



Effects of Project Screening Criteria on RCx Energy Savings

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Objective: Achieve Cost Effective RCx

■ Industry Accomplishments:

- Developed standard engineering procedures
- Proven the ability of RCx to save substantial energy and demand

■ Biggest current challenge:

- Consistently identify candidate buildings that produce high levels of energy savings

■ Approach:

- Learn from the results of 3 large utility-sponsored recommissioning programs



Overview of Discussion

- Overview of Programs
 - Xcel Energy
 - Rocky Mountain Power
 - CenterPoint Energy

- Analysis of Program Results
 - Energy & Demand Benchmarks vs. Actual Savings
 - Engineering Assessment Approach

- Additional Resources for Project Screening

- Conclusions



Overview of Programs

89 Completed Projects; 14.7 MW peak demand; 40 GWh annual energy savings

- Xcel Energy's Recommissioning Program

- 2002 – 2005

- CenterPoint Energy's Commercial and Industrial Retro-Commissioning Program

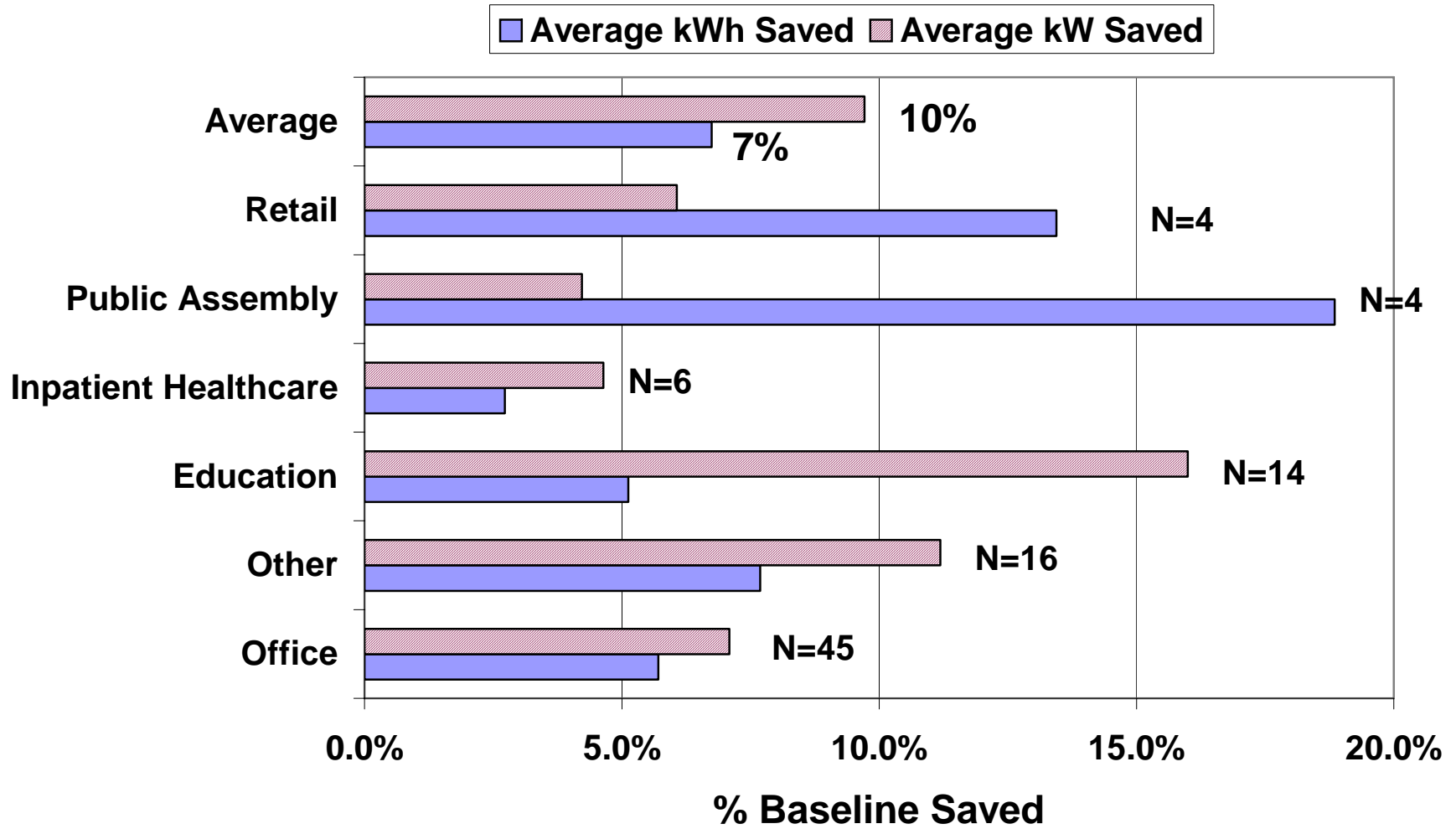
- 2004 - present

- Rocky Mountain Power Recommissioning Program

- 2006 – present

RCx Project Results

Percent Energy & Demand Savings By Building Type





Program Requirements

■ Minimum Building Size (2 of 3 programs)

- 175,000 or 300,000 square feet

■ Minimum Peak Demand (kW)

- 300 kW or 1,000 kW

■ Customer Commitment

- \$10,000 for implementation
- Motivated staff

■ Other Requirements

- Advanced control system
- Location or Rate Schedule



Using Energy & Demand Benchmarks

Energy benchmarks normalize energy use:

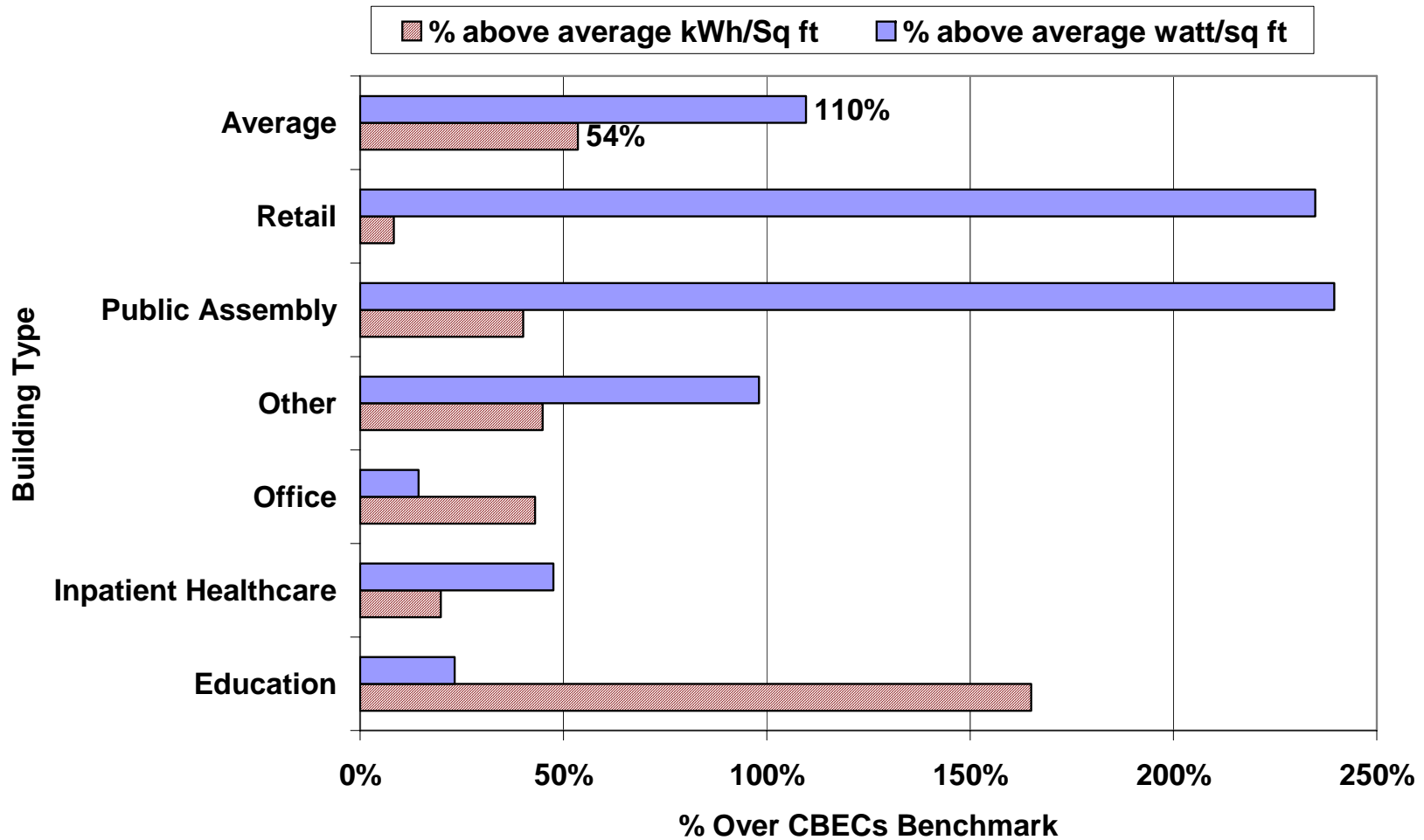
- Peak demand (W) per square foot
- Energy use (kWh) per square foot

Most common evaluation criteria used by electric utilities:

- Compare candidate buildings to each other
- Compare to average benchmarks for building type and climate zone
 - CBECs (Commercial Buildings Energy Consumption Survey)
 - Demand was extrapolated
- Savings potential is ~ amount over average benchmark

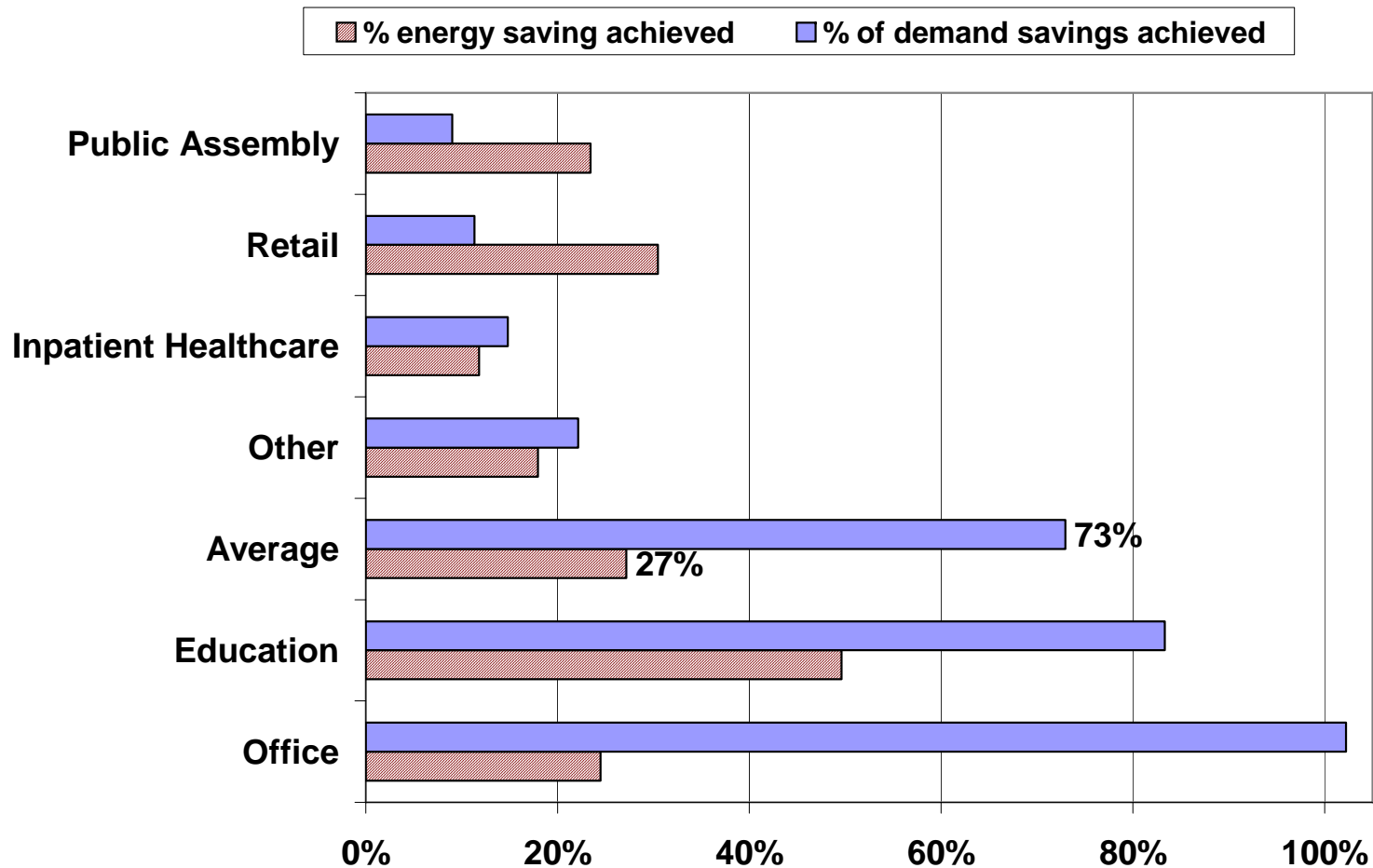
Energy & Demand Benchmarks

Percentage Actual Benchmarks Exceed CBECS



Actual Savings vs. Predicted

% of Savings Predicted By Benchmarks Achieved





Engineering Assessment Approach

- Data gathered via detailed questionnaire submitted with application
 - Facility staff – motivation and capabilities
 - Types of equipment & systems
 - Control strategies
 - Operational issues
- Use with energy & demand benchmarks to select best candidates for RCx
- Underutilized approach
 - Requires engineering expertise



Engineering Assessment: Project Scoring

- We have developed a scoring method to simplify the process:
 - Identified 16 categories w/ 0 to 3 points available each
 - Some categories are worth more points
 - Total of 34 possible points
 - Higher score = greater RCx opportunity
 - Simplified for use by non-RCx engineers



Engineering Assessment: Categories

- Categories include:
 - Mechanical cooling system type
 - Air-side distribution system type
 - Capabilities of control system
 - Use of air or water-side economizers
 - Evaporative cooling
 - Minimum levels of outdoor air
 - Condition of mechanical equipment



Example Scoring

■ Air-side distribution system type

- Variable flow systems offer more opportunities for optimization
 - 1 = Constant volume; 2 = Variable volume

■ Use of air or water-side economizers

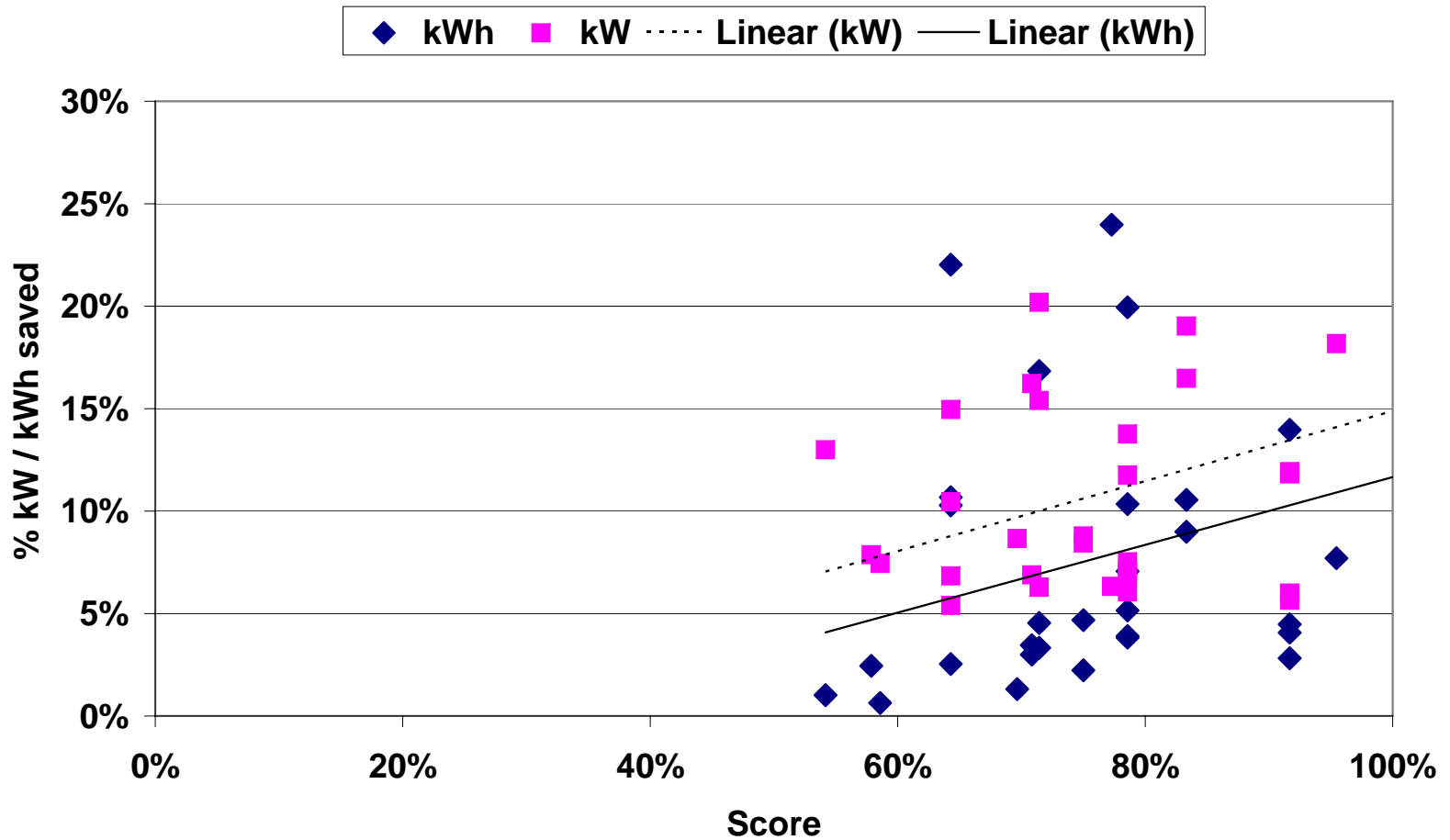
- Potential for economizer tune-ups are likely
 - 0 = no economizer; 1 = water side; 2 = air side; 3 = water and air economizers

■ Type of mechanical cooling

- Larger single systems offer more potential savings for less effort
 - 0 = packaged DX; 1 = Custom AHUs; 2 = IDEC or chiller; 3 = IDEC & chiller

Assessment Score vs. Energy and Demand Savings

Engineering Assessment Score vs. % energy saved





Other Screening Resources

- Benchmarking total energy use
 - Include all fuels
- Energy Star Benchmarking
 - Portfolio Manager
 - Detailed building criteria
- Evaluate load shapes
 - Itron eShapes
- Labs21
 - Laboratory facilities



Conclusions

- Screen buildings to prioritize candidate facilities
- Focus on a comprehensive evaluation of building characteristics
 - Use demand & energy benchmarking
 - Conduct engineering assessments
 - Consider “soft” characteristics (motivation, staff availability)
- Identify the right projects = RCx Success!



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