Lean Six Sigma
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The current situation

Carbon Footprint

carbon footprint refers to the number of greenhouse gases emitted into the atmosphere.
Homeowners can control the amount of electricity they use, but they can't control the emissions that are associated with the generation of that electricity, because the electric company controls that.

Define

Voice of Customer
- The customer was a homeowner who was concerned about the environment.
- The customer wanted to lower the carbon footprint by at least 5% without adding any additional costs.

Baseline Data and Performance to Customer Expectations
- The baseline data was collected and analyzed to determine areas of improvement. These improvements were grouped by category and tested in phases.
- A running chart was used to document the results at various improvement phases.
- Data-driven testing continued until a 5% carbon footprint reduction was reached.
- Only the items with zero cost were considered per the VOC.

Measure

Transportation: 18.4 tons
Housing: 7.8 tons
Shopping: 20.8 tons
TOTAL: 47 tons

Carbon footprint measurements were based on the following data:
- Location of home
- Square footage of home
- Number of persons living in the home
- Annual household income
- Annual food, home goods and services spending
- Vehicle(s) gas mileage and annual distance driven
- Annual electricity, gas and water usage
- Amount of air miles travelled annually
- Amount of public transportation miles travelled annually
- No historical data was available since this was the first carbon footprint reading for this home.

Analyze

- Brainstorming led to several potential causes that could affect energy and resource use and impact the carbon footprint.
- Analysis of the data showed significant improvements could be made to reduce the amount of carbon used. These improvements would not require major lifestyle changes or any additional costs.
- The online software divides the carbon footprint into three categories – Transportation, Household and Shopping. The approach chosen was to make improvements in one category at a time and measure the impact on the overall rating after each set of improvements were proposed.

Improve

- Accomplished a pledged reduction in the amount of carbon and exceeded customer expectations by 2%
- Chose solutions that not only met the VOC criteria (5% reduction with no additional costs) but also could be easily implemented into their customers' household routines

Phase 1 Improvements – Transportation (Vehicles)

- Maintain Vehicles – Check tire pressure and maintain vehicle regularly. A smoothly running machine trims pounds off the carbon footprint.
- Practice ECO-Driving – Reduce highway speed to 65, most car engines get less and less efficient as speeds increase. Also, reduce rapid acceleration and braking.

Phase 2 Improvements – Home (Energy)

- Adjust Thermostat – Adjust thermostat settings in winter and summer by 2 degrees and reduce to a neutral setting during the day when unoccupied.
- Line-Dry Clothing – Use dryer less and consider drying outdoors (if sunny). In addition to saving emissions and money, it's nicer for your clothes and helps extend their lifetime.
- Switch to CLF – incandescent light bulbs use four times more energy than their efficient CFL relatives for the same brightness.
- Purchase Green Electricity – Voluntary buy-in to EPA-certified green power from the local utility company.

Phase 3 Improvements – Shopping (Food)

- Go Organic – buy organic food including reducing chemical toxins in the environment and encouraging sustainable farming practices, which frequently accompany organic farming.
- Change to a Low-Carbon Diet – A third of all food emissions in the United States come from red meat and dairy products.
- Chicken and vegetables have up to ten times smaller footprints per serving. Small diet switches can make a BIG difference.

Control

Monitoring and Response Planning

- If the proposed measures are not followed by all team members, the reduction in carbon emissions will not be realized. This would also eliminate any potential cost savings.
- Team Member 1 will serve as the person responsible to monitor team member activities to make sure everyone is on board. Team member activities will be monitored on a weekly basis.
- Another carbon footprint reading will be taken every 3 – 6 months. If the target goal of 7 % is not maintained, additional carbon-reducing measures will be introduced.

Additional Benefits Of Improvements
- Transportation Carbon Footprint Savings (Vehicles): $166/year
- House Carbon Footprint Savings (Energy): $386/year
- Shopping Carbon Footprint Savings (Food): $859/year
- Total Carbon Footprint Savings: $1,342/year