# Project Comparison and Evaluation Techniques

Module 02-1: Project Comparison Modified: January 27, 2003

#### Purpose:

- Review the need for financial measures in the alternative selection process.
- Go over some of the problem areas.

#### Learning Objectives:

 Students should be able to compare simple project cashflow situations and make a choice between projects based upon B/C ratio, NPV, AE, Cap Value, IRR and ERR.

#### Overview

- There are a number of ways to compare alternative problem solutions; that is, which alternative is the most desirable? We can compare:
  - Emotionally
  - Physical Feasibility
  - Political Acceptability
  - Financially

#### A Problem for Engineers

- Engineers Use both Physical and Financial Evaluations and tend to ignore the Political and Emotional considerations.
- Why is this a problem? Get some comments from the class!

#### **Physical Feasibility**

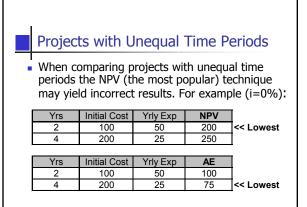
- Actually possible to build anti-gravity devices?
- Won't cause more Harm than Good Environmental Issues (maybe political)

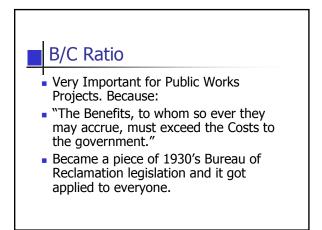
#### Financial Techniques:

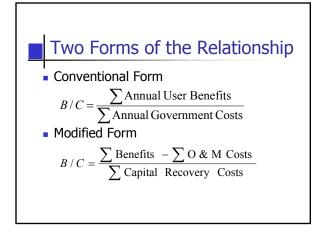
- Net Present Value non equal periods problem
- Net Annual Equivalent may obscure total value
- B/C (Benefit / Cost) Ratio legally required in some cases; the two forms may yield different results.

#### Cont'd.

- IRR Lenders prefer but may yield non-sense results
- ERR Yields better results but not understood by lenders
- Cap Rate method Too easy to manipulate to your advantage
- Pay Back Period Doesn't work with extreme interest rates
- Incremental Analysis using all of the above You have to know what you are doing.

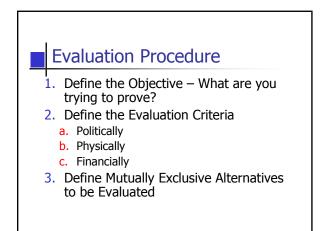






Class Pair\Team Problem							
<ul> <li>Use the B/C Ratio evaluator with i=0% to select the best of the following:</li> </ul>							
	Α	В	С				
Benefits	1,000	1,000	2,000				
O&M	100	250	500				
Cost	10,000	15,000	15,000				
Years	10	20	15				

The Answers Are:						
	Α	В	С			
Mod	0.90	1.00	1.50			
Conv	0.91	1.00	1.33			



#### Cont'd.

- 4. Estimate Net Cash Stream for each mutually exclusive alternative
- 5. Apply the appropriate evaluation technique to get: NPV, B/C, etc.
- 6. Rank Order by ... ...
- Select the "best" alternative or the "best" sequence using Other Criteria to break ties.

## Pair Exercise.

Three artificial turfs are available for covering the playing field in a college stadium. The costs are a follows and use i=15%. Find the best using Annual Equivalent (AE).

	Turf King	Turf Ease	Turf Magic
Cost New(\$)	540,000	608,000	467,000
Annual Maintenance Cost (\$)	2,300	1,600	2,500
Expected Life (years)	12	15	10
Salvage Value (\$)	54,000	57,000	40,000

The answer is Magic.							
IC	Maint.	SV	Total				
-99,630	-2,300	1,860	-\$100,070				
-103,970	-1,600	1,200	-\$104,370				
-93,070	-2,500	1,970	-\$93,600				
	IC -99,630 -103,970	IC Maint. -99,630 -2,300 -103,970 -1,600	IC         Maint.         SV           -99,630         -2,300         1,860           -103,970         -1,600         1,200				

### Summary

- Selection of the "Best" alternative is a rational process.
- You can use an engineering process, a political process, or an emotional process.
- Which ever one you use, follow the steps.

