

# STEAM UP PROJECT ACHIEVEMENTS

Project Newsletter - February 2018



This Project Newsletter is addressed to decision makers and technical staff of industries that use steam systems for their energy demand. It is the third issue of the STEAM UP project that aims to achieve radical improvement of energy efficiency in industry. The project is undertaken by Austria, the Czech Republic, Denmark, Germany, Greece, Italy, Spain and The Netherlands and co-funded by the European Horizon2020 programme.

## 3 years Steam Up

With the results of 75 in-depth steam audits in the pilot, carried out in the 8 EU countries Austria, Czech Republic, Denmark, Germany, Greece, Italy, the Netherlands, Spain, we aimed to formulate a business case. The success is based on the developed methodology, which describes how to involve the management, how to cooperate with a team in the company and how to identify and calculate the Non Energy Benefits. Especially the NEB's are important for the business case.

All the audit results the consultant entered in a webbased application, the Energy Management Centre (EnMC). The energy manager from the company is able to enter this EnMC and can manage the progress of his own measures. This EnMC is freely accessible; developed for all kinds of saving measures and not only applicable for steam installations and the audited companies.

Another important activity as part of the Steam Up project was to let as many energy experts and other people working in getting acquainted with it the anchoring of the Steam Up knowledge and body of thoughts under as many as possible steam experts in these countries. Many high qualified energy experts were trained, and will put this Steam Up knowledge into practice in their consultancy jobs they do for the industry. This group consisted of energy managers, operators, directors, maintainers, production managers, environmental managers, and everybody else somehow working on a position w.r.t. energy. In the future, Steam Up study materials will be available at training organisations in the EUREM network.

More about the achieved results of the 3 years project Steam Up you can read in this final project newsletter. For more information, do not hesitate to contact us.

Michiel Steerneman, Project coordinator



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## What makes Steam Up so special...

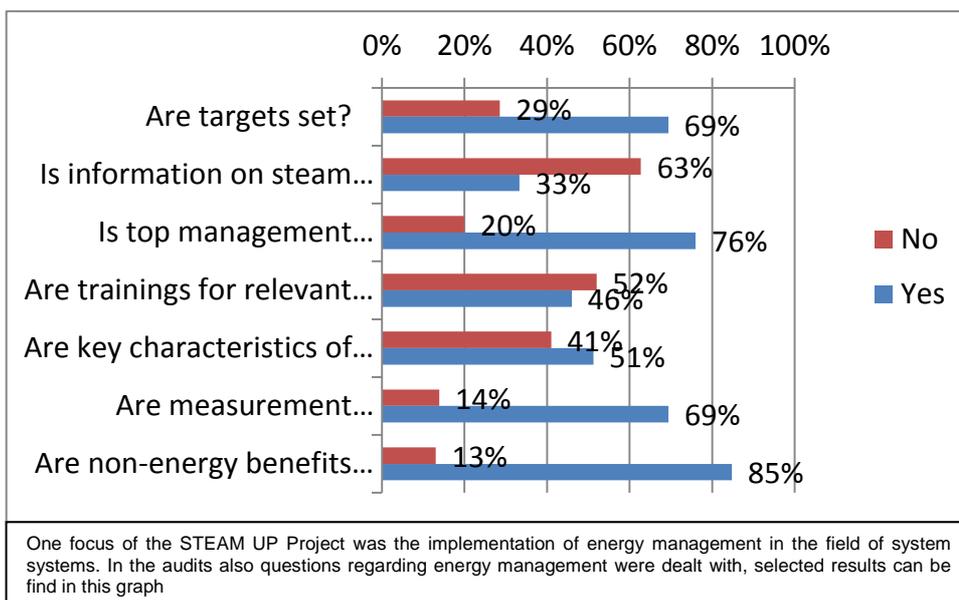
What makes the Steam UP project so special can't be expressed in just one or two words, as it means a new approach in the field of energy saving that must result in a permanent focus on energy saving within the organizations. To this end, the project promotes involvement in energy saving by introducing and/or optimizing energy management. In addition, the focus of the companies in the business cases are taken into

account by qualifying the Non Energy Benefits (NEBs) and where possible quantifying them. This new approach is proven suitable for different company sizes and, although the focus is still on the steam system, the approach can also be of value to other energy systems within the company. The EnMC (energy Management Center) is already prepared for various energy systems and can be consulted via the website.

### Audits

Between May 2016 and Jan 2018 a total of 78 audits were conducted in the participating countries within the STEAM-UP Project. Participating companies came from the sectors food industry (32 companies), chemical industry and industrial laundries (10 companies each), pulp and paper (8 companies), pharma industry (4 companies), textile industry (3 companies) and several others.

Total energy consumed for steam within the STEAM-UP project was approx. 7,000 GWh. Fuels providing this energy were gas (48%), biomass (41%), oil (4%), coal (3%) and waste (3%). Biomass includes mainly black liquor in the selected paper mill, but also vegetable oil and rice husks. More than 50 companies (out of 78) use gas as the main energy carrier to produce steam.



After a thorough analysis of the steam consumption, generation and distribution and checking the main information of the steam energy management system, the auditors defined detailed action plans for each company. Approx. 235 actions were defined. Most of actions (56%) recommended referred to the field of generation, 30% of the actions would optimize the steam distribution and condensate system and approx. 10% the action the steam use. By implementation of the actions approx. 220 GWh of energy would be saved.

By far, the most important energy saving measure proposed was the installation of a new steam boiler. This would lead to energy savings from 8 to 35% of the energy used for steam. Other relevant energy saving measures for steam generation were the installation of economizers (up to 7% energy savings possible), reduction of boiler operation time and the optimization of the oxygen level. The most important energy saving measures in the field of the steam distribution and condensate system included: increase condensate return (approx. 5% energy savings), installation of a high pressure condensate system, checking and/or changing steam traps (7-12% savings), and insulation of the distribution pipes, valves and condensate pipes (1-3% energy savings).

Finally, the end use in steam system could be improved by the following suggested saving measures: optimization of tank cleaning (currently done by steam), replacement of steam supplied hot water system, warm water production by heat pumps, adjustment of dryers, heat recovery in a washing process and by reduction of the system pressure. For several measures energy savings of 10% - 30% are possible in certain cases, this are even higher saving rates than initially were calculated.

Selected energy saving measures which were already implemented include:

New steam boiler installations in Austria, Netherlands, Czech Republic, Spain.

Improvement of steam boiler control, pressure reduction, change in O2 settings, insulation of water tanks, insulation of boilers, insulation of steam boilers, new frequency converter for feed water pumps and for fans, additional insulation of hot water baths, change of steam blowing heat transfer surfaces, use of unused steam accumulator as condensate tank.



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### Trainings and training materials

Almost 400 professionals coming both from the industries and their suppliers were trained by the Steam-Up project, including from managers to engineers dedicated to energy management.

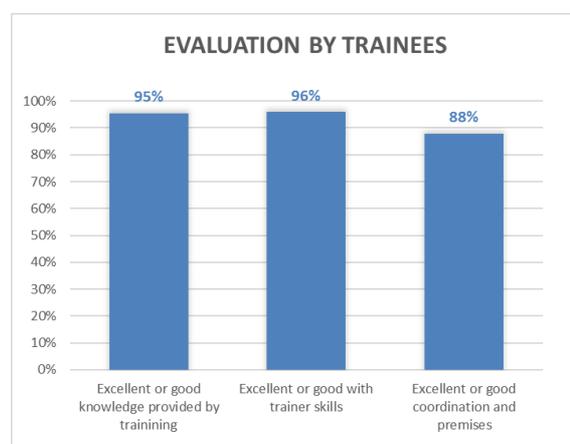
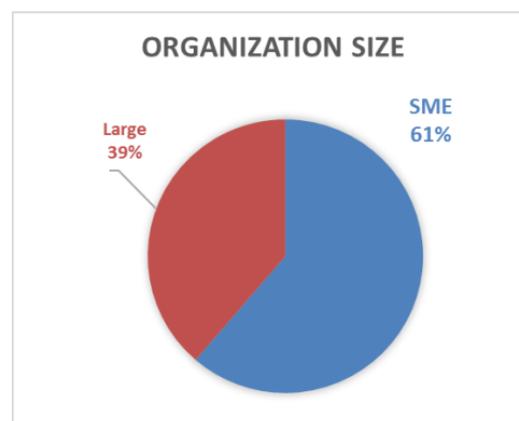
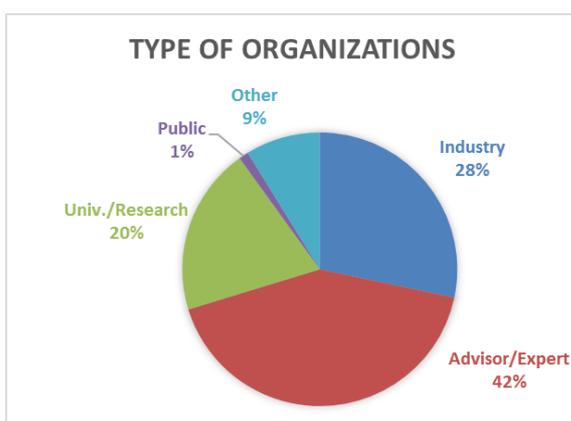
Considering the type of organization participating in the training, advisors and experts were the main group followed by industry managers and engineers. Considering the organizations size, SMEs constituted 6 of every 10 participants, while large industries, companies and institutions covered the remaining.

The assessment of the training done by trainees was very positive and 97% declared to be highly satisfied. The knowledge provided by trainings was good or excellent for 95% of the trainees, training skills was highlighted by 96% and coordination aspects by 88%.

Several positive aspects mentioned were useful for workplace, training aims defined and fulfilled, teachers providing practical classes, answers provided by teachers, motivation, expose with clarity, organization, venue, equipment and documents provided.

Also it was mentioned that length of the training was, too short for the amount of contents and materials.

Training materials are available after the project end in the website for those interested. Requests can be sent to the project coordinator.



## Non Energy Benefits as a driver for energy efficiency in steam systems

One of the results of a steam audit is a list of energy saving opportunities for the whole steam system. Nearly always the list of opportunities only highlighting the energy savings in kWh. However, that is not the whole story, as any energy saving action is always connected to some 'non energy benefits', like reduced production costs, less maintenance or improved health and safety.

The value of the NEBs can be ranked from a multiplication factor to the energy saving from 1 to 70 in some projects, and research indicates that in average the energy saving can be multiplied by 2,5. However in most cases it is possible to calculate the value of the NEB. One of the profitable energy savings in steam systems is to implement a steam trap inspection program, the value of the NEBs connected to such a program depends on how the steam traps are installed. If the steam trap is placed in the steam pipe to make sure that there is no condensate in the process, the condensate from the steam trap could go into the condensate recovering system, if

the steam trap is not working, besides wasting energy it can lead to noise in the steam pipes, production stops and thereby quality problems. If the steam trap is placed in the steam pipe to make sure you do not have condensate in the steam pipe and the condensate goes in the drain, a malfunction could lead to damage on pipes and installations, production problems and unexpected production stops.

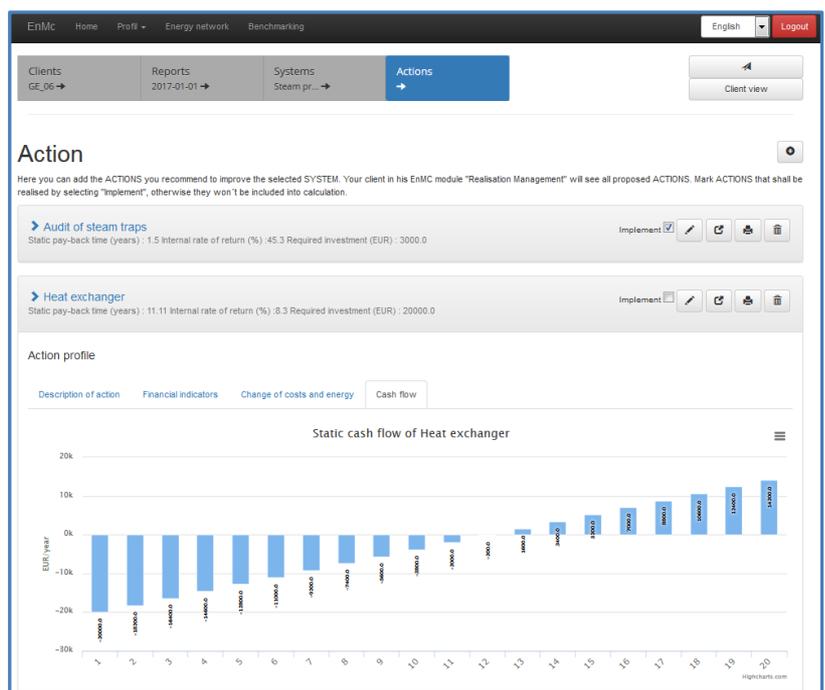
As a case we can look at how we can calculate the value of a steam inspection program in the case where the condensate goes in the drain. With the help of steam trap inspection tool we learned that the 3 of the steam traps had a condensate equal to 214 t/år, if the data for the steam system is known you can calculate the energy saving to 164.845 kWh/år, and the water loss to 214 m<sup>3</sup>, or prepare the makeup water in this company you would need 214 kg salt this is the easy NEBs that has been calculated to them you can add the value of reduced maintenance and better productivity that can be assessed when the system has been in place for some months.

## EnMC – the Energy Management Centre

Although energy audits reveal very attractive energy saving opportunities, recommended measures are often not realised within the companies. Before being able to discuss realisation of measures with the Top-Management from the investment perspective, energy managers have to extract the information from long paper based audit reports that focus mainly on the technical aspects. Within the Steam-Up consortium, Adelphi developed a web-based "Energy Management Center" (EnMC) to overcome those obstacles. Energy auditors can use the EnMC to summarize their findings from an investment point of view. Subsequently the EnMC automatically prepares management-friendly action plans.

To support realisation of measures also after decisions have been made upon investments, the EnMC e. g. provides an interactive Gantt-Chart allowing quick and easy definition and time planning for specific tasks. Further functionalities of the EnMC cover Monitoring and an Energy Forum.

Until now more than 50 auditors used the EnMC for reporting audits to more than 100 companies EU-wide. These numbers show that the interest in using the EnMC is great and that it is used well beyond the circle of Steam-Up project members. Additionally the EnMC was constructed in a way that it can be used for all kinds of energy audits. It is not only available for steam focused audits. The EnMC is open source and available in Czech, Danish, Dutch, English, German, Greek, Italian and Spanish, and can be found under [www.energy-management-centre.eu](http://www.energy-management-centre.eu).



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## More project results...

During the project a range of public project documents were produced. These documents include among others fact sheets on steam efficiency, newsletters, audit fact sheets, national result leaflets and a project results leaflet. Training materials can be downloaded here as well. A list with steam experts in the participating project countries is also available. All documents can be found on the Steam Up website. Should you wish to learn more about the Steam Up project, do not hesitate to contact the Steam Up partner in your country.



[www.steam-up.eu](http://www.steam-up.eu)



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