TECHNOALPIN®

2023 SUSTAINABILITY REPORT


WE WORK
FOR YOUR SNOW

TECHNOALPIN®

NOTES ON THE METHODOLOGY

This is the first sustainability report for TECHNOALPIN SpA (hereinafter "TechnoAlpin"), which has been prepared voluntarily to communicate to stakeholders the company's vision and achievements regarding economic, environmental, and social issues.

In doing so, TechnoAlpin provides insights into its understanding of the company, its performance, its results, and the impact of its activities on the community and the environment.

This Sustainability Report was prepared based on a selection of the GRI Sustainability Reporting Standards 2021 published by the Global Reporting Initiative (GRI). This document refers to GRI 1: Foundation 2021.

It should be noted that TechnoAlpin does not fall within the scope of Italian Legislative Decree no. 254 of December 30, 2016, which would require the company to prepare a non-financial statement in implementation of the European Union Directive 2014/95/EU (The Non-Financial Reporting Directive or NFRD).

This Sustainability Report is therefore prepared on a voluntary basis and is not subject to the NFRD.

The general principles used to prepare the Sustainability Report are set out in the GRI Standards. The principles of stakeholder engagement, sustainability context, materiality, and completeness were considered when determining the contents of the report. In determining the quality of the report, the principles of accuracy, balance, clarity, comparability, reliability, and timeliness were taken into account.

The topics covered and the scope of their reporting were selected based on the results of the materiality analysis, which is described in more detail in the following sections.

The performance indicators were selected from the reporting standards used. They represent the sustainability areas studied and are consistent with the company's business activity and the impact it causes.

The reporting scope of qualitative and quantitative data relates to the performance of TechnoAlpin SpA, excluding its subsidiaries, and covers the period from May 1, 2022 to April 30, 2023. TechnoAlpin determines the scope of the report and decides which sites to include. This document is the first edition of the company's sustainability report and will be revised annually in the future. Any specific restrictions are explicitly stated in the index.

The heads of the company's various departments were involved in preparing the Sustainability Report. The project was accompanied by the Terra Institute.

The Sustainability Report was approved by the Board of Directors and the Green Team of TechnoAlpin SpA on 08/29/2023 and has not been reviewed by an independent auditor.

The Sustainability Report is published on the company's institutional website at the following address **www.technoalpin.com/en/sustainability/**

For more information, please contact:
sustainability@technoalpin.com

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OUR PATH TO THE FUTURE

TECHNOALPIN®

OUR PATH TO THE FUTURE

Dear Reader,

I am pleased to present TechnoAlpin's first Sustainability Report. This report is an important milestone in our company's history and underscores our commitment to innovative solutions to make the entire winter sports industry more sustainable.

Snow fascinates people of all ages and backgrounds. It is the basis for successful winter sports and therefore the economic lifeline of many regions around the world where there is no alternative to winter sports. Our mission is to secure this business basis in the most resource-conserving way possible and turn hoping for snow into a snow guarantee.

As Managing Director of TechnoAlpin, I am proud of what our company has achieved over the past decades. We have always aimed to redefine the standards in snowmaking as a technology leader. Today, when we talk about conserving resources technologies, snow management, or using equipment for multiple purposes, these achievements are due to our tireless spirit of innovation. For this, I would first and foremost like to thank our employees, who think outside the box every day to find the best solutions for our customers. With our efforts to develop more efficient and environmentally friendly systems, we want to continue to play a pioneering role in the industry and help make it more sustainable.

However, we are also aware of our responsibility to society and especially the mountain regions. Our focus on innovation and social sustainability is at the heart of our corporate strategy. We are convinced that only a balanced interplay between technological progress and social responsibility can ensure a sustainable future for winter sports.

This report details our progress and challenges as we move towards a more sustainable future. It is a summary as well as a starting point. It reflects the achievements of the past and, at the same time, it is a signpost for further progress. Together with our partners, we aim to make our entire value chain more conscious over the coming years.

We can count 2022 as one of the most successful years in TechnoAlpin's history. That our customers around the world continue to trust us motivates us and also proves that we are on the path to a more sustainable future.

Thank you for your commitment and support on this journey that we are embarking on together.

Erich Gummerer

TechnoAlpin CEO

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WHO WE ARE: THE TECHNOALPIN GROUP

TECHNOALPIN®

2.1 The Group companies

2.2 The TechnoAlpin Group in numbers

2.3 Company and locations

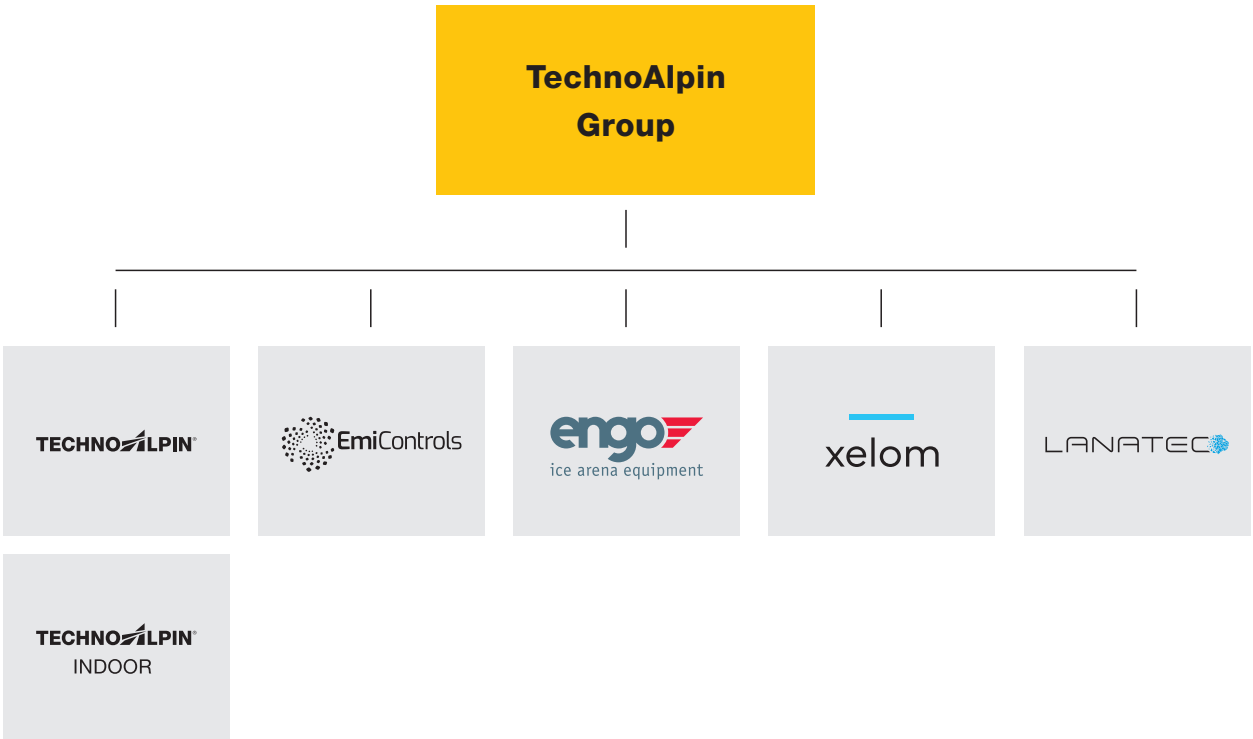
2.4 Our history

2.1 THE GROUP COMPANIES

In 1990, Georg Eisath, Walter Rieder, and Erich Gummerer founded TechnoAlpin. They had a clear goal in mind: they wanted to guarantee ski areas all around the world the best quality snow. It was clear to the founders from the start that, if you want to be successful in a niche market, you have to operate globally. Today, TechnoAlpin is part of the TechnoAlpin Group, which is made up of several companies from different industries. All the companies in the group offer top-quality, high-tech products for a niche market.

THE CORE COMPANIES OF THE TECHNOALPIN GROUP

In addition to some smaller activities and operations, the Group predominantly consists of the following companies, each of which develops high-tech products.



TECHNOALPIN SpA

TechnoAlpin has been designing and building turnkey snowmaking systems for ski areas all over the world since 1990. A love of snow and a passion for innovative solutions have made the company the world's leading supplier of snowmaking equipment. The Company's number one priority is to find the ideal solution for every customer. Every system is meticulously designed to meet individual customer requirements. The product range is constantly being expanded in a bid to produce snow of the highest quality in the most energy-efficient way possible. In addition to turnkey outdoor solutions, TechnoAlpin also offers various options for indoor snowmaking, paving the way for unique snow adventures all around the globe.
More than 2,400 customers in over 50 countries in all parts of the world rely on the expertise of TechnoAlpin.

Employees: 331

Corporate Headquarters: Bolzano, Italy

EMICONTROLS Srl

EmiControls was founded in 2008 as TechnoAlpin pro air solutions and became independent in 2011. EmiControls uses its expertise in mechanical engineering, most notably in water atomization, to provide solutions that fight fires, dust, and odors. Each of these areas makes unique products that use water mist differently. For example, the turbines are used as efficient extinguishing components in stationary fire protection systems. In addition, extinguishing robots and add-on turbines have been developed for mobile firefighting. A new line of business aims at preventing e-mobility fires. The technology is mainly used in recycling plants, ports, and heavy industry to control dust. Composting plants use odor controllers, for example.

Employees: 29

Corporate Headquarters: Bolzano, Italy

ENGO Srl

Engo has been a reliable contact and supplier for ice arenas for more than 40 years and part of the TechnoAlpin Group since 2018. The company develops and manufactures electrically operated ice resurfacing machines and flexible dasher boards. The product line is rounded out with a wide range of accessories. Engo products set the standards for safety while also impressing with innovative, user-friendly technology. Ice skating rinks all over the world, including those used in the Olympic Games, trust Engo's quality.

Employees: 49

Corporate Headquarters: Varna, Italy

XELOM

Xelom was founded in 2019 as a startup in Bolzano, Italy to produce electric commercial vehicles. After intensive development work, the first vehicle in the Dust Cat line was completed and sold in 2022. It went to a mine in Sweden and was fitted with a dust controller from EmiControls. The company also manufactures electric-powered alpine mowers and crate transport equipment for agriculture. Xelom has been wholly owned by the TechnoAlpin Group since the end of 2022. The aim is to provide reliable electric commercial vehicles for a variety of applications.

Employees: 13

Corporate Headquarters: Bolzano, Italy

LANATEC Srl

Since 2021, Lanatec has been manufacturing lithium batteries for a wide range of applications, including agricultural, municipal, earthmoving, and special machinery. The company makes batteries with different capacities, ranging from 5 kWh to 1,000 kWh. Lanatec became part of the TechnoAlpin Group in 2022.

Employees: 15

Corporate Headquarters: Lana, Italy

2.2 THE TECHNOALPIN GROUP IN NUMBERS

3,500
CUSTOMERS IN
64 COUNTRIES

24
SUBSIDIARIES
WORLDWIDE

701
EMPLOYEES
(01/2023)

302
MILLION €
IN SALES

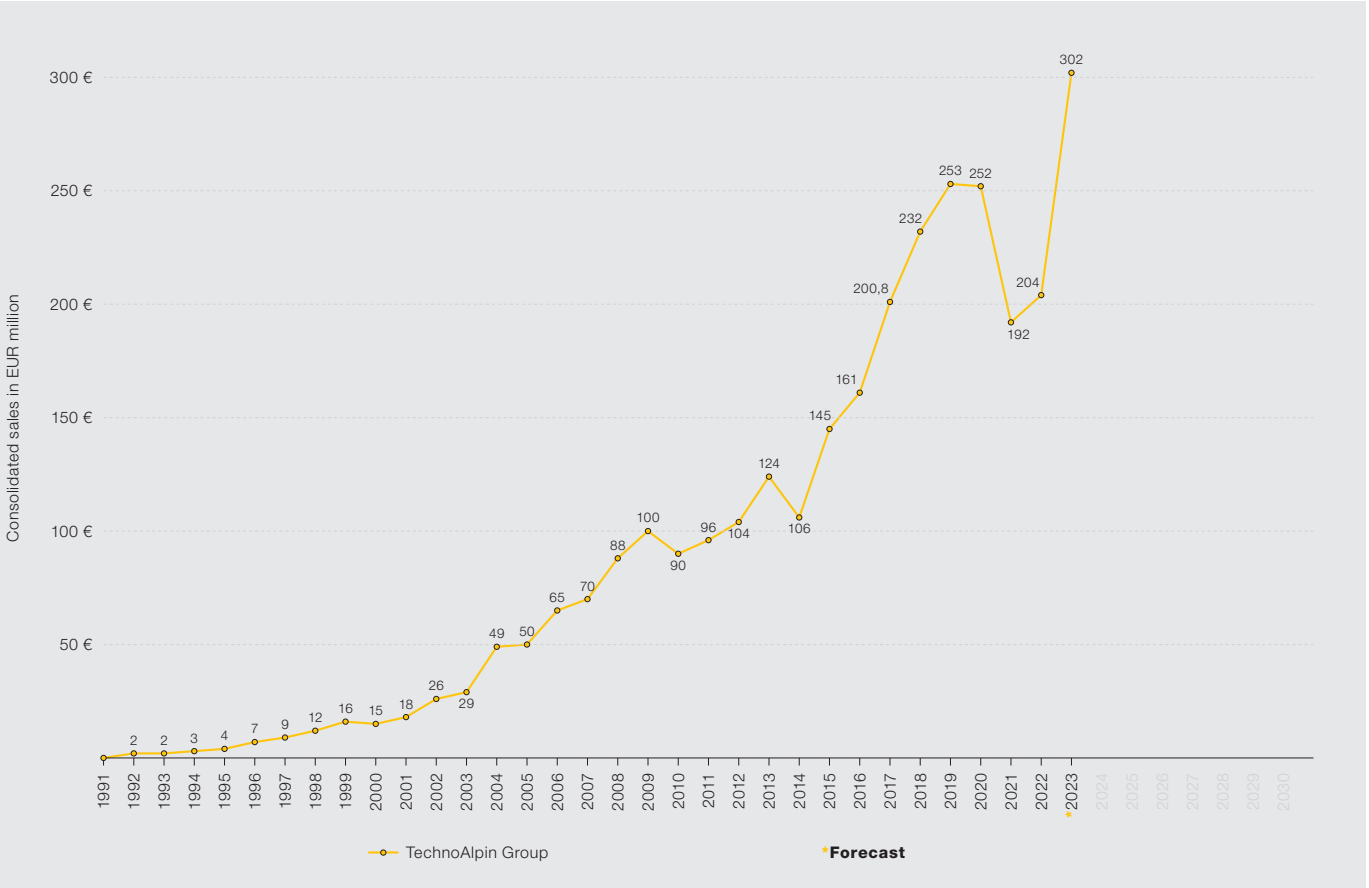
SALES AND EMPLOYEE DEVELOPMENT SINCE 2010

Year	2010/11	2015/16	2020/21	2021/22	2022/23
Employees	237	394	616	620	701*
Revenue	96 M €	161 M €	192 M €	204 M €	302 M €**

*Group without seasonal workers

**Forecast 7+5

SALES DEVELOPMENT SINCE THE COMPANY WAS FOUNDED IN 1990

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2.3 COMPANY AND LOCATIONS

TechnoAlpin's headquarters is in Bolzano, Italy. Bolzano is also home to the main production plant, the welding shop, and now also a mechanical workshop after an acquisition completed at the end of April 2023. The company has another branch in Trento that performs similar activities as the headquarters but with fewer employees.

The following sustainability report pertains to TechnoAlpin SpA, which is the Italian subsidiary of the TechnoAlpin Group. Data on the mechanical workshop is not available due to the recent acquisition. Over the next few years, the report will be expanded to include TechnoAlpin's other subsidiaries.

LOCATIONS IN ITALY

- Via Piero Agostini 2, 39100 Bolzano
- Via Werner von Siemens 12, 39100 Bolzano
- Via Nicolò Copernico 16, 39100 Bolzano
- Via Louise Braille 10, 39100 Bolzano
- Zona Produttiva Vurza 7, 39055 Laives (BZ)
- Via dei Solteri 38, 38121 Trento

HEADQUARTERS

Via Piero Agostini 2, 39100 Bolzano

Activities: Headquarters, administrative and sales offices, technical office, construction management, research and development, customer service, training, and warehouse

Year of opening: 2010

Area: approx. 14,500 m^2

Volume: 140,000 m^3

PRODUCTION

Via Werner von Siemens 12, 39100 Bolzano

Activities: Production, warehouse, and training

Year of opening: 2019

Area: approx. 14,500 m^2

Volume: 110,000 m^3

WELDING WORKSHOP

Via Nicolò Copernico 16, 39100 Bolzano

Activities: Workshop and welding

Area: 2,400 m^2

Volume: 6,000 m^3

MACHINING PRODUCTION COMPANY

Via Louise Braille 10, 39100 Bolzano

Activities: Production and assembly of mechanical parts

Year of acquisition: 2023

Area: 650 m^2

Volume: 2,450 m^3

WAREHOUSE

Zona Produttiva Vurza 5, 39055 Laives (BZ)

Activities: Storage of large materials returned from construction sites or used machinery

Area: 2,800 m^2

TECHNICAL OFFICE

Via dei Solteri 38, 38121 Trento

Activities: Administrative and sales offices, technical office, construction management, and research and development

Area: 199 m^2

TECHNOALPIN AROUND THE WORLD

In addition to its headquarters in Bolzano, TechnoAlpin has 15 other locations in 13 countries and 17 sales partners in 15 countries.

2.4 THE HISTORY OF THE TECHNOALPIN GROUP

TechnoAlpin has been setting new standards in technical snowmaking for over 30 years. The company was founded in 1990 based on the vision of Georg Eisath, Walter Rieder, and Erich Gummerer and is synonymous with quality and reliability.

However, the history of TechnoAlpin goes back even further.

1983

In the early 1980s, the regions south of the Alps experienced a number of winters with little snow. Walter Rieder and Georg Eisath, managers of the Obereggen ski area (ITA), developed a prototype snowmaking system in 1983 that was specially adapted to the climate south of the Alps and used commercially available components, including a hay fan from the family farm and agricultural nozzles.

1990

TechnoAlpin was created together with Erich Gummerer, building on the success of WI.TE OHG, which was established in 1985 by Walter Rieder and Georg Eisath. The aim was to set the company up for global success right from the start by acting as a global supplier.

1991

The company finds its first sales partners for Norway, Poland, Slovakia, Czechia, and Switzerland.

1992

4-jet ceramic nozzles used for the first time

Sales partner for Argentina, Finland, Japan, Korea and Spain

1995

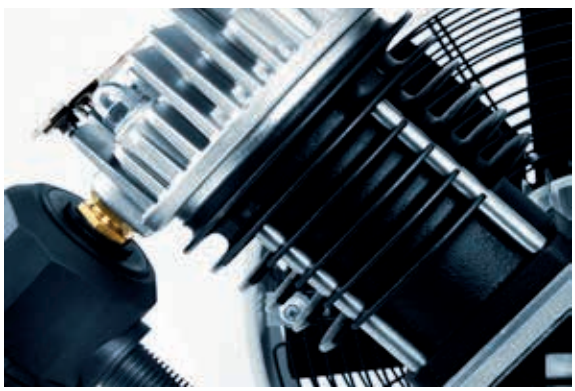
ATASS 1.0 (Automatic TechnoAlpin Snowmaking System), the first data management and control software for TechnoAlpin snowmaking systems, is launched.

1996

From the very beginning, TechnoAlpin aimed to become an international player. The first TechnoAlpin subsidiaries were set up in Austria, Switzerland, and Germany in the mid-1990s.

1998

Oil-free compressor introduced and series production of the CES Lance started



2002

Launch of the M18 fan gun. Creation of TechnoAlpin USA and TechnoAlpin France.

2003

For the first time, TechnoAlpin sells more than 1,000 snow guns in one year (1,461 units). Creation of TechnoAlpin East Europe.

2005

Introduction of the revolutionary A-Lance with round head. TechnoAlpin employs over 100 workers worldwide.

2007

Launch of the T60 fan gun and the A30 lance.

2011

TechnoAlpin pro air solutions becomes an independent company under the name EmiControls.
TechnoAlpin acquires Innovag, a company specializing in indoor snowmaking.

2012

TechnoAlpin takes over competitor Johnson Controls Neige, which becomes MYNEIGE.

Johnson Controls Neige was founded in 1976 as York Neige and has long been a pioneer in snowmaking, installing more than 50,000 snow guns. It even built the first automatic systems back in the 1980s. In 2012, TechnoAlpin buys the company, changing the name to MyNeige. MyNeige initially remains a separate company, retaining its structure, 103 employees, and products. In 2014, MyNeige and TechnoAlpin were brought together under the TechnoAlpin umbrella. This ensured that all of the expertise remained within the group of companies. In the years that followed, the best of both successful product worlds was combined to create new solutions. At the time of the acquisition, MyNeige had registered patents on 8 products, which were transferred to TechnoAlpin.

2013

Creation of TechnoAlpin China.

2014

The SnowFactory, the snow producer for snowmaking at degrees above zero, is launched.
TechnoAlpin, MYNEIGE and Innovag are brought together under the TechnoAlpin umbrella. Three centers of excellence are created: Fan guns in Bolzano, Italy, lances in France, and a division for indoor snowmaking.

2015

TechnoAlpin Nordic and TechnoAlpin Turkey are established in Sunne (Sweden) and Istanbul.

2016

TechnoAlpin Austria opens new headquarters in Volders.
This location starts handling international spare parts management immediately

2018

Engo Srl, a technology leader in ice resurfacing machines, becomes part of the TechnoAlpin Group.

2019

A new production facility is inaugurated in Bolzano South. Market launch of the TR10 fan gun and the SNOWMASTER App for ski resort managers.

2021

The TT10 snow gun on tower and TL Lance series are both introduced. The TT10, the first snow gun with a tiltable tower, sets new standards in snowmaking. ATASSpro software introduced.

3

WHO WE ARE:
TECHNOALPIN SpA

TECHNOALPIN®

3.1 PRODUCTS AND SOLUTIONS

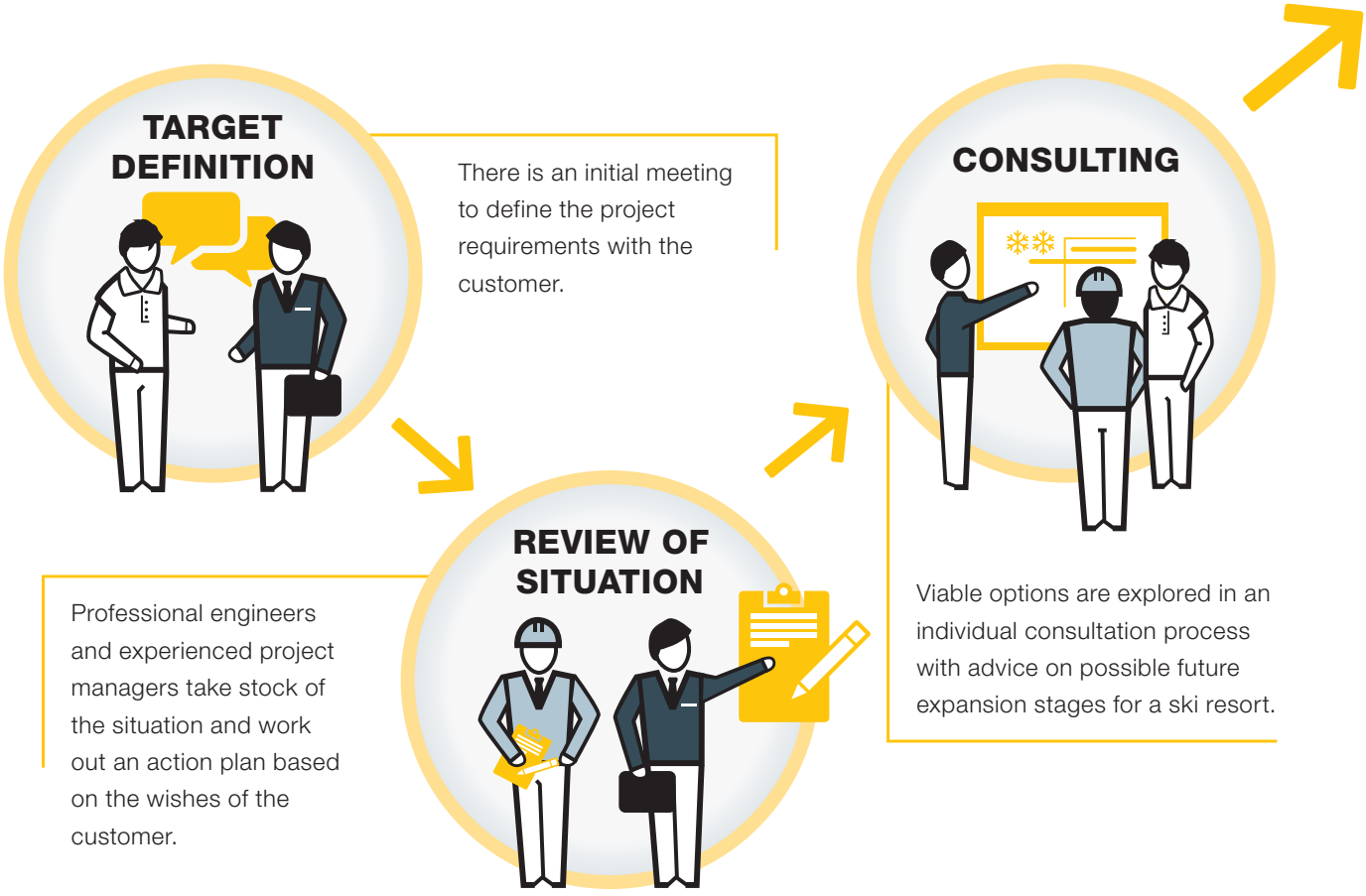
TechnoAlpin has been designing and building turnkey snowmaking systems for ski areas all over the world since 1990. A passion for snow and innovative solutions has made the company an industry leader. To produce top-quality snow with maximum energy efficiency and minimum resource consumption, we are constantly expanding our product line.

Snowmaking systems are highly complex technical systems with a large number of components. All of the components have to work together perfectly to produce the best possible snow. TechnoAlpin manages every stage of the project—from planning to implementation and service.

PLANNING TURNKEY SOLUTIONS

Energy-efficient snowmaking depends on careful planning. Specific requirements are discussed together with ski area managers to ensure the custom system is the right size.

TechnoAlpin can install turnkey systems and handle project management as follows:



OFFER

The masterplan is used to prepare a detailed quote covering all aspects of the project.

CONTRACT SIGNING

Once the contract has been signed, work will start on the project. All the details will be discussed and the deadlines fixed.

START-UP

Qualified technicians and expert application software programmers put the entire system and the snow guns into operation together with the customer.

PROJECT MANAGEMENT

The project manager coordinates the site supervision, the programming of the custom control software, the production of the machines, the construction of the pumping station, and the punctual delivery of all the materials.

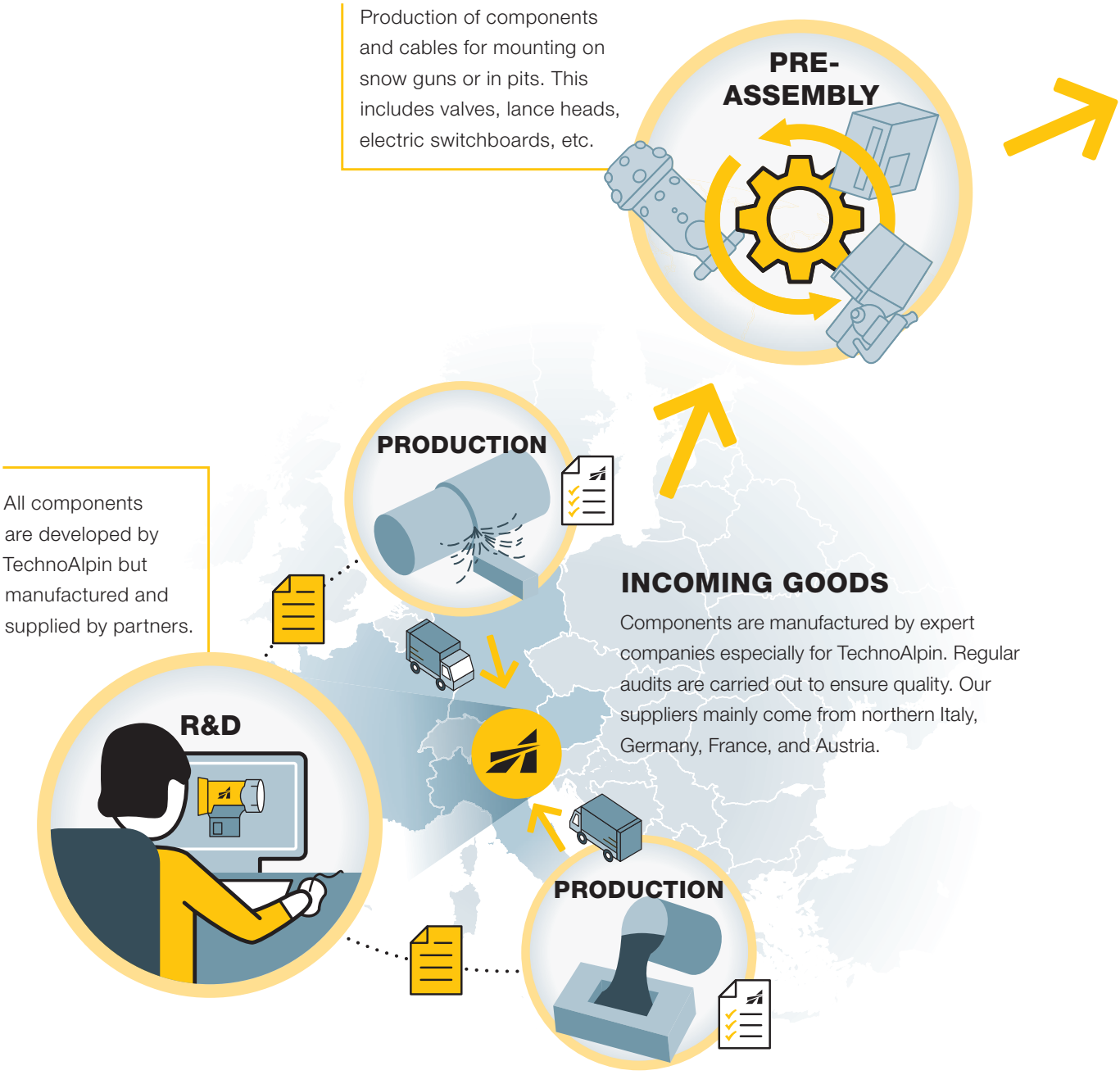
MASTERPLAN

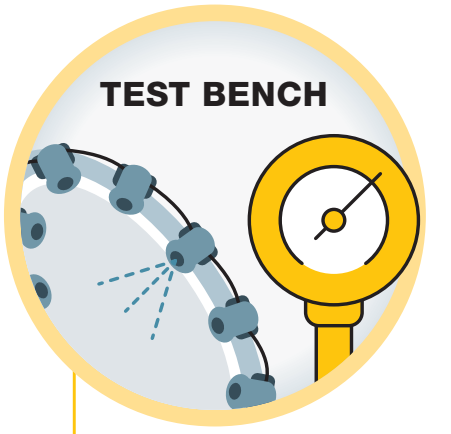
The master plan contains the specifications for the technical components of the entire snowmaking system.

THE PRODUCTION CHAIN

When planning how the system will be installed, TechnoAlpin draws on its wide range of products to select the right snow gun for the right location. All snow guns are manufactured at our plant in Bolzano, where components provided by suppliers are assembled.

The production process includes the following steps.





Water-bearing units, such as nozzle rings, are tested with a water pressure of 80 bar before final assembly.

Turbines and foundations are manufactured in two parallel lines.

In the so-called “marriage”, the turbines are mounted on the foundation. This is followed by wiring and cladding.

Electrical tests and water tests are performed on each machine to make sure everything is working.


WIRING
EP-05
04-05.1

PRODUCTS FROM TECHNOALPIN

TechnoAlpin offers a wide range of snow guns for indoor and outdoor snowmaking, so the right model is available for every application. We continuously improve and optimize our products in terms of energy efficiency, function, comfort, and reliability. TechnoAlpin also offers all components for system construction as well as software solutions.

OUTDOOR SNOW GUNS

› FAN GUNS

TechnoAlpin's fan guns are true pioneers. As a result of meticulous research and development programs, the fan guns feature innovative and efficient technologies, such as ruby inserts in nucleators and nozzles or new valve technology that ensures not even a drop of water is wasted. TechnoAlpin offers a wide range of fan guns to meet the most diverse needs.

› LANCES

TechnoAlpin lances meet the highest and most innovative technical standards, and we are constantly optimizing their nozzles and nucleators to improve snow output. Here, too, the focus is on optimizing energy efficiency. Our TL series lance heads are mounted on the new universal lance pipe, eliminating the need to use different types of pipes.

› SNOWFACTORY

The SnowFactory produces snow with an innovative cooling technology that uses an efficient heat exchanger to cool water down to freezing so that snow can be produced regardless of the outside temperature. It is not intended to replace classic snow guns but complement them.

WATER AND AIR SUPPLY

TechnoAlpin not only takes care of the snow guns, but also the entire snowmaking system. The company designs and builds the machine rooms and necessary pipeline systems as well as pits, valves, and cooling towers.

› PUMPING STATIONS

There is a pumping station at the heart of every snowmaking system, because without water, you cannot produce snow. TechnoAlpin uses high-quality components and state-of-the-art digital technology to make the system as simple and safe to operate as possible. TechnoAlpin has been using the IO-Link communication system since 2019, which allows all measured values to be transmitted digitally.

› CAST-IRON PIPELINE SYSTEM

Field pipelines have to meet very high standards to ensure optimum snowmaking. The ALPINAL pipeline system from TechnoAlpin is incredibly flexible, robust, and durable thanks to high-quality materials. This system was specially developed to be used in difficult conditions and is excellent for water supply in mountainous regions and under high-pressure conditions.

› COMPRESSORS

Snow guns can only work at their best if the compressed air is cooled to the optimal temperature. That's why TechnoAlpin relies on state-of-the-art compressors with sophisticated technology for its snowmaking systems. To obtain the compressed air they need, our snow guns either have a compressor installed directly on board or they get it from a central compressor plant.

› COOLING TOWERS

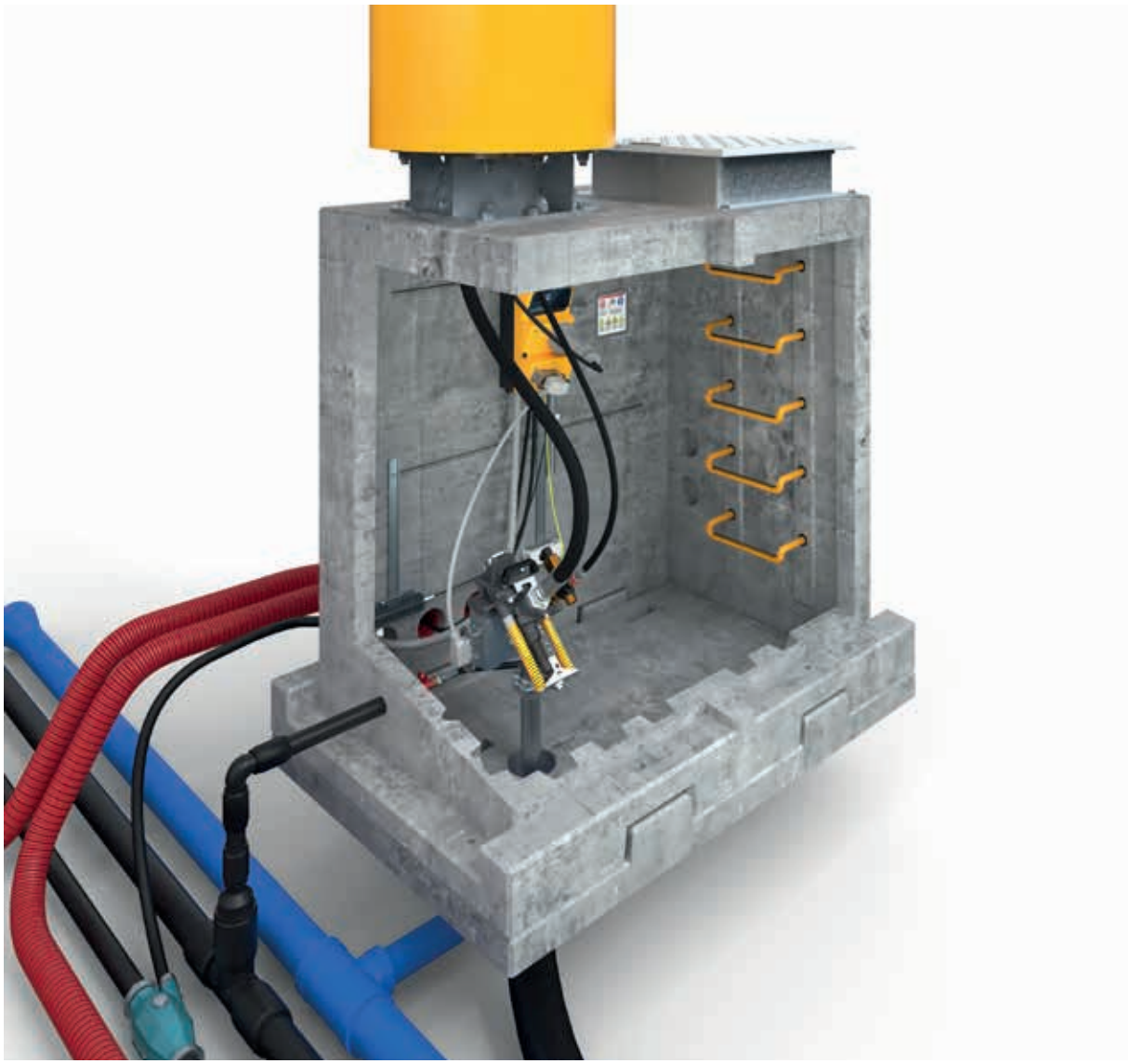
Our sophisticated cooling towers cool the water by distributing it over a large area in the heat sink's honeycomb system without freezing. This cooler water is then used for snowmaking, which helps optimize the performance of the individual snow guns as well as the energy efficiency of the entire system.

› VALVES

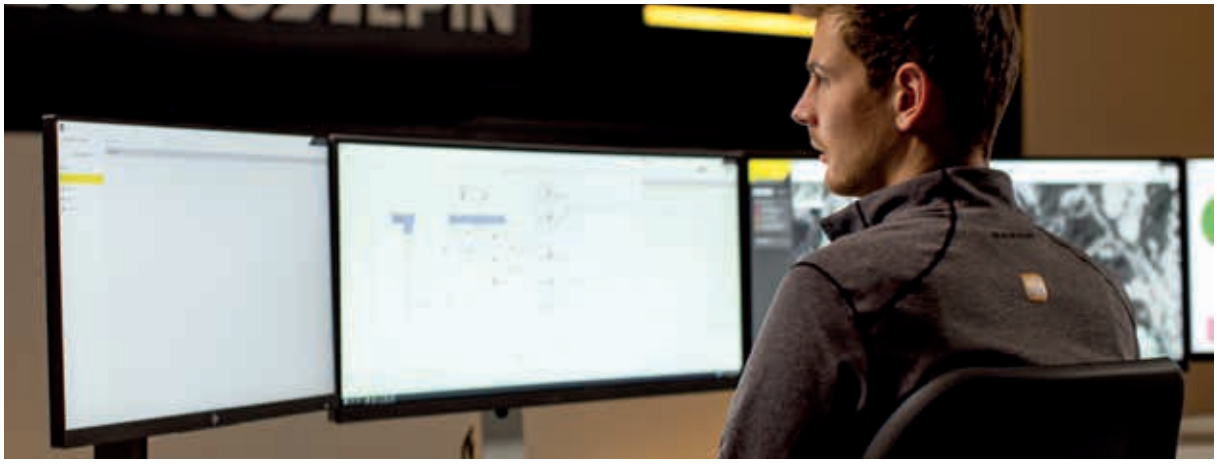
The valves of a snowmaking system must be highly resistant. Besides the cold, wind and weather, they are required to withstand water pressures of up to 100 bar. TechnoAlpin develops valves that meet the highest technical requirements. They have an automatic closing function in case of malfunctions and an integrated discharge valve.

› PITS

TechnoAlpin's pits allow all the electrical and hydraulic components for the water, power, air, and data connections of a snowmaking system to be installed. TechnoAlpin supplies concrete, steel, and polyethylene pits. Just looking at the details, like the two-part entrance hatch, the amount of innovation in this area is apparent. The snowmaking manager no longer has to go down into the pit to connect the cables — a real plus for operational safety.



CONTROL SYSTEM



› ATASSpro Software

Fully automatic and intelligent control of the snowmaking system is a basic prerequisite for producing snow in a resource-efficient manner. At TechnoAlpin, we are continuously developing our ATASSpro software. New tools constantly offer new possibilities — from planning to actual snowmaking and follow-up (data analysis, statistics, etc.). They improve performance, increase the operational reliability of the system, and ensure more efficient use of resources.

› SNOWMASTER

SNOWMASTER was developed to give ski area managers better insight into technical snowmaking. The most important key figures for snowmaking are derived from the large amount of available data and processed for management via a user-friendly web application. SNOWMASTER provides an accurate overview of resources as well as a preview of the days to come.

SOLUTIONS FOR INDOOR SKI CENTERS

In the field of indoor snowmaking, TechnoAlpin offers solutions for a wide range of applications. The common thread among all technical solutions is that the snow they produce consists solely of water and air.

› S6

The dry snow produced by the S6 is perfect for indoor ski slopes. The specially developed indoor snow nozzle is surrounded by an extremely cold air current which manages to produce more snow than conventional snowmaking systems. At the same time, the S6 releases fewer water particles into the surrounding air and does not affect indoor conditions during snow production.

› SNOWRAMP

The SNOWRAMP was specially designed to create an authentic winter atmosphere in indoor ski centers. This snow producer complements the S6 perfectly and is designed to make snow specifically for decorative elements such as trees, houses, and cave ceilings.

TECHNOALPIN INDOOR

› SNOWROOM

The SNOWROOM brings winter and the magic of snow to the whole world year round.

Its versatility makes it possible for the SNOWROOM to be integrated into thermal spas, luxury hotels with wellness centers, cruise ships, and fitness areas and also serve as an attraction at special events. It is also used in retail to test outdoor products under realistic winter conditions.

Three components form the basis of this efficient system:

- The snow cabin is made of high-quality materials with excellent insulation properties.
- The central technical system introduces cold air and water into the cabin and controls snowmaking.
- The system is continuously cooled through recirculation.

› SNOWSKY

There are no limits on creativity with SNOWSKY. Its compact size means it is easy to integrate into new and existing indoor spaces, either next to a sauna or fitness area for hygienic refreshment or on its own in a hotel lobby or cocktail bar.

At room temperature, the snow falls at 15 l/h — a relatively small amount of water compared to the average shower — and is guaranteed to attract a lot of attention. Snow is an independent element and therefore independent of style. This makes integration even easier and smoother.

SOLUTIONS FOR INDUSTRY

When developing new products and materials, it is often necessary to test their behavior in typical winter conditions, such as in snow and cold. TechnoAlpin develops custom solutions for these needs to produce real snowfall in an enclosed space. This allows manufacturers to conduct prototype testing faster and more frequently than time-consuming winter tests. Most importantly, they can reproduce exactly the same test conditions, even at short intervals. This helps reduce the overall ecological impact of the item being tested.

› SNOW COLUMNS AND SNOW NOZZLES

During the development of the snow column, special attention was paid to the size of the snow particles. The result of this meticulous development work is a snow nozzle that simulates the properties of natural snow as realistically as possible. The nozzle is located on the robust snow column body, which is flexibly designed to allow additional nozzles to be integrated. The team responsible can then adapt the settings to the test in question without necessarily having to adapt to the environment.

› SNOWFALL SIMULATION

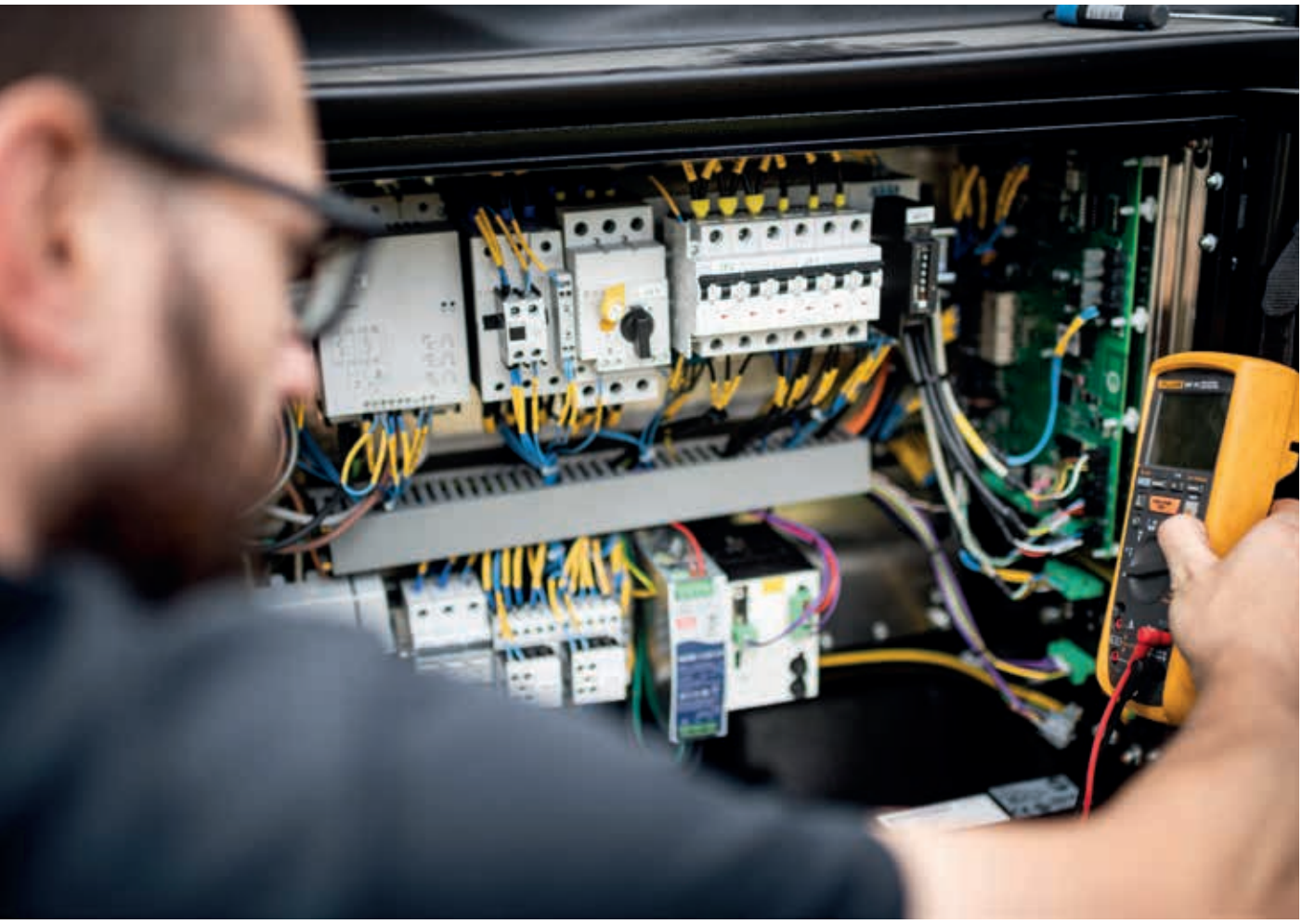
TechnoAlpin is the first company in the world to offer the ability to reproduce natural snowfall in an enclosed space. Sophisticated technology makes it possible to simulate snowflakes falling from above onto the various components of a vehicle.

TECHNOALPIN SERVICE

Optimal maintenance is essential for a system to operate sustainably. Longevity and efficiency increase when the system can be operated under optimal conditions. That's why TechnoAlpin relies on the B.E.A.T. concept for preventive maintenance. B.E.A.T. stands for the 4 phases of Beginning, Equipment, Action and Target and divides the year into these action intervals.

What's more, TechnoAlpin guarantees its customers worldwide service and personalized support. More than 120 service employees are ready to travel to any location to fix any kind of problem. The service team can be reached around the clock at the dedicated hotline or by e-mail and offers customers competent and reliable help for problems with snow guns or machine rooms. Remote access to all systems worldwide allows users to quickly identify and rectify problems.

TechnoAlpin's ServicePortal provides essential support to quickly and easily order spare parts and access important technical documents.



TECHNOALPIN ACADEMY

Optimal and efficient control of a snowmaking system also depends on how well trained the snowmaking team is. The TechnoAlpin Academy has been offering an extensive training program for years, with more than 500 people participating annually worldwide. This involves not only the maintenance and repair of snow guns and pumping stations, but also the correct control and optimum snow quality for conserving resources when in operation.

To create an ideal learning environment, the training centers in Bolzano are equipped with modern technology and numerous sectional models of equipment and machines. Qualified trainers jointly develop simple and efficient training content, with an emphasis on practical training. Additionally, on-site training is available through the Academy on Tour to allow for even more targeted attention to specific needs.

3.2 PARTNERS AND SUPPLIERS

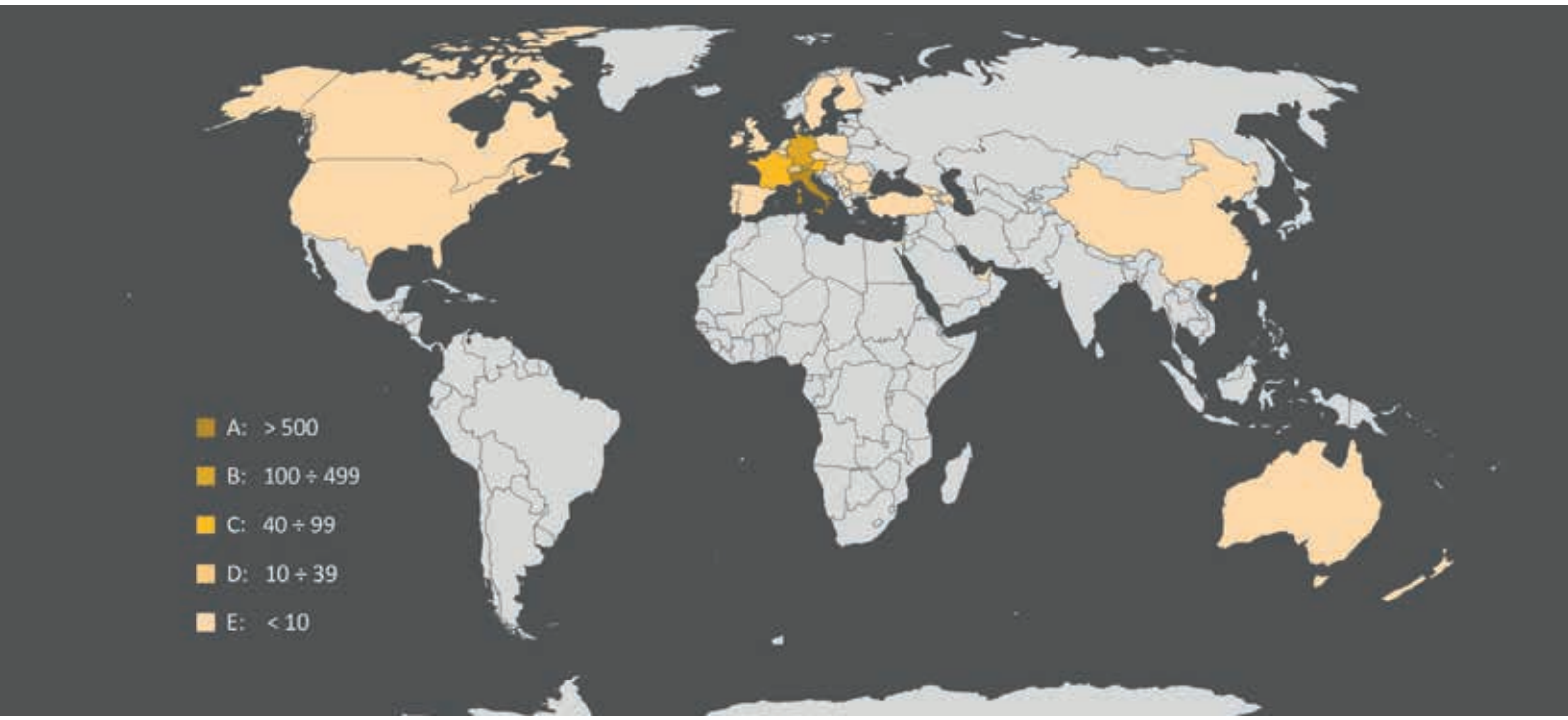
TechnoAlpin relies on reliable and established partners to optimize its products and services. Suppliers and subcontractors manufacture components according to the technical specifications developed by the R&D department. Alternatively, the company sources standard components that have been carefully tested and selected. Until now, no unprocessed raw materials have been purchased. However, this will change over the coming years with the integration of the machining production company in May 2023, although the amount of raw materials will remain very low.

TechnoAlpin also buys pipes, flanges, and other components used to build pumping stations and concrete pits, which it welds at its Via Copernico plant in Bolzano or on site at the customer's location using its own personnel or qualified subcontractors.

Service providers on construction sites include electricians and contractors. For construction work, TechnoAlpin often uses contractors recommended by customers and employees from local companies.

Other service providers and consultants include planning professionals, law firms, real estate professionals, utilities and waste management.

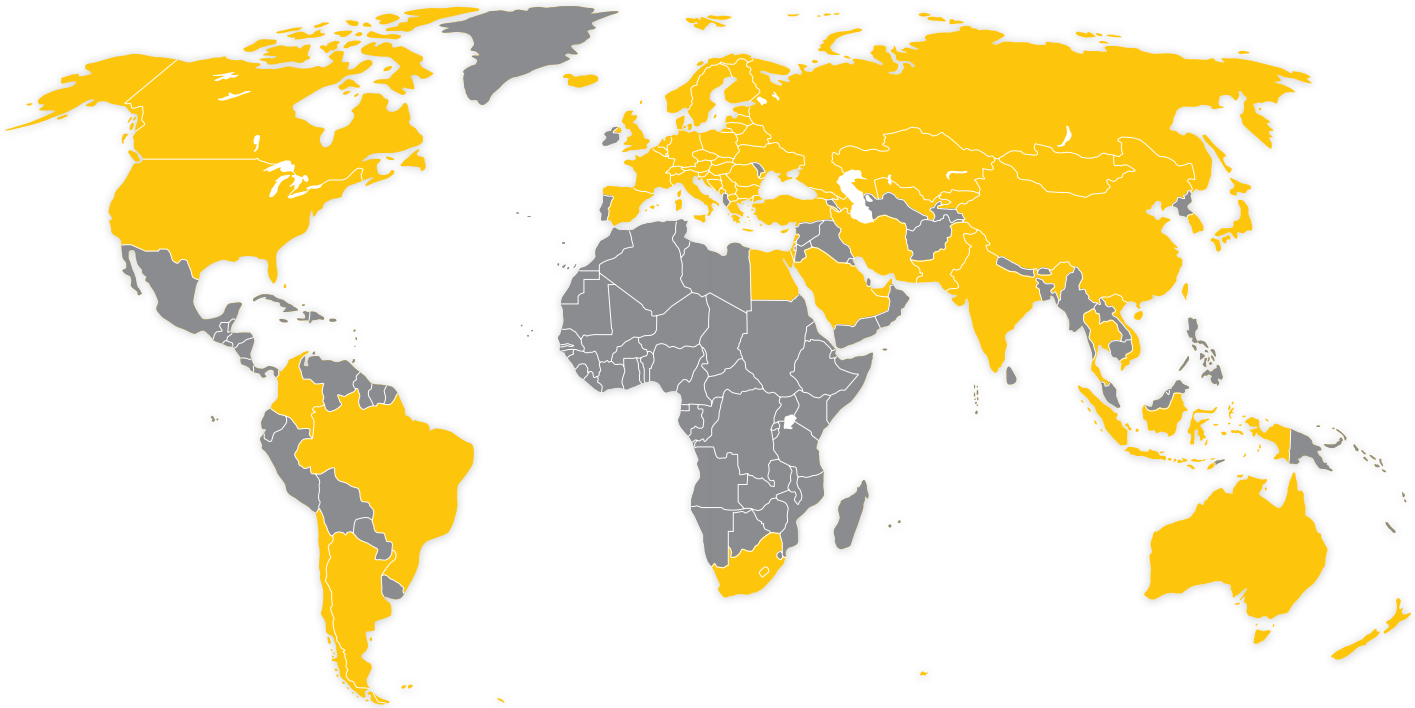
TechnoAlpin also works with universities, research institutions, and expert companies to find ever-more advanced and innovative solutions for snowmaking. Snow guns as well as other system components, such as pumping stations and software, benefit from this continuous research. **The majority of the suppliers (around 70%) are located in Italy, followed by neighboring European countries.**



3.3 OUR CUSTOMERS

A passion for snow and innovative solutions has made the company #1 in the world. About 2,400 customers in 55 countries place their trust in TechnoAlpin's expertise. These include the world's most famous ski areas and numerous organizers of major winter sports events. Many Nordic centers also rely on TechnoAlpin's high-quality products. TechnoAlpin supplies customers on all continents, including public and private customers.
In the indoor sector, TechnoAlpin's customers include resorts, wellness centers, stores, and industrial companies that conduct tests in extreme climate conditions. In every area, TechnoAlpin is a guarantee of first-class snow quality.
It is no longer possible to operate a successful ski resort without snowmaking systems. The large investment required for infrastructure and the higher demand from guests make planning the season inevitable.

With its high-quality products, TechnoAlpin is essential in value creation for entire regions. The Austrian Economic Chamber came up with some impressive figures. Cable car companies create 17,057 jobs. A total of 125,900 jobs depend directly on the success of winter sports. The value-added multiplier is 8.3, i.e. €1,000 in wages, salaries, profits, and depreciation, as cable cars bring €8,300 in revenue to the region. In total, cable cars in Austria require about 1.2% of the national electricity production.



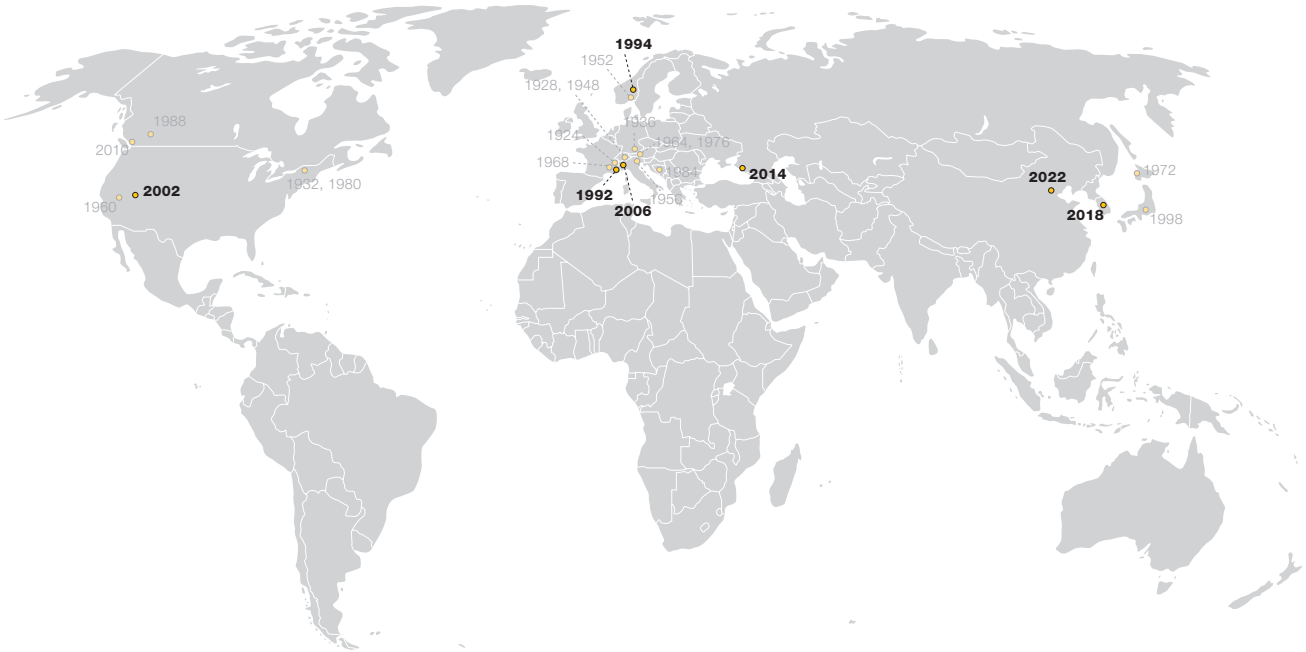
3.4 PARTNERSHIPS

The world's most influential winter sports associations rely on TechnoAlpin's many years of experience and extensive expertise for quality. They are not only involved in organizing major events, but also act as consultants for destinations that do not have sufficient knowledge of winter sports.

The world market leader is also in demand as a national product partner and at major events. TechnoAlpin is proud to be a partner of the following associations and events:

THE MOST IMPORTANT EVENTS

Many major events around the world depend on the reliability and performance of TechnoAlpin products. Numerous Alpine and Nordic World Ski Championships and most World Cup races are held on snow from TechnoAlpin. Seven of the last nine Winter Olympics were also entirely or partially held on snow made by TechnoAlpin.



Albertville **1992**	Lillehammer **1994**	Salt Lake City **2002**	Torino **2006**	Sochi **2014**	PyeongChang **2018**	Beijing **2022**

3.5 TECHNOALPIN EMPLOYEES

As of January 2023, TechnoAlpin SpA and TechnoAlpin Holding in Italy have

- 331 permanent employees
- 74 seasonal employees
- 4 freelancers

The figures in the following table are for fiscal year 2021-2022 and fiscal year 2022-2023 for TechnoAlpin SpA and TechnoAlpin Holding. The figures indicate FTE as of April 30 of each year, while an annual average was calculated for seasonal workers.

NUMBER OF EMPLOYEES (FTE)

		05.2021-04.2022	05.2022-04.2023
Employees by gender as of April 30	**Female**	**40**	**50**
	Male	**311**	**348**
Number of employees		**351**	**398**

NUMBER OF PERMANENT EMPLOYEES (FTE)

		05.2021-04.2022	05.2022-04.2023
Employees by gender as of April 30	**Female**	**38**	**43**
	Male	**273**	**310**
Number of permanent employees		**311**	**353**

NUMBER OF TEMPORARY EMPLOYEES (FTE)

		05.2021-04.2022	05.2022-04.2023
Employees by gender as of April 30	**Female**	**2**	**7**
	Male	**38**	**38**
Number of temporary employees		**40**	**45**

NUMBER OF FULL-TIME EMPLOYEES (FTE)

		05.2021-04.2022	05.2022-04.2023
Employees by gender as of April 30	**Female**	**35**	**41**
	Male	**304**	**344**
Number of full-time employees		**339**	**385**

NUMBER OF PART-TIME EMPLOYEES (FTE)

		05.2021-04.2022	05.2022-04.2023
Employees by gender as of April 30	**Female**	**5**	**6**
	Male	**7**	**7**
Number of part-time employees		**12**	**13**

NUMBER OF SEASONAL EMPLOYEES (FTE)

		05.2021-04.2022	05.2022-04.2023
Employees by gender, annual average	**Female**	**2**	**2**
	Male	**34**	**48**
Number of seasonal employees		**36**	**50**

There are no employees at TechnoAlpin with non-guaranteed working hours.

Additional personnel-related key figures can be found in the “Employee Engagement” section.

3.6 CORPORATE GOVERNANCE

TechnoAlpin SpA has a management and control system based on the traditional model and is made up of the Board of Directors, which consists of two members, the Chair and Chief Executive Officer, and one other member of the Board of Directors. The Board of Directors is responsible for the ordinary and extraordinary management of the Company, establishes strategic guidelines, evaluates the adequacy of the organizational, administrative, and accounting structure, and is responsible for the general evaluation of management's performance. The Supervisory Board consists of five members appointed for three financial years. It monitors compliance with the law, the Articles of Association, and the principles of proper management.

As required by law, the Company has appointed an auditor to verify that the accounts have been properly kept and that transactions have been correctly recorded in the books and to issue an opinion on the financial statements in a corresponding report.

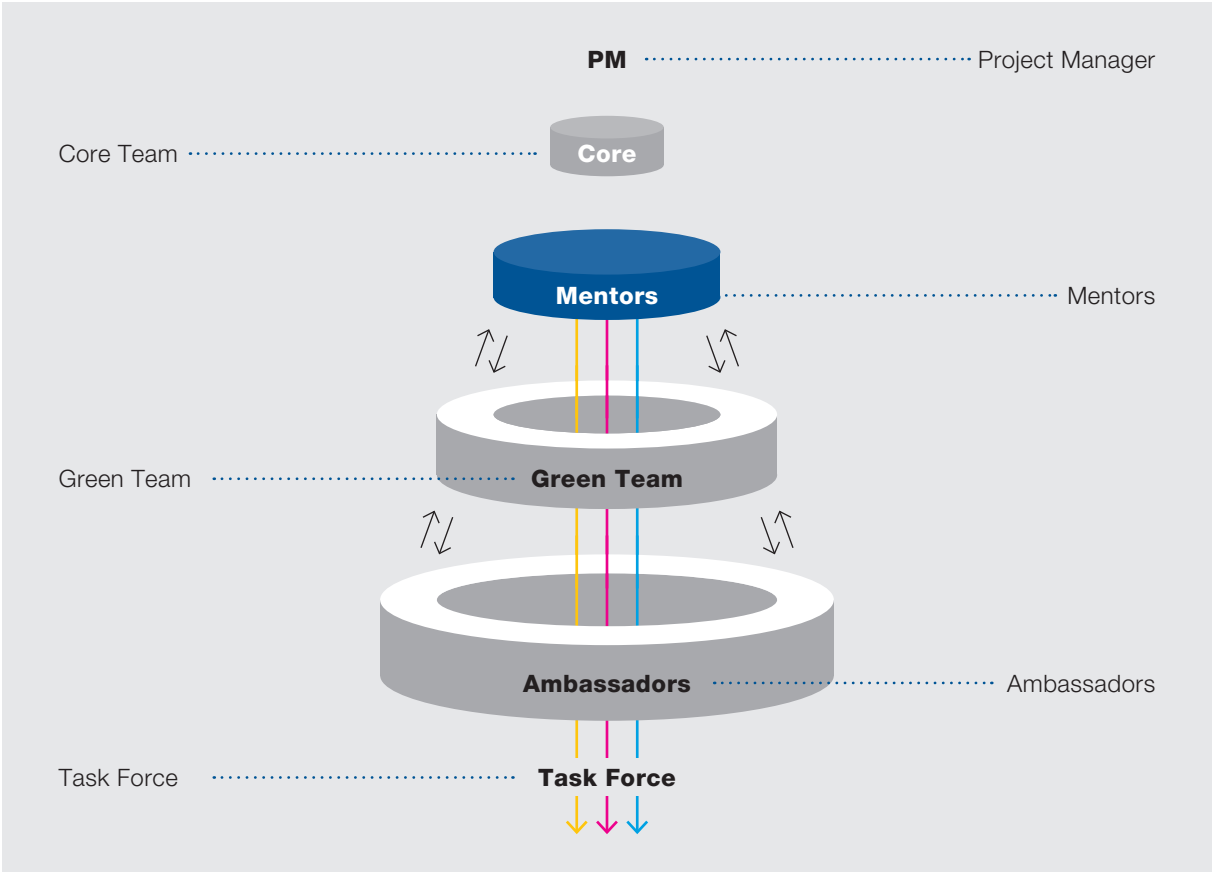
With notarized documents, the Board of Directors has delegated certain tasks to five officers, who perform their work according to the principles and powers of the granted power of attorney.

Additionally, based on the current laws on occupational safety, environmental protection and the liability of the company and its managers, the TechnoAlpin Board of Directors has decided to have a member of the Board of Directors who meets the technical and professional requirements and has obtained the title of Employer in accordance with Italian Legislative Decree no. 81/2008 and Guarantor of the Environment in accordance with Italian Legislative Decree no. 152/2006.

Under the provisions of Italian Legislative Decree 231/2001 on the administrative liability of legal entities ("Regulation of the administrative liability of legal entities, companies and insurance companies, including those without legal status, pursuant to Article 11 of Italian Republic Law no. 300 of September 29, 2000"), the Board of Directors, by resolution of January 23, 2023, reestablished a supervisory body to monitor the effectiveness and functioning of the organizational, management and control model and regularly adapt and update it.

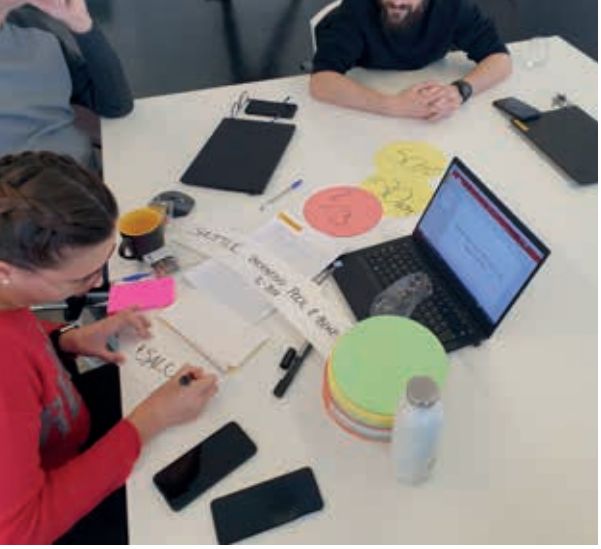
3.7 SUSTAINABILITY MANAGEMENT

The implementation of a sustainable corporate strategy is not possible if sustainability is not important to the company's management: Only then can sustainability become a fundamental part of corporate culture. TechnoAlpin has therefore set up an internal body to promote sustainability at all levels of the company.



The project, supported by the mentors, is implemented by the Core Team. The Green Team regularly reviews and validates each development step. The Green Team includes the CEO, the members of the Board of Directors, senior managers, the Head of People & Culture, the Facility Manager, the Head of Legal, and the Occupational Safety Officer.

After this first report has been finalized, the Green Team assumes responsibility for defining strategies and guidelines as well as identifying projects for sustainable development. However, it also monitors any specific sustainability risks and ensures that the defined strategies are translated into action. It is also responsible for coordinating activities within the Group.



The task forces (working groups) are made up of company employees in various roles and from various departments. They analyze TechnoAlpin's main issues and, for each issue, identify the measures taken to manage the issue and the associated impacts. They help with KPI reporting and identify potential new measures to be implemented in the future to prevent and mitigate negative impacts or monitor actual and potential positive impacts.

The Ambassadors play an important role, meeting voluntarily at regular intervals to discuss topics related to the Material Topics and other sustainability issues. Their main role is to help create and spread a corporate culture of sustainability, motivate other employees to participate in the initiatives proposed by the company, promote knowledge sharing on case studies by improving internal communication, and become an internal hub for sustainability and innovation.

This report is the result of a careful analysis of the company's direct and indirect impact and the measures it has taken over the years, which are now described from this perspective. The future goals outlined here have been endorsed by the entire Green Team and make up the action plan for aligning the company's culture with the goals of the 2030 Agenda. These goals are supported by concrete and quantifiable measures that will be monitored and reviewed over the next three years. Each company business unit/department has decided to integrate sustainability into its own activities. Short and long-term goals are therefore being set that are not separate from the business goals but instead are part of them. It is therefore the responsibility of each member of the Green Team to address the organization's impact on the economy, the environment, and people within the scope of their own responsibilities and their respective coordinated departments.

The Sustainability Report was approved by the TechnoAlpin SpA Board of Directors and the Green Team on August 29, 2023.

3.8 ABOUT US: VALUES AND STRATEGY

OUR VALUES

SNOW EXPERTISE
IN LOVE WITH TECHNOLOGY
CUSTOMER-FOCUSED
METICULOUS
HUNGRY FOR SUCCESS
CURIOUS

3.8.1 OUR VALUES

Our values are our DNA. They have made TechnoAlpin what it is today. TechnoAlpin's employees embody the company's core values and demonstrate them to the outside world. None of these values works on its own: TechnoAlpin only exists if they all work together.

› SNOW EXPERTISE

TechnoAlpin is the expert when it comes to snow production, with more experience as a supplier of turnkey systems than any other company and the ability to provide the optimum solution for every snowmaking requirement and therefore guarantee the perfect snow quality.

› IN LOVE WITH TECHNOLOGY

A joint approach is taken to new challenges at TechnoAlpin, with discussions and working practices geared to engineering the perfect solutions and bringing the best products to market. These products and solutions have placed TechnoAlpin at the cutting edge of technology in the industry.

› CUSTOMER-FOCUSED

The customers of TechnoAlpin have put the company where it is today and so are the focal point at TechnoAlpin. TechnoAlpin knows its customers' requirements and challenges and gives priority to finding the ideal solution for everyone, always willing to go the extra mile.

› METICULOUS

TechnoAlpin lives by its commitment to loving attention to detail, demanding the highest quality and perfection from every single component of the snowmaking system right through to the overall presentation of the company.

› HUNGRY FOR SUCCESS

TechnoAlpin has always claimed to be better than all the rest. All our employees are ambitious, seeking to achieve the best solution at all times, and are not content to rest on their laurels.

› CURIOUS

The joy of thinking outside the box, exploring new ideas and leaving absolutely no stone unturned in the attempt to improve snowmaking systems – this is what TechnoAlpin is all about.

3.8.2 OUR VISION AND MISSION

While the brand values show who we are and what distinguishes TechnoAlpin as a company, the company's mission and vision provide information about the company's strategic goals.

VISION

WE INSPIRE WITH UNIQUE EXPERIENCES OF SNOW AND ICE.

TECHNOALPIN®

MISSION

WE ARE TRENDSETTERS AND INNOVATORS.

Our curiosity and passion lead to creative solutions and make us the first point of contact for our customers worldwide.

3.8.3 CORPORATE GOALS

In 2022, the company set four corporate goals that define the line to follow in each of the company's development projects.

3.9 ABOUT US: PROCEDURES AND POSITIONING

3.9.1 THE PURSUIT OF QUALITY IS THE STANDARD

Conformity with international standards in all areas is a must for TechnoAlpin. Occupational safety measures, environmental protection measures, and the highest quality in production processes are equally fundamental.

For this reason, TechnoAlpin introduced an ISO 9001 quality management system to help optimize our processes. Since November 2007, TechnoAlpin has been ISO 14001 certified, proof that we are meeting environmental requirements in our operating processes. Since December 2009, TechnoAlpin has implemented a health and safety management system in accordance with the ISO 45001 standard, which aims to prevent occupational accidents and protect the health of our employees.

Every year, the company undergoes several audits by internationally recognized bodies. TechnoAlpin has also implemented a system to control processes through internal audits and careful management of internal and supplier non-conformities, customer complaints, accidents, and near misses.

In addition to the above certifications, the company has obtained further certifications for specific products and processes. The quality of the welding work on conduits and pipes is important for system safety. Various welding projects and internal quality controls therefore guarantee compliance with ISO 3834-2 requirements. A certain percentage of the work is also regularly subjected to non-destructive testing using X-ray and ultrasound techniques.

TechnoAlpin has F-Gas certification (for work with stationary refrigeration systems containing fluorinated greenhouse gases), SOA certification (mandatory for public contracts) and cTUVus certification for machinery and products for the North American region.

All of TechnoAlpin's certifications can be viewed on the company's website.


DNV
MANAGEMENT SYSTEM ZERTIFIKAT
Zertifikat-Nr.: C531041
Datum der Erstzertifizierung: 01. August 2022
Gültig: 01. August 2022 – 31. Juli 2025
Hiermit wird bescheinigt, dass das Unternehmen
TechnoAlpin S.p.A.
Via Piero Agostini, 2 - 39100 Bolzano (BZ) - Italy
sowie die im Anhang aufgeführten Standorte
ein Qualitäts-Managementsystem in Übereinstimmung mit dem folgenden Standard eingeführt hat und anwendet:
ISO 9001:2015
Dieses Zertifikat ist gültig für die folgenden Produkt- oder Dienstleistungsbereiche:
Planung, Realisierung, Installation, Verkauf, Wartung und Instandhaltung von Maschinen, Komponenten und Anlagen für die Beschneiung, einschließlich ergänzender Bauarbeiten und technischer Anlagen. Konzeption und Durchführung von Schulungen zu den Produkten und Anwendungen des Unternehmens.
(IAF 18, 28, 37)
ISO 9001 ACCREDIA EA 28
DNV
MANAGEMENT SYSTEM ZERTIFIKAT
Zertifikat-Nr.: C531039
Datum der Erstzertifizierung: 29. Juli 2022
Gültig: 29. Juli 2022 – 28. Juli 2025
Hiermit wird bescheinigt, dass das Unternehmen
TechnoAlpin S.p.A.
Via Piero Agostini, 2 - 39100 Bolzano (BZ) - Italy
sowie die im Anhang aufgeführten Standorte
ein Umwelt-Managementsystem in Übereinstimmung mit dem folgenden Standard eingeführt hat und anwendet:
ISO 14001:2015
Dieses Zertifikat ist gültig für die folgenden Produkt- oder Dienstleistungsbereiche:
Planung, Realisierung, Installation, Verkauf, Wartung und Instandhaltung von Maschinen, Komponenten und Anlagen für die Beschneiung, mittels der Phasen der mechanischen Bearbeitung, der Montage und des Schweißens, einschließlich ergänzender Bauarbeiten und technischer Anlagen. Konzeption und Durchführung von Schulungen zu den Produkten und Anwendungen des Unternehmens
(IAF: 18, 28, 35)
ISO 14001 ACCREDIA
Ort und Datum:
Vimercate (MB), 29. Juli 2022
Zertifizierungsstelle:
DNV - Business Assurance
DNV
MANAGEMENT SYSTEM ZERTIFIKAT
Zertifikat-Nr.: C531040
Datum der Erstzertifizierung: 01. August 2022
Gültig: 01. August 2022 – 31. Juli 2025
Hiermit wird bescheinigt, dass das Unternehmen
TechnoAlpin S.p.A.
Via Piero Agostini, 2 - 39100 Bolzano (BZ) - Italy
sowie die im Anhang aufgeführten Standorte
ein Managementsystem für Sicherheit und Gesundheit bei der Arbeit in Übereinstimmung mit dem folgenden Standard eingeführt hat und anwendet:
ISO 45001:2018
Dieses Zertifikat ist gültig für die folgenden Produkt- oder Dienstleistungsbereiche:
Planung, Realisierung, Installation, Verkauf, Wartung und Instandhaltung von Maschinen, Komponenten und Anlagen für die Beschneiung, mittels der Phasen der mechanischen Bearbeitung, der Montage und des Schweißens, einschließlich ergänzender Bauarbeiten und technischer Anlagen.
(IAF: 18, 28)
TÜV AUSTRIA
ZERTIFIKAT
ÖNORM EN ISO 3834-2
CQOP SOA
Impresa: TECHNOALPIN S.p.A.
SGS

3.9.2 CODE OF CONDUCT AND ORGANIZATIONAL MODEL

The Code of Conduct is an integral part of the Organizational, Management, and Control Model adopted by TechnoAlpin SpA in compliance with Italian Legislative Decree 231/2001. The Code contains the guidelines and ethical principles that the company's employees apply in their daily work and is published on the company's intranet.

The Organizational, Management, and Control Model is communicated to all TechnoAlpin SpA personnel through specific training plans, raising awareness, and communications. In the future, it will also be presented to new business partners at the beginning of each business relationship.

TechnoAlpin SpA has set up a whistleblowing system to allow anyone to report conduct that is not compliant with the Organizational, Management, and Control Model policies and procedures or applicable regulations. Reporting procedures and work instructions are adequately outlined in the Organization, Management, and Control Model, which is available to all employees on the intranet, and has been referred to on several occasions through announcements on the Viva Engage channel. The Company is committed to maintaining the highest level of confidentiality when processing reports and will not tolerate any form of retaliation associated with a report or any resulting corrective action. As of the date of publication of this text, no reports have been received by the whistleblowing system.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4

MATERIALITY ANALYSIS

4.1 PROCESS FOR SELECTING THE SUSTAINABILITY TOPICS

Materiality analysis is the fundamental process for identifying the sustainability issues that should be given the most consideration in a corporate sustainability strategy, the material issues. Material issues are any aspects that reflect the significant economic, environmental, and social impacts of a business and that significantly influence stakeholder assessments and decisions.

TechnoAlpin's material issues were defined in a multi-stage process involving multiple stakeholders based on the GRI reference standards.

PROCESS DESCRIPTION

ANALYZE ALL RELEVANT STAKEHOLDERS AND THEIR WEIGHTING.

ENVIRONMENTAL ANALYSIS (MARKET DEVELOPMENT, REGULATIONS, RISKS, AND OPPORTUNITIES).

BUSINESS AND VALUE CHAIN ANALYSIS.

IDENTIFY POTENTIAL MATERIAL ISSUES USING THE SDG, GRI, AND EUROPEAN GREEN DEAL MODELS.

DEFINE THE FOLLOWING
17 POSSIBLE MATERIAL ISSUES.

ENERGY EFFICIENCY

Lower energy consumption and emissions output in the value chain. Use more renewable energy.
Produce more efficient products and publicize best practices to help customers use energy more consciously.

PRODUCT QUALITY AND SAFETY

Use appropriate processes and technologies to ensure the highest quality products and services.

INNOVATION

Develop sustainable products and solutions. Publicize best practice examples
to help customers procure and use energy and water more consciously.

CLIMATE ADAPTATION

Take action to prepare for and adapt to the current impacts of climate change and those expected in the future.

FISCAL RESPONSIBILITY

Support customers by promoting transparency and accountability in accordance
with the Code of Conduct and Corporate Values in all processes.

CUSTOMER WELL-BEING

Promote customer wellbeing through improved best practices and continuous learning.
Increase workplace safety through the service network and innovations.

EMPLOYEE HEALTH AND SAFETY

Ensure working conditions that guarantee the health and safety of employees in all company processes.

BIODIVERSITY

Collaborate with universities and biodiversity experts to raise awareness
and promote biodiversity initiatives at ski areas through our Academy and other dedicated channels.

NOISE POLLUTION

Minimize the acoustic impact of our products on the environment.

WATER AND WASTEWATER

Reduce water consumption in the production process and publicize best practice examples to help customers procure, store, and use water more consciously.

EMPLOYEE COMMITMENT

Promote internal measures to keep employees motivated:
Support diversity and inclusion throughout the company through specific initiatives.

CIRCULAR ECONOMY

Develop products and services that share, rent, reuse, repair, and recycle existing materials and products for as long as possible.
Reduce waste.

LOGISTICS AND MOBILITY

Develop smart mobility solutions for employees and goods to lower emissions and unnecessary costs for logistics and travel.

TRANSPARENT SUPPLY CHAIN

More transparency in and control of social and environmental impacts along the supply chain.

SALES PRACTICES AND PRODUCT LABELING

Market products and services ethically, with clear marketing and labeling.

LANDSCAPE PRESERVATION

Communicate ideas and insights for designing sustainable landscapes with targeted assessments and training activities.

CONTRIBUTION TO THE LOCAL ECONOMY

Promote economic development and support local communities (through job creation, tourism, increased sales, etc.).

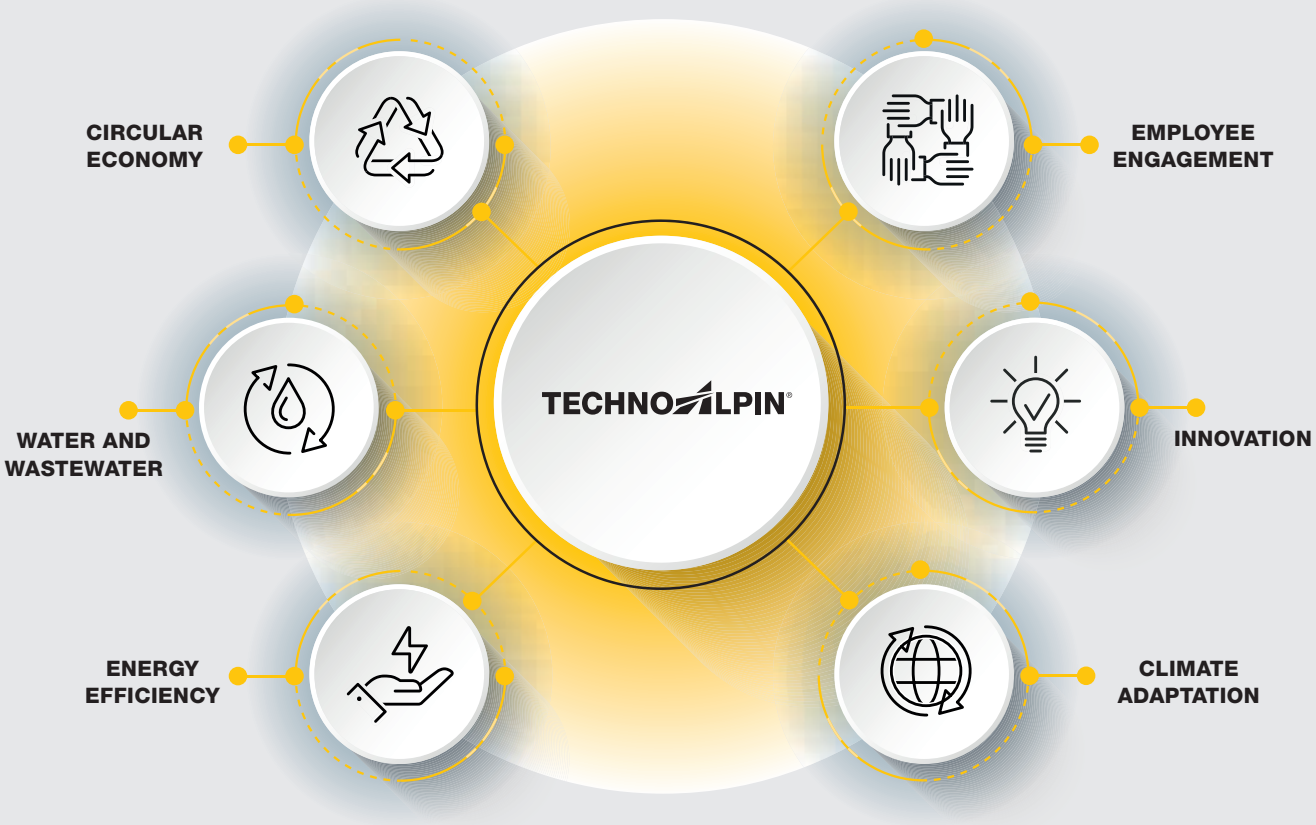
THE SURVEY WAS SENT TO 740 STAKEHOLDERS,
WITH ABOUT 40% OF THEM RESPONDING.
THEIR ANSWERS HELPED DETERMINE THE MATERIAL ISSUES.

TECHNOALPIN STAKEHOLDER ENGAGEMENT

4.2 OUR TOPICS FOR THE FUTURE

The process described above produced 5 material issues that exceeded the materiality threshold from the stakeholders' perspective. Evaluation of employee questionnaires also revealed that employee engagement is especially important to internal stakeholders. The Green Team and management decided to take this into account and included employee engagement as a separate material issue in addition to the Top 5.

THE COMPANY'S MATERIAL ISSUES ARE:



- **INNOVATION:** Develop sustainable products and solutions. Publicize best practice examples to help customers procure and use energy and water more consciously.

- **ENERGY EFFICIENCY:** Lower energy consumption in the value chain. Increase the use of renewable energy sources. Lower CO_2 emissions. Provide more efficient products and publicize best practice examples to help customers procure and use energy more consciously.

- **CLIMATE ADAPTATION:** Climate change is here. Not only do we need to do everything we can to slow the pace of global warming, but we also need to take action to prepare for the impacts of climate change and its predicted consequences.

- **CIRCULAR ECONOMY:** Develop products and services that share, rent, reuse, repair, and recycle existing materials and products for as long as possible. Reduce the amount of waste from packaging and production.

- **WATER AND WASTEWATER:** Reduce water consumption in the production process and publicize best practice examples to help customers procure, store, and use water more consciously.

- **EMPLOYEE ENGAGEMENT:** Promote internal actions to maintain employee motivation and support diversity and inclusion throughout the company with specific initiatives, such as the participation of women and their involvement in leadership positions and the inclusion of people with disabilities or people of different nationalities, religions, and orientations in all company activities.

The following sustainability strategy is therefore based on 6 material issues: 4 environmental issues, 1 social issue, and 1 innovation issue. The issues are closely related. For example, innovation is also an essential part of TechnoAlpin's sustainability strategy, as it influences all other issues and allows the company to achieve its strategic goals.
For each issue, the strategic objectives, action plan, and KPIs to measure the effectiveness of the strategy were defined according to the GRI standard.

This report focuses on the activities of TechnoAlpin's locations in Italy. The impact of other subsidiaries, suppliers, and customers was not taken into account in this report. This report should therefore be seen as the starting point of a process in which TechnoAlpin's entire value creation chain will be analyzed and optimized.
In the coming months and years, data from our subsidiaries and the indirect impact of TechnoAlpin will also be collected to define further steps for more sustainable development.

5

INNOVATION

TECHNOALPIN®

Develop sustainable products and solutions. Publicize best practice examples to help customers procure and use energy and water more consciously.

LONG-TERM GOAL

Define an internal innovation policy in which sustainability is considered a process factor

5.1 INTRODUCTION AND VISION

TechnoAlpin's position as market leader is a result of its aim to lead the industry in innovation and technology. This aim is also included in TechnoAlpin's corporate goals and emphasized by considerable ongoing investments.

CONSOLIDATING AND EXPANDING THE GLOBAL MARKET AND TECHNOLOGY LEADERSHIP

The company takes a customer-oriented approach that relies on its global network of subsidiaries and partners. This enables TechnoAlpin to consolidate its market leadership in its core markets and strengthen its position in growth markets.
Continuous investment in research and development means that the company can continue setting standards in outdoor and indoor snowmaking and further extend its technological lead.

Innovation not only refers to developing new and optimized products and solutions, but also optimizing all processes using the latest technologies. The topic of innovation, therefore, touches all areas of the company and influences all of the material issues. Innovation is the driving force that will help the entire company develop in a more sustainable way.

For TechnoAlpin, innovation means creating new solutions to secure and expand market leadership. The focus is on the needs of customers and specific products, services, and applications to support them. Basic research projects play a rather small role. Considering current market and technology trends, on the other hand, is vital.

Currently, the most important trending topics are:

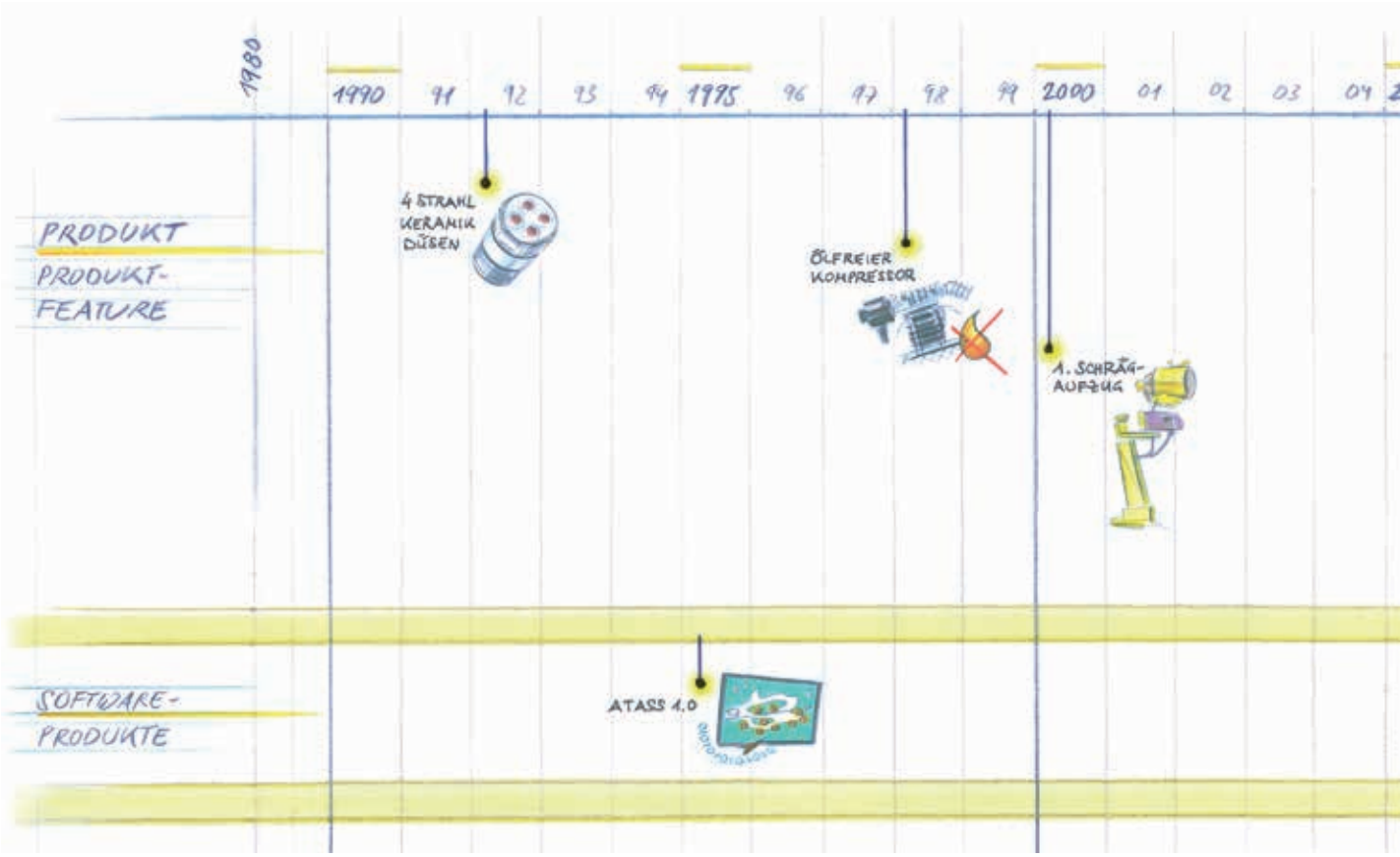
- Manufacturing technologies
- Individualization
- IoT and connectivity
- Platform systems for units and products
- Product security and cyber security
- Predictive maintenance

The actions and targets described in this chapter are aligned with the following Sustainable Development Goals (SDGs) of the 2030 Agenda.

5.2 R&D MILESTONES IN SUSTAINABLE PRODUCT DEVELOPMENT

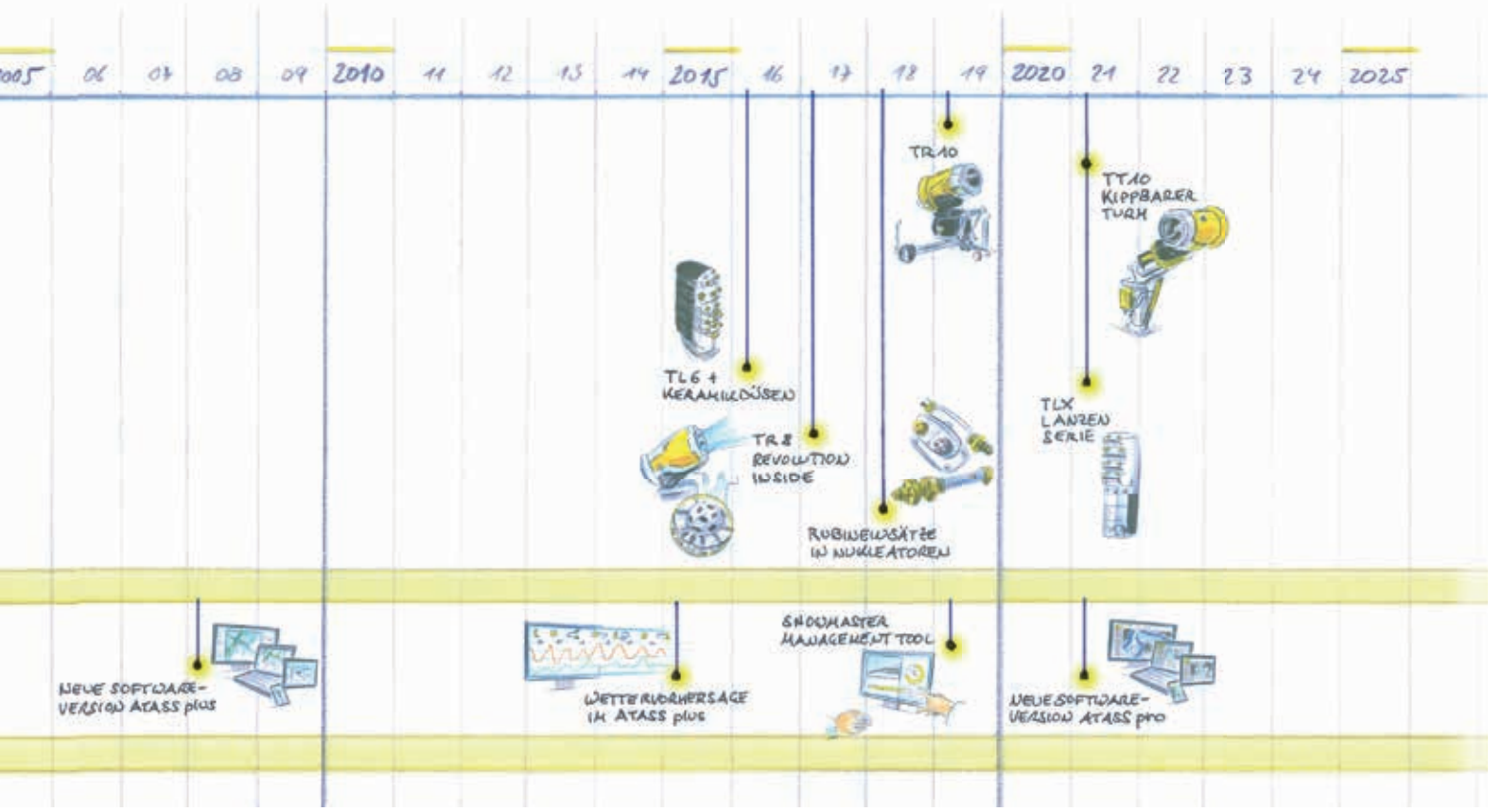
Sustainability is not viewed as an isolated issue in R&D, but as an important component of all individual issues and projects currently being researched and developed.
The main research areas at TechnoAlpin can be roughly divided into plant construction and mechanical engineering/product development. These, in turn, encompass many specialized disciplines, such as software development, control engineering, drive engineering, fluid mechanics, and thermodynamics.

TechnoAlpin has shaped and developed the snowmaking industry in all these areas like no other company. Many of TechnoAlpin's product innovations have become industry standards over the years. Even from the early years of TechnoAlpin, its products and applications were developed with the goal of using resources



sustainably. Securely supplying water and energy to large-scale infrastructure in mountainous areas has always been a challenge, and operating them as efficiently as possible has been essential to success.

The following graphic shows some lighthouse projects from the innovation family tree of TechnoAlpin's product developments related to sustainability. Each product is briefly described in the individual chapters. Innovations in plant construction include machine room 4.0, the concept of connected pumps, and the electrical distributor on the pit cover, to name just a few.



The following key figures underpin TechnoAlpin's innovation leadership

EMPLOYEES IN RESEARCH AND DEVELOPMENT

Employees R&D	Number of employees	Full-time equivalents	Date
TechnoAlpin Italien	42 (1 freelance)	41.5	June 5, 2023
TechnoAlpin France*	11	11	May 1, 2023
Total	**53**	**52.5**	

*100% R&D site financed by TechnoAlpin Italy

TOTAL INVESTMENT IN RESEARCH AND DEVELOPMENT

2020/2021	**2021/2022**	**2022/2023**	**2023/2024**
€ 6.6 million	€ 6.5 million	€ 6.6 million	€ 8.1 million*

*Budget

The invested amounts include the site in Italy and TechnoAlpin's research and development center in France.

Spending also remained consistently high during the COVID-19 pandemic.

OUR PATENTS

	with reference to sustainability	without reference to sustain.	Total
Priority documents	**13**	**15**	**28**
Patents	13	14	27
Utility models		1	1
in other countries	**39**	**48**	**87**
Patents	37	48	85
Utility models	2		2
Total	**52**	**63**	**115**

Just under half of TechnoAlpin's basic patents have a direct impact on sustainability.

This means they either help save resources, increase efficiency, or extend the service life of a product.

5.3 IoT: LEARNING FROM THE PAST FOR THE FUTURE

Each component of our snowmaking systems provides a variety of data that converge in the ATASSpro software. Over the past few years, TechnoAlpin has built up a team and considerable expertise to evaluate this data. The aim is to use past data to optimize snowmaking in the future.

Operating data from more than 30,000 snow guns were evaluated during the 2019-20 season. For example, trends can be identified based on snowmaking times and temperature windows and incorporated into the development of new products, system concepts, and software services.

The results of the data analysis flow into a wide variety of areas and support TechnoAlpin in terms of:

- Developing snow guns further
- Optimizing existing systems
- Improving the planning of new systems

Each snowmaking system is unique, and no two seasons are the same. It is therefore difficult to make blanket statements and general strategies when it comes to optimization. The data represent 30 years of experience and countless systems and will help guide improvements going forward. By analyzing this data, TechnoAlpin can perfect its guiding principle of using the right snow gun in the right place. We have optimized our product line over the past few years to offer the right snow gun for every application while standardizing as many components as possible.

Our analysis team identified enormous potential in the machine room, which accounts for more than half of a snowmaking system's energy consumption. With a few changes in snowmaking operations and basic settings, energy can be saved without making large investments or sacrificing slope quality. What’s more, the data provide an important basis for producing snow in exactly the required amount, of the right quality, at the right place, and in optimal conditions. This can further improve snow production when it comes to saving resources.

5.3.1 DATA ANALYSIS FOR MORE SUSTAINABILITY IN SNOWMAKING

TechnoAlpin aims to process this data for customers to help them learn how to operate the systems in the best possible way. This topic is coming up more frequently at trade fairs, events, and other customer meetings.

One example is the customized data analysis offered at the Interalpin trade fair in Innsbruck in April 2023. Models were developed that use real data to show where energy can be saved. Several meaningful key figures were defined that highlight the relationship between energy and water volume [kWh/m^3] to create measurable quantities. A forecast scenario was also created based on the data from the previous season, which can be used to quantify optimization potential. More than 40 ski areas received a customized analysis of their systems at the show.

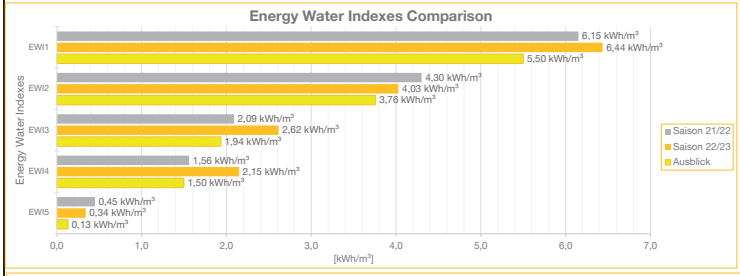
In summary, by combining the management data collected, the information provided by customers, and TechnoAlpin's experience, ways to optimize systems to save resources can be identified that translate into environmental progress and economic benefits.

TECHNOALPIN

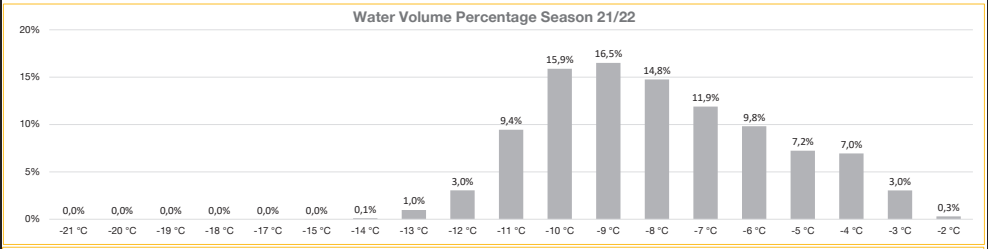
SUSTAINABILITY FACT CHECK
of
BEISPIEL SKI RESORT
Projektnummer: IT0224

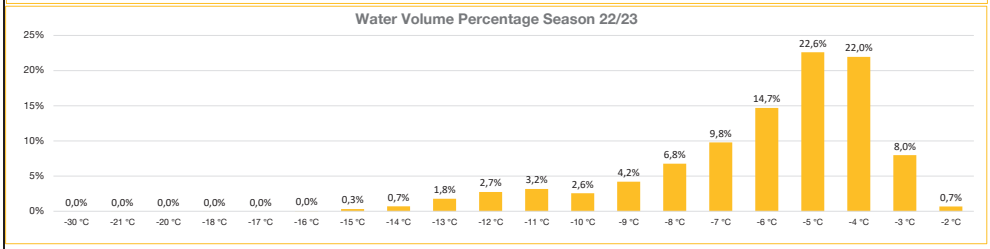
Bearbeiter:	
e-mail:	
Area Manager TechnoAlpin Bezugsperson:	
Area Manager TechnoAlpin e-mail:	
Firma:	TechnoAlpin Spa
	Via Piero Agostini, 2
	I-39100 Bolzano
Aktualisiert am:	**06.04.2023**

Zu Handen von:



Energy Water Indexes	Saison 21/22	Saison 22/23	Ausblick
EWI_1	6,15 kWh/m³	6,44 kWh/m³	5,50 kWh/m³
EWI_2	4,30 kWh/m³	4,03 kWh/m³	3,76 kWh/m³
EWI_3	2,09 kWh/m³	2,62 kWh/m³	1,94 kWh/m³
EWI_4	1,56 kWh/m³	2,15 kWh/m³	1,50 kWh/m³
EWI_5	0,45 kWh/m³	0,34 kWh/m³	0,13 kWh/m³





Kommentare (falls vorhanden):

Zusammenfassung der Anlage und Reduzierungsannahmen:			
- Wir schlagen vor, die Schneequalität für die Einscheinphase zu erhöhen von	**4 -> 5**	um eine Reduzierung der Schneistunden zu erreichen von ca.:	**16%**
- Wir schlagen vor die Wassertemperatur um:	**4°C**	zu reduzieren, um die Betriebsstunden wie folgt zu verkürzen:	**10%**

SNOWMASTER – BETTER OVERVIEW, MORE EFFICIENCY

One result of advances in data analysis is SNOWMASTER. This platform displays the wealth of data provided by the snowmaking system in real time. On one hand, SNOWMASTER provides an overview of the current snowmaking stage. What percentage of the snowmaking or seasonal target has already been achieved? How much snow is on the slope? How many hours have the snow guns been in use? How many snow guns were operating?

On the other hand, SNOWMASTER makes it possible to forecast snow production. Taking detailed weather forecasts into account, the SNOWMASTER calculates the amount of snow that can be produced in the next few days and the amount of water required to do so. Ski area operators, therefore, know exactly what snowmaking target can be reached in the next few days. This allows customers to plan how they use resources more efficiently and take full advantage of the window of opportunity for snow production.

5.4 INNOVATION IN THE SERVICE DEPARTMENT: B.E.A.T. PRODUCT DEVELOPMENT

In early 2023, the service department launched the B.E.A.T. concept, a preventive maintenance awareness campaign. Tools and services are provided to customers to spread maintenance work out over the year. As a result, systems operate more efficiently, and work and transport can be coordinated in the best possible way.

Preventive maintenance has always been part of TechnoAlpin's corporate culture, but it was generally considered difficult to communicate the concept internally and externally. Its standing has been raised with B.E.A.T., and the issue is becoming the focus of corporate communications.

Customers are now more involved and, with the help of B.E.A.T., will take control of the efficiency and sustainable management of their systems. This helps set a cycle in motion that helps customers perform preventive maintenance and servicing on their equipment, train their personnel, and maintain a well-stocked spare parts inventory.

B.E.A.T. stands for a rhythm that divides the year into 4 phases and repeats itself every year. The goal is hassle-free and efficient snowmaking.

BEGINNING February - May

The first phase begins immediately after the snowmaking season and includes inspections and analyses of the installations. It is important to identify any problems and prepare the system for the next season. During this phase, the customer receives the following support from the service team:

- Checklists to check that equipment is functioning correctly, not only from a technical point of view, but also in terms of efficiency and reducing waste.
- B.E.A.T. report on the current status of the system and breakdown of what measures should be implemented to maintain and improve the system.
- Recommendations for performing preventive maintenance.
- An ACADEMY program for training the snowmaking team.
- The service portal for ordering spare parts.

EQUIPMENT June - August

On completion of the analysis, the summer months from June to August should be used to perform annual maintenance routines and any repairs. Any spare parts ordered are delivered during this phase. This ensures optimum work and transport coordination, leading to less stress and fewer demands in the fall. This approach will save valuable resources in terms of work and reduce transport requirements. The service portal allows customers to view technical documentation online, helping to avoid unnecessary printing.

ACTION September - October

The systems are put back into operation, and all components are thoroughly tested. The system should be running seamlessly once back in operation. However, should a problem occur, there is still enough time to coordinate final repairs.

TARGET November - January

The aim of B.E.A.T is simple, hassle-free snowmaking with a sustainable and efficient system, operated by well-trained staff. For TechnoAlpin, B.E.A.T. is an innovative culture that helps make the snowmaking industry more sustainable. When a system is properly maintained, it performs better, lasts longer, and has less downtime. The perfect windows of opportunity for snow production during the fall are short and must be put to optimum use. What's more, it also increases safety and satisfaction in the workplace.

When a system is properly maintained, it is therefore more efficient, more reliable, and safer.

5.5 DIGITALIZATION AND PROCESS INNOVATION

Digitalization and process innovation have a major part to play in increasing efficiency in the company and therefore also for greater sustainability. TechnoAlpin has set up the IT & Processes department at the top management level for this reason. This department is not only responsible for developing the company's IT infrastructure, advancing its IT systems, and introducing innovative technologies, but, above all, optimizing internal workflows and processes, and supporting them as they go digital.

In recent years, the following projects have been implemented that have a direct impact on the company's sustainability:

OPTIMIZATION OF PROCUREMENT AND LOGISTICS

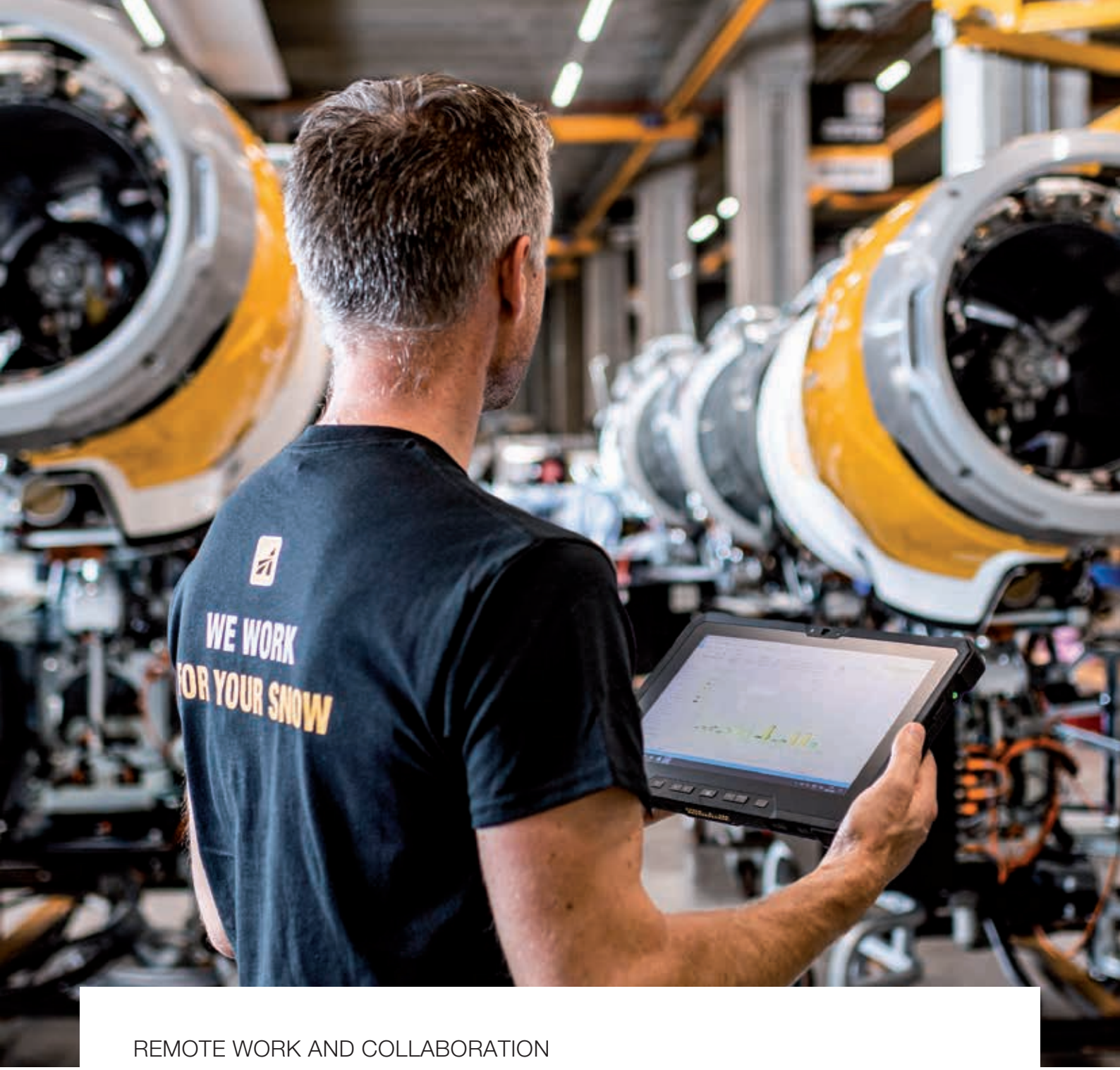
- Optimization of forecasting and planning, for example by implementing and optimizing the MRP system and supply chain processes.
- Optimization of TechnoAlpin SpA's warehouses and the international spare parts warehouse in Volders by introducing paperless picking and a state-of-the-art warehouse system (including automated high-bay warehouse, shuttle systems, and digital link to carriers). This reduces incorrect deliveries and optimizes stock levels.

PRODUCTION OPTIMIZATION

- Optimization of processes in the welding shop by introducing system-supported pipeline planning and automatic creation of the isometric drawing for manufacturing and pre-welding pipes.
- Continuous improvement of processes in production to increase quality and efficiency. Especially noteworthy here are the introduction of automated resupply calculation of the production islands and the recording and feedback of production in real time through production data acquisition (PDA).

DOCUMENT MANAGEMENT

- Introduction of a document management system (DMS) and digital expense reporting with SAP Concur to reduce printouts and simplify processes.



REMOTE WORK AND COLLABORATION

› Introduction of video conferencing, communication tools, and remote access to reduce business travel and expand smart working.

CYBER SECURITY

› Targeted measures for greater IT security and reducing cyber attacks prevented financial damage and improved the energy efficiency of IT systems.

› Protecting personal information strengthens the employee and customer trust in the company.

5.6 SUMMARY: MEASURES IMPLEMENTED SO FAR

- Product innovations for more efficient use of resources.
- Products with longer service lives.
- Reduction in materials used.
- Standardization of components used.
- Development of expertise in data analysis to better advise customers and plan systems more efficiently.
- Establishment of the B.E.A.T. service concept to raise awareness about preventive maintenance in the industry.
- Investment in the latest technologies to optimize internal processes and cyber security.

TECHNOALPIN®

5.7 SUSTAINABILITY GOALS FOR 2025

DRIVING INNOVATION FORWARD THROUGH INVESTMENTS

TechnoAlpin is investing €8 million every year in research and development.

ANCHORING SUSTAINABILITY IN THE INNOVATION PROCESS

The goal is to firmly anchor and expand sustainability issues in the project manual with topics like:

- Circular economy (repair and recycling).
- Manufacturing processes for individual products (energy, waste, etc.).
- Final product packaging (to the customer).
- Individual product packaging (from the supplier).

USING IOT DATA IN THE B.E.A.T. SERVICE CONCEPT

System data is evaluated and included in B.E.A.T. reports. It will then be given to customers to help guide preventive maintenance. It will also show required maintenance intervals, for example.

USING IOT DATA TO PLAN PROJECTS AND OPTIMIZE SYSTEMS

The system data is evaluated and taken into account when planning projects. This will make it possible to show and recommend areas the customer can improve when it comes to system use.

6

ENERGY EFFICIENCY

TECHNOALPIN®

Lower energy consumption in the value chain. Increase the use of renewable energy sources. Lower CO_2 emissions. Provide more efficient products and publicize best practice examples to help customers procure and use energy more consciously.

LONG-TERM GOAL

Lower CO_2 emissions.

6.1 INTRODUCTION AND VISION

With the energy crisis at the end of 2022, energy efficiency has gained a whole new level of importance. Numerous media reports have discussed whether technical snowmaking in times like these is justifiable. The cable car industry responded with various facts that demonstrate energy efficiency has been an important issue for ski areas long before the recent discussions began. In Austria, for example, cable cars (including lift operation and snowmaking) account for around 1.2% of total electricity demand. The electricity demand for all cable cars is therefore 750 GWh per year. In comparison, standby operation by households in Austria requires 800 GWh annually.[1]

It became clear in the discussion that electricity supply in the mountains has always been a challenge and high efficiency is required. One of the unique features of snowmaking is the huge amount of power it requires over a very short period of time. Modern snowmaking systems operate for up to 300 hours per season. From an energy point of view, this low number of operating hours results in comparatively low energy consumption, despite the high power demand (e.g. compared to industrial production plants, which typically operate for several thousand hours every year). This short time ultimately determines whether the entire winter season will be a success. During the snowmaking phases, power demand is naturally high. This is because as many pumps, compressors, and snow guns as possible are running at the same time to take full advantage of the temperature windows. Snowmaking usually takes place during periods when energy demand is otherwise low: Before the season (when hotels and lifts are not yet operating) and at night. Beyond these 300 or so hours of operation, the systems require very little power. What's more, we have already seen some examples where snowmaking system components have been used to generate electricity when not in use.

Expanding the systems toward an even shorter snowmaking phase seems paradoxical at first glance. After all, power demand increases in the short term. On closer inspection, however, high-performance systems with as few operating days as possible bring greater efficiency. The reason for this lies in the fact that snow guns have an almost constant power consumption, and therefore overall higher efficiency is achieved at colder temperatures. The aim is therefore to make the best possible use of the optimum conditions. TechnoAlpin snow guns, machine rooms, and control systems all play an equally important role.

TechnoAlpin's goal is to lower the company's overall CO_2 emissions to help the world transition to a low-carbon economy and support the green transition. However, there is a distinction to be mad ebetween direct and indirect emissions. Indirect emissions include all emissions generated on the customer side, for example during snowmaking, and those generated by suppliers. The aim is to continuously optimize products and supply chains and also raise awareness.

Direct emissions occur within TechnoAlpin and can be lowered through internal measures. A calculation of TechnoAlpin's carbon footprint is not currently available. However, the company is committed to doing this in the coming years.

The actions and targets described in this chapter are aligned with the following Sustainable Development Goals (SDGs) of the 2030 Agenda.

6.2 DIRECT EMISSIONS

TechnoAlpin's energy consumption can be attributed to 3 areas:

- THERMAL ENERGY
- ELECTRICAL ENERGY
- MOBILITY

6.2.1 THERMAL ENERGY

All of TechnoAlpin's main buildings are connected to the city of Bolzano's district heating network, which is fed by the local waste recycling plant. The main buildings were built according to the highest energy standards to compensate for the significant temperature differences between summer and winter. The buildings on Via Werner von Siemens and Via Piero Agostini also have green roofs, which have a positive effect on the thermal insulation of the building. Due to reduced soil sealing, green roofs also have a positive effect on the climate in cities.

Indirect energy consumption		
	2021-2022	**2022-2023**
Purchased heating energy	2,251,980 kWh	1,669,557 kWh
	8,107 GJ	6,010 GJ

6.2.2 ELECTRICAL ENERGY

Electricity consumption is mainly attributable to TechnoAlpin's production activities. However, there is also the power supply for electrical equipment (computers, printers, elevators, etc.), the pumping station to support the test area, the lighting, the company cafeterias, the recirculation and air-conditioning system, the heating system, and charging company and employee electric vehicles.

SOLAR PANEL SYSTEMS

A major investment for the company was installing two solar panel systems on the roofs of the main buildings on Via Agostini and Via Siemens, with capacities of 192 kW and 198 kW, respectively. In 2022, about 26% of the required energy was generated by the solar panel systems.

	2019-2020	2020-2021	2021-2022	2022-2023
Energy produced	306,581 kWh	452,570 kWh	504,454 kWh	480,282 kWh
	1,104 GJ	1,629 GJ	1,816 GJ	1,729 GJ
Self-produced and sold energy	22,998 kWh	41,748 kWh	54,505 kWh	52,220 kWh
	83 GJ	150 GJ	196 GJ	188 GJ
Self-produced and self-consumed energy	283,583 kWh	410,823 kWh	449,949 kWh	428,061 kWh
	1,021 GJ	1,479 GJ	1,620 GJ	1,541 GJ
Total energy required	2,364,109 kWh	2,127,229 kWh	1,942,988 kWh	1,886,268 kWh
	8,511 GJ	7,658 GJ	6,995 GJ	6,791 GJ
Energy from solar	**13%**	**21%**	**26%**	**25%**

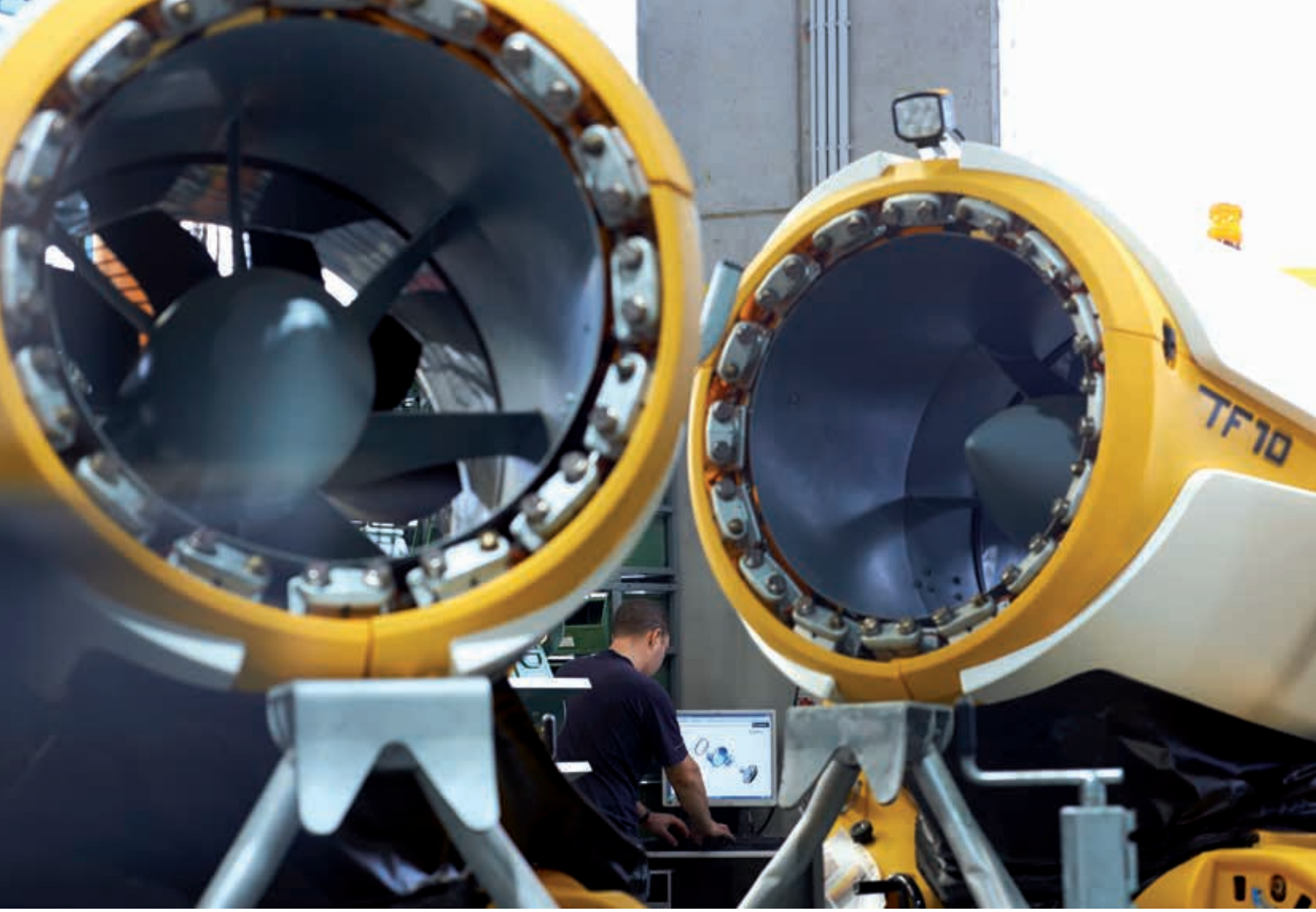
The following quantities of energy were purchased from external suppliers:

Purchased energy	2,080,526 kWh	1,716,406 kWh	1,493,039 kWh	1,458,207 kWh
	7,490 GJ	6,179 GJ	5,375 GJ	5,250 GJ

LED LIGHTING

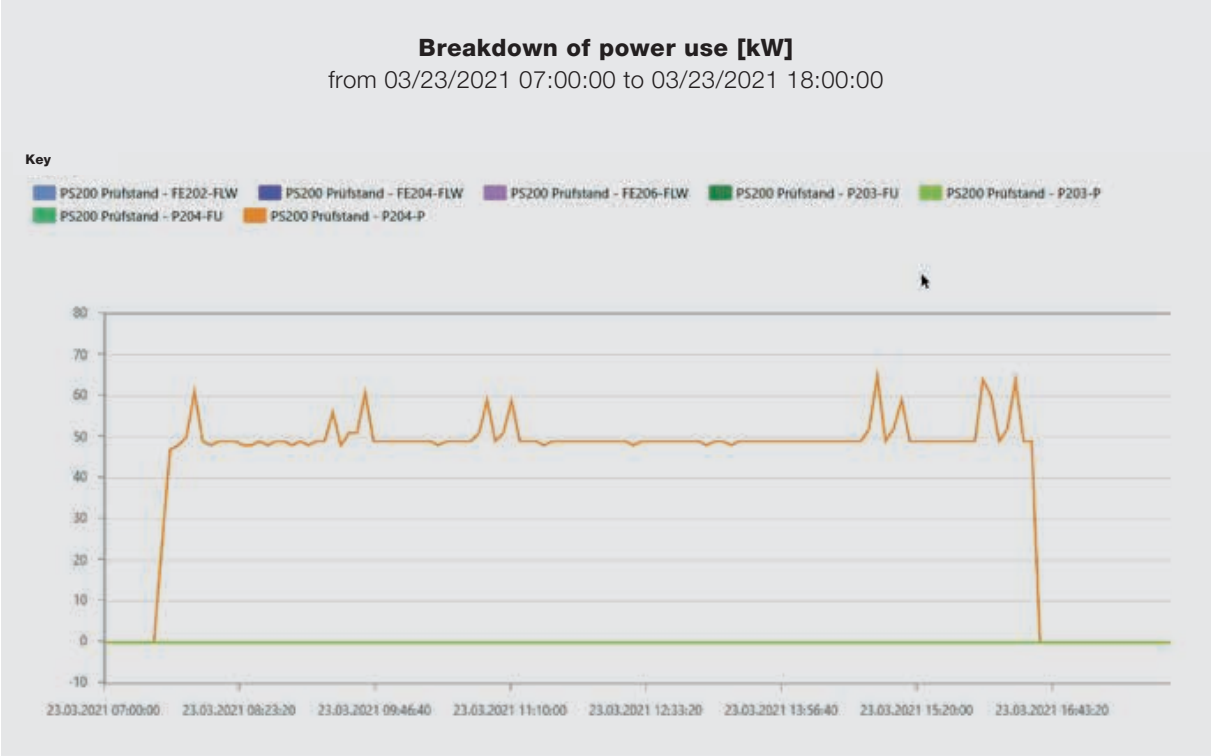
LED lighting was used from the outset at the new production site on Via Siemens to keep energy consumption low. In the spring of 2022, in the building on Via Agostini, the previous neon and halogen lighting was replaced with LED lighting in the large-scale storage and servicing facilities as well as the garage. This, therefore, reduced the amount of electricity required for lighting from 80 kWh to 35 kWh, resulting in an annual savings of 117,000 kWh.

Savings from LED lighting in the aforementioned areas

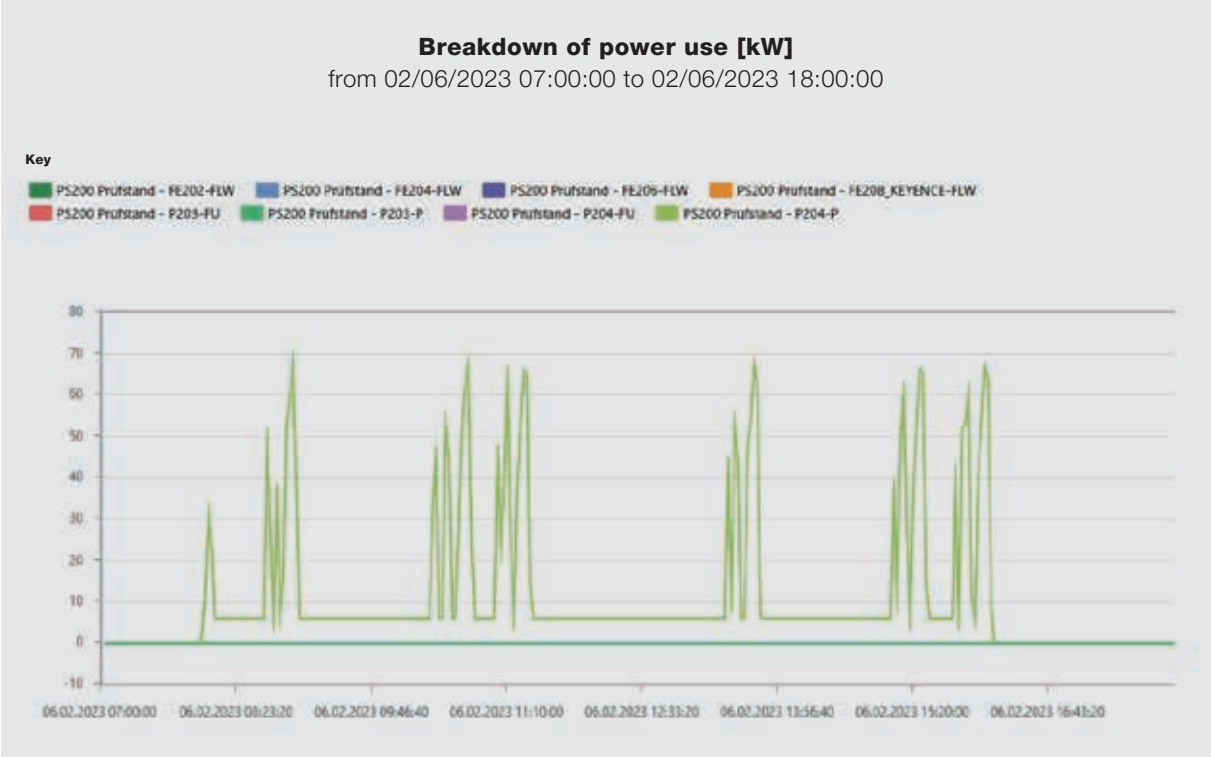


MACHINE ROOM TEST STAND

TechnoAlpin products undergo extensive testing during the production and servicing process. This helps prevent defective products from being delivered that then have to be repaired in time-consuming service calls. These tests require high-pressure water, which is provided by an internal pumping station at both sites. In 2023, the previous system was optimized even further. Up until that point, the pressure of the system was kept at a constant level, regardless of whether tests were being performed. This required a significant amount of energy, namely 20.5 kWh per m^3 of water. With the new system, the pumps activate automatically when the snow guns are tested. The amount of energy required has therefore been reduced to just 3.7 kWh per m^3 of water.



Consumption before conversion



Consumption after conversion

6.2.3 MOBILITY

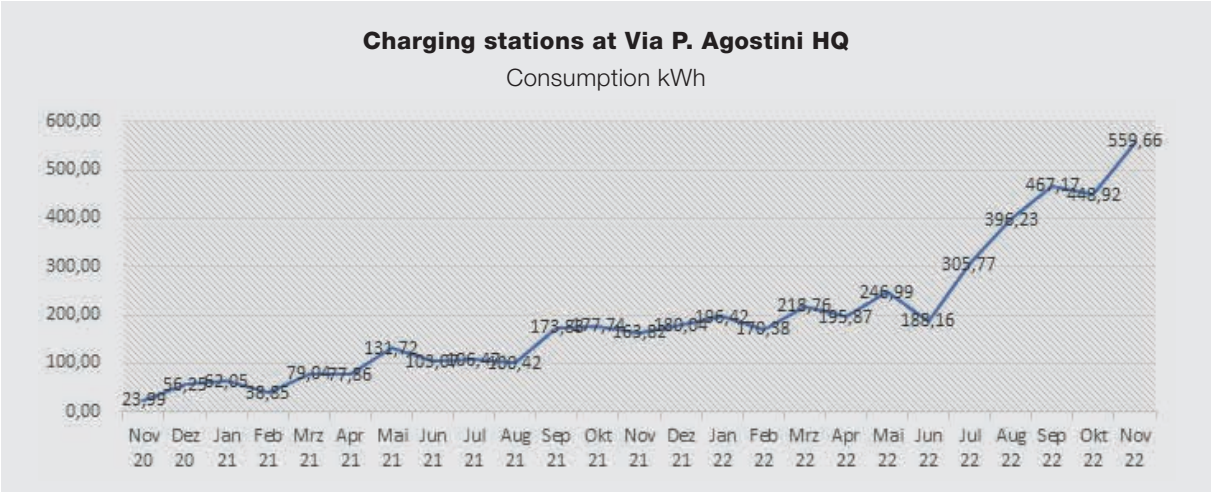
Expanding modern communications systems has helped reduce employee travel. This applies to visits to customers but especially to travel between branches.

The company's vehicle fleet is constantly being updated to provide employees with the most efficient vehicles possible for trips that are still necessary. As of May 2023, it consists of 115 vehicles, 107 of which are ICE (diesel) and 8 electric.

Seasonal workers are employed in the production and welding departments, mainly from other EU countries. They are given accommodations in the Bolzano area. Five minibuses with 9 seats are available for employees to go back and forth between their temporary residence and their workplace. Outside of production hours, these vehicles are used for company activities that involve several people, such as attending training sessions.

	2020-2021	2022-2023
No. of diesel vehicles	97	107
No. of electric vehicles	4	8
Diesel kilometers	2,397,108 km	2,737,245 km
Electric kilometers	13,803 km	145,405 km

To promote e-mobility beyond the company fleet, TechnoAlpin also gives its employees the opportunity to charge their private electric cars at the company free of charge. This was very well received, as illustrated by higher consumption at the charging stations.



MOBILITY MANAGER

As required by Italian law, TechnoAlpin has appointed a mobility manager and created a home-work travel plan to encourage employees to use sustainable mobility. The plan includes a detailed analysis of the means of transportation TechnoAlpin employees usually use to travel to work and describes the activities the company intends to promote to increase the use of low- or zero-carbon modes of transportation. These include promoting the use of bicycles for commuting to work, participating in the Südtirol radelt (South Tyrol Cycles) competition with excellent results, and the option of smart working to reduce commuting to work.

6.3 INDIRECT EMISSIONS

With regard to indirect effects, TechnoAlpin aims to continuously optimize its own products, provide various tools, and train customers on how to use equipment correctly and efficiently.

Advances in energy efficiency affect TechnoAlpin's outdoor and indoor products and include all components of the respective systems.

6.3.1 OUTDOOR SNOWMAKING

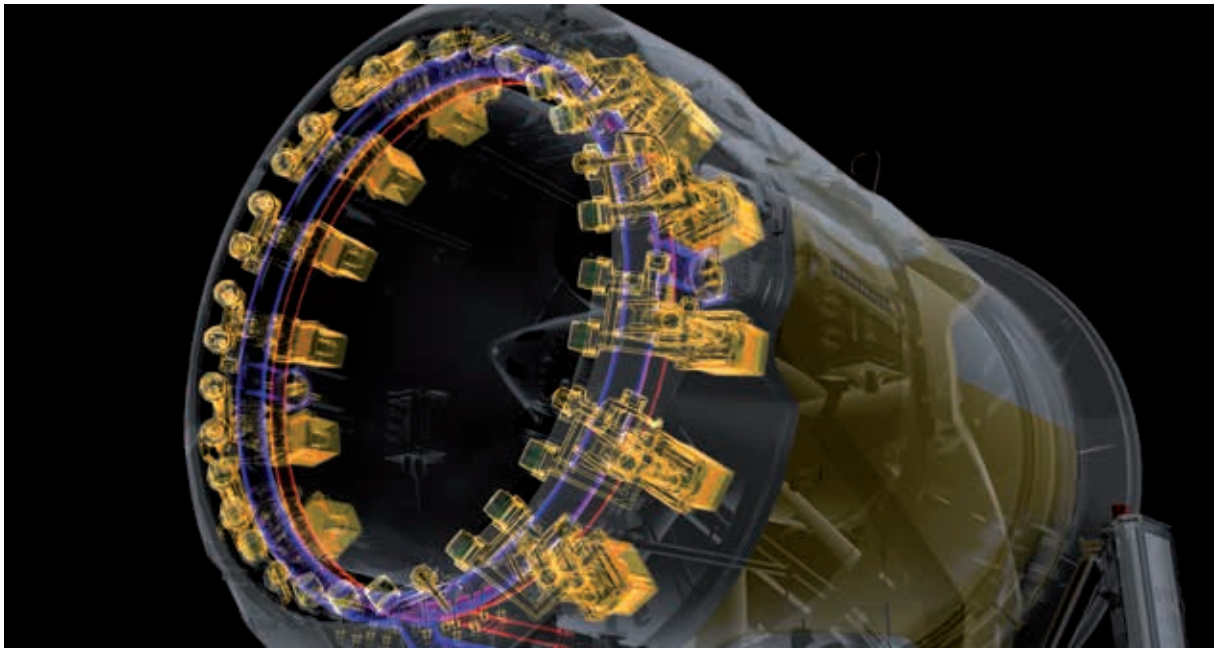
The snow gun development department has set the following goals over recent years:

- Increase the efficiency of the snow guns and the system as a whole
- Increase snow output at the limit temperature range
- Improve operational and occupational safety
- Use sustainable materials
- Standardize the components of different models
- Reduce the number of components used

FAN GUNS

We have optimized the following components in our fan guns to achieve the above goals:

› NOZZLE VALVE TECHNOLOGY Each of the nozzle valves on the new valve ring is controlled individually and only switches one nozzle, unlike all previous models where a varying number of nozzles were switched with one valve on the valve block. This always guarantees the ideal combination, thereby enhancing overall snow gun output and ensuring that the system always operates at optimum efficiency.

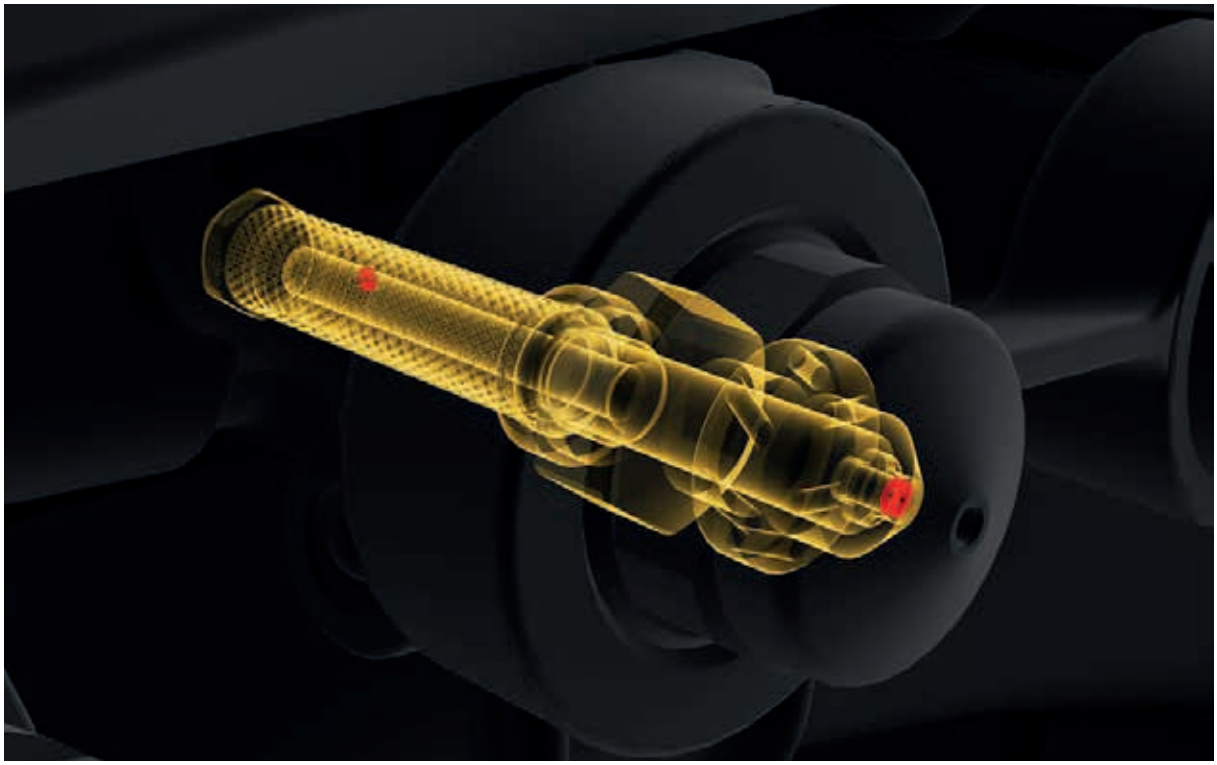


› MOTOR The new models (starting with the TR8 in 2017) only require a single electric motor for the turbine and compressor. The additional electric motor for the compressor is not required. This minimizes the use of resources, reduces and facilitates maintenance, and makes the snow guns quieter overall.

› AUTOMATIC HEIGHT ADJUSTMENT Correct snow gun positioning is key to high efficiency. The mechanical concept devised for the new snow guns automatically sets them to the correct snowmaking position. When the snowmaking stops, the snow guns automatically return to the stand-by position, preventing natural snow from falling into the turbine. This will help prevent damage to the fan wheel.

› STANDARDIZATION To save as many resources as possible in procurement and logistics, we have also tried to standardize our new models as much as possible. 90% of the components used for the TT and TR snow guns are identical.

› RUBY INSERTS All components are designed to be as durable and robust as possible. This is also reflected in the nozzles and nucleators, which have a ruby insert. Ruby is much harder than stainless steel and hardly wears at all — even in contact with hard water. This guarantees consistently high, long-term snow output whilst significantly reducing wear and tear.



WHEN IT COMES TO FAN GUNS, THE LATEST DEVELOPMENTS RESULTED IN:

› 15% more snow production with the same energy input (compare T60 from 2007 with TR10 from 2019).
› Less wear and less maintenance.
› Lean standard equipment with the possibility of customization if needed.
› 90% identical components for simplified procurement and optimized inventories.

SNOW LANCES

For snow lances, the following developments are helping to achieve the above-mentioned goals:

- **Higher number of adjustable steps** over the entire temperature range.
  The lance switches its steps so that it always operates as efficiently as possible.
- Better controlled air consumption.
- **Ceramic inserts** in the nozzles for the entire product range for better snow quality and less wear.
- **Nucleators with ruby inserts** for better snow quality and less wear.

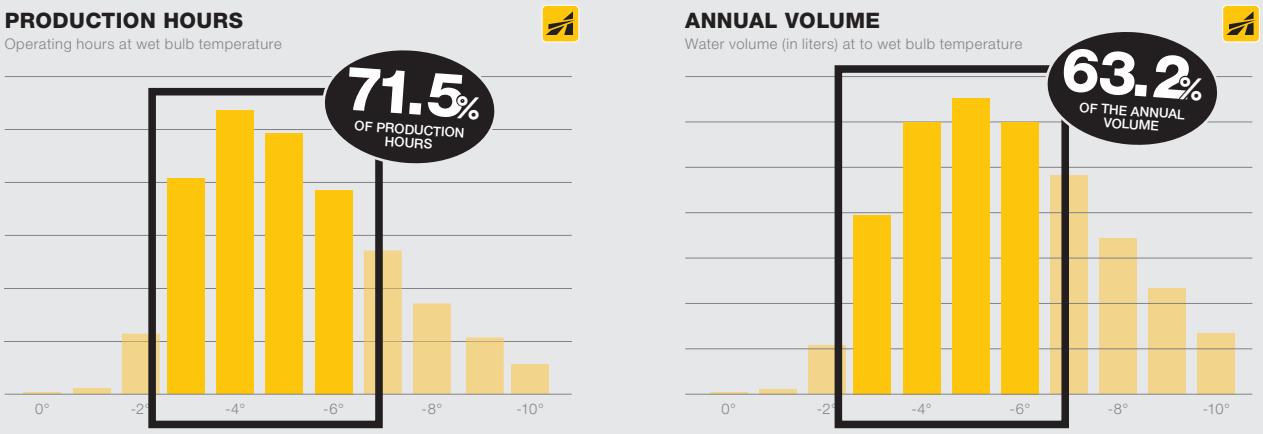
LANCE HEAD EXCHANGE

Lances offer the attractive option of simply swapping the head and still benefiting from the advantages of the new technologies. This option is not only cost effective, but it also saves resources because the lance construction remains. Energy savings can vary from 35% to 70%, depending on the model.

DATA ANALYSIS FOR MORE EFFICIENCY

Snowmaking provides a variety of data. Thanks to a detailed analysis of numerous existing systems, the following findings emerged, which will be used in the future to advise customers on how to optimize existing systems and plan new systems. The greatest potential for savings was found in the machine room. Since every system is planned individually, no standard values for savings can be defined. Real system data can be used to optimize existing snowmaking strategies and develop new strategies together with customers. The interaction between the machine room and snowmaking is the most important thing — taking into account technical parameters such as water pressure, water temperature, air pressure, etc.

ACCURATE WEATHER FORECASTS FOR OPTIMAL CONDITIONS



Analysis of selected operational data.

Various data analyses show relevant and stable trends in the development of snowmaking. These trends allow us to develop and optimize software modules based on them. One is the TechnoAlpin weather module.

TechnoAlpin developed its own weather module, integrated into the ATASSpro software, to make the best possible use of relevant temperature windows. Based on the historical weather data from snow guns, the weather module can provide an accurate forecast for the next few days. This means that ski areas no longer have to rely on large-scale weather data, which can differ wildly, especially in Alpine areas. Instead, they have their own forecasts for the important points in the ski area. This means that the snow team always knows where optimal conditions will occur in the next few days and can make the best use of the temperature windows. Systems can then run at optimum efficiency for longer.

A snow forecast is also available in SNOWMASTER, a tool that provides an overview of the entire system. It shows how much snow can be produced in the next few days and how much more snow is required to reach each snowmaking target. This helps ski areas better plan how they use their resources.

SNOW MANAGEMENT – NOT A SINGLE SNOWFLAKE TOO MANY

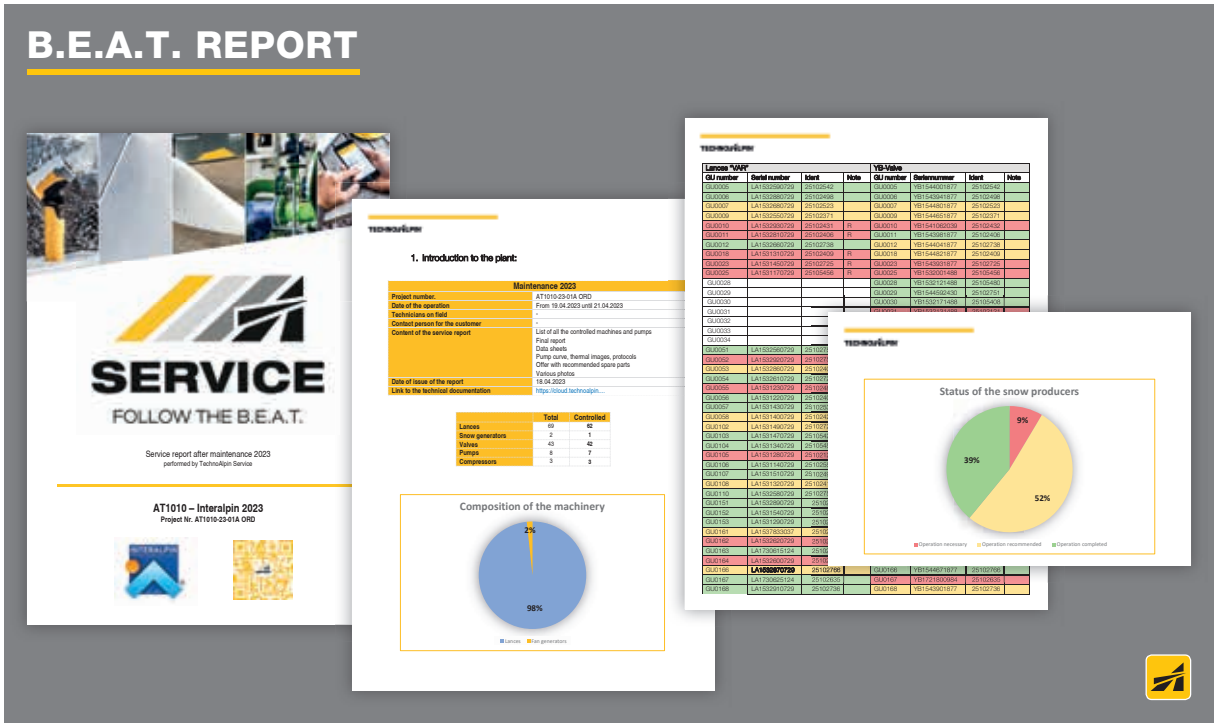
It was only thanks to automation that ever-larger snowmaking systems and the increasingly complex interaction between pumping stations, snow guns, pit valves, and meteo stations became possible. Automatic systems are able to react perfectly to constant changes in the environment and are therefore much more efficient. The ATASSpro product range, now in its third generation, includes several modules related to efficient snowmaking and snow management.

What's more, it has also spawned some of TechnoAlpin's more recent patents, most notably the patented SnowManager, which made it possible to efficiently manage snow in ski areas for the first time. This service has been further developed by combining snow depth and snowmaking measurements as well as integrating pinpoint weather forecasts to help customers produce exactly the amount of snow required to operate their slopes safely.

Modern analysis tools, therefore, allow customers to make better use of optimal snow conditions and carefully plan how they use their resources. Both lead to significantly more efficiency in the system. The snowmaking team no longer has to rely on gut feeling and can instead make decisions based on sound data.

B.E.A.T. SERVICE CONCEPT FOR GREATER EFFICIENCY

In the first phase of B.E.A.T. (beginning), the entire system is analyzed to provide the customer and the TechnoAlpin team with data on the system's current state. This also enables the team to objectively assess what work is needed to increase the efficiency of the system and make plans to complete it in a timely manner. A well maintained system prevents components from operating at less than optimum efficiency and is therefore more efficient. It also helps increase the service life of the systems and work safety. Predictive maintenance allows work and transport to be better coordinated, which also leads to savings.



TECHNOALPIN ACADEMY

The TechnoAlpin Academy provides further support for customers, offering awareness raising for more sustainable snowmaking among its training courses. Well-trained employees are the key to greater efficiency, because any potential savings can only be fully exploited if the latest developments are applied correctly. In 2022, 540 people attended courses at the TechnoAlpin Academy.

OVERVIEW OF THE MODULES OFFERED BY THE TECHNOALPIN ACADEMY

ATASSPRO

- **ATASSpro Advanced** module

  This course teaches participants how to use TechnoAlpin management and analysis tools confidently and provides deep insight into the functions, automations, and evaluation options offered by ATASSpro. Practical exercises are used to reinforce the learning content so that participants are then ready to apply what they have learned to their own systems.

- **TR & TT SERIES** module

  The TR and TT series fan guns are completely different from previous TechnoAlpin snow guns thanks to their innovative technology. This makes it all the more important to provide participants with a detailed overview of all the technical innovations in an intensive training session.

- **LANCES & VALVES** module

  This training course specifically covers the wide range of lance heads and corresponding valves manufactured from 2014 onwards. The structure, functional principle, wiring, and maintenance work on heads and valves is backed up with independent practical work.

- **T40 & TF10** module

  This course unit takes an in-depth look at the design and operation of the T40 and TF10 fan guns. Causes of failure and methods of fault diagnosis are also discussed.

› **PUMPING STATION** module

Various models are used to explain the individual components, functions, and control of pumping stations. As an authorized service partner of KSB, Caprari, and Kaeser, TechnoAlpin's technicians can provide extensive insight into not only how pumping stations work but also how they are maintained.

› **ATASSpro BASIC & DATA LINE** module

This unit provides a detailed understanding of the structure of a data line as well as thorough insight into the operation, functionality, and analysis options of the ATASSpro control system.

› **SERVICING** module

The servicing training course covers all the servicing work that needs to be done on snow guns, valves, and the entire system. This ultimately ensures trouble-free recommissioning.

› **BASICS** module

This two-day training provides a general overview of the configuration and operation of fan guns and lances, as well as the functions and automations of the control system. No prior knowledge of electrics is required for this course.

› **ELECTRIC** module

This two-day training course covers the operating principle of the different machine types, with special attention on electrical details as well as the structure of the data lines, functions, and automations of the control system. It also includes an increasing number of practical sessions and fault simulations. Participants should have some knowledge of electrical engineering.

liberty

› **SNOW GUNS & VALVES (Liberty technology)** module

At the heart of this training is the assembly of and functioning of snow guns and valves with Liberty technology. Practical applications and malfunctions are simulated to reinforce the learning material.

› **SERVICING (Liberty technology)** module

The servicing training course covers all the servicing work that needs to be done on snow guns, valves, and the entire system. This ultimately ensures trouble-free recommissioning.

› **Liberty EXPERT & DATA LINE (Liberty Technology)** module

This unit provides a detailed understanding of the structure of a Liberty data line and provides a thorough insight into the operation, configuration, and functionality of the Liberty control system.

ALPINAL

› **ALPINAL® PIPE LAYING** module

This half-day module prepares participants for pipe laying work on construction sites by teaching them about the structure of ductile cast-iron pipes and the various restrained connection methods. Practical exercises allow participants to practice joining and unlocking socket joints, as well as repairing water pipes with repair sleeves under the supervision of experts.

6.3.2 INDOOR SNOWMAKING

In 2012, TechnoAlpin acquired Innovag, a company that specializes in indoor snowmaking. Products for snowmaking for snow rooms, indoor ski centers, and industrial solutions have therefore been added to TechnoAlpin's portfolio. In recent years, we have continuously developed these solutions to make snowmaking as efficient as possible, even indoors.

SNOWROOM

The SNOWROOM is used for a wide range of indoor applications, including cold therapy in the wellness sector, product testing in the retail sector, as a recovery aid for athletes, and more. Since launching in 2012, the product has been completely revamped and equipped with several applications that help optimize energy efficiency:

- Option to recover heat: The electrical energy fed into the product, which is mainly used to cool the system via the refrigeration cycle, also produces waste heat that has to be dissipated. This waste heat can be efficiently reused. For instance, water in a swimming pool can be heated by installing an additional plate heat exchanger. Another option would be to use an additional heat pump, which can make use of all the waste heat, for example for heating rooms or warm water. Up to 80% of the energy fed into the system can therefore be used again.
- Intelligent control software ensures that the cooling process uses resources in the most efficient way. What's more, we are continuously optimizing this software. Once the correct temperature has been reached, energy consumption goes down dramatically.
- Remote maintenance can be performed by TechnoAlpin technicians using VPN access. This lowers the logistical effort required to diagnose and troubleshoot malfunctions.
- High-quality insulating panels and triple glazing ensure the lowest possible cold bridges and cold losses.
- A specially designed door ensures that the room is sealed and insulated perfectly.
- An existing compressed air network and the building's cooling system can also be used.

6.4 SNOWMAKING SYSTEMS AS ELECTRICITY PRODUCERS: JAKOBSHORN DAVOS POWER PLANT PROJECT

Snowmaking systems only operate for a few days a year. For the rest of the year, existing infrastructure can be used to generate hydroelectric power with minimal intervention. The project at Jakobshorn in Davos, Switzerland, is a great example.

The Bergbahnen Davos Klosters ski area planned and implemented a power plant project with TechnoAlpin between 2013 and 2016 to use existing snowmaking infrastructure all year long (reservoir, pipelines, control system). Existing hydraulic engineering for the snowmaking system was used to integrate a total of 3 turbines at the Ischalp and Bolgen pumping stations to generate electricity — without any additional interference with nature.

Installations:

- 2 turbines at Ischalp: approx. 17 kW at 15 l/s and approx. 120 kW at 40 l/s
- 1 turbine at Bolgen: approx. 120 kW at 40 l/s

Water from the overflows of the existing drinking water sources can now be used efficiently during the warmer seasons (spring/summer/fall). As a result, the snowmaking system now not only consumes electricity but also produces it.

RESULT:

In 2020, the area required approx. 1,570 MWh for snowmaking.

In that same year, the power plant generated approximately 984 MWh.

- The snowmaking system therefore generated 63% of the energy required.
- Amortization of investment costs after less than 4 years.

6.5 SUPPLIER AUDITS

An important step in ensuring the quality of our products and services is monitoring the quality of our suppliers, which is why quality assurance personnel conduct third-party audits of critical suppliers at regular intervals. Among the criteria included in the checklist used during the audit are those aimed at monitoring the company's sensitivity to the environment, employee health and safety, and quality management (5% of the total score).

Audits performed:

05/01/2021–04/30/2022 => 29

05/01/2022–04/30/2023 => 24

6.6 SUMMARY: MEASURES IMPLEMENTED TO DATE

- Use of district heating by local waste processing facility.
- Installation of solar panels on the main buildings: Total power generation: 390 kW.
- Neon and halogen lights replaced with LED lights in warehouses and garages:
  Savings per year: 117,000 kWh.
- Energy optimization of the internal pumping stations for the test stand:
  Energy demand reduced from 20.5 kWh per m^3 of water to 3.7 kWh per m^3.
- E-mobility promotion by integrating electric vehicles into the vehicle fleet
  and offering the option of charging private vehicles at the company site.
- Appointment of a Mobility Manager.
- Optimization of fan guns:
  15% more snow production with the same energy input.
- Option to replace lance heads for energy savings of up to 70%.
- Launch of data analysis offers for customers.
- Introduction of the weather module for better utilization of optimal temperatures.
- Introduction of SnowManager to optimize the amount of snow produced.
- Introduction of the B.E.A.T. service concept to ensure systems are properly maintained.
- Creation of the TechnoAlpin Academy.
- Optimization of indoor snowmaking products.

› Option to recover waste heat from SNOWROOMS.

› Use of existing snowmaking infrastructure as a small power plant.

› Integration of sustainability into supplier audits.

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6.7 SUSTAINABILITY GOALS FOR 2025

CALCULATE THE FOOTPRINT OF THE ENTIRE VALUE CHAIN

Calculate the carbon footprint across the entire value chain. Breakdown of Scopes 1, 2, and 3 between 2023 and 2025.

- **Scope 1** Direct emissions from TechnoAlpin.
- **Scope 2** Indirect emissions from purchased energy.
- **Scope 3** Indirect emissions within the value chain.

LOWER DIRECT EMISSIONS

Further measures are derived after evaluating our footprint.

Measures already adopted:

- Switching to LED lighting in offices, where appropriate.
- Evaluating the change in the energy mix and using green energy.
- Conducting internal awareness-raising activities on how to use energy more sustainably (lighting, heating, etc.).

EXPAND THE SUSTAINABILITY CRITERIA (SOCIAL, ECOLOGICAL) IN SUPPLIER QUALIFICATION

Social and ecological criteria are to have greater importance when selecting suppliers.

- Identify evaluation criteria.
- Integrate the criteria into the audits.

EXPANDING MOBILITY MANAGEMENT

Optimizing employee mobility measures and monitoring the measures used:

- Updating the vehicle fleet; E-Car Pool + Diesel EURO6+
- Reducing the carbon footprint of employees through concrete suggestions such as:
  - Dedicated parking for carpools.
  - Contacts with public transportation operators to improve stops and schedules.
  - Internal awareness activities.

OPTIMIZING LOGISTICS

Analyzing data from previous years to identify any potential ways to achieve the following goals:

- Reducing transport.
- Reducing incorrect deliveries.
- Optimizing packaging.

In a second step, a bonus-malus system is being introduced for carriers that will give preference to electric trucks. Internal transport will use electric trucks.

OPTIMIZING SNOWMAKING SYSTEMS AT CUSTOMER LOCATIONS

- Expanding energy consulting for customers for more efficient products and solutions.
- Expanding preventive maintenance (B.E.A.T.) and increasing the focus on energy efficiency measures.
- Integrating sustainability into the TechnoAlpin Academy program to better seize opportunities for automation and emphasize the importance of snow quality.
- Expanding online training to reduce travel.

ACTIVELY PROMOTING THE OPTION OF PUMPED-STORAGE POWER PLANTS

Pumped-storage power plants should be offered even more actively, and customers should be made aware of the potential for energy generation.

7

CLIMATE ADAPTATION

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Climate change is here. Not only do we need to do everything we can to slow the pace of global warming, but we also need to take action to prepare for the impacts of climate change and its predicted consequences.

LONG-TERM GOAL

Support the transition to a low-impact economy that protects and supports the environment.

7.1 INTRODUCTION AND VISION

Contrary to what is often assumed, climate change is not the decisive factor in expanding snowmaking systems. Investing in a snowmaking system is first and foremost an investment in safety and predictability. TechnoAlpin's ultimate goal is to turn hoping for snow into a guarantee of snow. We want people all around the world to experience snow.

Climate change is therefore not the main reason for the expansion of snowmaking systems. Nevertheless, it has a major impact on TechnoAlpin, its customers, and the future viability of the outdoor business model. It is often questioned whether snowmaking still makes sense. Public discussion focuses on whether snowmaking will continue to be possible in the face of climate change, whether current investments make sense at all. On that point, a study conducted by Future Snow Cover Evolution in Austria (FuSE-AT), a collaboration between the Central Institute for Meteorology and Geodynamics, the Institute of Geography at the University of Innsbruck, and the Climate Change Centre Austria, revealed the following: Climate protection has an enormous impact on snow conditions for natural snow and snowmaking. If the Paris Agreement (2-degree warming) is reached, almost all ski areas with snowmaking will continue to have guaranteed snow. Atmospheric conditions for snowmaking deteriorate by about 10% at altitudes between 1,500 and 2,000 meters. [2]

Winter tourism is the only way for many regions to be economically successful and maintain prosperity in the valleys. TechnoAlpin aims to optimize its products and solutions to make the best possible use of cold weather, increase the snow output of the systems in difficult conditions, and keep resource requirements to a minimum. In recent years, many new developments have been introduced to the market to compensate for the increasingly difficult conditions and make the systems more efficient. At the same time, ski areas are also investing in more sustainable structures and solutions so that winter sports will become even more sustainable in the future, not only economically and socially, but also ecologically. Below is an outline of the product developments and measures that make snowmaking possible even in increasingly difficult conditions. System efficiency also goes up, especially when used within the limit temperature range.

The actions and targets described in this chapter are aligned with the following Sustainable Development Goals (SDGs) of the 2030 Agenda.

7.2 PRODUCT DEVELOPMENTS FOR SNOWMAKING AT LIMIT TEMPERATURES

7.2.1 COOLING TOWERS

The temperature of the snowmaking water plays a key role when it comes to the efficiency of a snowmaking system. A water temperature just above freezing enables optimum operation and ensures higher snow output, especially in the limit temperature range. For every 4°C increase in water temperature, the wet bulb temperature must be 1°C cooler to produce snow. This means that it also takes longer to start producing snow.

However, if the water is too warm, the system cannot take full advantage of the conditions – even cold temperature windows. The snow guns simply cannot convert the same amount of water into snow as they could with water at the optimum temperature. Therefore, the efficiency of the entire system goes down. Cold temperatures can significantly reduce the time it takes for the system to produce snow.

TechnoAlpin cooling towers have a sophisticated operating principle in which the water is cooled as it is distributed over a large area in a honeycomb system. This honeycomb principle keeps energy consumption low and output incredibly high. The throughput ranges from 30 to 90 l/sec., depending on the model. Sixteen nozzles ensure optimal water distribution. The increased water surface maximizes temperature exchange and increases cooling capacity. The required power is 15–45 kWh depending on the model.

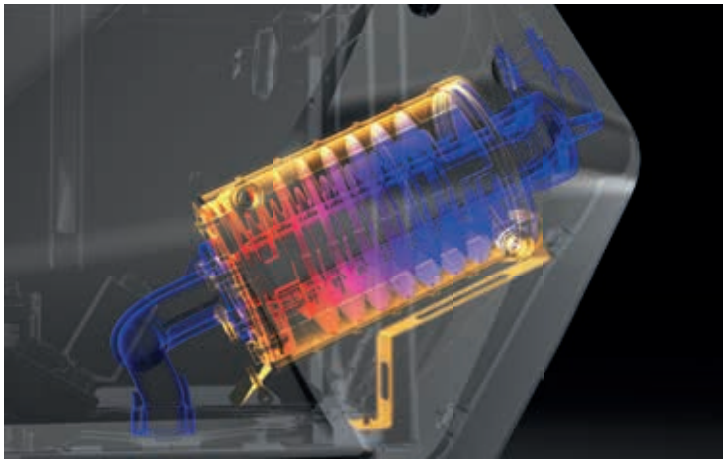
7.2.2 OPTIMIZATION OF NOZZLES AND NUCLEATORS

TechnoAlpin is constantly optimizing its nozzles and nucleators. Advanced nozzles and nucleators enable systems to produce snow in a wider temperature range. This allows snowmaking systems to operate in milder temperatures, extending the snowmaking season and reducing dependence on cold weather conditions. Different configurations also make it possible to adapt the systems perfectly to the prevailing temperature conditions. For ski areas with predominantly mild limit temperatures, special nozzle configurations are defined that make it possible to start snow production at warmer temperatures. For areas with lower temperatures, switchable nozzles make it possible to optimize the amount of snow needed and produce larger quantities.

TechnoAlpin uses nozzles made of high-quality materials, such as ceramic or ruby inserts, to ensure optimum atomization for decades. This ensures high efficiency and snow quality with low maintenance. Optimized nozzles and nucleators can significantly increase the performance of snow guns in difficult temperature conditions. Higher snow production ensures that the available amount of water is converted to snow as best as possible and that the electrical energy consumed is used more efficiently. This makes the systems easier to use in regions that have challenges with water and energy supply.

7.2.3 HEAT EXCHANGER FOR COMPRESSED AIR

The temperature of the compressed air has a significant influence on snowmaking performance at limit temperatures. Therefore, starting with the TR10 model released in 2019, all new snow guns have a local heat exchanger with a very large cooling surface. The compressed air is routed around the cold snowmaking water and is cooled from approx. 100°C to 10°C — without using any additional energy. Additional heating in the water filter is not required because the waste heat from the compressed air is used. This saves around 30% of the heating power.



7.2.4 DATA-BASED SNOWMAKING

TechnoAlpin's ATASSpro software offers a new level of intelligence for the sustainable use of resources. It enables significant water and electricity cost savings and reduces snowmaking hours so that slopes can open much faster.

Based on experience in recent years, the ATASSpro patented SnowManager system ensures accurate planning of the amount of snow required per snow area and slope, so that, ultimately, neither too much nor too little snow is produced. Continuous comparison between target and actual amounts as well as other important factors ensure optimal planning in terms of snowmaking and the work of the snowmaking team, thus saving valuable snowmaking time. Each slope is constantly monitored and the system always operates at optimum efficiency.

ATASSpro also provides invaluable support for higher efficiency when delivering snow and preparing the slopes. The data generated by the snow depth measurement systems are transferred to the software and can thus be analyzed by the snow team. The existing snow depth in cm is automatically converted by the software into m^3 of snow to be produced. This also ensures that exactly the right amount of snow is produced. The ATASSpro weather module provides a reliable weather forecast for various locations around the ski area, providing important support. With the 14-day forecast, an upcoming cold spell can be identified early on to find the perfect snowmaking conditions. This allows the system to be operated far more efficiently. Temperatures that are cooler by as little as -2°C allow for savings of over 20%.

7.2.5 SNOWFACTORY

The SnowFactory is a snowmaking technology that can produce snow regardless of air temperatures. It is a way for some areas to mitigate the effects of climate change and provide a basic service when it is not yet possible to take advantage of traditional snowmaking. TechnoAlpin does not see the SnowFactory as a replacement for conventional snowmaking systems, but rather as a complement to them. They are particularly useful when a lot can be achieved with a small amount of snow. It is suitable, for example, for Nordic ski areas or shorter sections of the slopes. Even if the energy required is significantly higher than for classic snowmaking, various economic, social, and ecological factors may speak in favor of using them, for example, to avoid long trips to other ski areas, to teach children the basics of winter sports, or to add value to major events that depend on snow.

TechnoAlpin launched the SnowFactory in 2014. It was adapted from an existing product from a third-party manufacturer for flake ice. Since 2021, TechnoAlpin has been developing and producing the SnowFactory to further optimize the systems for snowmaking.

7.3 SUMMARY: MEASURES IMPLEMENTED TO DATE

- Development of products to increase snow output at limit temperatures and shorten snowmaking time to increase system efficiency in challenging conditions.
- Expansion of data-based snowmaking to shorten snowmaking time and make the most of cold snow windows.

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7.4 SUSTAINABILITY GOALS FOR 2025

INCREASE AWARENESS AMONG CUSTOMERS

- Integrate sustainability into the B.E.A.T. service concept to take full advantage of preventive maintenance.
- Expand the TechnoAlpin Academy to help ensure systems are operated correctly.

EXPAND DATA ANALYSIS AND OPTIMIZE PRODUCTS

- Expand data analysis.
- Optimize the product line based on results from data analysis.

8

CIRCULAR ECONOMY

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Develop products and services that share, rent, reuse, repair, and recycle existing materials and products for as long as possible. Reduce the amount of waste from packaging and production.

LONG-TERM GOAL

Establish a method for integrating a circular approach into our value-creation processes wherever possible.

8.1 INTRODUCTION AND VISION

At TechnoAlpin, we have always attached great importance to the high quality and durability of our own products. Ultimately, the conditions in the mountains place special demands on the materials we use. They have to withstand extreme temperature fluctuations, strong solar radiation, high winds, and high water pressure. Product innovations like the four-jet nozzle with ceramic insert or the oil-free compressor were helping TechnoAlpin products stand out as early as the 1990s. The durability of the components used is demonstrated by the fact that snow guns from the early 1990s are still in use today. In fact, customers generally only replace a snow gun for better efficiency, not functionality.

TechnoAlpin is committed to increasing the amount of recycled and recyclable materials in product development over the next few years. There will be a life cycle analysis to determine priorities. Any measures will also be accompanied by efforts to raise awareness internally and externally.

TechnoAlpin aims to integrate a circular approach whenever possible. That is why we have taken steps in recent years that go beyond pure product development to minimize the use of resources in the entire value chain as much as possible. This includes everything from high-quality workplaces with modern IT solutions to reusable tableware, water dispensers in offices, and alternative packaging concepts. Every action, no matter how small, makes a difference and is important.

This Sustainability Report primarily focuses on the measures taken in the areas of product development, repair, packaging, and waste management, as these are the areas where the impact is greatest.

The actions and targets described in this chapter are aligned with the following Sustainable Development Goals (SDGs) of the 2030 Agenda.

8.2 PRODUCT DEVELOPMENT: LESS IS MORE

8.2.1 STANDARDIZING OUR PRODUCT FAMILIES

TechnoAlpin has attempted to standardize new models of the fan guns in a bid to take advantage of as many synergies as possible in procurement and logistics. About 90% of the components used for the TT and TR snow guns are identical.

Standardizing the TL series has been a significant step for lances. With the TL2, TL4, TL8, and TL4 Double, customers can now use the right lance head for every application. All heads can be mounted on a standardized lance pipe, meaning there is no longer just one type of lance pipe per model.

These standardizations bring significant advantages in procurement, logistics, and storage, as fewer different components have to be purchased. This makes it easier to optimize inventories and bundle items for transport, internally at TechnoAlpin and on the customer side.

8.2.2 REDUCING MATERIAL USE

The most sustainable resource is the one that is not needed. Starting with the TR8 model introduced in 2017, all fan guns only require one motor to drive the turbine and the compressor. Up until that point, this required two motors. In 2022 alone, this has saved around 2,000 motors. What's more, it also helps reduce the amount of maintenance required.

The unique concept of the TT family also allows customers to customize equipment as needed. There is a slim standard version that can be extended according to the needs of an individual ski area. This ensures that only the components that are needed are actually installed.

8.2.3 LANCE HEAD EXCHANGE – A SHOWCASE PROJECT

New snow guns operate much more efficiently than older models (see the chapter on Energy efficiency, page 109). TechnoAlpin offers ski areas worldwide the opportunity to trade in old lance heads for new ones at a lower cost. This helps dramatically increase the efficiency of the system, as very little new material is needed because the lance construction can be reused. TechnoAlpin offers new heads at a very competitive price, as long as old heads are returned. These are mainly produced from aluminum and are fully reintegrated into the value chain.

With very few resources and no waste, ski areas benefit from the latest advances in product development.

8.2.4 SNOWROOM – LONGEVITY IN A FAST-MOVING WORLD

New trends play a major role in the wellness and fashion sector. All SNOWROOM designs can be dismantled so that they can always be changed to match current design trends. Cabins can be refitted without affecting the SNOWROOM. Dismantled modules can still be used, and newly equipped cabins are a great new attraction.

8.3 SUSTAINABILITY AS A RESULT OF REPAIR AND MAINTENANCE

8.3.1 REPAIR DEPARTMENT AND USED EQUIPMENT

TechnoAlpin's sustainability is evident not only in new products, but also in the way it handles repairs. On one hand, the repair and servicing department fixes defective snow guns and individual components. On the other hand, it also reconditions rental and demonstration equipment as well as used snow guns. Additionally, the repair and servicing department provides professional repair and servicing of pumps, compressors, valves, and individual components.

REPAIR RATE 2022-23

- Of the snow guns received, 60% were repaired/maintained and recirculated.
- Around 95% of the other components (pumps, compressors, valves, and individual components) were repaired internally or returned to the manufacturers for repair.

If it is no longer practical to overhaul a model because the damage is too extensive, all components that are still usable are removed. They then become spare parts for older models on the used equipment market for which components are not always easy to obtain after more than 30 years in service. Thanks to the focus on using high-quality materials since the company began, all non-defective components are generally still in perfect condition.

Snow guns returned from rentals and demonstrations or replaced by newer models are reconditioned. This means that devices from different generations are available in the used equipment section. All snow guns are completely refurbished and as good as new. This is also guaranteed by TechnoAlpin's one-year warranty. The high quality of the products ensures a long life span, which is how snow guns produced in the 1990s can still be fully operational. For some applications, older-generation snow guns are perfectly adequate.

8.3.2 SPARE PARTS AND SERVICE PORTAL

All spare parts are shipped from the international spare parts warehouse at TechnoAlpin's Austria site in Volders. A state-of-the-art automated storage system ensures quick order processing and efficient operations. All spare parts are guaranteed for the entire life of a snowmaking system. Around 6,500 different components are permanently in stock at Volders, with a total of around 530,000 individual items. Every year, 8,000 shipments leave the warehouse.

The TechnoAlpin ServicePortal provides important support for customers when selecting and ordering spare parts. It includes optimized search options with the ability to switch between 3D drawings and list mode. This ensures that everyone can choose the view they feel most comfortable with so that ski areas can find what they really need. All selected spare parts can be added to the shopping cart and then requested with just a single click.

For wear parts, there are appropriate maintenance kits with high-quality spare parts based on the year of operation and model.
Early ordering helps to ensure that transport is as coordinated and efficient as possible. Customers are being made aware of this with the current B.E.A.T. campaign.

8.4 SUSTAINABLE PACKAGING SOLUTIONS

8.4.1 REUSABLE SYSTEM FOR COMPONENTS

TechnoAlpin has developed a sophisticated system of reusable packaging to minimize the amount of disposable packaging used. Modular wooden crates, lattice boxes, and cable drums are made available to suppliers to deliver various components to TechnoAlpin. Examples include the TL series lance heads and their covers, nozzle holders, and many other pre-assembly components. They are delivered unpackaged in a TechnoAlpin wooden box. Cardboard dividers prevent scratches. For example, a Euro pallet (120 x 80) with two wooden frames (80 x 120 x 20 each) has enough space to deliver 120 covers for lance heads.

Examples of components supplied in reusable wooden boxes

TechnoAlpin, in turn, uses the same wooden crates and cable drums to transport equipment to ski areas worldwide and store purchased components. The modular system of wooden boxes with pallets and wooden frames ensures that components and equipment are transported efficiently and that all available space is used effectively. TechnoAlpin uses recycled cardboard instead of polystyrene chips as infill material.

Customers and suppliers pay a deposit for the reusable packaging to ensure that it is returned.

Modular packaging system

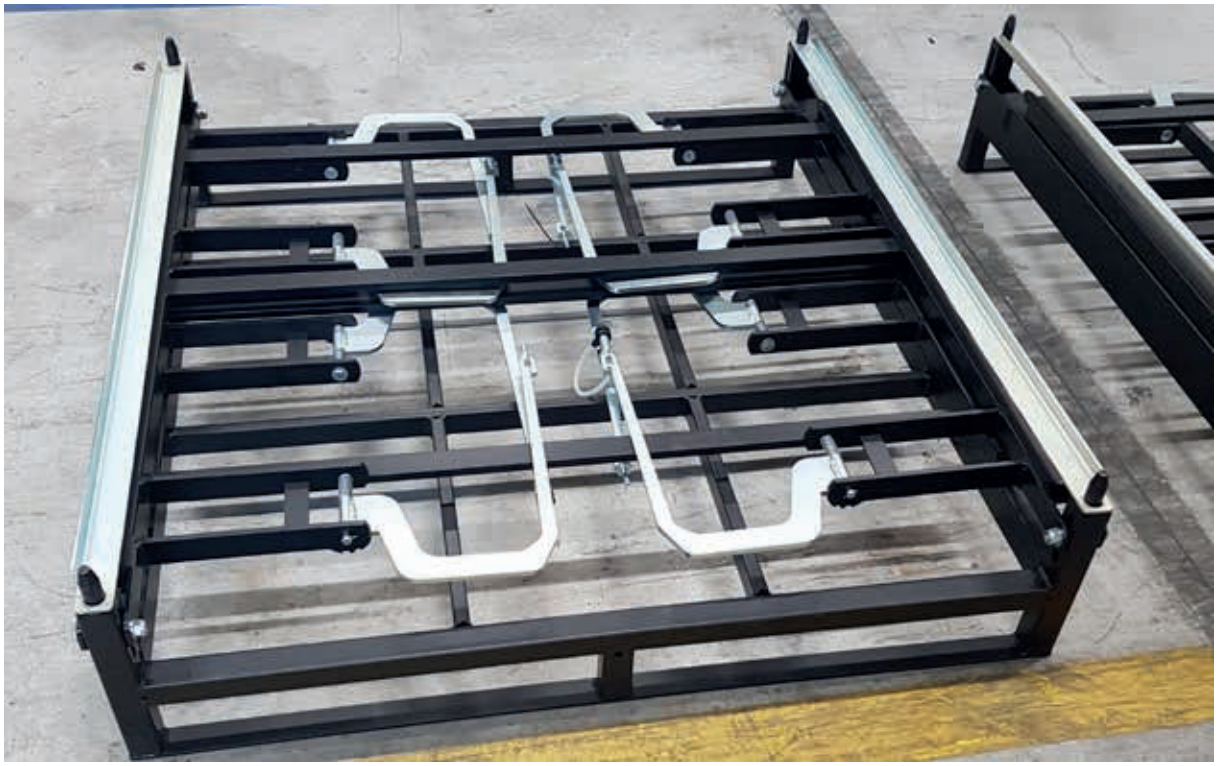
8.4.2 INDIVIDUAL PACKAGING SOLUTIONS

For some components, individual solutions have been developed to reduce cardboard and plastic packaging as much as possible. The transport racks for the covers of the TR and TT series fan guns are a great example of this. Tailor-made racks were developed for the side cladding and the nozzle ring cover, on which the elements can be transported in a space-saving manner. Previously, the covers were packed individually in cardboard boxes. Care was taken during development to ensure that the racks were designed to make the best possible use of the loading areas in trucks and occupy as little storage space as possible. Empty racks can be folded for transport to suppliers. Easy loading and unloading as well as the secure anchoring of components on the transport racks also help increase work safety.

Components are packed in durable plastic sleeves to prevent damage during transport. These sleeves are then returned to the supplier and reused. The nozzle ring cover does not need any further plastic packaging.

Covers on transport racks

Transport racks in the production line. Sleeves are collected and reused.



Transport rack folded for optimized transport

Transport racks have also been developed to deliver lance constructions, which enables packaging-free transport and circulation between suppliers, TechnoAlpin, and customers.

Transport racks for lance constructions

For other components, such as intake ports and turbine pipes, the main focus was on optimizing transport and storage. They can be stacked on top of each other on a Euro pallet to make the best use of the height of trucks. This makes further packaging unnecessary. Pallets are reused.

Turbine pipes and intake ports after delivery

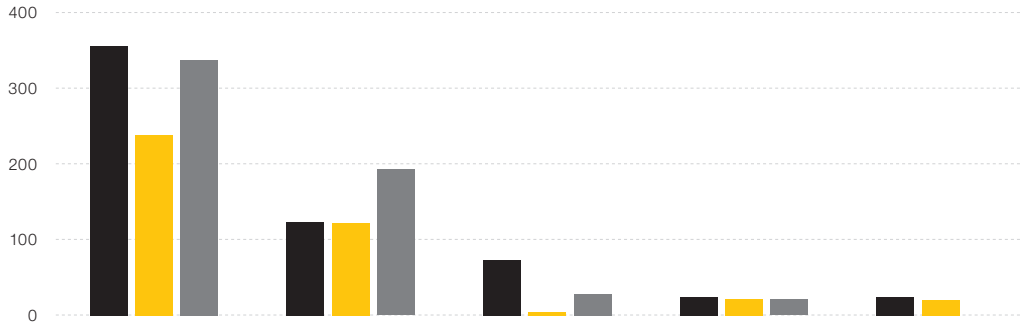
8.5 WASTE MANAGEMENT

Despite our best efforts, it is not always possible to avoid waste. TechnoAlpin relies on qualified partners to not simply dispose of corporate waste, but to recycle it or convert it thermally into energy.

As a result of the above-mentioned measures, the company has significantly reduced waste, especially from packaging material.

Below are the amounts of waste produced by each TechnoAlpin site for the last 3 years in tons. These amounts do not include municipal waste and similar waste that does not originate from production or storage, such as cafeteria and office waste. This waste is collected and managed by the Environmental Hygiene Service management company for the City of Bolzano.

WASTE GENERATED IN TONS



	TAIT+TAHO Via P. Agostini	**TAIT** Via Siemens	**TAIT** Vurza Warehouse	**TAIT** Via Copernico	**TAIT** Via Copernico (Indoor)
2020-2021	356 t	124 t	73 t	24 t	24 t
2021-2022	239 t	122 t	5 t	22 t	2 t
2022-2023	338 t	193 t	28 t	21 t	0 t

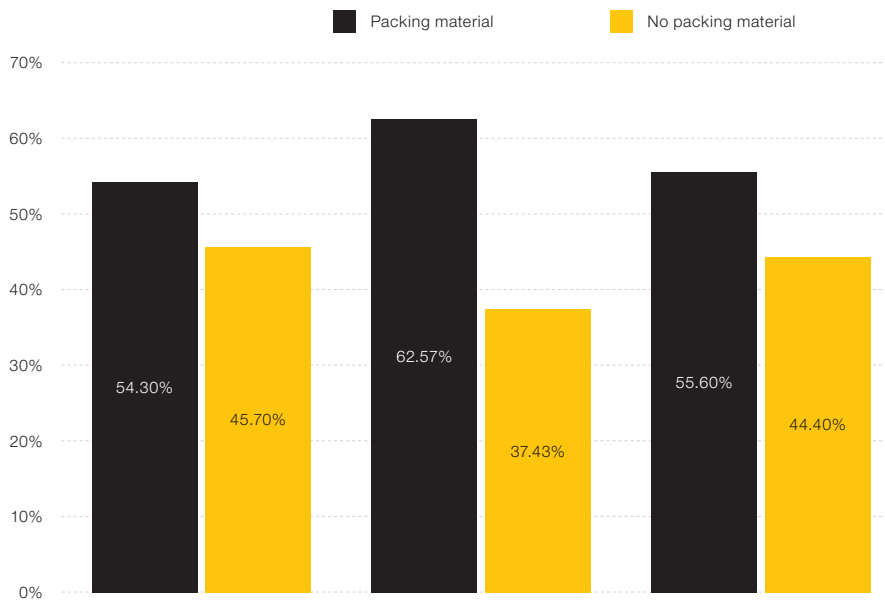
The amounts can only be interpreted correctly when considered in relation to the number of snow guns manufactured and sales generated.

	2020-2021	2021-2022	2022-2023
Waste	600 t	389 t	580 t
Snow guns	3534	3150	4679
Waste / snow gun manufactured	**0,17**	**0,12**	**0,12**

The amount of hazardous waste generated is minimal, at less than 1% of the total waste generated.

	Total volume	not hazardous	hazardous
2020-2021	600 t	592 t	8 t
2021-2022	389 t	387 t	2 t
2022-2023	580 t	577 t	3 t

Most of the waste consists of packaging material. Waste is also generated during the manufacture and maintenance of equipment as well as during the proper disposal of equipment and components that are returned by customers and can no longer be repaired.



	2020-2021	2021-2022	2022-2023
Packaging	54.30%	62.57%	55.60%
Not from packaging	45.70%	37.43%	44.40%

The amount of waste to be disposed of is less than 1%, so TechnoAlpin is recovering almost all of the waste it generates.

Year	Disposal	Recycling
2020-2021	1.45%	98.55%
2021-2022	0.79%	99.21%
2022-2023	0.41%	99.59%

The small amount of waste that requires disposal is delivered by a partner company to the district heating plant in Bolzano.

Cardboard and plastic packaging is delivered to processing plants where they are used as raw material for further cardboard packaging or LDPE and HDPE pellets. This ensures that it is not used as waste (end of waste). Wooden packaging is shredded and sent for recycling in furniture factories. All metal, electrical, and electronic components as well as oils are carefully recovered. Toner cartridges, on the other hand, are disposed of properly as End of Waste.

8.6. SUMMARY: MEASURES IMPLEMENTED TO DATE

- The 4 latest models (TT10, TR10, TT9 and TR9) consist of 90% identical components. Standardized lance pipes for TL series.
- 1 motor that drives the turbine as well as the compressor.
- Slim standard variant with the option to extend.
- Old lance heads are replaced and recycled. Lance constructions continue to be used.
- In the repair and servicing department, TechnoAlpin repairs and reuses as many snow guns and components as possible.
- Modular reusable packaging for purchasing and sales.
- Individual transport racks reduce packaging material.
- TechnoAlpin has reduced the amount of waste it produces despite increased production figures. Any waste generated is recycled wherever possible.

TECHNOALPIN®

8.7 SUSTAINABILITY GOALS FOR 2025

PRODUCT LIFE CYCLE ASSESSMENT

› Life cycle analysis for 1-2 product families: Calculate the environmental footprint of a product along its entire life cycle using an analytical and systematic methodology, from the extraction of the raw materials that make up the product, through production, distribution, and use, all the way to final disposal.

PRODUCT DESIGN

Optimize product design based on the results of the life cycle analysis:

› Current analysis of the proportion of recycled/recyclable material (1).

› Increase the percentage of recycled/recyclable material in the future (2).

FURTHER OPTIMIZE WASTE SEPARATION, ESPECIALLY IN OFFICES

› Create a plan to improve internal waste separation by organizing new collection points in offices.

› Raise awareness among employees about separating and avoiding waste.

FURTHER OPTIMIZE PACKAGING

› Continue to optimize packaging projects (quantitative and qualitative) and reduce disposable packaging (internal/external).

INCREASE AWARENESS AMONG CUSTOMERS

› Expand the TechnoAlpin Academy training program and the LMS learning platform.

› Expand the B.E.A.T. concept to further increase the service life of equipment through preventive maintenance.

DIGITAL PRODUCT MANUALS

› Product manuals are to be supplied exclusively in digital form and no longer in paper form as soon as all the legal framework conditions for this are in place.

9

WATER & WASTEWATER

TECHNOALPIN®

Reduce water consumption in the production process and publicize best practice examples to help customers procure, store, and use water more consciously.

LONG-TERM GOAL

Water is a shared resource, and TechnoAlpin promotes best practices for the cycle-oriented use of water resources.

9.1 INTRODUCTION AND VISION

All resources are valuable and must be used carefully to ensure TechnoAlpin develops sustainably. However, dealing with water, the basis of all life, requires special sensitivity. TechnoAlpin is aware of the responsibility it bears as part of the winter sports industry and attaches great importance to using water consciously and economically.

To understand the impact of snowmaking on water supply, it is first necessary to explain how technical snow is produced and how water is used in the process.

Water is not consumed in the course of technical snowmaking, but rather transformed into a different state and conserved. As the snow melts and evaporates, the water is returned to the cycle. The most important thing is that the water is not contaminated during this process. Technical snow is nothing more than frozen water. Regardless of whether snow falls from the sky or is produced technically, it consists exclusively of water and air. Technical snowmaking simulates natural snow to some extent. Snowmaking technology involves the use of nucleators which produce a mixture of water and compressed air which forms nuclides (= snow nuclei) on entering the atmosphere. The nozzles on snow guns atomize the water into fine droplets which combine with the nuclides and freeze into small snow crystals on their way down to the ground.

A supply of water is therefore essential for any snowmaking system to function. It is subject to strict water law approval procedures by the respective government institutions. Potential impacts on the local water supply are also considered by experts and local authorities. Each system may only use as much water as permitted by license.

Creating near-natural reservoirs can also have a positive influence on the careful handling of water and cycle-oriented use. In this process, water is collected during periods of high runoff to be available during periods of low precipitation. Reservoirs can also be used to intercept peaks from snow melt and high rainfall, and prevent flood damage. What's more, reservoirs have the advantage that large quantities of water are immediately available. This makes it easier to take full advantage of cold temperature windows, increasing the efficiency of the system.

It is TechnoAlpin's business to make snow plannable and produce it under conditions that are as considerate and careful as possible. Along with further technical development, there is still room for improvement in training and educating ski area snowmaking teams. Although awareness in the industry is already very high, there is still a need to elaborate on material issues to ensure that water is used more carefully. The right quality of snow and the optimum amount of snow, for example, have a major influence on how much water is saved during snowmaking. New product solutions and digitalization are making a major contribution in this area.

As with energy, TechnoAlpin has a direct and indirect impact on the use of water and wastewater. The direct impact includes water demand at the company's sites. The indirect impact lies in using water for snowmaking in ski areas. TechnoAlpin is constantly working to optimize its products and, during the consulting process, takes an in-depth look at the on-site water situation together with customers to help achieve a sustainable result. However, the ski areas and local authorities are ultimately responsible for decision making and approval.

When it comes to the ongoing operation of systems, TechnoAlpin's primary goal is to provide customers with the best possible advice and information and to constantly improve its products and services.

The actions and targets described in this chapter are aligned with the following Sustainable Development Goals (SDGs) of the 2030 Agenda.

9.2 DIRECT WATER DEMAND

TechnoAlpin's direct water demand is divided into water for sanitary purposes (including air treatment), water for cafeterias, and water for the functional checks of the snow guns. All water is supplied through the municipal water system. The catchment areas are not considered areas of water scarcity.

Most of the drinking water in Bolzano is groundwater. Groundwater is brought to the surface by 12 deep wells using pumps from a depth that varies from 30 to 80 meters depending on the zone.

The following table shows the total volume of water demand for the Via Agostini and Via Siemens sites. These sites are the main consumers.

	2021-2022	2022-2023
Total volume	14,217.00 m^3	16,288.60 m^3

Consumption at the other sites is negligible and cannot be provided at this time because no annual consumption data is currently available. TechnoAlpin is committed to taking monthly readings starting with the next report.

Over the past two years, the company has minimized the time the air treatment system for the offices and production areas spends operating to reduce water consumption as much as possible.

While we can only change water demand for sanitary purposes and cafeterias to a small extent, a solution was introduced a few years ago to reuse the water in the functional checks, thereby helping to minimize consumption.

9.2.1 FUNCTIONAL CHECKS OF THE SNOW GUNS

Every TechnoAlpin snow gun is subjected to a functional check with water before delivery to ensure the quality of the snow gun, regardless of whether it is new or used.

The test stands at the Via Agostini repair and servicing facility and the Via Siemens production facility both have a water tank that is used to collect and reuse water. Before use, the water is treated with UV light to kill any bacteria, ensuring it can be used over a long time frame.

Some of the water that evaporates naturally has to be replenished periodically. This accounts for about 234 m^3/year. The tank is also regularly emptied for cleaning and maintenance purposes.
This test water recirculation system enabled TechnoAlpin to save around 5,800 m^3 of water per year in 2021-22 and around 8,626 m^3 per year in 2022-23.

9.2.2 WASTEWATER

At Via P. Agostini, rainwater runs through a grit separator into the seepage ditches. At Via Siemens, rainwater runs into soakaways.

Industrial wastewater from the production areas and garages passes through a water-oil separator before being discharged into the wastewater sewer system.
In the newer cafeteria at Via Siemens, there is a grease separator for pretreatment before the water runs into the wastewater sewer system.

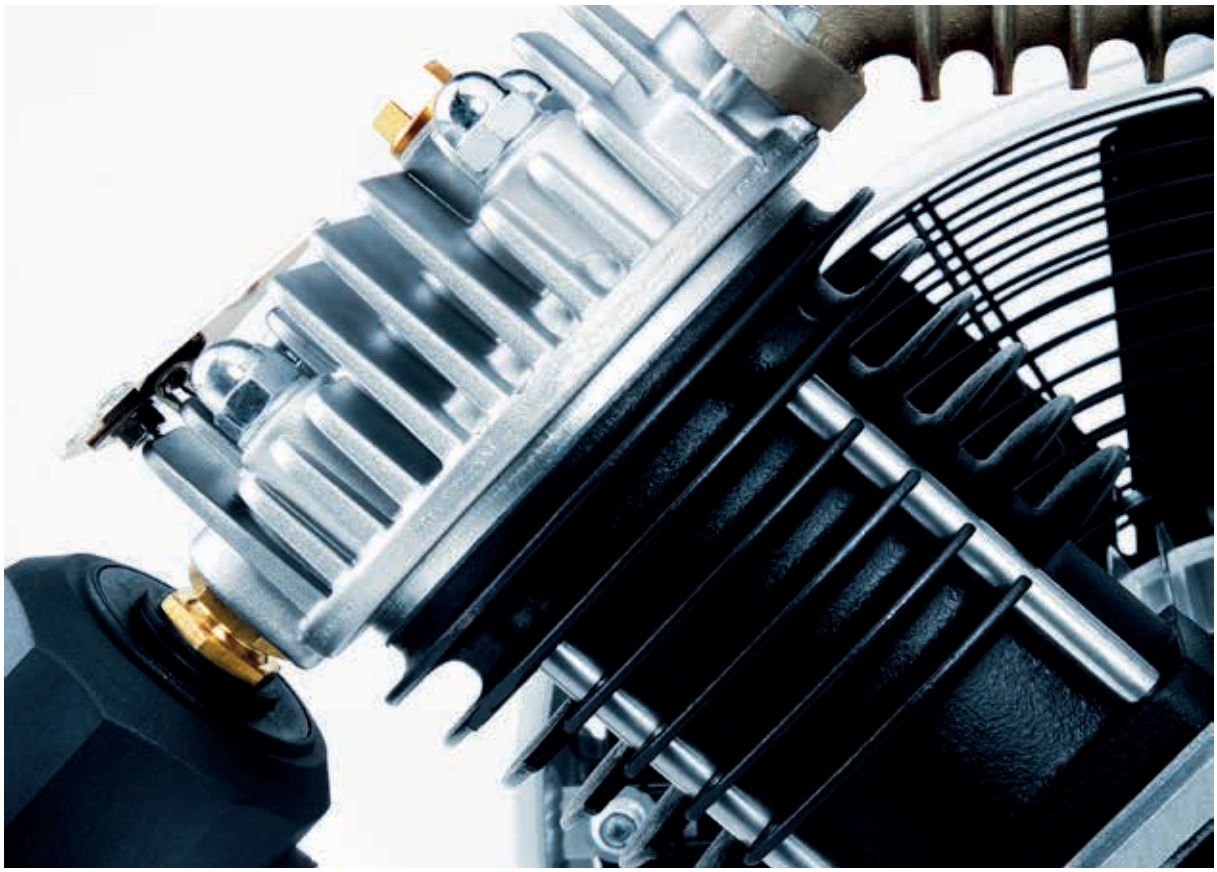
The oil and grease separation equipment is regularly maintained to ensure its efficiency. Wastewater destined for the municipal sewer system is analyzed annually in approved laboratories.

9.3 INDIRECT WATER DEMAND

Indirect water demand refers to the water supply of ski areas. TechnoAlpin has no direct influence on this but aims to develop products and solutions that do not contaminate the water used and also use water as sparingly as possible.

9.3.1 PRODUCT DEVELOPMENT FOR OUTDOOR SNOWMAKING

OIL-FREE COMPRESSOR



Already back in the late 1990s, product developers at TechnoAlpin set themselves an ambitious goal: not a single drop of oil should enter the environment due to technical snowmaking. In the future, each snow gun should be equipped with an oil-free compressor. Together with leading compressor manufacturer KAESER, TechnoAlpin developed an oil-free piston compressor with an integrated cooling circuit made from aluminum: the KTC 840. From 1999 onwards, this was used in every TechnoAlpin snow gun without exception. Oil-free compressors are extremely low-maintenance. There are no oil filters, trap cartridges, oil level monitors, stationary heating installations, etc. which need to be changed. In 2022, 2,287 snow guns with compressors left the TechnoAlpin factory. Oil-free compressors saved over 25,000 liters of oil and over 9,000 oil separator cartridges in 2022 alone.

In the fan line, the KTC 840 was replaced by a new oil-free rotary vane compressor with the launch of the TR8. The KTC 840 continues to be used for lances.

NEW VALVE TECHNOLOGY

TechnoAlpin's development team created new nozzle valve technology, which is used on lances and fan guns to ensure that not a single drop of water is wasted. The water in the nozzle valves is no longer discharged downward during operation but rather driven forward into the air jet and converted into snow. A calculation example for the TL series lances shows just how much water this can save:

With conventional lances, each valve step switch empties the lance pipe channel, diverts the water and distributes it underground. Therefore, the amount of water lost per step switch adds up to 0.75 l/m x 9 m lance pipe = 6.75 l. On average, 50 valve switches per lance and season were detected. Per lance, this corresponds to a loss of 350 l per season. An average lance system consists of about 300 lances. The new technology can therefore save around 100,000 liters of water per season.

9.3.2 WATER SUPPLY IN THE FIELD

The water supply for individual snow guns is a major challenge in snowmaking. Pipes must be laid in difficult conditions and be able to withstand high pressures in difficult terrain. Reservoirs must be built as carefully and non-invasively as possible and in the best possible location. It is vital to avoid water losses in storage and transport. It is not just about managing water as a resource but also about safety. Landslides caused by eroded terrain can cause extensive damage.

ALPINAL PIPES

TechnoAlpin relies on ductile iron pipes from the ALPINAL system to meet the strict requirements and avoid water losses. ALPINAL provides a complete system that covers all pipeline construction requirements. It includes all pipes and fittings required for pipeline construction in alpine terrain. All components have been developed specifically to meet the high demands of these conditions and are available in various sizes and pressure ratings. This offers maximum flexibility in the planning and execution stages.

In alpine terrain, a pipe system must not only withstand extreme conditions, but it must also be easy to lay. The push-fit socket technology of the ALPINAL system allows pipes to be laid easily, without welding. Assembly is achieved using an excavator and the appropriate tool.

Ductile iron cast pipes are elastic and can be deformed under load. This makes them resistant to pressure points caused by stones, for example. Even in inhospitable mountain conditions, the excavated material can be used to backfill the pipe trench; this is environmentally friendly and cost-effective. The push-fit socket connections can bend a little to accommodate certain angles (up to 3°). This reduces the number of fittings, and cuts down the excavation and blasting work required.

The coating also plays an important role in product quality. The Zinalium coating system used on ALPINAL pipes combines environmental friendliness and durability. It is made of a zinc-aluminum alloy (ZnAl 85-15) that is twice as thick as the layer required by the standard (400 g/m^2). The AQUACOAT water-based acrylic protective layer is then applied on top.

The two-phase structure (aluminum and zinc) increases the resistance of the coating and extends its service life even in aggressive soils. Any minor damage is rectified by the self-repairing effect of the protective layer.

The Zinalium coating system is free from solvents and bisphenol A.

ALPINAL system pipes are produced in Europe by PAM Saint Gobain, the leading supplier of ductile iron pipe systems. Just like TechnoAlpin, Saint Gobain attaches great importance to the sustainable development of its products as well as durability through the highest quality. Saint Gobain has committed to the UN Global Compact Business Ambition for 1.5°C Campaign, with the aim of achieving net-zero emissions by 2050.

ONGOING MONITORING

Pipelines and reservoirs are monitored around the clock to quickly detect and correct any losses.

The software stores the current water pressure in the line. If this falls below a preset value for no apparent reason, the software immediately sounds an alarm, and the line can be checked.

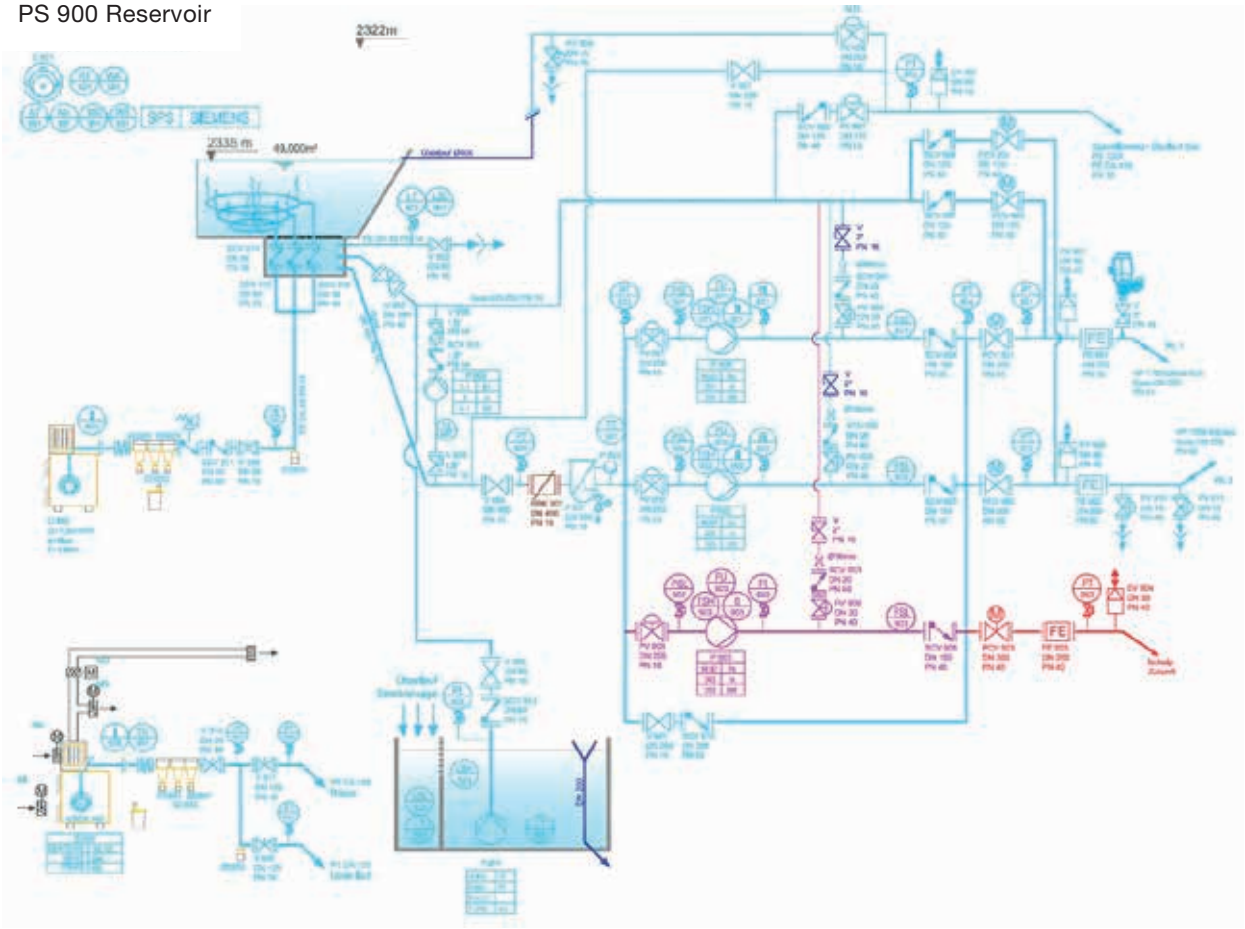
TechnoAlpin can also help customers measure drainage to detect any leaks in reservoirs. For this purpose, water from the drainage system is piped into a small collecting tank where it is directed over a V-notch weir. The level of water at the weir is measured and the current water throughput is calculated using a level sensor. If this rises, the system sounds an alarm.

RESERVOIR – RECIRCULATION WITH LAKE DRAINAGE

TechnoAlpin also aims to develop innovative concepts so that ski areas can prevent water loss and reuse melt water as effectively as possible. The Bramabüel reservoir on the Jakobshorn in Davos (SUI) is a great example of this.

A drainage pipe was laid under the reservoir. This not only allows the reservoir to be continuously monitored for leaks, but it also captures the water that collects after precipitation. The recirculated amount can be determined using a pump with a frequency converter and level probes. Therefore the reservoir is essentially filled during the period of high rainfall and snow melt. This also efficiently cushions peaks.

PS 900 Reservoir



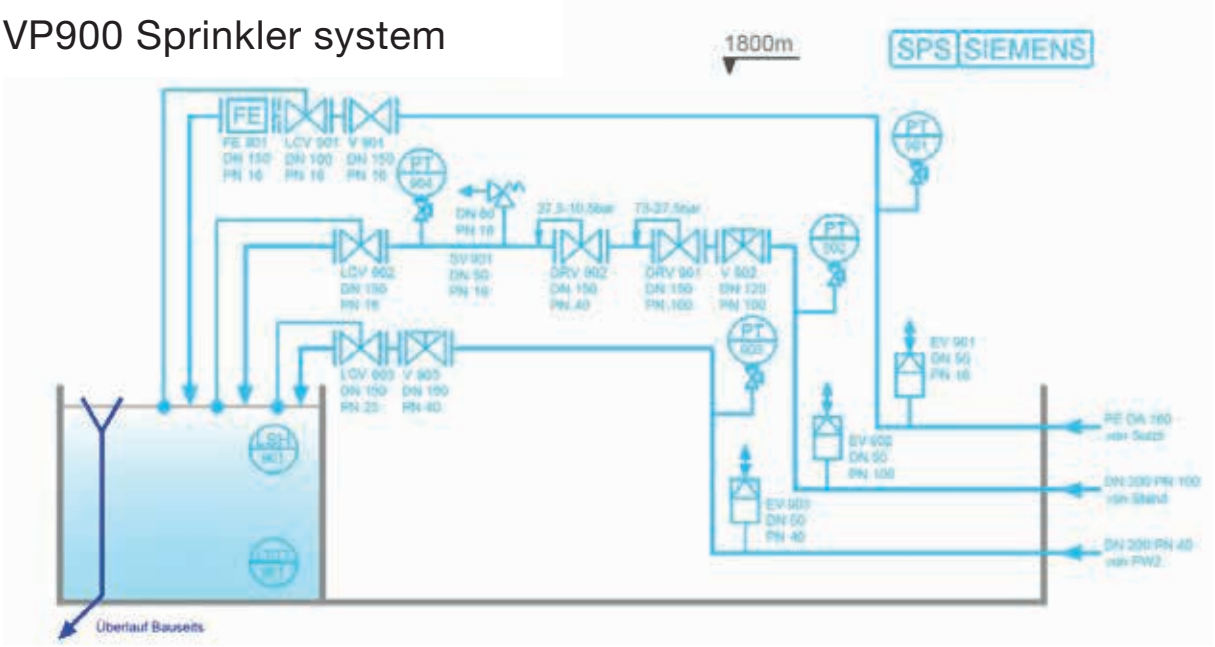
9.4 MULTIPLE USE OF SNOWMAKING SYSTEMS

Sustainability also means using existing infrastructures in a variety of ways and thus avoiding further interference with nature. Snowmaking systems are particularly suitable for fire protection. Every snowmaking system can be converted into a fire protection system. TechnoAlpin offers adjustable pressure-reducing stations for this purpose, which are connected to each supply point. This means that potentially every supply point in the ski area can be used as a fire hydrant. But there are also examples where the fire protection system has been combined with the snowmaking system to make the best possible use of the infrastructure.

FIRE PROTECTION WITH SNOWMAKING AT CUSTOMER SITE

At the Titlis ski area in Switzerland, the customer needed to build a new fire reservoir with a prescribed amount of water. TechnoAlpin developed a plan for the customer to provide the prescribed amount of water using three systems to supplement the fire reservoir. It used an existing feeder from the mountain railroad's own sources, the existing snowmaking system pumping station, and the contents of the pipelines that are always full. The new fire reservoir could be made much smaller by using these existing water resources. This meant that less concrete work was required, minimizing the overall impact on nature.

VP900 Sprinkler system



9.5 OPTIMAL SNOW QUALITY AND QUANTITY

The right snow quality and quantity are fundamental when ensuring water resources are used sparingly. If the snow is too wet or too much is produced, it means that more water was used than necessary. TechnoAlpin's software provides important support for producing only as much snow as is absolutely necessary (see also the Energy Efficiency chapter on page 111).

TechnoAlpin snow guns allow customers to select snow quality between 1 (very dry) and 9 (very wet). While more water is converted into snow at very cold temperatures, meaning a higher snow quality can be set, care must be taken to adjust the snow quality at limit temperatures. If the snow produced is too wet, it also leads to an icy slope in addition to wasting resources. Fortunately, the software provides critical support in this area as well to make the best possible use of the prevailing conditions. Snow of the right quality conserves resources and ensures greater safety on the slopes.

Beyond providing the necessary tools, our main goal is to raise awareness and educate snowmaking teams at ski areas. This is where the TechnoAlpin Academy comes in. Training sessions have focused on snow quality for the past few years. In the future, even more emphasis will be placed on this in a separate module on sustainable snowmaking.

9.6 INDOOR SNOWMAKING

The SNOWROOM from TechnoAlpin offers a water-saving alternative for wellness areas. The snowmaking process in the SNOWROOM requires very little water. One cubic meter of water produces five times the amount of snow. Per week, the amount of water required to run a SNOWROOM averages around 200 liters. Other ways to cool down after a sauna, such as cold water pools or experience showers, require significantly more water.

9.7 SUMMARY: MEASURES IMPLEMENTED TO DATE

- Water for product testing is collected and reused.
- Oil-free compressor in snow guns ensures that not a single drop of oil is released into the environment.
- New valve technology also turns water into snow during step switching (instead of draining it).
- High-quality components and ongoing monitoring prevent water loss through leakage.
- Concepts to use equipment for multiple purposes help reduce the impact on nature.
- Digitalization is helping ski areas get the right amount and quality of snow.
- The SNOWROOM is a water-saving alternative to help people cool down in the wellness sector.

TECHNOALPIN®

9.8 SUSTAINABILITY GOALS FOR 2025

INCREASE AWARENESS AMONG CUSTOMERS

Train customers on how to use water resources correctly from the point of view of cycle-oriented use.

EXPAND THE SUSTAINABILITY CRITERIA (SOCIAL, ECOLOGICAL) IN SUPPLIER QUALIFICATION

Social and ecological criteria are to have greater importance when selecting suppliers.

- Identify evaluation criteria.
- Integrate the criteria into the audits.

FURTHER DEVELOP AND EXPAND SNOW MANAGEMENT

Expand data analysis and related optimized product development, system design, and consulting.

10

EMPLOYEE ENGAGEMENT

TECHNOALPIN®

Promote internal measures to maintain employee motivation and support diversity and inclusion throughout the company with specific initiatives such as the participation of women and their involvement in leadership positions, and the inclusion of people with disabilities or different nationalities, religions, and orientations in all company activities.

LONG-TERM GOAL

Remain a top employer in terms of attractiveness, employee retention, well-being, diversity, and inclusion. Build a corporate culture that includes sustainability as a key driver.

10.1 INTRODUCTION AND VISION

As an employer, TechnoAlpin wants to provide its employees a secure and future-oriented workplace with opportunities for personal development, regardless of their background, religion, orientation, or gender. At the headquarters in Bolzano alone, the team consists of 11 different nationalities.

The focus of personnel development is to ensure that the company remains attractive as an employer and limit staff turnover, ensuring the long-term retention of employees. Various measures, benefits, and development opportunities have already been established over recent years to help the company achieve these goals.

In the coming years, these programs will be continued or expanded. The focus will be on diversity and inclusion, which are essential for strengthening the brand as an employer.

One of the company's main objectives is to strengthen collaboration with the international team. A number of projects and campaigns have already been launched in this regard and will be expanded over the coming years. The company has always relied on flat hierarchies and an open-door policy. Every employee is invited to contribute and actively provide feedback.

This chapter explains the programs and actions that have already been implemented and are helping the company move towards the goals mentioned above.

The actions and targets described in this chapter are aligned with the following Sustainable Development Goals (SDGs) of the 2030 Agenda.

10.2 ORGANIZATION

One of TechnoAlpin's overarching corporate goals is to strengthen the cooperation and team spirit of the international team. Various opportunities have been created under the One Team. One Company motto to better connect the team and improve collaboration across departmental and branch boundaries.

The brand values make it clear what TechnoAlpin stands for. New employees are made aware of these values in the onboarding process, and they are reflected in various areas throughout the company. The TechnoAlpin Survival Guide contains essential information about the company, such as its history, products, image, strategy, etc. It also answers specific questions on topics such as paychecks, sick leave, parental leave, and more. Additionally, it contains practical tips, including recommendations for lunch in the area or how to use the ticketing system in different departments. The Survival Guide was given to all existing employees when it was first introduced in 2019 and has since been provided to each new employee prior to their first day.

Since 2009, TechnoAlpin has been ISO 45001 (formerly OHSAS 18001) certified and uses an occupational health and safety management system to help improve the health of employees in the workplace and prevent accidents and near misses. These values are also included in the QHSE policy.

For more than 10 years now, a code of ethics has been in place to familiarize new and existing employees with TechnoAlpin's culture. It also includes guidance on whistleblowing and bullying. To date, no incidents of discrimination as defined by GRI 406 have been reported at the company.

All general information about the company is published on the internal communication platform Viva Engage. Additionally, each employee has the opportunity to publish information about their everyday life at TechnoAlpin, their projects, or joint leisure activities.

10.2.1 NEW EMPLOYEES AND TURNOVER

The following tables show how the number of employees (TechnoAlpin SpA and TechnoAlpin Holding) has changed in the past two fiscal years. They do not include seasonal employees. The figures indicate full-time equivalents (FTE), and the calculation period runs from 05/01 to 04/30 of each fiscal year.

		05.2021-04.2022 **New hires**	05.2022-04.2023 **New hires**
WOMEN	**< 30 years old**	6,10	6
	30 to 50 years old	2	4
	> 50 years old	0	3
Total new hires (women)		**8,10**	**13**
MEN	**< 30 years old**	29	30
	30 to 50 years old	13	26,275
	> 50 years old	1	3
Total new hires (men)		**43**	**59,275**
TOTAL NEW HIRES		**51,10**	**72,275**

New hires from May 1 to April 30 by gender and age group (full-time equivalent (FTE))

		05.2021-04.2022 **Turnover**	05.2022-04.2023 **Turnover**
WOMEN	**< 30 years old**	1	2
	30 to 50 years old	2,75	3
	> 50 years old	0	1
Total turnover (women)		**3,75**	**6**
MEN	**< 30 years old**	8	7
	30 to 50 years old	19	25
	> 50 years old	3	2
Total turnover (men)		**30**	**34**
TOTAL TURNOVER		**33,75**	**40**

Turnover from May 1 to April 30, by gender and age group (full-time equivalent (FTE))

		05.2021-04.2022 **Total Number of employees**	05.2022-04.2023 **Total Number of employees**
WOMEN	**< 30 years old**	12	14
	30 to 50 years old	25	31
	> 50 years old	3	5
Total number of women		**40**	**50**
MEN	**< 30 years old**	79	96
	30 to 50 years old	199	206
	> 50 years old	33	46
Total number of men		**311**	**348**
TOTAL		**351**	**398**

Number of employees from May 1 to April 30, by gender and age group (full-time equivalent (FTE))

10.2.2 DIVERSITY IN CONTROL BODIES AND AMONG EMPLOYEES

The following tables provide an overview of the composition of the company's management and employees broken down by age and gender. The figures indicate full-time equivalents (FTE), and the calculation period runs from 05/01 to 04/30 of each fiscal year.

Board of Directors by gender and age		05.2021-04.2022	05.2022-04.2023
WOMEN	< 30 years old	0	0
	30 to 50 years old	0	0
	> 50 years old	0	0
Total women on the BoD		**0**	**0**
MEN	< 30 years old	0	0
	30 to 50 years old	1	0
	> 50 years old	1	2
Total men on the BoD		**2**	**2**
BoD TOTAL		**2**	**2**

Board members as of April 30 by gender and age group (full-time equivalent (FTE))

Executive managers by gender and age		05.2021-04.2022	05.2022-04.2023
WOMEN	< 30 years old	0	0
	30 to 50 years old	0	0
	> 50 years old	0	0
Female executive managers		**0**	**0**
MEN	< 30 years old	0	0
	30 to 50 years old	5	6
	> 50 years old	1	1
Male executive managers		**6**	**7**
TOTAL EXECUTIVE MANAGERS		**6**	**7**

Executive managers as of April 30 by gender and age group (full-time equivalent (FTE))

Employees by position and gender	05.2021-04.2022		05.2022-04.2023	
	Women	Men	Women	Men
Executive managers	0	8	0	9
Head of Department	6	15	6	15
Office staff	34	235	44	245
Manual laborers	0	53	0	79
GESAMT	**40**	**311**	**50**	**348**

Employees by category and gender as of April 30 (full-time equivalent (FTE)).

Seasonal workers are not included in this table.

Employees by position and age	05.2021-04.2022			05.2022-04.2023		
	< 30 years old	30-50 years old	> 50 years old	< 30 years old	30-50 years old	> 50 years old
Executive managers	0	6	2	0	6	3
Head of Department	0	21	0	0	20	1
Office staff	59	182	28	74	183	32
Manual laborers	32	15	6	36	28	15
GESAMT	**91**	**224**	**36**	**110**	**237**	**51**

Employees by category and age as of April 30 (full-time equivalent (FTE)).

Seasonal workers are not included in this table.

10.3 WELFARE SERVICES

FLEXIBLE WORKING HOURS

Since 2019, TechnoAlpin has allowed its employees to work flexible schedules, although core hours (09:00—12:00 and 14:00—16:00) must be observed. This provides a better balance between family, leisure, and work. It also ensures that teams can schedule meetings at suitable times even when working internationally.

REMOTE WORKING

Like many other companies, TechnoAlpin had to switch to remote work at short notice during the COVID-19 pandemic. It quickly became clear that we should continue this working model. Remote working contracts were introduced in April 2020, allowing employees to work one to three days per week remotely. Currently, more than 31% of TechnoAlpin employees have a remote working contract.

SABBATICAL

Demand for career breaks has increased in recent years. TechnoAlpin works with the employees and the departments concerned to define individual periods for employees to pursue their personal goals. On average, approximately 4-5 employees take between 1 and 4 months of time off per year.

MUTUAL HELP

Italian law requires most sectors to join a collectively bargained health fund that provides services that supplement the public-State health system. TechnoAlpin has chosen not to join the collective bargaining fund and instead work with local provider Mutual Help. This ensures that the services offered are better adapted to local conditions and needs. The fund, which is free of charge for employees, includes full or partial reimbursement of various expenses, such as medical expenses and wellness treatments. General life, health, and occupational disability insurance, as well as parental leave, are provided by the national health service.

RETIREMENT PROVISION

In Italy, employees can decide whether to invest in a supplementary pension fund or severance pay. At least 1.2% of every employee's salary goes into either a severance payment, which is paid out when the employee leaves the company, or a supplementary pension fund. If an employee opts for a supplementary pension fund, they can increase the amount paid in. TechnoAlpin pays an additional 2% of an employee's base salary into the pension fund in accordance with the collective agreement. This amount is paid in addition to the regular monthly salary. This regulation does not apply to seasonal employees.

CORPORATE BENEFITS

TechnoAlpin employees have access to the Corporate Benefits discount portal. This includes price advantages with many large, international companies, but also agreements with local partners, such as tire providers and selected ski areas. Each employee receives an ExpertsCard that identifies them as an employee and allows them to use the portal.

CHILDCARE SUBSIDY

A childcare subsidy was introduced at TechnoAlpin in 2022. TechnoAlpin pays part of the hourly costs for childcare to support employees financially and make it easier for them to return to work.

All of the above-mentioned benefits are available to all employees with a contract, regardless of whether their employment is temporary or permanent or whether they work full-time or part-time.

10.4 ENGAGEMENT

Numerous initiatives have been introduced to bring together employees from different departments and branches, and meet the corporate goal of One Team. One Company.

LUNCH LOTTERY

All TechnoAlpin employees in Bolzano have the opportunity to sign up for the Lunch Lottery. Every week, 2 employees are selected at random to enjoy lunch together at the company's expense. This brings together people from a wide range of areas and different levels. The meetings have improved collaboration and even yielded some great suggestions for improvement.

EVENTS

The annual Christmas party is the highlight of a whole series of events that bring employees together several times a year. There are also several after-work happy hours, a chestnut evening in the courtyard, a ski day for the whole family, and ladies' night, specifically for the women on the team. A monthly event is also scheduled where employees can meet and exchange ideas in an informal setting, helping deepen contact outside of work.

CAFETERIAS

Both TechnoAlpin sites in Bolzano have a cafeteria exclusively for TechnoAlpin employees and guests. They allow employees to have snacks and lunch for a reasonable price. Breakfast and dinner are also available for seasonal employees from abroad. Employees who are local residents may take home dinner with advance notice.

TechnoAlpin SKI COURSE

The TechnoAlpin Ski Course was organized for the first time in the winter of 2022. All employees and their families were invited to participate. In 2022, 64 people took up the offer. In 2023, over 150 participants registered for the second skiing course. Participants enjoy ski lessons, a day ticket, and equipment free of charge. This not only strengthens the team spirit among participants, but it also helps achieve another important goal: all TechnoAlpin employees should be snow enthusiasts.

10.5 ADVANCEMENT AND CAREER

TRAINEE PROGRAM

TechnoAlpin has long offered employees opportunities for advancement and development, regardless of their level of education or professional experience. Some of our current executives started their careers as interns at the company. An internal trainee program was developed so that the company and its employees can continue to take advantage of this potential. The process allows employees to pass through various departments and take on different areas of responsibility to identify and promote strengths and talents on an individual basis.

Regular feedback meetings between trainees and talent managers help determine suitable next steps that specifically address the needs of each trainee. There is no set time frame for this trainee program, and everyone goes through it at their own pace and based on their skills.

INTERNAL MOBILITY

Employees can apply for vacant positions within the company. This allows them to develop professionally or take on more responsibility without leaving the company. For TechnoAlpin, this ensures that expertise stays within the company. The Insights personality analysis can be taken by mutual agreement to check the suitability of an employee for a new position and better identify strengths and weaknesses. This helps reduce any uncertainties about a new challenge.

EXCHANGE PROGRAM

In September 2022, the first employees took part in the Exchange Program, which aims to further reinforce the One Team. One Company strategy. This program enables employees to work for at least one month or longer in a TechnoAlpin branch abroad. A company car or transfer and accommodations are provided free of charge. What's more, employees receive a lump-sum foreign allowance. The positive experiences reported by the employees and the company have prompted TechnoAlpin to push the program internally.

10.5.1 EDUCATION AND TRAINING

Every employee has access to individual training and development opportunities, which they discuss in their annual reviews with their supervisors. Employees can complete specific training courses relating to TechnoAlpin using the internal Learning Management System (LMS) operated by the TechnoAlpin Academy.
The following table shows the number of hours of continuing education completed by employees according to position and gender. It does not include training hours completed by seasonal employees, nor does it include on-site training for foremen or mandatory safety training. The FTE used in Chapter 10.2 Organization were taken into account when calculating the figures in this table.

Training by employee position in hours	05.2021-04.2022	05.2022-04.2023
Training executive managers	75.5	43
Training department managers	627.2	172.6
Training office staff	5,193.8	3,674.6
Training manual laborers	324	247.5
Training total	**6,220.5**	**4,137.7**
Training by gender in hours	05.2021-04.2022	05.2022-04.2023
Training women	577.2	268.2
Training men	5,643.3	3,869.5
Total number of training hours for employees	**6,220.5**	**4,137.7**

Training by employee position in hours	05.2021-04.2022	05.2022-04.2023
Average training hours per executive manager	9.4	4.8
Average training hours per department head	29.9	8.2
Average training hours per office staff member	19.3	12.7
Average training hours per manual laborer	6.1	3.1
Average training hours per employee	**17.7**	**10.4**
Training by gender in hours	05.2021-04.2022	05.2022-04.2023
Average training hours per female employee	14.4	5.4
Average training hours per male employee	18.1	11.1
Average training hours per employee	**17.7**	**10.4**

During the Covid pandemic, operations at TechnoAlpin were also reduced. In order to make as little use as possible of wage compensation and instead increase employee competence, TechnoAlpin used the "Fondo nuove competenze" program during this period, in which the salary for training hours was covered by the state. This is the reason for the higher number of training hours in the period 2021/2022.

10.5.2 FEEDBACK

All TechnoAlpin employees receive an annual appraisal of their performance and professional development, regardless of whether they have a part-time or full-time contract and are employed on a temporary or permanent basis. These annual reviews also discuss the effectiveness of any training measures implemented and possible future measures, adapted to any new tasks and responsibilities.
During the discussion, employees also have the opportunity to outline their expectations for their own professional development, including whether they would like to progress within the company or move to a different country. It is also used to define personal goals and measures for personnel development.

In the first year of employment, a total of four feedback meetings are held, during which employees receive direct feedback and have the opportunity to raise any doubts, problems, or suggestions.

10.6 OCCUPATIONAL SAFETY

10.6.1 MANAGEMENT SYSTEM

TechnoAlpin has a management system for occupational health and safety that complies with the legal requirements of Italian law (Legislative Decree 81/08) and has been extended since 2009 for voluntary certification to ISO 45001. All employees are integrated into the system. Subcontracted employees are carefully monitored for compliance with the requirements set out in the regulations, including appropriate behavior in the workplace.

The regulations and management system require that a risk profile be prepared for each employee based on the activities they perform, and that subsequent measures be implemented to eliminate or reduce risk. Mechanical, chemical, physical, electromagnetic, electrical, microclimate, and stress-related risks are taken into account. The risk assessment is updated according to the legal deadlines and whenever there is a change in job requirements. The employer, the head of the prevention and protection service, the company physician, and the employees themselves and their representatives take part in the risk assessment. These people have to participate in special training to ensure they are suitably qualified and provide high-quality work.

10.6.2 RISK ASSESSMENT AND INCIDENT INVESTIGATION

The system is continuously monitored by the head of the occupational health and safety service, who makes frequent visits to workplaces to check whether any changes in the production process could lead to an increased risk for employees. Elected safety spokespersons also help support the control process. The presence of supervisors is also hugely important, as they monitor how everyone is working and how safety measures are being applied.

The results of workplace inspections and assessments carried out by the company physician can be used to assess whether the measures aimed at protecting the health of workers need to be expanded or renewed. Each workplace has a health protocol that requires annual visits for the highest-risk areas. Visits for office jobs, on the other hand, vary from 2 to 5 years depending on age and other parameters.

All accidents are reported through a distribution list sent to all managers, occupational safety and health directors, safety spokespersons, employers, and supervisors in the highest risk areas. The incident is then analyzed by the head of the occupational safety and health service and the causes investigated. Based on this, the company then considers whether it needs to introduce new measures to eliminate or reduce risks and improve the system. If necessary, a meeting will be called with the safety spokesperson and the affected manager/supervisor to explain the new measures.

10.6.3 EMPLOYEE PARTICIPATION AND COMMUNICATION

All operating instructions, including health and safety measures, are translated into three languages and, in the case of production, also into Slovak. What's more, they are also available to all employees on the intranet. They can also be accessed via smartphone.
If employees would like to report something, they can contact the safety spokespersons who represent them before the employer. Employees are therefore protected from possible disciplinary action. To date, however, no cases have been reported that have resulted in disciplinary action for an employee. Employees can also report misconduct by superiors to the whistleblowing email address. Furthermore, TechnoAlpin complies with Italian Legislative Decree 231/2001, which ensures that the company's activities are also controlled and monitored from a safety point of view.

Company policy requires employees who are in a hazardous situation to stop work immediately. After the hazardous situation, employees are called together with the head of the occupational safety and health service, the general manager, and the supervisor to understand the causes and analyze the situation. If they deem it necessary, employees may also consult with one or more safety spokespersons.

10.6.4 TRAINING FOR HEALTH AND SAFETY AT WORK

Every employee must complete or brush up on continuing education courses as required by law during their working hours. Courses are conducted by qualified and accredited institutions and are either specific to an area or type of risk or qualification to be able to perform certain activities. The latter usually consist of a theoretical and practical part.

Employees are also informed and trained on how to use certain personal protective equipment (PPE), such as ear protection, and certain devices, such as gas detectors. Of course, high-quality safety clothing is also provided.

The quality of the training is evaluated through direct interviews with the HR department and the head of the occupational safety and health service.

10.6.5 OVERVIEW OF OCCUPATIONAL ACCIDENTS

The safety of employees is a top priority for TechnoAlpin. Italy has very strict occupational health and safety regulations, which TechnoAlpin implements worldwide. The majority of occupational accidents in the following tables are cuts and bruises.

Employees	2021/2022	2022/2023
Hours worked	526,762	603,194
Total number of reportable work-related injuries	14	14
of which commuting accidents (only if transportation was organized by the company)	1	1
of which serious work-related injuries (>6 months loss of working hours)	0	0
of which resulting in death	0	0
Percentage of reportable work-related injuries	26.58	23.21
Percentage of work-related injuries with severe consequences	0	0
Percentage resulting in death	0	0

10.7 SUMMARY: MEASURES IMPLEMENTED TO DATE

- Introduction of various welfare benefits to help employees better balance family and work life (remote working, flexible working hours, and childcare subsidy).
- Membership in Mutual Help health fund for reimbursement of expenses.
- Introduction of internal training and development measures to promote talent regardless of educational background.
- Introduction of various work safety measures.

10.8 SUSTAINABILITY GOALS FOR 2025

INCREASE FLEXIBILITY

TechnoAlpin aims to consider and slowly introduce new/alternative work models to give employees even greater flexibility.

INTRODUCE MORE BENEFITS

TechnoAlpin intends to add 3 additional benefits focusing on employee well-being and health.

MORE TRAINING FOR MANAGERS

The company aims to provide further training for managers to strengthen management quality.

INTERNAL EMPLOYEE SURVEY

An internal employee survey will help identify additional potential for improvement.

IMPROVE CAFETERIAS

In the future, both cafeterias will make greater use of regional foods to make what they offer more sustainable and healthier.

IMPROVE INTERNAL COMMUNICATION

TechnoAlpin intends to hold regular employee meetings to improve internal communication and help promote employee wellbeing.

SUPPORT PLATFORMS TO PROMOTE FEMALE EMPOWERMENT

TechnoAlpin is collaborating with a local platform to promote gender equality.

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(2) ZAMG. Schnee im Klimawandel. [Online] 02/04/2022. [Quote from: 07/06/2023] https://www.zamg.ac.at/cms/de/klima/news/schnee-im-klimawandel.

GRI CONTENT INDEX

Statement of use TechnoAlpin Spa has reported the information cited in this GRI content index for the period 1st May 2022 to 30 April 2023 with reference to the GRI Standards.

GRI 1 used GRI 1: Foundation 2021

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	2-3 Reporting period, frequency and contact point	pagg. 6 - 7
	2-4 Restatements of information	pagg. 6 - 7
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	2-7 Employees	pagg. 56 - 57
	2-8 Workers who are not employees	Pag. 52. TechnoAlpin subappalta ad aziende qualificate lavorazioni specifiche effettuate in cantiere. TechnoAlpin coordina i lavoratori di queste imprese interagendo con la persona di riferimento da esse incaricata, verificando l'idoneità al lavoro e la conformità contributiva.
	2-9 Governance structure and composition	pag. 58 - 68
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	2-22 Statement on sustainable development strategy	pag. 12-13, 63-65, 72-77
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GRI STANDARD	DISCLOSURE	LOCATION
GRI 3: Material Topics 2021	3-1 Process to determine material topics	Pagg. 70-77
	3-2 List of material topics	Pag. 77
	3-3 Management of material topics	Pagg. 78 - 158 www.technoalpin.com/en/sustainability/
GRI 302: Energy 2016	302-1 Energy consumption within the organization	Pagg. 97 - 123
GRI 303: Water and Effluents 2018	303-3 Water withdrawal	Pagg. 150-165
GRI 305: Emissions 2016	305-1 Direct (Scope 1) GHG emissions	Pagg. 97 - 123
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GRI 306: Waste 2020	306-3 Waste generated	Pagg. 132-149
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	306-5 Waste directed to disposal	Pagg. 132-149
GRI 401: Employment 2016	401-1 New employee hires and employee turnover	Pagg. 166 - 185
	401-2 Benefits provided to full-time employees that are not provided to temporary or part-time employees	Pagg. 166 - 185
GRI 403: Occupational Health and Safety 2018	403-1 Occupational health and safety management system	Pagg. 166 - 185
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	403-5 Worker training on occupational health and safety	Pagg. 166 - 185
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GRI 404: Training and Education 2016	404-1 Average hours of training per year per employee	Pagg. 166 - 185
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