

Feasibility of a recycling BBC in Calvinia

A recycling **Buy-Back Centre (BBC)** is a depot where individual waste collectors can sell their recyclable waste.



PROBLEMS



Plastic bags at the landfill are blown into the surrounding nature.



77% of the household sample is unemployed and looking for a job.



QUESTION

Will a recycling BBC be **financially sustainable** in Calvinia?



Alternatives

Other options that could be investigated to divert waste from the landfill and to create employment opportunities:

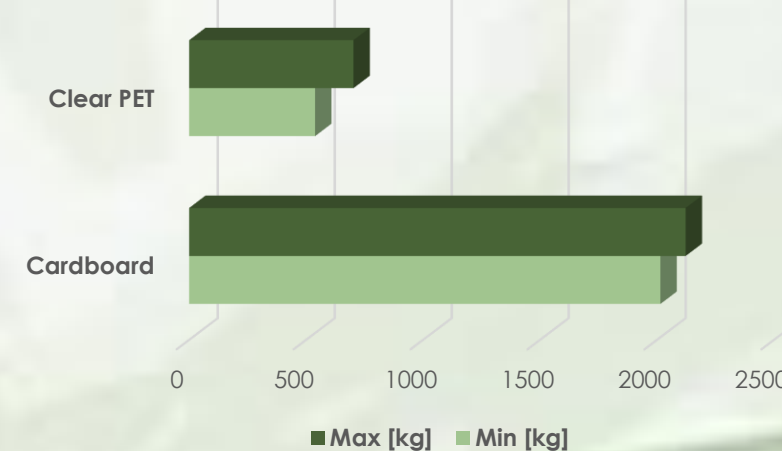
- Converting waste to energy.
- Using recyclables in building materials.
- Composting food waste.

The alternatives aim to avoid any major transport costs.



WASTE FROM BUSINESSES

The minimum and maximum monthly recyclable waste for local businesses in Calvinia were acquired firsthand. **Random** values between the minimum and maximum limits were used in the financial model.



RESULTS

Scenario 1 concludes that the collector will have a 50% chance of making R4 000 per month. Scenario 1 includes a benefactor that provides some of the needed resources freely. Scenarios 2 and 3 considers **BBCs** on different scales and both have a **100% chance of making a loss**. Scenarios 2 and 3 only included the bare minimum costs. A 4th scenario, as a hybrid between scenarios 1 and 2, was also considered and rejected. The transport cost to recyclers in Cape Town is just too steep.

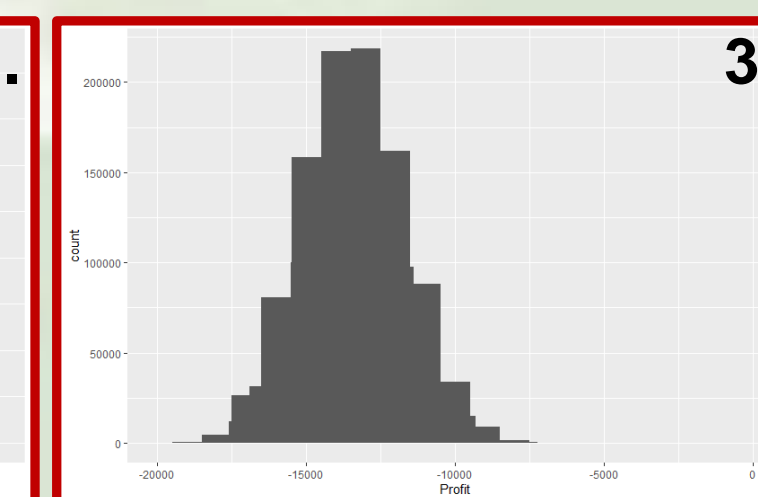
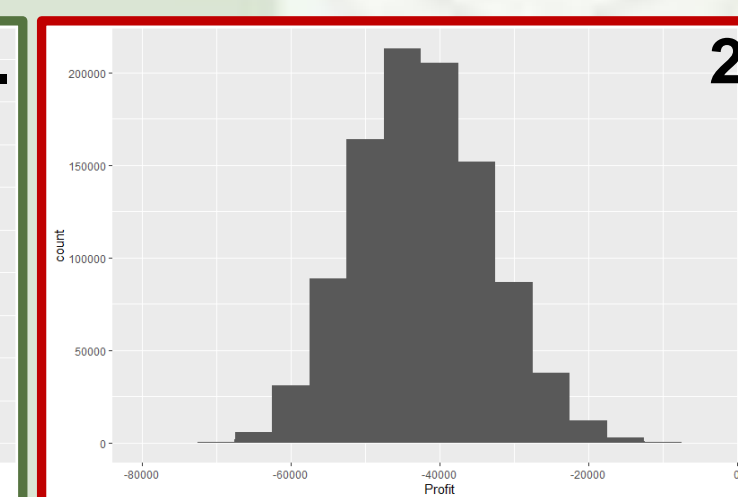
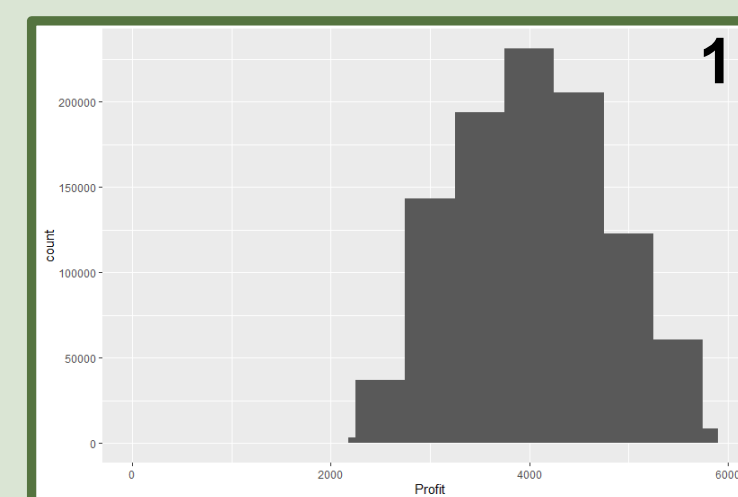


423 km
4 hr 14 min



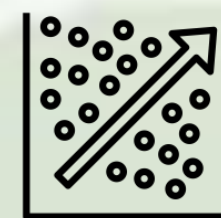
FINANCIAL SIMULATION

A **Monte Carlo** financial simulation was used to simulate the probable circumstances for the potential BBC. Uncertainties such as volatile selling prices, fluctuating amounts of waste received, competition for scrap metal, participation of households in the initiative, etc. were incorporated into the model. The model was run 10 000 times for each synthetic population. This means that **1 million** cost calculations were made for each scenario. Three scenarios were investigated. **Scenario 1** is the status quo in Calvinia which is an individual collecting recyclables and not a BBC. **Scenario 2** is a BBC that receives materials from Calvinia. **Scenario 3** is a BBC that receives materials from the entire Hantam municipality.



HOUSEHOLD WASTE PREDICTION

Data including the weight of 50 households' waste was used to predict the population's waste. Each household's size, income, highest education, and employment status was used in the predictions. First, a **Multiple Linear Regression (MLR)** prediction model was used. The accuracy of predictions was poor, especially on the population's data. Secondly, a more intuitive **Bayesian Network (BN)** prediction model was used. The results, based on probabilities, were then used in the financial model.



Cape Town

