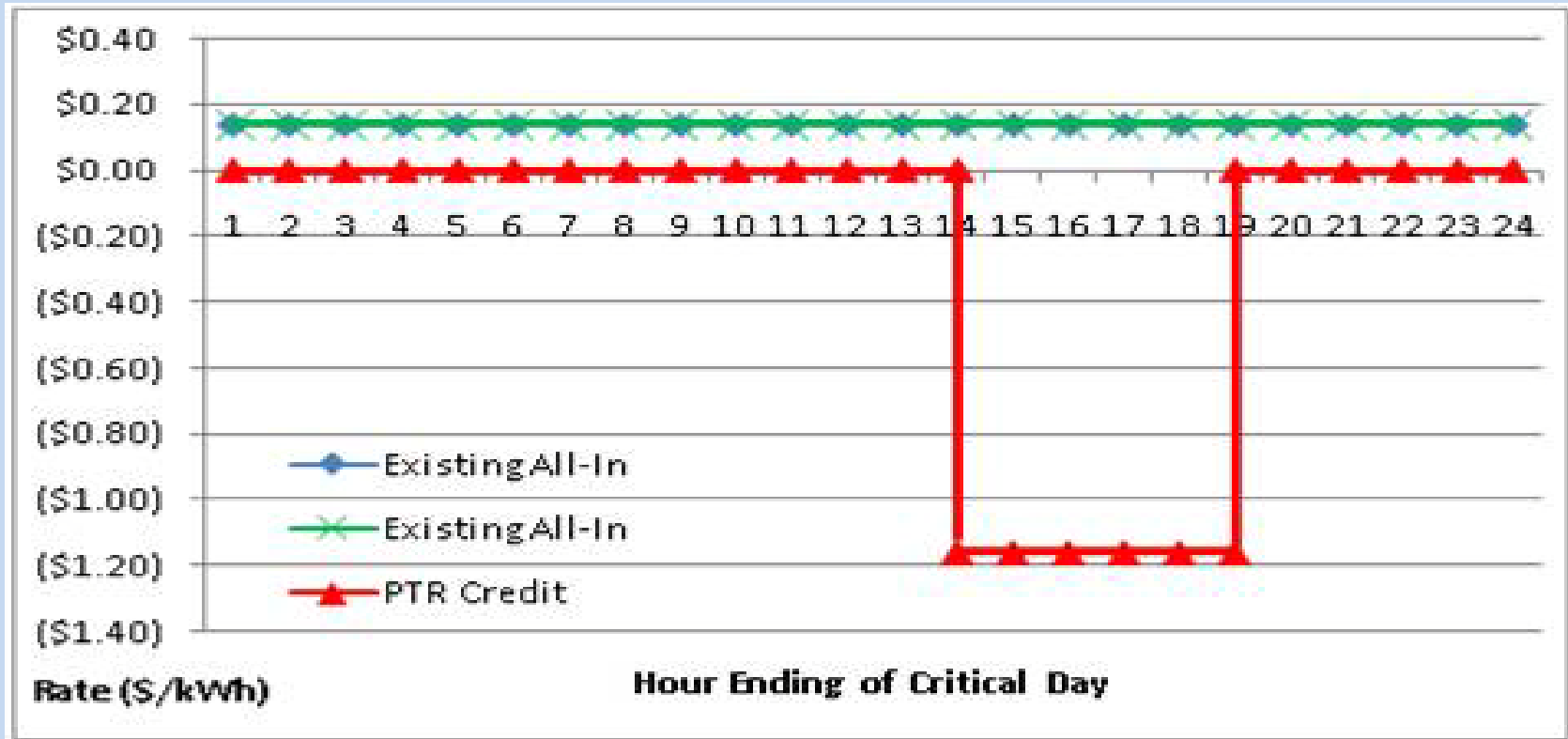
Value For Consumers and Utilities

Baltimore Gas & Electric

Dynamic Peak Pricing: Weekdays (excluding Holidays)

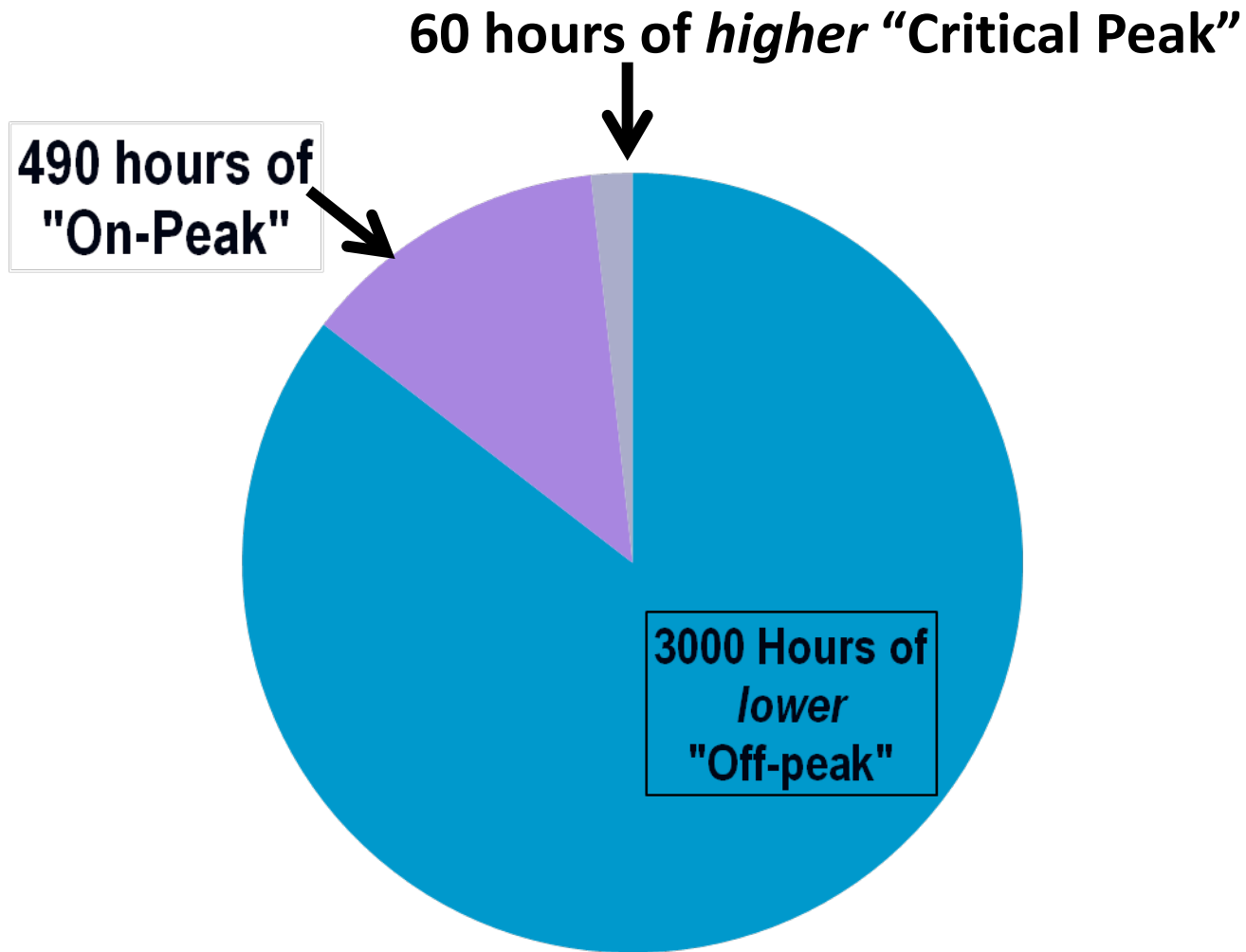


Peak Time Rebate: Weekdays (excluding Holidays)



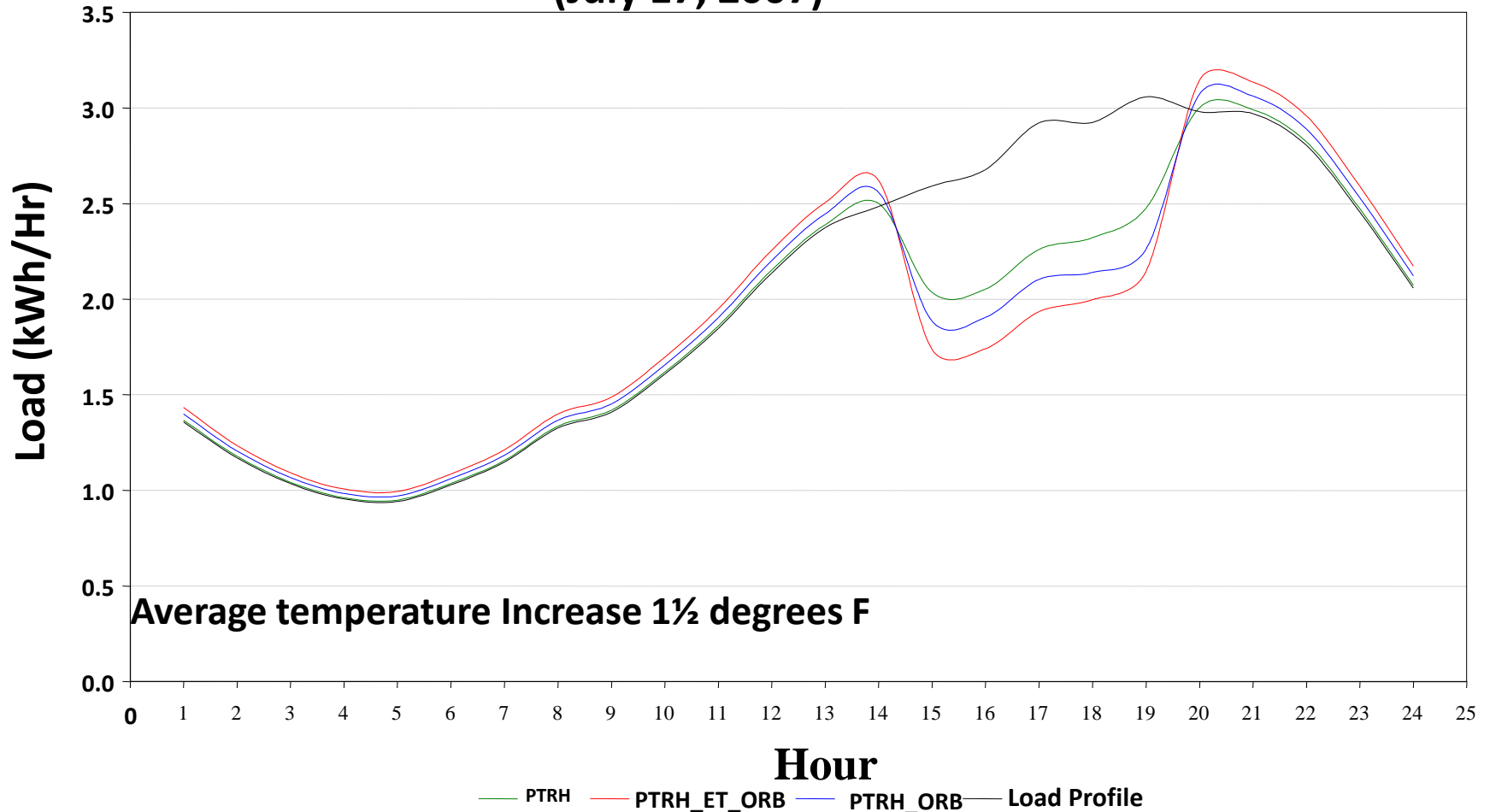
- Schedule R summer rates are \$0.14 / kWh for all summer hours
- Up to 12 critical peak days will be called by 6 p.m. the prior day
- Customers who use less during the critical period (2 – 7 p.m.) on any critical peak day will receive a rebate. Two levels being tested: \$1.75/kWh and \$1.16/kWh

Hours in Each Summer Pricing Period



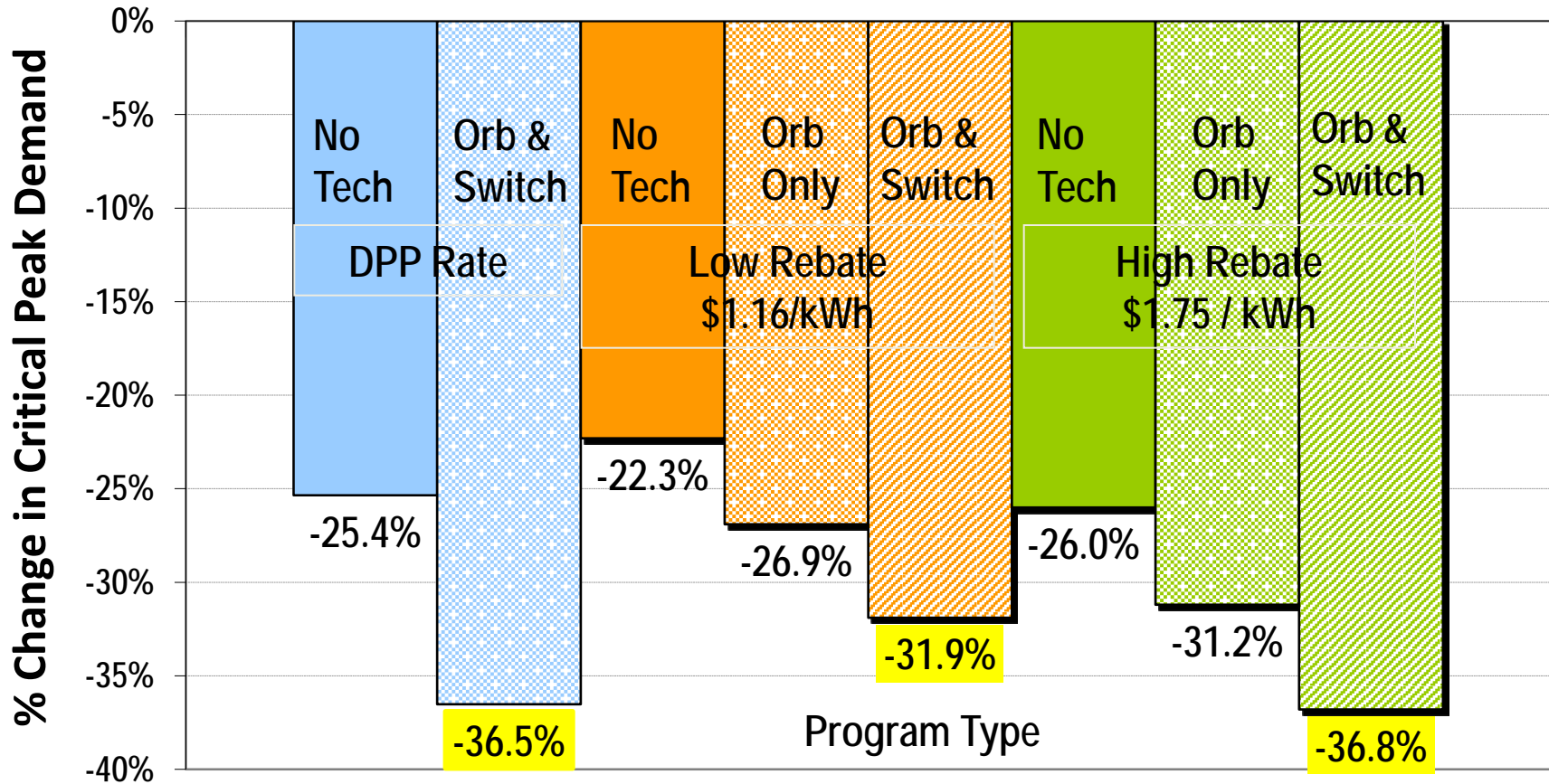
Actual Load Shapes for Participants and Control Group during Critical Peak Event

Load Profile on CPP Day before and after Demand Response
(July 17, 2007)



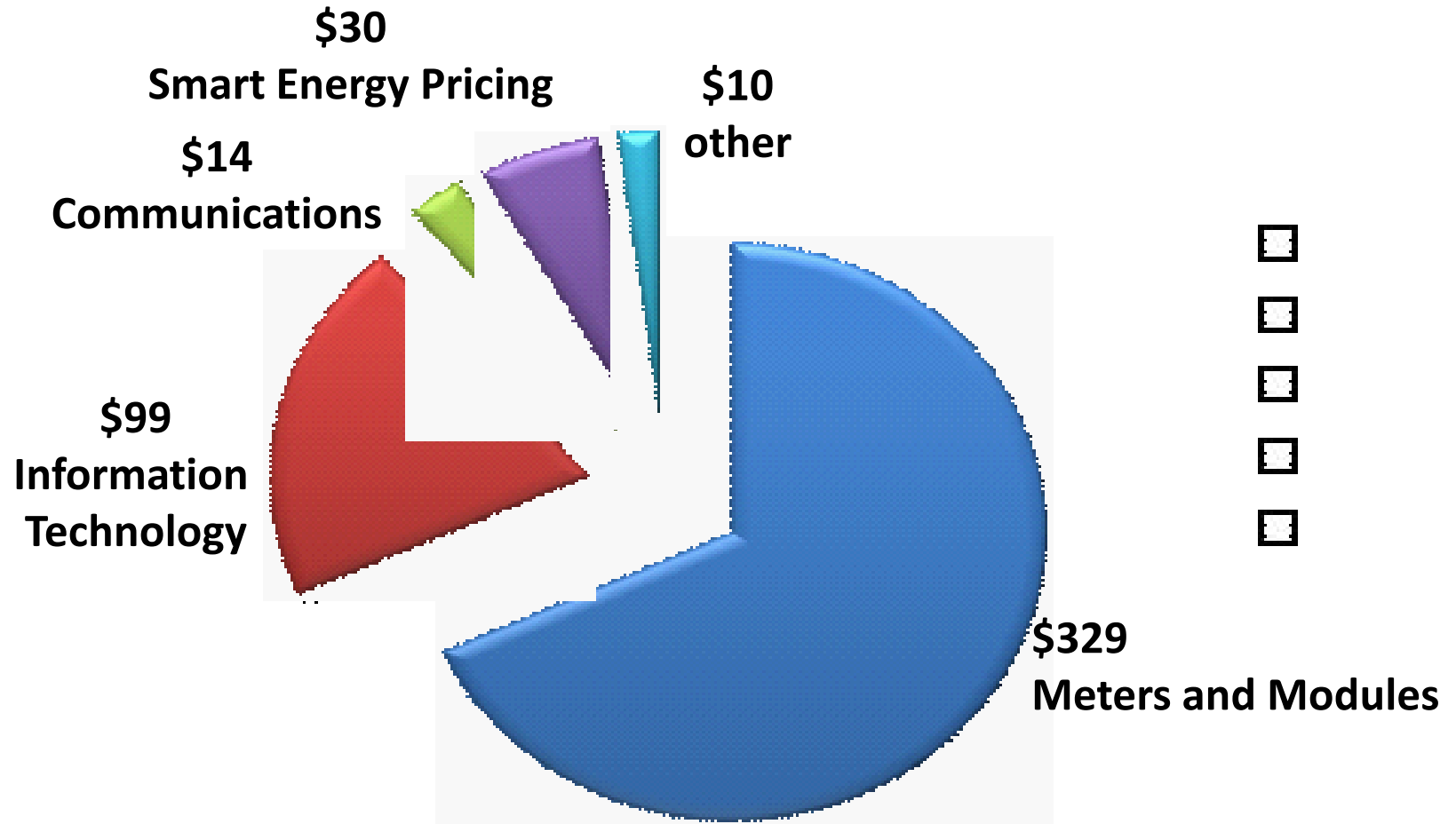
Summer 2008 Pilot Smart Energy Pricing - Peak Demand Reductions

Average Customer



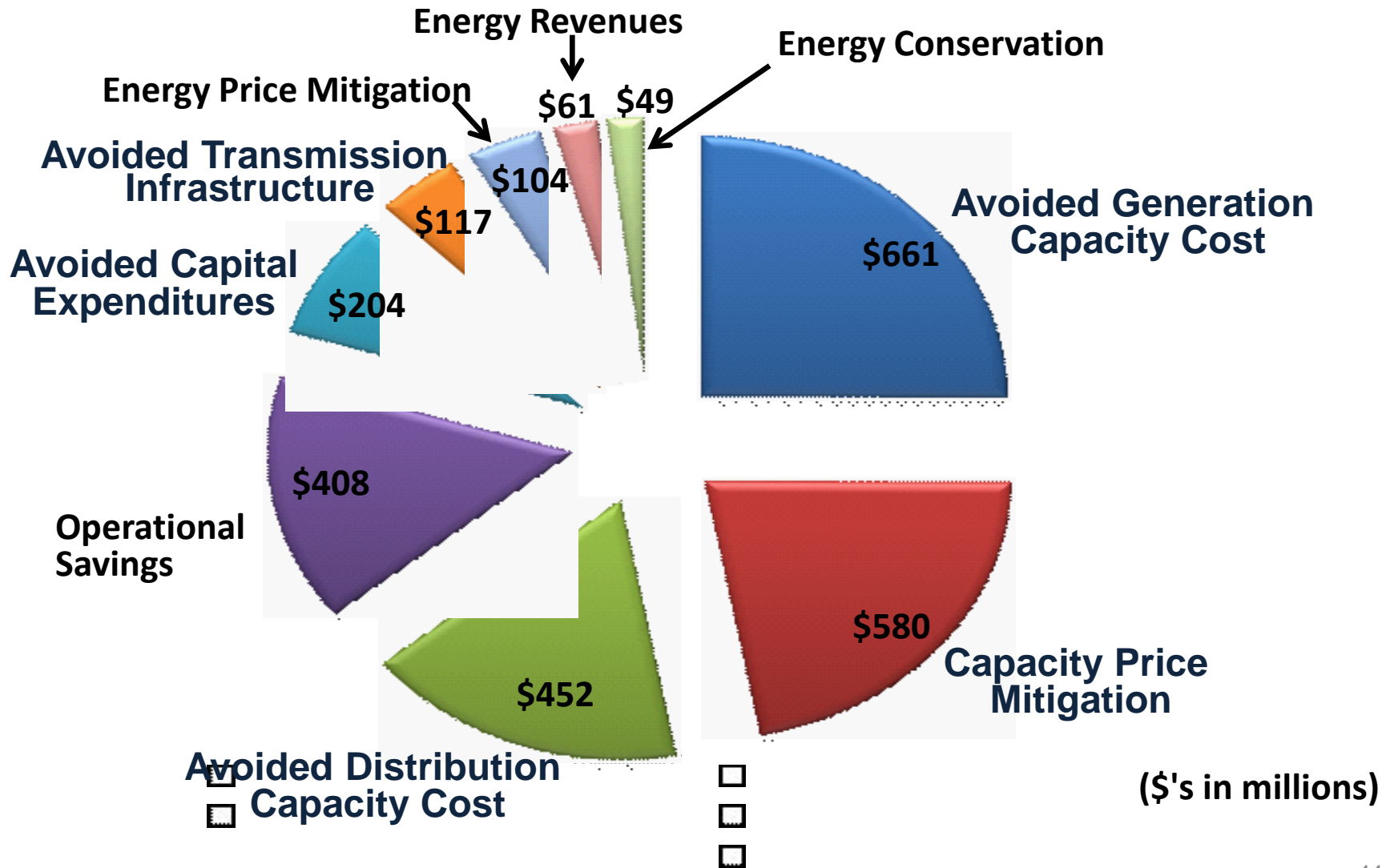
Estimated BG&E Deployment Costs

\$ 482 Million (2009-14)



Customer Savings Greatest Benefit

Projected Life-cycle Saving >\$2.6 B

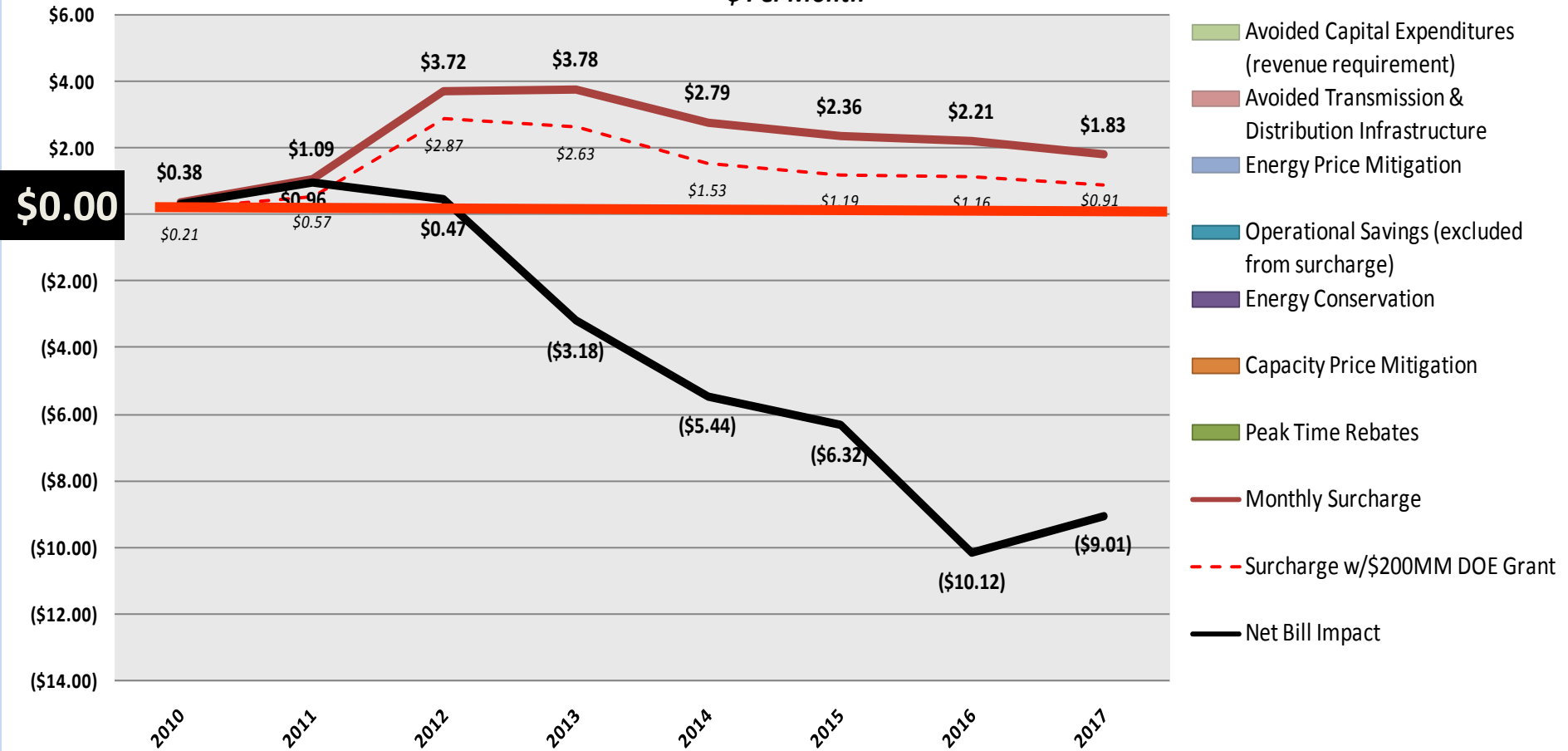


BG&E Residential Bill Impact

Over the life of the recovery period, the average monthly electric and gas surcharge is projected to be \$1.24 and \$1.52, respectively

Residential Electric Customer Bill Impact

\$ Per Month



NATIONAL BROADBAND PLAN

National Broadband Plan

Key Objectives

- **Ensure broadband access for all Americans**
 - Find most effective and efficient ways
- **Affordability and maximum utilization of broadband infrastructure and services**
 - Develop strategies for achievement
- **Evaluate status of broadband deployment:**
 - Including the progress of related grant programs
- **How to use broadband to:**
 - Advance consumer welfare, civic participation, **public safety and homeland security**, community development, health care delivery, **energy independence and efficiency**, education, worker training, private sector investment, entrepreneurial activity, job creation, and **economic growth, and other national purposes.**

NBP Recommendations: Energy & Environment

- Integrate broadband into the Smart Grid
 - FCC proceeding on resiliency of carrier networks
 - State reforms re: rate base and cost recovery
 - NERC clarification of CIP requirements
 - Congress reforms to enable utilities to share 700 MHz PS broadband wireless network
 - National Transportation and Information Administration/FCC to identify spectrum for smart grid
 - Dept. of Energy to study communication needs of utilities

NBP Recommendations: Energy & Environment

- **Unleash innovation in smart homes and smart buildings**
 - State requirements on consumer data from smart meters and historical consumption, price and bill data over the Internet. States must act w/in 18 months
 - Rep. Markey (D-MA) introduces related legislation already!
 - FERC standards for consumer data for states to follow
 - DOE evaluation of SG grants re: data access
 - RUS prioritization of SG loans to co-ops; favoring SG projects from states/utilities w/ strong data access policies

NBP Recommendations: Pole Attachments

- Improving utilization of infrastructure
 - “Low uniform rental rates” for pole attachments
 - Rules for lower “make-ready” costs
 - Comprehensive timelines / dispute resolution processes
 - Pole attachment database
 - Harmonized pole attachment policies - “clarify and streamline” access
 - Eliminating exemptions
 - Expanding regulation – cover ILECs, munis and co-ops
 - Establishing minimum criteria

NBP Recommendations: Public Safety

- Promote public safety wireless broadband communications
 - Create a *nationwide interoperable public safety wireless broadband communications network* (public safety broadband network)
 - Survey public safety broadband wireless infrastructure and devices
 - Ensure that broadband satellite service is a part of any emergency preparedness program
 - Preserve broadband communications during emergencies

NBP Recommendations: Public Safety

- Promote cyber security and the protection of critical broadband infrastructure
 - Nationwide interoperable network
 - FCC / National Communications System (NCS) priority network access for broadband communications
 - PS roaming/priority access to commercial carriers at “reasonable” rates
 - Implies utilities and sharing spectrum with PS
 - FCC Cyber roadmap
 - Broadband outage reporting requirements
 - FCC voluntary cyber security certification regime
 - FCC / DHS cyber security information reporting system.
 - FCC international participation and outreach.
 - FCC investigation of BB network resilience

DOE Request For Information Data Access, Third Party Access, Privacy

UTC Comments On DOE RFI

Data Access, Third Party Access, Privacy

- **Data ownership**
 - “Ownership” clouds issue of data access
 - Utilities follow the rules and regulations
 - But consumer consumption data from utility meter belongs to the utility
- **Privacy Protections**
 - Consumer and utilities entitled to privacy protections
- **Privacy Practices**
 - Increase in data doesn't change need for privacy and security
 - Only change is application of principles in era of internet and cyber security

UTC Comments On DOE RFI

Data Access, Third Party Access, Privacy

- **Consumer Opt in /Opt out of smart meter deployment**
 - Can undermine large portion of the value of such deployment
 - Remote meter reading, house-by-house outage reporting, implementation of dynamic pricing
- **Consumer control of sharing information with utilities and third parties**
 - No question re utilities since it is utility data
 - Consumer control over sharing with 3rd parties
- **Reporting concerns or problems with smart meters**
 - Utilities already have fully staffed call centers to deal with questions related to utility owned meters.

UTC Comments On DOE RFI

Data Access, Third Party Access, Privacy

- Addressing the needs of different communities –
 - Smart grid pilots already focused on low-income consumers
 - Revealed benefit from dynamic pricing
- Relevant data-privacy standards –
 - Current state regulatory authority data privacy standards most relevant
- Security architecture –
 - Smart grid security architecture to ensure that consumer privacy and security are built into smart grid technologies, not added on later.

UTC Comments On DOE RFI

Data Access, Third Party Access, Privacy

- **Government access to consumer data –**
 - Utilities will continue to cooperate with authorized government agents in accordance with federal and state laws and judicial decisions
- **Third party access to consumer data –**
 - No absolute right for third
 - Consumers control 3rd party access
- **Forms of energy information available –**
 - Depends upon forms of energy information collected by the meter

UTC Comments On DOE RFI

Data Access, Third Party Access, Privacy

- Access to real-time or near real-time information –
 - From meter
 - Requires zigbee chip and customer devices
 - From utility
 - Requires replacement of communication infrastructure
 - Seriously undermine any value created with potentially significant cost implications for consumers.
 - Decision should be left to state jurisdictions
 - All mechanisms involve some level of cost that will need to be recouped through local rates.

DOE Request For Information Utility Communication Needs

UTC's Comments On Utility Communication Needs

- **Utilities use various technology solutions**
 - Wireless essential for quick, cost-effective, reliable wide area coverage and long range backhaul
- **Utilities lack access to spectrum to support wireless upgrades**
- **UTC estimates utilities and CIs need**
 - 30 MHz of licensed spectrum below 2 GHz to support wireless needs
 - Needed to support Tier 2 distribution backhaul layer of network
 - Below 2 GHz – favorable propagation characteristics to cover wide areas and support high-capacity backhaul to point-to-point links
 - Below 1 GHz – near edge to penetrate walls and overcome moisture and foliage

UTC's Comments On Utility Communication Needs

- Use private internal networks for mission critical applications
 - Functional requirements – designed for reliability not coverage
 - Survivability – natural and manmade disasters, extended backup, high winds and heavy ice
 - Availability – no traffic congestion
 - Coverage
 - Latency, security and life cycle
 - UTC study will look at business, technical and functional requirements of both core and edge communication functions within utilities
- Urgent action needed to support smart grid and other upgrading

Basic Requirements

- **Security**
 - Survive physical and cyber security attacks, and protect consumer data
- **Bandwidth and throughput**
 - Some applications are hundreds of bytes / day, others are megabits/sec
- **Reliability**
 - Different requirements for different applications
- **Coverage**
 - Generally need 100% coverage for mission critical voice and data
 - Gaps need to be filled for future needs
 - Distribution automation
 - Smart metering

Basic Requirements

- **Latency**
 - Teleprotection – latency is critical – millisecond responses
 - Meter reading – latency not as important
- **Back-up power**
 - Mission critical applications require hours, days or weeks
- **Interoperability**
 - Meet upcoming NIST interoperability standards
 - Utilities lack interoperability during mutual aid scenarios in aftermath of storms or other disasters that cause widespread outages
 - Lack interoperability with public safety entities during emergency response scenarios

Basic Requirements

- **Durability**
 - Operate in harsh and demanding environments
 - Industrial standards
 - Designed for safety / reliability where high voltage and lightning are issues
 - Ruggedized for extreme weather, temperatures, humidity, dust, etc.
 - Designed for 25 year life cycles not subject to technical obsolescence

Other Factors

- **Topography of the grid**
 - Overhead / underground structure
 - Radial or networked
- **Size and customer density**
- **Terrain, foliage, weather**
- **Strategic partnerships**
 - Commercial carriers, public safety, government entities

Utilities – The new needs

- Two way communication to customer premises
 - Outage detection, power quality monitoring
- Intelligent grid devices – 72% need upgraded communication
- Customer premises – 91% need upgraded communication
- Synchrophasors – latency < 20 milliseconds
- Distribution substation broadband access <13%
- Support millions of smart meters, appliances, devices and backhaul data – 91% of customers need upgraded comm.

How Much Spectrum is Needed?

- 30 MHz dedicated or shared with compatible users
 - Based upon estimated throughput for each SG application extrapolated by the number of devices/nodes and average number of collectors per branch of the network
 - Above 2 GHz for certain short range applications – possibly Home Area Networks
 - Not long haul or in areas with Line of Sight issues
 - Under 2 GHz optimal propagation
 - Cover wide areas, support high capacity backhaul pt-to-pt links
 - Below 1 GHz
 - At edge of network – penetrate walls, overcome moisture and foliage issues

Why Wireless?

- **Uniquely capable of providing wide area coverage**
 - Connectivity to millions of devices on the grid
 - Point-to-point connectivity to distribution substations
- **Cost effective**
 - Relatively low capital and operational investment compared to wireline
- **Deployed quickly and easily**
 - Commercial carriers may be able to support some of these applications

WIRELESS ISSUES AT FCC

Can US Follow Canadian Lead?

New Spectrum: 1800-1830 MHz Band

- Recently allocated in Canada for utility purposes
- Suitable for WiMAX applications for Smart Grid
 - WiMAX equipment developed; other vendors interested
 - Can be used for mobile as well as fixed communications
- **Allocated to Federal government in the U.S.**
 - UTC meeting with NTIA and DoE to share the spectrum with Federal incumbent users
 - UTC files comments at FCC in NBP to garner support

CI Sharing Spectrum With Public Safety?

New Spectrum: 700 MHz D-Block

- D-Block was auctioned but bid did not meet minimum
- FCC required by statute to re-auction D-Block
 - Winner was intended to share with public safety
 - Public Safety always entitled to preempt access to capacity during emergencies
 - FCC showing interest in public safety / utility partnerships
 - Public Safety Spectrum Trust (PSST) and business partners looking to UTC for sharing guidance
 - Discussions with PSST representative about sharing
 - Pressure from carriers to ease restrictions
- FCC National Broadband Plan encourages PS to share spectrum with utilities and other CI

Unused Broadcast Channels

New Spectrum: TV White Spaces

- FCC decides on unlicensed, fixed & mobile use of unused broadcast channels (FCC 08-260)
 - Fixed in Ch. 2-51(except 3, 4, 37) – use must be registered in database, away from TV operations, max 4 watts EIRP
 - Personal portable in Ch. 21-51 (except 37), max 100 mw (40 mw near TV)
 - Technology based on Dynamic Power Control
- **Database providers**
 - Google, Comsearch and others file
 - New products must connect to the Internet to determine available channels
 - Once FCC decides on database providers
 - Product certification and implementation will quickly follow
 - Consumer adoption remains to be seen

Problems with Wireless Headsets in TV Bands

- Nuclear plants using Part 74 headsets under renewed experimental licenses; renewal includes all equipment
 - Continue to operate below 700 MHz
 - Continue to operate in core broadcast bands
- Some testing of alternatives, but most of industry still needs access
- Five-year waiver request by UTC/NEI filed 7/09
 - Will continue to use at nuclear sites but inside use only
 - No coordination with local broadcasters to be required
 - FCC takes up waiver request as part of NPRM
- UTC/NEI comments in wireless microphones RM seek:
 - Grant of waiver or Part 74 licensing of Telex headsets
 - Continued access to 700 MHz band for 3 year transition
 - Exemption from TV exclusion zones

FCC Limits Narrowbanding to 12.5kHz

Existing Spectrum: Below 512 MHz

- FCC issues clarification regarding narrowbanding to 6.25 kHz
 - FCC likes narrowbanding, but no mandate to 6.25 kHz
- **Reminder: Deadlines:**
 - **1/1/2013** – Licensees must convert to 12.5 kHz channels or efficiency equivalent.
- New 12.5 kHz equipment will be in short supply – don't wait!
- UTC offering studies on land mobile upgrade options, webinar, also specialized consulting (research / legal / technical)

FCC Protects PS from Interference

Existing Spectrum: 800 MHz Rebanding

- FCC process to protect public safety from interference from low site cellular architecture systems (Sprint / Nextel)
 - Told Sprint / Nextel to vacate spectrum and move up to high side of the band
- **Currently –**
 - FCC releases Public Notice of vacated Sprint / Nextel channels
 - Coordinators established criteria for allocation
 - PS get three year preference, then Critical Infrastructure gets preference to remaining Sprint/Nextel channels for next two years
 - Process is ongoing and completion by 2011 deadline questionable.

FCC Freezes Licenses for 900 MHz

- Freeze on new applications stays until six months after each NPSPAC region 800 MHz reband is complete
 - FCC to provide Public Notice w/in 60 days of time that a region is cleared
 - If contour reaches into uncleared NPSPAC areas, FCC will consider waivers
 - FCC promises to assess qualifications of applicants and monitor the filing of new applications to protect against abuse
- FCC adopts interference protection standards based on 800 MHz band:
 - -88 dBm for mobiles / -85 dBm for portables
 - Unacceptable interference = 17 dBm
 - Receiver standards = 60 dB intermod rejection; 60 dB adjacent channel rejection and -116 dBm sensitivity.

VIEW FROM FERC / NIST

UTC Participating in Standards Groups

- UTC participates in smart grid, control system security standards processes through a variety of groups:
 - OPEN SG
 - Energy Sector Control Systems Working Group (ESCSWG)
 - DHS Industrial Control System Joint Working Group (ICSJWG)
- Goal – represent UTC member needs
 - Bring information *from* standards meetings to members
 - Articles, white papers and briefings so that members and clients are up to speed (as much as possible) with activities;
 - Bring information *back* to standards groups from members that do not have the resources to participate.

VIEW FROM CONGRESS

Spectrum Inventory Legislation (HR 3125 and S 649)

- **To promote spectrum efficiency**
 - Identify unused or underutilized spectrum for purposes of reallocation
 - Inventory private and government licenses in 225 MHz up to 10 GHz
 - Create publicly accessible website with current licensing information
- **Information to be included**
 - Services authorized to operate in each band of frequencies
 - Identity of Federal or non-federal user
 - Activities, capabilities, functions / missions of transmitters, terminals or receivers
 - Total amount of spectrum and geographic area covered
 - Total number of transmitters, terminals or receivers
 - Extent freqs. used geographically by amount and percentage of time
 - Contour maps of coverage area and signal strength
 - Commercial names of non-federal users offering facilities-based services

Spectrum Inventory Legislation (HR 3125 and S 649)

- Exemptions for national security, homeland security or public safety
 - Classified information or Information for which there is a legal basis for nondisclosure and
 - Showing that if made public would adversely impact national or homeland security or public safety
- Concerns re: impact on UTC members:
 - Reveals all critical functions, missions and uses of licenses which can be used to identify key critical communications facilities and nodes
 - Disparate treatment of information pertaining to PMAs vs. FCC licensees
 - Inability to qualify for an exemption from public website
- Status: Passed the House, awaiting action in the Senate

Security of the Electric System (HR 5026 and S 1462)

- **Purposes**
 - Avoid disruption by exploitation of vulnerabilities, cyber acts, electromagnetic pulse, geomagnetic (solar) events and physical attacks
 - Expedite implementation of protection measures
 - Address the Aurora vulnerability
 - Enhance information sharing by facilitating necessary security clearances
- **What it would do:**
 - Expands FERC authority to issue rules or orders address vulnerabilities and imminent threats not covered by NERCIP standards
 - Extend FERC authority to distribution systems serving Top 100 critical defense facilities as designated by the President to address vulnerabilities and threats to the reliability of the facilities' electric supply
 - Extends FERC authority to all 50 states and territories

Security of the Electric System (HR 5026 and S 1462)

- **How it would be done:**
 - FERC rules/orders effective until FERC okays new NERC standard
 - President issues directive or determination of imminent grid security threat then FERC can order emergency measures to protect electric system and critical defense facilities
- **Concerns re: Impact on UTC members:**
 - Federal authority would extend into the distribution grid since military all
 - Cost recovery
 - limited to incremental costs of protecting critical defense facilities
 - Bulk Power System for threat mitigation or emergency orders – distribution?
 - Mexico and Canada? Non-uniform protection standards across the North American grid
- **Status: Both bills await Floor action.**

Spectrum Sharing with Public Safety (HR 5081)

- To expedite build-out of nationwide interoperable emergency response broadband network for public safety
- What it would do:
 - Allocate (rather than auction) the 700 D block to the PSST
 - Leverage existing or planned commercial infrastructure as network infrastructure
 - Authorize shared use of the public safety broadband spectrum and infrastructure by emergency response providers with public safety retention of priority access
- Concerns re: UTC members:
 - Utilities eligible for shared-use but only on secondary basis
 - Preference given to commercial systems as network providers and build-out
 - Coordination with waivers being granted by the FCC for statewide or regional public safety systems which include utility participation, some supported by NTIA grants for broadband deployment
 - Would mandate the use of LTE technology which means higher equipment costs if utilities do participate

Spectrum Sharing with Public Safety (HR 5081)

- **Status**
 - Legislative action in initial stages
 - Meetings ongoing w/ Cong'al staff to raise utility issues/concerns
 - Alt. leg. being developed to follow NBP re auctioning spectrum block
 - Examining current public safety/utility shared-use networks
 - Alternative models to use of commercial networks
- **Exploratory meetings between public safety representatives and UTC**

Other Legislative Issues

- **Climate Change** - House passed Senate stalled due to Gulf spill
- **Cyber Security**
 - Numerous proposals leveraging federal procurement practices
- **Other Federal level initiatives**
 - PCIS – Interdependencies Working Group
 - Telecommunications Electricity Alliance (TEA)
 - Implementation of recommendations in Communication
 - Dependency on Electric Power (CDEP) Report to address impact and mitigation of long-term outage
 - DHS Communications Sector Coordinating Council
 - 2010 National Sector Risk Assessment due by year end
 - National Level Exercise Planning
 - Office of the Director of National Intelligence
 - Pilot to coordinate intelligence community efforts with CI protection

VIEW FROM STATES

State Trends

- States are eager to get federal funds for smart grid and / or broadband
 - Lending support to utility requests for funding
- States are also suspicious of Federal intrusion into matters of state jurisdiction
 - Example - regulation of electric distribution grid
- States are beginning to take an interest in consumer protection issues for SG
 - Example - data privacy and security

Conclusions

- Making progress on quest for spectrum!
- Pole attachment and overall FCC policy attitude toward CII present continuing challenges for UTC members
- Smart grid, energy tie-in create best opportunities
- Get involved to learn more!
- For bi-weekly updates join the UTC Public Policy Department calls!
- For real time updates sign up for UTC Alters and UTC Insight

Thank you!

Many issues not covered!
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