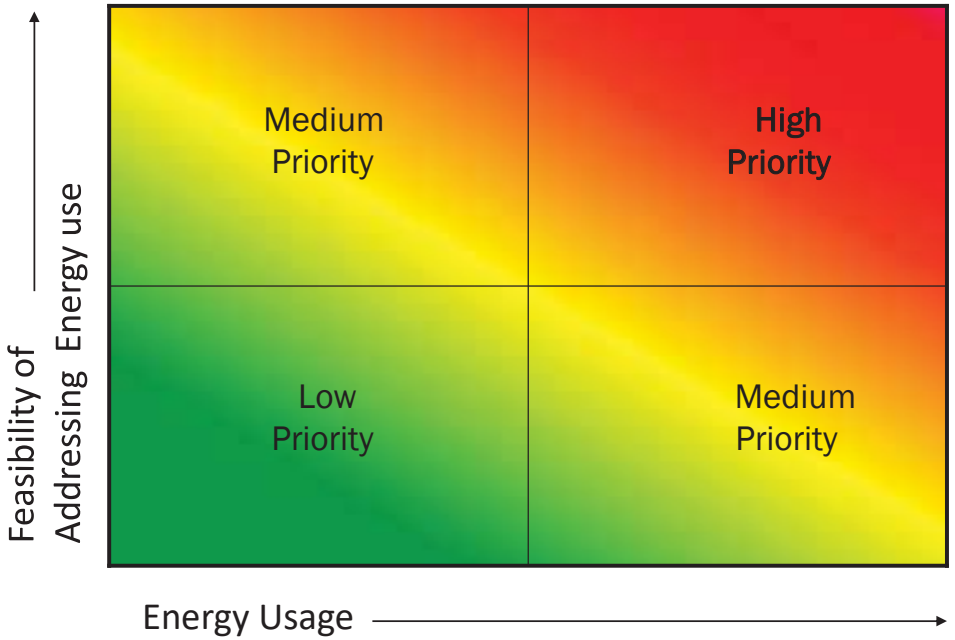
Step 5: Prioritize Opportunities for Implementation

Prioritization of Energy Use



Which category of assets will be the most important for energy efficiency?

Least important?

Specific Actions Required in Step 5

- Identify appropriate evaluation criteria for non monetary characteristics of energy efficiency opportunities.
  - Identify those costs and benefits of energy efficiency opportunities that cannot be easily quantified in monetary terms (e.g. operability, risk factors, ability to implement an energy efficiency opportunity), and define appropriate evaluation criteria for those situations.

Specific Actions Required in Step 5

- Evaluate the costs and benefits of the non-monetary characteristics of energy efficiency opportunities. Score and rank the costs and benefits, and organize the evaluation into a table or matrix to communicate results.

Specific Actions Required in Step 5

- Evaluate the monetary characteristics of energy efficiency opportunities. Choose appropriate evaluation methods, quantify costs and benefits, convert all costs into equivalent terms, and tally the results.

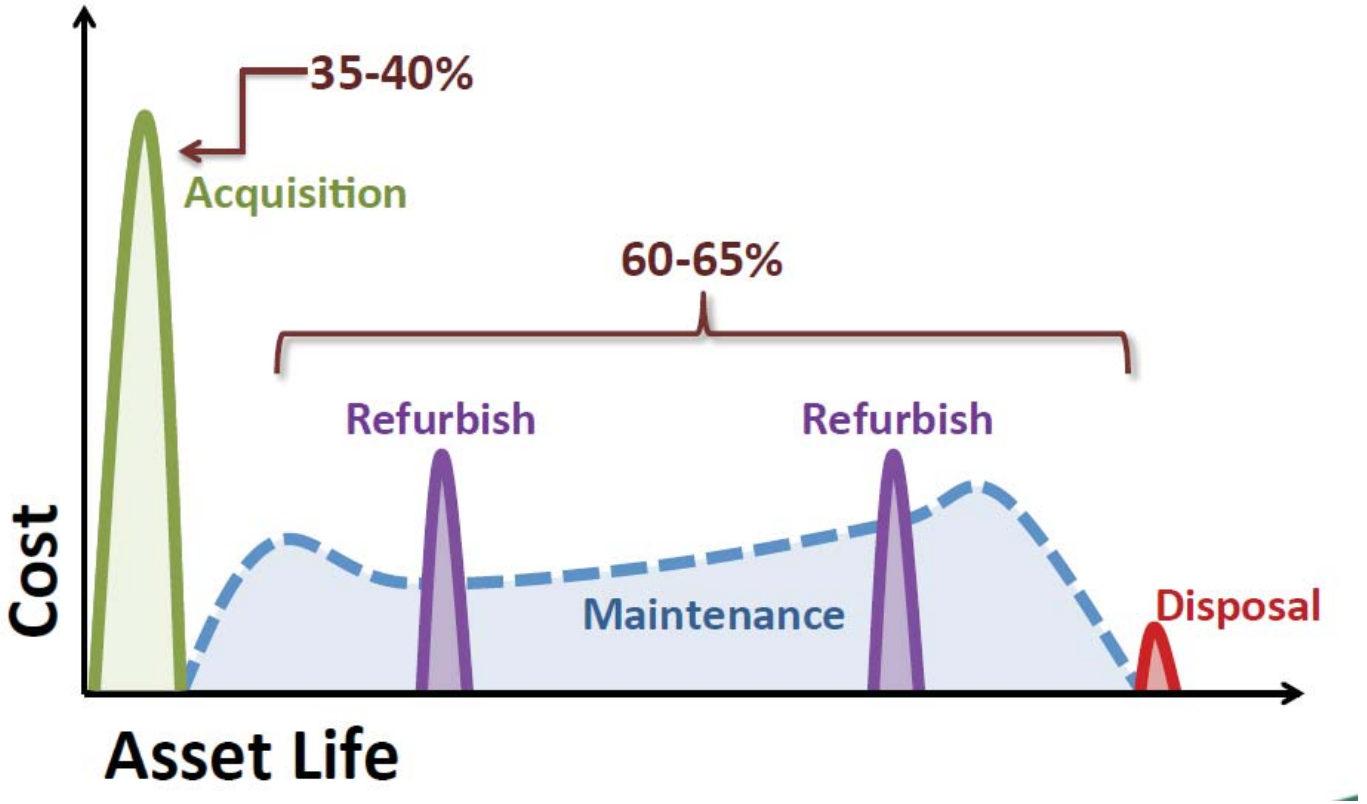
Specific Actions Required in Step 5

- Combine non-monetary and monetary characteristics, and rank energy efficiency opportunities.

Economic Evaluation

- It will be useful to apply some type of economic evaluation method such as the payback period or the lifecycle costs to prioritize candidate energy efficiency opportunities.

Caution: With installing new equipment – Capital investments are just the tip of the iceberg



Simple Payback Period: Definition

- Also known as Payback Period or Simple Payback.
- Does not account for the time value of money.
- The SPB method calculates the length of time over which cumulative energy savings and other project benefits will be equal to (or "payback") the initial project investment. To calculate the SPB, divide the total project cost by the total expected benefit.

$$SPB(yr) = \frac{Cost\_of\_project(\$)}{Annual\_savings(\$/yr)}$$

Source: NYSERDA, "Water & Wastewater Energy Management: Best Practices Handbook," 2010.

Simple Payback Period: Example

- You are evaluating Project A, whether to replace pump motors with more efficient models.
- The new motors cost $200,000 total.
- They are expected to reduce energy costs by $100,000 per year and last for 5 years before another $200,000 motor replacement is needed.
- The Simple Payback Period for Project A is 2 years.

Source: NYSERDA, “Water & Wastewater Energy Management: Best Practices Handbook,” 2010.

Life-Cycle Cost (LCC) Analysis

- LCC analysis considers the initial cost of the project as well as all of the costs and benefits over the lifetime of the project. The LCC approach incorporates the time value of money, the volatility of utility costs and other factors, such as operation and maintenance or other costs.

$$LCCSavings = LCC(Current\_process) - LCC(New\_process)$$

where:

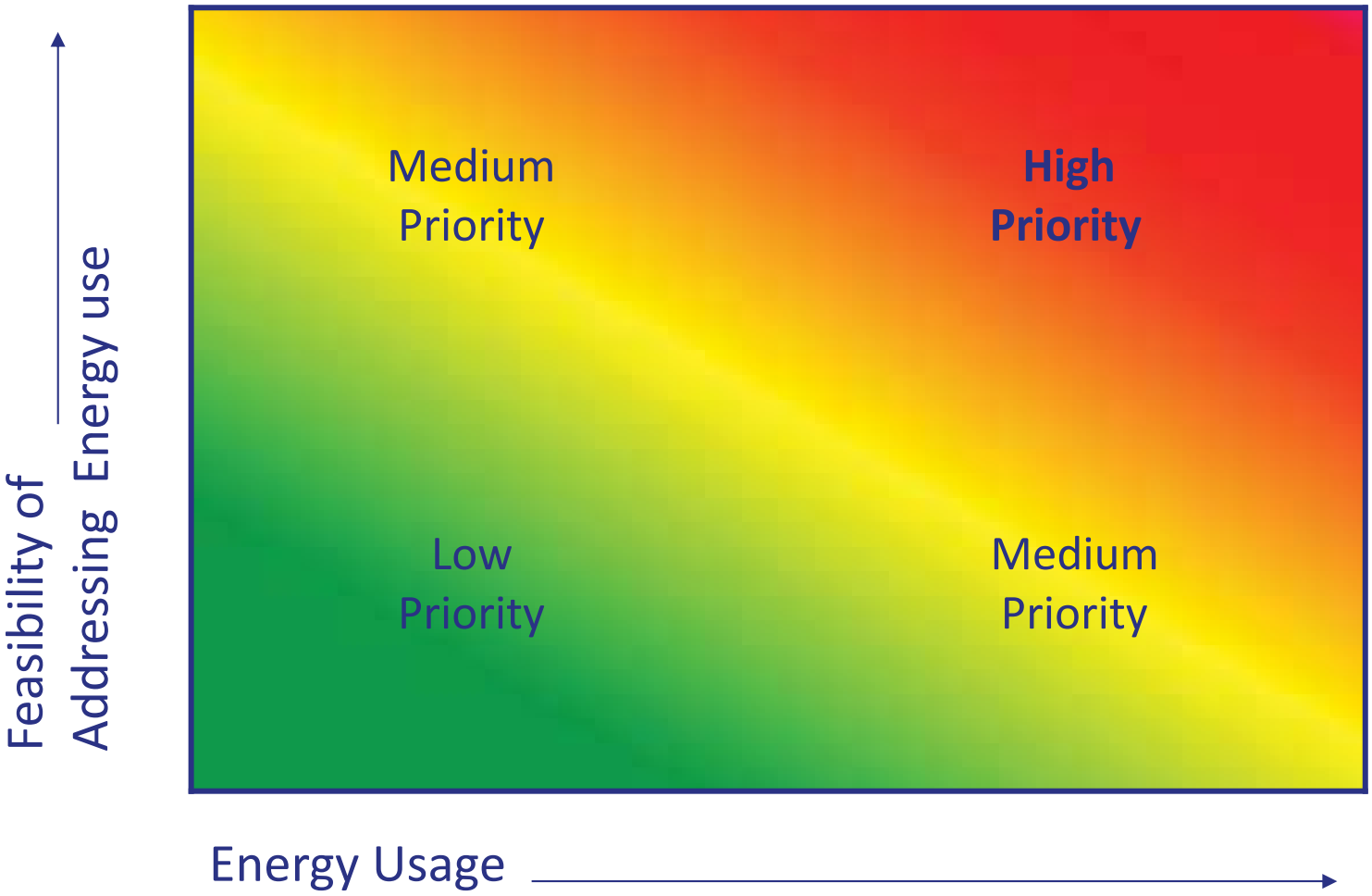
$$LCC(Current\_process) = \sum AnnualCosts - \sum AnnualSavings$$

$$LCC(New\_process) = CapitalCost + \sum AnnualCosts - \sum AnnualSavings$$

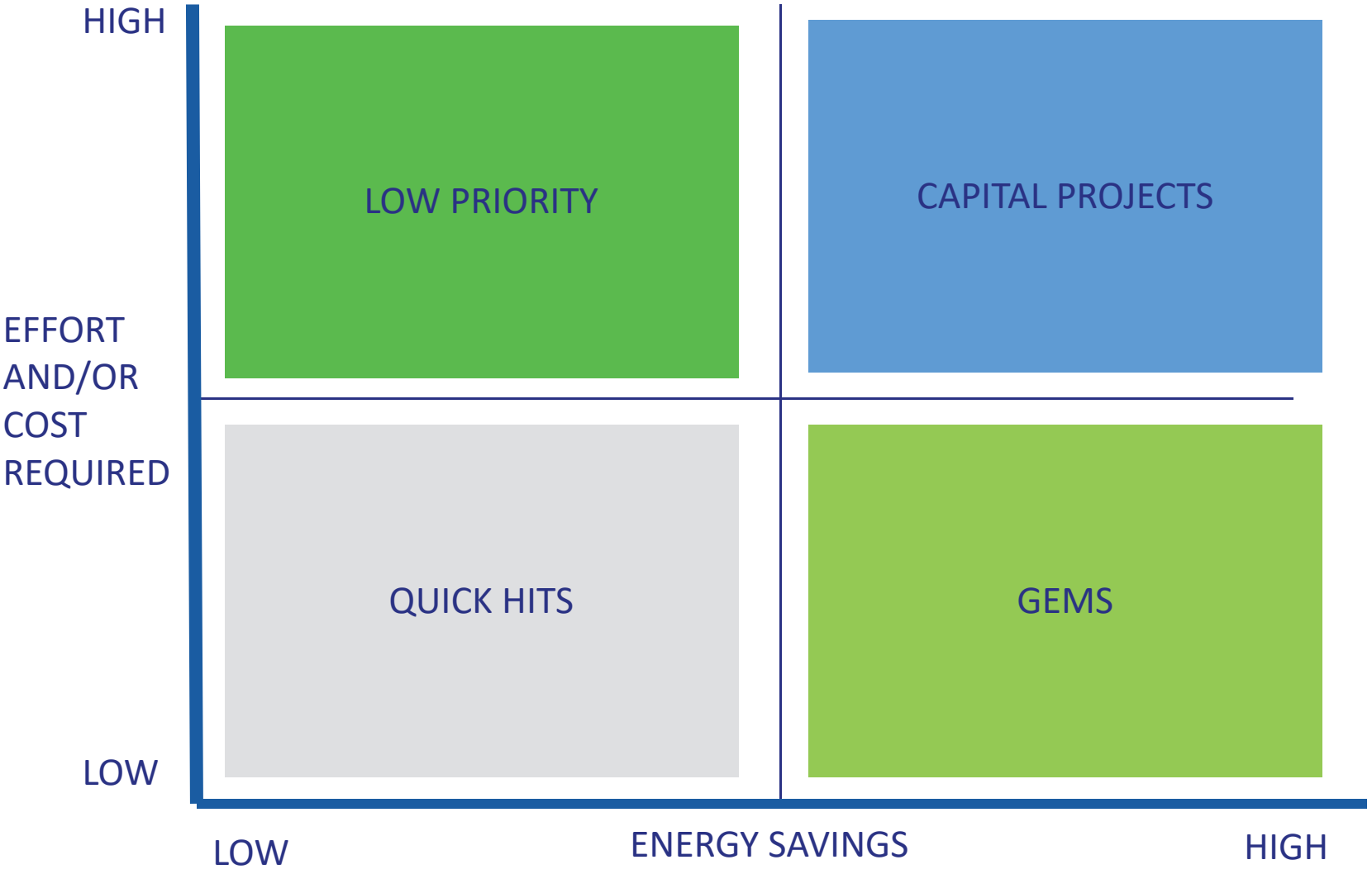
Prioritization tools

Keep your goals in mind

- Energy cost savings
- Cost of implementation
- Simple payback period
- Regulatory compliance or service level goals
- Advantageous funding availability
- Operational feasibility
- Other



Source: SW EFC's AM KAN Work!



Source: Doug Evans, Mountain Regional Water District, Park City, UT

Energy Project Decision Matrix									
Proposed Energy Efficiency Project	Energy Cost Savings (1 to 5)	Cost of Implementation (1 to 5)	Payback Period (1 to 5)	Necessary to Meet Regulatory Requirements (1 to 5)	Necessary to Meet Level of Service Goals (1 to 5)	Availability of Advantageous Funding (1 to 5)	Operational Feasibility (1 to 5)	Part of a Larger Project (1 to 5)	Total Score

Source: EPA's Energy Management Guidebook for Wastewater and Water Utilities

Scoring in the Decision Matrix

- Score each category from 1 to 5. Bigger numbers are better! ☺
- In other words, higher scores are more attractive projects for energy savings, ease of implementation, and so on.

Now it’s your turn

Project Prioritization Exercise

Energy Project Decision Matrix

Energy Project Decision Matrix									
Proposed Energy Efficiency Project	Energy Cost Savings (1 to 5)	Cost of Implementation (1 to 5)	Payback Period (1 to 5)	Necessary to Meet Regulatory Requirements (1 to 5)	Necessary to Meet Level of Service Goals (1 to 5)	Availability of Advantageous Funding (1 to 5)	Operational Feasibility (1 to 5)	Part of a Larger Project (1 to 5)	Total Score

Your small water system could reduce electrical energy use by implementing numerous strategies, including:

Process Targeted / Goal	Improvement and Estimated Savings	Implementation Cost ($)	Estimated Annual Energy Savings (kWh)	Estimated Annual Cost Savings ($)	Simple Pay-Back (Years)
Lighting (A)	Reduce number of lighting hours by 40%	No cost. Turn lights off.	7,488	$4,118	0
Lighting (B)	Replace T12 fluorescent light bulbs and fixtures with T8 equivalents	$12,470	22,976	$10,800	1.15
High Service Pumps	Replace high service pumps with premium efficiency ones at two pumping locations	$52,400	34,640	$19,052	2.75
HVAC and Window Films	Replace air conditioning with high efficiency system and install window films to reduce solar heat gain	$218,382	138,104	$64,909	3.36

Observations about the Matrix

- Total Score: allows you to compare / rank potential energy management projects.
- Higher Scores: indicate E.M. projects that may be most advantageous to the utility.
- Caution: As all columns are weighted equally in this matrix, you may want to consider some columns as more important than others.

Tips for Using the Decision Matrix in Your Utility

- Involve your energy team and discuss evaluation criteria (You can use the matrix provided as a starting point.)
- Set weights based on the level of importance to your system.
- What's missing? In addition to the matrix, other commonly used criteria may include:

Tips for Using the Decision Matrix in Your Utility

- Ease of implementation
- Time until solution is fully implemented
- Cost to maintain
- Support or opposition to the solution
- Enthusiasm by team members
- Potential effects on customers
- Potential problems during implementation

Tips for Using the Decision Matrix in Your Utility

- If individuals on the team assign different ratings to the same criterion, discuss this so people can learn from each other's views and arrive at a consensus. Do not average the ratings or vote for the most popular one.

Some Keys to Success

- Convert all energy efficiency opportunities characteristics to monetary terms whenever possible.
- Evaluate all energy management, including ancillary benefits when possible.
- Test the sensitivity of results to determine the impact of important assumptions (e.g. time horizons)
- Make sure that the final results make sense in terms of the utility's capabilities.