

Some frequently asked questions when utilising the energy mapping tool

- Question 1:

In practice, we [Energy Auditing Firms] have worked at a variety of factories with thousands of different products, each having distinct production processes. For instance, a factory has a total of 7 main workshops and 2 auxiliary workshops supporting the production of the products. Each workshop reports the output volume in different units, such as kilograms and pieces. How should we handle this when building the production process flow?

It is always important to reduce the number of units to an absolute minimum, which makes the generation of KPI, reporting and comparison much easier and it reduces the risk of errors. When this is set, then the purpose of having a management system is to assist the company in improving their performance. Whatever activities are chosen, it must support the company in improving their performance. Thus, if using separate units is a more efficient way of working compared to using the same unit, then you should stick to that, otherwise you should recommend them to change.

- Question 2:

There are many factories that produce many product types at the same time on one production line. But the production flow of each product is not sequential in each step, but some step(s) can be skipped. For some products, the steps can be rotated and repeated. How to handle this?

When making a process flow mapping, it is essential to look at it in the light of what you will be using the mapping for afterwards. It is very common that a production facility has a big variety of products being produced on the same production lines. If the purpose of the flow mapping is to make an energy mapping, then you should ask yourself if each product has special requirements with regards to energy. This should be evaluated with respect to the level of details (e.g. assumption made) in all other parts of the mapping. E.g. if the energy losses in the distribution system are estimated to be within 5-10% of the total energy supply, does it then make sense to differentiate the different products based on different temperature requirement on the decimal level? Often it turns out that the product can be categorized into a few categories. The question is whether energy consumption is affected or not.

- Question 3:

In the process mapping tab, what is the difference between columns CG12 and CH12? According to row 11, we can calculate based on similar data. However, when applying the same formula, we obtain two significantly different results. Please explain further.

CG12 uses the flow approach which calculates the energy consumption based on flow and temperature. It represents the ideal situation, where losses, consumption to start and stop are not included. CH12 uses the KPI approach, which is based on mass flow and the specific KPI for the unit. Often this KPI also includes losses and other consumptions associated with the unit of operation. If there is a huge difference, then this can be caused by a unit mix-up, wrong measurements, difference in time span, etc.

Also, be aware that the Cp value in column K is only an example and must be updated accordingly to the specific product – we haven't been clear about this.

- Question 4:

In the “Utility mapping” sheet, if you input loss percentages, it’s considered that you already know which areas experience losses. Therefore, the mapping process is primarily concerned with the “Process” itself, isn’t it?

We are focusing on two areas: one area looking at energy consumption from a process perspective and another looking at it from a utility perspective. The exercise with doing energy mapping is to use all the best information available to create a picture of how energy is used.

When you estimate a loss both on the process part and in the utility part, you will give it your best estimate. This will indicate in the energy mapping that there is a loss, and you should be aware of that. It is of course important to clearly state the assumptions used in estimating/calculating the losses, so it will be clear to the user how the figures have derived.

- Question 5:

Please explain further the use of the Result overview sheet to analyze electricity consumption to identify potential energy savings.

The electricity overview is used to indicate where electricity is used in the factory. This can indicate where changes will have the most significant effect if an optimization is introduced. Optimizing the electricity consumption is different from the way that the thermal systems are optimized. The electricity consumption is often done by setting a standard on how the different components must perform. E.g. all motors of a certain size must be VFD controlled, or all lighting must be LED. And this is why we have chosen “effect” approach in the process mapping sheet. By using this approach, the designer of the energy mapping will list all major consumers, which will create a picture of magnitude of drives, pumps, fans, etc.

When optimizing the electricity consumption, it is also very important to evaluate the use and how the electricity consumer is integrated into a system. This cannot be seen directly from the result; this will be a task for the auditor to evaluate the systems like the way the auditor will have to do on the thermal systems.

- Other input:

In the energy mapping template, we were aware of a constraint in the temperature’s columns G and H. The constraint limits the temperature to 100°C, which in some cases is not desirable. To remove the constraint, follow the steps below:

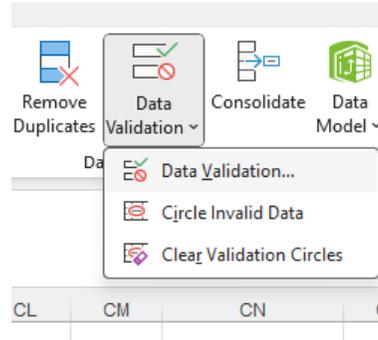
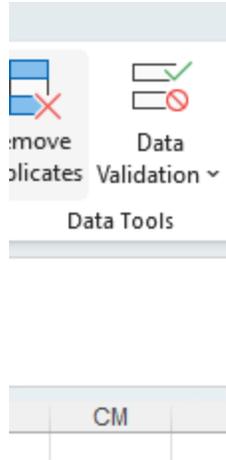
Step 1: Mark column G and H.

Step 2: Chose Data Validation.

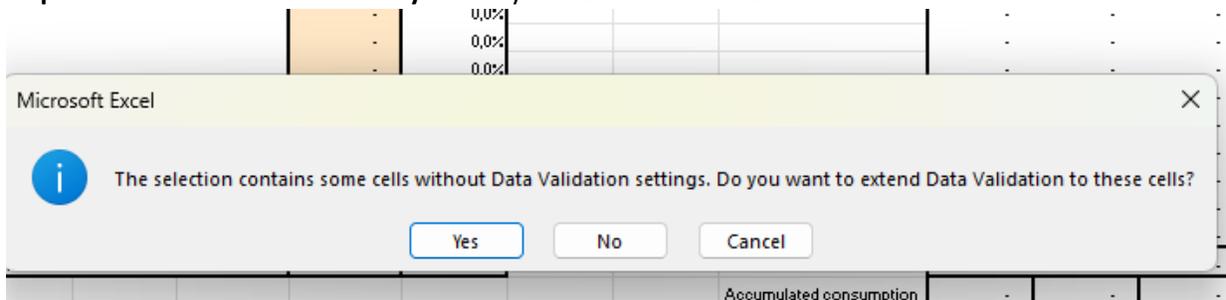
Step 3: In the drop-down menu, choose Data Validation.

Additional rows to the tables

System	Temp. In °C	Temp. Out °C	Mass flow t/yr
am	20	50	125.000
am	50	100	135.000
water	45	50	101.250
am	20	60	125.000
am	20	80	134.938
water	20	50	26.000



Step 4: Then this box occurs. Click **yes** that you want to extend Data Validation to these cells.



Step 5: Change the maximum to e.g. 5000 and then click Ok and now the constraint should be set at such a high value that it will not be a problem for the energy mapping.

