Group 02-3: Jaclyn Carifi, Gloria Kim & Alli Yocum

Work Division: 1 - Jaclyn; 2 - Jaclyn; 3 - Alli; 4 - Gloria; 5 - Gloria; 6 - Alli

1. **What research questions are identified? Who are the stakeholders in the issues identified?**

The research questions identified involve determining the relationship between cost and emissions. Also, calculating the energy use of buildings will help answer the question of which buildings require the most energy. An ultimate goal of the database is to solve the inquiry related to the future by predicting the cost and emissions of potential new structures and existing structures. The stakeholders involved in the issues identified are The College of New Jersey as a whole and specifically Paul Romano who is the Senior Director of Sustainability and Energy Management at TCNJ as well as existing and potential suppliers and producers of energy.

2. **What financial and nonfinancial data would you incorporate in your model/database design for the identified issues?**

The financial data incorporated into the database design include gasoline, diesel, and crude oil prices as well as income and profit ratings. The nonfinancial data incorporated into the database design involve building size (square footage), building operational hours, building age, energy consumption, efficiency measures, building occupancy, building activity, and emissions.

3. **What is the cost object in the problem identified?**

The cost object for our problem is the amount of energy demand for a specific building. The purpose of our database is to predict how much energy will be used by a building based on building size, specific use of the building, age of the building, etc. Once this is determined, our ultimate goal is to determine how to minimize this cost in order to save money as well as reduce carbon footprints.

4. **Can direct costs, indirect costs, fixed costs or variable costs related to the issue be identified based on the data available/provided? If yes, describe them.**

Direct costs, indirect costs, fixed costs and variable costs related to the issue can be identified based on the data available and provided. Direct costs are the materials (electric grid, renewable energy, natural gas, etc.) and labor involved in producing the energy. The indirect and/or fixed costs identified in the database will include overhead expenses such as utilities as well as costs related to equipment, project management, and construction. The variable costs involve fuel costs which depend on the electricity usage.

5. **What are the cost drivers for the issues identified?**

The cost drivers for the issues identified include state and/or federal mandates, utility tariffs/regulations, number of energy units consumed, access to renewable energy sources, availability of suppliers, number of operating hours used, and fuel pricing including coal, natural gas, and oil.

6. **What is your plan to solve the issues identified? What do you expect to see from your end product that address the issues identified?**

Our plan is to create a user-friendly database which has the ability to estimate the energy demand cost of a specific building, along with the amount of energy used. In order to determine this estimate, we must identify patterns in buildings. For example, determining the amount of energy both used and lost in buildings that are older, larger, or used for similar purposes. We also must determine the energy consumption as well as carbon emissions of buildings on a gross square footage basis. With this knowledge, our database will have the ability to take in the data specific to a certain building and output the amount of energy used and what the approximate cost will be to maintain this. One feature that our database provides to users is the ability to create a map of

multiple buildings. Users can virtually place buildings onto an area to see how much total energy they would use, as well as the total cost of this energy demand.