SECO/WARWICK
INVENTION MEETS RELIABILITY

THE BEST SOLUTIONS FOR AN ENERGY CRISIS

Production Economics According to SECO/WARWICK

PRODUCTION ECONOMICS ACCORDING TO SECO/WARWICK

For the past four years, the global economy has faced difficulties. Extended raw material delivery times, high energy prices, challenges in key industries, fewer orders, and transportation difficulties - many related to the outbreak of war in Ukraine - are just some of the challenges that manufacturing companies have been dealing with since 2020.

Global investment banks are publishing analyses warning of a global crisis. In times of uncertainty, reducing production costs will be particularly important for many companies, as such actions can ensure the continuity of their operations. SECO/WARWICK solutions perfectly illustrate how these actions can be implemented in practice.

Efficiency and savings in production have become key factors influencing the success of a company.
Companies that can produce more efficiently while controlling costs gain a market advantage and acquire a crucial edge in difficult times.

According to the latest S&P survey, the private sector in the eurozone ended the year with a decline. This was accompanied by the fastest rate of job cuts in four years. Companies are reducing their workforce.

"At SECO/WARWICK, we are well aware of this, which is why we are constantly working on solutions that will support our partners in this mission. Seeking savings is a sign of prudence today, and every business should constantly look for optimization of solutions and processes while simultaneously increasing the efficiency of work and resources. Today, to be competitive, one must think in terms of being efficient, skillfully utilizing resources, and taking a frugal approach to what one has. This does not mean saving on investments, but rather considering investments, such as those aimed at reducing energy costs,"

- says Sławomir Woźniak, CEO of the SECO/WARWICK Group.

SECO/WARWICK

EFFICIENT USE OF RESOURCES

"At SECO/WARWICK, we have built a photovoltaic panel installation that helps us diversify energy sources and relatively reduce its costs. But the key to success is production implementations that enhance efficiency. Therefore, more and more often in our industry, companies decide to purchase new industrial furnaces, citing significant reductions in production costs as the reason. Our devices allow for reduced energy and process gas consumption while ensuring greater efficiency and, importantly, increased production efficiency,"

– add Katarzyna Sawka, Vice President of Marketing at SECO/WARWICK Group.

Medium-sized enterprises (according to the Polcom report) are focusing on migrating IT infrastructure to the cloud (IaaS, PaaS) and using SaaS (Software as a Service) applications. Through these actions, they **aim to eliminate technological debt, reduce operational costs, and increase operational flexibility.**

According to the data collected in the APAGroup Report on Industrial Transformation 2024, 88% of respondents confirm that the **implementation of Industry 4.0 technologies increases market competitiveness**. Respondents see significant benefits, such as process optimization, improved operational efficiency, and the ability to quickly respond to changing market conditions.

Resources, both human and technological, are the foundation of every production process. Their optimal use translates into increased operational efficiency and cost reduction. One example of a tactical improvement is the addition of FURNACE/PLUS an **intelligent process management center** that allows users to optimize the work flow of equipment and personnel, **minimizing waste**, and improving efficiency. The FURNACE/PLUS system facilitates the **efficient use of energy and raw materials**, supporting the economy and ecology of production, using the **data collected to analyze trends**, assess results, and provide the foundation to make strategic decisions.

FURNACE/PLUS

Manage and optimize resources and processes!

Unplanned downtime is one of the biggest sources of production losses. Eliminating it through process monitoring and proactive maintenance actions brings tangible savings. Once again, SECO/WARWICK's intelligent system, FURNACE/PLUS, comes to the rescue. Its advanced features include **real-time equipment condition monitoring, which allows for predicting potential failures; proactive maintenance planning, which minimizes the risk of unexpected downtime; and process data integration, which enables quick response to changes and optimization of actions.**

- Monitoring devices in real-time allows for early detection of potential failures, **minimizing production downtime and repair costs.**
- Predicting failures **increases operational efficiency and reduces the costs of unplanned downtime.**
- Regular and scheduled maintenance translates into **greater operational stability.**
- Monitoring systems **optimizes operational costs.**
- Analyzing media consumption **identifies areas where savings can be implemented.**

Thanks to FURNACE/PLUS, companies can reduce energy and raw material consumption while increasing productivity, significantly lowering production costs. But we can also use resources efficiently through specific innovations.

FURNACE/PLUS is a solution that helps users to avoid costly repairs by monitoring key parameters of equipment enabling a quick response and in this way, companies can minimize downtime, which translates into higher operational efficiency.

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VORTEX 2.0

Make better use of energy resources and lower production costs

For companies involved in aluminum processing, we have designed the VORTEX 2.0 **coil annealing system, which provides a 35% reduction in heating time compared to traditional technologies**, thereby reducing **operating costs** and CO_2 emissions. It also ensures high energy efficiency and better use of available resources, lowering production costs. These systems are already operating in the largest aluminum processing plants in the world, and their implementation can be seen as a forward-looking approach to what is happening in global markets.

VORTEX 2.0 reduces the heating time of the charge by up to 35%, leading to lower energy consumption and reduced operational costs. Faster heating translates into shorter production cycles, increased throughput, and the ability to fulfill more orders at the same time, increasing a company's competitiveness.

- Shortening the heating time of the charge **reduces the time needed for production processes and lowers operational costs.**
- Shorter heating times mean lower energy consumption during the process, resulting in **lower operating costs**.
- Faster heating shortens the production cycle, allowing more charge to be processed at the same time, **increasing production efficiency and productivity**.
- The system provides **better properties in the final product**, such as improved surface quality, minimized cracking, and elimination of local overheating, which not only **increases its long-term value but also improves the company's competitive offer.**

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Heat Recovery

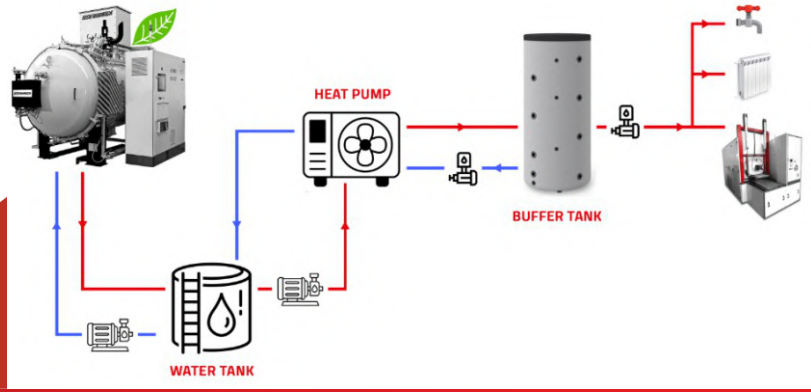
Lower costs, more energy!

- The ability to achieve independence from external gas supplies by **reducing energy consumption by up to 90%**, significantly impacts **energy savings.**
- **Independence from gas supplies** for heating buildings and water means that companies can expect a return on investment within 2 to 3 years.

Another money-saving solution is to equip hardening plants with an installation that recovers waste heat from production processes. This process involves capturing the heat generated during heat treatment processes and using it to power other production processes, heat rooms, and provide hot water.

"This not only helps reduce energy costs but also makes us independent of gas supplies. It also brings environmental benefits by reducing CO_2 emissions, for example. We are installing more and more of these types of installations for partners who are paying closer attention to reducing costs,"

- says Sławomir Woźniak, CEO of the SECO/WARWICK Group.



Heat recovery from an industrial furnace fully utilizes waste heat in other production processes.

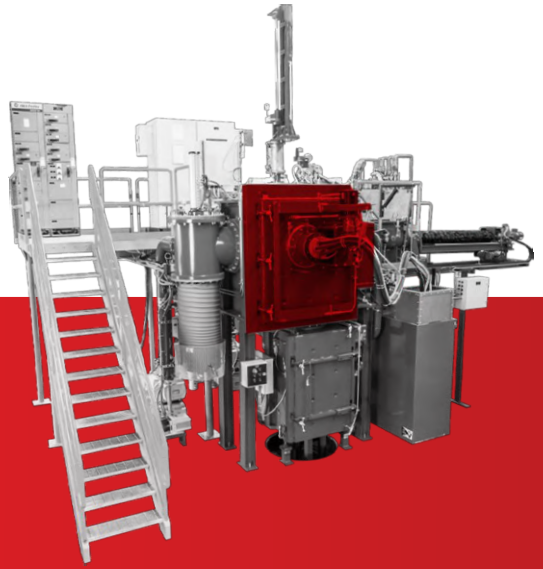
SECO/WARWICK

JetCaster

Shorter crystallization, faster production, lower costs!

"Many manufacturers praise their equipment. But at SECO/WARWICK, we don't make empty promises. We have precisely calculated the cost optimizations resulting from the use of our equipment. The JetCaster furnace revolutionizes casting processes. It ensures a reduction in crystallization time by up to 50%, enabling faster production. Additionally, it reduces energy consumption by up to 40%, and with comparable energy use, we can produce twice as many castings. These are figures that capture the imagination,"

- added S. Woźniak.



JetCaster technology shortens crystallization time by 50%, translating into lower production costs and increased energy efficiency. Reduced energy and cooling water consumption supports the company's eco-friendly and economic strategy.

Modern technologies create solutions with increased efficiency and savings by shortening process times, reducing energy consumption, and eliminating unnecessary costs. Among the solutions that respond to the needs of contemporary manufacturers, several deserve special attention.

- **Shortening the production cycle reduces operational costs.**
- A faster cycle means faster product delivery to the market, **increasing a company's competitiveness**.
- **Twice as many castings** with a comparable energy demand translates into **lower energy costs**.
- **More efficient use** of raw materials and energy **lowers production costs.**
- **Better quality** of turbine blade castings means **lower costs** related to complaints and corrections.

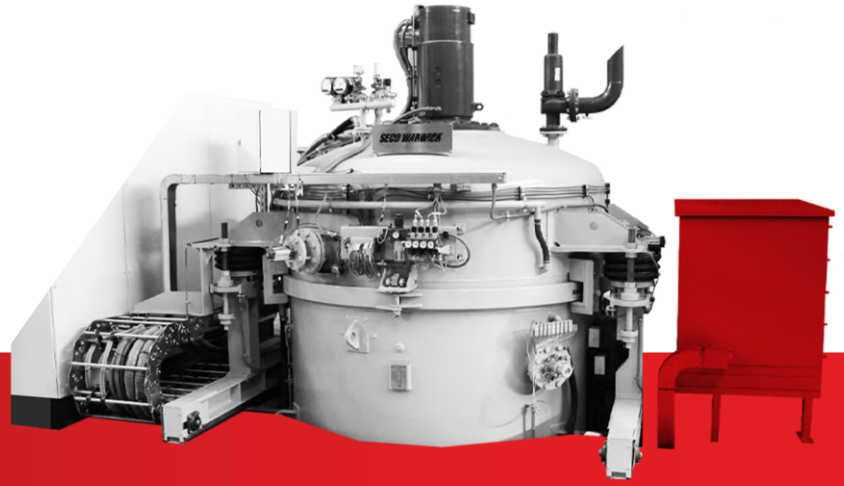
SECO/WARWICK

Pit-LPC

Carburize Faster, Cheaper, More Efficiently!

Pit-LPC is an **alternative to traditional gas carburizing**, producing a **process time reduction of over 60%**, which reduces energy costs. Additionally, **implementing this technology effectively allows users to replace up to three atmospheric furnaces with one vacuum furnace**, reducing both investment and operational costs

- Shortening the carburizing process, while eliminating the preparation of the process atmosphere, **reduces energy and process gas costs.**
- **3 = 1,** meaning the replacement of 3 atmospheric furnaces with 1 vacuum furnace **reduces investment and operational expenses.**
- **Eliminating costly consumables media.**
- **Reduces investment costs** associated with infrastructure reconstruction.



Pit-LPC shortens the carburizing process (2-3 times) by eliminating the need to prepare the process atmosphere. This significantly reduces energy and process gas costs. Additionally, the ability to replace up to three atmospheric furnaces with one vacuum solution reduces both investment and operating expenses.

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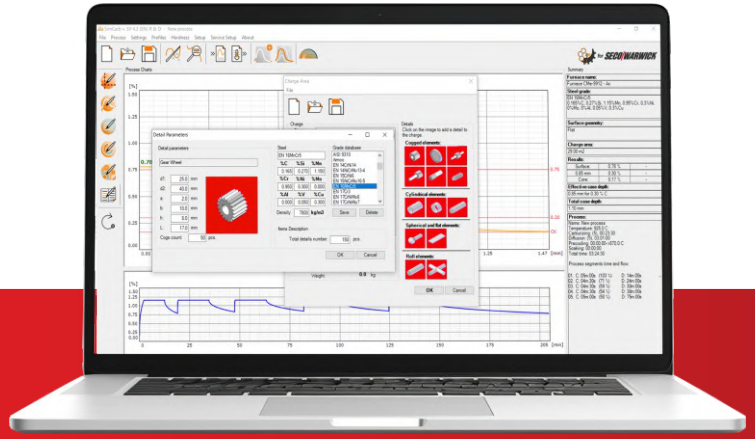
SimVAC

Optimize Carburizing!

Vacuum technologies ensure minimal process gas consumption during carburizing, enable the use of higher process temperatures, and thus **shorten process times**. One of the engineering tools that calculates, among other things, the demand for process gases is the SimVAC program, developed by the Lodz University of Technology in cooperation with SECO/WARWICK.



SimVAC optimizes the consumption of process gases by adjusting their amount to actual needs. Reducing gas losses and precise carburizing control reduces costs and increases energy efficiency.

The program enables users to design **each vacuum carburizing (LPC) process** cycle by selecting optimal process parameters to achieve the required technological result at minimal cost with maximum efficiency.wydajności.

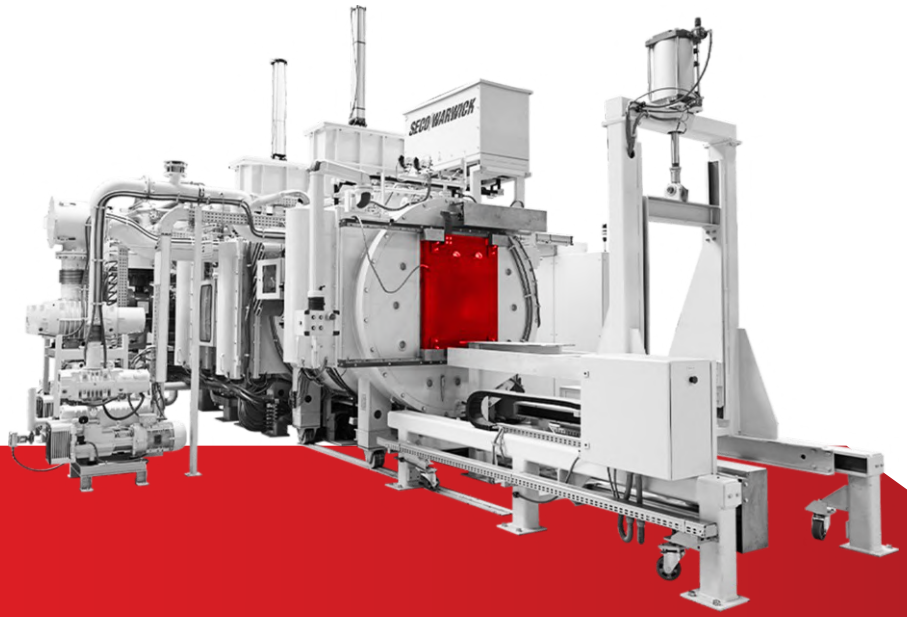
- Precise adjustment of process parameters ensures the **desired technological results with minimal expenditure.**
- Optimization of process parameters maximizes efficiency and **increases production efficiency**.
- SimVAC eliminates or significantly reduces the number of tests needed to develop the process for new products, **thereby reducing costs**.

SECO/WARWICK

CaseMaster Evolution D/T

Efficient and reliable vacuum heat treatment!

An example of equipment that increases the efficiency and savings of production plants is our two- and three-chamber vacuum furnaces, the CaseMaster Evolution. These systems operate using comprehensive vacuum carburizing with optional oil or gas quenching for large-scale and mass production.



CaseMaster Evolution D/T enables the simultaneous processing of multiple charges in one furnace, contributing to shorter production cycles and lower costs. Thanks to automation and the elimination of the need to wash parts after quenching, the technology user saves time and reduces media consumption.

This solution increases efficiency and minimizes the waiting time for subsequent production stages, allowing for faster order fulfillment.

- Processing multiple charges in the furnace at the same time **increases efficiency and lowers costs**.
- Eliminates the need to wash parts after quenching, when using high-pressure nitrogen quenching, **shortening the cycle time and reducing operational costs**.
- Both automation and the elimination of the need to wash parts after quenching **saves time and reduces media consumption**.
- Complete automation of the furnace operation reduces the need for human intervention, **lowering operational costs**.
- The precision and repeatability of vacuum treatment results minimizes defective components, reducing **production costs and potential complaints.**

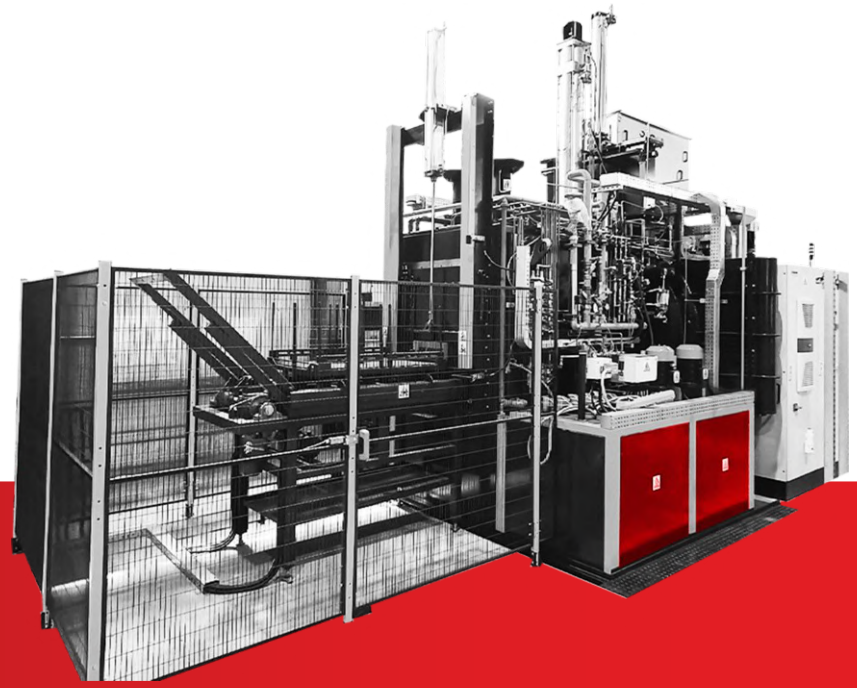
SECO/WARWICK

Super IQ

A productive approach to carburizing and oil quenching!

- **Optimization of technological processes.**
- Hybrid technology **reduces the consumption of process media and lowers overall operating costs**.
- Working at higher temperature ranges allows for **shorter technological cycles**, accelerating the process, ultimately **enabling higher productivity**.

Another solution is Super IQ, a hybrid of vacuum and atmospheric technology, allowing users to take advantage of the benefits of vacuum carburizing and traditional oil quenching.



Super IQ combines the advantages of vacuum carburizing and traditional oil quenching, optimizing technological processes. The ability to work at higher temperatures accelerates production cycles, increasing plant efficiency and reducing operational costs.

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ZeroFlow

Combine ecology with economy!

The ZeroFlow nitriding technology, on the other hand, allows for a reduction in ammonia consumption by up to 12 times, which lowers process costs. It also significantly reduces environmental impact by decreasing the use of process gases and the emission of post-process gases.

ZeroFlow - precise control of the nitriding potential lowers process costs and significantly improves the environmental impact of the process.

- The ZeroFlow nitriding technology eliminates the need for continuous gas flow by using only appropriate portions of ammonia at the right time, effectively **lowering process costs.**
- Precise control of the nitriding potential and reduced ammonia consumption (up to 12 times) **reduces company costs**.

SECO/WARWICK

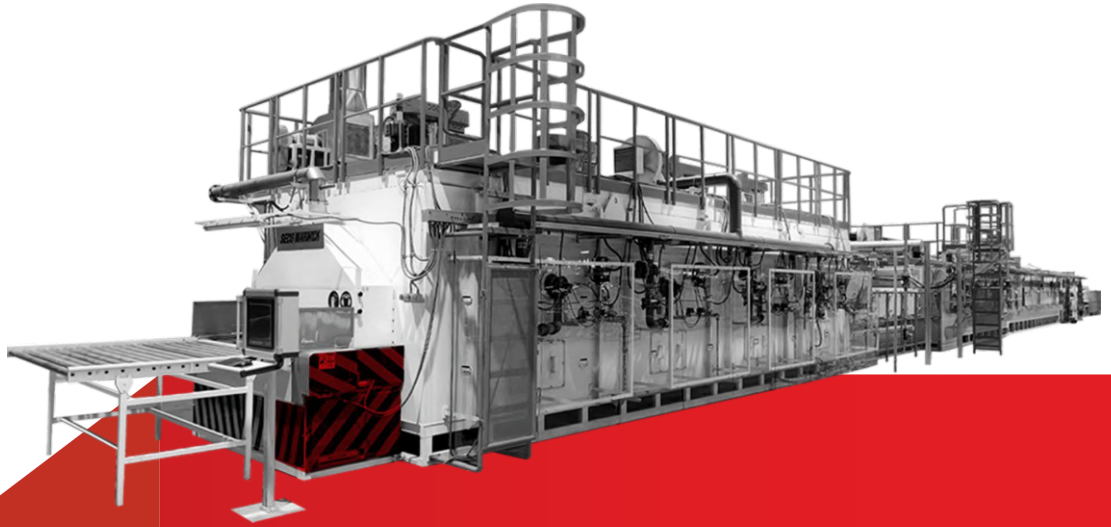
CAB Line

More efficient production, better results!

CAB (Continuous Aluminum Brazing) uses heat recovery systems, reducing energy consumption by up to 30%. Structural solutions minimize heat losses and improve the efficiency of the aluminum brazing process, translating into lower operating costs and reduced CO_2 emissions.

- The heat exchanger between the Degreasing Furnace (200°C) and the Afterburner (700°C) **reduces energy consumption** by preheating the exhaust gases before they enter the Afterburner.
- **Recovery of hot exhaust gases** from the Heating Chamber (550°C) and the Brazing Furnace (600°C) supports the heating system in the Drying Furnace (300°C), **reducing the need for additional energy sources**.
- Heating the inlet curtain reduces heat loss through the conveyor and products being processed, **lowering reheating costs in subsequent process stages**.

These solutions significantly reduce energy consumption and can be used in both gas and electric furnaces. Each saved energy unit means a direct reduction in costs, both in terms of energy consumption and CO_2 emissions.



The CAB line guarantees energy savings at every stage of the process - as well as heat recovery, reduced losses, and lower operational costs.

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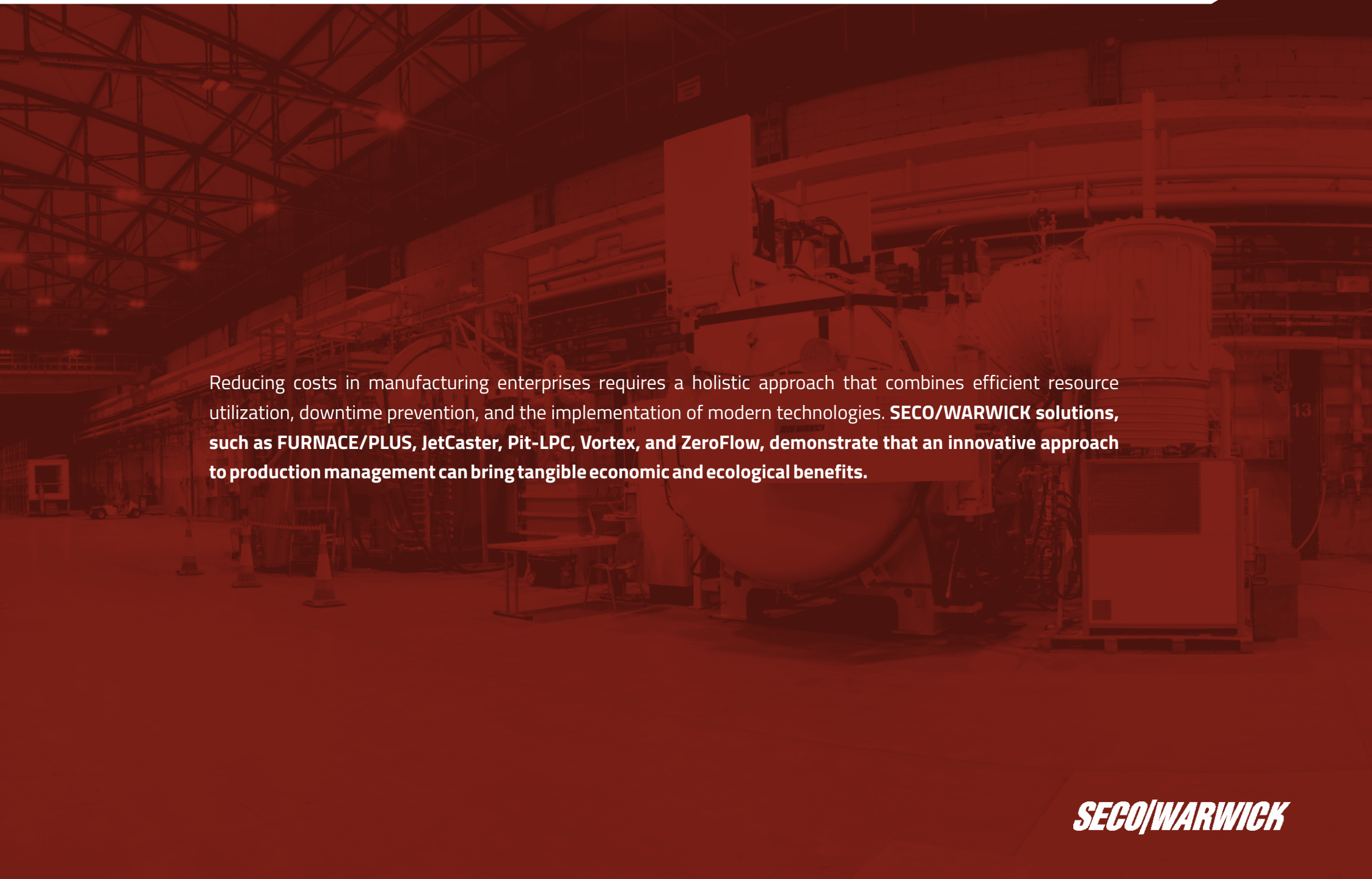

Reducing costs in manufacturing enterprises requires a holistic approach that combines efficient resource utilization, downtime prevention, and the implementation of modern technologies. **SECO/WARWICK solutions, such as FURNACE/PLUS, JetCaster, Pit-LPC, Vortex, and ZeroFlow, demonstrate that an innovative approach to production management can bring tangible economic and ecological benefits.**

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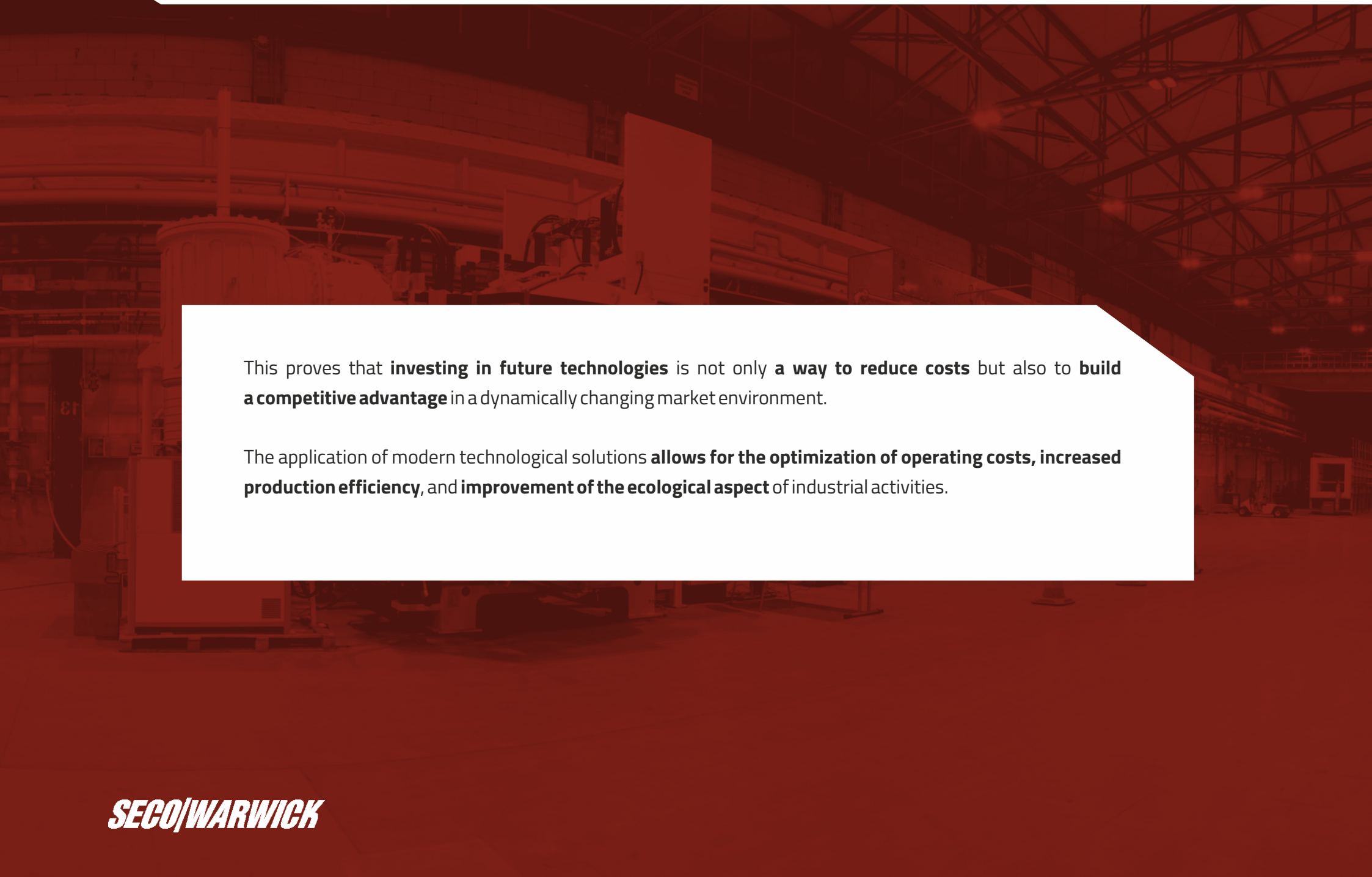

This proves that **investing in future technologies** is not only **a way to reduce costs** but also to **build a competitive advantage** in a dynamically changing market environment.

The application of modern technological solutions **allows for the optimization of operating costs, increased production efficiency**, and **improvement of the ecological aspect** of industrial activities.

SECO/WARWICK

EFFICIENCY – SAVING – PROFIT

With SECO/WARWICK technologies businesses can lower operating costs, increase efficiency, and reduce their carbon footprint. It's an investment in the future that translates into real savings and higher profits.

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