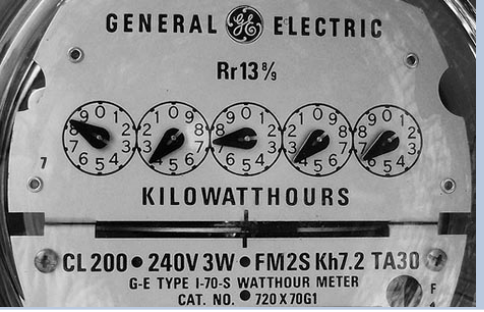
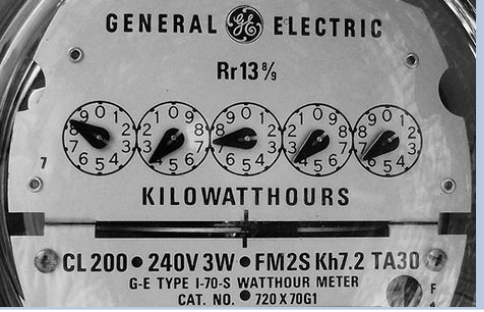
ASSET MANAGEMENT

ENERGY EFFICIENCY

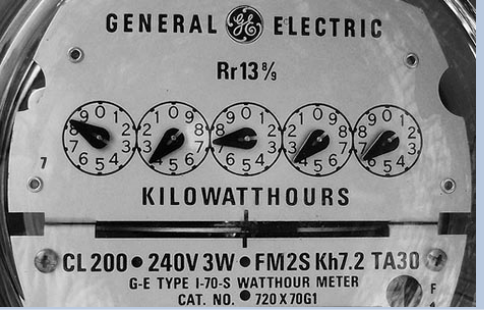
The Nexus Between
Asset Management & Energy Efficiency



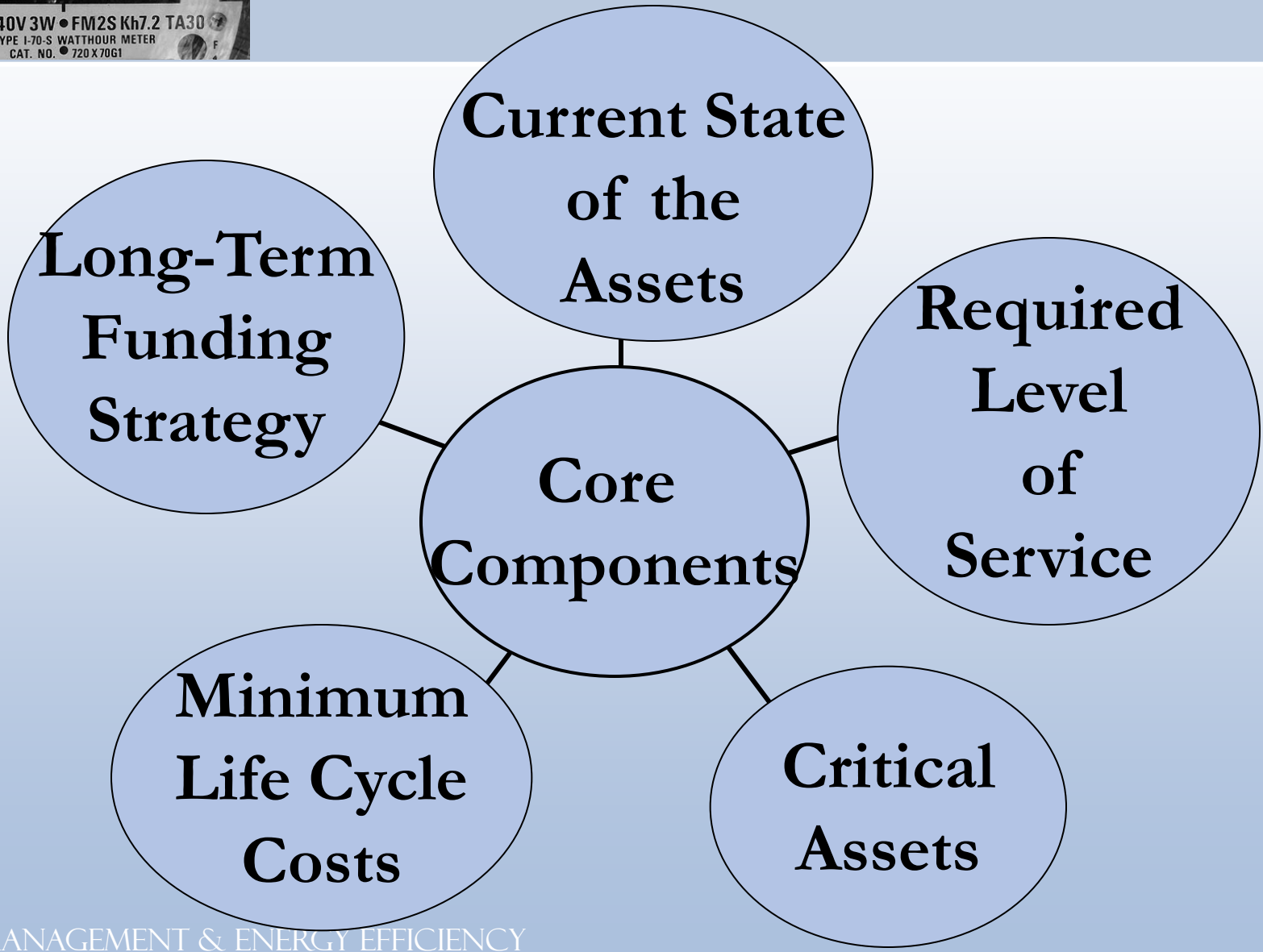
There are many ways to approach energy efficiency for water and wastewater facilities

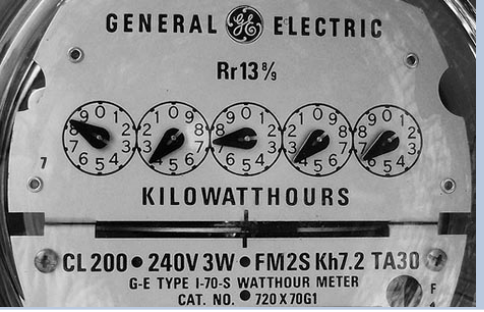


One way is to look at the linkages between the process of asset management and the process of energy efficiency



Asset Management





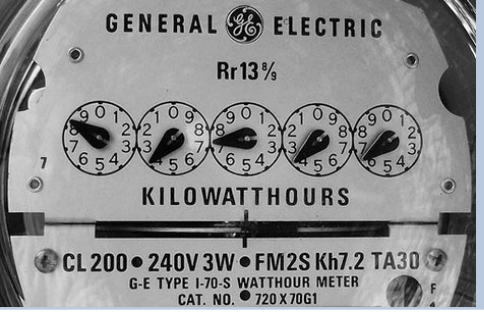
Energy Efficiency Process

Implementing Improvement Programs

Monitoring and Measuring Energy Improvement Program

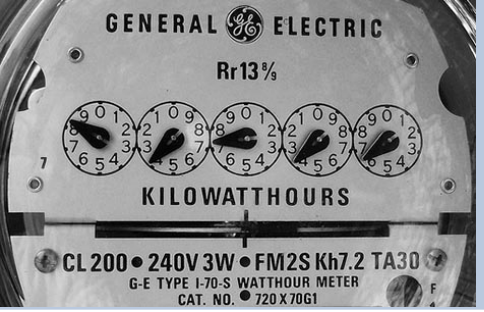
Maintaining Energy Improvement Programs

Planning for Energy Efficiency



Natural Links: AM & EE Inventory Overview

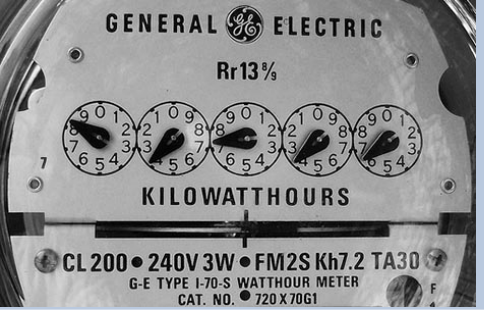
- Asset Management
  - Current state of the Assets
    - What do you own
    - Where is it
    - What's its condition
    - What's its value
    - What's its useful life
- Energy Efficiency
  - Initial Planning
    - Energy baseline
      - What uses energy
      - Where are these facilities located



Sample Blended Inventory

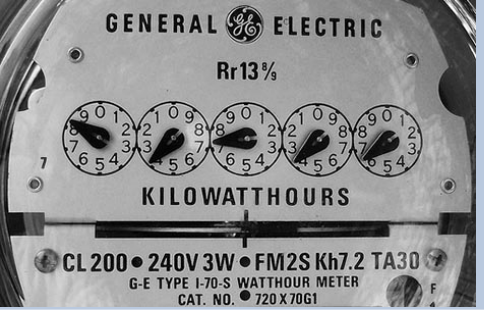
Asset ID	Asset Category	Asset	Condi-tion	Useful Life	O&M Cost	Energy User (Y/N)	Type of Energy	Energy Usage per month	Energy Cost per month
WP6654	Pumps	Main Street Pump Station Pump 1	3	10 years	250/mo	Y	Electric	120 kW	$50
WWM3422	Mixer	Aeration Basin Mixer 3	4	25	35/mo	Y	Electric	50 kW	$20

- Inventory database including energy usage information
- Ability to sort database based on energy usage, type of energy used, amount of energy used, or cost



Natural Links: AM & EE Level of Service

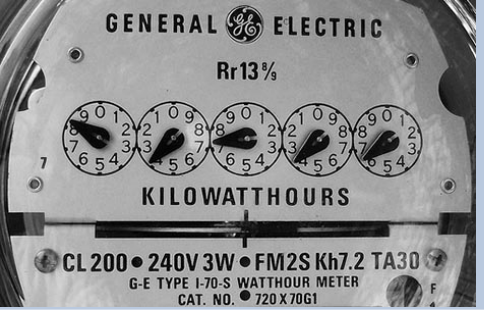
- Asset Management
  - Level of Service
    - What do you want your assets to do?
    - What are your goals?
    - Measuring results against goals to determine how well you're doing
- Energy Efficiency
  - Monitoring & Measuring Energy Improvement
    - Set goals for energy improvement
      - What do you want your program to achieve?
    - Measure improvements to determine how well you've met goals



Natural Links: AM & EE Level of Service

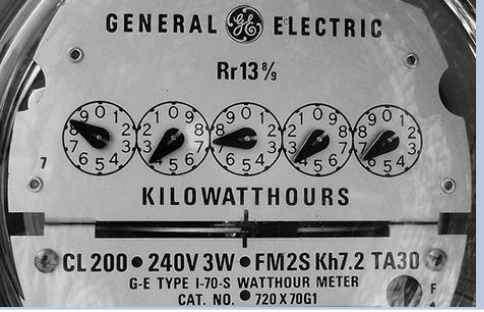
- Asset Management
  - What do the customers want?
  - What are they willing to pay for?
- Energy Efficiency
  - Are customers willing to pay more for green energy?
  - Are customers willing to pay for conversion of carbon energy to green?

Will customers agree to water conservation to reduce wear and tear on assets and reduce energy usage. Water conservation benefits both.



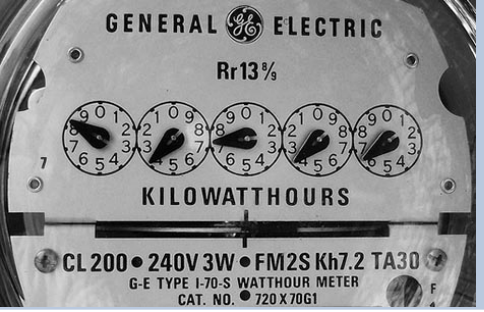
Blended Level of Service

Goal	Target Level	Actual Level	Comments
Replace all incandescent light bulbs with CFLs in all facilities by January 2011	200 bulbs replaced	100 bulbs replaced	Waiting on new shipment of CFLs
Reduce water consumption by 25 gallons per household per year	25 gallons per household	15 gallons per household	Working with schools to achieve additional reductions
Replace diesel pumps with electric pumps	All 10 diesel pumps replaced by 2012	2 diesels replaced	Awaiting further funding

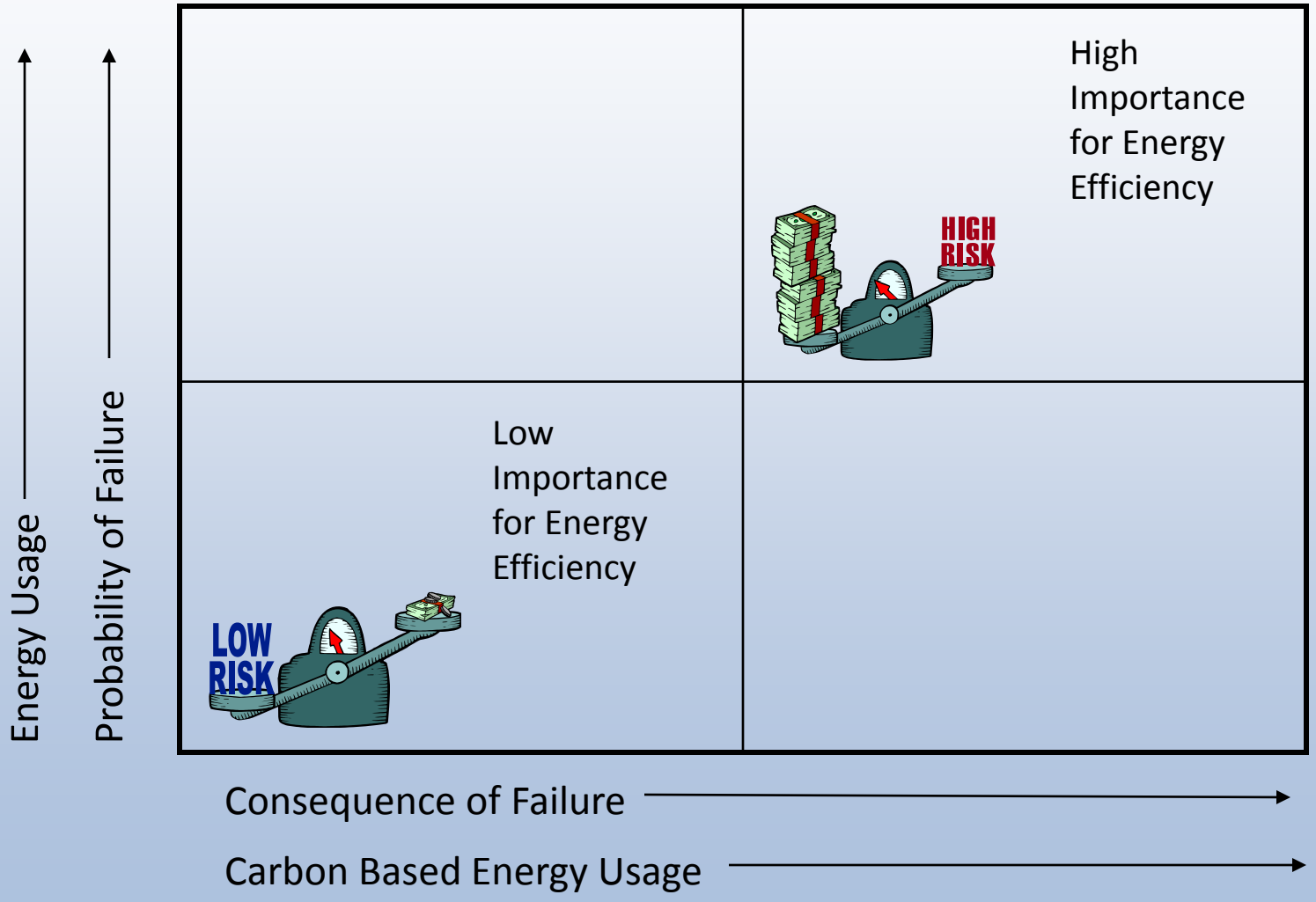


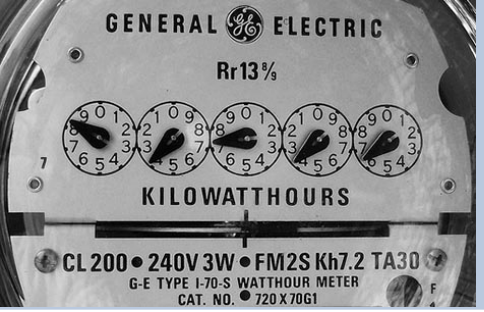
Natural Links: AM & EE Criticality

- Asset Management
  - Which assets are critical to sustained performance?
  - Which assets are most likely to fail?
  - Which assets cause the greatest consequence if they fail?
- Energy Efficiency
  - Which assets contribute the most to overall energy usage/cost?
  - Which assets use the most carbon based energy?
  - Which assets have the lowest energy efficiency?



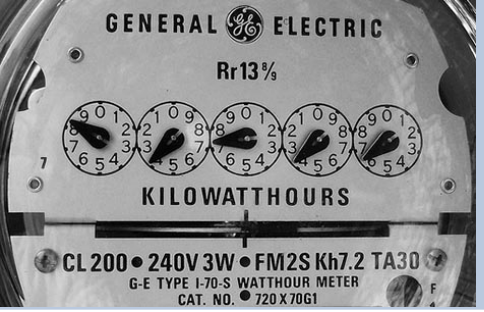
Blended Criticality Evaluation



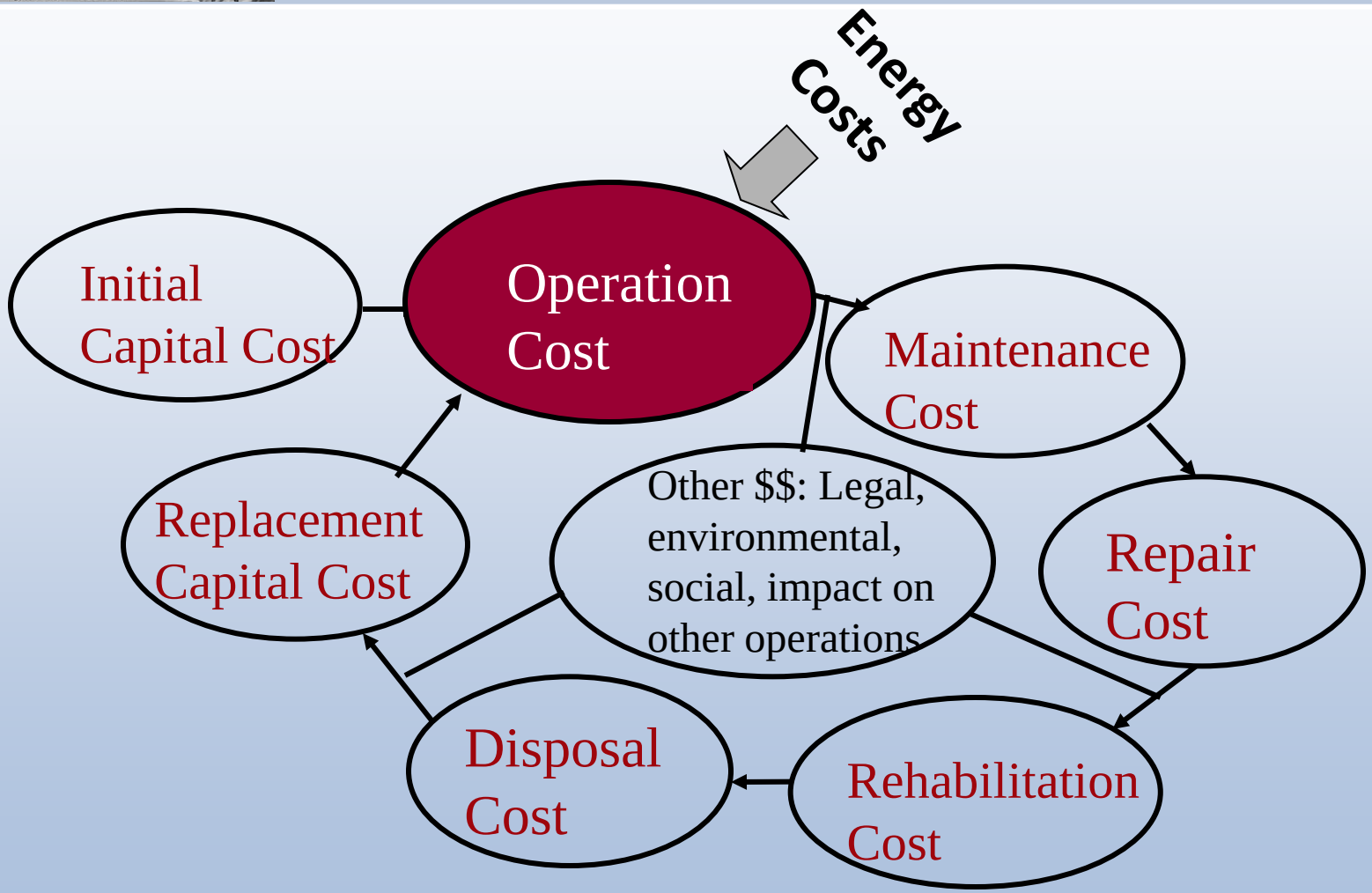


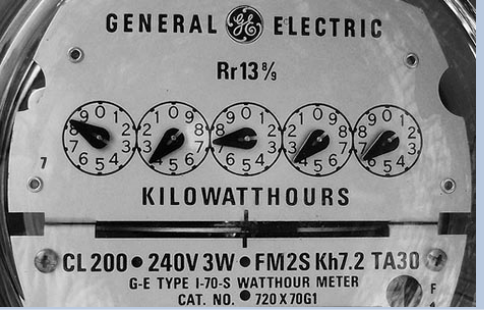
Natural Links: AM & EE

- Asset Management
  - Life Cycle Costing
    - When is the appropriate time to replace an asset?
      - O&M costs
      - Capital costs
    - What are total costs of running asset over time
      - Includes energy costs when appropriate
- Energy Efficiency
  - Costs of reducing energy use
    - Full cost of replacing an asset with a more efficient or “greener” asset over time
      - Can a case be made for this replacement using life cycle costing



Blended Life Cycle Costing



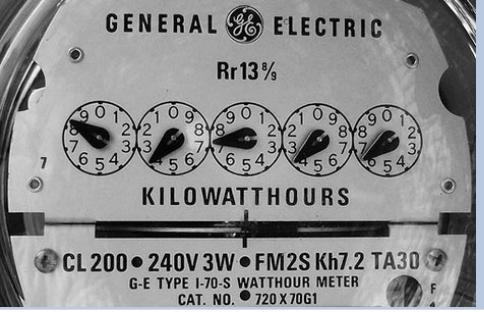


Blended Life Cycle Costing

When to repair?

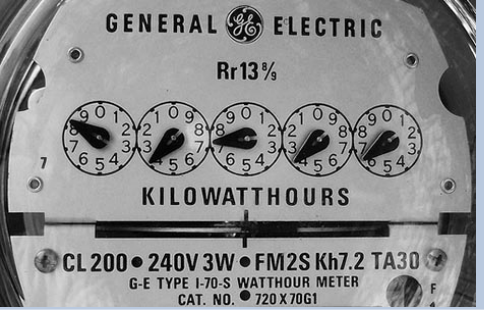
When to replace?

Energy Efficiency considerations may tip the scales in favor of replacement earlier than AM alone would say



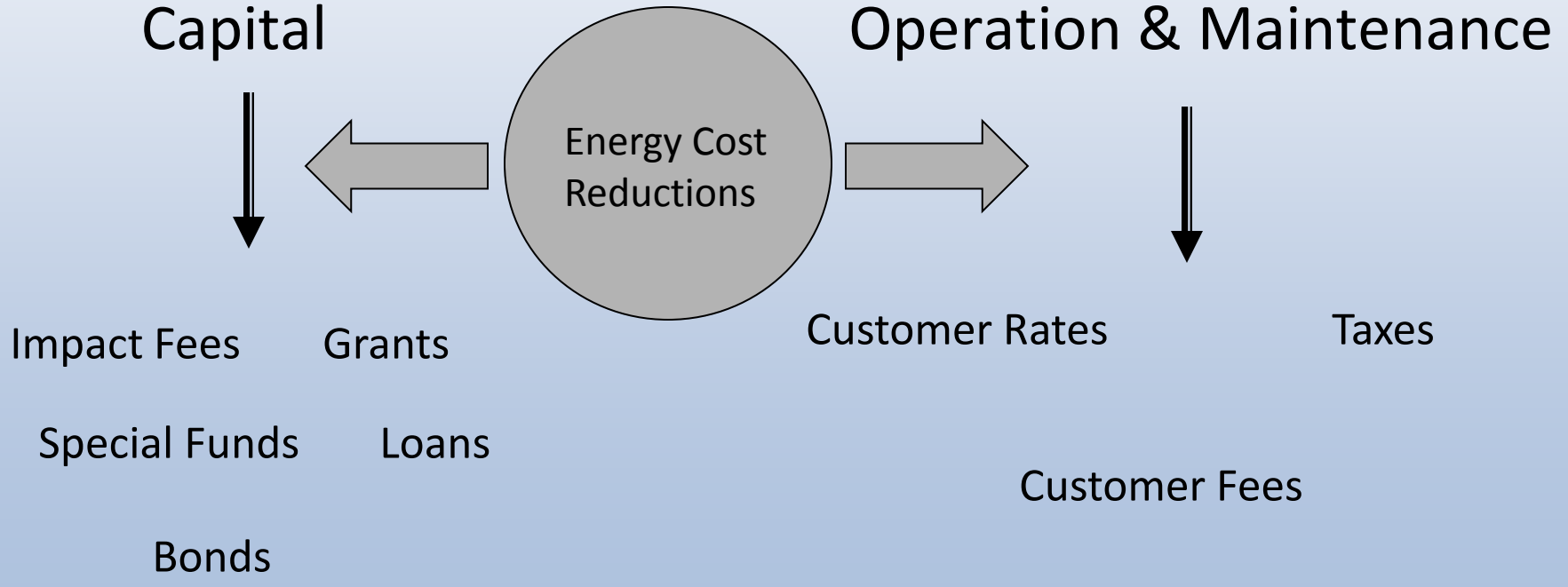
Natural Links: AM & EE

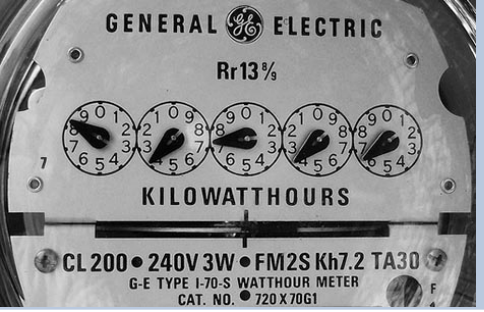
- Asset Management
  - Funding
    - What will the funding be for the overall program?
    - Where will money come from for O&M and capital?
- Energy Efficiency
  - Funding
    - Where will funding come from to run the program?
    - Will energy efficiency create sufficient reductions in costs to offset costs?
    - Can energy efficiency result in funds that can be used for other purposes?



What funding do we need to properly operate the assets?

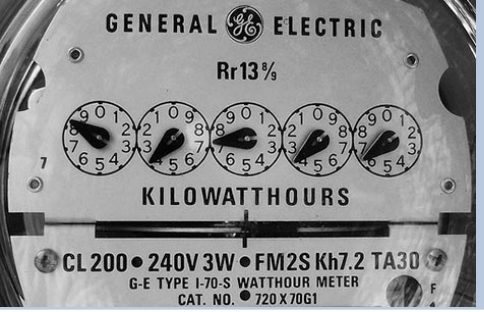
Where will the funding come from?





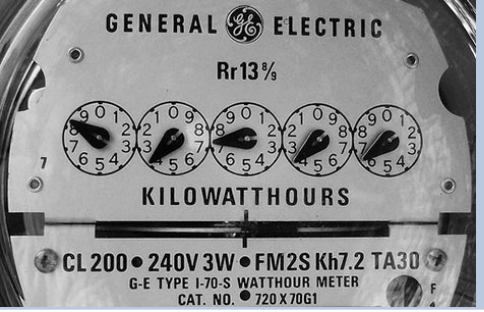
Natural Links: AM & EE Overall Plan

- Asset Management
  - Asset Management Plan
    - Summarizes the approach
    - Defines the goals
    - Communicates results
    - Continuous improvement, so reviewed annually and modified periodically
- Energy Efficiency
  - Energy Management Plan
    - Summarizes the approach
    - Defines the goals
    - Communicates results
    - Continuous improvement, so reviewed annually and modified periodically



Natural Links: AM & EE
Who can complete the plans?

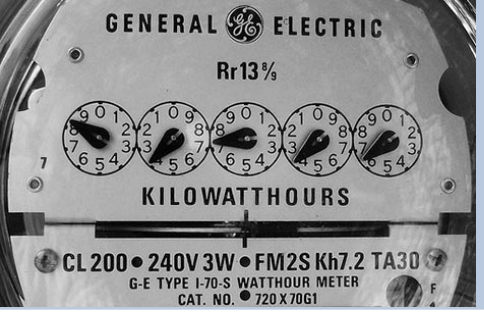
- Asset Management
  - Current Staff – KEY
  - Professional Consultants/ Assistance Providers
  - Elected Officials
- Energy Efficiency
  - Current Staff – KEY
  - Professional Consultants/ Assistance Providers
  - Elected Officials
  - Power Utility Staff



Why would you want to do either?

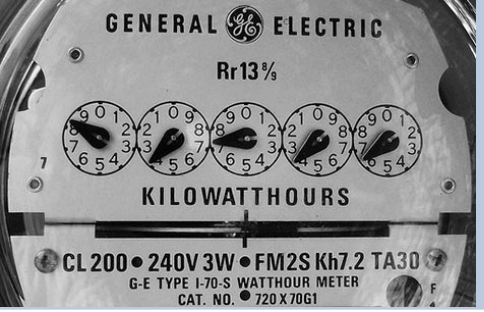
- Asset Management
  - Ability to provide good information to upper management & elected officials
  - Planned vs. Reactionary
  - Sustainable Systems
  - Customers who support you and what you're doing
  - Sound financial decisions
  - Ability to benefit from cost savings over time

- Energy Efficiency
  - Decrease energy costs, therefore reducing overall costs of operation
  - Reduce greenhouse gas emissions
  - Meet funding program requirements



Why would you want to do both together?

- Similar approach and work for each effort
- Same types of personnel required
- Benefits in one can benefit the other
- Goals may overlap
- Greater sustainability
- Doing both together will result in reduction of time and money rather than doing both separately
- One plan with both may be easier to manage
- Energy considerations may impact the asset decision-making process



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