



REACT

Summative assessment framework WebQuests

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WebQuest CU4

WebQuest title

Take up the energy \$avings challenge and seal the deal as a Facility manager!

Introduction¹

Did you know that improving energy efficiency and making energy savings does not only imply the use of technical solutions and it does not end with the implementation of technical improvement measures? I know, shocking, right? In fact, improving energy efficiency is a continuous process that is developed through education of end-users (changing users' behaviour), monitoring of system performance and proposing of potential system optimization measures – establishment of **building energy management system (BEMS)**.

Would you like to gain new knowledge or broaden existing one about how to achieve savings in your building by using non-costly solutions, such as BEMS? Then this is the right WebQuest for you.

You are a Head of facility management department for all schools in the City of Minsk (Belarus). City has some money to invest but they have doubts whether to invest in the BEMS for one school which is under your management or to buy an electric car for the city's car-pooling scheme. Now, it's all up to you to convince them to give the money to your department. Show them that investing in school is the right choice. Are you up for the challenge?



Task

In this WebQuest, you will apply your knowledge about energy management systems, energy consumption data analysis and monitoring plans in order to develop an “investment concept” that you will present to the Mayor and his advisory board (soft sell) to facilitate the decision-making process. Long story short, investment concept will actually be a short presentation about the size of investment (BEMS implementation), the benefits of having BEMS installed, current energy consumption in the school and potential energy savings that could be achieved through building's systems optimization if BEMS is installed.

To prepare an impressive presentation, you will have to do (B)EMS pricing and quality research, identify benefits of having BEMS installed, get all relevant energy data about the school to present current state of the building and finally propose simple non-costly energy efficiency measure(s) related to the optimization of building's systems which you plan to monitor with your new BEMS.

¹ Figure 1 source: <https://www.motilaloswalmf.com/knowledge-centre/5-keys-of-investing/5-key-benefits-of-dynamic-funds/41>



Your presentation should be simple, clear, to the point, without any unnecessary data that might be distracting from the things that matter. The mayor wants to know pure facts, relevant for making decisions, so be ready to bring up the numbers that count and be ready for some questions at the end from the mayor and his advisory board.

Process²³



1. Form groups of two to work in a collaborative manner in this task. One of you two will be FM (facility manager) focused on technical data and the other one will be focused more on financial data. Embody these roles through the whole process (research, data collection, proposing measures and while presenting).
2. First thing you have to do is to do EMS pricing and quality research in order to find the most suitable system in regards to the building purpose (school) by taking into account system's price and performances.

In the Resources section you can find links to search the web looking for a software but you are also encouraged to make some phone calls to the local/regional/national EMS dealers or you can use some other channels in order to get information you need (e.g. social networks). Once you have done the research, single out the three best software, upon the criteria above, and select the winner software by writing an explanation in your notes/flipchart (which you will later use for your final presentation) why this one is the best for the school – technical and financial data (first part of your investment concept - final presentation).

3. Identify the benefits of having BEMS installed to catch the Mayor's interest and to set the ground for the favourable decision.
4. Now that you have the EMS selected, it is time to obtain and analyse the data about the current state of the school, in terms of energy consumption. For this purpose, use the mobile EMS that has been installed in the school two years ago, to track gas and electricity consumption - <https://dash.smart-mac.com/demo>.

² Figure 2 source: <https://money.usnews.com/careers/best-jobs/market-research-analyst>

³ Figure 2 source: <http://www.justscience.in/stemcareer/technology/market-research-analysts/2018/02/23>

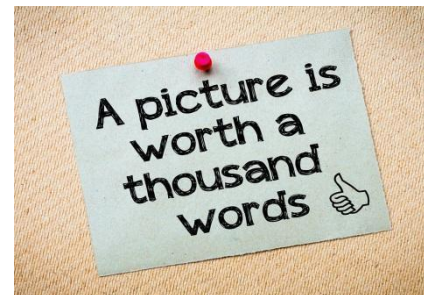


You need data about energy consumption (electricity and gas) and about total costs per month in the last two completed years of use in order to have a basis for proposing measure(s) that will reduce energy consumption in the future. Make a tabular view per months in your notes (begin with last year) with columns containing information about electricity consumption in kWh, electricity cost in €, gas consumption in m³, gas consumption in kWh*, gas cost in €, total cost and last column will contain data about outdoor temperature for each month.

Analyse the data taking into account total gross surface of the building - 200 m² (calculate the percentage of shares of gas and electricity in total consumption, calculate the annual average outdoor temperature, calculate the specific gas, electricity and total consumption in kWh/m² etc.

***Hint:** for gas calculation from m³ to kWh use gross calorific value of 11 kWh/m³.

5. Finally you have to propose a simple non-costly energy efficiency measure(s) related to the [optimization of building's systems](#) which you plan to monitor and, accordingly, take corrective actions with your new BEMS. Explain the measure(s) and the benefits it will bring by writing it in your notes/flipchart (which you will later use for your final presentation). For the proposed measure(s) create a [monitoring plan](#) in order to track progress of the set goal.
6. A picture is worth a thousand words!⁴ Pitch your investment concept using [PechaKucha Presentation](#). Prepare your presentation of the investment concept using a 20x20 presentation format, meaning you have to choose 20 images and for each you have 20 seconds for explaining. In other words, you've got 400 seconds to present your investment concept by using images. Be creative and persuasive!



Resources

[EMS pricing](#)

[EMS pricing](#)

[BMS benefits](#)

[EMS online version](#)

[Gas consumption calculation](#)

[Data analysis](#)

[Energy consumption data analysis](#)

[Energy efficiency measures](#)

⁴ Figure 4 source: <https://www.elklan.co.uk/blog/a-picture-is-worth-a-thousand-words>



[Optimization Strategies for Building Systems](#)

[Building optimization](#)

[Monitoring Plan](#)

[Building a Monitoring Plan](#)

[Energy Monitoring](#)

[PechaKucha Presentation](#)

Evaluation and LOs

After completing this WebQuest, the learner will be able to:

- Define what an energy management system is and how it works
- Prepare a monitoring tools (e.g. checklist) based on the legal requirements, technologies and equipment that is being used
- Identify key elements of energy consumption analysis to optimize building energy systems
- Contribute to monitoring reports by integrating energy consumption data
- Interpret and present monitoring results to decision makers in order to stimulate investment in buildings' energy efficiency
- Propose simple energy efficiency measures related to the optimization of thermo- technical systems
- Make a pitch/presentation using the PechaKucha method

Trainees will be evaluated in pairs based on the quality of their investment concept and based on their performance and the impression they left on the decision maker, as well as based on the ability to engage in the conversation, after the pitch, while answering the questions made by their peers and or/ trainer (Mayor).

Conclusion

A building physical environment – whether it is a restaurant, school or office building – says a lot about who runs it and how it operates. Building management keeps spaces in proper operating conditions through a routine and scheduled maintenance. A well-maintained building creates a safe working environment, reduces energy output costs, and makes all processes within the building run smoothly and efficiently. The lower consumption, and thus increased energy efficiency, significantly contributes to climate and environmental protection – without sacrificing comfort.