# Design Project #2: GE Transportation

The second design project covers the most efficient way to move cargo from Philadelphia to Pittsburgh

## Design Process:

- Identifying the problem: GE needs a new method of transporting cargo from Philadelphia to Pittsburgh
- Defining the problem: The method needs to be low cost, have low emissions, large capacity, and fast delivery
- Possible Solutions: Tier 4/Tier 3 Locomotive, by airplane, by truck, by same train but alternative fuels, or by maglev
- Evaluating the solutions: We used three different methods to rank the possible solution from best to worst
- Choosing the best solution: After the calculations, we determined that the most efficient method of transportation was implementing a Tier 4 Locomotive

| Option | Cost | Emissions | Capacity | On time delivery |
|---|---|---|---|---|
| 1. New Locomotive (Tier 4) | 5 | 7 | 6 | 6 |
| 2. New Locomotive (Tier 3) | 6 | 5 | 6 | 6 |
| 3. Alternate Fuels | 3 | 6 | 6 | 4 |
| 4. Transport by airplane | 2 | 4 | 8 | 8 |
| 5. Transport by truck | 10 | 2 | 3 | 1 |
| 6. Maglev | 1 | 10 | 6 | 8 |
| Maximum ranking | **10** | **10** | **8** | **8** |

Ranking Method

| Option | Cost (min) | Emissions (min) | Capacity (max) (kg) | On-time delivery (max) (%) |
|---|---|---|---|---|
| New Locomotive (Tier 4) | 0.42 | 0.0033 | 0.86 | 0.89 |
| New Locomotive (Tier 3) | 0.64 | 0.001 | 0.86 | 0.89 |
| Alternate Fuels | 0.04 | 0.00083 | 0.86 | 0.72 |
| Transport by airplane | 0.008 | 0.0005 | 1 | 1 |
| Transport by truck | 1 | 0.0005 | 0.14 | 0.56 |
| Transport by maglev | 0.0008 | 1 | 0.57 | 1 |

Scaling and Ideal Value Method