

## Project Affordability

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1

Is your project affordable?

If not, what can you do about it?

2

- Pre-session checklist
  - Who am I?
  - Questions
  - Slides
  - Audience participation

3

Infrastructure!  
We apparently need more of it.

- Old stuff is wearing out
- More people relying on it
- New demands for infrastructure.
- Demands for new infrastructure

4

As decision makers you have two responsibilities

- Protect public health, safety, and the environment
- Keep utility rates low
- These two are in inherent conflict.

5

How do you choose your infrastructure?

- Do what Ecology says?
- Do what your consultant says?
- Avoid making any choice?

6

A Life Cycle Cost Analysis (LCCA) can help you make good decisions if you know the assumptions that went into the analysis.

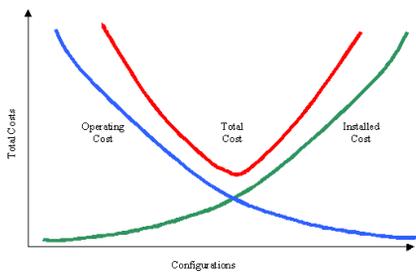
7

## Life Cycle Costs (LCC)

- Construction costs (including design, construction management, change order / high bid risk)
- AND**
- Operations costs (20 years of O&M, normal replacement, financing costs)

8

## The "Goldilocks" Curve



9

## Life Cycle Cost Analysis

- Time Value of Money
- Discount Rate
- Net Present Worth (2013 dollars)
- Opportunity Costs

10

## Welcome to Anywhere, WA!

- Population: 1,000
- Median Income: \$40,000
- Anywhere needs a new sewage treatment plant

11

## Anywhere has two options

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

12

### Up front Expenses

- Construction Cost Estimates
- Design
- Planning
- Construction Management

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

### Recurring Expenses

- 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*	\$9,207,000	\$14,731,200
<b>TOTAL</b>	<b>\$19,207,000</b>	<b>\$20,731,200</b>
<i>Savings</i>	\$1,524,200	

\* NPW = Net Present Worth

15

### 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	\$11,600,820	\$6,960,492
O&M NPW	\$9,207,000	\$14,731,200
<b>TOTAL</b>	<b>\$20,807,820</b>	<b>\$21,691,692</b>
<i>Savings</i>	\$883,872	

\* SRF loan; 20 year term; 2.3% interest

16

### 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	\$13,534,290	\$8,120,574
O&M NPW	\$9,207,000	\$14,731,200
<b>TOTAL</b>	<b>\$22,741,290</b>	<b>\$22,851,774</b>
<i>Savings</i>	\$110,484	

\* Municipal Bonds; 20 year term; 4% interest

17

### Limitations of the Life Cycle Cost Analysis

- Highly sensitive to how accurate the assumptions are.
- Most useful for small choices throughout the project design cycle.
- Large complex choices increase the uncertainty in the analysis.

18

### Life Cycle Cost Analysis when things get complicated

- What about inflation?
- How do you consider risk?
- How do you compare phased projects?
- How much do you weigh non-monetary benefits?

19

### Anywhere decides on Option A

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



20

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

Can you afford the  
least cost option?

21

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

22

### What is affordable?

- A \$15/ month rate increase?
- A \$0.25/month rate increase?
- A \$30 monthly bill?
- A \$95 monthly bill?

23

### How EPA identifies project affordability

- 1.5% of median household income is "affordable"
- For a community with a Median Household Income (MHI) of \$40,000. A \$50 sewer bill is "affordable".

24

### 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 MHI

25

### Anywhere, WA

Annual Budget	
Construction Debt*:	\$630,000
O&M:	\$500,000
Collections:	\$200,000
Outstanding Debt:	\$200,000
<b>Annual Expenses:</b>	<b>\$1,530,000</b>

\* SRF loan; 20 year term; 2.3% interest

26

### Affordability Analysis

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

\* SRF loan; 20 year term; 2.3% interest

27

### This is just an estimate

- Other things to consider:
  - Reserve amounts
  - Utility tax
  - Conservation rates
  - Individual rate structure

28

### What can we do?

- State Grant Funding

29

### Affordability Analysis

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

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

30

### What can we do?

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

31

### Affordability Analysis

Annual Budget	
Construction Debt*:	\$277,000
O&M:	\$500,000
Collections:	\$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

32

### What can we do?

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

33

### The O&M Iceberg

34

### 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?

35

### Why is Anywhere building a new treatment plant?

- Hopefully they have a good answer to this question, but we don't know it
  - Permit compliance?
  - Growth pressures?
  - Existing infrastructure is failing?
- This is the question Anywhere should have started with

36

## Why are you building your project?

- All projects should solve problems
- Do you know what problem your project is supposed to solve?
- Is your “solution” part of the problem?

37

## Ask yourself “WHY?”

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

38

## Identify your REAL PROBLEM

- 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

39

## Many projects suffer premature “HOW?”

- Have you ever noticed that every problem looks like a nail when you are holding a hammer?
- Your “project” might not be the solution to your “problem”
- Figure out your problem first, then think about how to solve it

40

## How do you solve your problem?

- Alternative analysis / Value Analysis / Cost Effectiveness Analysis
  - Identify the REAL PROBLEM
  - 1. Brainstorm. Get a big list of possible solutions
  - 2. Evaluate their ability to solve the problem
  - 3. Look at the costs benefits and lifecycle of the solutions
  - 4. Pick the Best/ Least Cost/ Highest Value project

41

## You call these Alternatives?



42

## Hammer Time ??



43

## On second thought, don't be Goldilocks

- Life Cycle Cost Analysis can help you make a decision.
- Use it to make the Right decision

44

## 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

45

## 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

46

## Reconsider your technology options

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

47

## Reconsider your options

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

48

*Plan your work  
Then work your plan*

49

*Everyone has a plan,  
until you get punched in the  
face  
– Mike Tyson*

50

*Plans are worthless,  
but planning is everything.  
– Dwight D. Eisenhower.*

51

Thank You!

52

### Additional information

- [David.Dunn@ecy.wa.gov](mailto: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>

53

Any Final Questions?

54