# Design Project 2

Pittsdelphia transports 165,000 tons of freight in and out of the city each day. The area uses Tier 2 emissions producing locomotives, which need to be upgraded to meet EPA Tier 3 requirements. The emissions currently being released by the trains are producing smog, and it has become a key complaint by the city residents. The necessary upgrades must be made with several criteria in mind: cost, emissions, freight capacity, public opinion, and on time delivery. Taking these under consideration, we weighted each factor and developed several possible solutions. By using the ideal value method and the rating method, we were able to determine that the best option would be to sell the current Tier 2 locomotives and buy new Tier 4 trains. We expect this solution to drastically reduce harmful emissions, meet the new EPA Tier 3 requirements, maintain freight capacity, and have the best long run cost efficiency.

| Rating Method | | | |
|---|---|---|---|
| | Cost | Emmsions | Total |
| Weight | 0.4 | 0.6 | |
| Option | | | |
| Upgrade to Tier 3 | 7.8 | 5 | 6.1 |
| New Tier 4 | 3.5 | 9.6 | 7.2 |
| New Tier 3 | 5.3 | 5 | 5.1 |
| Max | 7.8 | 9.6 | |

| Ideal Value Method | | | |
|---|---|---|---|
| | 1.12 | 0.039 | |
| Option | Cost (min) | Emissions (min) | Total |
| Upgrade to Tier 3 | 1 | 0.08 | 1.08 |
| New Tier 4 | 0.34 | 1 | 1.34 |
| New Tier 3 | 0.47 | 0.08 | 0.55 |