AGI ENERGY SERVICE CENTRE
Sustainable Energy for Profitability

WHAT ENERGY EFFICIENCY CAN DO FOR THE PLASTIC MANUFACTURING INDUSTRY?

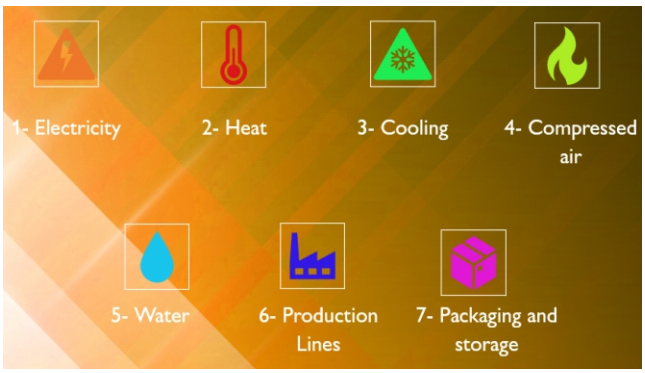
In recent times, plastics have become a dominant medium of packaging largely due to their affordability, hygiene, and convenience. Unfortunately, the massive demand for and use of plastics has brought in its wake a major national energy wastage and energy management challenges resulting in - among others - a lack of improvements in the energy efficiency of the plastic plants. Only immediate end-of-life management of plastics(*) and immediate action on energy management will result in reduced environmental load while also reducing the costs of production of the various plastic products.

01 You can't manage what you can't measure

This axiomatic statement holds true in all aspects of life; it is hard to manage one's weight without a scale and it's hard to manage how fast one is traveling without a speedometer. Like-wise, it is hard to manage energy costs if one does not know how the energy is consumed.

02 Energy audit

Energy audits are actions that identify areas of energy wastage/energy losses & determine ways to eliminate them. Significant reductions can be achieved by starting a measurement campaign, analyzing, challenging, and optimizing the energy balance. Energy Audits require expert knowledge relating to the performance of the buildings and the plastic manufacturing processes



03 Major energy consuming units in plastic production

Heat to melt the raw material and to shape plastic products constitutes the largest energy consuming process in a plastic industry. Partly the heat is generated directly (electrically) in the extruders, but partly also by means of external heat generation (e.g., by steam boiler). These boilers should be checked for defects in overall condition, energy losses, insulation, needs-based operation and needs-based temperature requirements. The shape of the plastic is often pressed, which regularly requires higher electrical energy consumption.

(*) Since 2018, Ghana implemented one of the first collection system and modern recycling facility for PET bottles in Africa according to the Ghana Plastic Manufacturers' Association (GPMA). 'Some Euro 400 million are being invested in the facility and infrastructure,'.

Plastic bottles are usually produced with compressed air from a small blank shape with high pressure. This requires up to 40 bars. There are many savings potentials with compressed air including leakage reduction. The waste heat from the compressed air can possibly (partially) be used to generate the necessary heat for melting and forming.

The machines for plastic injection molding are old hydraulic and electric powered machines, or new all-electric machines, or mixture of both. All electric machines have been shown to consume 60 – 80% less energy than hybrid and hydraulic machines.

04 Waste heat and cooling systems

In principle, there is waste heat in almost all factories, which should be examined to see whether it can be used in other processes. Plastic production has usually also high cooling demand.

The cooling system needs to be used demand-orientated: temperatures are meaningful, leakages are limited, renewed technologies including VSDs are commonly used. Extrusion machines are used as required, for example not having long idle times or if they are very old, they should be completely or partially renewed. It should also be inquired whether there is any available option offered by the manufacturers than can be added to reduce the energy consumption or allow for heat recovery. There is need for a check of the insulation of the molding machine surfaces. Usually in a humid environment like in Ghana, there might be water drops that reduce the quality of the produced plastics.

Check the plastic pellets humidity as this can alter the quality of the products. In some plants, it is required to dehumidify the pellets before using them.

05 Attracting new customers

Improving the energy efficiency will reduce the production costs of the plastic products restricted to limited profit margins, will improve the productivity and the quality of the products, and will help attract new customers that are aligned with sustainability concerns and reduction of greenhouse gases emissions.

For additional information on this opportunity, please contact:

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