

GRAPHET INC

ENERGY DATA MINING AND ANALYSIS

AICHE – Chicago Symposium 2006
Effective Energy Management Practices
Creating a Top Level Energy Management Program
Chandan Rao - October 9, 2006

Agenda

- How to achieve sustainable energy conservation ?
- What are the critical elements ?
- How are we doing today ?
- How to plan for continuous improvement ?
- What are the challenges for Industries ?

How to Achieve Energy Conservation ?

- Alternate Energy Sources
 - Solar, Wind, Nuclear...
- Reduction in Utility Cost Structures
 - Procurement Strategies
 - Rate Optimization
 - Load Management Strategies
- Efficiency of Energy Usage
 - Energy Conservation
 - Systems Optimization
 - Continuous Improvement

EXPERIENCE OVER 5 YEAR TIME FRAME OF COLLABORATION BETWEEN
STATE, INDUSTRY, RESEARCH CENTERS AND ENERGY CONSULTANTS

What are the Critical Elements for Sustainable Energy Conservation ?

- Linkage between energy issues & corporate goals
- An energy champion and energy team
- Defined financial criteria for energy projects
- Quantitative energy reduction goals and energy policy
- Process to ensure the right accountabilities (metrics)

EXECUTIVE / MANAGEMENT SPONSORSHIP

How are we doing today ?

- What gets measured, gets managed...
- Qualitative Metrics – “Process” Metrics
 - Benchmarking – engages senior management
 - Is needed for sustainability
- Quantitative Metrics – “Energy” Metrics
 - Lagging indicators (what has happened)
 - Timely / accurate / understood
 - Maintains accountabilities & results

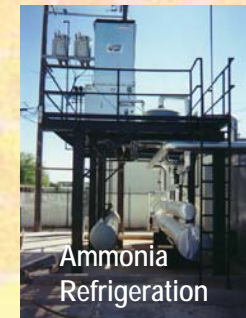
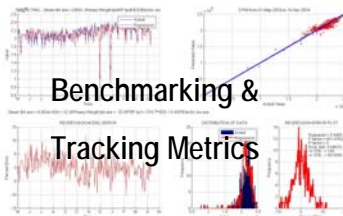
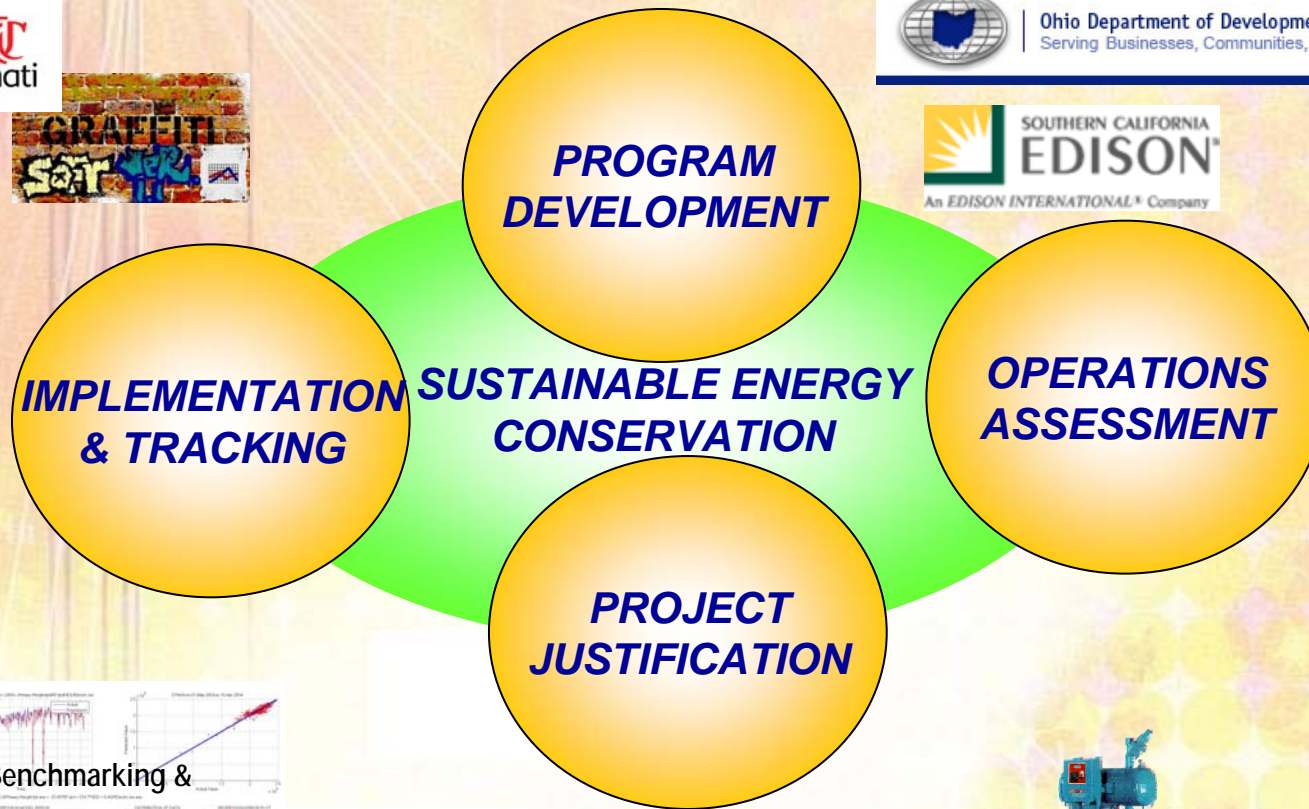
Data Mining and Analyses for Quantitative Metrics

- State of the art methods for uncovering energy usage patterns from available data
- Statistical analysis for developing meaningful key performance indicators
- System monitoring instrumentation for evaluating performance
- Customized system models for evaluating options and enhancing operator skills

Planning for Continuous Improvement



Ohio Department of Development
Serving Businesses, Communities, Citizens, and Visitors



Sustainable Energy Conservation Program Development

- **Approach**

- Engages senior management
- Links energy to business-critical issues
- Integration into your systems
- People-based approach: Skill/knowledge transfer
- Broken into easy steps with clear decision points

- **Benefits**

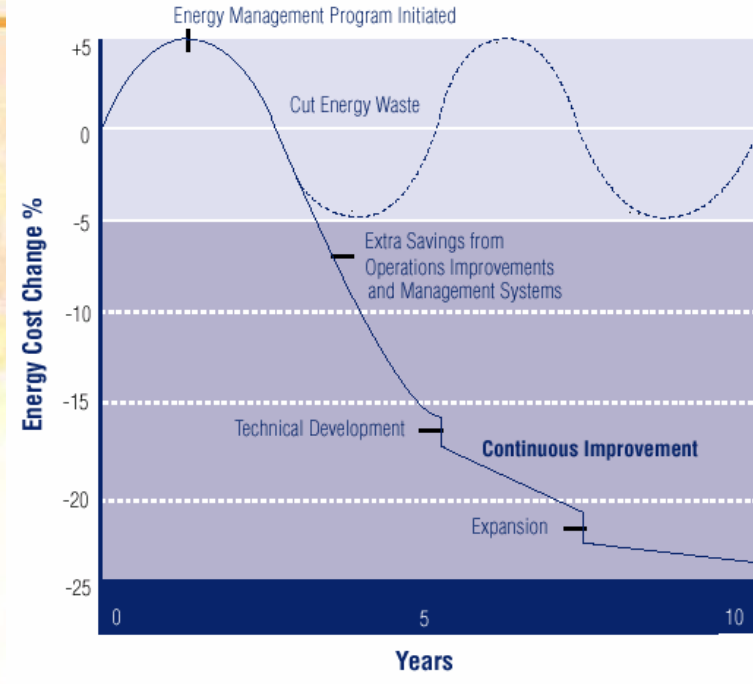
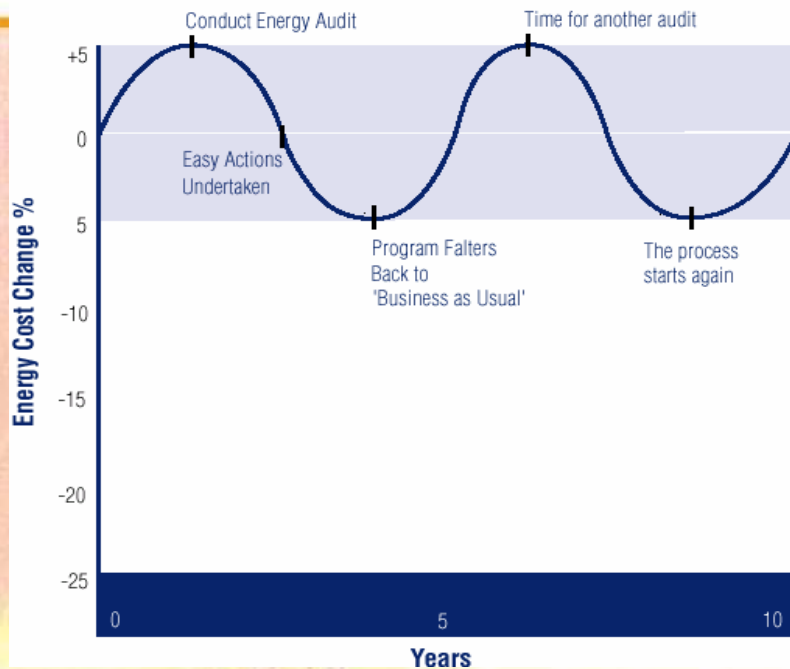
- Objective assessment based on identified “Best Practices”
- Comprehensive report with prioritized action steps
- Benchmarking within industry and other subsets
- Continuous improvement tracking, gap analysis and process auditing

Tackling Energy Management - Strategically

Traditional Approach

“+”

One-2-Five Approach



- Tactical, Project Basis
- No context of ongoing Mgmt System
- No Long-term Sustainability
- Authorities not Commensurate w/ level of Responsibility or Accountability

- Strategic, Program Basis
- Integrated to Business / Processes
- Continuous Improvement Functions
- Balanced Organizational Structure, Process, People, and Systems

EnVinta One-2-Five Program

Energy Management Benchmarking





Is the TOOL that.....

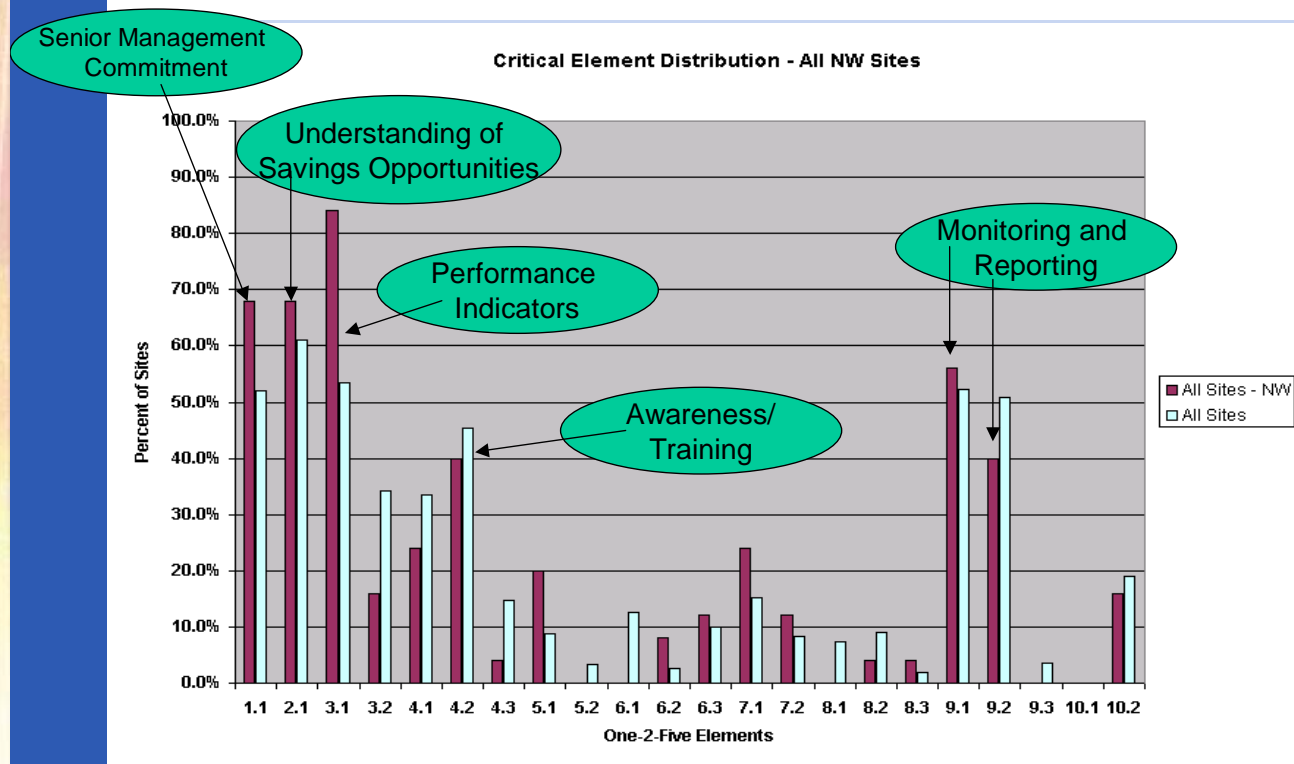
- Walks Members of the Organization's Management Team
- Representing Multiple Business Functional Areas
- In a Structured and Dynamic Workshop Setting
- Through the EnVinta Energy Management Business Practices Model
- Assesses the Org Balance in Activities, Processes, Procedures, Systems
- In a concise time frame (about 2 hours) to Determine:
 - Metrics and Scoring Parameters to Utilize in Benchmarking
 - What Parts of the Model are currently in place;
 - What Parts of the Model Should be in Place: and
 - The Most Critical Steps to Close the Identified Opportunity Gap

Key Challenges for Industries

- Primary opportunity is in Systems, not components (motors)
- Potential exists in all sectors, even energy intensive (pulp and paper)
- Trade allies not well situated to deliver systems-based solutions
- Information “clutter” prevents good use of available info.
- “Simple” efficiency measures fairly well understood, but deeper “systems optimization” not commonly implemented
- Industries view utilities and energy service providers from a commodity supplier viewpoint; don’t believe utilities understand their real business needs or interests

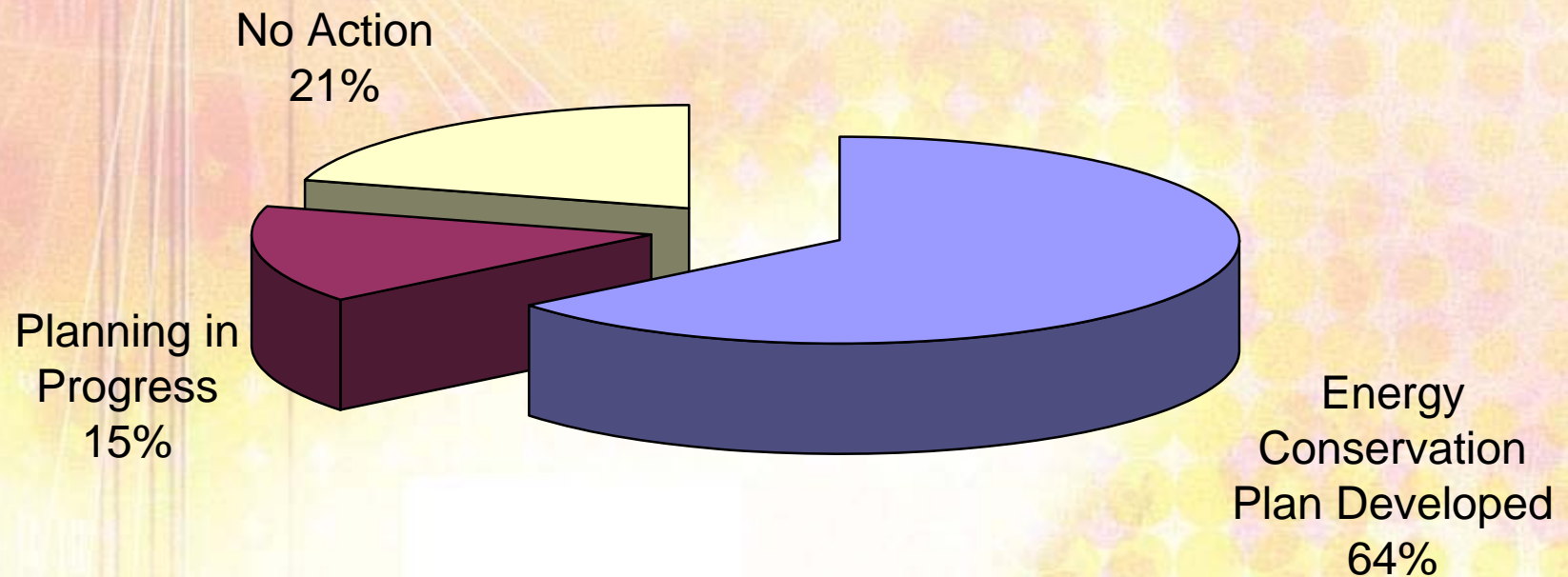
Key Challenges for Industries

Critical Actions in NW Companies



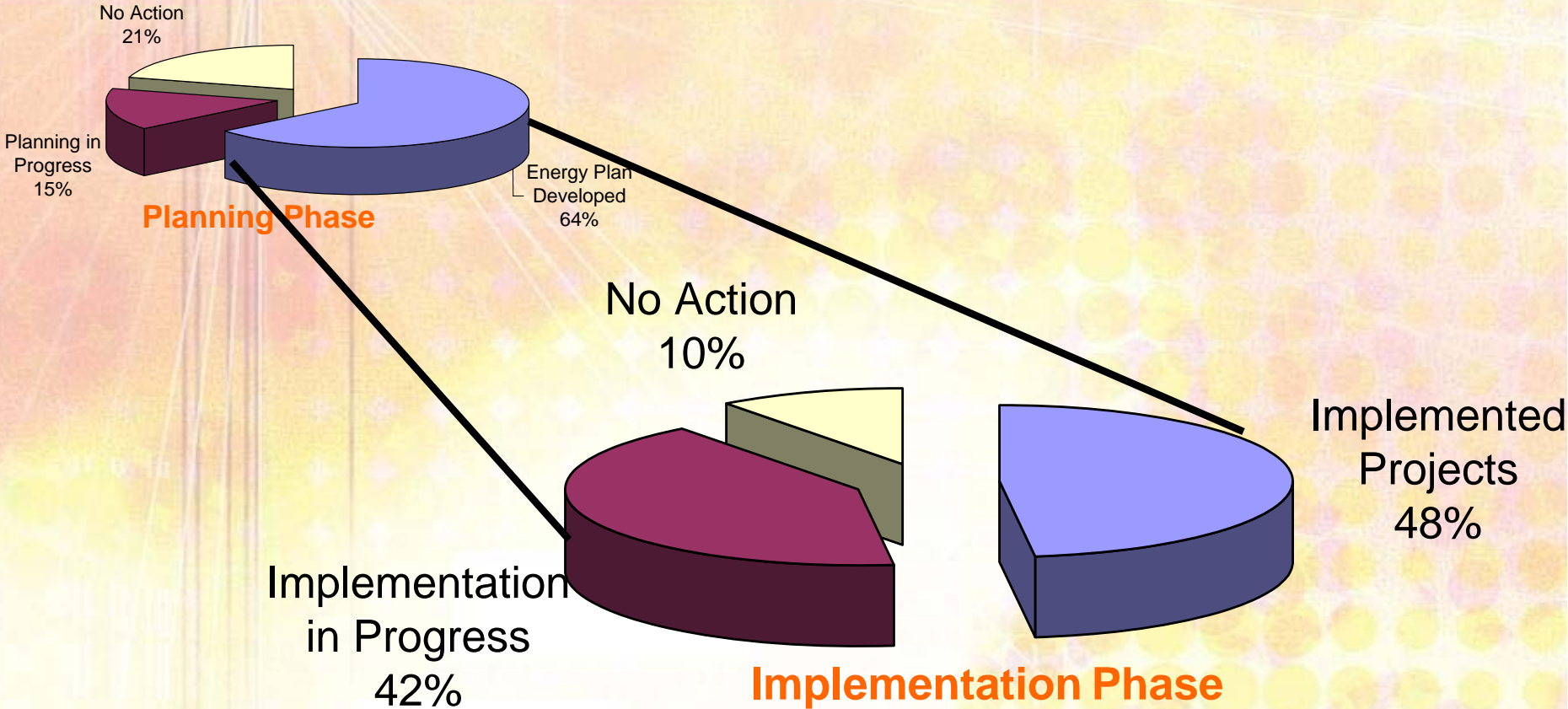
ENVINTA

Process Focus - Results



5 Year Historical Average

Actions to Drive Results



5 Year Historical Average

Continuous Improvement Model



Structured Dynamic Workshop with Senior Management

- Measures organization's ability to manage energy
- Examines Activities, Processes, Procedures, Systems
- Benchmarking Against Industry "Best Practices"
- Plans a path to improvement
- Monitors progress along that path

How is this Approach Different?

- **NOT a Technical Audit**
- Aimed at Senior Management & Financial Decision-makers
- Strategic in Nature
- Comprehensive Range of Energy Topics
- Continuous Improvement Tracking

Questions & Answers

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