

Utility Billing & Cost Allocation

The University of Arkansas, Fayetteville
AMCA System

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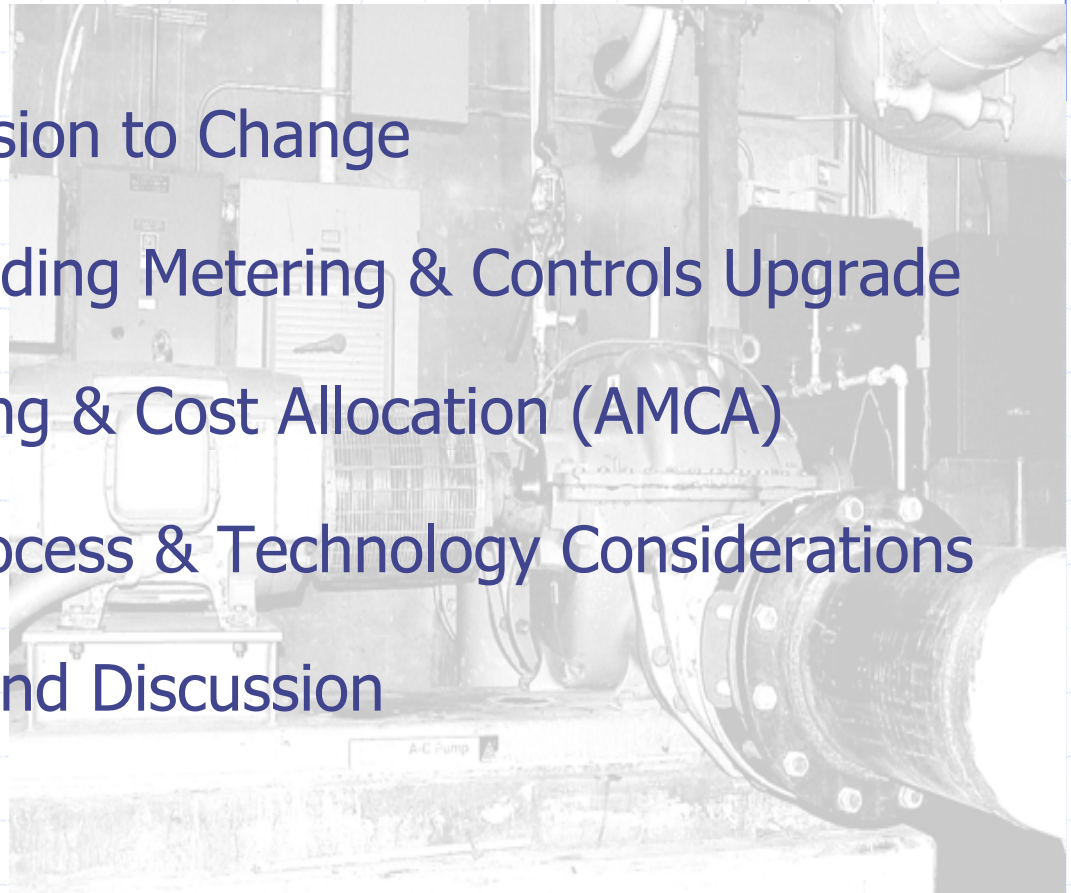
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VP of Marketing

Interval Data Systems



Discussion Topics

- ◆ The Business Decision to Change
- ◆ The Project — Building Metering & Controls Upgrade
- ◆ Automated Metering & Cost Allocation (AMCA)
- ◆ Organizational, Process & Technology Considerations
- ◆ Lessons Learned and Discussion



The Business Decision to Change

Why Make Radical Changes?

- ◆ Needed Quantum Leap in Energy Efficiency
- ◆ Needed Major Change in Financing to Address Capital Renewal & Deferred Maintenance
- ◆ Needed to Address Growth Demands Based on the Campus Master Plan

Campus Master Plan

Utility Development Plan

Academic
Plan

Enrollment

Facility
Needs

Infrastructure
Projects

Capital
Requirements



The Business Decision to Change Organizational Changes

- ◆ Holistic O&M Approach
- ◆ Part of Overall Facilities Management Re-engineering Effort
- ◆ Plant & Building HVAC Controls Group
- ◆ Co-located with Utility Plant Operators
- ◆ Zone HVAC Strategic & Financial Responsibility within Utility Operations



The Business Decision to Change Utility Development Plan

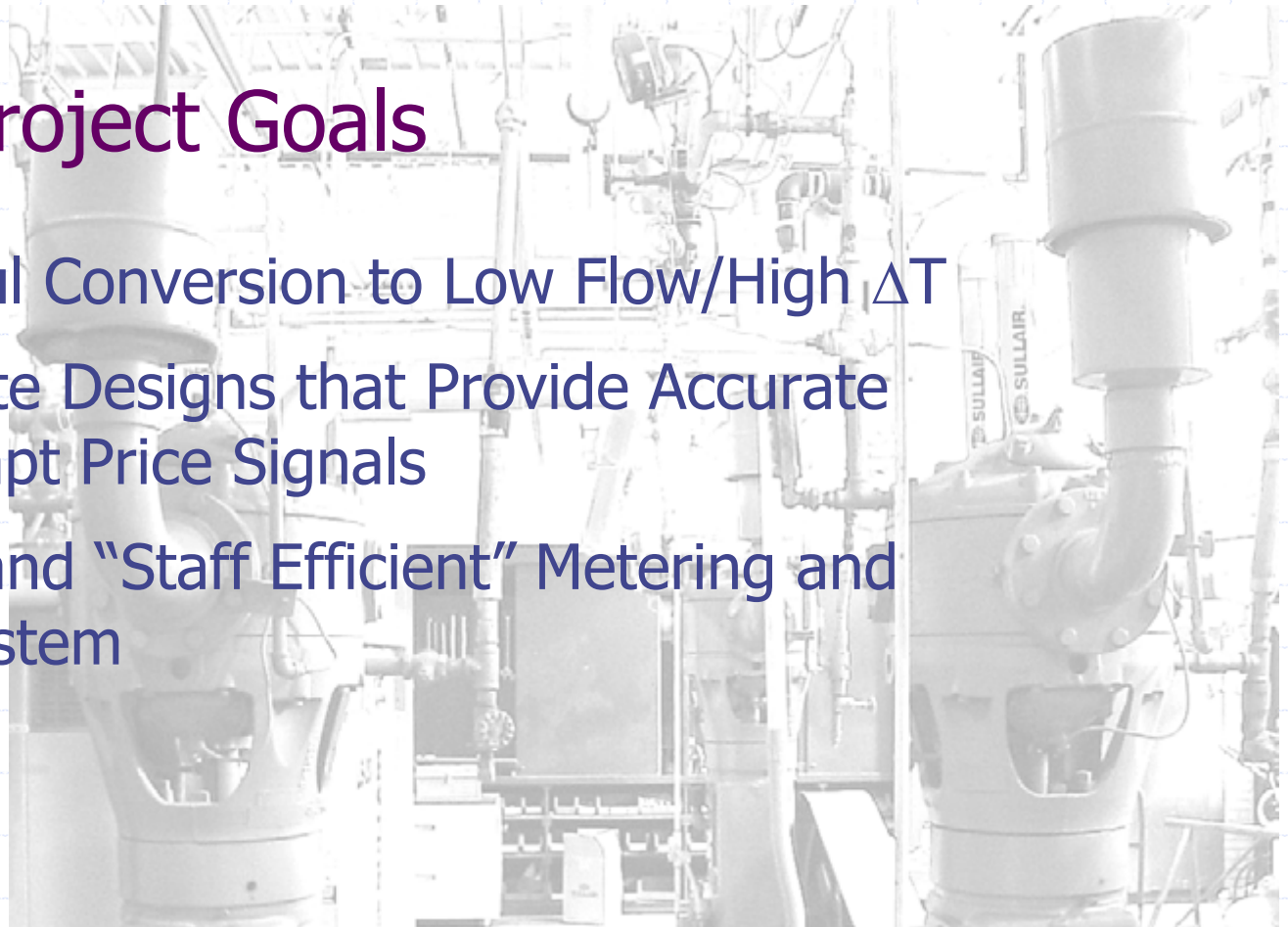
- ◆ Began to Identify “Building Side Problems”
- ◆ Linked Space and Enrollment Growth to Infrastructure Needs
- ◆ Required Long-term Thinking & Commitment from Decision-makers
- ◆ Put Utility Infrastructure at the Table with Building and Facility Needs
- ◆ The Financial Element — Metering & Cost Allocation



Building Metering & Control Upgrade (BMCU)

BMCU Project Goals

- ◆ Successful Conversion to Low Flow/High ΔT
- ◆ Utility Rate Designs that Provide Accurate and Prompt Price Signals
- ◆ Reliable and “Staff Efficient” Metering and Billing System



The BMCU Project

Controls Upgrade for

Low Flow/High ΔT

- ◆ 2-way Control Sequences — Pressure & Temperature Control Modes
- ◆ Established Demand and Volumetric Limits
- ◆ Increases CHW Distribution System Capacity
 - Reduced pumping costs
 - Higher chiller efficiency
 - Avoided capital cost
- ◆ Identifying and Correcting Wild Coils (Low ΔT) Requires Resources and Commitment



The BMCU Project

Utility Rate Design

A Utility Rate Structure that Provides Accurate and Prompt Price Signals to the Consumer has many Benefits:

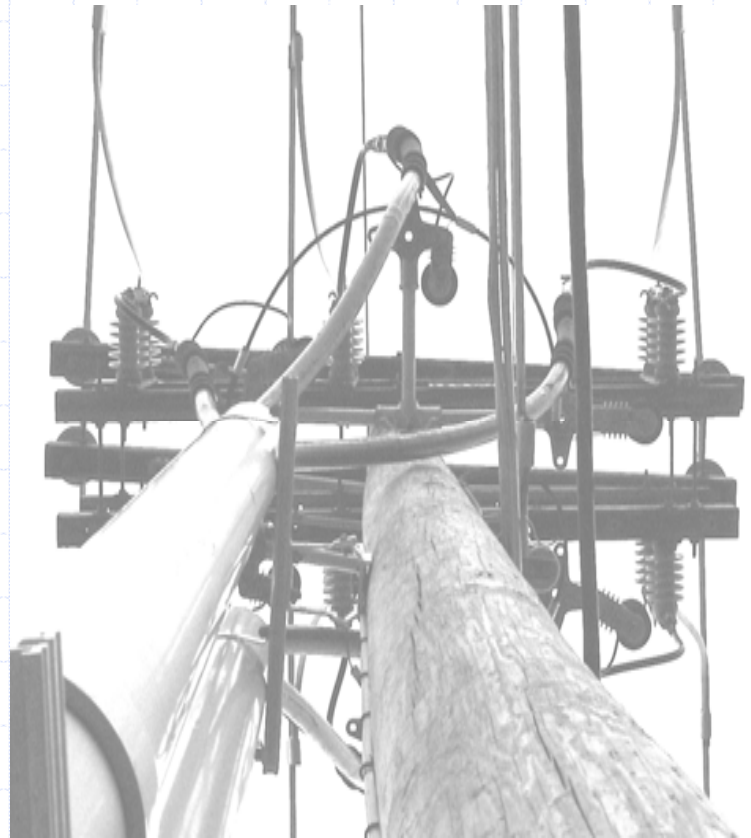
- Encourages Conservation
- Reduces Price Volatility
- Encourages "Big Picture" Thinking
- Rewards Good Behavior
- Achieve Uniform Levels of Fixed Cost Recovery
- Competitive with 3rd Party For-profit Entity



The BMCU Project

Electricity Rate Design

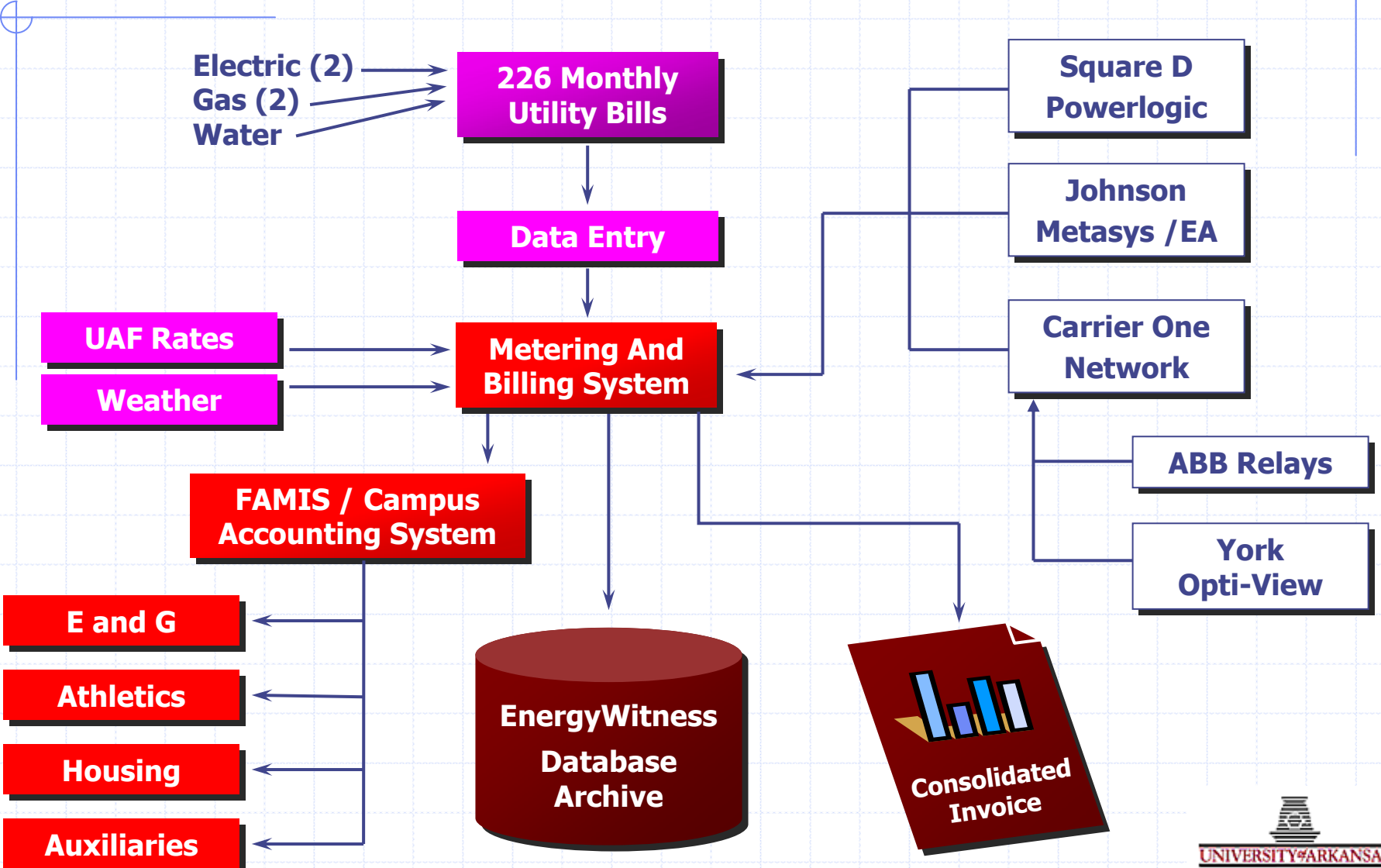
- ◆ Customer Service Charge
(\$/Month)
- ◆ Demand Charge
(\$/kW/Month)
- ◆ Commodity Charge
(\$/kWh/Month)
- ◆ Fuel Charge
(\$/kWh/Month)



Key Objectives of Metering & Cost Allocation

- ◆ Give Incentive for Good Behavior
- ◆ Tangible “Cause and Effect” of Conservation
- ◆ Optimize! Encourage System Thinking
- ◆ Data Driven Decision-making: Benchmarking
- ◆ Single Clearinghouse for All Utility Data
- ◆ Web Deployed: Self-serve Information
- ◆ An Entrepreneurial Business Model for Utilities & Facilities Operations Business

Automated Metering and Cost Allocation (AMCA)



AMCA

"Measurable" Cost Savings

"Where's the beef?"

- ◆ Customer Awareness of Their Place in the System
- ◆ Greater Incentives to Conserve (Demand vs. Energy)
- ◆ Confidence in Operating Decisions
- ◆ Proactive Maintenance Problem Solving
- ◆ Performance Contracting M&V / Capital Improvements
- ◆ Building Commissioning & TAB
- ◆ *Immediate Recovery of Volatile Energy Costs*
- ◆ *Indirect Cost Recovery*

AMCA

Changing Campus Culture

- ◆ Create Culture of Accountability & Responsibility for Energy Use by Customers
 - Behavioral Changes are Difficult, Slow, Long-term
 - Provide Information (AMCA) to Give Users Capability To Act — Data Driven
 - Utility Users Working Group: Co-op Model
 - Help Users Change — Assist in Identifying Energy Waste & Define Strategies to Lower Demand

AMCA

Managing the Process

- ◆ It's a Long Haul — Multi-year Effort to Reach Self-sufficient Level
 - Many Major Projects — Both Construction & Technology
 - Organizational Changes take Time to Root
 - Clear, Measurable Goals
- ◆ A Few Words on Managing Software/IT Projects



AMCA

Technology Management

- ◆ Active Management Involvement — Don't Delegate and Forget
- ◆ Full-time Person with Significant Computer/IT Skills Assigned to Project
- ◆ Get The Data Right — Clean, Accurate, Organized
 - Will Take 5-10x the Time You Allocate
- ◆ A Journey w/Many Paths, Many Chances for Mistakes — Accept That They Occur, Learn, and Continue Forward

AMCA

Lessons Learned

- ◆ The Engineering for BMCU is Pretty Sound and Shouldn't Scare Anyone
 - Variable flow chillers, towers and loops
 - Direct primary pumping
- ◆ AMCA is an Accounting Application
- ◆ Pain of being on the "Bleeding Edge"
- ◆ The Difficulty in Getting Traction for an Ambitious Project Like This One — Walking Without a Net
- ◆ Importance of Continuity of Personnel

Lessons Learned (continued)

- ◆ Convince Hardware Vendors and Controls Companies that they are in the IT Business Too — CISCO Systems
- ◆ Continue to Push for Open System Architectures and Communication Standards
- ◆ We are Becoming Dependent on the Technology
 - Fly by wire chiller plant
 - (8) servers — need a partnership with IT / CS
- ◆ Not Having Expertise on our Own Staff —
“It’s what I don’t know I don’t know
that scares me”



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AMCA On Line Demonstration

Acknowledgements to Partners

- ◆ UA Facilities Management Staff
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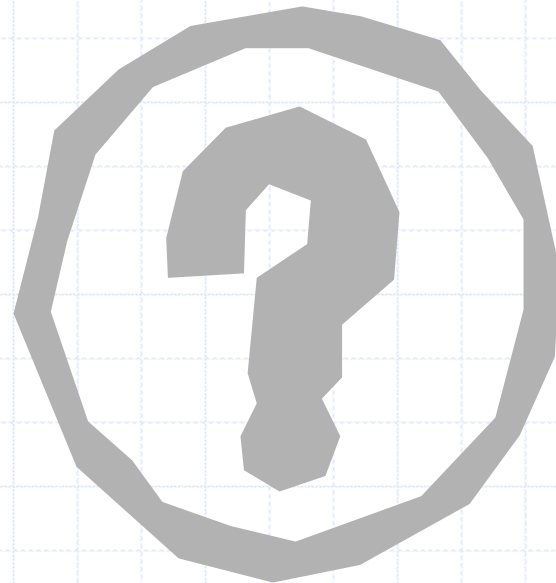
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Questions / Discussion

Presentation Available on Web:

phpl.uark.edu

www.intdatsys.com



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