

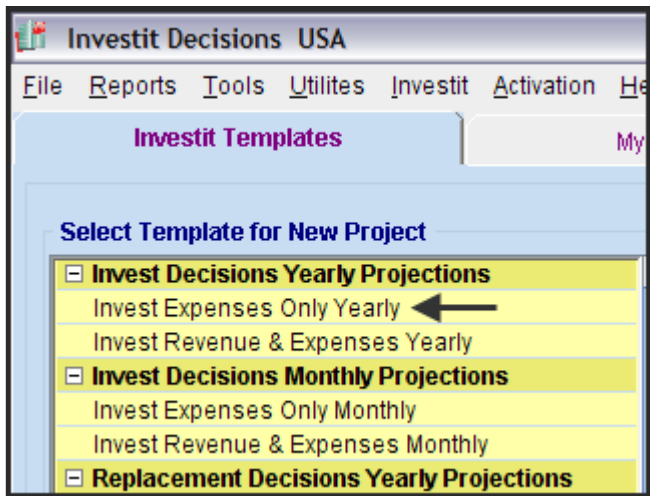
ENERGY EFFICENCY INIATITIVE

Example USA & Canada

INTRODUCTION

This example illustrates the application of Investit Decisions cost/benefit analysis to an energy savings initiative.

This example uses the “Invest Expenses Only Yearly”

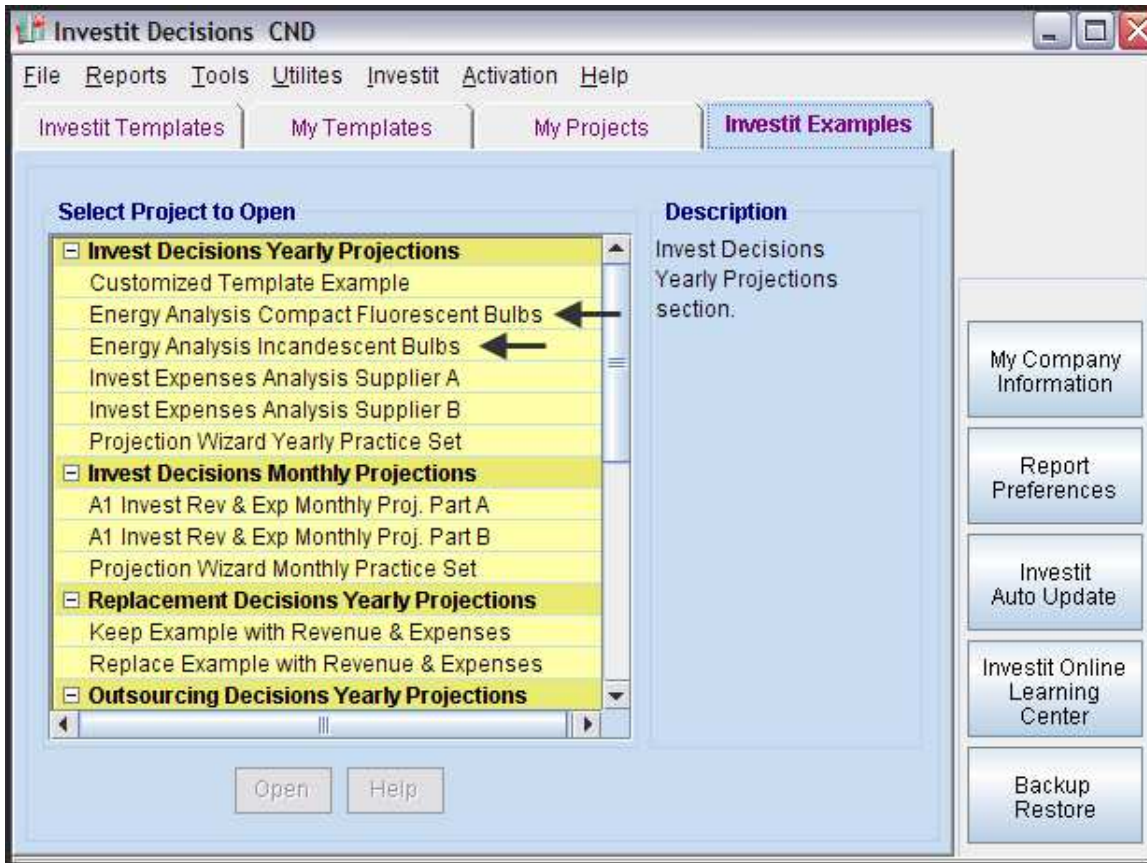


VERIFYING YOUR ANALYSIS

You can compare your analysis against the two Investit Decisions Examples;

1. Energy Analysis Compact Fluorescent Bulbs
2. Energy Analysis Incandescent Bulbs

Investit Examples



EXAMPLE

A restaurant chain is concerned about their monthly electrical bill which they suspect will increase dramatically over the next few years due to rapidly increasing power costs. They are considering replacing the incandescent lights with compact fluorescent lights (CFL's). They have 1,000 lighting fixtures.

They wish to carry out a before tax Cost/Benefit analysis using Investit Decisions.

The assessment will be made using the following information;

No. of light fixtures: 1,000

Operating hours: 15 hours per day x 360 days per year = 5,400 hours per light fixture

Electrical power costs: \$0.10 per kWh increasing at 7.00% per year compounding

Incandescent bulbs: 60 watt \$0.50 per bulb increasing at 2.00% per year compounding. Life 750 hrs

Compact fluorescent light (CFL's): 15 watt \$4.00 per bulb. Constant price over the next five years. Life 7,500 hrs

Labor: \$15 per hour increasing at 3.00% per yr compounding. Time to replace a bulb is 0.25 hours (15 minutes)

Initial Investment: CFL Bulbs 1,000 CFL's at \$4.00 = \$4,000

Installation: 1,000 fixtures x 0.25 hours x \$15.00 per hr = \$3,750

Working Capital: \$1,000 (for spare bulbs)

Bulbs: Costs per Light Fixture per Year

Incandescent bulbs (5,400 hrs per yr/ 750 hours per bulb) x \$0.50 per bulb = \$3.60 per light fixture per yr

CFL's (5,400 hrs per year/ 7,500 hrs per bulb) x \$4.00 per bulb = \$2.88 per light fixture per year

Labor: Bulb Replacement Costs per Light Fixture per Year

Incandescent bulbs (5,400 hrs per yr/ 750 hrs per bulb) x 0.25 hours x \$15.00 per hr = \$27.00 per light fixture per yr

CFL's (5,400 hour per yr/ 7,500 hours per bulb) x 0.25 hours x \$15.00 per hr = \$2.70 per light fixture per year

Power: Costs per Light Fixture per Year

Incandescent bulbs 5,400 hrs per yr x 60 watts x \$0.10 per kWh/1,000 = \$32.40 per light fixture per yr

CFL's 5,400 hrs per yr x 15 watts x \$0.10 per kWh/1,000 = \$8.10 per light fixture per year

General Information

Analysis Period: 5 Years

Discount Rate (Before Tax): 15.00%

INCANDESCENT BULB ANALYSIS

Project Info Folder

Project Name: Energy Analysis Incandescent Lights
Project Description: Business as usual case
Analysis Period: 5 years

Investor Folder

Turn off Tax Calculations
Discount Rate (Before Tax): 15.00%

Investment Folder

Capital Investment: None

Working Capital Folder

Working Capital: None

Expenses Folder

Bulb Replacements: \$3.60 per Light Fixture per Yr increasing at 2.00% per year compounded

Labor: \$27.00 per Light Fixture per Yr increasing at 3.00% per year compounded

Power: \$32.40 per Light Fixture per Yr increasing at 7.00% per year compounded

Financing Folder

No financing

Salvage Value Folder

No salvage value

COMPACT FLUORESCENT LIGHTS (CFL's) ANALYSIS

Project Info Folder

Project Name: Compact Fluorescent Lights Analysis
Project Description: Energy Efficiency Initiative
Analysis Period: 5 years

Investor Folder

Turn off Tax Calculations

Discount Rate (Before Tax): 15.00%

Investment Folder

Description: Bulbs \$4,000
Description: Installation \$3,750

Working Capital Folder

Working Capital: \$1,000

Expenses Folder

Bulb Replacements: \$2.88 per Light Fixture per Yr constant for 5 years

Labor: \$2.70 per Light Fixture per Yr increasing at 3.00% per year compounded

Power: \$8.10 per Light Fixture per Yr increasing at 7.00% per year compounded

Financing Folder

No financing

Salvage Value Folder

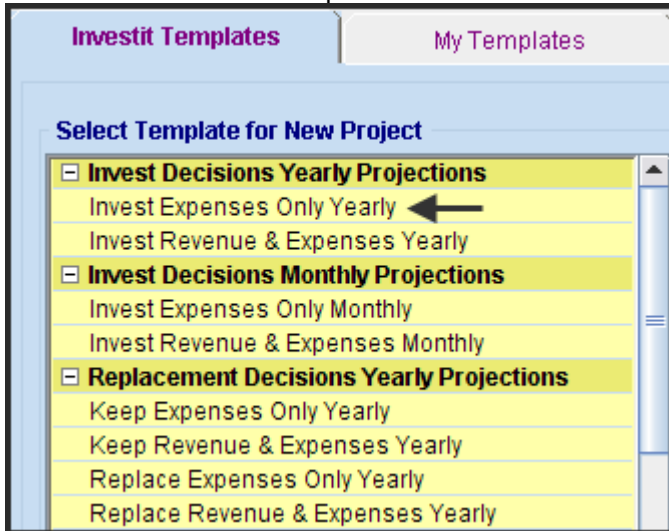
No salvage value

INSTRUCTIONS FOR ENTERING THE INCANDESCENT BULB ANALYSIS

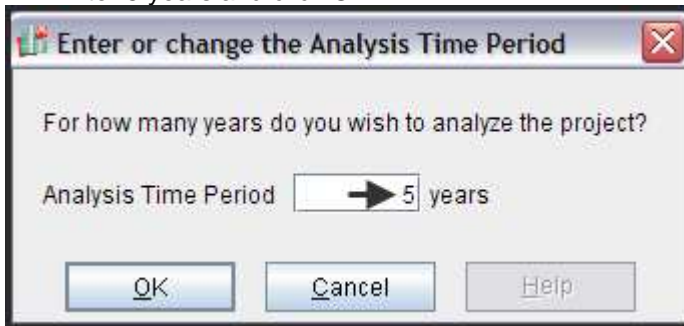
Getting started

The first step is to open the Investit Decisions Template “Invest Expenses Only Yearly” as follows:

1. Open Investit Decisions.
2. Select the Investit Templates folder



3. Select and open the Investit template “Invest Expenses Only Yearly”. The analysis period dialog will open at this point.
4. Enter 5 years and click OK



Entering the project data and information

Project Info Folder

Project Name: Energy Analysis Incandescent Lights
Project Description: Business as usual case
Analysis Period: 5 years

The screenshot shows the 'Project Info' folder selected in a tabbed interface. The tabs are 'Project Info.', 'Investor', 'Investment', and 'Working Capital'. The 'Project Info' folder contains the following sections:

- Report Headers**
 - Project Name: Energy Analysis Incandescent Lights
 - Project Description: Business as usual case
- Analysis Time Period**
 - 5 Years
 - Change Analysis Time Period button
- Entry Information**
 - Enter Revenue and Expenses: Yearly
 - Change Entry Information button
 - Starting Date: January Year 1

Investor Folder

Turn off Tax Calculations

Discount Rate (Before Tax): 15.00%

The completed Investor folder

The screenshot shows the 'Investor' folder selected in the tabbed interface. The tabs are 'Project Info.', 'Investor', 'Investment', and 'Working Capital'. The 'Investor' folder contains the following sections:

- Check "Turn Off Tax Calculations" (indicated by a downward arrow)
- Turn off Tax Calculations
- Discount Rate or Desired Return on Investment**
 - Before Tax: 15.00%

Investment Folder

No investments

Working Capital Folder

Working Capital: None

Expenses Folder

Bulb Replacements: \$3.60 per Light Fixture per Yr increasing at 2.00% per year compounded

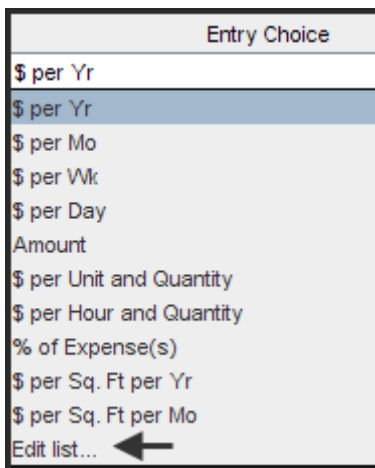
Labor: \$27.00 per Light Fixture per Yr increasing at 3.00% per year compounded

Power: \$32.40 per Light Fixture per Yr increasing at 7.00% per year compounded

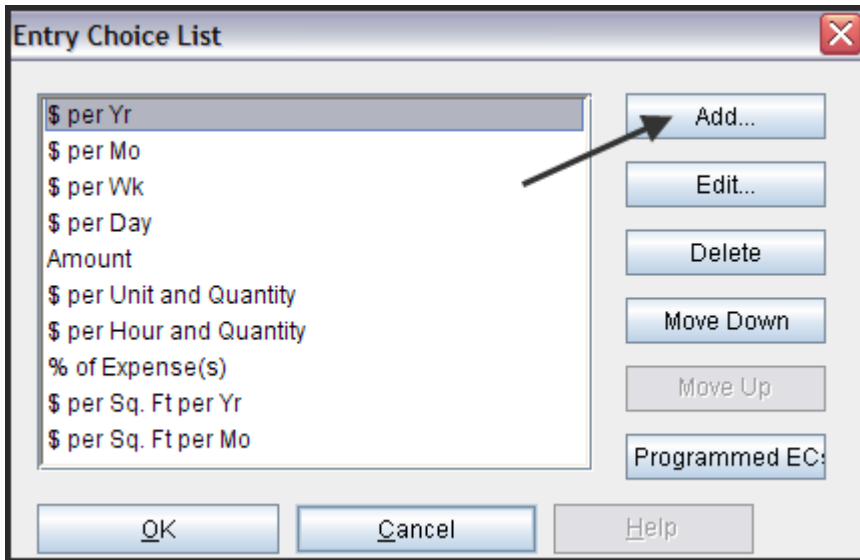
Setting up the Entry choice "\$ per Light Fixture per Yr" and moving to the top of the Entry Choice List

Steps

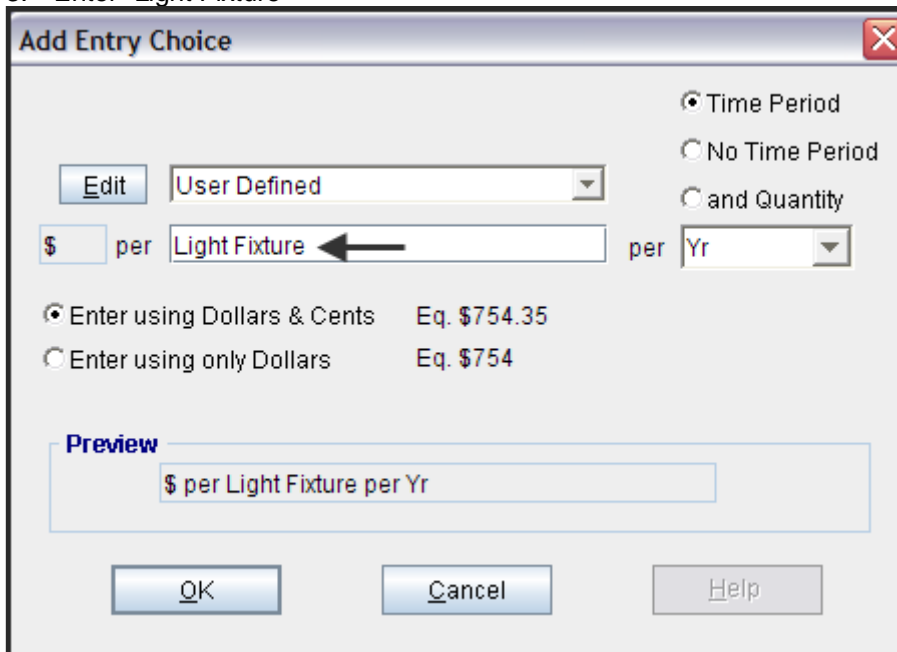
1. Display the "Entry Choice List" and select "Edit List..."



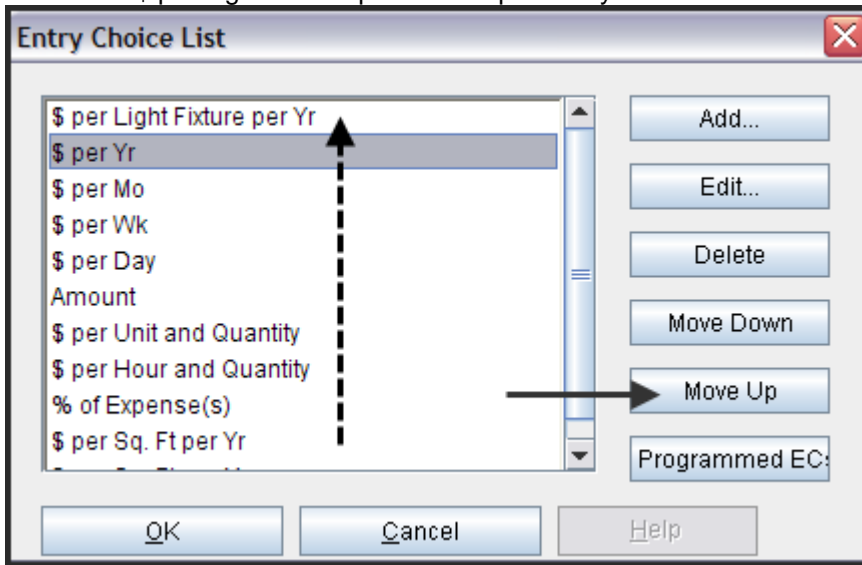
2. Click on the "Add" button



3. Enter "Light Fixture"



4. Move "\$ per Light Fixture per Yr" to top of Entry Choice list



5. Complete the Expenses grid as follows;

Project Info.	Investor	Investment	Working Capital	Expenses	
Expenses					
Description	Entry Choice	Qty	Category	Year 1 Jan...	Year 2 Jan...
Bulb Replacements	\$ per Light Fixture per Yr	1,000	Common	\$ 0.00	\$ 0.00
Labor	\$ per Light Fixture per Yr	1,000	Common	\$ 0.00	\$ 0.00
Power	\$ per Light Fixture per Yr	1,000	Common	\$ 0.00	\$ 0.00

1. Change Descriptions
2. Remove unused rows

3. Set Entry Choice to "\$ per Light Fixture per Yr"

4. Enter No. of Light Fixtures

Bulb Replacements: \$3.60 per Light Fixture per Yr increasing at 2.00% per year

1. Select the first row 'Bulb Replacements' and click on the 'Projection Wizard' button

Project Info.		Investor	Investment	Working Capital	Expenses	
Expenses						
Description	Entry Choice	Qty	Category	Year 1 Jan...	Year 2 Jan...	
Bulb Replacements	\$ per Light Fixture per Yr	1,000	Common	\$ 0.00	\$ 0.00	
Labor	\$ per Light Fixture per Yr	1,000	Common	\$ 0.00	\$ 0.00	
Power	\$ per Light Fixture per Yr	1,000	Common	\$ 0.00	\$ 0.00	

↓

2. Complete the "Projection Wizard" as shown, then click "OK" button

Projection Wizard

Entry Information

Description: Bulb Replacements
Entry Choice: \$ per Light Fixture per Yr

Projection

Entry	Project Entry Using...	Increase	Starting Year	Time Period		
				To End	Yrs	Cont. Proj.
\$ 3.60	Annual Compounding	2.00%	Year 1	<input checked="" type="checkbox"/>	5	

Projection Description

Bulb Replacements
Entry Choice: \$ per Light Fixture per Year
Quantity: 1,000
Year 1 \$3.60 per Light Fixture per Year
Compounding at 2.00% per year for next 4 years

Labor: \$27.00 per Light Fixture per Yr increasing at 3.00% per year compounded

1. In the Expenses Folder select the second row "Labor" and click on the "Projection Wizard" button
2. Complete the "Projection Wizard" as shown, then click "OK" button

Projection Wizard

Entry Information

Description: Labor

Entry Choice: \$ per Light Fixture per Yr

Projection

Entry	Project Entry Using...	Increase	Starting Year	Time Period		Cont. Proj.
			Year	To End	Yrs	
→ \$ 27.00	Annual Compounding	→ 3.00%	Year 1	<input checked="" type="checkbox"/>	5	

↑ Select

↑ Check

Power: \$32.40 per Light Fixture per Yr increasing at 7.00% per year compounded

1. In the Expenses Folder select the third row "Power" and click on the "Projection Wizard" button
2. Complete the "Projection Wizard" as shown, then click "OK" button

The screenshot shows a 'Projection Wizard' dialog box with the following details:

- Entry Information:**
 - Description: Power
 - Entry Choice: \$ per Bulb per Yr
- Projection:**

Entry	Project Entry Using...	Increase	Starting Year	Time Period		Cont. Proj.
				To End	Yrs	
→ \$ 32.40	Annual Compounding	→ 7.00%	Year 1	<input checked="" type="checkbox"/>	5	

Annotations: An arrow labeled 'Select' points to the 'Annual Compounding' dropdown menu. An arrow labeled 'Check' points to the 'To End' checkbox.

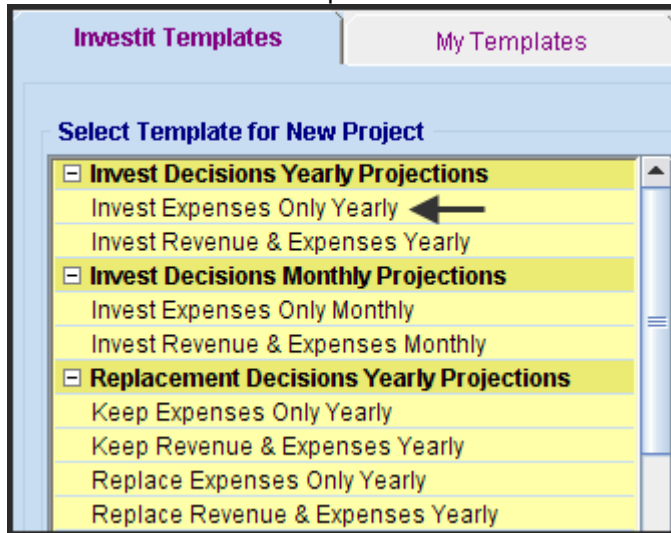
SAVE THE PROJECT

INSTRUCTIONS FOR ENTERING THE COMPACT FLUORESCENT BULB (CFL's) ANALYSIS

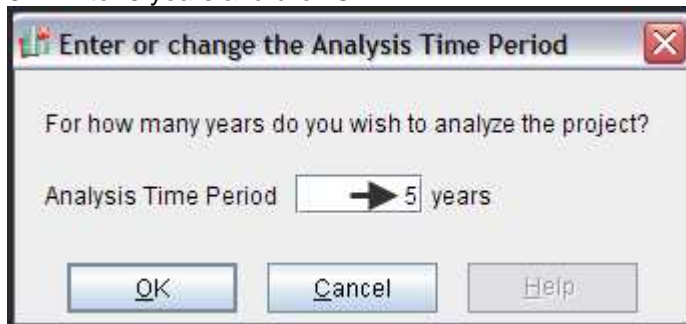
Getting started

The first step is to open the Investit Decisions Template “Invest Expenses Only Yearly” as follows:

1. Open Investit Decisions.
2. Select the Investit Templates folder and select “Invest Expenses Only Yearly” template



3. Enter 5 years and click OK



Entering the project data and information

Project Info Folder

Project Name: Compact Fluorescent lights Analysis
Project Description: Energy Efficiency Initiative
Analysis Period: 5 years

The screenshot shows the 'Project Info' folder selected in a tabbed interface. The 'Report Headers' section contains text boxes for 'Project Name' (Compact Fluorescent Lights Analysis) and 'Project Description' (Energy Efficiency Initiative). The 'Analysis Time Period' section shows '5 Years' and a 'Change Analysis Time Period' button. The 'Entry Information' section shows 'Enter Revenue and Expenses' set to 'Yearly' and a 'Change Entry Information' button, with a 'Starting Date' of 'January Year 1'.

Investor Folder

Turn off Tax Calculations
Discount Rate (Before Tax): 15.00%

The completed Investor folder

The screenshot shows the 'Investor' folder selected in the tabbed interface. A downward arrow points to the text 'Check "Turn Off Tax Calculations"', which is followed by a checked checkbox for 'Turn off Tax Calculations'. Below this, the 'Discount Rate or Desired Return on Investment' section shows 'Before Tax' and a text box containing '15.00%' with a right-pointing arrow.

Investment Folder

Row 1 Description: Bulb Amount: \$4,000
 Row 2 Description: Installation Amount: \$3,750

Completed Investment Folder

Project Info.	Investor	Investment	Working Capital	Expenses	Financing	Salvage Value
Investments						
Inflate						
Description			Amount	Year	Month	
Bulbs			\$ 4,000	Year 1	Jan	
Installation			\$ 3,750	Year 1	Jan	
↑ Enter descriptions			↑ Enter the "Amount"			

Working Capital Folder

Working Capital: \$1,000 Year 1 Jan

Completed Working Capital Folder

Project Info.	Investor	Investment	Working Capital	Expenses
Working Capital				
Description	Entry Choice		Year 1 Jan...	Year 2 Jan...
Working Capital	Add or Subtract (-) Working Capital		\$ 1,000	\$
↑ Enter "Working Capital"				

Expenses Folder

Bulb Replacements: \$2.88 per Light Fixture per Yr constant for five years

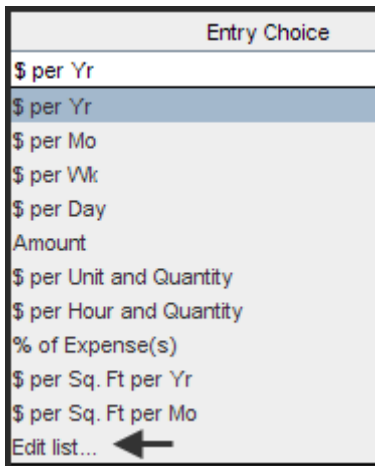
Labor: \$2.70 per Light Fixture per Yr increasing at 3.00% per year compounded

Power: \$8.10 per Light Fixture per Yr increasing at 7.00% per year compounded

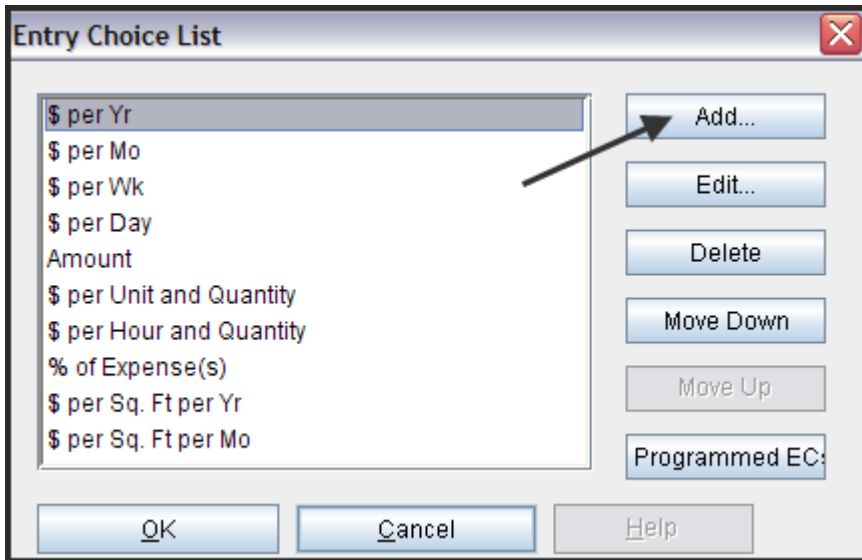
Setting up the Entry choice "\$ per Light Fixture per Yr" and move to the top of the Entry Choice List

Steps

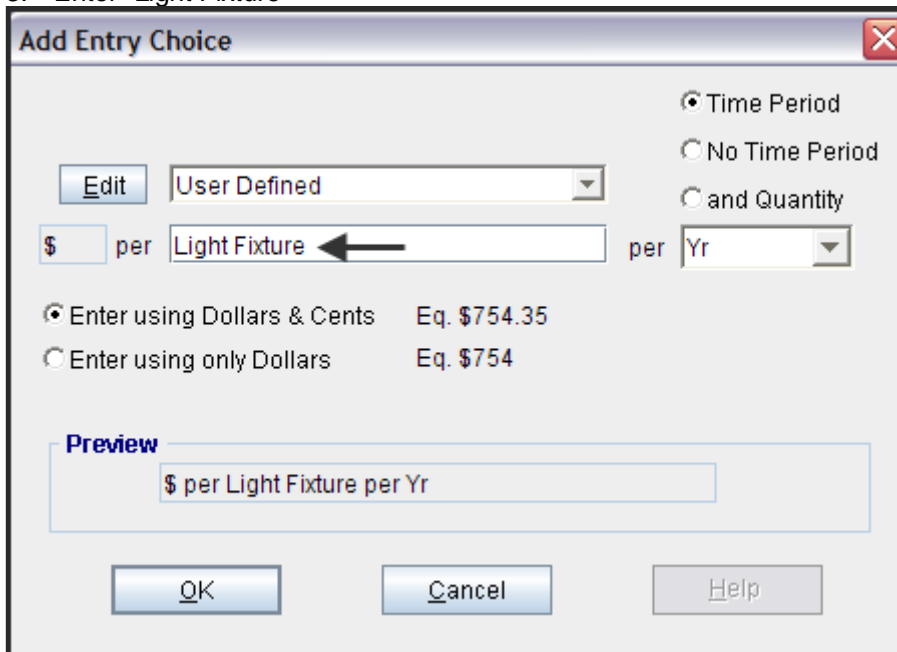
1. Display the "Entry Choice List" and select "Edit List..."



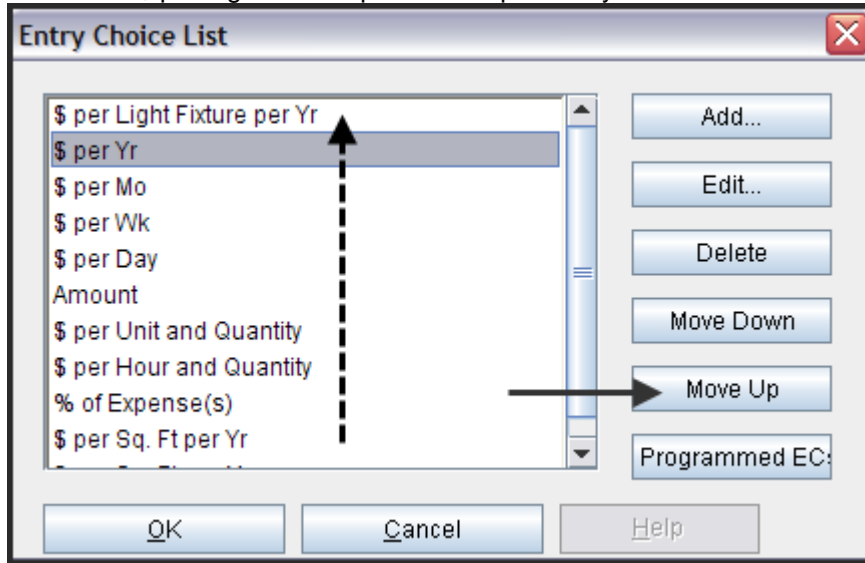
2. Click on the "Add" button



3. Enter "Light Fixture"



4. Move "\$ per Light Fixture per Yr" to top of Entry Choice list and click "OK"



5. Complete the Expenses grid as follows;

Project Info.	Investor	Investment	Working Capital	Expenses	
Expenses					
Description	Entry Choice	Qty	Category	Year 1 Jan...	Year 2 Jan...
Bulb	\$ per Light Fixture per Yr	1,000	Common	\$ 0.00	\$ 0.00
Labor	\$ per Light Fixture per Yr	1,000	Common	\$ 0.00	\$ 0.00
Power	\$ per Light Fixture per Yr	1,000	Common	\$ 0.00	\$ 0.00

1. Change Descriptions
2. Remove unused rows

3. Set Entry Choice to "\$ per Light Fixture per Yr"

4. Enter No. of Light Fixtures

Bulb Replacements: \$2.88 per Light Fixture per Yr constant for the five years

1. Select the first row 'Bulb' and click on the 'Projection Wizard' button

Project Info.		Investor	Investment	Working Capital	Expenses	
Expenses						
Description	Entry Choice	Qty	Category	Year 1 Jan...	Year 2 Jan...	
Bulb	\$ per Light Fixture per Yr	1,000	Common	\$ 0.00	\$ 0.00	
Labor	\$ per Light Fixture per Yr	1,000	Common	\$ 0.00	\$ 0.00	
Power	\$ per Light Fixture per Yr	1,000	Common	\$ 0.00	\$ 0.00	

↓

2. Complete the "Projection Wizard" as shown, then click "OK" button

Projection Wizard

Entry Information

Description: Bulb Replacments
Entry Choice: \$ per Bulb per Yr

Projection

Entry	Project Entry Using...	Increase	Starting Year	Time Period		Cont. Proj.
				To End	Yrs	
→ \$ 2.88	Constant (Fill Right)		Year 1	<input checked="" type="checkbox"/>	5	

↑ Check

Labor: \$2.70 per Light Fixture per Yr increasing at 3.00% per year compounded

1. In the Expenses Folder select the second row "Labor" and click on the "Projection Wizard" button
3. Complete the "Projection Wizard" as shown, then click "OK" button

Completed Projection Wizard

Entry	Project Entry Using...	Increase	Starting Year	Time Period		Cont. Proj.
				To End	Yrs	
→ \$ 2.70	Annual Compounding	→ 3.00%	Year 1	<input checked="" type="checkbox"/>	5	

Power: \$8.10 per Light Fixture per Yr increasing at 7.00% per year compounded

1. In the Expenses Folder select the third row "Labor" and click on the "Projection Wizard" button
2. Complete the "Projection Wizard" as shown, then click "OK" button

Entry	Project Entry Using...	Increase	Starting Year	Time Period		Cont. Proj.
				To End	Yrs	
→ \$ 8.10	Annual Compounding	→ 7.00%	Year 1	<input checked="" type="checkbox"/>	5	

Entries are complete. There are no entries in the Financing and Salvage Value folders

SAVE THE PROJECT

DECISION

To decide between the two different kinds of light bulbs use;

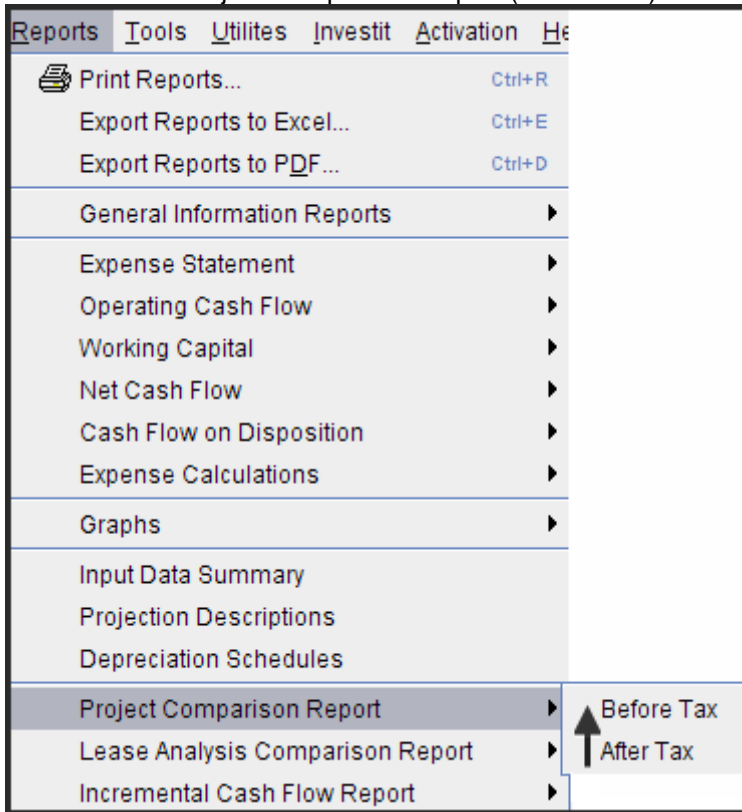
- a) The Project Comparison Report (Before Tax) and
- b) The Incremental Cash Flow Report (Before Tax)

Project Comparison Report

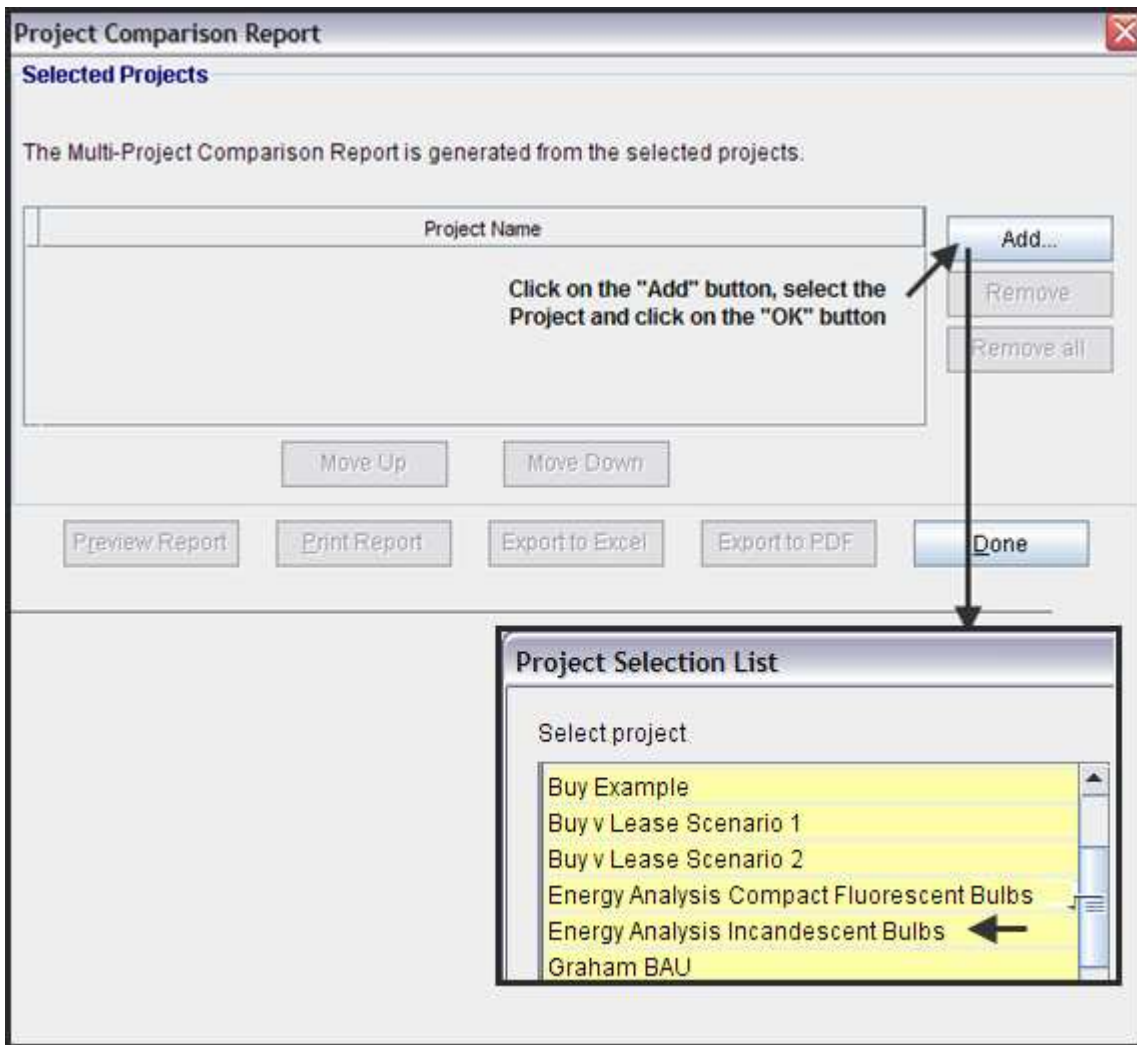
Up to four projects can be compared side by side.

Steps involved in selecting the projects for the Project Comparison Report.

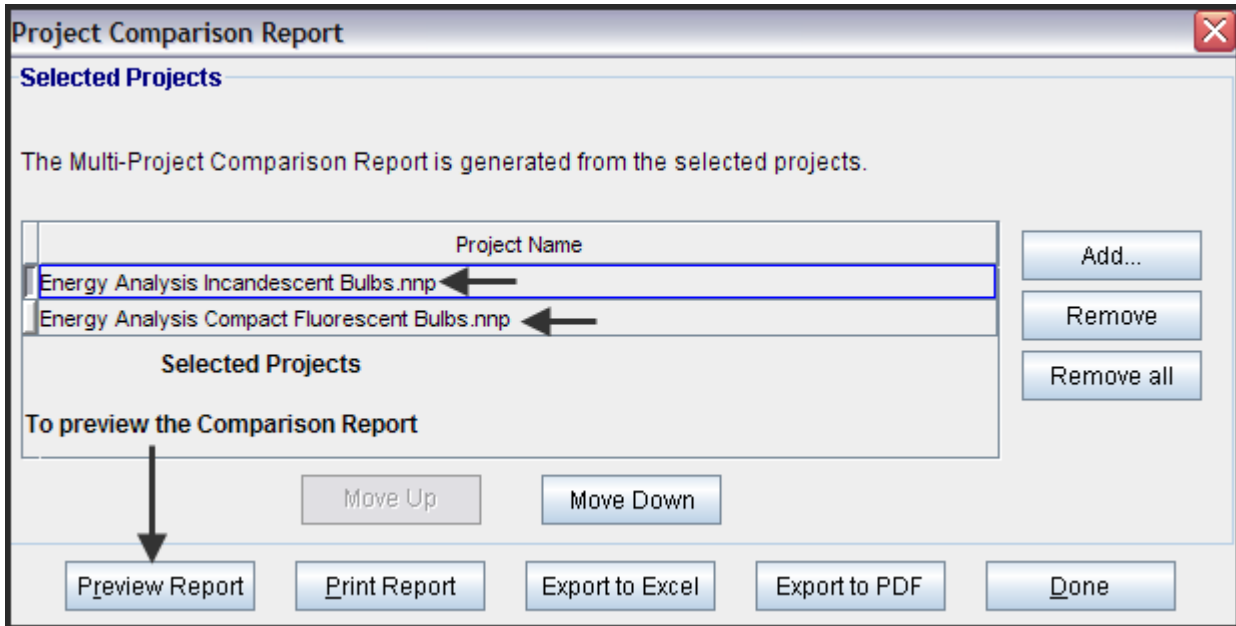
1. Select the Project Comparison Report (Before Tax) on the Reports menu



2. On the Project Comparison Report dialog click on the "Add" button to display the Report Selection List. Select the desired Project and click 'Ok'. Repeat the process to add another project as shown below.



3. The diagram below shows the selected projects to be displayed in the “Project Comparison Report”



Project Comparison Report

Project Comparison Report (Before Tax)			
Net Cash Flow(Before Tax)			
		Energy Analysis Incandescent Bulbs	Energy Analysis Compact Fluorescent Bulbs
Year	0	-	(8,750)
	1	(63,000)	(14,680)
	2	(66,150)	(14,330)
	3	(69,480)	(15,010)
	4	(73,010)	(15,750)
	5	(76,760)	(14,540)
	Total	(348,400)	(83,060)
Financial Return Before Tax			
Internal Rate of Return (IRR)		N/A	N/A
MIRR		N/A	N/A
Short term financing rate			
Short term reinvestment rate			
Net Present Value (NPV)	→	(\$ 230,393) at 15.00%	→ (\$ 58,454) at 15.00%
Annual Equivalency	→	(\$ 68,730) at 15.00%	→ (\$ 17,438) at 15.00%
Benefit to Cost Ratio		N/A	N/A
Payback Period (Years)		N/A	N/A
Discounted Pay Back Period (Years)		N/A	N/A
Note			
Unable to calculate the IRR and MIRR because all the Cash Flows are negative.			

Interpretation and decision using the “Comparison Report”

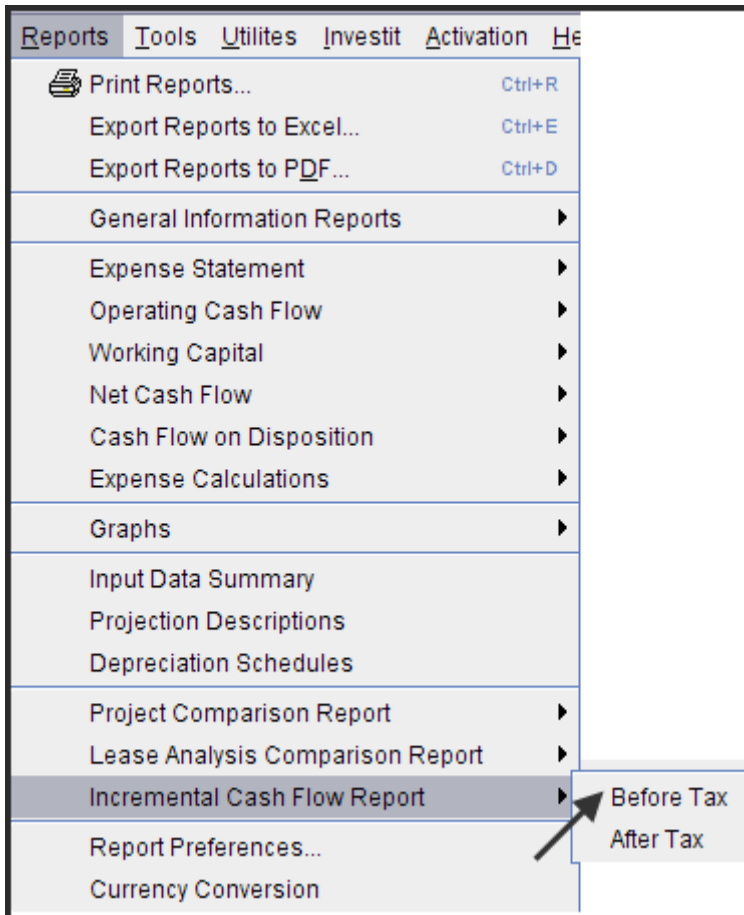
The Compact Fluorescent Light offers significant economic advantages. The Compact Fluorescent Light has the lowest Net Present Value (NVP) at 15.00% before tax which is <\$58,454> compared to <\$230,393> for Incandescent Lights which is a substantial savings.

Incremental Cash Flow Report

When carrying out “Incremental Cash Flow Analysis” the largest investment goes first for the Incremental Cash Flow Report. In this case it is the “Compact Fluorescent Light” option

Steps

1. Select the Incremental Cash Flow (Before Tax) on the Report menu

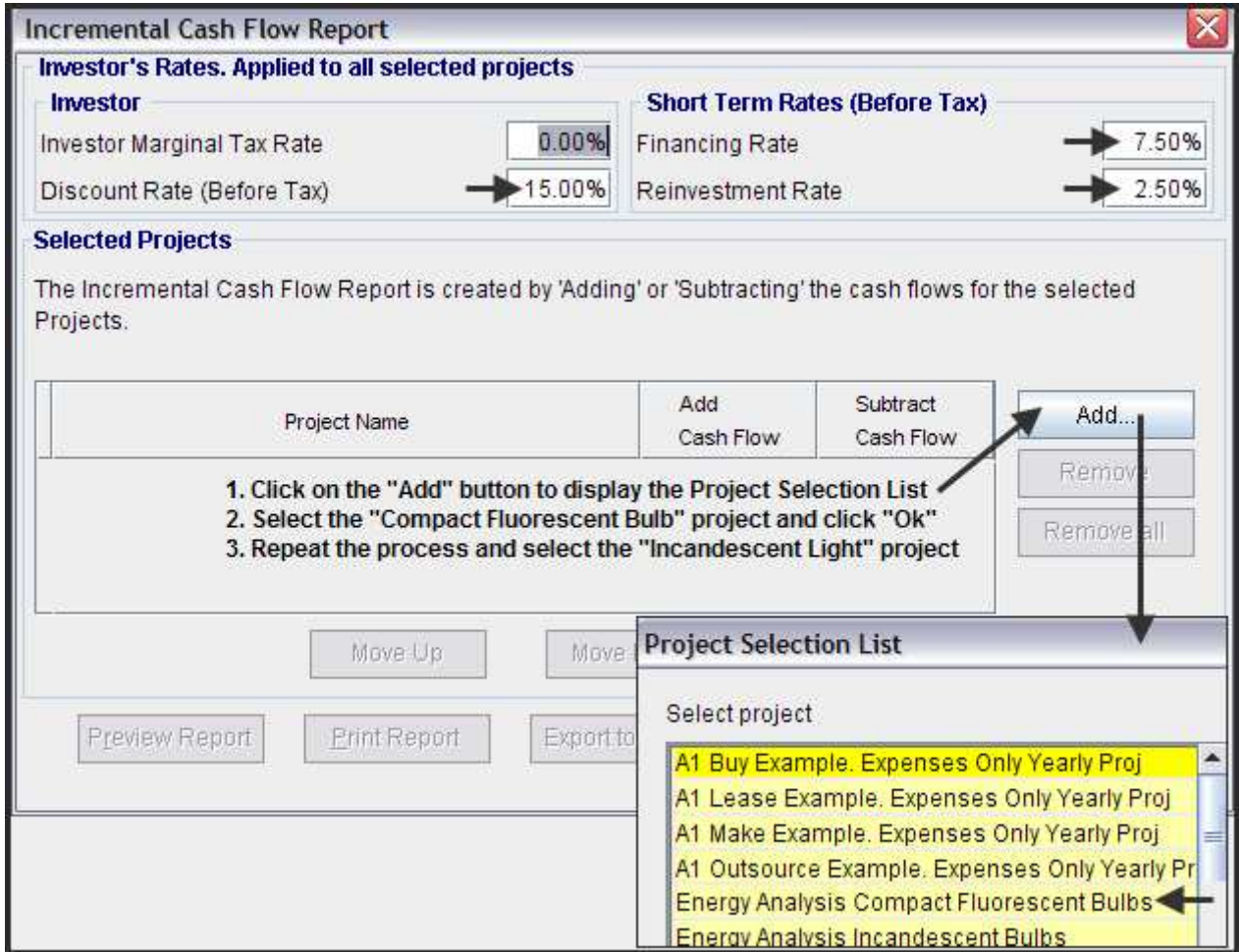


2. Enter the following;

Investor's Marginal Tax Rate: 0.00%
 Discount Rate: 15.00%
 Short Term Rates: Financing Rate 7.50%
 Reinvestment Rate 2.50%

On the "Incremental Cash Flow Report" dialog click on the "Add" button to display the Report Selection List. Select the "Compact Fluorescent Light" analysis and click 'Ok'. Repeat the process and select the "Incandescent Light".

The "Compact Fluorescent Light" analysis was selected first because it involves the larger investment.



The selected projects for the Incremental Cash Flow Report are:

Incremental Cash Flow Report ✕

Investor's Rates. Applied to all selected projects

Investor	Short Term Rates (Before Tax)
Investor Marginal Tax Rate <input style="width: 80px;" type="text" value="0.00%"/>	Financing Rate <input style="width: 80px;" type="text" value="7.50%"/>
Discount Rate (Before Tax) <input style="width: 80px;" type="text" value="15.00%"/>	Reinvestment Rate <input style="width: 80px;" type="text" value="2.50%"/>

Selected Projects

The Incremental Cash Flow Report is created by 'Adding' or 'Subtracting' the cash flows for the selected Projects.

Project Name	Add Cash Flow	Subtract Cash Flow	
Energy Analysis Compact Fluorescent Bulbs.nnp ←	→ <input checked="" type="radio"/>	<input type="radio"/>	Add...
Energy Analysis Incandescent Bulbs.nnp ←	<input type="radio"/>	→ <input checked="" type="radio"/>	Remove

The Net Cash Flow for the Incandescent Lights is subtracted from the Net Cash Flow for the Compact Fluorescent Lights

Click on the "Preview Report" button to display the "Incremental Cash Flow Report"

Incremental Cash Flow Report (Before Tax)

Incremental Cash Flow Report (Before Tax)			
Net Cash Flow(Before Tax)			
	Plus Energy Analysis Compact Fluorescent Bulbs	Minus Energy Analysis Incandescent Bulbs	Incremental Net Cash Flow (Before Tax)
Year 0	(8,750)	-	(8,750)
1	(14,880)	(63,000)	48,320
2	(14,330)	(66,150)	51,820
3	(15,010)	(69,480)	54,470
4	(15,750)	(73,010)	57,260
5	(14,540)	(76,760)	62,220
Total	(83,060)	(348,400)	265,340
Before Tax Financial Return			
Internal Rate of Return (IRR)	N/A	N/A	→ 559.08%
Net Present Value (NPV) at 15.00%	→ (\$ 58,454)	→ (\$ 230,393)	→ \$ 171,939
Modified Internal Rate of Return (MIRR)	N/A	N/A	101.03%
Short term financing rate	7.50%	7.50%	7.50%
Short term reinvestment rate	2.50%	2.50%	2.50%
Annual Equivalency at 15.00%	(\$ 17,438)	(\$ 68,730)	\$ 51,292
Benefit to Cost Ratio at 15.00%	N/A	N/A	N/A
Payback Period	N/A	N/A	0.18 years
Discounted Pay Back Period at 15.00%	N/A	N/A	0.21 years
Note			
Unable to calculate the IRR and MIRR because all the Cash Flows are negative.			

Interpretation and decision using the “Incremental Cash Flow Report”

The Internal rate of Return (IRR) of using “Compact Fluorescent Light” instead of “Incandescent Lights” is 559.08% before tax.

Using Compact Fluorescent Lights (CFL’s) offers substantial economic benefits and a very high return on Investment. The “Discounted Payback Period at 15.00%” is 0.21 years

Compact Fluorescent Light has the lowest Net Present Value (NVP) at 15.00% before tax which is <\$58,454> compared to <\$230,393> for Incandescent Lights which is a substantial savings

Both the ‘Incremental Cash Flow’ approach or choosing the option with the highest Net Present Value (NPV) will result in the same choice when dealing with mutually exclusive investments.