**Peer Grading Week 2**

No of lights = 100

No of operational days = 330

Average wattage per bulb = 60 W

Price per KWhr = 11.2 cents

Daily usage = 100 x 12 = 1200 Hrs

Daily electricity consumption = (Daily usage hours x average watt per bulb)/1000 KWhr

= (60 x 100 x 12)/1000

= 72

Annual electricity Consumption = (72 KWhr/day) x 330 days

= 23760kW/year

Cost per year = 23760 x $0.112

= $2661.12/year

Cost per month = Cost per year /12

= $211.76/month

Average watt(After replacement) = 32 watts

no of bulbs = 100

hours of operation = 12 hrs

no of operational days = 330

Daily usage of electricity = 12 x 100 = 1200 hrs

Daily electricity consumption = (1200 x 32)/1000 = 38.4 kWh

Annual electricity consumption = (Daily electricity consumption x no of operational days)

= 38.4 x 330

= 12672kWh/yr

Calculating annual cost for new LED lighting system:

Cost per year = 12672kWh/yr x $0.112(11.2 cent per kWh)

=$1419.264 per year

Cost per month = Cost per year /12

= $118.272/month

Savings = Baseline cost (per month) - New LED system(Per month)

=$211.760 - $118.272

= $93.488 per month

Total annual kWh used by the original lighting system = 23,760 kWh/year

Total annual kWh used by the LED Equivalent lighting system = 12,672 kWh/year

The conversion factor is: 0.0005925 metric tons CO2 per kWh.

Reduction in CO2 emissions = (Total annual kWh used by the original lighting system - Total annual kWh used by the LED lighting system) x Conversion factor

Reduction in CO2 emissions = (23,760 kWh/year - 12,672 kWh/year)x0.0005925 metric tons CO2 per kWh

=6.56964 metric tons of CO2 per year

So, by replacing the bulbs with their LED equivalents, the estimated reduction in CO2 emissions is approximately 6.57 metric tons of CO2 per year.

**Peer Grading Week 3**

Initial investments = $2300

Annual cost of Bottled water = $7150

Annual cost of Reusable stainless steel water bottles = $4068

Annual outlay or savings per year = Annual cost of bottles water - annual cost of reusable stainless steel bottle

= $7150 - $4068

= $3082

Annual outlay or savings for

year(0) : (-$2300)

year(1) : $3082

year(2) : $3082

year(3) : $3082

year(4) : $3082

year(5) : $3082

NPV (present values)

(Outlay or savings from table 1) x (Present value factor @ 6%) = Present value of outlay or savings

Present value of outlay or savings for

year(0) : (-$2300) \* 1 = -2300

year(1) : $3082 \* 0.9434 = 2907.5588

year(2) : $3082 \* 0.8900 = 2742.98

year(3) : $3082 \* 0.8396 = 2587.6472

year(4) : $3082 \* 0.7921 = 2441.2522

year(5) : $3082 \* 0.7473 = 2303.1786

Total net present value = (-$2300) + $2907.5588 + $2742.98 + $2587.6472 + $2441.2522 + $2303.1786

= $10682.6

With a positive Net Present Value (NPV) of $10,682.60 at a 6% discount rate over a 5-year horizon, the company should invest in the Hydration Station. This indicates that the cost savings and benefits associated with the Hydration Station and reusable stainless steel bottles outweigh the initial investment, making it a financially sound decision. The NPV represents the value the company can expect to gain over the investment's lifespan, and in this case, it's significantly positive, demonstrating that the investment is economically viable.

Yes, there are non-monetary benefits to consider.

These include environmental sustainability by reducing plastic waste, enhanced employee morale and well-being through access to clean water.

It will also improve corporate image.

These benefits promote a positive workplace culture, support sustainability goals, and can attract environmentally conscious customers and employees, ultimately benefiting the company's long-term reputation and brand equity.

Certainly, here are a couple of factors that could affect the analysis:

Maintenance and Repairs:

We didn't include potential maintenance or repair costs for the Hydration Station. Over time, the station might require servicing or part replacements, which could impact the overall cost-effectiveness. It's advisable to estimate these costs over the 5-year horizon.

Employee Usage Behavior:

Employee behavior can influence the success of the transition to reusable bottles. If employees don't fully adopt the stainless steel bottles or if bottles are frequently lost or damaged, it could impact savings.

**Peer Grading Week 4**

**Why is Noise pollution considered as Externality?**

**Noise pollution is often considered an externality. Noise pollution occurs when there is an excessive or unwanted sound that disrupts the environment, causing discomfort, annoyance, or health problems for individuals who are not responsible for the noise. It is an example of a negative externality because the individuals or entities producing the noise may not take into account the adverse effects their actions have on others.**

**Causes of Noise Pollution:**

**For instance, activities such as construction work, industrial processes, loud music, or transportation (e.g., traffic and aircraft noise) can generate noise pollution.**

**Impact the economic activity has:**

**Eg: Suppose there is a construction work of building in a nearby area and is creating noise with drilling , hammers , bulldozers , air pressure pump,loading etc. This project or building construction will lead to huge profits to developer and government will also benefit as it will get taxes on each apartment sold.**

**Impact on parties who suffered from these economic activity with noise pollution:**

**1) Health Effects: -**

**Noise pollution can lead to a range of health issues, including stress, sleep disturbances, hearing impairment, and increased risk of cardiovascular problems such as hypertension and heart disease. Prolonged exposure to loud noise levels can have serious long-term health consequences.**

**2) Quality of Life:-**

**Excessive noise can significantly reduce the quality of life for individuals and communities. It can disrupt daily activities, interfere with communication, and make it difficult to concentrate or relax. Noise pollution can lead to decreased well-being and overall life satisfaction.**

**3) Mental Health: -**

**Chronic exposure to noise pollution is associated with increased levels of anxiety, depression, and irritability. Noise-induced stress can have a negative impact on mental health and emotional well-being.**

**4)Learning and Academic Performance: -**

**Noise in educational settings can hinder students' ability to concentrate and learn. It may lead to reduced academic performance, particularly in schools located near noisy roads or industrial areas.**

**Peer Grading Week 5**

Q1)

Based on the information provided, it appears that your original savings estimates were based on a linear model. Here's why:

A linear model assumes a constant rate of change. In this case, I estimated the savings based on the assumption that everyone in the household would continue to use hot water as they had been, without considering any non-linearity or interactions between variables.

**Fixed Savings Estimate: -**

In your original estimates, you assumed a fixed monthly savings of $30.00 on your natural gas bill due to the solar water heating system. This fixed savings amount per month implies a linear relationship between the performance of the solar water heating system and your savings.

**Assumption of Unchanged Water Usage: -**

I assumed that there is no change in water use habits. This assumption further supports the idea of a linear model because it implies that your savings would be directly and linearly related to the performance of the solar water heating system.

**Q2)**

When you made your initial estimates for the savings from your solar water heating system and assumed that your water use habits wouldn't change, you may have missed several factors that can help explain why your actual water usage increased and what it suggests:

**Behavioral Change**:-

The fact that your water usage went up suggests that there was a behavioral change in your household related to the solar water heating system. When people install energy-efficient systems like solar water heaters, they often assume they have an abundance of hot water, leading to behaviors such as longer showers or using hot water for more tasks. It's common for households to unconsciously increase hot water usage when they feel it's readily available.

**Lack of Real-Time Feedback**: -

Your initial estimates were likely based on calculations and assumptions, but they didn't take into account the real-time feedback and experience of using the solar water heating system. Sometimes, people don't realize how their behaviors change until they see the impact in their utility bills or their daily routines.

**Complexity of Human Behavior**:-

Human behavior is often complex and influenced by various factors. Even though you assumed no change in your water use habits, changes can occur due to comfort, convenience, or even psychological factors. The presence of a new system can subconsciously lead to different usage patterns.

**Weather Variability**:-

Weather conditions can affect the performance of solar water heating systems. If there were fluctuations in the weather or sunlight availability, it might have influenced your household's reliance on the solar system, leading to increased water usage during periods when solar heating was less effective.

**Interaction of Variables**: Systems thinking recognizes that variables in a system can interact in unexpected ways. Your assumptions about sunny days and system ratings might not fully capture the dynamic interactions within your specific household system.

In summary, what you missed in your initial estimates were the complex and dynamic aspects of human behavior, as well as the potential interactions between variables within your system.

**Q3)**

Yes, the rebound effect could potentially apply to your situation with the solar water heating system.

1. **Psychological Factors**: People might have a psychological tendency to use more of a resource when they perceive it as cheaper. This can lead to an increase in consumption, even if the initial intention was to save energy and money.
2. **Increased Hot Water Usage**: As a result of having a more efficient and cost-effective source of hot water, you and your family may have increased your hot water usage. This could involve longer showers, using hot water for additional tasks, or simply being less cautious about hot water consumption.
3. **Comfort and Convenience**: Improved access to hot water due to the solar system may lead to increased usage for comfort reasons. For example, you may have been more inclined to take longer, hotter showers during cold weather.

**Peer Grading Week 5**

**In Governance section the topics surprised me the most is Ethics and transparency.**

**The items that would be easy to get data about were breached code of ethics breachment policy.**

**Some of the items that were difficult to search about were financial controls as it required access to audit department.**

**In Workers section the topics surprised me the most is Financial security.**

**The items that would be easy to get data about were Compensation Policies and participation of Employee Ownership which is quite transparent.**

**Some of the items that were difficult to search about were Employee managenemt and satisfcation as there were mixed reviews from various diversities and communities.**

In Community section the topics surprised me the most is Diversity,Equity and Inclusion.

The items that would be easy to get data about were Hiring practices,Diversity Ownership and Leadership.

Some of the items that were difficult to search about were Female percent Employees and percentage of Female Executives in board of directors.

In Environments section the topics surprised me the most were Type of footprint assessments, percentage of Products with Type of Footprint Assessment,Renewable Energy Usage and impact of product usage.

Since Apple is going towards the goal of "Closing the loop of cradle to cradle and carbon neutral".

The items that would be easy to get data about were Recycling programs and impact on Land and life.

Some of the items that were difficult to search about were Supply Chain Chemical Management.

https://www.coursera.org/learn/sustainable-business/peer/8JOwq/the-lay-of-the-land-the-b-lab-survey/review/YQqPRWD1Ee6ivQrl1Ht1mw

B)

Certainly! Here are two items that I am passionate about and believe would contribute to making an organization more sustainable:

1) Reducing Single-Use Plastics:

Single-use plastics, such as plastic bags, bottles, and utensils, have a detrimental impact on the environment due to their long-lasting nature and contribution to pollution. Implementing initiatives to reduce the use of single-use plastics within an organization can have a significant positive impact on sustainability.

Why it makes the organization more sustainable:

Environmental Impact:-

Reducing single-use plastics helps to decrease plastic pollution in landfills and oceans, protecting ecosystems and marine life.

Cost Savings:-

By reducing the use of disposable plastics, organizations can save money in the long run by investing in reusable alternatives.

Sustainable Image: It enhances the organization's image as environmentally responsible, which can attract environmentally conscious customers and partners.

Whether it's a good first project: Yes, it can be a good first project because it is relatively easy to implement and can yield immediate benefits.

Energy Efficiency and Renewable Energy Adoption: Increasing energy efficiency and transitioning to renewable energy sources are key steps in reducing an organization's carbon footprint and contributing to a sustainable future.

2)Carbon Footprint Reduction:

By using energy more efficiently and adopting renewable sources, an organization can significantly reduce its greenhouse gas emissions.

Why it makes the organization more sustainable:

Long-term Cost Savings:-

Investments in energy efficiency and renewable energy often lead to lower energy bills over time, contributing to financial sustainability.

Resilience:-

Renewable energy sources are more resilient to price fluctuations and supply disruptions compared to fossil fuels, ensuring a stable energy supply.

Whether it's a good first project: Transitioning to renewable energy can be a more complex and resource-intensive project compared to reducing single-use plastics.