

Factor Four

REDUCING ENERGY AND MATERIALS USE FOUR-FOLD

Real Time monitoring in a park consisting of 10 buildings

a) Background

You are the energy manager in charge of two commercial parks consisting of 10 buildings total. More information on the building park is provided in section 2. The buildings are all office space.

Your two commercial parks are located in the Lower Mainland.

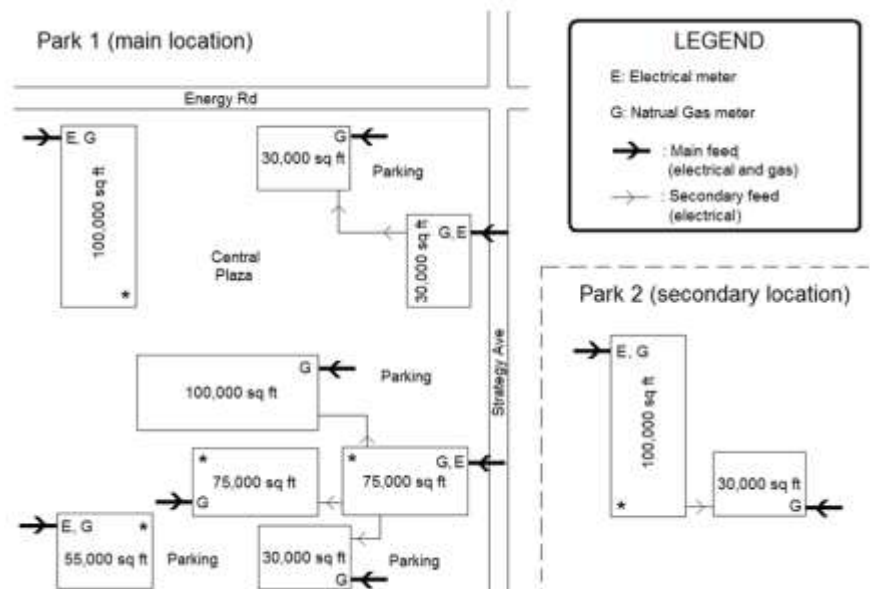
Your company is in a fairly bad financial situation and senior management is not in an investment mode. Your company culture can be described as risk averse.

b) Technical data and cost information

Building sizes are:

- 3 buildings at 100,000 sq ft;
- 2 buildings at 75,000 sq ft;
- 1 building at 55,000 sq ft;
- 4 buildings at 30,000 sq ft.

One 100,000 sq ft building and the 55,000 sq ft building have a billing meter at the building level (a billing meter for gas and a billing meter for electricity). All the other buildings are sharing billing meters (for gas and for electricity). See map below for more details. Note: as shown on the map below, you are currently working with a total of 5 BC Hydro billing meters and 5 Terasen Gas billing meters.



Because you do not know the energy consumption for each building, you know that an approximation can be calculated by adding annual energy consumption of your 10 buildings and by then dividing the total by your total area. Your energy bills show energy consumption of 60% in natural gas and 40% electricity. Using the methodology described above, you calculate the “average” total energy intensity of your two building parks is 1.92 GJ/m².

The following description is true for all your 75,000 sq ft buildings, two of the 100,000 sq ft buildings (including the one with the billing meters) and the 55,000 sq ft building:

- Have a Building Energy Management system in good working order;
- Have documentation including mechanical and electrical schematics;
- Have control drawings; testing, adjusting and balancing reports; and operation and maintenance reports;
- Have well-maintained equipment and systems;
- Have no major retrofits or tenant improvements planned for the next one to two years.

The building fitting the above description are marked with an “*” on the building map. The above description is not true (in total or in part) for all the other buildings.

The cost breakdown for the installation of one electrical meter:

PML # 7330 meter: \$2,500;
Current transformers and miscellaneous: \$1,000;
Labour: \$1,500;
Total cost: \$5,000.

Assume similar cost for a gas meter (state your assumptions and include them as uncertainty in your business case).

Your CFO established that for this kind of project 10% would be a good discount rate.

c) **Problematic**

You were asked to significantly reduce energy consumption. You were given a 15% reduction target over the next 3 years.

You were told that using an Enterprise Energy Management (EEM) software can help building managers reduce their energy consumption between 10% and 20%.

You want to explore the possibility of implementing such a technology in order to better manage the energy used in your buildings.

a) Questions

- Do you think that a 15% energy reduction target is reasonable?
- How many buildings should you connect to the EEM, which buildings and when (plan)? Can you include this planning in your SEMP?
- Would you monitor both gas and electricity in all the buildings selected?
- What will be your decision criteria to select the software that your organization will use to track building performance? (note: your decision must be done using a decision matrix with weighted criteria).
- Briefly describe your strategy to save energy through the use of the EEM software (include the potential interaction with building operators and building occupants) - Include the cost for this strategy in your business plan.
- Describe the components of project development
 - Who will do the work – installing meters and pulse meters?
 - How will you plan for the power shut down required during installation?
 - Who will do the upgrade to be able to use an EEM?
 - Is any training required?
- Prepare the business case, including all potential incentives and including a sensitivity analysis.
- Explore alternatives and risk. For example:
 - What are the obligations if you decide to go with BCH incentives?
- Provide an executive summary
- Present to senior management.