

# Life Cycle Cost Analysis (LCCA)

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*Key to project programming and design decisions*



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# Objective

- Explain Life Cycle Cost Analysis (LCCA)



## We will Discuss:

- ▶ When LCCA is required
- ▶ Why LCCA is used
- ▶ The basics of LCCA



# Why are we covering LCCA here?

## Several federal SDD mandates require inclusion of features if/to the extent life cycle cost effective

- energy use reduction (30% new, 20% renovation)
- 30% solar water heating
- Onsite renewable energy
- Conservation measures for potable process water
- Elimination of ozone-depleting compounds



# LCCA is a tool for making design decisions

- Whether a new building should be constructed
  - ▶ This is the level economic analysis used in DD1391 to justify projects
- Central energy plant or standalone system
- Energy source and systems for HVAC
- Increased envelope insulation
- Photovoltaic panels

*LCCA answers the question how long will it be before the initial cost of something (compared to a baseline) is offset by the operational cost savings it yields*



# Who does LCCA?

- LCCA is an applicable tool for all design disciplines – ideally all practicing architects and engineers
- Reality – expertise is spotty across USACE districts
  - ▶ Mechanical engineers
  - ▶ Cost engineers
- Because it is a required part of USACE processes, we need to rebuild this expertise



## Who does LCCA? Work Smart

- We need a way to support the LCCA requirement where districts need help, eliminate redundancy and compile LCCA data on a per-Installation basis
  - ▶ So every team on every project does not reinvent the wheel
- HQUSACE plans to stand up a LCCA Center of Expertise to provide this function
  - ▶ In its infancy – may take a few years
  - ▶ Until then sources of LCCA assistance are available at :
    - Donna Smigel: 202-761-7422
    - Wes Bushnell: 256-895-1313
    - Arkie Fanning: 256-895-1841



# How to hire Huntsville to help

- MIPR funds to Huntsville for extended, reimbursable help
- Minor questions, call and ask
- Need \_\_\_\_\_ weeks notice to develop a full LCCA product



# To perform LCCA you need five key variables

- Costs for the status quo or in-place system.
  - ▶ Current annual energy costs.
  - ▶ Current annual Operations & Maintenance Costs
- Costs for the new or alternative system
  - ▶ An estimate of with-project annual energy costs
  - ▶ An estimate of with-project Operations & Maintenance Costs
  - ▶ An estimate of the first costs for energy savings measure (ESM) installation



# In the real world, it ain't so simple.

- **Salvage Costs:** Any value of the raw materials (copper, concrete, metal or plastics) which can be resold after the end of the equipments useful life needs to be included into the cost calculation.
- **Multiple Impacts:** An energy saving measure may reduce the consumption of one type of energy and increase the consumption of another type of energy.
- **Opportunity Costs:** There may be opportunity costs associated with implementing a system.
- **Replacement of Major Components:** Major system components may need to be replaced periodically.
- **Life of an Alternative:** Different technologies have different economic lives.
- **Taxes:** We ignore them.
- **Sunk Costs:** We ignore those too.



# Source of Costs

- Costs for the status quo system should be obtained from the installation DPW.
- Costs for the alternative O&M and Energy Consumption should be obtained from the Design Engineer
- Costs for installation of the alternative system should be obtained from the cost engineer.



# Savings to Investment Ratio: SIR

- An estimate of the return on investment
  - ▶ The sum total of all the discounted savings streams divided by the sum total of the costs of the initial investment.
  - ▶ Answers the question: “For every dollar invested how many dollars are returned in the form of energy consumption reduction savings.”
    - **Go** - If the SIR is greater than one, then for every dollar invested more than a dollar is returned
    - **No Go** - If the SIR is less than one, the for every dollar invested less than a dollar is returned.



# Software

## Quick BLCC

<http://www.eren.doe.gov/femp/techassist/softwaretools/softwaretools.html>



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