Results of Simulation in Tabular Form:

**p = 0.01, q = 0.01, pumps = 2, tills = 2, trucks = false**

|  |  |
| --- | --- |
| Money lost | £29.80 |
| Profit made | £863.00 |
| Number of happy trucks | 0 |
| Number of sad trucks | 0 |
| Number of vehicles generated | 53 |
| Number of Cars generated | 13 |
| Number of Motorbikes generated | 20 |
| Number of Sedans generated | 20 |
| Number of Trucks generated | 0 |

**p = 0.01, q = 0.01, pumps = 2, tills = 2, trucks = true**

|  |  |
| --- | --- |
| Money lost | £800.20 |
| Profit made | £2,078.20 |
| Number of happy trucks | 22 |
| Number of sad trucks | 1 |
| Number of vehicles generated | 84 |
| Number of Cars generated | 26 |
| Number of Motorbikes generated | 12 |
| Number of Sedans generated | 11 |
| Number of Trucks generated | 25 |

**p = 0.04, q = 0.02, pumps = 1, tills = 4 trucks = true**

|  |  |
| --- | --- |
| Money lost | £2,315.40 |
| Profit made | £1,390.20 |
| Number of happy trucks | 6 |
| Number of sad trucks | 2 |
| Number of vehicles generated | 149 |
| Number of Cars generated | 55 |
| Number of Motorbikes generated | 39 |
| Number of Sedans generated | 22 |
| Number of Trucks generated | 33 |

**p = 0.03, q = 0.04, pumps = 4, tills = 1 trucks = true**

|  |  |
| --- | --- |
| Money lost | £208.80 |
| Profit made | £4,788.40 |
| Number of happy trucks | 25 |
| Number of sad trucks | 4 |
| Number of vehicles generated | 199 |
| Number of Cars generated | 48 |
| Number of Motorbikes generated | 41 |
| Number of Sedans generated | 78 |
| Number of Trucks generated | 32 |

What row money lost implies is how much money could have been made if it wasn’t for vehicles not being able to queue up for a pump as all pumps it was full. From this we can optimise the number of pumps and tills to minimise loss.

The profit made row implies the amount of money that contributes to financial gains after factoring cost of fuel. Using this value in conjunction with money lost we can maximise profits by altering the number of pumps and tills to serve more customers and to possibly adjust fuel prices for added income.

The number of happy trucks implies the number of drivers that entered the station to fill up were happy with the service as they could refill their fuel within a given time (8 minutes) whereas unhappy drivers had to spend longer than that to refill their fuel.

The number vehicles generated shows us the number of vehicles that were created and sent to the station, whether they entered the station or left before queuing. The next three rows show the number of vehicles generated for each specific vehicle which implies the type of drivers the station attracts. From this data, the owner can adjust the items in the shops for example, trucks, when enabled, frequently fill up their tanks a majority of the time compared to other vehicles and as they always buy things from the shop, so the owner should have items that appeal to truck drivers more so that they spend more money. Also, could find ways to better the service for those truck drivers as they tell other truck drivers about the service which will attract more customers.

However, we can see from the results, especially in the first two tables, that trucks aren’t beneficial for the business as overall loss was higher when they were involved, shrinking the profit margin. This could be because of their large tank size which takes very long to fill and the unit of space they take up in the pump meaning other vehicles can’t fit in the queues which forces them to leave. This is where money is lost and the correct configuration of pumps and tills to prevent this is:

**Optimal layout:** 4 pumps, 2 tills and no trucks = maximum profit.

(given that p and q are both 0.04)