Spreadsheets and Net Present Value

Physics and Mathematics of Sustainable Energy

College of the Atlantic. October 26–7, 2021

Instructions

- Work with one or two other people. Please do not work in groups larger than three.
- There is nothing to hand in associated with this lab. However, the spreadsheet model we start to build today will be used in next week's lab, for which there will be a small report due. Also, we'll use what we do today in class tomorrow (Wednesday).

In these exercises you'll build two spreadsheets. I'll show you how step by step. Please use google sheets, since this way if you're stuck you can share the sheet with me and I can jump in and see what's going on. Go to your google drive and click New and then Google Sheets.

Exercise One: Build a spreadsheet that analyzes the following situation, which should be familiar from Tuesday's class: You are considering an investment that will pay you $2000 for the next three years.

- Build a spreadsheet that calculates the net present value of this investment
- Make it so that you can adjust the discount rate.
- Currencies should have a $ in front of them and be rounded to the nearest tens of dollars.
- Also add a column that tallies up the total revenue.

Exercise Two: You wish to buy 20 solar panels, each of which has a nameplate capacity of 250 Watts. The electricity is worth $0.17 per kWh. Assume the panels last ten years.

1. How much energy will the panels generate each year?
2. How much is this energy worth? This is your yearly revenue.
3. Build a spreadsheet to analyze this situation. Your spreadsheet should:
    - Make it so that you can adjust capacity factor, cost per kWh, and discount rate.
    - Calculate the NPV
    - Include a column that tallies total revenue over time