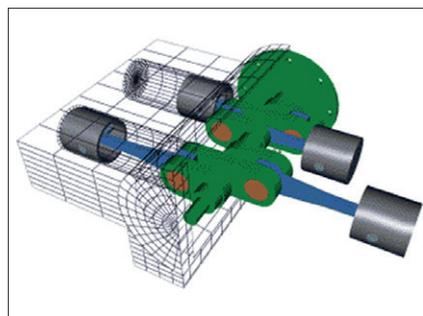


# SUSTAINABLE BLOWER AIR AND ENERGY MANAGEMENT

## Energy Management in the filling industry for plastic bottles

*The question about the importance of the environment compared to economy was a matter of perspective in the last century. In the short term, the economy took priority. One had to create a net income. Environmental parameters did not bear any weight that was compatible with economic decision-making horizons. Environmental factors used to worsen the result. Is that different today?*

The perspective has not changed significantly in spite of renewable energies. The German Renewable Energy Act (EEG) in its amended version of 2017 still omitted to shift the focus to the biggest of all energy sources: The biggest and the most underappreciated energy source is saved energy. On the contrary, using more electricity is rewarded.

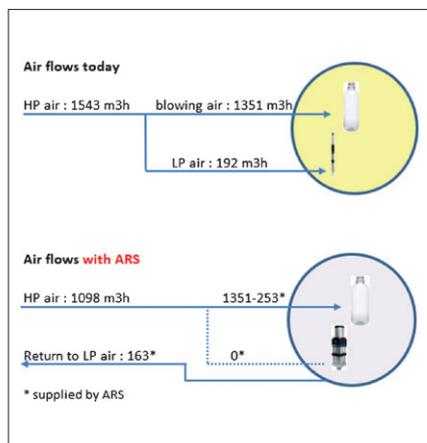


*Opposite horizontal arrangement of the cylinders of the compressor*

Those who now conclude that saving is not necessary make the wrong decision, because equipment that is energy-efficient, i. e. uses energy sparingly, runs more quietly and longer and its performance is noticeably more efficient. These characteristics are particularly important for the production of oil-free blower air in high pressures. Firstly, because the plastic bottle filler must be able to rely on the constant carefree productivity of the compressor. Secondly, on average up to half of the entire electricity supply for the complete filling line is used to provide blower air.

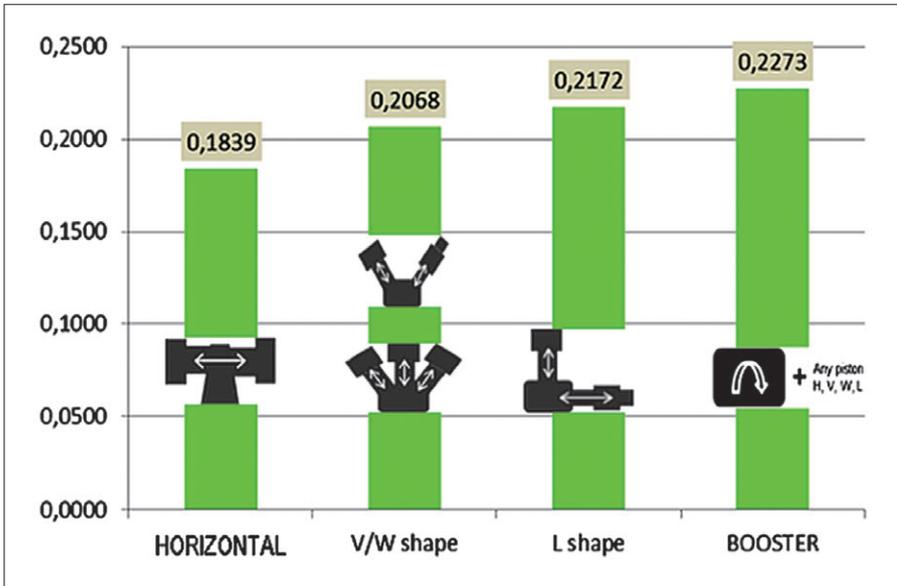
The high availability efficiency for blower air compressors of ABC Compressors is a result of their extraordinarily smooth running: Thanks to the construction of the opposing horizontal arrangement

Every operation which can prove its comprehensive energy management as part of ISO 50001 can enjoy a significant discount on its electricity price. An additional meter is already classed as a plus on the list and on the way to a discount for the kWh price. This results in higher, instead of lower usage.



Savings	
HP air savings = 7 + 8	445 m <sup>3</sup> /h
LP air savings = 9	163 m <sup>3</sup> /h
kW savings per hour = 15 x 0.25 kW + 16 x 125 kW	132 kW
kW savings per month	80,551 kW
Total kW savings per year	966,608 kW
Total financial savings per year	115,993 euros

*Before and after comparison of the energy NOTE: The author looks forward to mail you the comprehensive case study and the before/after-comparison as well as the savings estimate based on the ARS-upgrade ("ARS FULL"). Please address your request to info@glocon.eu.*



Comparison of the energy consumption of different compressor designs

of the cylinders the forces generated by the moving pistons are mutually canceled out.

First and second level mass forces are avoided. The result is the smoother running of the engine with minimalized energy consumption. The cylinders are perfectly balanced in this construction.

Proof of the high availability efficiency is the by far above average long maintenance cycles.

The smooth, practically vibration-free operation allows these long maintenance cycles (8,000 hours) and contributes to the electricity consumption which is on average 20 percent lower than the next best blower air compressor.

Why are facilities that were developed for minimalistic electricity consumption the right investment decision?

The electricity demand continues to rise, as firstly the demand for renewable energy sources increases to avoid the use of fossil, carbon-based and nuclear energy sources, and secondly the entire energy demand will continue to rise significantly due to new types of drives in logistics and transport (motor vehicles, trucks, trains, planes, ships).

The offer of renewable energies will, however, not be able to satisfy this disproportionately growing demand for energy in a reliable and constant fashion. The experience

with supply fluctuations of wind energy and solar power this summer and the problems transmitting electricity from the source to the user, e. g. from the north to the south, are warning signs we must not disregard.

## The solution is saving energy

Options for the filling industry for plastic bottles:

- Updates and recalculation of the actual requirements of blower air of even older blower machines (new bottle geometries and weights enable lower pressure and reduced volume). Many facilities still use older compressors, which were suitable at the time of their acquisition, but are too big by now for the production of modern bottle geometries and smaller bottle formats (mainly half a liter instead of 1.5 liter).
- Second use of compressed air through the recovery of blower air – even for older blower machines by means of upgrading them with air recycling systems of Technoplan Switzerland.

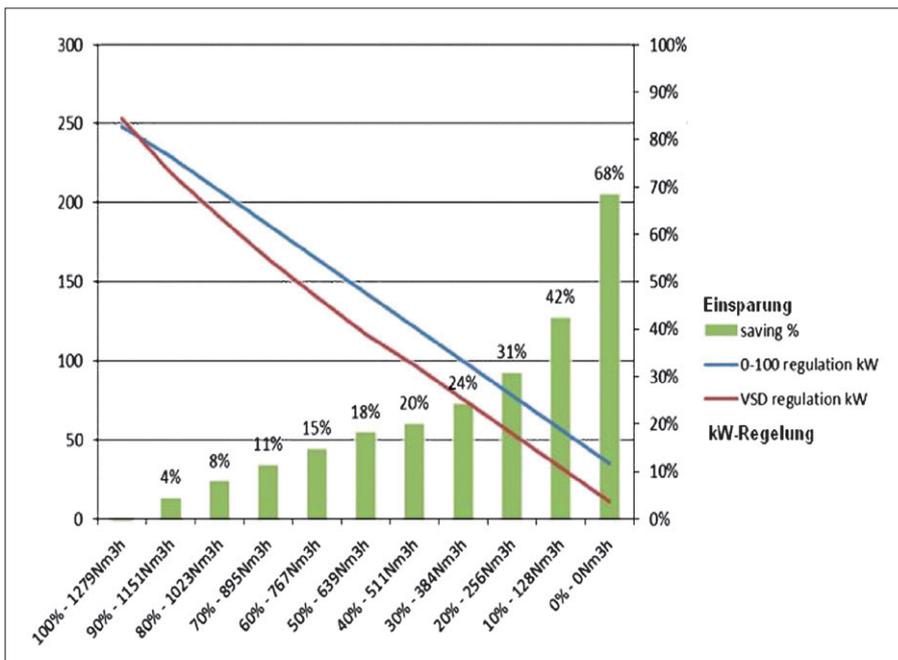
The product of Technoplan Oven Energy Optimization (TOEO) uses the same philosophy of energy efficiency with savings of up to 20 to 40 percent.

The object of this study has been a 10-year-old stretchblow molding machine of a German machine manufacturer. The format has been a 1-l bottle (for use of the ARS-technology this is actually a less favorable format – the ROI with this technology improves with the size of the applied bottle volume). Production speed: 32,100 bph, blow pressure P2: 32 bar.

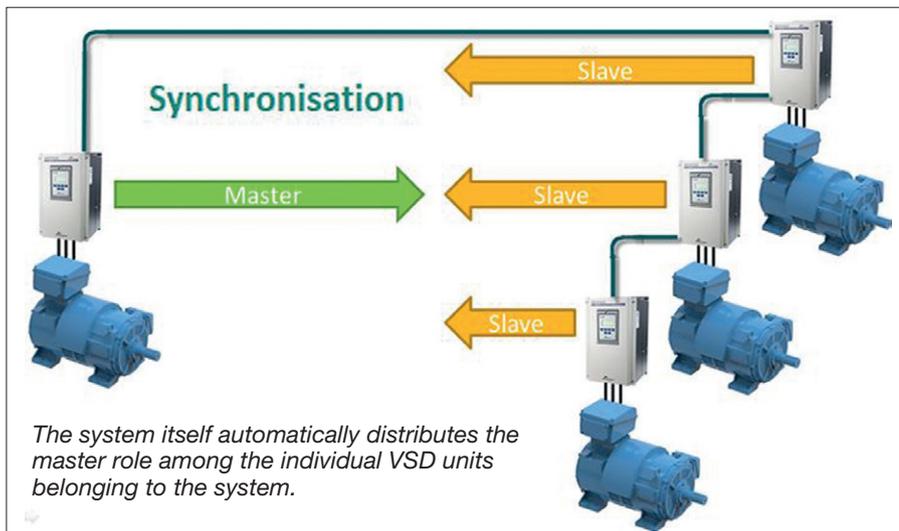
## Heat recovery

The collateral heat generated during the operation of high pressure compressors, which until now has been disposed of as lost heat, can be converted into useful heat when using the corresponding upgraded compressors. The warm water generated by means of a heat exchanger is used in beverage plants either for the heating system and/or for CIP processes.

The level of heat recovery is the share of heat that can be reused. When using an ABC Horizon high pressure compressor fitted with a



Energy saving potential through speed control



heat recovery system it is possible to recover up to 85 percent and in special cases even 90 percent of the heat.

In regulated compressor drives (VSD/variable speed drives – frequency controlled drives) which are set up to save energy depending on the format and size, the requirements are adjusted (e. g. when the size is changed from 0.5 l to 1.5 l), and they avoid surplus production. Capacity leveling through frequency adjustment: it enables the

integration of several compressors equipped with VSD for a common target value.

A variable drive (VSD) plays the master role, and the other compressors equipped with VSD work as slaves and follow the reference value of the master compressor.

Thus, all VSDs turn with the same speed.

The system automatically assigns the master role to the individual VSD units forming part of the system.

With the air recovery equipment (ARS) on board 282 m<sup>3</sup>/h of high pressure air and 163 m<sup>3</sup>/h low pressure air are saved.

Using the “full“ air recovery equipment (“ARS Full“) 540 m<sup>3</sup>/h are saved.

Saved energy is thus produced by:

- Avoiding fixed speeds, and instead by prompt adjustment to the actually required speeds
- Avoiding idle periods and peak loads
- Management and even distribution of working hours for all compressors

These measures – individually or taken together – ensure a higher net income in the short term, and at the same time save energy and support sustainable production. □

*Axel Below*

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