



SUSTAINABILITY INSPECTIONS IN PRINTING INDUSTRY

(POSTER PRESENTATION)

Dr. Habil. Csaba Horváth¹, István Mecsei²,

¹ Óbuda University, Rejtő Sándor Faculty of Light Industry and Environmental Protection
Engineering
Institute of Media Technology and Light Industry Engineering
H-1034 Budapest, Doberdó u. 6.

² Nyomda-Technika Kft.
4027 Debrecen, Böszörményi út 6.

The printing industry is in big trouble during this time. Answers should be given to questions about sustainability. There are no single answers for these questions. Every plants and every printing houses has its own conception about environmental protection, work safety, quality management etc., and every issues connected to the company's life. Sustainability is a slightly different thing. It connects all these issues into a larger system, whose mission is to provide a sustainable producing in harmony with the environment. A lot of individual studies can be found in this topic from printing plants all over the World. Analyzing these studies we realized that many recurring components can be found as constant elements in a continuously changing mathematical equation. With identification these key factors we are able to check and help a printing house (regardless of size and level of technical development) with advices and recommendations to get closer to be a member of a "greener future".

Keywords: **sustainable printing, greener future**

1 INTRODUCTION

Nowadays, the printed media represent the only type of media that offers endless combinations of colour tones, surfaces, shapes, carriers, scents and tastes, as well as all the things that are appealing to our senses, and bring emotional values to us. They remain operable even without power supply, they do not have batteries to run down, they are not to be connected to chargers. The printed media forge direct relationship with the reader, as time and energy have to be dedicated to identify the information that is useful for the reader. Reading a printed newspaper page conveys fewer disturbing elements to the reader than consulting the same information on a screen. More thorough reading leads to more thorough thinking. The printed media are always readily available, suitable for sustaining human relations, as it can be lent or showed to others at any time. For its continuous presence, it is particularly suitable for marketing, promotional purposes, and to reach any target audience.

Therefore, the printed media do have a future, but it can be achieved solely if they represent a sector of the industry that strives for sustainability on all levels.



2 EXPERIMENTAL

There were several papers published concerning the topic of the study of the sustainability of printing businesses, and by analyzing and reviewing them one can draw conclusions that can be fundamentally applied to production units of any size and technology.

The current research relies on studies [1.] made in relation to five business associations that are involved in the printing industry, and have obtained the American SGP certificates. Looking at the publications, we have made the following, material findings and observations that influence the individual companies to a varied extent.

ALCOM

This company operates in the U.S. town of Harleysville, has 110 employees, while its annual sales amount to USD 20 million. Applied technologies: sheet printing, roll-fed offset printing, digital printing. In the first round, the company placed the main emphasis on the recycling of raw materials. For this purpose, it was obviously inevitable to work out an appropriate system of measurement that was valid not only for the specific case, but for any process, because that was the way allowing them proper document and the detection of changes. The following step was the improvement, enhancement of energy efficiency. It raised fascinating questions in terms of both artificial illumination and the energy consumption of the equipment. The next thing to be studied was the potential substitution of raw materials with recycled raw materials, as well as the replacement of the inks and chemicals with soy-based inks with smaller eco-footprints and solvents containing less volatile substances. The last step was to consider how wastes that were inevitable generated could be disposed. A good example was that so far company has not been able to do anything with the ink remaining in the cans, and moreover it was to be regarded as hazardous waste (irrespective of the fact that it was vegetable-originated soy ink). Currently, they mix all the remaining waste ink, and thus they can produce a nearly black colour with which they produce their own forms and advertising materials.

GLOBAL PACKAGING

This company operates in the U.S. settlement of Oaks, has 155 employees, while its annual sales amount to USD 40 million. The applied technology is flexo printing. As the company uses flexographic technology, the key raw materials used in large volumes are films of various sizes and thicknesses. To broaden the scope of activities, they have expanded the plant, and therefore are now involved in bag production and lamination. The first spectacular action to bring about considerable returns was the reduction of raw material consumption, or to be more precise the decrease of the technological wastes generated in manufacturing activities. It was achieved with the modernization of production planning, by re-designing the products presented by the customer and securing the customer's approval. Customers tend to be more willing to accept changes when they see the underlying goals, even if they do not benefit from them in the form of cost savings. More energy-efficient lighting fixtures were installed in the plants. Additional, considerable costs could be saved with the reorganization and relocation of manufacturing to a single place, and as a result machines could be stopped in certain plant sections, and lighting could be switched off. Flexo printing procedures generate solvent vapours in quite large quantities. The two largest investments of the company involved the replacement of the catalytic afterburner for a regenerative thermal oxidizer, as well as the exchange of six separate units of liquid chillers for a central liquid chiller, bringing about 15,000 m³ water and 115,000 kWh power saved annually.



MONROE LITHO

The company operates in Rochester, USA, with 60 employees. Applied technologies: sheet-fed offset printing, digital printing. For quite a long time, the company had been interested in the recycling of their manufacturing wastes, but had never quantified the associated volumes, and therefore the first step was to introduce a measuring system based on simple weighting. They succeeded in bringing recycling and reprocessing to such a level that at the operating site a 30 m³ waste disposal facility could be closed down, because they did not generate such a large volume of wastes any longer. The next move of optimization was made in the area of manufacturing and work order: the work order run over seven days a week and in three shifts was changed to five days a week and two shifts. To increase sustainability, checklists were compiled at the various departments to facilitate and accelerate their work. For water consumption, toiler flushing tanks using smaller volumes of water were installed.

SUNDANCE MARKETING SOLUTIONS

This company operates in the U.S. city of Orlando, has 35 employees, while its annual sales amount to USD 5 million. Applied technologies: primarily sheet-fed offset printing and large-format digital printing. The first step was to review their manufacturing processes, and verify whether they complied with the relevant legal regulations, because it was impossible to walk the way of sustainability in case their waste management or wastewater emission practices were in conflict with any of the legal regulations. Then, ideas that were inherently associated with sustainability were raised: less waste, less production waste, improved efficiency, replacement of artificial illumination, abandoning some process of high energy demand, checking and monitoring what devices, machines could be switched off for nights or weekends, etc. Control over these simple processes resulted in waste and energy savings in huge quantities. The company also checks and documents the further way of the wastes they release. With additional improvements, they do not solely follow the way of wastes, but make efforts to formulate the packaging of the products they manufacture so that they remain easily recyclable.

T-FORMATION

The company operates in Midway, USA, with 105 employees. The applied technology is screen printing. The main goal of the company was to reduce energy consumption. To this end, they commissioned contractors to perform energy audits. One of their recommendations concerned the central management of thermostats and their removal from the offices. Another recommendation of much larger weight was the review of lighting. Altogether 112 lighting fixtures were used in the plant, still there were work stations where illumination was not sufficiently intense, while at other locations three or four lights could be turned off without causing any change to appropriate lighting. The relocation of certain lighting fixtures and the removal of the unnecessary units made 54 lamps redundant. As a further step, the replacement of the sources of light for more energy-efficient units is in progress. In practice, it means that a 300 W bulb can be changed to a 110 W bulb without decreasing light density. Unfortunately, there is no recycling plant operated in the settlement with collection services, and therefore the company sorts and collects wastes selectively on its own, and uses its own truck to deliver wastes to disposal. The next step is the reduction of the indirect materials and cleaning agents used in the various manufacturing technologies, and their potential replacement for more environmentally friendly substances. Of all these changes, the hardest task was the examination of effects and consequences. As intervention is executed in a process, the alteration of a single element may exercise an effect on the other elements of the process, too.

3 RESULTS AND DISCUSSION

Although these companies have several certifications beside SGP certification but SGP connects to these certifications on many levels and this is what makes the system a little bit difficult and complicated. From the studies it's very clear that many simple steps lead to a greener future, to a sustainable production. If we could collect and methodize these steps we can build a relatively independent and -what is more important- a simpler system.

The base of this system in our opinion is the understanding and detailed description of the processes. These processes can be grouped as you can see on Figure 1.

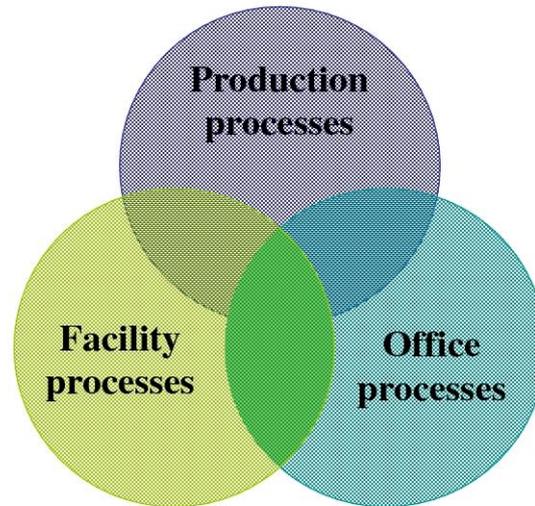


Figure 1: Process-bubbles

All the processes at a company can be fitted into the process-bubbles on the figure. The advantage of this categorization that in first step we can take those processes into it what we would like to focus on and later we can extend it step-by-step. The final target is that all of the company's processes inserted, monitored and documented. An example can be seen in Table 1.

Table 1: Process categorization

Production process	Facility process	Office process
CTP plate making	Pressroom I. Lighting	Office I. lighting
Sheetfed press I.	Pressroom II. Lighting	Office II. lighting
Sheetfed press II.	Bookbinding room I. lighting	Office III. lighting
Web press I.	Bookbinding room II. lighting	Office IV. lighting
Guillotine I.	Storage lighting	Office V. lighting
Guillotine II.	Climate Pressroom I.	Printing processes
Folding machine I.	Climate Pressroom II.	Paper consumption
Folding machine II.	Climate Bookbinding room I.	
Folding machine III.	Climate Bookbinding room II.	
Saddle stitcher I.	Climate Storage	
Saddle stitcher II.	Waste-paper handling system energy	
Packing line		

We can start the work with any processes but from the studies we see that is worth start with processes what need not so much investment but cause an immediate change.

Such processes are: „3R” raw materials (reduce-reuse-recycle)

Lighting efficiency, necessity

Work and manpower reorganization

After we determined the processes that we think is important to us we have to record the base status of the processes. Therefore we need to set up a monitoring system, that easily can provide us the necessary informations. The measuring method should be as simple as can, for example weight measurement, electric consumption measurement, water consumption measurement. The method can be seen on Figure 2.

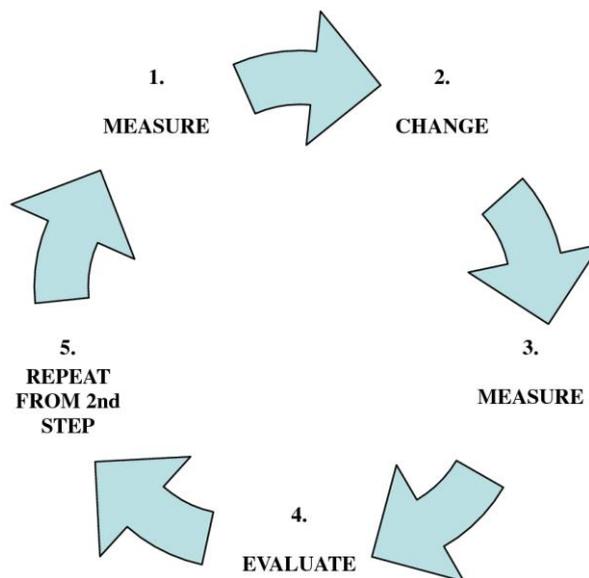


Figure 2: Changing method

These processes are similar to the human body's organs. The more processes we pull under the sustainability umbrella the better operating system we get. Our goal is that the company be similar to a body that functioning with positive self-preservation, and positive means profit here.

4 CONCLUSION

The changes lead to profit because the cheapest energy or raw material is the one we not use. If we needed to use we can even choose the way of the usage.

This is what we can see is a frame system that need to be adapted to every single company that would like to obtain the certification. It doesn't mean that this system imposes varying difficulty changes for different companies but the companies set up the necessary changes for themselves. The base of the system is that when a process added to it, then in strictly need to monitor, document and continuously develop it with changes. Important to see that some changes don't need investments some of them need small investments and some of them need more financial sacrifices. However we have to see that it's for a greener future and we have to involve the whole company staff for a common target. The target is to be a sustainable company in the printing industry.

On the following Figure 3. can be seen the European emissions.

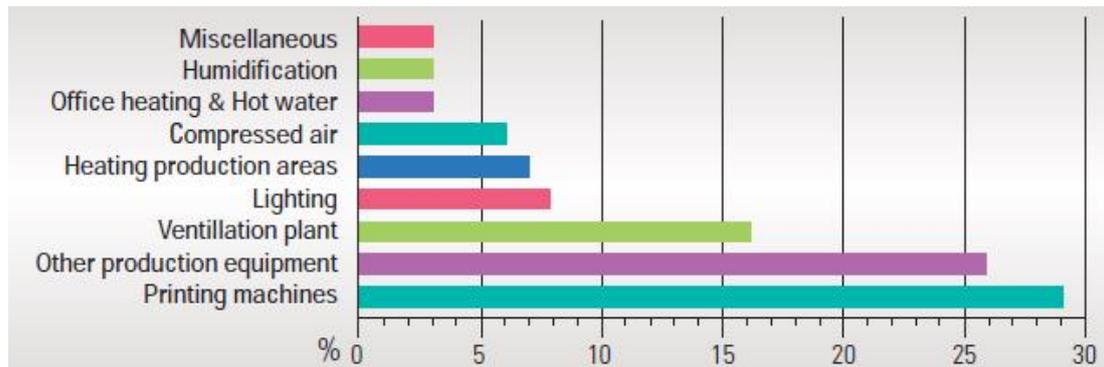


Figure 3: European emissions [2.]

You can see that the Pulp, Paper & Printing industry is smaller contributor for the total emissions but to operating themselves they use large amount of energy, raw material, and produce waste that all connects to other sectors such as Road transportation, Energy production and Other sources. That's why is important to deal with the sustainability of printing.

5 REFERENCES

- [1] Joe Deemer: SUSTAINABILITY STUDIES IN PRINT, PRINTING INDUSTRIES PRESS, ISBN-10: 088362719 - 1, PITTSBURG, (2011)
- [2] PrintCity GmbH + Co. KG: CARBON FOOTPRINT & ENERGY REDUCTION, PRINTCITY GMBH + CO. KG, AUGSBURG, (2013)

Corresponding author:

Istvan MECSEI
Nyomda-Technika Kft.
Böszörményi út 6.
4027 Debrecen
phone: +3630-754-6005 e-mail: istvan.mecsei@nyt.hu