WIND STUDY

Wind Study is intended for grades 5-8 and 8-11
Questions posted on: Monday Answers posted on: Friday
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2021Q8 (SAVINGS, NPV)

When One Energy performs an evaluation for a potential project, the financial feasibility is also determined. The estimated turbine production and the customer's current utility rate are used to determine the savings the customer experiences over the project's lifetime. Additionally, the Net Present Value (NPV) is calculated. NPV is used to determine the current value of the future cash flows. This is necessary because of inflation - a dollar today is worth more than a dollar tomorrow. NPV can be used to compare multiple different potential projects. If a plant was considering both a wind project and a solar project, for example, they could compare the NPV of both projects.

Level 1: A potential wind project is estimated to produce 8,790,000 kWh each year. The difference between the customer's grid rate and the price offered by One Energy is \$0.0165/kWh. What are the estimated total savings over 20 years? Assume that the grid rate does not change and that the difference in prices is constant.

Level 2: Based on the annual savings determined in the Level 1 question, what is the NPV of the first five years of savings? The formula for NPV is shown below:

$$NPV = \frac{Z_1}{(1+r)^1} + \frac{Z_2}{(1+r)^2} + \cdots + \frac{Z_i}{(1+r)^i} - X_0$$

Where i is a given year, Z_i is the savings for that year, r is the discount rate, and X_0 is the initial investment. Each year up to and including year i needs to be included in the formula. For One Energy's PPA projects, the customer only pays for the power delivered and has no initial investment. Assume a discount rate of 7%.

An operating turbine.