Design Project Two

In design project two our goal was to find the most cost effective way to update a locomotive system to make it meet EPA's requirements, and help reduce smog.

We came up with 3 possible solutions which were to:

1. Sell the current tier 2 trains and buy tier 4 trains
2. Update the current tier 2 trains to tier 3 with an after treatment system
3. Use alternate fueling systems

We then calculated the cost and emissions of these options and put them into a table

Option	Emission (min)	Cost (min)
1. Buy new locomotives	1.3 NO	$3,000,000
2. Upgrade locomotives	5.5 NO	$850,000
3. Utilize alternative fuels	1.3 NO	$1,001,000,000

We then converted the table into a min max tale to get values that were on the same scale

Option	Emission (min)	Cost (min)
1. Buy new locomotives	1	.283
2. Upgrade locomotives	.236	1
3. Utilize alternative fuels	1	0.000849

And finally we attributed a weight to Cost and Emissions that were reprehensive of which one was more important, and decided that buying new tier 4 locomotives was the most cost effective option that cut the emissions the most:

Emission: 3 Cost: 2

Option 1: $\frac{3}{5} * 1 + \frac{2}{5} * 0.283 = 0.7132$
Option 2: $\frac{3}{5} * 0.236 + \frac{2}{5} * 1 = 0.5416$
Option 3: $\frac{3}{5} * 1 + \frac{2}{5} * 0.000849 = 0.6$