

THE CHALLENGE

You and your fellow interns are tasked by the local Montgomery County government to recommend whether the new REWORLD RRF should be built.

Your team must analyze the quantitative data (costs, revenues, emissions, energy output) and the qualitative dimensions (community health, environmental justice, stakeholder concerns, alternatives). Your team will prepare a joint 7-minute presentation for key stakeholders, including: residents within a 10-mile radius, energy-justice representatives, policy makers (especially looking to service a proposed AI data-center in the region), and local businesses focused on efficient energy and GHG³ reductions.

Imagine the proposed facility is expected to process 300,000 short tons of MSW per year.

With that in mind:

- ✔ Calculate annual revenue from tipping fees: $300,000 \text{ tons} \times \text{US}\$56/\text{ton} = \$16.8 \text{ million}$.
- ✔ Calculate annual electricity generation: $300,000 \text{ tons} \times 565 \text{ kWh/ton} = 169.5 \text{ million kWh} = 169,500 \text{ MWh}$.
- ✔ At US\$35 per MWh, electricity revenue = $169,500 \text{ MWh} \times \$35 = \$5.9325 \text{ million}$.
- ✔ Total annual gross revenue $\approx \$22.7325 \text{ million}$.
- ✔ Annual operational cost at \$27 per ton: $300,000 \times \$27 = \8.1 million .
- ✔ Suppose ash disposal cost: If 300,000 tons of MSW convert to ash at 25% weight (75% reduction), ash = 75,000 tons. Disposal cost = $75,000 \times \$42 = \3.15 million .
- ✔ Net annual revenue $\approx \$22.7325 \text{ m} - (\$8.1 \text{ m} + \$3.15 \text{ m}) = \11.4825 million .
- ✔ Breakeven time = $\text{US}\$186 \text{ million} / \text{US}\$11.4825 \text{ million} \approx 16.2 \text{ years}$.
- ✔ Qualitative considerations: How does this compare to alternative waste-treatment solutions (e.g., increased diversion/recycling)? What are community health and environmental justice risks? Could the facility offset fossil-fuel-based electricity generation, thereby reducing GHGs?
- ✔ Reminder: If the facility diverts waste from landfill, it may avoid methane emissions (which have $\sim 81\times$ greater 20-year global warming potential than CO₂) — meaning there is a climate benefit worth quantifying.