

## MPOWER

### Results:

<u>Power Station</u>	<u>Hours Per Week</u>
Coal	150
Gas	136.5
Hydro	7
Nuclear	0
<u>Total Weekly Cost</u>	£4264

MPower is a gas company looking to minimise costs. They are subject to satisfying demand and falling below regulated emission levels. Minimizing cost also requires analysis of energy outputs for each power station, along with the specific emissions that follow. The optimized results are demonstrated in the following tables.

### Recommendations:

One recommendation to decrease cost is to eliminate or subsidize the nuclear plant. The nuclear plant is not used in the optimal solution. However, there are likely costs associated with owning and maintaining this plant. Another recommendation would be to increase the hours the hydro plant station can run per week. The time constraint is limiting the ability to minimize costs for the Hydro station. For every hour increased per week that the Hydro station can run, total cost will decrease by £8. Another area of improvement could be with the emission constraints of Sulphur. The emission limit for Sulphur is reached, while CO<sub>2</sub>'s is unreached. The value of increasing the emission constraints on CO<sub>2</sub> for one unit/week would decrease cost by £3.3. Lastly, MPower should even consider decreasing the demand constraint. This also depends on what the market value is for each unit sold of gas is. Decreasing the demand for each unit of gas will decrease total costs by £1.8.

### Changes in Generation Policy:

By decreasing the emission limits, the total cost is increased. This is because we are restricting what we can emit. This increases until no gases are allowed to be emitted and thus, the model cannot run. If a policy is enacted which limits what MPower is allowed to emit, this will cause the total cost to increase. The x-axis shows stepwise decreases (1 to 0 in 0.1 increments) of emission limits.



