

Project Evaluation of New Water Treatment Facility

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Dedicated to,  
Prof.

Name of the student  
Year of the student

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## Executive Summary

ABC Pty Limited has recently launched a Special Purpose Vehicle (SPV) that is to be incorporated in Australia. The Special Purpose Vehicle is a BOT arrangement where Water Solution will develop and build, operate and transfer the facilities back to the government at the end of 20 years. The evaluation of the project help the management to decide whether it is feasible to form the Special Purpose Vehicle with the capital structure and cost of debt given.

The report gives the detail analysis of the cost and benefits from the arrangement of providing treated water. In order to evaluate the project, we use two methods the Project IRR and the Equity IRR and the relationship between the two. We even used the NPV Method at the end to compare the result.

Therefore, with all the assumptions available we can decide whether to proceed with the water project or not. The investment rules suggest that higher the project's internal rate or return the more profitable the investment will be. Further more, Project IRR is compared with equity IRR, to know the effect of debt on the profitabiliy of the project.

Based on all the above analysis, we further provide a series of conclusion and the recommendation on the basis of the conclusion so provided.

## Assumptions

All the calculations made are based on the assumptions below:

- The amount expressed in Australian Dollars
- The interest free rate (based on Government bond) is 3.5%
- ABC Pty Ltd's beta is estimated to be 1.1 (based on the ratio of the standard deviation of the firm's return to the standard deviation of the stock market return)
- Expected market return of the water industry where ABC Pty Ltd main business lies, is 18%
- WaterSolution will borrow 80% of the capital expenditure from a consortium of banks at a cost of 11%. The repayment will start immediately in Year 1 and should be repaid fully in year 20. The remaining 20% is raised through equity.

Source	Amount \$
Bank loans	60,000,000
Equity	15,000,000
Total	75,000,000

- Construction completed in year 0 and operation begin immediately in year 1
- There is no tax involved

## Introduction:

ABC Pty Limited, is considering a project of purchasing untreated water and changing it to treated water and sell the same to its clients. The initial investment is \$ 75,000,000. On the basis of the assumptions and the sales, purchase and maintenance amount given. ABC Pty limited wants to know whether the Special Purpose Vehicle so formed is economically feasible or not

Various methodologies are used time to time, to determine the feasibility of the project but the most important is the IRR and the Net Present Value Concept. Most of the times, both provide the same result. In our report, we have used the IRR concept.

The report focuses more on the IRR without the influence of the capital structure of the firm and one Equity IRR which shows the effect of leveraging on the project's financing decision. The relationship between the Project IRR and Equity IRR . Furthermore, we have calculated the debt service coverage ratio to see whether the cash flows are enough to service the debt raised.

## Methodology:

### 1. Project IRR:

To have a good decision to follow, and to separate the project decision from the financing decision, we use Project IRR independent of the financing mix. Therefore, an IRR is calculated without considering cash flows related to financing. In the below computation, interest and debt service payments are kept out.

To calculate the project IRR, we need to have the expected cash flows for the project period. As from the input available, we have the following details available to find the project IRR.

Project Life	20 Years
<b>Initial Investment</b>	<b>\$75,000,000</b>
Sales:	
A	\$4,891,000
B	\$5,475,000
C	\$5,475,000
<b>Total Sales</b>	<b>\$15,841,000</b>
Purchases	\$2,737,500
Annual Cost	\$1,000,000

Where, Purchases =  $(400,000 + 500,000 + 600,000) * 0.005 * 365 = \$ 2,737,500$

Sales = A =  $(400,000 * 0.035 * 365) = \$ 4,891,000$

B =  $(500,000 * 0.03 * 365) = \$ 5,475,000$

C =  $(600,000 * 0.025 * 365) = \$ 5,475,000$

Annual Cost =  $\$ 300,000 + \$ 550,000 + \$ 100,000 + \$ 50,000 = \$1,000,000$

On the basis of the above information, Let us find the yearly cash flows, The yearly cash flows will be:

Year	Particulars	0	1 - 20
	Initial Investment	(\$75,000,000.00)	
	Sales		\$15,841,000.00
Less	Purchases		\$2,737,500.00
Less	Annual Cost		\$1,000,000.00
	<b>Annual Cash Flow</b>		<b>\$12,103,500.00</b>
	<b>Project IRR</b>		<b>15.18%</b>

Note: The Project IRR is calculated on the basis of the excel sheet attached with this report.



2. Introducing Debt Structure:

As we calculated the Projected IRR, now we will introduce the debt structure in our project. As given, we assume that the total debt taken for the project is \$ 60,000,000 at the rate of interest of 11% for 20 years. The amount that is paid every year is in equal amount. Hence let us prepare the amortization table on the basis of the given information.

Particulars	Amount
Loan amount	\$60,000,000
Annual interest rate	11.00 %
Loan period in years	20
Number of payments per year	1

Amortization Table:

Year	Installment amount	Interest amount	Principal Amount	Balance
1	\$7,534,538.21	\$6,600,000	\$934,538.21	\$59,065,461.79
2	\$7,534,538.21	\$6,497,200.80	\$1,037,337.42	\$58,028,124.37
3	\$7,534,538.21	\$6,383,093.68	\$1,151,444.53	\$56,876,679.84
4	\$7,534,538.21	\$6,256,434.78	\$1,278,103.43	\$55,598,576.41
5	\$7,534,538.21	\$6,115,843.41	\$1,418,694.81	\$54,179,881.60
6	\$7,534,538.21	\$5,959,786.98	\$1,574,751.24	\$52,605,130.37
7	\$7,534,538.21	\$5,786,564.34	\$1,747,973.87	\$50,857,156.49
8	\$7,534,538.21	\$5,594,287.21	\$1,940,251.00	\$48,916,905.49
9	\$7,534,538.21	\$5,380,859.60	\$2,153,678.61	\$46,763,226.89
10	\$7,534,538.21	\$5,143,954.96	\$2,390,583.26	\$44,372,643.63
11	\$7,534,538.21	\$4,880,990.80	\$2,653,547.41	\$41,719,096.22
12	\$7,534,538.21	\$4,589,100.58	\$2,945,437.63	\$38,773,658.59
13	\$7,534,538.21	\$4,265,102.44	\$3,269,435.77	\$35,504,222.82
14	\$7,534,538.21	\$3,905,464.51	\$3,629,073.70	\$31,875,149.12
15	\$7,534,538.21	\$3,506,266.40	\$4,028,271.81	\$27,846,877.31
16	\$7,534,538.21	\$3,063,156.50	\$4,471,381.71	\$23,375,495.60
17	\$7,534,538.21	\$2,571,304.52	\$4,963,233.70	\$18,412,261.90
18	\$7,534,538.21	\$2,025,348.81	\$5,509,189.40	\$12,903,072.50
19	\$7,534,538.21	\$1,419,337.98	\$6,115,200.24	\$6,787,872.26
20	\$7,534,538.21	\$746,665.95	\$6,787,872.26	\$0.00



### 3. Equity IRR:

Equity IRR, is calculated after including the debt service in our calculation of Project IRR. As the cash flows after debt payments belongs to equity shareholders, we will rework the IRR to find the return on equity invested in the project i.e Equity IRR.

Let us calculate the Equity IRR by including the debt calculation in our report.

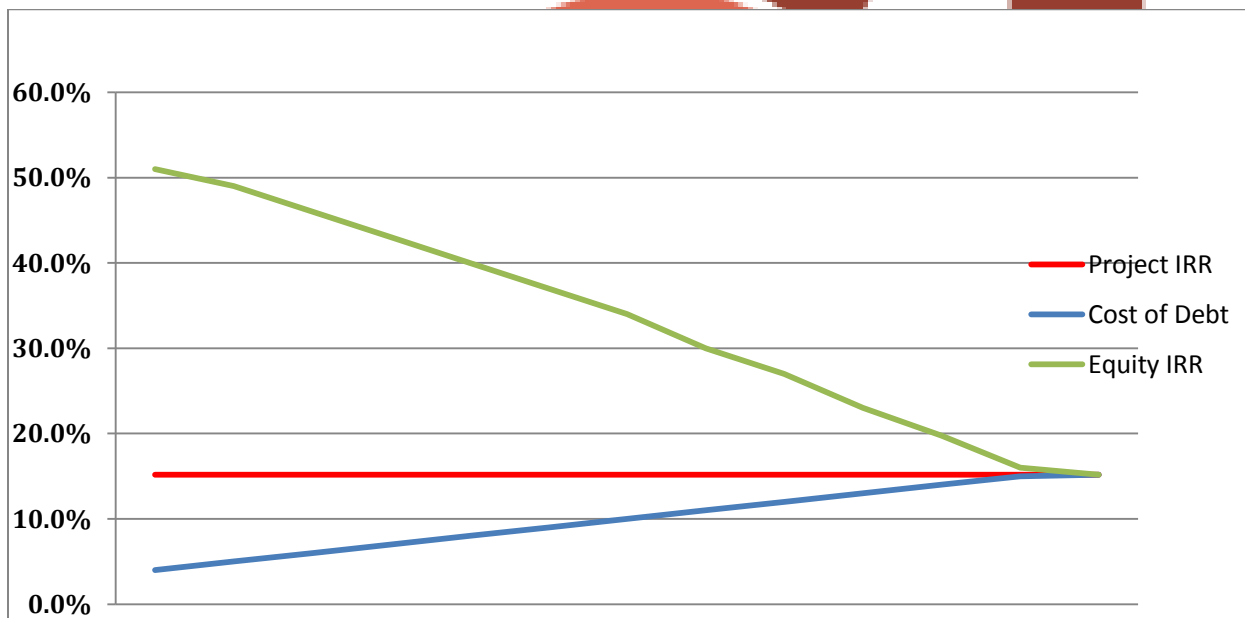
Year		0	1 - 20
	Initial Investment	(\$15,000,000.00)	
	Sales		\$15,841,000.00
Less	Purchases		\$2,737,500.00
Less	Annual Cost		\$1,000,000.00
	Profit before Interest Amount		\$12,103,500.00
Less	Inst. Amount		\$7,534,538.21
	<b>Annual Cash Flow</b>		<b>\$ 4,568,961.79</b>
	<b>Equity IRR</b>		<b>30.31%</b>

Note: The Equity IRR is calculated on the basis of the excel sheet attached with this report.



#### 4. Project IRR V/s Equity IRR:

Sn	Project IRR	Cost of Debt	Equity IRR
1	15.2%	4.0%	51.0%
2	15.2%	5.0%	49.0%
3	15.2%	6.0%	46.0%
4	15.2%	7.0%	43.0%
5	15.2%	8.0%	40.0%
6	15.2%	9.0%	37.0%
7	15.2%	10.0%	34.0%
8	15.2%	11.0%	30.0%
9	15.2%	12.0%	27.0%
10	15.2%	13.0%	23.0%
11	15.2%	14.0%	19.7%
12	15.2%	15.0%	16.0%
13	15.2%	15.2%	15.2%



5. Debt Service Coverage Ratio:

Debt Service Ratio is the ratio of cash available for debt servicing to interest and principal payments. The formula to calculate the debt service coverage ratio is:

Debt Service Coverage Ratio =  $\frac{\text{Net Operating Income}}{\text{Total Debt Service}}$

$$= \frac{\$ 12,103,500}{\$ 7,534,538.21}$$

$$= 1.61 \text{ times}$$

The Debt Service Coverage ratio is more than 1, hence it indicates that the company will be at a comfortable position to repay its debt with the profit earned. Hence, the company can go ahead with the current level of debt.

6. Expected Rate of Return as per CAPM:-

The Capital Asset Pricing Method (CAPM) is a model that calculates the expected return based on the expected rate of return on the market, the risk free rate and the beta coefficient of the stock.

The formula to calculate CAPM is  $E(R) = R_f + B(R_m - R_f)$

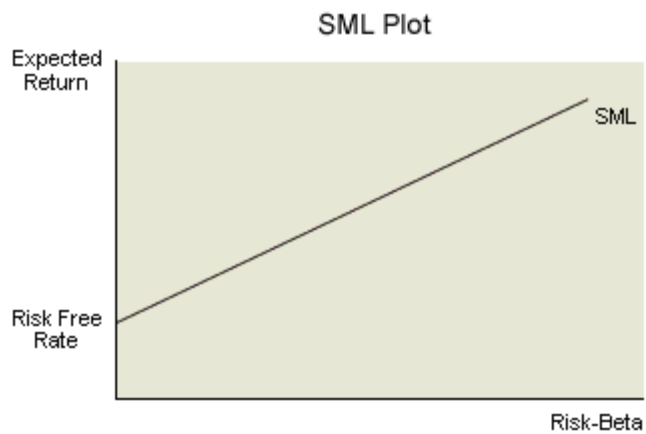
Risk Free Rate of Interest ( $R_f$ ) = 3.50%

Beta Coefficient of the stock = 1.10

Return on the market ( $R_m$ ) = 18.00%

Expected return on the stock  $E(R) = 3.50 + 1.1(18 - 3.5)$   
= 19.45%

On the basis of the CAPM Model, we can derive the SML Line with the beta coefficient.



7. Weighted Average Cost of Capital (WACC):-

The weighted average cost of capital is the rate at which the company is the average cost the company has for all the securities or the financing used. Here, the weighted average cost of capital is :

Cost of Debt: 11% (As per the assumption given)

Cost of Equity: 19.45% (As per the CAPM Model)

$$\frac{\text{Weight of Debt} = 60,000,000}{75,000,000} = 0.8 \text{ or } 80\%$$

$$\frac{\text{Weight of Equity} = 15,000,000}{75,000,000} = 0.2 \text{ or } 20\%$$

$$\begin{aligned} \text{Now, Weighted Average Cost of Capital (WACC)} &= 0.8 * 11\% + 0.2 * 19.45\% \\ &= 12.69\% \end{aligned}$$

## Conclusion:

An investment is accepted, if the IRR is more than the Required Rate of Return and rejected if the IRR is less than the Required rate of return.

- Decision on the basis of Project IRR:-

Now in the above question, the Project IRR is 15.18% and The Weighted Average Cost of Capital is 12.69%

Accept the Project = The Project IRR > The Weighted Average Cost of Capital  
= 15.18% > 12.69%

**Hence, On the basis of the Project IRR, we will accept the project.**

- The decision on the basis of the Equity IRR:-

The Equity IRR is 30.31% and the Expected Return as per CAPM is 19.45%

Accept the project = The Equity IRR > The Expected Return as per CAPM  
= 30.31% > 19.45%

**Hence, on the basis of the above figures, we will accept the project.**

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