Student Proposal for Question 3

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Proposal One: peak time estimation

- **Problem**

Gas and electricity companies need the information of in which period users demand more gas daily to deal with possible huge demands. The problem is how to obtain the peak time of the consumption of all users through all the data acquired.

- **Value**

Knowing the peak time during one day enables the gas companies to provide a rush-hour supply strategy, and companies such as Singapore Power can also refer to this data to modify the measurement frequency to improve efficiency. Both are quite necessary to maintain a stable run.

- **Analysis Plan**

We need to collect the readings of all users during each hour and compute the average hourly consumption. No additional data is required.

Proposal Two: monthly usage estimation

- **Problem**

The gas consumption of different users may vary a lot. Therefore, the gas company can provide different gas volume package to meet different demands and gain more profit. In this case, they need to find out the monthly usage of users to set their supply packages.

- **Value**

Natural gas companies can refer to this data and set different price packages for users. For example, the more they use, the more favorable the price is. Users can purchase different packages according to their

own needs.

- **Analysis Plan**

Given a certain month, compute the average monthly consumption of all users. Apply this to all months. No additional data is required.

Proposal Three: prevent electricity theft

- **Problem**

Electricity theft means the household may modify the voltage of the meter or modify the cable of the meter, which leads to the slow growth of the meter readings. Therefore, we need to detect electricity theft through all the readings.

- **Value**

Detecting electricity theft protects the benefit of the victim users and regulates the behaviors of all users.

- **Analysis Plan**

We can compare the change of daily electricity consumption of the meter between the two adjacent months to determine whether the meter is modified. If it decreases dramatically, it could be electricity theft. If it increases a lot, it could be that the electricity of this household is being stolen by their neighbors. Surveillance videos are needed for additional affirmations.

Proposal Four: adjust the marginal consumption unit

- **Problem**

The marginal consumption is a threshold of which the next meter reading will be recorded. The setting of marginal consumption is currently 2 cubic feet. However, as some users consume only a little gas, their meter readings may stagnate for so long that they can be detected as abnormal readings.

- **Value**

By providing specified marginal consumption units, the gas consumption of different users will be calculated in a more considerate and refined way, especially for those who need little or more gas than average.

- **Analysis Plan**

We will collect the data of normal meters to compute the time of data that remained unchanged in peak and low peak periods to judge whether the current unit setting was reasonable. No additional data is required.