

Investing in clean air: The economic benefits of modern filtration systems



Potential savings from air pollution control - how companies reduce costs and protect employees

Economic challenges and the need for air pollution control

The economy is currently navigating challenging waters. The picture is characterized by subdued growth expectations and a noticeable reluctance to invest. Companies are under pressure to optimize their running costs, with energy and electricity spending being a particular focus. In this economic climate, investments in areas that do not directly contribute to value creation often seem avoidable.

In addition to economic constraints, there are also legal requirements. They oblige companies to ensure employee and occupational health and safety, including comprehensive measures for air pollution control in the workplace. The use of extraction and filtration systems is mandatory in many industries in order to ensure employee health and comply with legal limits.

Given economic uncertainty and cost pressure, companies are hesitant to invest. The use of extraction and filtration technology may initially seem like a burden, but modern systems offer long-term savings potential through innovative technologies. It's important to weigh the short-term investment costs against the long-term economic benefits of these essential technologies.

Legal framework for air pollution control in companies

The use of extraction and filtration systems in companies is mandatory under specific national laws and regulations. These regulations establish fundamental obligations to protect the health of workers. With regard to the handling of hazardous substances, these national provisions specify the necessary measures to minimize exposure, including the use of technical protective measures such as extraction systems. In addition, national technical guidelines and regulations contain detailed specifications for the design and operation of these systems, as well as for the limit values to be observed for pollutant concentrations in the workplace air.

Failure to comply with these regulations can result in regulatory requirements, fines, and liability risks. The use of air pollution control technology is therefore not a voluntary measure, but a legal requirement to protect employee health and comply with the law.



Image 1: Occupational safety monitoring officers check compliance with the limit values for workplaces at a laser cutting system © [Public Domain Mark/ULT](#)

Cost savings thanks to modern extraction and filter technology

Contrary to initial assumptions that extraction and filtration technology merely incurs costs, the use of modern systems proves to be a tool for sustainable cost reduction in companies. This is made possible by several factors:

- Energy efficiency:
 - Today's advanced extraction and filtration systems are often equipped with demand-based control technologies, such as constant negative pressure. This means that the system's performance is automatically adjusted to actual demand. During periods of lower emissions or breaks, performance is reduced, resulting in significantly lower energy consumption.
 - Heat recovery is also integrated into many modern systems. The heated exhaust air is used to preheat fresh air, which can significantly reduce heating costs in winter.
 - Modern extraction and filtration systems increasingly rely on EC fans (electronically commutated fans). These enable continuous and precise control of the air volume, thus optimally adapting to actual requirements. Compared to conventional AC fans, EC fans are significantly more efficient and therefore consume less energy.

Comparison motor efficiency level

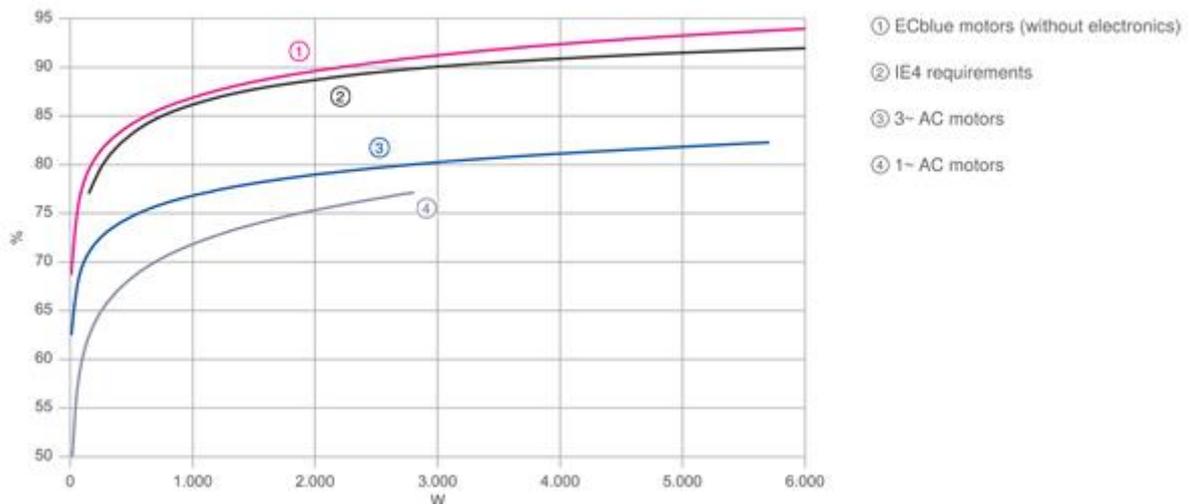


Image 2: Motor comparison AC vs. EC fans © Ziehl-Abegg

- Reduction in production losses and downtimes:
Airborne contaminants such as dust or particles can impair sensitive machinery and equipment or even cause failures. Effective extraction and filtration protect production equipment from contamination and wear. This leads to higher system availability, less frequent maintenance work, and thus lower repair costs and fewer production downtimes.
- Lower cleaning costs:
Where dust and particles are effectively removed, significantly less cleaning work is required on machines, systems, and in production halls. This saves time and reduces the costs of cleaning personnel and cleaning supplies.
- Employee health and motivation:
Clean air in the workplace is a crucial factor for employee health and well-being. Reducing pollutants in the air leads to fewer respiratory diseases and allergies, which translates into fewer sick days and higher productivity. Motivated and healthy employees are a key competitive advantage.
- System design:
Smart system design plays a crucial role in energy consumption. Every component in the air duct system, such as hoses, pipes, bends, reducers, and filters, causes a pressure drop, which increases the energy required by the fan. Careful planning and dimensioning of the entire system is therefore essential. Considering pressure drop calculations and using flow-optimized components are essential to maximize the system's energy efficiency. Smart system design plays a crucial role in energy consumption. Every component in the air duct system, such as hoses, pipes, bends, reducers, and filters, causes a pressure drop, which increases the energy required by the fan. Careful planning and dimensioning of the entire system is therefore essential.

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Bild 3: System design for optimum efficiency © ULTAG

- Recovery of valuable materials:
In certain production processes, extraction and filtration systems can recover valuable materials that would otherwise be disposed of as waste. This can not only save disposal costs but, in the best case, even generate additional revenue.
- Positive effects on product quality:
In sensitive production areas, such as the food, pharmaceutical, or electronics industries, air purity is crucial for the quality of the final products. Effective filtration prevents contamination, thus ensuring product quality and avoiding costly recalls.

These points demonstrate that modern extraction and filtration technology is far more than just a chore. It's an investment in efficiency, employee health, and ultimately, the company's economic success.

No alternative to air pollution control

Investing in effective extraction and filtration technology is no longer a matter of choice for companies today, but an unavoidable necessity. This can be deduced from several reasons.

- Legal obligation:
- As already explained, a comprehensive legal framework exists that obligates companies to protect their employees from harmful air pollution. Compliance with these laws and regulations is mandatory and non-negotiable. In many cases, the use of appropriate air pollution control technology is the only way to comply with the prescribed workplace exposure limits and, thus, avoid legal consequences.
- Ethical responsibility:
- Beyond the purely legal obligation, companies have an ethical responsibility for the health and well-being of their employees. Providing a safe and healthy work environment is a sign of appreciation and professionalism. Neglecting air quality can

lead to preventable health problems and permanently damage the relationship of trust between employer and employee.

- Long-term risk minimization:

Consciously investing in air purification technology is a measure for long-term risk minimization. It not only protects employee health but also prevents potential liability claims, production downtime due to plant contamination, and negative impacts on product quality. These preventative measures are generally more economically viable than fixing problems after the fact.

- Image and competitiveness:

Companies that actively promote employee protection and adhere to environmental standards enjoy a better image among the public and potential talent. This can be a decisive competitive advantage when recruiting qualified employees and acquiring customers. Sustainable practices are increasingly becoming an important decision-making criterion.



Bild 4: Fume extractor LAS 800 Ex (left) utilized with a laser cleaning system

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Investing in the future

Given current economic pressures, investing in modern extraction and filtration technology may initially seem like an additional burden. However, a detailed analysis shows that these technologies are essential to protecting employees and complying with legal requirements. Furthermore, they offer long-term economic benefits through energy efficiency and reduced

operating costs. Companies that invest in modern air pollution control systems minimize risks and secure their future viability. Thus, the perceived cost burden becomes a strategic advantage for sustainable corporate success.

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