

DSS5202 Sustainable Systems Analysis

Assignment #2

Due: 16 September 2024

Instructions

You must show your workings before using computing tools to compute the final answers.

Submit your answers to this assignment as **one PDF file** via Canvas.

Problem Description

An energy company is considering acquiring a local Waste-to-Energy plant that produces electricity for the energy market by burning waste collected from the community. The company will fund the investment with a 5-year bank loan and will pay it back with 5 equal end-of-year payments of \$4 million each starting from the end of the first year. Annual profits from the sales of electricity generated by the plant to the power grid are estimated to be \$2 million in years 1 to 10, and \$3 million in years 11 to 20. All cash flows are assumed to occur at the end of each year. The plant has a useful life of 20 years with a salvage value of \$500,000. The company's *MARR* is 10%.

1. Draw a cash flow diagram for the project indicating all the cash flows at the end of each year. (10 marks)
2. What is the *Net Present Value (NPV)* of the project? Show the formula that is computed. A direct answer from Excel or Python financial function is not acceptable. Is the project financially feasible? (10 marks)
3. What is the *Internal Rate of Return (IRR)* of the project? Show the equation to be solved before using a solver. A direct answer from Excel or Python financial function is not acceptable. Is the project financially feasible? (10 marks)
4. Do you expect investment decisions in Question 2 and Question 3 above to be always the same regardless of the *MARR*? Explain your answer. (10 marks)
5. What is the *Modified Internal Rate of Return (MIRR)* of the project if the financing rate is 8% and the reinvestment rate is 10%? Show your workings. A direct answer from Excel or Python financial function is not acceptable. Is the project financially feasible? (10 marks)

*** End of Assignment ***