Planning for Project Affordability

IACC conference – Wenatchee WA

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Two Questions

- Is your project affordable?
- If not, what can you do about it?

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Infrastructure! We apparently need more of it.

- Old infrastructure is wearing out
- More people relying on it
- New demands on existing infrastructure
- Demands for new kinds of infrastructure
- Water, Sewer, Stormwater, Roads, public buildings, fiber networks,

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As decision makers for a utility you have two responsibilities

- Protect public health, safety, and the environment
- Keep utility rates low
- These two are in inherent conflict
- That's why you're "decision makers"

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How do you choose your infrastructure?

A. Do what Ecology says?
B. Do what your consultant says?
C. Avoid making any choice?
D. Or, do you lead your utility forward through smart choices?

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Life Cycle Cost Analysis

- A Life Cycle Cost Analysis (LCCA) is a powerful tool.
- LCCA can help you make good decisions
- If you know the assumptions that go into the analysis.

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Life Cycle Costs (LCC)

Life Cycle Costs include both:

- Construction costs (including design, construction management, change order / high bid risk)

  AND

- Operations costs (20 years of O&M, normal replacement, financing costs)

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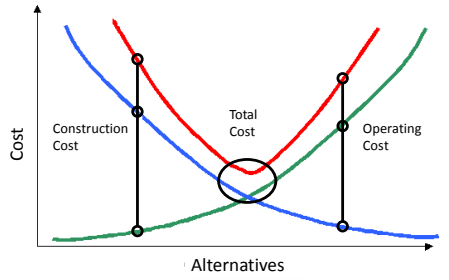
The "Goldilocks" Curve



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Life Cycle Cost Analysis

- Best way to show one alternative is superior
  - Required for Ecology funding
- Thinking about total ownership costs
  - Comparing future costs to today's costs
  - Comparing a string of costs to a lump sum cost
- Includes the Time Value of Money
  - Today's money is worth more in the future
  - (Future costs are less expensive today)

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Net Present Worth

- Discounting future costs - Time Value of Money
  - Imagine investing today to provide for future payments.
  - Use the "Real" (inflation adjusted) Discount Rate
    - 1.6% for 20 year bonds as of 7/9/14
- Examples Net Present Worth (2014 dollars)
  - $36,400 invested today equals $50,000 (inflation adjusted) in 2034.
  - 20 annual payments of $50,000 have a Net Present Worth of $850,000

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Decision Matrices

- Commonly used tool
- List of criteria with scores for each alternative

- Beware of decision matrices
  - Unclear criteria
  - Subjective scores
  - An easy way to fool yourself

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A Bad Example

Criteria	MBR	Lagoons
Construction Cost	1	3
Community Acceptance	4	1
Sustainability	3	5
Quality of Effluent	4	1
Meets "Class A" reclaimed water standards	5	1
	17	**11**

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Another Bad Example

Criteria	MBR	Lagoons
Construction Cost	1	3
O&M Cost	1	5
Sustainability	3	5
Meets permit requirements	5	3
	10	**16**

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A Bad Example

Criteria	MBR	Lagoons
Construction Cost	1	3
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Quality of Effluent	4	1
Meets "Class A" reclaimed water standards	5	1
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If you have to use decision matrices

- Understand how the rating criteria supports the goal of the project
- Understand how scores are assigned across the range
- Use as tie breakers after doing LCCA

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An Example of LCCA

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Welcome to Anywhere, WA!

- Sewer Customers: 1,000
- Median Household Income: $40,000
- Anywhere needs a new sewage treatment plant

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Anywhere has two options

- A: Expensive upfront, cheaper to operate
- B: Cheap upfront, more expensive to operate

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Up front Expenses (Anywhere, WA)

- Construction Cost (Estimates)
- Design
- Planning
- Construction Management

	A	B
Capital Cost	$10,000,000	$6,000,000

Recurring Expenses (Anywhere, WA)

- Staff
- Overhead
- Supplies / Tools
- Power
- Chemical
- Asset Replacement
- Lab expenses
- Biosolids Disposal

	A	B
Annual O&M	$500,000	$800,000

Life Cycle Costs (cash)

	A	B
Capital Cost	$10,000,000	$6,000,000
Annual O&M	$500,000	$800,000
O&M NPW*	$8,500,000	$13,600,000
TOTAL	**$18,500,000**	**$19,600,000**
Savings	*$1,100,000*	

* NPW = Net Present Worth

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Life Cycle Costs (loan)

	A	B
Capital Cost	$10,000,000	$6,000,000
Annual Debt*	$630,000	$378,000
Annual O&M	$500,000	$800,000
Debt NPW	$10,710,366	$6,426,219
O&M NPW	$8,500,290	$13,600,464
TOTAL	**$19,210,656**	**$20,026,684**
Savings	*$816,028*	

* SRF loan; 20 year term; 2.3% interest

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Life Cycle Costs (bond)

	A	B
Capital Cost	$10,000,000	$6,000,000
Annual Debt*	$735,000	$441,000
Annual O&M	$500,000	$800,000
Debt NPW	$12,495,426	$7,497,256
O&M NPW	$8,500,290	$13,600,464
TOTAL	**$20,995,717**	**$21,097,720**
Savings	*$102,003*	

* Municipal Bonds; 20 year term; 4% interest

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Limitations of the Life Cycle Cost Analysis

- Highly sensitive to how accurate the assumptions are.
  - Construction cost estimates
  - Estimates of annual O&M cost
- Most useful for small choices throughout the project design cycle.
- Large complex choices increase the uncertainty in the analysis.

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Anywhere decides on Option A

- It's the least cost option (LCC)
- Maximizes Grant / subsidy options

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Three Cheers for Anywhere, WA!

- You are a very wise leader.
- You have chosen the least cost option.

Can you afford the least cost option?

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Life Cycle Cost Analysis can't tell you if you can afford a project.

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What is affordable?

- Every community has a different sense of what is affordable to them
- EPA defines a utility bill that less than 2% of the median household income is "affordable".
- For a community with a Median Household Income (MHI) of $40,000 (like Anywhere, WA) a $67/month sewer bill is "affordable".
- For ratepayers facing "unaffordable" utility bills Ecology, Health, and CDBG offer grant funding.

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Affordability Analysis

- Evaluate the annual utility budget
  - Debt for new project
  - Any old debt
  - All O&M costs
- Calculate a per sewer account cost
- Compare to the Median Household Income

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Anywhere, WA

Annual Budget	
Construction Debt*:	$630,000
Treatment O&M:	$500,000
Collections O&M:	$200,000
Outstanding Debt:	$200,000
Annual Expenses:	**$1,530,000**

* SRF loan; 20 year term; 2.3% interest

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Affordability Analysis

Annual Budget	
Construction Debt*:	$630,000
Treatment O&M:	$500,000
Collections O&M:	$200,000
Outstanding Debt:	$200,000
Annual Expenses:	**$1,530,000**
Sewer Accounts:	1,000
Annual per customer:	$1,530
Monthly Sewer Bill:	**$128**
MHI:	$40,000
Affordability Index:	3.825%

* SRF loan; 20 year term; 2.3% interest

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This is just an estimate

- Other things to consider:
  - Large or industrial users
  - Reserve amounts
  - Utility tax
  - Conservation rates
  - Individual rate structure

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What can we do?

- State Grant Funding

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Affordability Analysis (w/ grant)

Annual Budget	
Construction Debt*:	$315,000
Treatment O&M:	$500,000
Collections O&M:	$200,000
Outstanding Debt:	$200,000
Annual Expenses:	**$1,215,000**
Sewer Accounts:	1,000
Annual per customer:	$1,215
Monthly Sewer Bill:	**$101**
MHI:	$40,000
Affordability Index:	3.038%

* SRF loan; 20 year term; 2.3% interest plus $5,000,000 in state grants

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What can we do?

- ~~State Grant Funding~~
- Lower Interest Rates

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Affordability Analysis (w grant and refi)

Annual Budget	
Construction Debt*:	$277,000
Treatment O&M:	$500,000
Collections O&M:	$200,000
Outstanding Debt*:	$87,719
Annual Expenses:	**$1,064,719**
Sewer Accounts:	1,000
Annual per customer:	$1,065
Monthly Sewer Bill:	$89
MHI:	$40,000
Affordability Index:	2.662%

* SRF loan; 20 year term; 1.0% interest plus $5,000,000 in state grants

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What can we do?

- ~~State Grant Funding~~
- ~~Lower Interest Rates~~
- Rearrange rates
- Remove stuff from the construction project
- Start cutting back on O&M

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The O&M Iceberg

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What can we do?

- ~~State Grant Funding~~
- ~~Lower Interest Rates~~
- Rearrange rates
- Remove stuff from the construction project
- Start cutting back on O&M

- Go back to the drawing board?

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Back to the drawing board

- Why is Anywhere building a new treatment plant?
  - Permit compliance?
  - Growth pressures?
  - Existing infrastructure is failing?
- Anywhere only looked at two Options. Why?
- LCCA proved that "Option A" was less expensive than "Option B", not that "Option A" the best way to solve the problem.

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Why are you building your project?

- All projects should solve problems
- Do you know what problem your project is supposed to solve?
- Is your project addressing symptoms or root causes?

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Ask yourself "WHY?"

- WHY?
- WHY?
- WHY?
- WHY?
- Keep asking till you identify your real problem

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Identify Your Real Problem / Need

- Use the "five why's"
- Be honest with yourself
- Look for root causes, not symptoms
  - You may have more than one problem
- Get Clarity: Write it down
  - Two sentences, no more than 20 words, plain English
- Review with utility staff, engineers, elected officials
- Get them to buy into the problem statement
- Fully define your Need before you start working on a solution
- Develops a team to tackle the problem

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On second thought, don't be like Goldilocks

- Goldilocks is great at optimizing
- Goldilocks is bad at deciding what to optimize
- Was her real problem cold porridge or breaking and entering? Or maybe not getting eaten by bears?
- A clear understating of the problem will lead to solutions to your the problem

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How do you solve your problem?

- Facility Planning / Alternative Analysis / Value Analysis / Cost Effectiveness Analysis
  0. Identify the REAL PROBLEM / NEED
  1. Brainstorm. Get a big list of possible solutions
  2. Evaluate their ability to solve the problem
  3. Look at the lifecycle costs and benefits of the solutions
  4. Pick the Best/ Least Cost/ Highest Value alternative
  5. Plan the path forward to implement that project

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Many projects suffer premature "HOW"

- Is your project a prechosen solution looking for a problem?
- Solving the wrong problem isn't going to move you forward.
- Remember, not every problem is a nail.
  - Even if you have the most amazing hammer in the world.

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Brainstorming when you're stuck in a rut

The Most Amazing Hammer

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Really brainstorm: Go get more alternatives

- Think "outside the box"
  - Or hire somebody who can
- Think about scale
- Reconsider your assumptions
- Think about levels of technology
- Consider political and regulatory approaches
- Keep the "nobody will do that" ideas

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Reconsider your assumptions

- Growth projections
  - Planning for growth vs. building capacity for tomorrow's growth today.
- Per capita sewer volumes
- Capacity of existing treatment plant
- Permit Limits

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Reconsider your technology options

- Individual Septic Tanks
- Large Onsite Sewage Systems (LOSS)
- Lagoons
- Sand filter / RGF
- Mechanical Treatment
- Advanced Treatment
- Membrane Separation

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Explore Other Options

- Regional Alternatives
- I/I reduction
- Conservation
- Pollution Trading
- Plant capacity re-rating

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This is Infrastructure Planning

- The report might be called a "Facility Plan" or an "Engineering Report", or a "Water System Plan"
- The report documents your process for decision making.
  0. Identifies the REAL PROBLEM / NEED
  1. Develops a list of possible solutions (alternatives)
  2. Evaluates their ability to meet the need
  3. Calculates the Life Cycle Costs for each solution
  4. Pick the Best/ Least Cost/ Highest Value alternative
  5. Plans the path forward to implement that project

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Plan your work

Then work your plan

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Everyone has a plan,

until you get punched in the face

– Mike Tyson

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Plans are worthless,

but planning is everything.

– Dwight D. Eisenhower.

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No Plan Survives Contact With The Engineer

- Don't be a slave to your plan
- Be prepared to be flexible during design and construction
- Undiscovered site conditions, new technology, and changing regulations are all "opportunities"
- Consider how any changes or opportunities will affect the real need underlying your project

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Thank You!

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Additional information

- David.Dunn@ecy.wa.gov 360/407-6503
- Ecology funding program site: http://www.ecy.wa.gov/programs/wq/funding/funding.html
- Grant and Loan listserv: http://www.ecy.wa.gov/maillist.html

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