



# SUSTAINABILITY REPORT 2017







## **OUR PLANET'S NATURAL FILTERS.**

The forests of our planet sustain nature's diversity, benefit our climate and support human well-being. Their trees are natural air filters because they clean the air we breathe by absorbing carbon dioxide in the air and many other gases, and by acting as filters that remove particulate matter as small as 1 micron (PM1). Like the trees and plants of our Earth, Camfil has been helping people breathe cleaner air for more than half a century. As a leading manufacturer of premium clean air solutions, we provide commercial and industrial systems for air filtration and air pollution control that benefit human health and the environment. We have chosen to symbolize this on the cover with a photo of the forest outside Pont-Sainte-Maxence in northern France, taken by Camfil employee Thomas Vanderheyden.



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# Clean Air's Mission in a Sustainable Society

The Camfil Group achieved another year of record sales and earnings in 2017 and entered 2018 with a strong order backlog from customers who are increasingly recognizing the benefits of premium clean air solutions for saving energy and delivering the best indoor air.

In the interview below, President and CEO Alan O'Connell, and Anders Freyschuss, EVP Global Standardization & Sustainability, talk about Camfil's history of sustainability, energy-saving products and important clean air mission.

## HOW DOES CAMFIL CONTRIBUTE TO SUSTAINABILITY?

**Alan O'Connell** **AOC** For more than 50 years, we have delivered daily on our promise to design, manufacture and deliver the best and most sustainable air filtration products in terms of energy usage and eco-friendly materials. Our products help customers lower the operating cost of filtering and cleaning air in commercial and industrial applications and reduce their carbon footprint.

**Anders Freyschuss** **AF** Camfil has been a sustainable company from day one. We have a strong in-house culture of sustainability born and bred in the Nordic market that is embedded in everything we do globally today. Being sustainable gives us a competitive edge, but to us, it is a natural way of working that directly benefits our customers. We take a holistic approach to sustainable air filtration: from design to delivery and across the product life cycle, we consider the impact of what we do on people, processes and the environment.

## DESCRIBE YOUR MARKET

**AOC** Our market is steadily growing, and clean indoor air – whether for production, health or safe working conditions – is becoming a desired commodity, considering today's knowledge of the dangers of indoor/outdoor air pollution and their link to disease and early mortality. This requires the use of filters of increasingly high efficiency to deliver healthy indoor air quality.

Customers also need best-in-class filtration to protect capital-intensive industrial processes, or to make their buildings more energy-efficient. They are therefore paying closer attention to the filters they choose to maximize their filtration investment. There is a growing awareness in the world that clean, filtered air improves worker and equipment productivity, minimizes energy use, and benefits human health and the environment. In our industry and market,



*Alan O'Connell, President and CEO*

we are proud to enjoy a reputation for energy-saving filters, high indoor quality and value for money.

**AF** In many filtration applications, Camfil products are the benchmark for the industry. Competitors try to replicate us in many ways, but we remain the leader in product and technical innovation and offer the most sustainable clean air solutions.



Anders Freyschuss, EVP Global Standardization & Sustainability

### DID CAMFIL HELP PIONEER SUSTAINABLE AIR FILTERS?

**AF** We were the first to recognize, embrace and highlight the importance of sustainable air filtration and Camfil's historical timeline includes several milestone accomplishments in this area. For example, we were the first filter manufacturer to introduce Life-Cycle Costing (LCC) software that allows the optimization of Heating, Ventilation and Air Conditioning (HVAC) systems for buildings. This software, in combination with an innovative product line, has helped us build a very strong market position.

Our trailblazing efforts in the 1990s to analyze the life cycle of our air filters were also instrumental in guiding our R&D team to develop low-energy products, select eco-friendly material and assess their environmental impact. In some respects, these initiatives were also market-driven to meet emerging requirements, such as incinerable filters to reduce waste in the Nordic market.

We have a long tradition of driving the industry forward. Camfil has been actively involved in the standardization of air filters and we introduced energy ratings for our filters before Eurovent's energy classification system was adopted.

**AOC** We are also known for the integrity of our products – everything we say about our products and their performance pans out in real-life operating conditions. Only in recent years has it been possible to measure and prove filter efficiency. Our products always do what we say they will do. They clean air with the highest efficiency and the lowest amount of energy, and they last longer for reduced maintenance and disposal costs. They have been developed by the best clean air experts in the industry, with the finest technology and R&D resources in the business.

**AF** All in all, customers get a lower total cost of ownership, which is the same as sustainability: energy savings, reduced carbon footprint, and less waste for a sound and green investment in filtration.

### HOW GREEN IS YOUR PRODUCTION?

**AF** All Camfil factories are ISO 9000 and many are certified to ISO 14000. We work daily to make our production as sustainable as possible by optimizing our processes to produce less waste and emissions and use less energy per manufactured filter.

Camfil is also unique in the industry because we design our own production machinery. We can optimize every size of filter for our customers for the highest performance. We also have best-in-class laboratory facilities and test equipment to help customers find the right filters for the greenest clean air solution.

**AOC** Our suppliers and customers demand proof of our sustainability and want to see that we are committed strongly to it and making progress. Following the sustainability route is also good business sense.

We can prove that our filters are the most sustainable solution, regardless of the application. We offer flagship energy-saving products like Hi-Flo®, Opakfil®/Durafil® and 30/30® for comfort ventilation, or Gold Cone® and HemiPleat® for air pollution control, and Cam GT® for turbines to boost output and reduce CO<sub>2</sub> emissions.

We try to maximize every filter we make in terms of particle removal efficiency and energy usage. We offer everything from high to lower tech products to meet all needs and applications, but even our simpler air filters are better than their peer group in terms of energy use.

### HOW DO YOU MAKE BUILDINGS ENVIRONMENTALLY FRIENDLY?

**AF** Our filter systems are part of a building's infrastructure and we are involved all over the world in making new buildings more and more sustainable in different green building concepts.

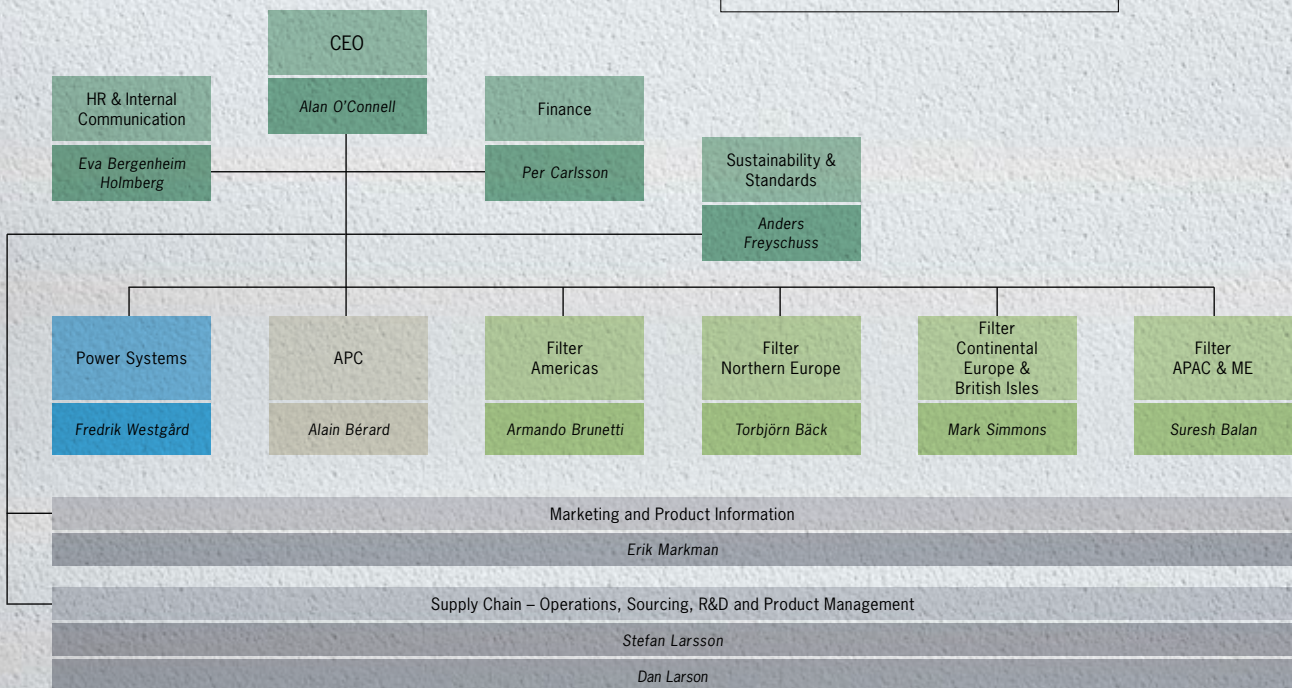
Buildings and facilities are always a long-term investment and their HVAC systems account for up to 50% of their operating costs, of which 30% is air filtration. With their longer life, lower energy use and higher efficiency, Camfil's premium air filters can deliver a direct payoff to our customers, allowing them to find the right balance between energy conservation and high indoor air quality.

Keep in mind that energy efficiency is being legislated and required in many countries. Today, buildings are "competing" for a green label by increasing their energy efficiency. Just look at the number of energy awards that are being given out. Green building rating systems like LEED – and sustainability assessment methods like BREEAM – empower those who own, commission, deliver, manage or use buildings to achieve their sustainability aspirations. Camfil is their partner to lower the cost of the HVAC system, the most expensive item in a building's operating budget.

**AOC** If you want to stay in business today, you must be sustainable, that's the bottom line. You need to be sustainable to attract more business. With our industry track record, we know we are doing what is best for our customers and will continue to make their operations greener as their clean air provider of first choice.



# Global Organization





## Mission Statement

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Camfil's mission is to provide customers with Indoor Air Quality (IAQ) and clean emissions in line with customer needs. This is being achieved with sustainable best-in-class air filtration products and services, as well as through local presence.

## Growth and profitability goals

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Camfil's goal is to achieve organic growth well above market growth with maintained profitability.

## Core Values

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Committed and innovative people in an entrepreneurial environment are Camfil's keys to success. Our core values express the soul of our company and serve as a guiding star for the entire Camfil Group. Constant efforts are made to ensure that all our employees understand and work in line with the following core values:

### Reliability

We are reliable because we know the market, we are honest and truthful. Our people, products and processes must always meet, or supersede, agreed results.

### Commitment

We are committed to always striving for the best possible solutions and we are in the forefront of technological and environmental developments in our fields of expertise.

### Customer satisfaction

We put our customers first. We focus on identifying customer needs and creating long-lasting customer value.

### Teamwork

Working together makes us stronger and increases employee satisfaction both locally and globally.

### Local presence

Local understanding and presence on local markets builds customer relations and satisfaction.

# Filters

## – Sustainable filters that save energy and protect health

Camfil air products are used to filter and clean the air in indoor environments. Every filter is backed by more than 50 years of experience – from replacement filters capable of removing sub-micron particles and gases, to complete air circulation and filtration systems.

Customers can choose from the widest and most advanced range of air filters in the industry to improve health and performance, protect critical manufacturing processes, boost productivity and safeguard the environment. Clean air, the filtered end-product, is free of harmful or damaging pollutants, dust, dirt, allergens, contaminants, molecular gases and, in some cases, even life-threatening radiation, depending on the application

- For “comfort air” in public and commercial buildings, Camfil has the most energy-efficient filters for Heating, Ventilation and Air Conditioning (HVAC) systems. These products, including a range of air purifiers, deliver clean air to protect people by improving Indoor Air Quality (IAQ), protecting the HVAC system from contamination, and helping the owners of buildings to reduce their energy consumption and carbon footprint.
- In the production world, Camfil's clean air solutions protect advanced and sensitive manufacturing processes by eliminating molecular and microbiological contamination that jeopardizes output, product quality or workplace health. In the nuclear power industry, particulate filtration, gas-phase filtration and containment are other specialties, as well as advanced biocontainment

systems and filter housings for high-risk research facilities and biosafety labs.

### AIR FILTERS, ENERGY SAVINGS AND CARBON FOOTPRINT

Sustainable air filtration solutions provide a concrete answer to new requirements from authorities for mitigating climate change and implementing energy efficiency policies without compromising indoor air quality. The result is the right balance between energy conservation and protecting people's health and the environment.

Camfil's solution is to make filters with a long lifespan. These products drastically lower costs by limiting installation expenses and reduce energy costs by remaining efficient for a longer time. Using fewer filters reduces the consumption of critical raw materials such as metals and wood resources for packaging, but it also reduces the amount of adhesives, plastics and filter media that are used, of which some are petroleum-based. Energy is also naturally saved in the amount of energy used to produce filters.

### AIR FILTERS AND HEALTH

Clean air matters for good health and Camfil believes that clean air is a human right. We want people to breathe with total confidence and we also want them to be more aware of the fine particles in air pollution that constitute an invisible threat and a public health challenge today.

To meet this objective, we actively take steps to raise aware-





ness about indoor and outdoor pollution through online initiatives and other actions such as our global “Take a Breath” campaign, European Camfil Roadshow campaign, and most recently, our IAQ Forum in Sweden.

Clean air is not only crucial to good health but also affects workplace productivity because of employee absences due to pollution-related ailments. Clean air also impacts the rate of classroom attendance, because children with asthma and other respiratory conditions tend to miss more school when air pollution levels are higher.

#### **ISO 16890 LEADS THE WAY**

It is consequently encouraging that the introduction of a new standard, ISO 16890, marks for the first time in history that the air filtration industry has agreed on a global testing and classification standard that makes it easier for customers to select the right filter for the right application. The standard will replace two existing standards: ASHRAE 52.2, dominant in the U.S., and EN779:2012, dominant in Europe (both coexist in Asia and the Middle East).

The standard is harmonizing the industry and leading to transparency, equality and opportunities for air filter manufacturers. It is also creating a level playing field because ISO 16890 makes it easier and fairer to compare competing products and will eliminate poor-performing filters to the benefit of customers and end-users. ISO 16890 is leading to higher indoor air quality because a filter’s

efficiency is tested with three different particle sizes and the results are related directly to performance against PM1 ( $\leq 1\mu\text{m}$ ), PM2.5 ( $\leq 2,5\mu\text{m}$ ) and PM10 ( $\leq 10\mu\text{m}$ ). Camfil offers many high-efficiency air filters that are rated for PM1 removal for high IAQ.

#### **ENERGY EFFICIENCY CLASSIFICATIONS**

In recent years, professional trade organizations are putting greater emphasis on the energy aspects of air filters.

In Europe, the Eurovent Energy Efficiency Classification System for air filters grades products from A+ to E, with A+ standing for the lowest energy consumption and E the highest. With the push to lower the energy consumption of HVAC systems, a filter’s energy class gives customers a clearer understanding of a filter’s annual energy usage, initial efficiency and minimum efficiency.

Camfil’s labels include the A+ to E energy rating to point out the difference between our filters and competitor products. Another example is in the U.S., where Camfil’s premium filters carry a 5-Star rating. Our most energy-efficient filters also have names to indicate this, such as Hi-Flo ES and Durafil ES2, with ES standing for energy-saving.

*Please visit [www.camfil.com](http://www.camfil.com) for detailed information about sustainable air filtration, energy-saving filters for HVAC systems and Camfil’s full range of world-class products and solutions.*



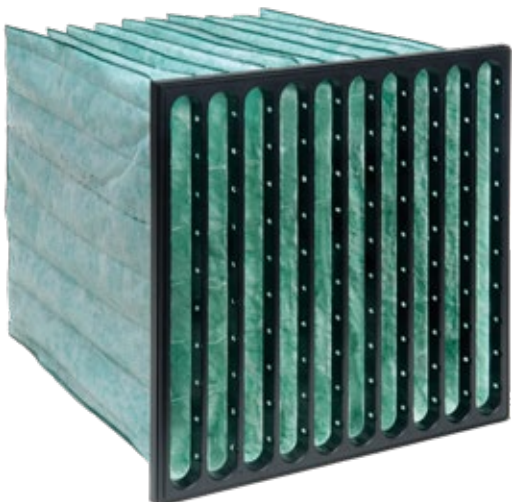
# Two best-selling filters that are lean and green

Camfil continuously invests in R&D because it maximizes value for customers and is a very important factor for the development of sustainable air filtration solutions. Products are developed at six research centers across Europe, the Americas and Asia using state-of-the-art laboratory and testing equipment based on the latest standards.

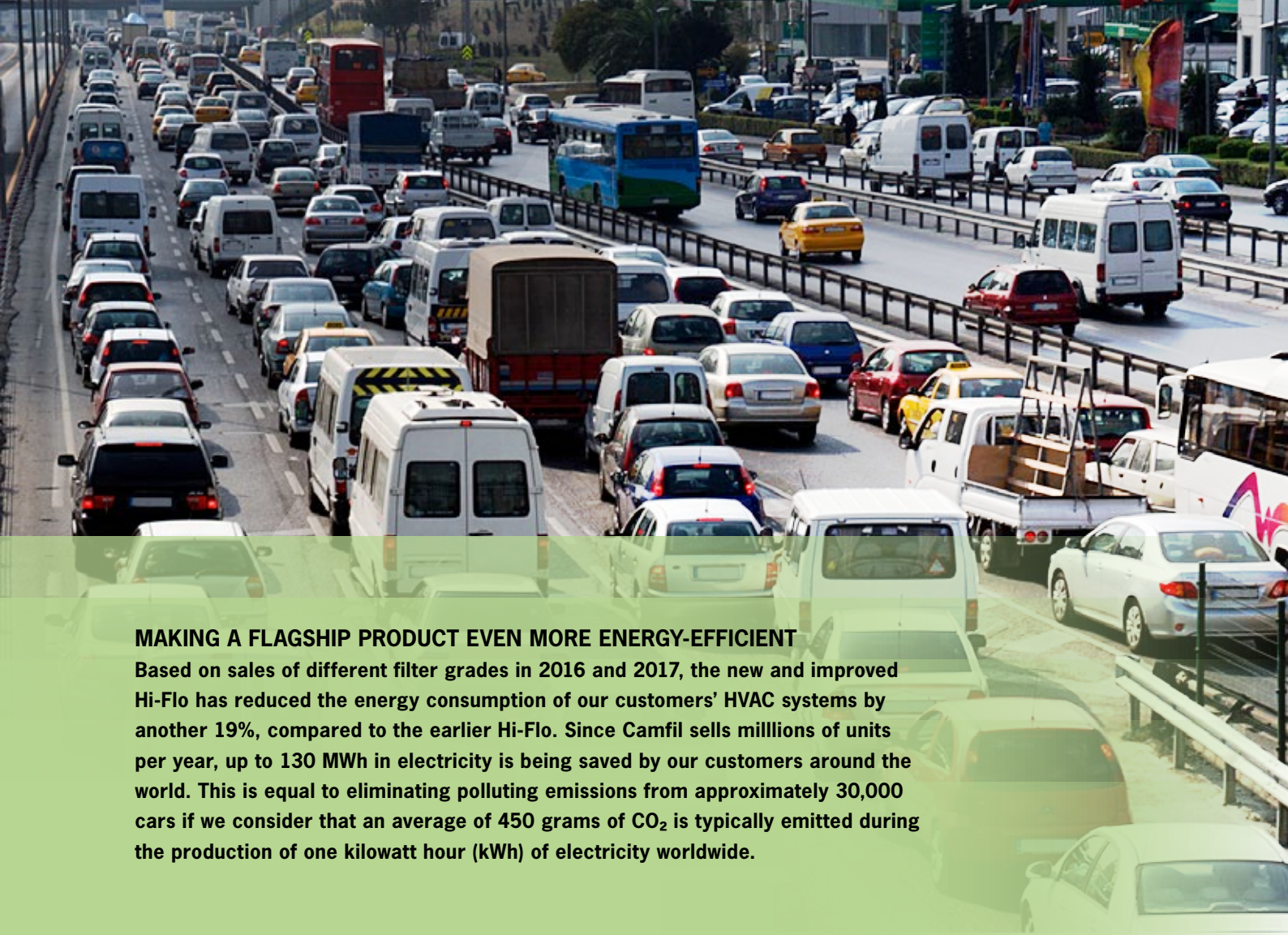
Designing environmental aspects into Camfil's air filters has been a priority for years. Not only should our filters be energy-efficient. Product design and process control also integrate eco-efficiency considerations, including the preservation of natural and fossil resources, reduction of waste and emissions, pollution risk prevention/reduction, the substitution of hazardous substances and use of recycled materials, and the development of alternative product recycling methods.

Improving and "tweaking" products for higher efficiency is part of this innovative process, as exemplified by Hi-Flo, Camfil's best-selling bag filter for air handling units that comes in several versions, including Hi-Flo, Hi-Flo XL and Hi-Flo ES. Hi-Flo has always been the preferred choice of customers for energy savings. The filter has the lowest initial and average pressure drop to ensure the lowest energy cost in the industry. It is also the longest lasting pocket-style filter on the market, requiring fewer changes and reducing landfill waste.

But Camfil never rests on its laurels and the filter has been improved and released in new versions to reach new heights. In 2015, Camfil's R&D experts developed a new and more efficient fiber mix for the filter media and proprietary stitching technology for the pockets on machines developed by Camfil.







### **MAKING A FLAGSHIP PRODUCT EVEN MORE ENERGY-EFFICIENT**

**Based on sales of different filter grades in 2016 and 2017, the new and improved Hi-Flo has reduced the energy consumption of our customers' HVAC systems by another 19%, compared to the earlier Hi-Flo. Since Camfil sells millions of units per year, up to 130 MWh in electricity is being saved by our customers around the world. This is equal to eliminating polluting emissions from approximately 30,000 cars if we consider that an average of 450 grams of CO<sub>2</sub> is typically emitted during the production of one kilowatt hour (kWh) of electricity worldwide.**

### **COMPACT FILTER WITH HUGE SAVINGS**

Another example of refining products for bigger energy savings is Opakfil, marketed as Durafil in the Americas, the most sold compact filter in the world. This filter delivers high efficiency filtration at very low energy consumption in a compact format. It is used in any air conditioning application and for preparatory filtration in cleanrooms.

Major revisions to the design, media and configuration have resulted in a new filter concept with the highest particle removal efficiency, longer life and smallest environmental impact.

Unique pleating technology, developed in-house, was used to create a new media for all filter grades. Camfil also designed an innovative frame system that is more aerodynamic, letting ventilation air pass more easily through the filter to save energy.

Based on sales of different filter grades in 2016 and 2017, the newly designed Opakfil/Durafil has achieved the same additional energy savings for customers as the improved Hi-Flo – 19 % compared with the previous model. Since Camfil sells hundreds of thousands of units per year, up to 70 MWh is being saved by our customers, which is equal to reducing polluting emissions from 15,000 cars.

Customers also benefit from product refinements like these in terms of reduced waste and environmental impact. Under normal

conditions, the filters have a longer life than competitor filters, which adds up to less filter disposal. Greenhouse gases emissions are also reduced due to less filters in transit from factory to end user. A longer lasting, energy-frugal filter will save users money in energy and labor, and positively impact the carbon footprint.





# LCC and other software for energy-saving filtration

It is well known in the HVAC industry that the energy consumption of a building's air conditioning and ventilation system is directly proportional to the average pressure drop over the filters in air handling units (AHUs). In the average commercial building, up to 50% of the energy bill is for the HVAC system and 30% of that is directly related to the air filtration, so it always pays to choose the best low-energy air filter combination for the right filtration application. Choosing the right filters for AHUs therefore saves energy for greener ventilation systems.

Camfil has been a pioneer and industry leader for than half a century in designing low average pressure drop filters in all filter classes and can demonstrate how better air filters lower Total Cost of Ownership (TCO) for customers and deliver a more sustainable solution. Low-cost filters clog quickly, causing a higher resistance to the airflow, resulting in an energy cost penalty. Camfil air filters capture particles and maintain the proper airflow two to three times longer than low-cost filters and require less frequent filter changes. Fewer filters add up to less labor cost for changeouts and reduced waste, while the biggest savings is lower energy costs for running the air handling system.

## 1 PA = EUR 1

*By selecting filters designed for lower average lifetime resistance, air handling units do not work as hard to pull air through the system. A rule of thumb, for a typical installation running half time over one year, is that one additional Pascal (PA) in pressure drop over a filter adds EUR 1 (around USD 1.25) in extra energy cost. A bad filter construction could add 50 Pascal compared to a "good" construction, even when the same filter class is used. In other words, each poor-performing filter can add an average of EUR 50 (USD 62.50) to a building's annual electric bill.*

## LCC SOFTWARE

To facilitate the right choice of filters for a system, Camfil's R&D Department pioneered the first Life Cycle Costing (LCC) software in the early 1990s to help air filter users to select the best filtration solution in terms of indoor air quality (IAQ) and energy performance. This software debut has been gradually followed by the launch of additional innovative computer programs for different applications and filters.

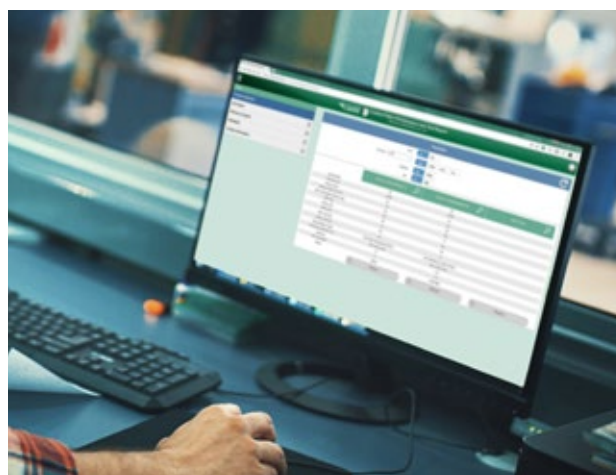
The LCC computer software has evolved over the years to include data from hundreds of filters, both Camfil and competitive. The latest version, Camfil LCC Green, considers filter efficiency, filter life, filter change labor, filter cost, disposal costs and allows for varied inputs for all of these factors plus the largest filter expense – energy usage.

The program data is based upon real life data collected at facilities around the world for real world results, as opposed to theoretical calculations. There is even input criteria with guidance to input the specific air quality parameters for a geographic area base upon data from cognizant authorities.

## POWERFUL MODELING TOOL

Camfil's LCC software is a power modeling tool identifying the most effective filter strategy for every operating condition based on the LCC of filters. To minimize energy use and maximize filter life, the program indicates the ideal pressure drop at which filters should be changed, based on real-life application data. Different combinations of filter types can be simulated to ensure the most sustainable filtration solution for customers.

The energy consumption and environmental impact of filters can be estimated for different air handling units and outdoor air qualities at various running conditions. This enables the user to make the optimum selection by comparing systems using single or multistage filtration. The LCC can also indicate the current CO<sub>2</sub> footprint of the filter installation, based on the customer's local situation.



## CFSS PORTFOLIO

Today, LCC software and other Camfil proprietary software is combined in the Camfil Filter Solution System (CFSS) portfolio.

With analysis and optimization tools for a wide range of filter applications, CFSS caters to all applications in a single package, making it simple to perform IAQ analyses for every type of installation, from advanced industrial cleanrooms to commercial buildings. Regardless if clean air is needed for clean manufacturing processes, power generation or an office space, the solution is often just a few clicks away on a computer screen.

### THE CFSS PLATFORM ALSO INCLUDES:

- LCC POWER to evaluate the LCC of air filters in gas turbines and other turbomachinery.
- CLEAN to estimate the cleanliness class for cleanrooms or commercial spaces using Camfil filters.
- CREO (Clean Room and Energy Optimization) to design cleanrooms and calculate the LCC and cleanliness class for clean process applications in industry.
- HPE (High Performance Filter Analysis) to obtain real efficiencies, pressure drops and construction data for Camfil's HEPA and ULPA filters.
- COMFORT IAQ to get information indicating how indoor air quality improves by choosing the right type of air filters.
- CAir for on-site measurements of air quality to select the right Camfil air cleaner or air purifier for rooms and spaces.



# Curbing the appetite of power-hungry data centers

A “hyper-scale” data center is the term for the largest data centers constructed by Silicon Valley giants like Google, Facebook, Amazon and Microsoft. These centers usually have a minimum of 5,000 servers and there are 390 in the world today, with that number estimated to increase to 500 going into 2020. In the U.S. alone, the most recent measurements indicate that data centers consumed approximately 70 billion kWh of electricity in 2014, or about 2% of the total energy consumed in the country – the equivalent of power used by 6.4 million American households.



Air filtration is required in these data centers because of the high demand for clean air. If air is not kept at optimum conditions, particulate can collect on PCBs (printed circuit boards) and negatively affect the heat transfer of the heat sinks. When PCBs collect dust and dirt, the circuit boards cannot transfer their heat as efficiently and could cause performance loss and eventually board failure.

## RIGHT FILTERS SLASH ENERGY +40%

In the past few years, Camfil has taken initiatives to reduce the energy consumed by these centers by over 40%, while also improving the indoor air conditions to help keep servers operating efficiently. A second benefit to Camfil’s data center solutions is the reduction in waste disposal of air filters by nearly 80%, as measured in cubic meters per year. This has been achieved by eliminating an entire stage of air filters, the energy they consume and the waste they create.

At one customer’s data center using a two-stage filtration system with pre-filters, Camfil’s LCC (Life Cycle Cost) analysis showed a savings of USD 80,000 per year in operating costs with Camfil filters, 1.6 million kWh in saved energy, and 261 cubic meters of less landfill waste per year.

Camfil’s product solution only needs single-stage filtration with the high-efficiency, energy-saving Hi-Flo ES. The benefit of the Hi-Flo ES over the competitor’s solution is the entire elimination of the prefilters, which consume more than 50% of the data center’s total energy consumption. The Hi-Flo ES, unlike traditional V-Cell and other low-cost filters, operates as two stages of filtration in one package, while also maintaining its rated efficiency.



# Smart tech saving packaging and energy

Camfil’s constant goal is to produce and distribute air filters in the most sustainable way possible. An example is CamSize, a filter packaging solution that reduces Camfil Germany’s outbound freight volume up to 40%.

All outer packaging is cut exactly to the required air filter size, lowering costs for storing many package sizes, which in turn reduces space requirements and simplifies product administration with fewer digital code numbers.

With smart packaging, only three shipping pallets are required instead of five for the same volume of filters. The system also eliminates the need for filling material in filter boxes, which adds up to less waste for end-customers to dispose of.

The new customized filter boxes, free from any glue, filling material and metal, also has advantages for installers of HEPA filters in terms of quality and easier handling.





# Air Pollution Control

– dust, mist and fume collectors for cleaner and healthier work environments

Foto by Lena Hjeltnæs, Camfil Denmark

Operating in North America, Europe and Asia, Camfil APC (Air Pollution Control) is one of the world's largest manufacturers of dust, mist and fume collection equipment. The business area is represented on six continents and draws upon over five decades of experience and expertise to ensure that customers are kept safe and productive.

Many manufacturing processes create some kind of dust, mist or fume and these byproducts can be harmful to workers and cause machinery to become less efficient. In the global market, Camfil APC's collection equipment is used in a variety of applications, including abrasive blasting, chemical processing, food and beverage, laser and plasma cutting, mining, pharmaceutical, thermal spray, welding and machining. Each industry has its own unique set of collection challenges and Camfil APC's products deliver clean air to the workplace for better health and safety and also reduce outdoor emission levels to protect the local environment.

## FLAGSHIP COLLECTORS AND FILTERS

Camfil APC's best-known products for dry dust and fume collection include the Farr Gold Series® of dust collectors for industry, Farr Gold Series Camtain for pharmaceutical and containment applications, the compact Quad Pulse Package, and machining mist collectors like Oil Expert and EM Profi for oil mist and emulsion/coolant separation.

The Farr Gold Series utilizes Gold Cone® cartridge technology to deliver clean air and long life while utilizing the smallest floor

space of any dust collector available today. Camfil APC's exclusive HemiPleat® state-of-the-art filter pleating technology holds the pleats of the cartridge open with wide pleat spacing not found in competitive cartridges, which are packed too tightly to maximize media use. This ensures 100% media use, resulting in longer filter life and lower pressure drop while improving cleaning efficiency.

## HELPING CUSTOMERS COMPLY

In every country it operates in, Camfil APC helps customers stay on top of the very latest regulations and standards for occupational safety and health and fire protection. Camfil APC also knows about recirculating air from dust collectors. Whether dust collectors are used in a plant to control indoor air quality (IAQ), keep equipment clean, and/or recover high-value process dusts, many plants are considering recirculating the air back into the plant downstream of collectors instead of exhausting it outdoors. When using recirculating dust collection systems, Camfil APC ensures that special safety and performance concerns are addressed.

## TEST FACILITY

Camfil APC has a state-of-the-art dust collection test facility that performs full-scale tests of customer dust. By identifying dust characteristics properly, Camfil APC can select the right type of collector and filtration media for optimal energy savings and operational efficiency, minimizing maintenance problems and reducing emissions while extending filter life.



# Better and more energy-efficient oil-mist collection in China

In northern China, Arnold Fasteners (Shenyang) Co., Ltd. operates as a subsidiary of the Arnold Group, a leading producer of innovative fastening technology headquartered in Germany.

Serving the Chinese and other Asian markets, the Shenyang facility manufactures fastener products, solutions and systems for the automotive industry and other industries with high quality requirements. The target customer groups are automotive OEMs and their sub-suppliers, truck and heavy off-road machinery, the electronics industry, and communication infrastructure component manufacturers.

## MIST PROBLEMS FROM PRODUCTION

Since the start of operations in 2007, Arnold's China factory had been using electrostatic filters for ten years. These filters required very frequent maintenance and the filtration result gradually worsened to affect working conditions.

A more effective filtration system was needed to eliminate oil-mist emissions from about 70 heading machines for cold forging of fasteners in the 2,600 square meter workshop. The main goal was to improve indoor air quality and create a safer and healthier environment for employees.




## NO MORE MIST WITH OIL EXPERT

Seeking a way to improve the work environment, Arnold China was referred to BMW Shenyang, a local manufacturer using Camfil APC products.

Camfil APC was contacted, and to meet Arnold China's requirements, Camfil APC recommended Oil Expert, a highly efficient mist collector utilizing multi-stage filtration and self-cleaning filtration media with a long life. Due to a flexible and modern design, multiple units can be combined for any size application.



A photograph of an offshore oil rig at sunset. The sun is low on the horizon, creating a bright glow and reflecting on the water. The rig's tall, lattice-like structures are silhouetted against the sky. In the foreground, there are some out-of-focus yellow flowers.

# Power Systems

## – protecting turbomachinery equipment

The Camfil Power Systems business area specializes in air inlet filtration and acoustical systems for turbomachinery, mainly for gas turbines, generators, industrial air compressors and diesel engines. The result is more efficient power generation and use of carbon fuel resources, which contributes to reducing Green House Gas (GHG) emissions.

Systems are designed to meet the priorities and requirements of Original Equipment Manufacturers (OEMs), Engineering Procurement Construction companies (EPCs), operators and end users. With Power Systems as their partner, these customers can rest assured that their turbomachinery will operate in the most profitable and environmentally friendly way with maximum availability and reliability.

### SYSTEMS AND SERVICES

With more than 50 years of experience, Power Systems has more than 2,000 installation references worldwide for power generation, oil and gas, and industrial air compressor customers. Solutions are engineered and manufactured to the highest standards and equipped with proprietary Camfil filter products to ensure that customers operate their assets reliably and efficiently.

In addition to complete air inlet filtration and acoustical systems (inlet silencers and noise enclosures), the range includes a variety of options for anti-icing and/or cooling.

These systems are engineered by Power Systems teams in Sweden, Germany, Canada, India and China in line with the customer's pri-

orities, operating needs and local environmental conditions. The teams also work closely together with Camfil's subsidiaries, agents and distributors to increase the filtration knowledge of customers with a view to improving and retrofitting their existing systems, or to define the best solution for new equipment investments.

### FILTRATION BOOSTS EFFICIENCY AND CUTS EMISSIONS

Turbomachinery technology has evolved tremendously over the last decades and the use of more innovative technologies and materials has boosted the efficiency of this equipment to a much higher level, helping to increase their industrial merit and lower GHG emissions as much as possible.

However, these evolutionary improvements have also made turbomachinery more susceptible to fine airborne particulates that cause fouling, corrosion and faster degradation of performance. At the same time, stricter emission regulations have changed the particulate distribution dramatically, requiring newer filtration technologies of increasingly high efficiency.

To ensure optimum system designs, Camfil has a unique R&D center in Sweden with a specially dedicated test-rig for turbomachinery applications. Here, tests are conducted with the latest technologies to develop new filters matching new customer demands.

By leveraging its considerable international resources and experience, Power Systems has the knowledge, expertise and R&D facilities to assess, analyze and recommend optimal solutions for turbomachinery applications anywhere in the world.



## How Power Systems helps customers reduce their carbon footprint

### EDUCATING CUSTOMERS

Power Systems' Test & Learn Centers in Canada, Sweden, Germany, Malaysia and China are used to educate and share our expertise with customers. With these facilities, Power Systems can bring more visibility to the actual performance of a specific filtration system. The centers allow customers to test and compare different solutions to better understand the differences between poor and optimal filtration. In-house labs have a large variety of testing capabilities for analyzing new and used filters to enhance knowledge about the environmental conditions at the customer's site.

### ANALYZING FIELD PERFORMANCE

Power Systems has globally deployed several mobile CamLabs to allow customers to compare and analyze filter performance on location, under real-life conditions, with the main goal being to reduce their carbon footprint to a minimum by boosting turbine efficiency and output with lower fuel consumption.



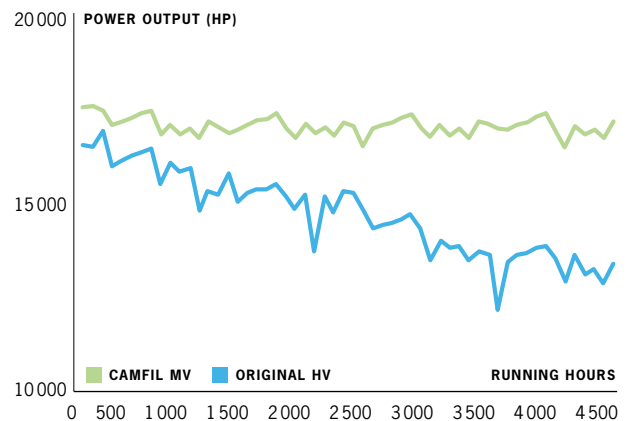
### ON-SITE SERVICES

To better understand the customer's local environmental conditions and operations, Power Systems performs air analyses, conducts site surveys and installs IIoT (the Industrial Internet of Things) systems on site. With these services, customers can improve their operational excellence and reduce their impact on climate change.

## Stabilizing output for lower greenhouse gas emissions

On an offshore platform in Thailand, Power Systems upgraded and retrofitted the air inlet filtration solution of a gas turbine, increasing its efficiency to EPA-class and reducing the initial/average pressure drop. Turbine efficiency is now substantially improved, resulting in higher and more stable power output and much lower GHG emissions.

Before the upgrade/retrofit, high pressure drop of the original filter system and fouling of the gas turbine negatively affected efficiency by 3.5%, with higher CO<sub>2</sub> emissions as a result. The new and improved Camfil filtration system reduced the additional CO<sub>2</sub> emissions to an insignificant 0.5%.



*Camfil inlet air filtration vs. a competitor solution for an offshore gas turbine. With Power Systems' solution, the turbine has a more efficient and stable power output that results in lower CO<sub>2</sub> emissions.*

## Cutting carbon emissions 3,000 tons per year

By retrofitting a gas turbine package in Italy in 2017, Power Systems improved the overall performance of the installation by lowering pressure drop and increasing efficiency from F-class filtration to EPA-class filtration.

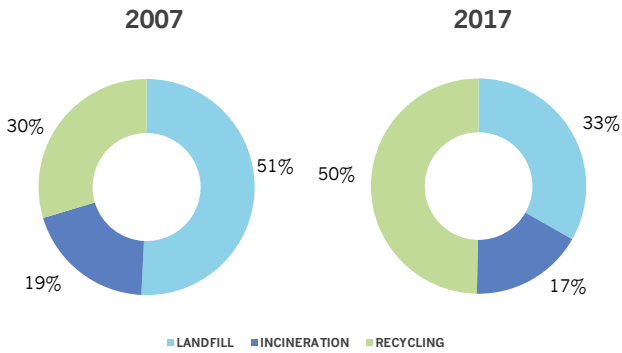
At first start after the retrofit, the customer immediately noticed a higher power output due to a lower initial pressure drop. Pressure drop directly impacts the heat rate of a gas turbine, and by decreasing it with the right filtration, GHG emissions are reduced considerably because fuel resources are used more efficiently.

Increasing the efficiency class of the filtration system will make a major long-term, greener contribution to lower GHG emissions, as the gas turbine will be able to run at test-cell performance for a much longer time, compared to the original solution. With the upgrade, the reduction in CO<sub>2</sub> emissions is expected to be in the range of 3,000 tons per year.



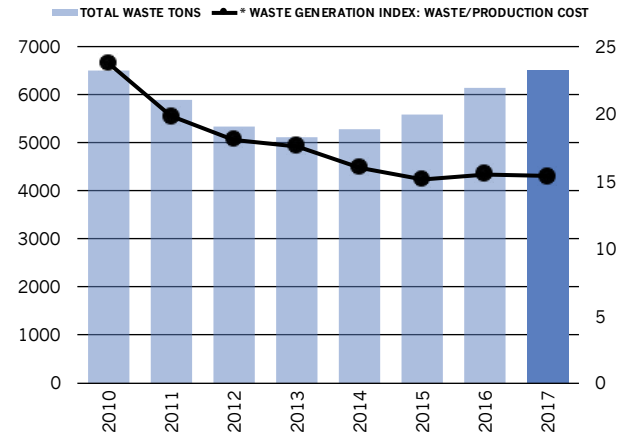
# Environmental impact

## WASTE DESTINATION



## WASTE

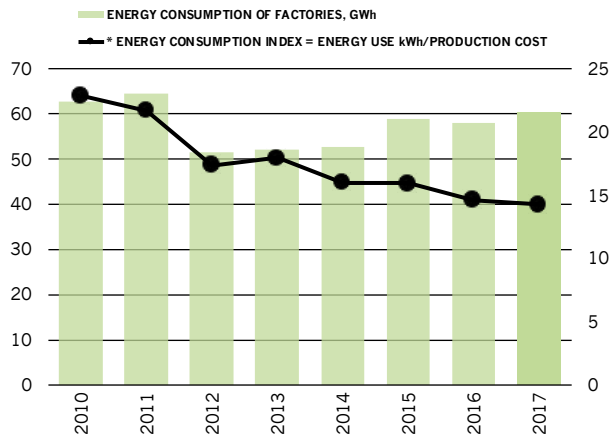
Goal: 2% improvement in WGI\* annually



The global Camfil Group has been steadily recycling more material and producing less waste in factories.

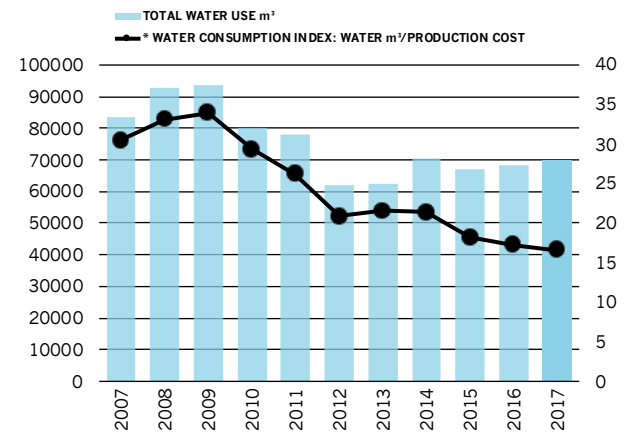
## ENERGY USE

Goal: 2% improvement in ECI\* annually



## WATER USE

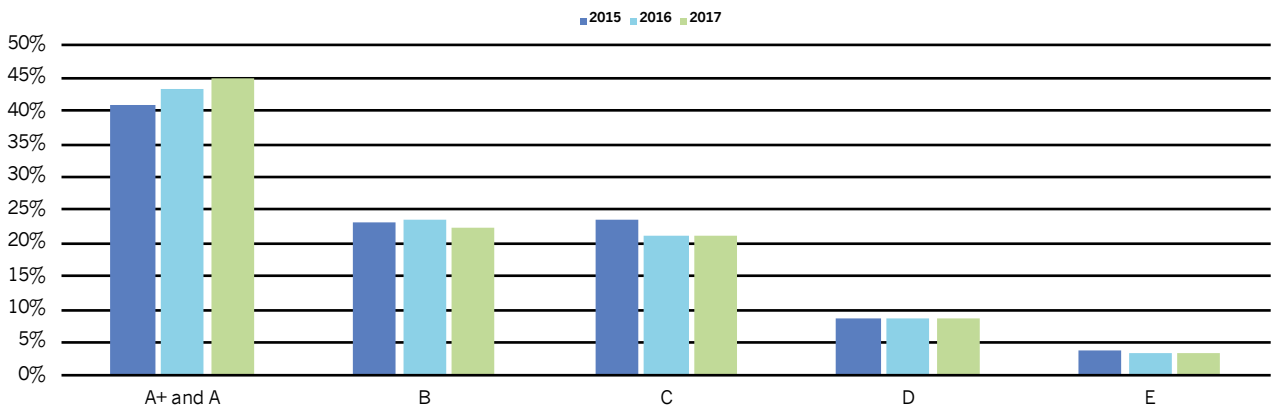
Goal: 2% improvement in WCI\* annually



Camfil production units around the world have successfully implemented programs and measures to use less energy and water in filter manufacturing.

## CAMFIL FILTER SALES PER EUROVENT ENERGY CLASS FOR MAJOR EUROPEAN COUNTRIES

Goal: to increase A+ and A 3% annually





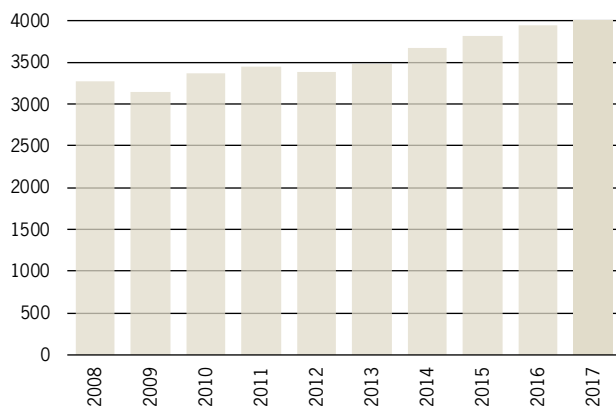
# Attracting and retaining talent is vital for success

Camfil understands the benefits of employing a diverse range of talented individuals. As an equal opportunity employer, we take a positive approach to diversity and use a global recruitment process to select candidates with transparency, fairness and respect.

Globally, the average age of the workforce is 43 years old and 35% of our employees are female.



## EMPLOYEES AT YEAR-END



## FIRST IN INDUSTRY WITH GEEIS CERTIFICATION

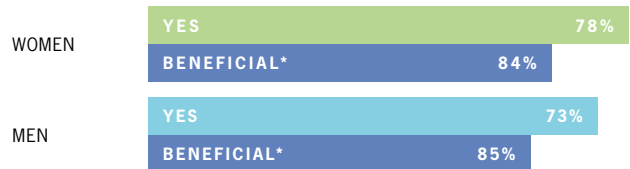
Camfil promotes equal opportunities and diversity in terms of recruitment, pay, development and promotion and became the world's first air filter manufacturer to be awarded the Gender Equality European and International Label Standard (GEEIS Diversity) label. This certificate was awarded in 2017 by Bureau Veritas to Camfil AB, the Parent Company, and to Camfil Svenska AB (Sweden), Camfil SA (Belgium) and Camfil SASU (France). In 2018, the goal is to obtain GEEIS certification in six other countries to build further on a culture of equality within the Camfil Group.

## RETAINING AND DEVELOPING EMPLOYEES

Camfil places great value on developing and retaining our employees. Important goals are to constantly improve their skills, competencies and performance, ensuring that employees contribute to the business in a rewarding way.

Camfil's performance management process clarifies for each manager and employee what the requirements and expectations are for their performance. Giving all employees an annual performance appraisal is an important part of this process.

In the Group's bi-annual employee survey, CAMPAIR, we ask our employees not only if they have had a review but also if they found it beneficial:



\*Of those who answered "Yes, I have had a PA review".

In CAMPAIR, we also ask about training. The most recent result, 5.46 on a 7.0 scale, indicated that employees were positive to the question "Do you get sufficient training to do a good job?".

Our internal competence development organization, Camfil Academy, offers internal training programs. Our Newcomers Course, intended primarily for new sales and marketing staff, is one of the academy's most popular training activities.

The course, conducted in Sweden, Camfil's home base, gives new hires an introduction to Camfil's culture, values and business concept. The curriculum covers Camfil's product portfolio and a basic introduction to filtration technology, including energy efficiency and life cycle cost calculations for filter applications.

## GLOBAL DEVELOPMENT PROGRAM (GDP)

Camfil's performance management process is also used to identify and develop talented employees with high future potential.

Our Global Development Program (GDP) aims to support employee development and growth. It is tailor-made for Camfil in cooperation with the KTH Executive School in Stockholm.

The selection of all GDP participants is based on their performance and individual growth potential. This highly appreciated program has had participants from 16 different countries to date. Fifty-three percent of the participants in the first program have been promoted or given a bigger role in Camfil. The most recent program ended in 2017, but already 25% have been promoted.





# Creating a healthy and safe work environment

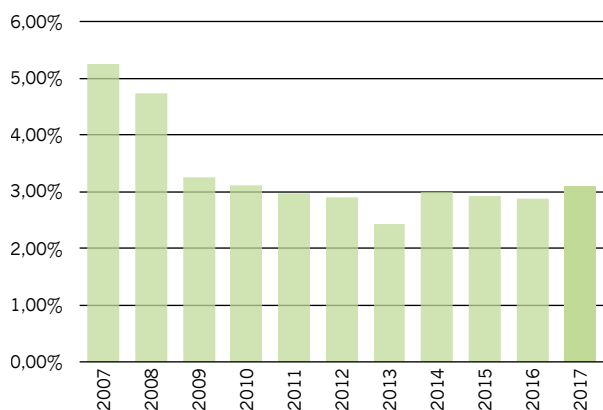
At Camfil, we have always believed that employee well-being, health and safety are part of being a sustainable employer.

To achieve this goal, Camfil uses a global Operational Scorecard as a Key Performance Indicator (KPI) to measure the number of Occupational Safety and Health (OSHA) injuries that are recordable.

In 2017, we had a total of 89 injuries in Camfil, compared to 69 in 2016, an increase of 29% in the incident rate, which is monitored monthly as part of internal action programs to implement safety improvement measures. The goal for 2018 is to reduce the rate to 50 injuries or less.

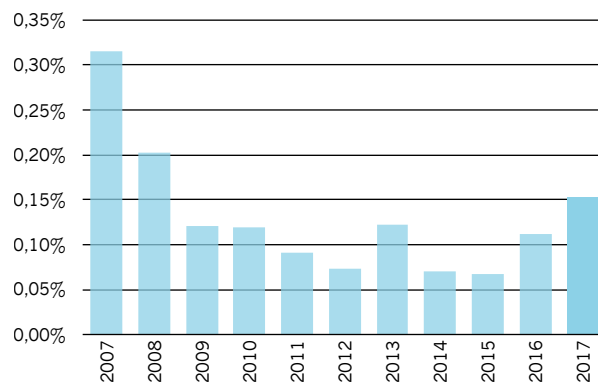
**NUMBER OF SICK LEAVE DAYS PER 100 WORK DAYS**

■ Goal: 2.5%



**LOST WORK DAYS DUE TO OCCUPATIONAL INJURIES PER 100 WORK DAYS**

■ Goal: 0.07%



## Group-wide program to promote local sustainability actions

### A DECADE OF 'CAIRING'

As a significant global player in the air filtration industry, Camfil has a responsibility to make sustainability an essential ingredient for long-term success. Engaging employees in local sustainability and corporate social responsibility (CSR) actions is a vital part of this.

This is accomplished with CamfilCairing (abbreviated "Cairing"), an annual Group-wide program that has been run for almost a decade to build a strong in-house culture of sustainability. The program integrates sustainability and good corporate citizenship into our business within all Camfil companies, and across all geographic regions we operate in.

Each year companies hold a CamfilCairing Week that is especially dedicated to highlight our continuous sustainability work. For five days, we carry out different activities and work together as a global company to create a sustainable future for generations to come. Activities range from implementing internal measures to improve the greenness and work environment of facilities, to local community actions like blood drives and fund raising to combat diseases like cancer and cystic fibrosis.



A coherent approach is assured through corporate coordination with the CamfilCairing Network. The network's members, who represent various Camfil subsidiaries, are responsible for cascading and implementing local sustainability policies within daily business activities. This work also serves as a channel for gathering information that Camfil uses in sustainability reporting, and to escalate relevant internal sustainability actions. Both CamfilCairing and the sustainability network are an effective way for Camfil to embed sustainability in everything the Group does.

# Risk management

## BUSINESS RISKS

Among other key issues, the internal CamfilCairing Code addresses the management of business risks, which includes managing the protection of our employees, customers, property, information and the environment.

Integration of risk management in policies and programs helps develop awareness and procedures to identify and mitigate:

- Liability risks through laws and regulations compliance.
- Product failure and customer risk through quality management systems implementation.
- Pollution risk through environmental management systems implementation.
- Employee safety risk through the implementation and control of operational safety policies.
- Information security risk through IT security policies and recovery planning.
- Business disruption risk through continuity planning development.
- Fundamental continuous improvement to ensure sustainable growth and profitability in the long term. Here, Camfil efforts are to be focused on improving product and service quality performance and cost control while enhancing employee safety and minimizing environmental impact.

## ECONOMIC RISKS

The market for Camfil's products is developing favorably due to increasing recognition and awareness that air filters providing high indoor air quality benefit people's health, productivity and well-being in the work environment, and improve production output in sensitive processes. In other industries, Camfil filtration solutions mitigate environmental impact by cleaning emissions. The Group's energy-saving filtration solutions are also being increasingly demanded by customers to green their buildings and reduce their carbon footprint.

Geographically, Camfil's operations are well distributed and there is less of a risk that the Group's performance will be affected if the economy of a country should weaken. A large percentage of the Filters business consists of aftermarket sales, which are less affected by changes in demand caused by economic fluctuations. Operations conducted by the Power Systems and APC business areas are more cyclical and project-based and their sales are consequently driven more by investments, making them more sensitive to economic changes.

To reduce business risks related to production capabilities, Camfil manufactures the same air filters in many different plants around the world and has firm policies in place with suppliers and to secure the provision of key production material like filter media.

## FINANCIAL RISKS

Because Camfil operates primarily in countries outside Sweden, the Group is exposed to several different financial risks that are managed with policies and procedures on corporate level within the Finance Department of the Parent Company in Stockholm. The department identifies and limits the Group's financial risks following a finance policy that is approved and updated by the Board annually. Risks are managed by means of derivatives and other financial instruments in accordance with limits set in a finance policy.





## TRADE COMPLIANCE POLICIES

It is the global policy of all Camfil business units to fully comply with, as a minimum, all export control and trade sanctions laws and regulations of the European Union (EU) and other such local laws and regulations governing the sale, supply and export of Camfil products, services and technical data, globally, as may be applicable. To ensure the adequacy and effectiveness of policies and procedures worldwide, Camfil has a Group Trade Compliance Manager.

Trade compliance procedures are in place for export licensing, screening of third parties and vessels, U.S. export controls and trade sanctions, product classifications, mandatory contract clauses, country-specific requirements, end user certificates and red flag situations.

## CORPORATE MANAGEMENT AND GOVERNANCE MANAGEMENT STRUCTURE

As indicated in the organization chart on page six, the Camfil Group is managed by Group Management, consisting of the President and CEO and the Executive Vice Presidents for three primary corporate staff functions: HR & Internal Communications, Finance, and Sustainability & Standards. For the Group's global operations, there are six principal entities headed by Business Unit Managers for Power Systems and APC, and for Filter operations in the Americas, Northern Europe, Continental Europe & British Isles, and Asia-Pacific & the Middle East. Corporate support functions manage key global processes for marketing and product information, supply chain management, sourcing, R&D and product management.

To facilitate the availability of governing documents, managers of business units have access to corporate policies and instruction manuals on Cintra, the Group's intranet.

## CORPORATE GOVERNANCE

As a Swedish-based corporation headquartered in Stockholm, Camfil applies a code of corporate governance based on the Swedish model to distribute authority, management and control between the shareholders, the Board of Directors, the CEO and Group Management in accordance with current legislation, regulations and instructions. Within the governance structure, the Board of Directors administers the Group's business, regulations, practices and owner/stakeholder relations.

### United Nations sustainable development goals

The United Nations has 17 goals for sustainable development and Camfil has identified four that the Group's clean air solutions contribute to on a global basis:

**3** For the best indoor air quality promoting good health and well-being, Camfil offers high-efficiency air filters to remove harmful particles and contaminants in ventilation air, as well as air pollution control systems that collect dust, mist and fumes in industry for safer work environments.

**8** We provide optimum working conditions for more than 4,000 employees at 28 manufacturing sites, backed by strong human resource management and local employee care and health programs. This global workforce steadily helps us to increase our annual sales and earnings to contribute to economic growth in 26 countries.

**11** Camfil's air filters and clean air solutions are the most energy-efficient on the market and conserve energy to create more sustainable buildings in cities around the world.

**12** The environmental impact of Camfil's production plants is being continuously reduced each year through in-house improvement measures and green initiatives to conserve energy, water and reduce landfill waste.

# UN Global Compact and respecting human rights

Camfil is a member of the UN Global Compact and supports and complies with the Compact's ten principles regarding human rights, labor, the environment and anti-corruption.

Camfil also believes that access to clean air is a human right. We respect all internationally proclaimed human rights as reflected in our Code of Conduct and Code of Business Ethics, which are part of our CamfilCairing Code.

To raise awareness, the Code is part of the onboarding program for new employees. In the most recent CAMPAIR survey, we asked sales managers, local management teams and purchasing personnel if they were familiar with the CamfilCairing Code, with 86% responding yes.



## Five-Year Summary – Camfil Group

	2017	2016	2015	2014	2013
<b>Income statement</b>					
Net sales	7 294	6 722	6 250	5 461	4 906
Operating profit	896	775	657	572	516
Profit after financial items	829	725	558	502	443
Tax	-258	-205	-189	-148	-110
<b>Profit for the year</b>	<b>572</b>	<b>521</b>	<b>369</b>	<b>354</b>	<b>332</b>
<b>Balance sheet</b>					
Goodwill and other intangible assets	1 432	1 416	1 260	1 185	917
Property, plant and equipment	980	963	914	947	786
Financial assets	109	128	85	183	102
Inventories	930	1 056	827	1 088	986
Cash and cash equivalents	615	316	453	659	651
Other non-current assets	1 428	1 352	1 228	1 214	1 081
<b>Assets</b>	<b>5 496</b>	<b>5 231</b>	<b>4 767</b>	<b>5 275</b>	<b>4 523</b>
<b>Equity</b>					
Interest-bearing liabilities	1 934	2 084	1 229	1 895	1 777
Interest-free liabilities	1 643	1 684	1 376	1 539	1 352
<b>Equity and liabilities</b>	<b>5 496</b>	<b>5 231</b>	<b>4 767</b>	<b>5 275</b>	<b>4 523</b>
<b>Cash flow</b>					
Cash flow from operating activities	849	684	712	601	442
Cash flow from investing activities	-281	-262	-190	-356	-174
Cash flow from financing activities	-260	-571	-728	-275	-16
<b>Cash flow for the year</b>	<b>308</b>	<b>-149</b>	<b>-206</b>	<b>-30</b>	<b>252</b>
<b>Key ratios</b>					
Operating margin, EBIT	12.3%	11.5%	10.5%	10.5%	10.5%
Profit margin before tax, EBT	11.4%	10.8%	8.9%	9.2%	9.0%
Equity ratio	35%	28%	45%	35%	31%
Interest-bearing net liabilities	1 275	1 740	760	1 143	1 099
Net debt-equity ratio (gearing ratio)	66%	119%	35%	62%	78%
Return on capital employed	29.3%	28.2%	21.4%	22.3%	20.3%
Return on equity	33.8%	28.7%	18.4%	21.9%	26.1%
Investments	182	163	129	200	175
Employees (average for the year)	4 225	4 076	3 811	3 736	3 507

*EBIT margin (operating margin)* – Earnings before financial items, appropriations and taxes, as a percentage of sales.

*EBT margin (profit margin before tax)* – Earnings before tax, as a percentage of sales.

*Equity ratio* – Equity as a percentage of total assets.

*Interest-bearing net debt* – Interest-bearing liabilities less cash and cash equivalents and other interest-bearing receivables, such as derivative financial instruments.

*Debt-equity ratio (gearing ratio)* – Interest-bearing net liabilities as a percentage of equity.

*Capital employed* – Total assets less non-interest-bearing liabilities including non-interest-bearing provisions. Average capital employed is calculated as capital employed at January 1 plus capital employed at December 31 divided by two.

*Return on capital employed* – Profit after financial items plus financial expenses as a percentage of average capital employed.

*Return on equity* – Profit after tax as a percentage of average equity. Average equity is calculated as equity at January 1 plus equity at December 31 divided by two.

*Investments* – Investments in intangible assets and property, plant and equipment.



# Camfil Sustainability Report 2017

## **For more than half a century, Camfil has been helping people breathe cleaner air.**

As a leading manufacturer of premium clean air solutions, we provide commercial and industrial systems for air filtration and air pollution control that improve worker and equipment productivity, minimize energy use, and benefit human health and the environment. We firmly believe that the best solutions for our customers are the best solutions for our planet, too. That's why every step of the way – from design to delivery and across the product life cycle – we consider the impact of what we do on people and on the world around us. Through a fresh approach to problem-solving, innovative design, precise process control and a strong customer focus we aim to conserve more, use less and find better ways – so we can all breathe easier.

The Camfil Group is headquartered in Stockholm, Sweden, and has 28 manufacturing sites, six R&D centers, local sales offices in 26 countries, and 4,180 employees and growing. We proudly serve and support customers in a wide variety of industries and in communities across the world.

To discover how Camfil can help you to protect people, processes and the environment, visit us at [www.camfil.com](http://www.camfil.com).