



April 14, 2008

NYPSC AMI Technical Conference

Albany, NY

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President, Plexus Research



Briefing Outline

Introduction

What you need to know...

and where crisp definitions dare not go:

- AMR
- AMI
- MDMS
- Smart Meters
- Smart Grid - The Journey or the Destination?

The Benefit driven process

Risks: Avoiding contracting mine fields

Summary

Essential: The AMI Vision Statement

From one of the California IOUs:

Our AMI strategy will:

1. Empower our customers.
2. Reduce costs and improve quality of service.
3. Meet state and federal regulatory requirements.
4. Move toward a “smarter” grid.
5. Create a platform for future innovation.

AMI – Observing the “Fit”

- Supports Retail Choice, TOU, CPP Rates
- Creates new customer service options
- Mandatory Reliability Standards
- Renewables
- Mergers & Acquisitions, Foreign Investment
- CO² capture and sequestration
- Aging Workforce
- AMI and Operational Benefits
- Demand Response Benefits
- The path to a Smart Grid

Who is Plexus Research?

▶ *The business & technologies of utility interaction with customers.*

- Founded 1983
- Technology & Economics
- Objective, Independent
- Acquired by R. W. Beck 2007

CORE EXPERTISE

- Metering, Meter Data Systems
- Energy automation
- Data Communications
- Telecommunications
- Customer Applications, Technologies & Automation

MISSION: SERVING CLIENTS

- Institutional Clients
- Utilities & Energy providers
- Industry Technology Suppliers

Perspectives from Active Plexus AMI Projects

AEP - Texas, Indiana

DTE Energy (MI) *

Westar (KS) *

Vectren (IN)

Central Vermont Public Service (VT)

Texas - New Mexico Power (TX)

Public Service of New Mexico (NM)

Jamaica Public Service (Mirant) *

Progress Energy (FL and NC)

Unitil (NH, MA) *

Sacramento Municipal Utility District (CA)*

City of Seattle (WA)

Cities of Riverside (CA), Danville (VA), Lafayette (LA), Chelan County (WA)

EPRI - Multi-Metering (CA), D/A (TN)

California Public Utilities Commission (CA) re: PG&E, SDG&E, SCE *

AMR

Automatic Meter Reading - Mobile/Handheld

*Meter equipped with ERT
(encoder/receiver/transmitter)*



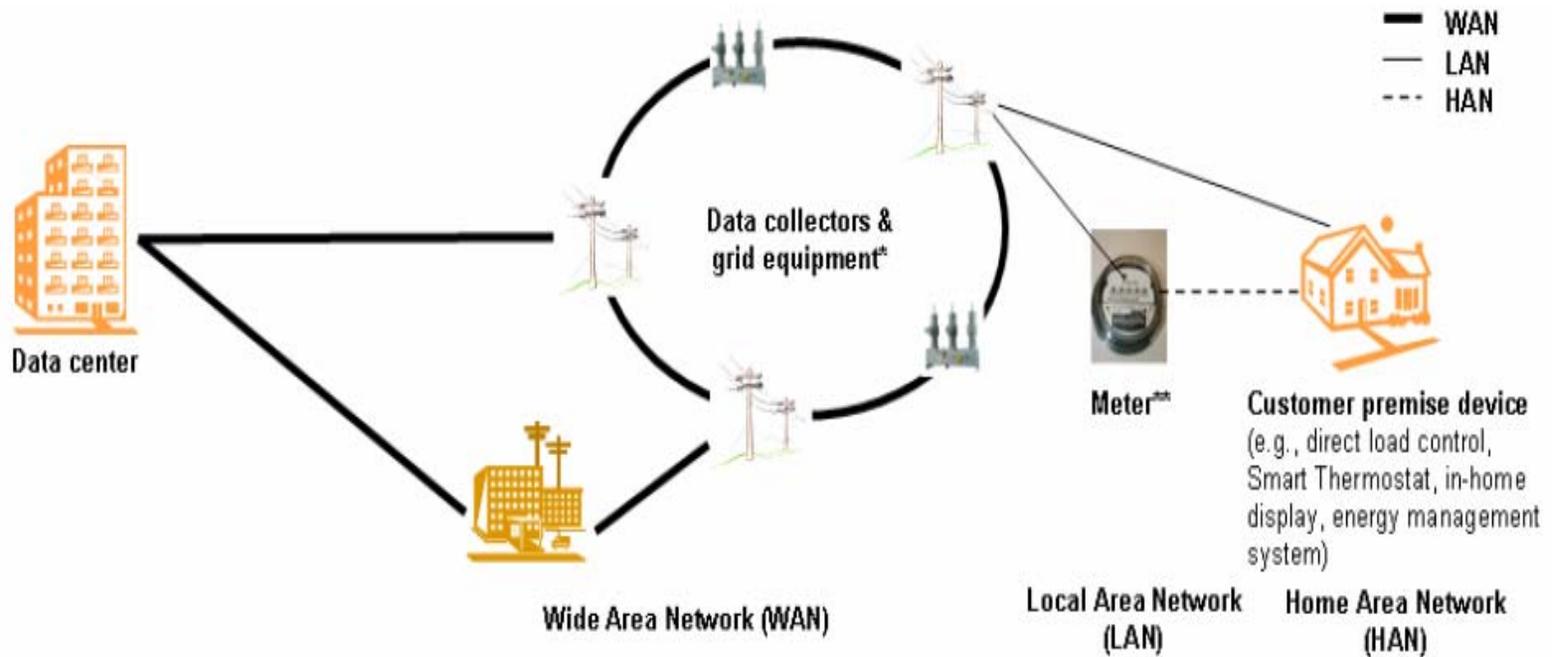
*Mobile Data Collection Vehicle
(hand-held collector too)*



AMI

Advanced Metering Infrastructure

Figure 1: WAN, LAN, Meter, and HAN Interfaces



The Challenge of Definitions

“Smart Meter” is simply a component of an AMI system

1-way versus 2-way?

TOU and CPP capable

*Remotely programmable?

*Customer alert/notification?

*HAN Interface?

*Integral remote disconnect?

*Prepayment metering capable?

*Load control capable?

5, 10, 15, 30, 60 minute data?

Polled or self-initiating

Tamper detect? (What and how?)

Voltage, PQ and ?

Net metering? How?

Lifetime “*The meaning of life*”

Useful Life (*Operational, service, useful, functional, used and useful.*)

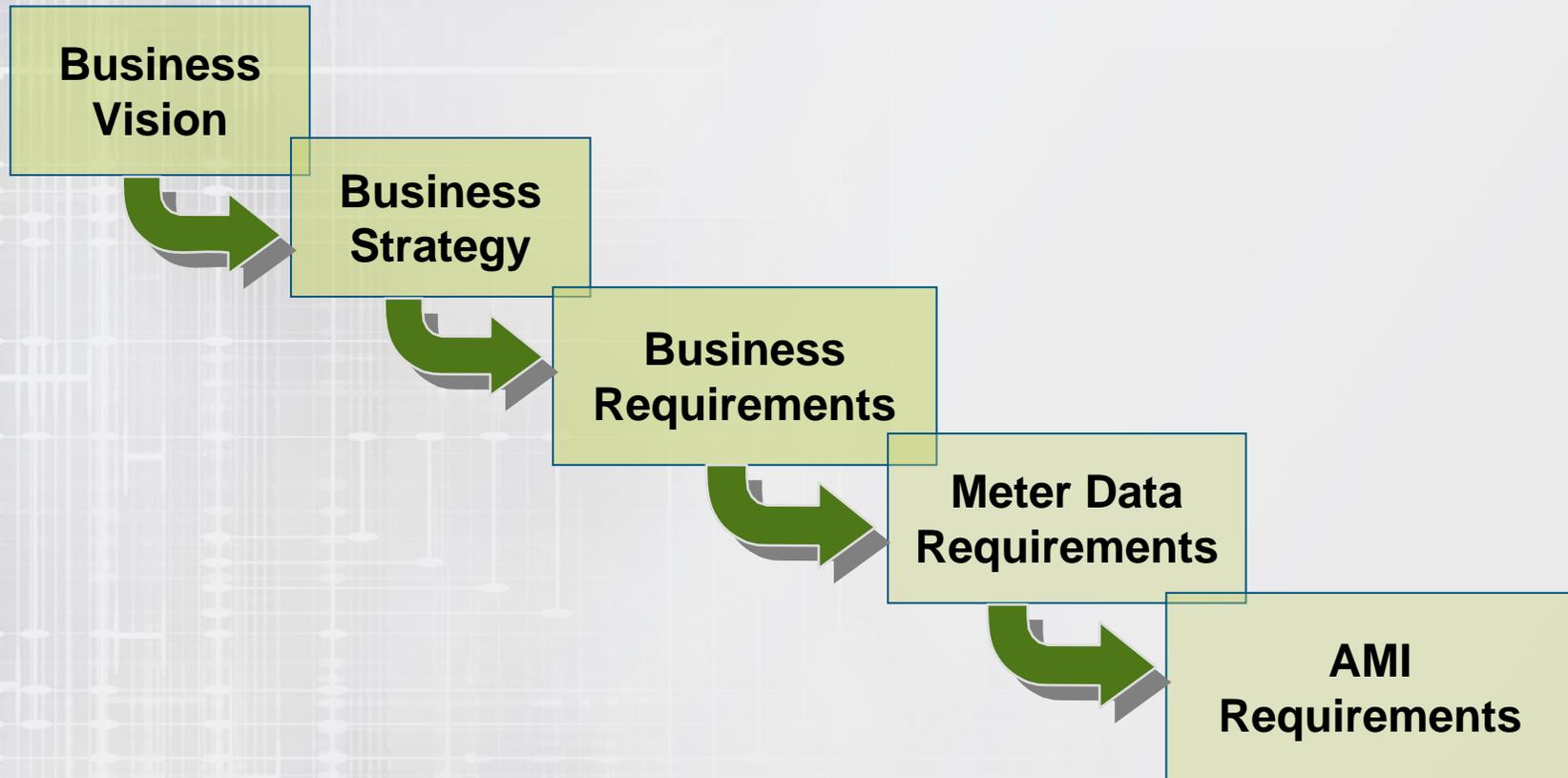
Depreciable Life (*Ratepayer reimbursement of long-lived assets*)

Economic Life and Study Period (*Performs correctly, and alternative not less expensive. Study period is analytical tool.*)

Technological Life (*Used and useful but necessarily technically current. Example: Manual reading is functional, used and useful, but technologically obsolete.*)

Per PG&E Final Decision 06-07-027 July 20, 2006

Steps in AMI Selection & Deployment



AMI Operating Benefits

Quantifiable Benefits

New Revenue

- Reduced Read-to-Pay Time
- PBR incentive Harvesting
 - Reduced Outage Minutes
 - Fewer Estimated Bills
- New Customer Services
 - Energy Information Services
 - Selectable Bill Date
 - Selectable Bill Frequency
 - Bill Aggregation
 - On-Demand Bill
 - Customized Bill
 - Meter Reading for Other Utilities
 - Outage/Restoration Notification
 - Analysis/Conservation Services

One Time & Short Term Benefits

- Meter Accuracy Improved
- Sale of used meters
- Meter Changeout Ends
- Tamper Detection & Correction

Capital Reductions

- Load Research Equip.
- Meter Reader Vehicles
- Optimal Transformer Sizing
- Meter Inventory

Reduced Expenses

- Customer Service
 - Bill Inquiries Reduced
 - Faster Inquiry Resolution
 - Customer Site Visits
- Billing
 - Reduced Manual Processing
 - Fewer Estimated Bills
 - Fewer Pre-bill Audits
- Metering & Reading
 - On-Cycle Reads
 - Off-Cycle Reads
 - Meter Reader Safety, Liability
 - Meter Reader Training
 - Reduced Meter Testing
 - Direct Access Settlement
 - Load Research Metering
- Distribution Operations
 - Capacitor Control
 - Outage Restoration
 - Transformer Failure

Avoided Losses

- Reduced Non-Billable Consumption
 - Tamper Deterred
 - Unoccupied Premises
- Electric System Optimization
 - End of Line Voltage
 - Feeder Load Balancing
 - Power Factor Losses

Intangible Benefits

Customer Service Benefits

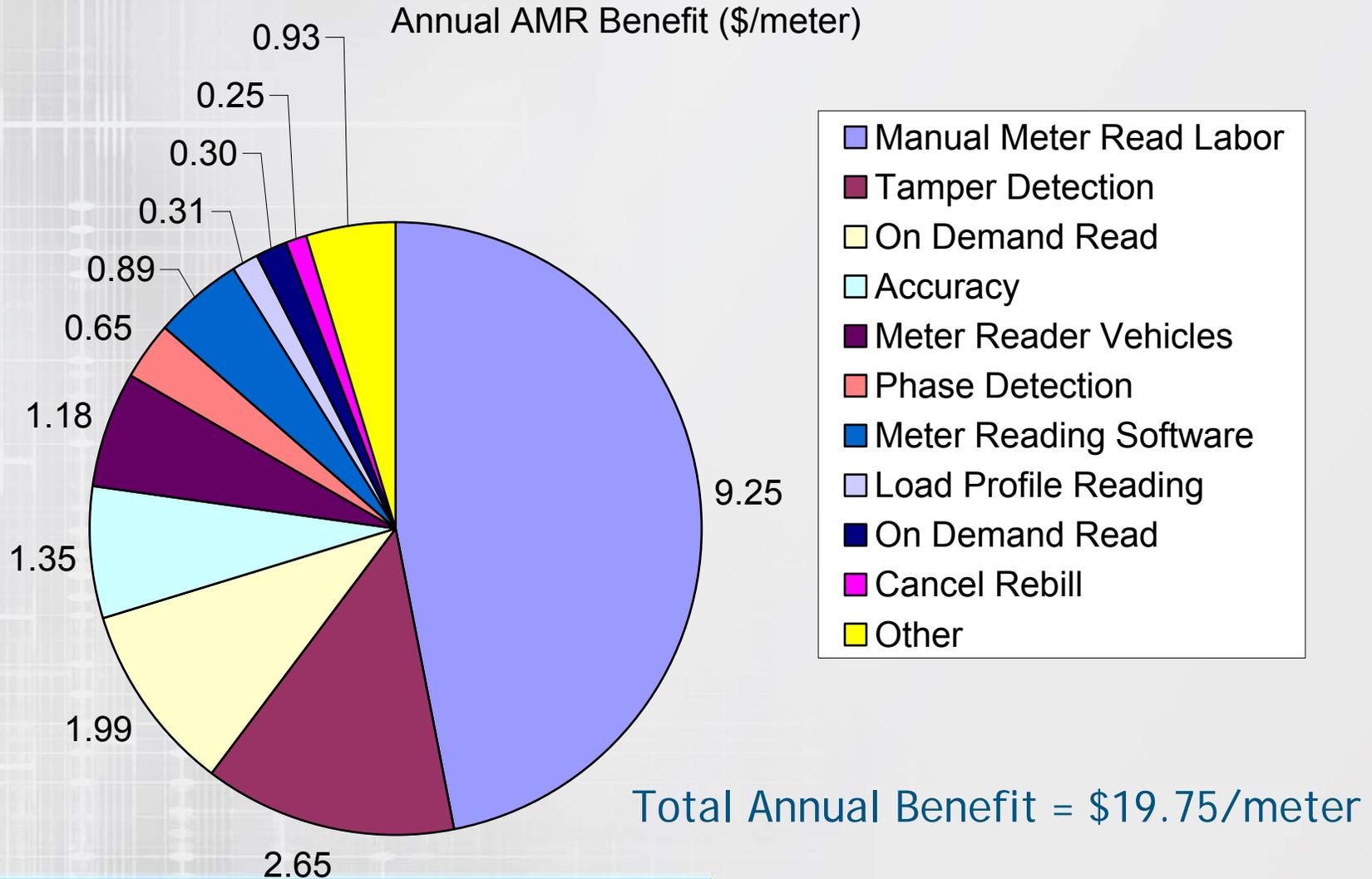
- Diverse Customer Services
- New Rates Possible
- Increased Responsiveness to Customer
- Less Intrusive to Customer
- Power Quality Monitoring

Strategic Benefits

- Distribution Automation
- Monitor/Manage Distributed Generation
- Greater Approved Return
- Improved Costs & Pricing Basis
- Improved Load Forecasting & System Planning
- Improved System Reliability
- Market Segmentation & Targeting
- Improved Public/Regulatory Relations
- Improved Customer Satisfaction

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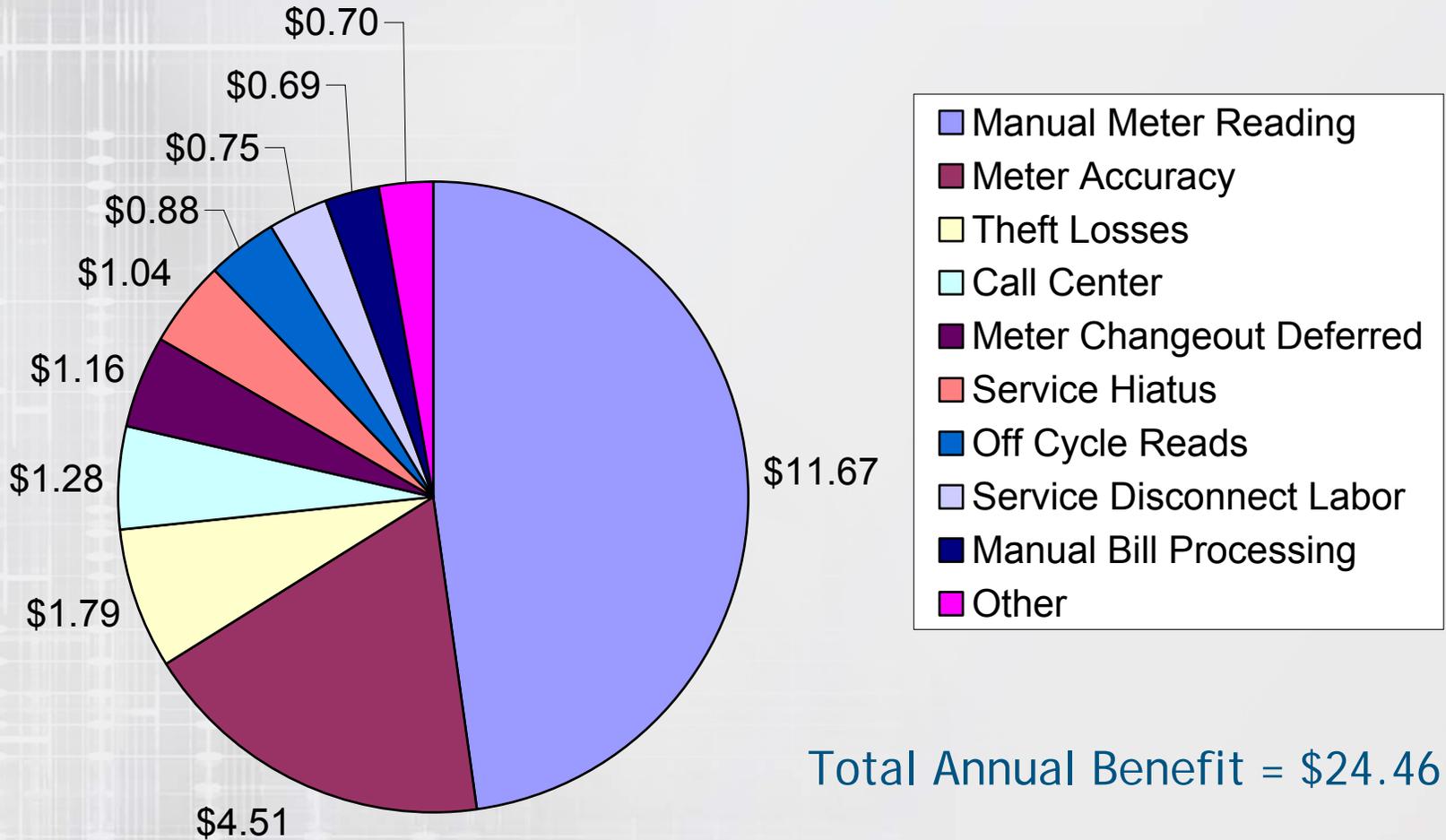
Small Gas & Electric IOU



Medium-sized IOU

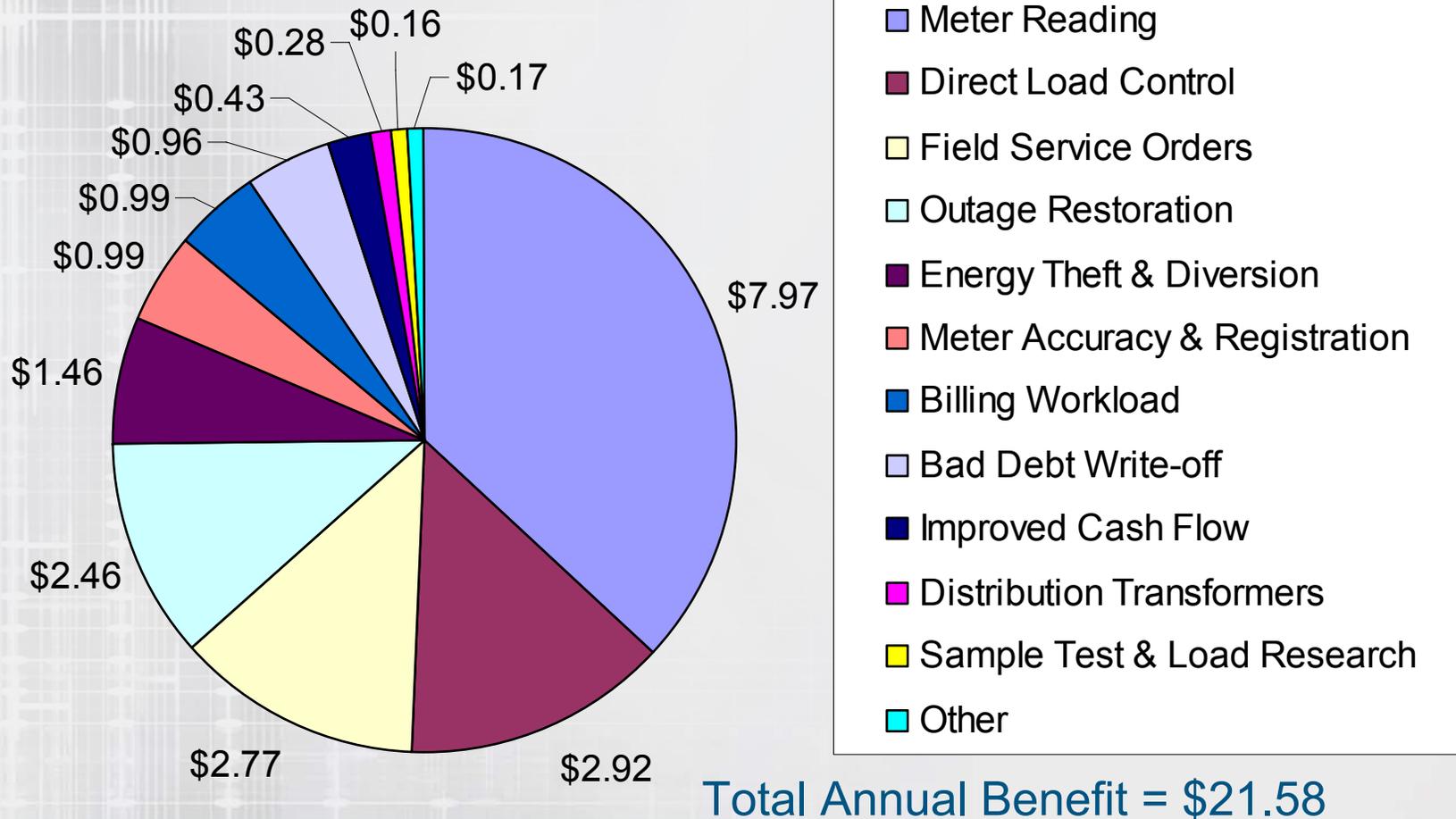
with load control of 15% of sites, service switch at 7% of meters

Annual AMR Benefit (\$/meter)

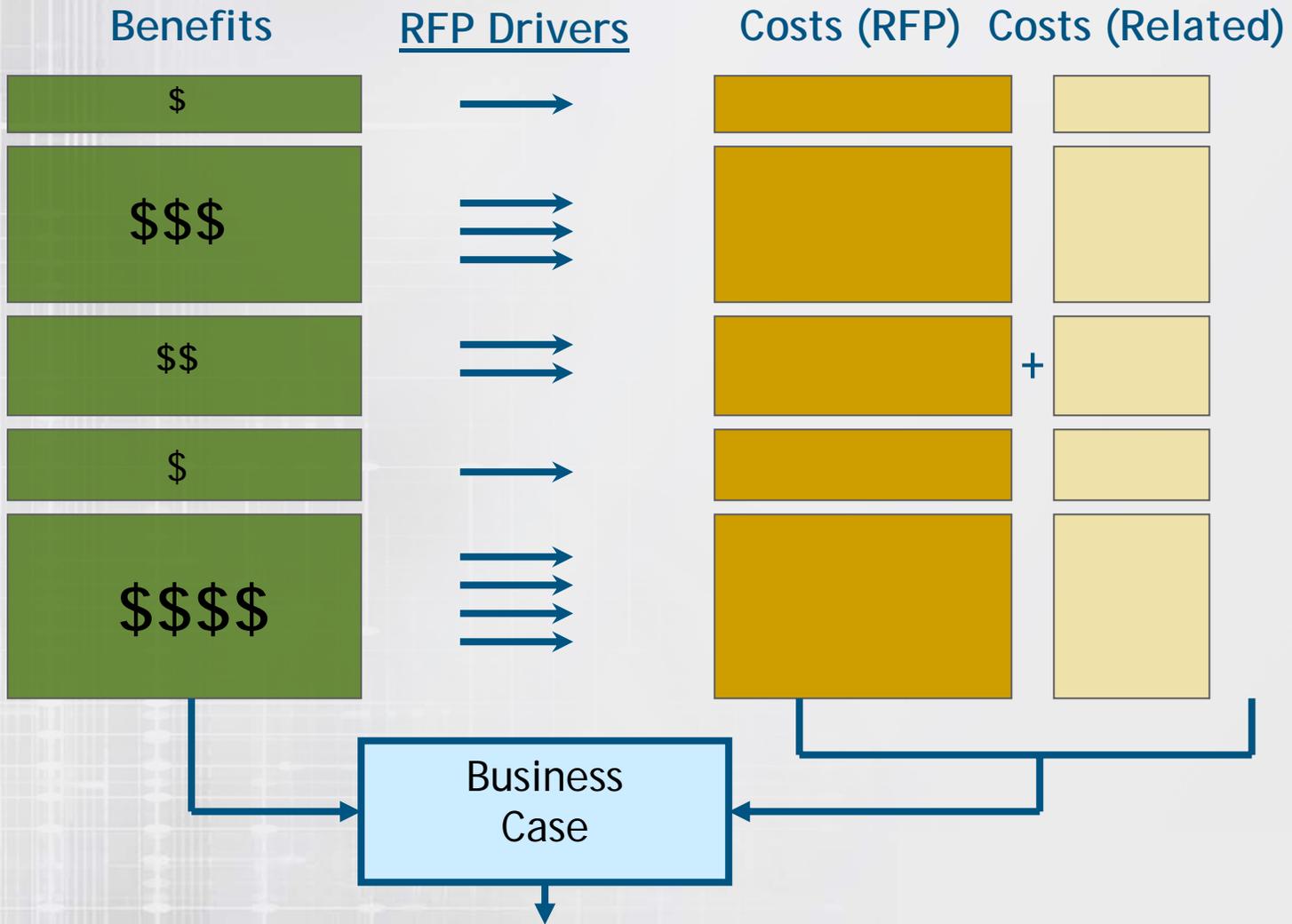


Large Electric Investor Owned Utility

Annual AMI Benefits (\$ per meter)

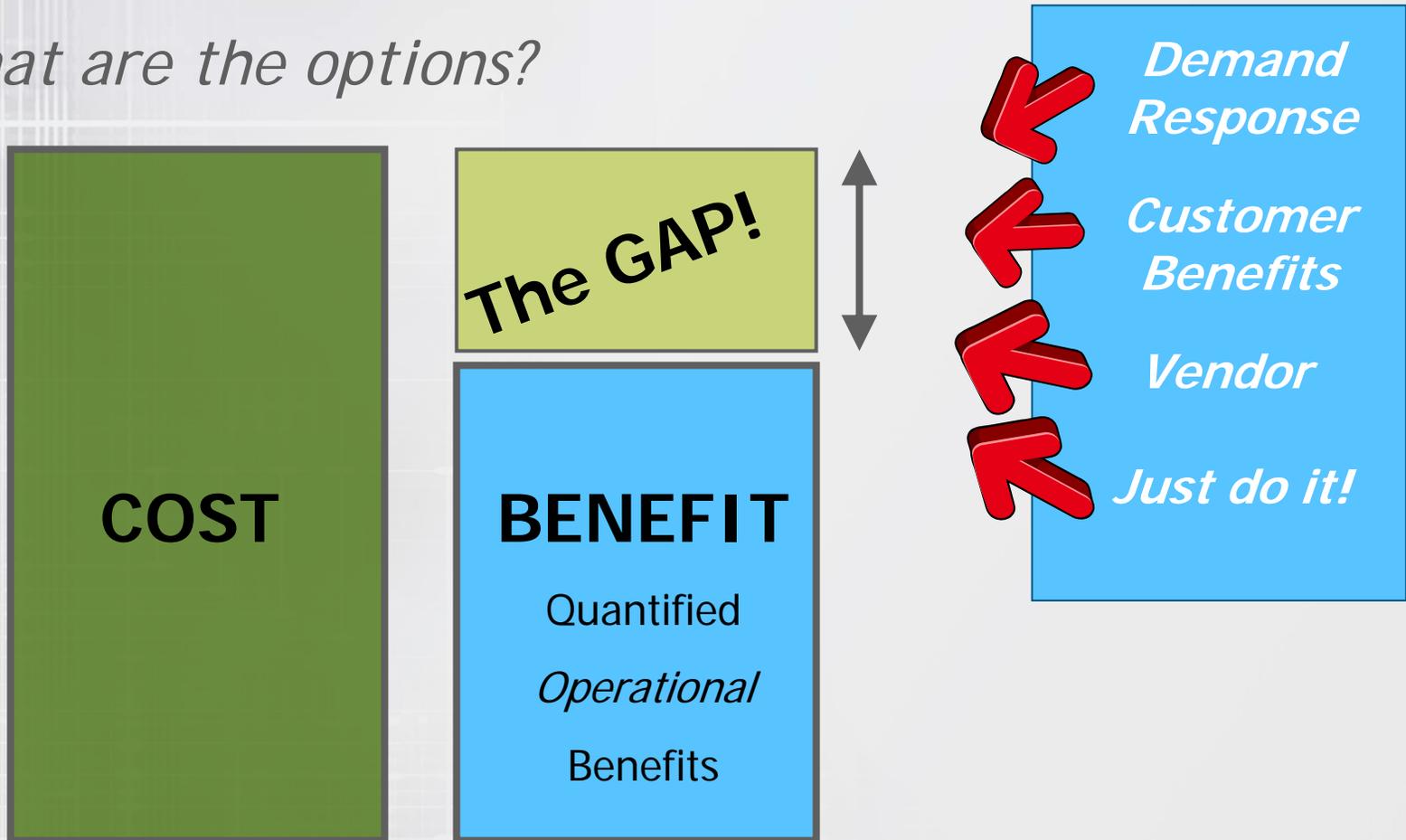


Components of Business Case

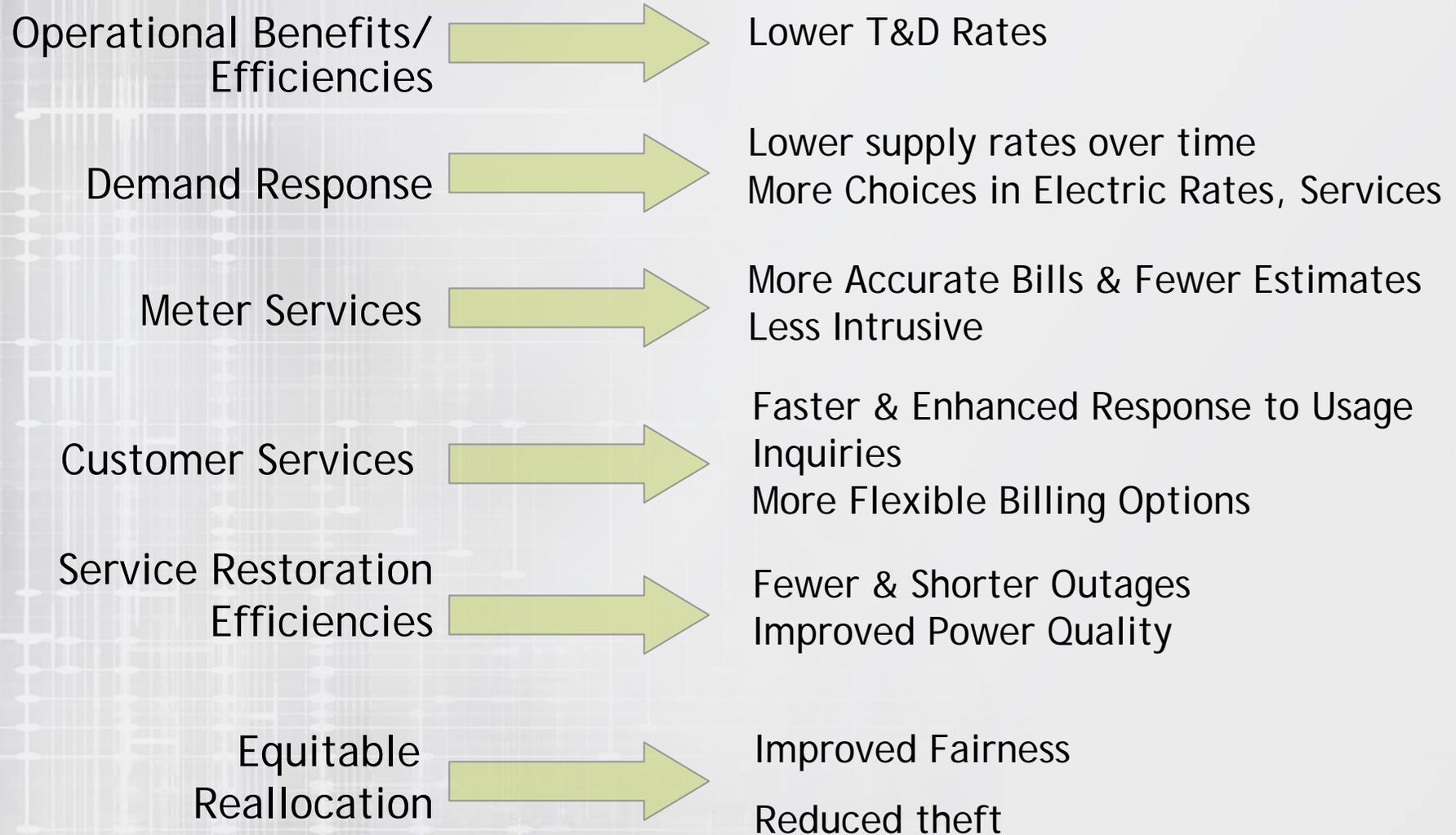


When Benefits Don't Equal Costs

What are the options?

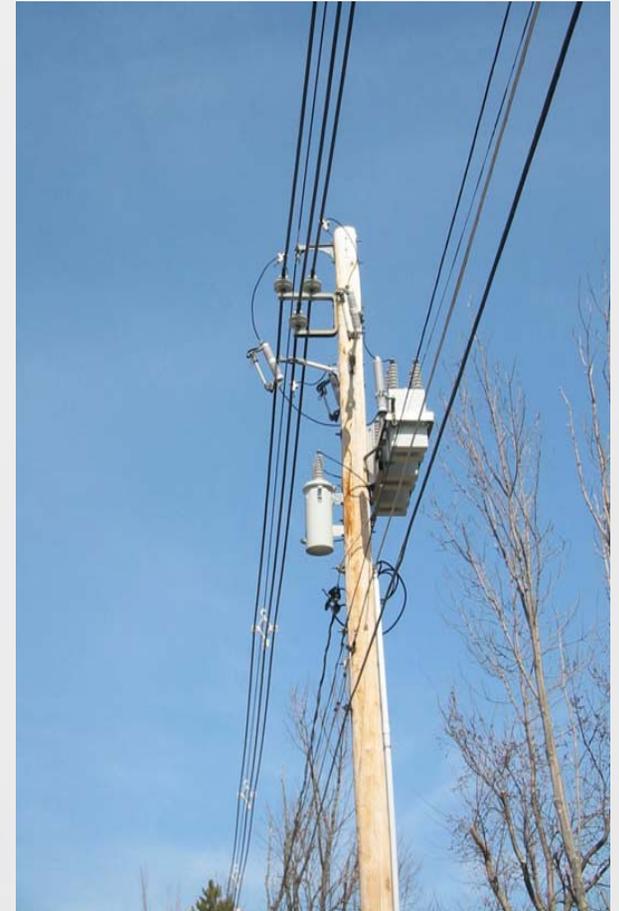


AMI Customer Benefits

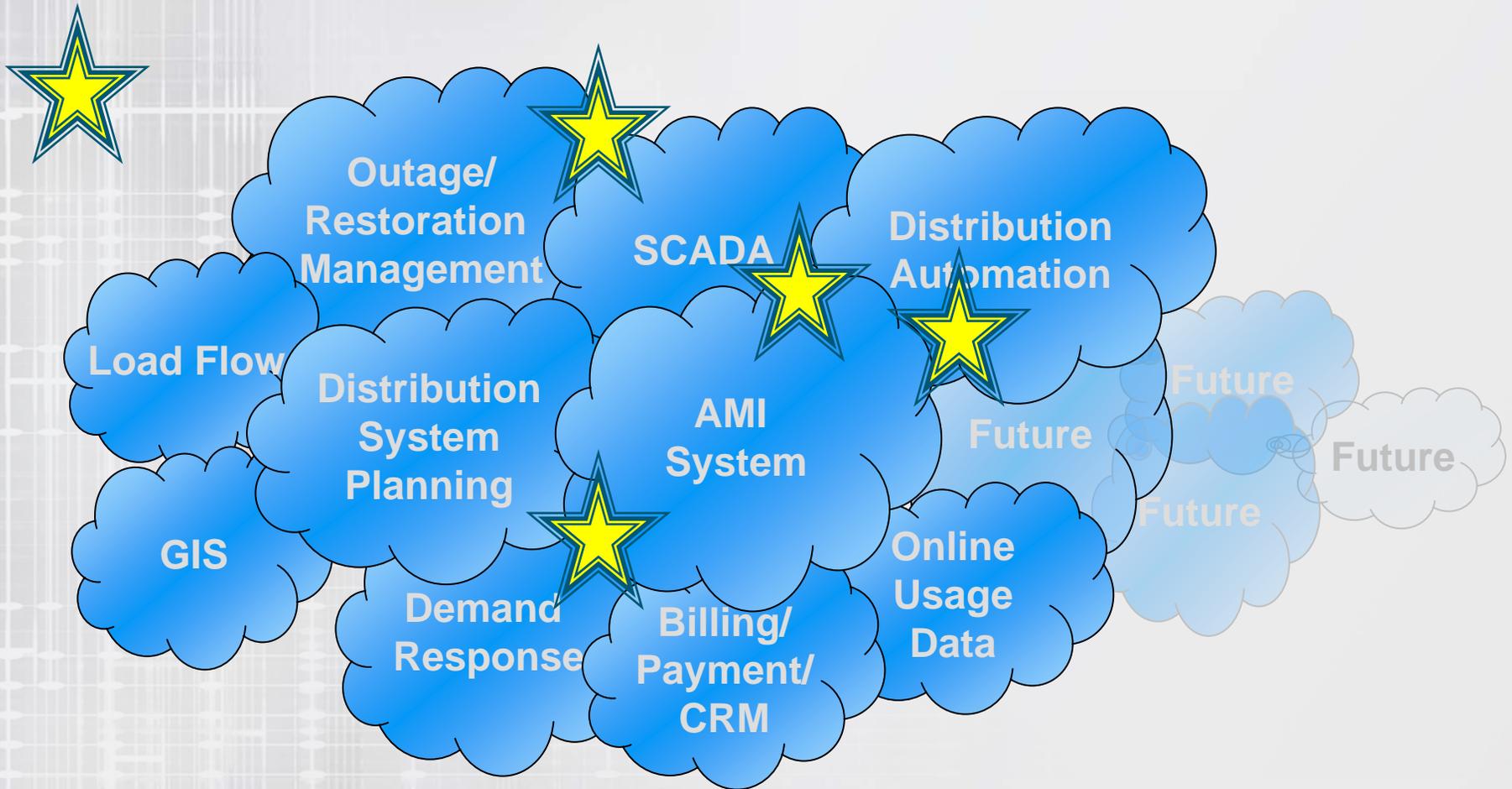


Societal Benefits of AMI

- Improved environment
- Improved economic climate
 - Single-player market dominance reduced
 - More stable electric market
- Moderation of need for new generation
- Better utilization of assets
 - Increased distribution system load factor
- Improved Quality of Service



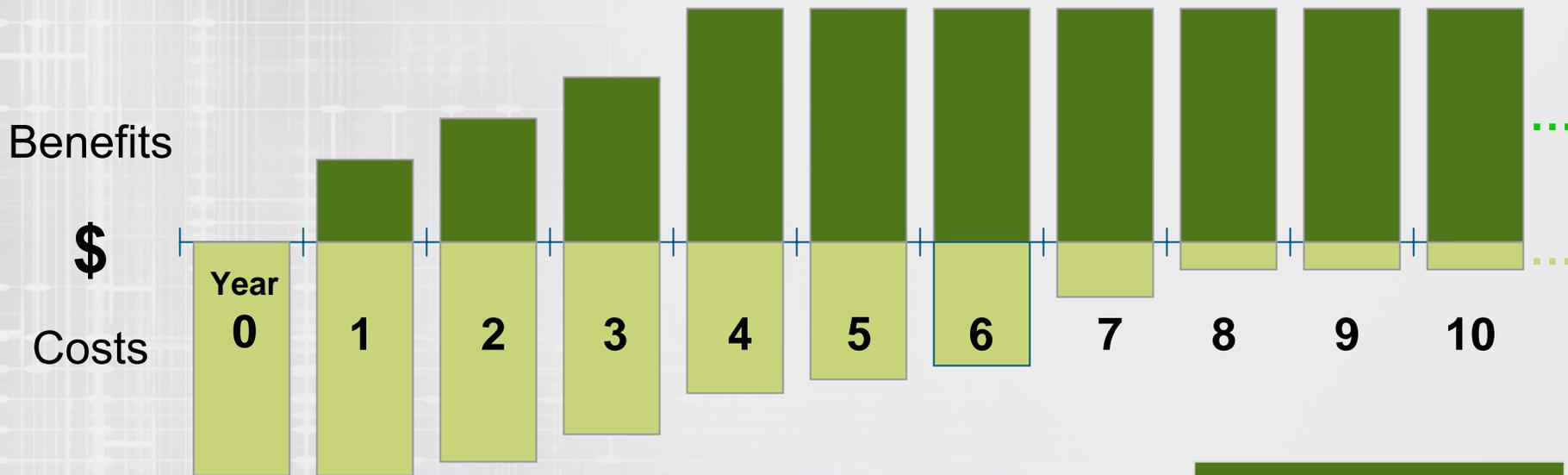
Smart Grid will emerge from the combinations of growing technology in distribution management & operation.



The Cost of Waiting

- Benefits & costs are both big.
- Years to “pay for” the system.
- Finally, the benefits are huge.

Present value
of this benefit is
\$15 to \$25 per
customer/year*



**in electric service*

Risks in AMI Contracting?

*Experience is what you
have right after you
needed it.*



Once signed, the AMI contract is
*your principal risk-management
resource.*

Get it right!

Why AMI Contracts are different!

- Many into one - Many, many, many low cost devices that must all operate together as a *single system*.
- Extreme environment - Large quantity of low cost devices that must operate unattended for 20+ years in a hostile environment.
- Cash register - That *single system* is the *cash register* of the company. Once the meter readers are gone it must work!
- Supplier transience - AMI companies and technologies come and go, and are bought and sold - especially in this field.
- Performance hard to judge - Staged delivery over time, not one shipment. You must have formal acceptance testing.
- Cost impact of delay - Performance or shipping delays are very costly.



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