ARM CUSTOMERS IN ACTION

AMI - Have We Reached the Tipping Point?

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AMI Fundamentals

What is Advanced Metering Infrastructure?

AMI Refers to the System of Collecting, Measuring, and Analyzing Energy Usage from 'Smart' Meters via Various Communications Media.

- AMI enables the communication and analysis of data *by multiple business applications* and provides the ability to integrate metering information with other enterprise systems.

- AMI is a key enabler for demand management programs and inter-system reciprocity. It also provides command and control functions such as remote connectivity analysis, price and load signaling, and "last gasp" outage notification.

- Components of AMI include:
  - 'Smart' meters with enterprise system interaction capability
  - Gateway devices, such as programmable communicating thermostats
  - Communications channels, including leased line, power line carrier, and wireless
  - Data repository, management and business intelligence systems

An AMI System Representation

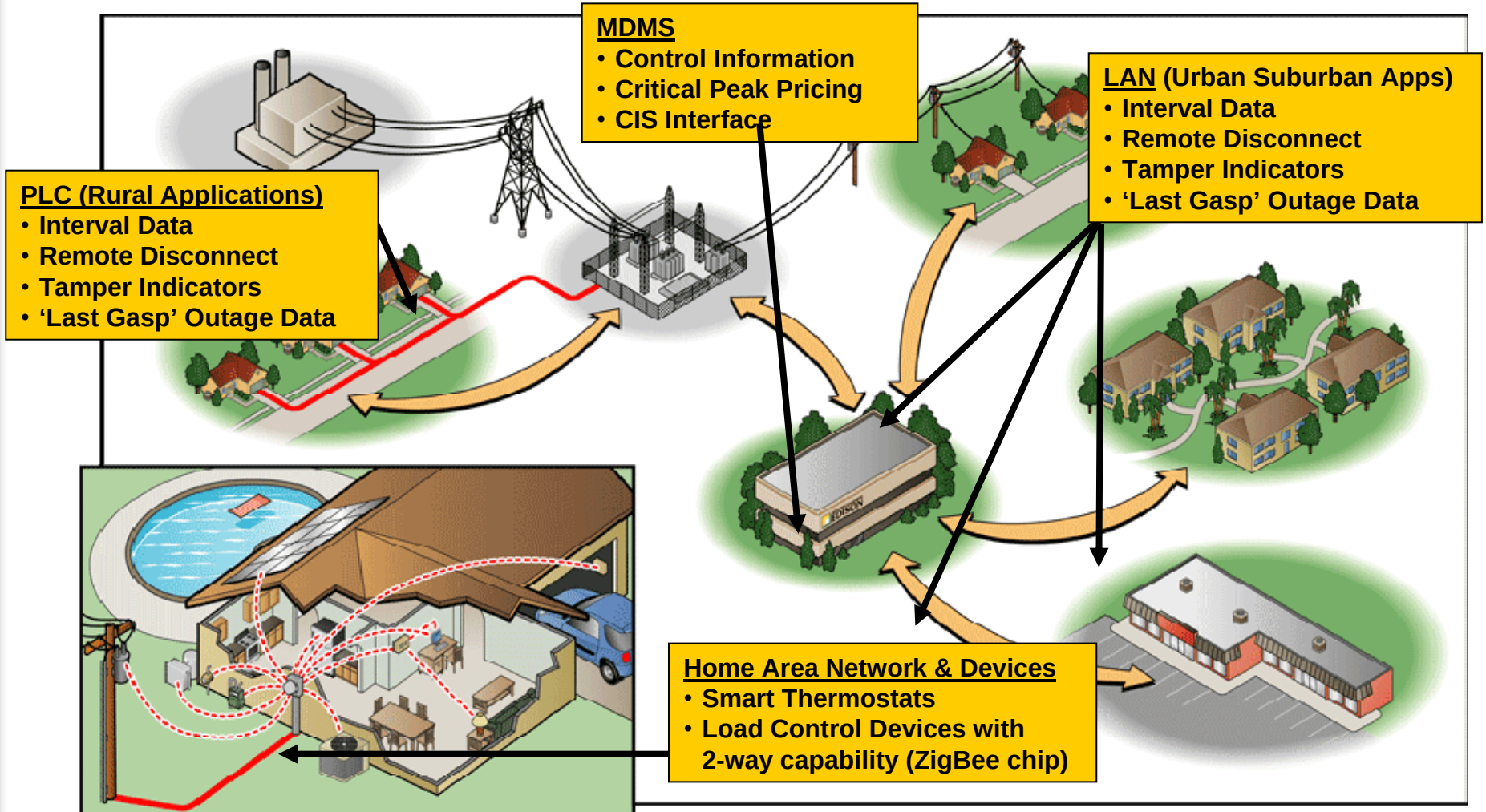


Illustration Source: Southern California Edison

Drivers of AMI Growth

What Led to the Initial Interest in AMI?

Macroeconomic Trends, Technological Advancements, and Regulatory Initiatives are Driving a Renewed Interest in Energy Conservation & Demand Management

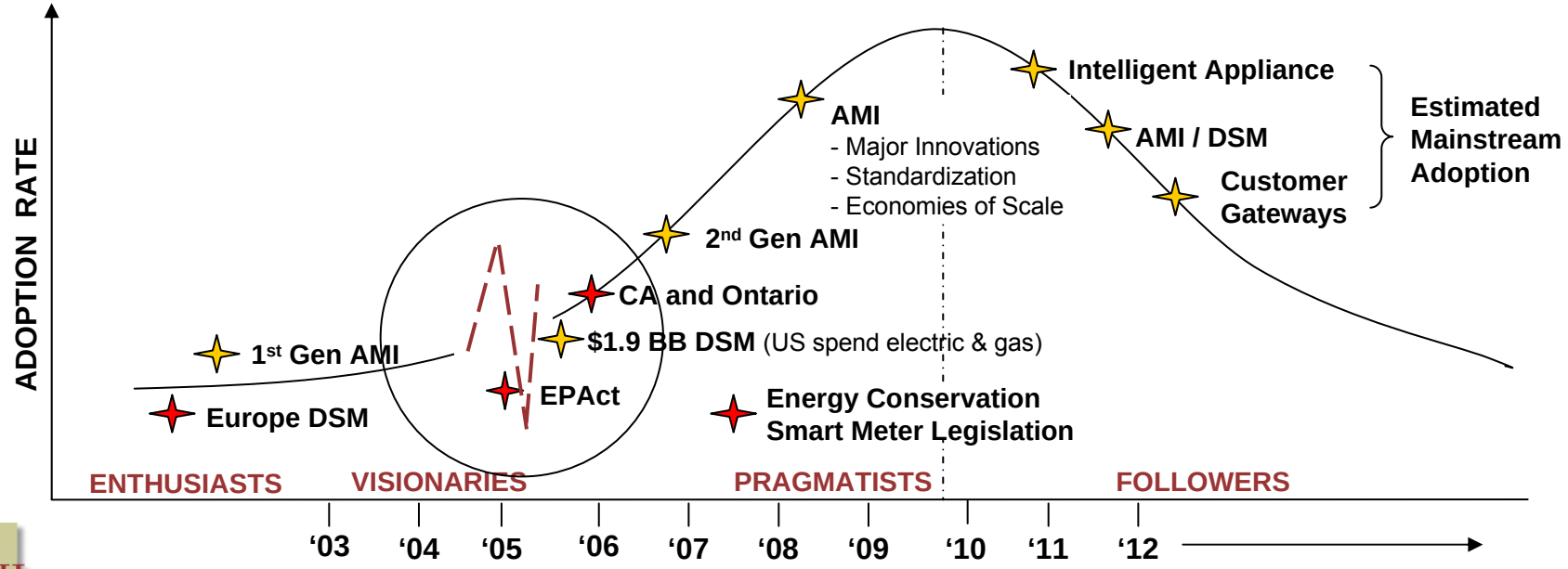
- Fundamental issues in the energy industry regarding load growth, capacity constraints, fuel costs and environmental concerns have created an impetus for improved energy management:
  - At current growth rates, $350 billion dollars of investment capital will be required over the next 20 years to meet the rising electrical demand, and replace aging delivery assets
  - Fuel costs are becoming an increasing concern for producers and consumers, with fossil fuel prices increasing an average of 283% from 1999 to 2005.

- The interests of utilities, their customers and regulators are converging to create a growing need for DSM and energy management technologies:
  - For utilities, energy management is the “fifth fuel” in integrated resource planning
  - For customers and regulators, it is a means to manage energy costs and respond to environmental concerns
  - AMI is a key enabler for virtually all DSM and energy management initiatives

Technology and Regulation are Driving the Adoption Rate

An Inflection Point was Reached with the Energy Policy Act of 2005

- Components of AMI had been proven but lacked a market catalyst. The EPACT was enacted by the Federal Government, and other jurisdictions (CA and Ontario) quickly followed. A significant market opportunity was then created.
- While limited results of mass market deployments are available, the tipping point for mainstream adoption has been reached, due to the widespread availability of AMI technology, the improving economics, and growing public interest.



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Early Statewide Adopters

State Initiative Overview

State	Regulatory Environment	Sample Utility Initiatives
CA	• Shaped by energy crisis and expiration of rate caps • Endorses EPACT 2005 recommendations • Mandates universal AMI implementation	**SDG&E** • Pilot: 10,000 meters in 2006 • Tech: BPL
MD	• Responding to dramatic "end of freeze" price increases • Adoption of AMI is currently voluntary but pending legislation would make mass market availability of smart meters mandatory by October, 2007	**BGE** • Pilot: 2 diverse areas • Tech: Piloting multiple vendors
NY	• Responding to frequent and extended outages in 2006 • PSC requested NY utilities develop business case and on Aug 1, 2006 issued an order for utilities to file plans for the development and deployment of AMI	**ConEd** • Pilot: Total of 500,000 meters in 4 pilot areas • Tech: RF licensed and mesh
TX	• Voluntary adoption of AMI for state utilities, with PUC approval required six months prior to implementation • Compliance with ongoing requirements (i.e. bi –annual deployment updates, two-way communication, etc.)	**TXU** • Pilot: 145,000 meters • Tech: DCSI TWACS, BPL

Key Observations

Key Observations

A New Regulatory Paradigm is Emerging

- Traditional rate making policy creates a financial disincentive for conservation and DSM, since utility revenues and profits are typically driven by energy usage. Some states are now moving toward decoupling, to enable utilities to offer conservation programs while maintaining adequate returns on their infrastructure investments.

- The early statewide adopters previously highlighted have progressed further, establishing a regulatory framework which encourages (or mandates) energy conservation offerings and provides full recovery for the required AMI investment.

- Legislation recently enacted in Virginia is emerging as a model of the new regulatory paradigm: Improved ROE incentives are provided for both generation and conservation investments. Such incentives drive an *Integrated Resource Planning* philosophy which fairly balances generation and conservation. *If this legislation does become a model for other states, the tipping point truly has been reached!*

Key Observations (cont.)

Begin Now to Initiate Regulatory Discussions and Plan Pilot Programs

- There is an opportunity in most states to initiate a collaborative rate design effort which will respond to growing public concerns, while providing the necessary rate structures and incentives to serve the interests of both utilities and customers.

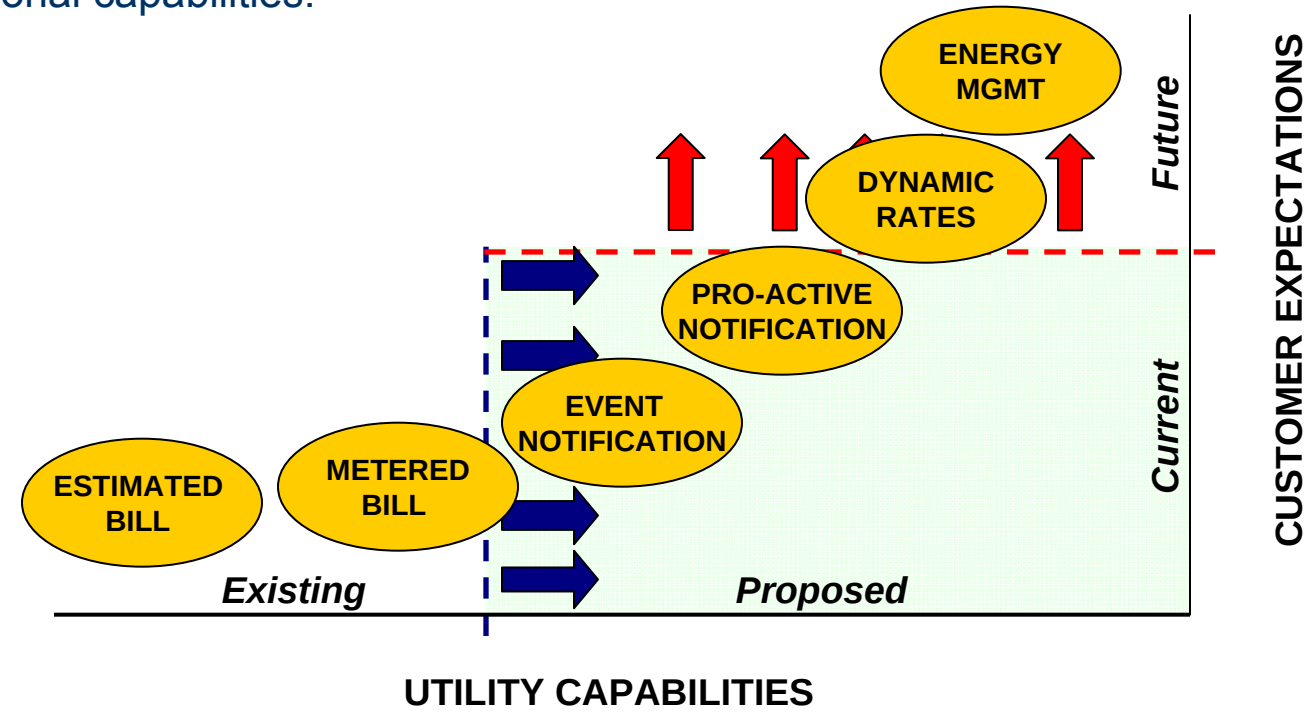
- There is also an opportunity to develop a portfolio of pilot programs which will enable the utility to thoughtfully evaluate it particular business drivers, customer segments, and operational requirements.

- A suggested planning approach is provided in the next few slides. The key is to pilot and test various initiatives, to validate expected adoption rates and business benefits. The mix of initiatives can then be varied over time, to optimize the customer, regulatory and business result.

Key Observations (cont.)

Effective Strategies Combine both External and Internal Points of View

- Mass market and regulatory acceptance of AMI expenditures will require tangible improvements in the customer experience specific to a utility's operating environment. "We do not all live in California", so one solution will not fit all utilities or customers.
- However, AMI is critical to closing the gap between customer expectations and utility operational capabilities.



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Key Observations: AMI Complements SCADA

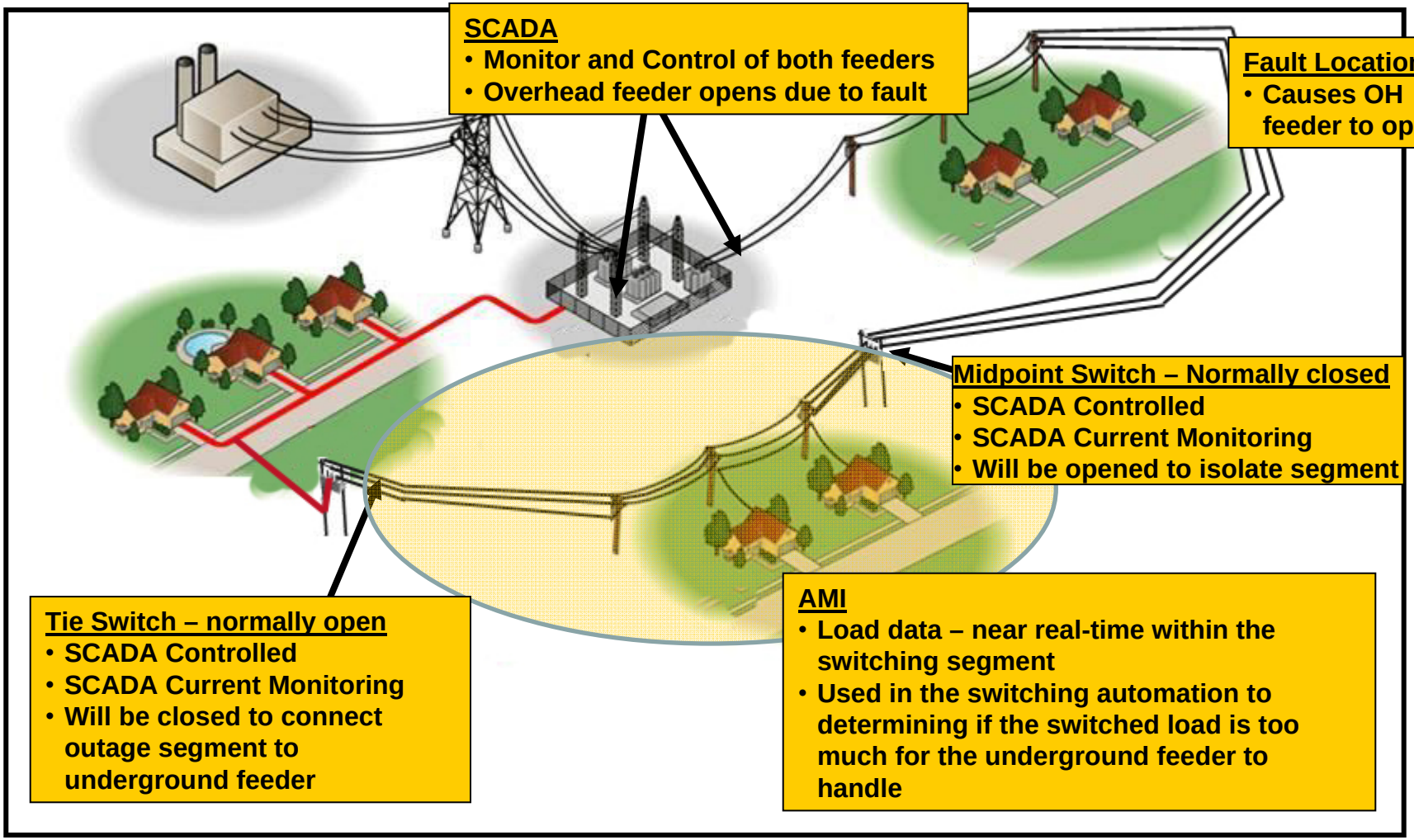

Illustration Source: Southern California Edison

Recommended Actions

Develop an *Enterprise* Strategy

The Enterprise Strategy Integrates the "Outside" and "Inside" Points of View:

- *The "Outside" Point of View is Customer-Focused*
  The strategy should incorporate the market, regulatory and customer considerations that are relevant to the utility's service territory. The required analyses will include market research, customer needs analysis and segmentation, the development of specific product and service offerings, and associated promotional and customer enrollment considerations.

- *The "Inside" Point of View is Operations-Focused*
  The strategy must encompass the operational benefits of an AMI implementation, including meter reading savings, outage/restoration notification, load profiling, network analysis and capacity planning, switching plan development and maintenance optimization.

The optimal utility strategy incorporates both points of view and delivers the best return on investment!

Develop an *Enterprise* Strategy (cont.)

Integrating Both Points of View

	Define the Drivers	Develop Initiatives	Pilot & Evaluate
Customer-Focused	▪ Energy Mgmt / Cost Control ▪ Environmental Concerns ▪ Reg. Directives ▪ Supplier Competition	▪ Time of Use / CP Pricing ▪ Direct Load Control ▪ Home Energy Mgmt Solutions	▪ Define Segments & Create Offerings ▪ Monitor Results ▪ Refine / Optimize Adoption Rates & Business Case
Operations-Focused	▪ Peak Reduction ▪ Asset Utilization / Capacity Planning ▪ Outage Response ▪ O&M Reduction —Turn-on / Turn-off —Maint. Planning	▪ Load Profiling ▪ Feeder-Segment Analysis ▪ Outage / Restore Notification ▪ Maintenance Optimization	▪ Pilot and Test ▪ Monitor Results ▪ Integrate AMI Inputs with OMS / SCADA ▪ Refine / Optimize Operational Benefits

Optimize Portfolio

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Focusing on the Customer – A Segmentation Analysis

The SDG&E AMI Business Case Illustrates the Importance of Segmentation

- It was first determined that C&I customers were more likely to benefit from AMI:
  - Largest energy users, most sensitive to changes in price and outages, responsive to real-time pricing, and therefore best able to maximize AMI benefits

- A partial deployment plan provided the best results. The scope of implementation was limited to:
  - All C&I customers with a 20KW rating or greater, or those located in climate zones with high AC saturation: (600K meter points)
  - This plan, summarized below, provided a lower cost and better NPV

Deployment	*CAPEX + O&M*	*Op Benefit*	*DSM Benefit*	*NPV*
Full	$ 612 MM	$ 392 MM	$ 268 MM	$48 MM
Partial	$ 340 MM	$ 242 MM	$ 207 MM	$109 MM

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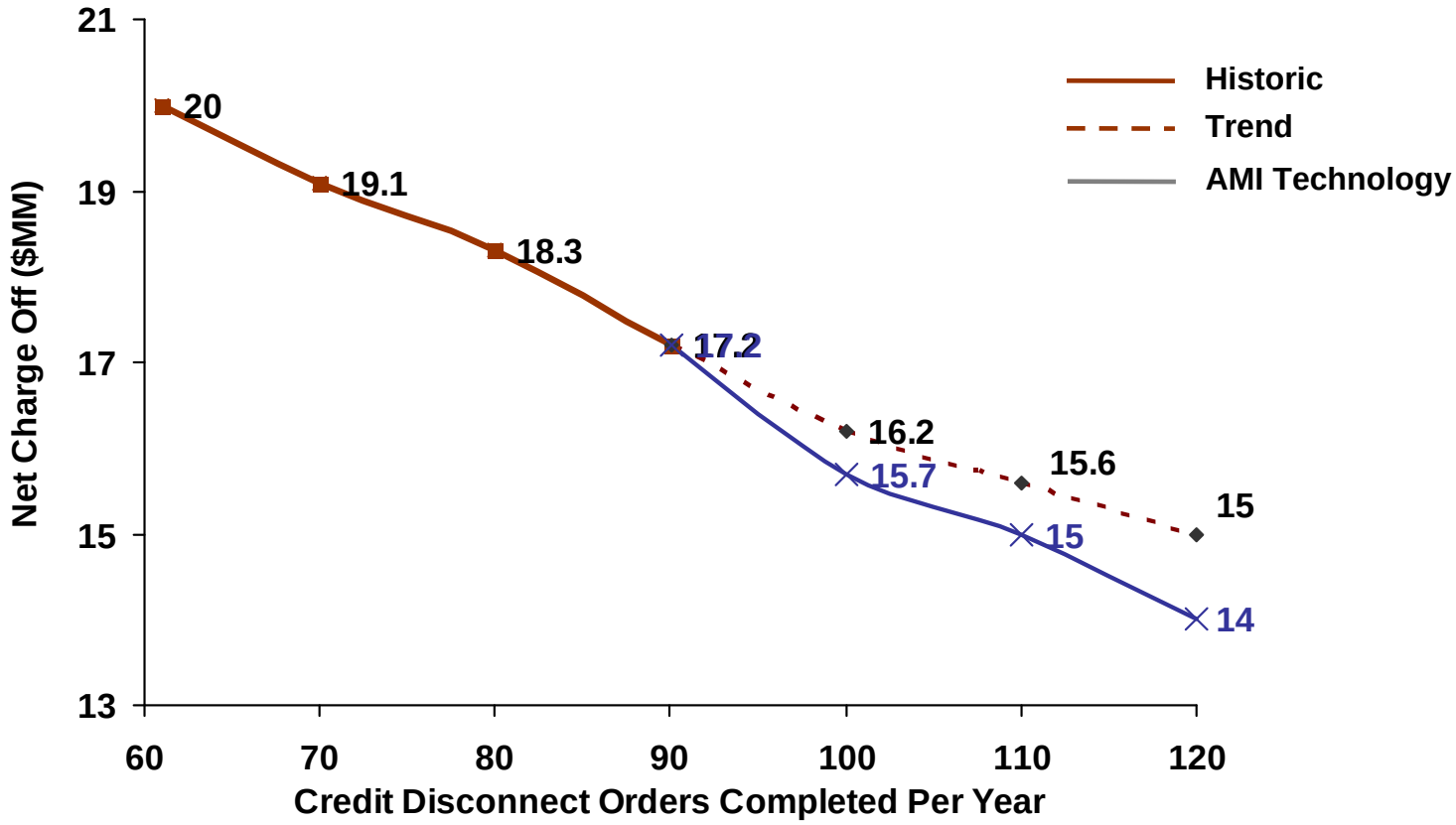
Focusing on Operations – Turn-on / Turn-off Savings

Generate Working Capital Benefits by Better Allocating Resources

- Technology enables operations to automate low value tasks like read requests
- Customer behavior based deployment of AMI will improve project ROI



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Conclusions

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We Believe the Tipping Point has been Reached and Momentum Continues to Build

- The Energy Policy Act, increasing energy costs, and growing environmental concerns, have created a convergence of interests among customers, suppliers, regulators and utilities to develop energy management solutions.

- Most states will adopt rate structures with decoupling or incentive mechanisms to promote utility investments in energy management. Integrated Resource Planning, with conservation as the "fifth fuel", will become a standard practice. This is the time to initiate regulatory discussions and help shape local policies and programs.

- This increasing interest and investment in AMI systems will drive open standards and economies of scale for all critical components, accelerating future growth.

Conclusions (cont.)

Developing an Effective Strategy Encompasses Two Points of View

- The *"Outside"* point of view addresses the utility's business environment, including market and regulatory forces, emerging customer expectations, potential competitor initiatives, etc. A customer segmentation analysis is suggested for developing targeted service offerings and their associated costs and benefits.

- The *"Inside"* point of view addresses operational considerations and the potential internal costs and benefits of an AMI implementation. This is the more challenging analysis, since internal costs for the metering, communications, and IT infrastructure are substantial. Significant operational benefits must then be identified, quantified and validated with key stakeholders to create the optimal strategy.

- Pilot programs should then be designed to validate various technology and service offerings, customer adoption rates, and expected operational benefits. Continuous monitoring of these pilot programs will enable the utility to optimize its AMI project portfolio over time, and achieve its strategic objectives.

Appendix: Sample Utility Responses

Sample Utility Responses – California / SDG&E

Budget and Business Case

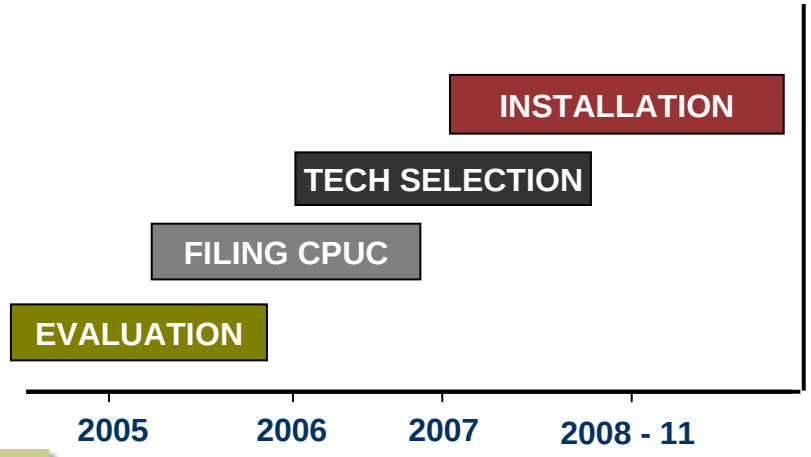
- Customers: 1,400,000 electric
  830,000 gas
- Total Cost: $612 MM*
- Project NPV: $48 MM (17 yr duration)
- Recovery of capital and O&M costs

** Full scale implementation*

Pilots and Implementation

- Pilot: 10,000 beta meters in 2006
- Implementation:
  - Full preferred
  - Partial is contingency, consisting of 600,000 inland customers & all C&I customers with ≥ 20kW load

Proposed Timeline



Capabilities and Technology

- Credit Offering for peak load curtailment
- Improved outage restoration
- MDMS: Itron Enterprise Edition
- Meters: Selection 3rd Qtr 2007
- Communications: BPL, Wireless, SCADA

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Sample Utility Responses – New York / Con Edison

Budget and Business Case

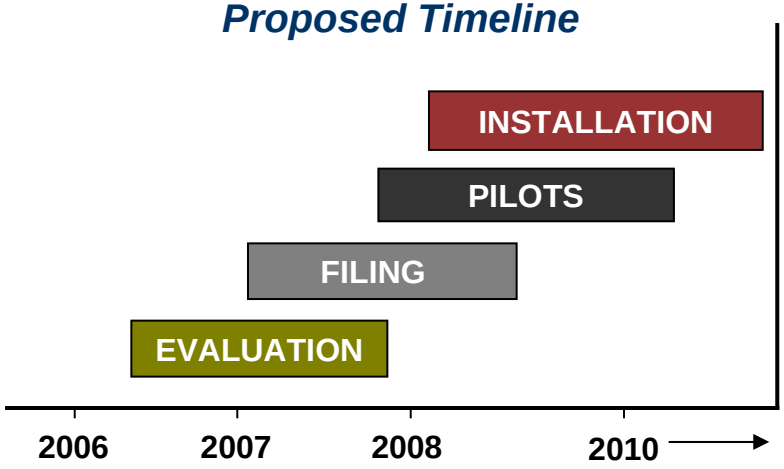
- Customers: 3.2 million electric
  1.1 million gas
- Total Implement. Cost: $892 MM*
- Project NPV: $69.7 MM (15 year duration)
- Recovery of capital and O&M cost

** Full scale Implementation*

Pilots and Implementation

- Pilot: 4 pre-deployment demonstrations
  - Orange and Rockland (5k meters)
  - Westchester (300k)
  - Queens (100k)
  - Bronx (100k)
- Implementation: Full scale

Proposed Timeline



Capabilities and Technology

- Emphasis on outage notification
- Improved meter reading performance
- MDMS: SAP
- Meters: Piloting Itron, Nexus, Cellnet
- Communication: LAN, Radio Frequency (licensed and mesh based)

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