

Interreg  
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# Smart Altitude

A LOW-CARBON, HIGH-IMPACT AND RESILIENT FUTURE  
FOR ALPINE WINTER TOURISM TERRITORIES

## IMPRESSUM

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# Smart Altitude

Alpine winter tourism territories demonstrating an integrated framework for a low-carbon, high-impact and resilient future.

## Abstract

This final report summarizes the outcomes of the Smart Altitude project. The Smart Altitude project ran from June 2018 to April 2021 and was carried out by ten partners from six different countries in the Alpine Space (Austria, France, Italy, Germany, Slovenia, and Switzerland). The project was co-financed by the European Union via Interreg Alpine Space. The aim of the project was to enable and accelerate the implementation of low-carbon policies in winter tourism regions by demonstrating the efficiency of a step-by-step decision support tool for energy transition in four Living Labs. The project targeted policymakers, ski resort operators, investors, tourism and entrepreneurship organizations. The Smart Altitude approach was designed to ensure suitability across the Alpine Space, thereby fostering its replication and uptake in other winter tourism regions and thus increasing the resilience of mountain areas.



# Introduction

Ski resort managers are faced with multiple challenges posed by global warming and its impacts on snow cover and water resources. One of the consequences is an increasing need for energy and water for the production and distribution (grooming) of artificial snow. This is in addition to the other energy needs of a ski resort, including the operation of ski lifts and heating of technical buildings and tourist accommodations. At the same time, there is an increasing demand from political, economic and environmental actors, and the general public for ski resorts to reduce their greenhouse gas emissions (GHG) and save energy. In this context, the improvement of energy efficiency and the integration of renewable energies by valorizing endogenous resources is a necessity.

Smart Altitude aims at enabling and accelerating the implementation of low-carbon policies in winter tourism regions. Today, there are various technical solutions for reducing energy consumption and GHG emissions in mountain areas depending on winter tourism and these should be exploited. However, key trade-offs are at the heart of their slow uptake: they require stronger and innovative involvement to overcome strategic (goals, priorities, risks), economic (costs, financing), and organizational (partnership, stakeholder involvement) challenges.

Smart Altitude demonstrates the efficiency of a decision support tool integrating all challenges into a step-by-step approach to energy transition. The project clearly innovates by deploying a comprehensive approach of low-carbon policy implementation based on impact maximization accounting for technical, economic and governance factors.

It is based on common performance indicators, monitoring systems (snow processes, municipal infrastructure, renewables, buildings, etc.) and Energy Management Systems (EMS) in mountain regions, in order to build a shared situational awareness and take impactful decisions. The approach is successfully implemented in four Living Labs and is now replicated in 20 other Alpine Space winter tourism regions.

On the following pages we present a brief overview of the main achievements and the lessons learned in the Smart Altitude project. It is addressed to all persons and institutions interested in actions to improve the energy footprint of mountain resorts, build a resilient future for winter tourism regions, and, more generally, to implement low-carbon policies across the Alpine Space.

To learn more about the project's achievements, please visit the results section of the project website at <https://www.alpine-space.eu/projects/smart-altitude/en/project-results> and the Smart Altitude Toolkit at <https://smartaltitude.eu/>

# Context



## MAP OF THE SMART ALTITUDE LIVING LABS AND REPLICATORS

(Credit: Smart Altitude/Interreg Alpine Space)

### LEGEND:

 Alpine space

 Living Labs resorts  
Smart Altitude

1. Les Orres (F)
2. Madonna di Campiglio (I)
3. Kravacec (SL)
4. Verbier (CH)

 Involved areas

#### France

1. Arâches (Carroz/Flaine)
2. Avoriaz (in process)
3. Chatel
4. Isola 200
5. Les Belleville (San Martin, Les Menuires, Val Thorens)
6. Oz-Vaujani
7. Risoul
8. Val Cenis
9. Val d'Isère
10. Villarembert
11. Montgenèvre

#### Italy

12. Aprica - Corteno
13. Bardonecchia Ski
14. Folgarida - Marilleva
15. Monte Bondone
16. Paganella
17. Pejo
18. Pinzolo
19. Ponte di Legno - Tonale
20. Sestriere SPA
21. Valle Bianca

## CLIMATE

Climate change already impacts winter tourism regions negatively and this trend is predicted to further increase. Indeed, in its Special Report on the Ocean and Cryosphere <sup>[1]</sup> (p. 6), the Intergovernmental Panel on Climate Change (IPCC) observes that “in nearly all high mountain areas, the depth, extent and duration of snow cover have declined over recent decades, especially at lower elevation”. Consequently, the report also observes that “tourism and recreation, including ski and glacier tourism, hiking, and mountaineering, have also been negatively impacted in many mountain regions” (p. 16). The report further predicts that “current snowmaking

technologies are projected to be less effective in reducing risks to ski tourism in a warmer climate in most parts of Europe” (p. 25). The decrease in natural snow reliability therefore implies a strong increase of needs for artificial snowmaking by the 2050s <sup>[2]</sup>. An increase of artificial snow production however also comes with higher energy, financial and ecological costs. It is therefore critical for winter tourism regions, especially for those at lower elevations to reduce their vulnerability to climate change by developing and implementing adaptation strategies along with measures for climate change mitigation that reduce their emissions of greenhouse gases.



## POLICIES AND LEGISLATION

With the adoption of the Sustainable Development Goals <sup>[3]</sup> and the Paris Agreement <sup>[4]</sup> in 2015, the United Nations have intensified their effort to tackle the threats of climate change by setting the goal to keep the global temperature rise well below 2 °C. They agreed to translate this goal into action by developing legal frameworks and incentives that foster climate change adaptation and mitigation.

Policies were and are being implemented at all levels: European, national, regional, local, and personal. Existing and planned policies should compel and support winter tourism areas to take measures regarding climate change adaptation and mitigation. The legislative context and incentives are therefore crucial parameters that need to be considered by winter tourism regions when developing adaptation/mitigation strategies.

## THE KEY INITIATIVES RELEVANT FOR WINTER TOURISM REGIONS IN THE ALPINE SPACE ARE:

1

**The EU Strategy for the Alpine Region (EUSALP)** <sup>[5]</sup>, a joint initiative of Alpine states and regions to strengthen cooperation and to address common challenges in a more effective way. One of its objectives is the establishment of a multi-level governance framework and transnational policies to enhance climate mitigation and adaptation among the Region's countries.

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2

**The EU Adaptation Strategy to climate change**, adopted by the European Commission on 24 February 2021<sup>[6]</sup>. This strategy focuses on delivering an effective and coordinated approach in order to render the EU Member States more resilient to climate change, at all levels of governance. This is expected to be achieved by supporting EU states, regions and cities in the adoption of adaptation strategies; by promoting adaptation actions in specific and more vulnerable fields such as agriculture and infrastructures; and by enhancing communication and information about climate adaptation in the decision-making context.

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3

**The European Green Deal**, the EU plan for climate mitigation, set an ambitious target for the European Union to become the first climate-neutral continent by 2050. The 2020 objectives have been achieved (-20% GHG emissions compared to 1990), while the 2030 objectives are being defined (at least -55% GHG emissions compared to 1990) <sup>[7, 8]</sup>. To pursue the aim of substantially reducing greenhouse gas emissions, investing in a sustainable and circular economy system, preserving the European environment and biodiversity, the main measures implemented are the European Green Deal action plan with the proposal of European Climate Law and European Climate Pact initiatives <sup>[9]</sup>.

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4

**The Covenant of Mayors (CoM)** is an important voluntary instrument for cities and local municipalities to commit to tackle climate change through mitigation and adaptation policies <sup>[10]</sup>. By signing the covenant, public administrations commit themselves to develop a Sustainable Energy and Climate Action Plan (SECAP), targeting 2030, where a baseline emissions inventory and a vulnerability and risks assessment related to the specific plan need to be included as a baseline to identify mitigation and adaptation actions in their region. Smart Altitude is also developing recommendations for the effective implementation of the Covenant in winter tourism municipalities.

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# Vision

**To paint a vision for a completely carbon-free Alpine region, let us start with a look at the European Strategy for the Alpine Region (EUSALP), as defined in the specific objectives of Working Group 9 (Energy Efficiency and Renewable Energies) <sup>[11]</sup>, which we summarize here:**

- Setting up two clusters: one for energy efficiency and one for renewable energies. The aim is to establish cooperation in the innovative development of technical solutions, processes and products for energy efficiency and renewable energies adapted to the Alpine Region, with a special focus on the housing and mobility sectors.
- Greening the Alpine infrastructure — with a special focus on assessment tools for public authorities and the building sector.
- Supporting the development, installation, and sharing of local energy monitoring and control systems for energy efficiency of installations.
- Better use of local sources to move towards self-sufficiency.

In its mission statement, EUSALP mentions that the action aims at supporting a significant reduction of energy consumption in the housing and mobility sector, as well as in small and medium enterprises. The Alpine Space shows a wide economic and social diversity among its constituent regions. However, many local economies of the mountainous areas are characterized by a relatively low level of industrialization and a particularly high dependence on winter tourism.

Smart Altitude contributes towards the vision and goals formulated by EUSALP by focusing specifically on winter tourism destinations and by developing specific solutions for ski resorts and their direct environment. It is important to recognize that a mountain resort is a place where two important industrial sectors converge: the sports and leisure industry and the construction and equipment industry. We note that political decision makers often

take little account of or misunderstand the specific needs and constraints of mountain resort operators. Smart Altitude aims to fill this gap by proposing an operational approach to the deployment of low-carbon and energy optimization policies in ski resorts recognizing their economic relevance on a territorial scale as well as the potential driving effect they can have on their immediate environment.

To realize this vision, we make the Smart Altitude approach, tools, and models available to all ski regions in the Alpine Space. The replication of Smart Altitude started in the last months of the project and will continue by supporting ski areas after the project ends. The project tools and approaches can support ski resorts to assess their current status in relation to energy consumption and production, identify their gaps and opportunities, implement the right low-carbon solutions, and engage key stakeholders and policy makers towards a zero-carbon future.

# Options to act: explaining the Smart Altitude Toolkit and process

**The Online Toolkit developed by Smart Altitude is designed to provide a single low-carbon decision support system to two categories of ski resort stakeholders:**

- **Ski resort operators:** supporting the definition of the low-carbon decision-making criteria and related tools, with the suggested steps for decarbonising a ski resort, including results monitoring and results communication.
- **Ski resort policy makers:** policy recommendations and roadmaps on how to promote a low-carbon ski resort and how to make good practices visible.

The Toolkit is a set of six tools to support the planning, optimization, and implementation of low-carbon measures in mountain ski areas.

The tools are related to the six-steps approach of Smart Altitude outlining key questions and decision-making factors that ski resort operators and local policy makers should consider when designing low-carbon measures in Alpine ski areas. Each tool has been developed in the Smart Altitude project and tested in the project's Living Lab and replicator sites.

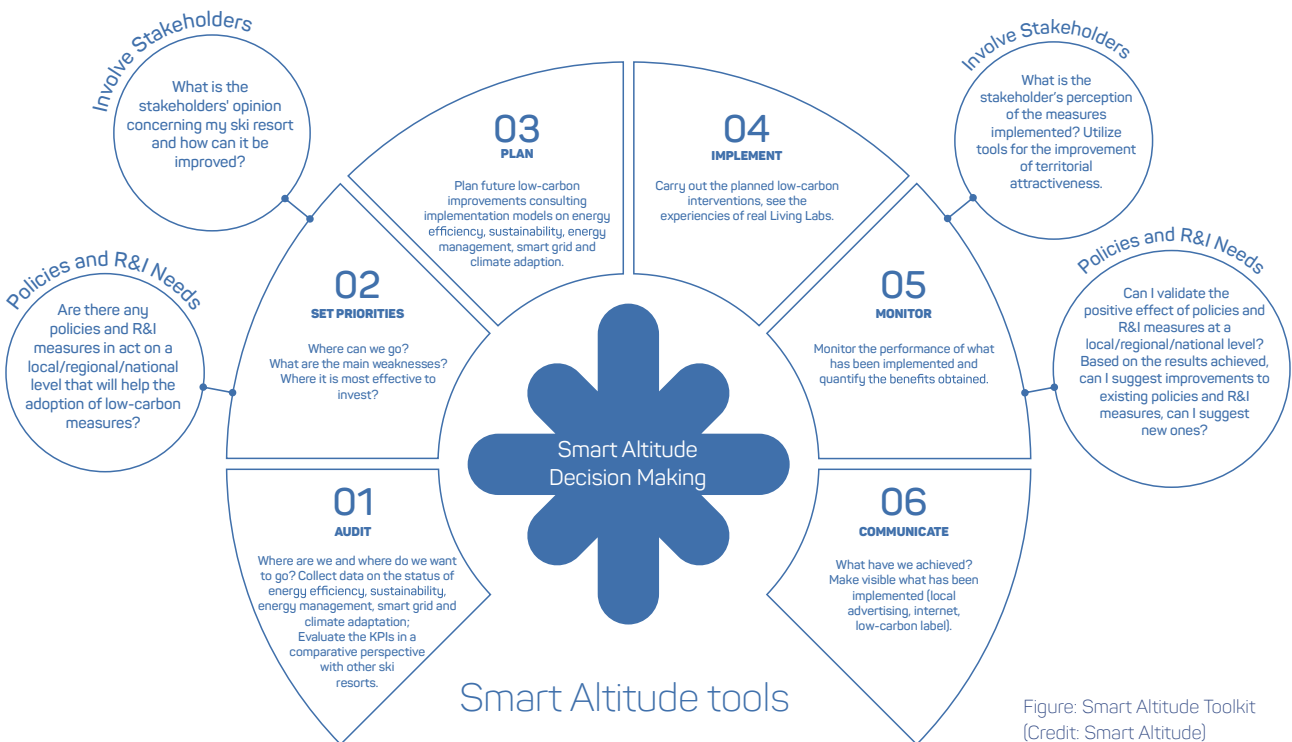


Figure: Smart Altitude Toolkit (Credit: Smart Altitude)

## THE SIX-STEPS APPROACH OF SMART ALTITUDE TOOLKIT

| IMPLEMENTATION STEP       | TOOL   | GOAL  |
|---------------------------|--|---|
| 01. <b>AUDIT</b>          | Wi-EMT   | The Wi-EMT is an audit tool for the ski resort operators to evaluate the ecological, energetic, and management status, identifying the priorities of intervention in a comparative perspective with other ski resorts. It relies on a self-audit questionnaire and is part of the replication process.  |
| 02. <b>SET PRIORITIES</b> | WebGIS   | Web-based geographical information system on energy infrastructure, uses, and potential. The WebGIS integrates data from the Smart Altitude Living Labs and replicators. It includes a set of KPIs to be implemented in the monitoring system and used by the WebGIS to optimize low-carbon policies in mountain resorts and regions.   |
| 03. <b>PLAN</b>           | Implementation models  | The Implementation Models are guidelines and best practices to design and implement measures on energy efficiency, sustainability (renewable energy and sustainable mobility), energy management, smart grid, climate adaptation, and value creation through low-carbon innovation.   |
| 04. <b>IMPLEMENT</b>      | Living Lab examples  | The four Smart Altitude Living Labs tested specific actions on the ground, at different levels of maturity and experience in energy management and smart solutions. Their experience and lessons learnt can be used by other ski resorts to follow the same or similar paths. More specifically: Kravec on energy consumption reduction; Madonna di Campiglio on deploying an integrated energy management system (IEMS); Verbier on deploying an energy management system throughout the whole ski domain; Les Orres on the transition from an IEMS to smart grid. |
| 05. <b>MONITOR</b>        | Monitoring systems for live performance assessment and decision-making | Describing the specifications of monitoring systems allowing to supervise energy data from multiple sources (ski operations, snow making, tourism housing, public buildings, and infrastructure)  |
| 06. <b>COMMUNICATE</b>    | Smart Altitude Websites, Social Media and WIKIAlps.                    | Websites and social media of the project, plus a wiki-style platform WIKIAlps, with more information on the WebGIS and the project, including extensive user guidance and help pages  |



# Providing leadership: the experience of Smart Altitude Living Labs

## LIVING LAB LES ORRES – Smart Mountain Grid

In Les Orres, we implemented a comprehensive diagnosis of energy consumption in ski operations and an integrated energy management system (IEMS) in 2012–2014, as part of the ALPSTAR Alpine Space Project. In 2014, measurements showed us that the system had resulted in a 20% reduction in energy consumption, a 100 teq CO<sub>2</sub> reduction in GHG emissions, and a 25% reduction in energy costs. Since then, Les Orres has continued to develop and improve its IEMS. During the Smart Altitude project, Les Orres ski resort extended the scope of its Integrated Energy Management System by including new electrical uses and new energy production sources working towards a Smart Mountain Grid.



UCPA Center, newly equipped with an Intelligent Building Solution (Credit: © UCPA)



Data analysis with WebGIS [Credit: © comunicazione design.net]

**This Smart Mountain Grid has been set up along several axes:**

- **Renewable Energy:** integrating the production of renewable energy into the system;
- **Energy consumption:** monitoring and controlling the energy consumption in tourist accommodation;
- **Supervision system:** setting up supervision systems for public buildings and infrastructures (public lighting, emergency and health centers, etc.).

The extension of the IEMS to tourist accommodation and in particular to the UCPA center is an innovative solution which

allows the heating systems, the production of domestic hot water, and the ventilation of the center to be modulated in real time. The system is coupled with the site's reservation and occupancy platform.

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**Ultimately, the aim of the Smart Mountain Grid will be to move towards a self-sufficient mountain area with monitoring and control of energy consumption and production.**

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## LIVING LAB VERBIER – Towards the European Energy Award GOLD

In the Living Lab of Verbier, we carried out a complete energy and climate assessment, supported by the research center CREM. Téléverbier, the operation of the Verbier ski resort, has developed an ambitious roadmap to achieve efficient energy management at the local level. Together, we have defined important steps towards a low-carbon economy by increasing energy efficiency and renewable energy. We drafted a detailed action plan to achieve these ambitious goals and includes the following aspects:

- **Ski lifts:** speed variator, speed function of passage, low consumption energy motor.
- **Snow making:** low energy consumption snow cannon, pumping station transformation.
- **Snow grooming:** radar, motor optimization, replacement by hybrid technology.
- **Building:** replacement of fossil fuel heating by renewable energy, insulation and window replacement, room temperature regulation, heat release from ski lift engines valorization.

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**The implementation of these actions is already under way. For example, the oil heating system of the most polluting building in the ski area is being replaced by a pellet heating system, thereby reducing its GHG emissions by more than 90%.**

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Téléverbier is also in process of certification for the ISO 50'001 Energy Management, which will systematise the procedure and ensure the successful integration of its approach. Over time, Téléverbier energy strategy will be aligned with the one from the municipality of Val de Bagnes with a view to obtain the European Energy Award GOLD. CREM is supporting this action by facilitating the proper integration of the major stakeholders in the area.



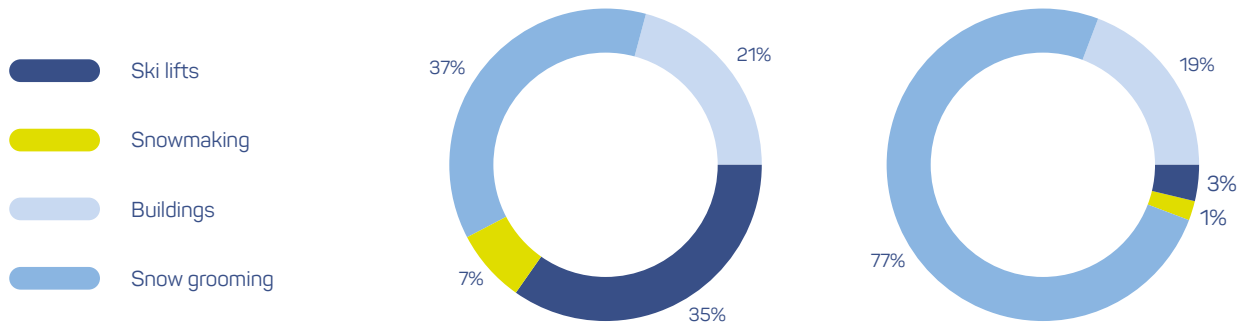




Verbier cable car station (© dmitry\_islentev.livejournal.com)

### ENERGY CONSUMPTION AND GREENHOUSE GAS EMISSIONS DISTRIBUTION FOR VERBIER SKI AREA

(Credit: © CREM)



## LIVING LAB KRVAVEC – Energy Savings

Ski resort operator RTC Krvavec strongly supports the transition towards a sustainable, low-carbon economy. The main goal for the Living Lab within the Smart Altitude project was to reduce the use of energy in the resort's systems. In the last years we have taken important steps towards upgrading and renewing our systems to increase energy efficiency. We started the process by providing data on GHG emissions reduction, equipment, performance and investment efficiency. Then, we set a goal to work on a multi-energy consumption reduction approach for snowmaking processes, ski lifts and heating.

Krvavec ski resort has a complex system regarding snowmaking processes. Its geographic position and climate, with rapid changes in temperatures, wind directions and weather conditions, made it necessary to optimize snowmaking, which produced excellent results. By optimizing the heating systems, we have reduced the heating oil/gas consumption by 20% and enabled higher comfort for the guests and easier management of the heating system leading to more satisfied guests and reduction of our staff working hours. We have learned that modernizing equipment is of extreme importance. New technologies are available and investing in them definitely pays off.

The Smart Altitude project and its tools have proven to be of great help for ski resort Krvavec and we will continue to use and promote them in efforts to increase our energy efficiency. We believe it is very important that companies all over the world connect through such initiatives, so that we can share our experiences and increase the awareness of doing business in an environmentally friendly way. This project is for us just a beginning.

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**“We are actively looking for new solutions and will continue to take coherent and important steps in the direction of a sustainable, low-carbon, energy efficient management of our ski resort.”**

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Krvavec ski resort (Credit: © RTC Krvavec)

## ACHIEVED GOALS – LIVING LAB KRVAVEC

(Credit: © RTC Krvavec)



30% less water needed to cover the slopes with technical snow



30% electrical power reduction



Optimal snow depth on the slopes  
less snow groomer hours



40% less working hours,  
safe management

## LIVING LAB MADONNA DI CAMPIGLIO – Integrated Energy Management System

In the Italian Living Lab in Madonna di Campiglio, we tested an Integrated Energy Management System (IEMS) to improve energy efficiency, optimize the use of water, integrate renewable energy sources and reduce CO2 emissions in the ski area. Our mission is to achieve zero CO2 emissions by 2026, the year of the XXV Winter Olympic Games hosted in Italy. With the IEMS, we monitor the plants' operations and its consumption of energy and water to support sustainable decisions. The IEMS integrates data from both existing and new Smart Altitude monitoring systems. The new systems monitor Lake Montagnoli (the main reservoir for snowmaking), four ski lifts, two snow groomers warehouses and photovoltaic potential at the top station of a new ski lift.

The IEMS organizes data into folders, allows a graphic view, processes specific KPIs and produces monthly and seasonal reports.

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**The main objective is to facilitate data management, through a single platform, and to support ski managers in taking sustainable decisions.**

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Active since November 2019, it monitors and integrates data coming from ten different sources:

- **Weather:** snowfall and air temperature in some locations of the ski area;
- **PV potential:** at the top station of a new ski lift;
- **Snow thickness:** on all the slopes of the ski area;
- **Skier data:** data on the skier days;
- **Ski lifts:** data on electricity consumption and number of entrances;
- **Snow production:** data on the water, compressed air and electricity consumption;
- **Snow grooming:** operational data (km, hours) and diesel consumption;
- **Operational buildings:** electricity consumption for heating two snow groomer warehouses;
- **Electric grid:** data on electricity consumption from the medium voltage grid;
- **Lake Montagnoli:** data on water temperatures at different depths, water surface level and weather conditions.





Lake Montagnoli (Credit: © Funivie Madonna di Campiglio)



**SMART ALTITUDE**  
OUR MISSION ZERO EMISSION

In Smart Altitude a special research focus has been dedicated to Lake Montagnoli, the main artificial reservoir supporting the snow production. It is located at an altitude of 1775 m above sea level, has a maximum depth of 11.7 m and a capacity of approximately 200,000 m<sup>3</sup>. The capacity of the lake allows the whole ski area to be covered with snow in 80–100 hours. In the new Smart Altitude monitoring system of Lake Montagnoli, we analyzed the thermal behaviour of the lake to improve the use of water in the snow making process. It is a set of hi-tech sensors connected to two floating buoys, in the north and in the south of the lake, that gathers data on water temperature at different depths, water surface and meteorological conditions, providing data to study the possibility to optimize the artificial snow production process through energy and water savings and heat recovery.

# Smart Altitude Replication Pathway

Smart Altitude already started the replication process with the aim to engage 20 replication sites before the project end. The objective is to create a core community of actors who, though at different stages of the energy transition, are engaged in the same process. This is fully in line with the already mentioned objectives of EUSALP Working Group 9. We developed an uncomplicated replication process in order to engage as many potential replicators as possible, taking into account the diversity in their backgrounds and levels of technical and financial competence. Below the key steps for the engagement of replicators are summarized:

## **INFORMATION, COMMUNICATION AND SCOUTING**

Five online webinars were held explaining the objectives and work plans of the Smart Altitude project. The webinars were directed to two categories of stakeholders: decision makers and project observers on the one hand, potential replicators on the other hand.

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## **ENROLMENT**

Potential replicators were approached by email and in person, inviting them to a specific workshop organised to explain the opportunities and advantage of becoming a replicator. Ski resorts interested in engaging as project replicators were asked to sign a Memorandum of Understanding (MoU). Each replicator was then given the option to engage in the full energy audit or to review the project deliverables and outcomes and gain support for replicating the implementation models in their areas.

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## **IMPLEMENTATION**

Online meetings were organized by the project partners in order to support replicators with the energy audit process. In addition, an interactive exchange platform has been set up through which a dedicated Smart Altitude expert provides technical-economic advice to replicators in need of support and moderates threads of discussion for exchanges between peers.

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## **EXPANSION**

Creating an enabling environment ensuring sustainability of results and further replication after the project: Smart Altitude partners have created conditions that support the continuation of the efforts for sustainable and attractive winter tourism regions also after the project. This includes the development of policy recommendations and the establishment of a network of winter tourism regions and stakeholders supporting this transition. Also, the establishment of an interactive platform for project replicators goes towards the objective of generating a long-term community of resorts and mountain regions exchanging information on the practical implementation of low-carbon solutions and energy optimization. Contacts are also made with EUSALP in order to continue the actions beyond the closure of the Smart Altitude project and disseminate the replication process throughout the Alpine Space.

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## SMART ALTITUDE REPLICATION ROADMAP

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### DURING THE PROJECT

#### 4 LIVING LABS

- **Les Orres:** testing an integrated smart model
- **Verbier:** optimising energy consumption of buildings
- **Krvavec:** more efficient snow making and water management systems
- **Madonna di Campiglio:** testing an integrated energy management system

#### 20 REPLICATORS

**Ski resorts** participating to project webinars and workshops

- providing recommendations for policy improvements
- engaging in replication of Smart Altitude tools and approaches (Wi-EMT, implementation models,...)

#### WINTER TOURISM REGIONS, A NETWORK OF STAKEHOLDERS ACROSS THE ALPINE SPACE

- engaging in events
- supporting dissemination and exchange of best practices
- facilitating spread of policy recommendations

### AFTER THE PROJECT

#### SMART ALTITUDE, TOGETHER WITH OTHER EU PROJECTS, SET THE CONDITIONS FOR THE CONTINUATION OF THE JOURNEY TOWARDS SUSTAINABLE WINTER TOURISM AREAS IN THE ALPS, BY LEAVING:

- a transitional network of stakeholders
- websites and disseminations of results
- policy recommendations at all levels
- a platform to engage and support replicators

# Final conclusions and recommendations

Support of the Smart Altitude Project to strategic EUSALP Objectives: The Smart Altitude project provides a comprehensive procedural step-by-step approach to policy makers as well as to ski resorts operators interested in the transition towards a low-carbon approach for their location. The main policy framework which could help fast-track the adoption of the Smart Altitude approach within the Alpine

region is the EUSALP strategy and specifically the work carried out within the Action Group 1—Research & Innovation, Action Group 2—Economic Development, and Action Group 9—Energy Efficiency. The Smart Altitude project contributes to various EUSALP objectives, but in order to achieve the EUSALP objectives more comprehensively, the project makes several recommendations.

## EUSALP OBJECTIVES AND IMPLEMENTATION NEEDS



### ENERGY EFFICIENCY AND RENEWABLE ENERGIES CLUSTERS

**Living Labs and replication process for energy efficiency operations and tourism housing, renewable energy development**

Applying the Smart Altitude approach to sustainable mobility at 3 levels: intrastation, station/valley, and station/conurbation  
Cooperation in technical solutions, processes, and products for energy efficiency with a special focus on the housing and mobility sectors.



### GREENING THE ALPINE INFRASTRUCTURE

**Recommendations to regional, national and EUSALP authorities and decision makers**

Facilitating cooperation between professional organizations for alpine sports and tourism and energy innovation clusters with their R&I organizations.



### SUPPORTING LOCAL ENERGY MANAGEMENT SYSTEMS

**Living Labs (Madonna di Campiglio, Verbier, Les Orres, Krvavec), Replicator toolkit and support platform**

Expanding the deployment of energy consumption supervision systems to the municipality or valley area



### BETTER USE OF LOCAL RENEWABLE ENERGY RESOURCES

**Living Labs (Madonna di Campiglio, Verbier, Les Orres), WebGIS**

Facilitating cooperation between energy innovation clusters with their R&I organizations and alpine areas.



### SUPPORTING MOUNTAIN RESORTS IN THEIR IMPLEMENTATION OF ENERGY EFFICIENCY AND SELF-SUFFICIENCY SOLUTIONS

**All components of Smart Altitude project**

Further development of the toolbox and support platform for replicators beyond the Smart Altitude project.



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Moreover, the Smart Altitude project has formulated recommendations for the replication of the Smart Altitude approach targeting key stakeholders.

## RECOMMENDATIONS FOR REPLICATION

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### POLICY MAKERS AT THE LOCAL, REGIONAL, AND NATIONAL LEVEL

- Fast-track the adoption of energy efficiency and renewable self-sufficiency solutions in mountain resorts by overcoming specific policy barriers and by supporting the transition through technical personnel.
- Establish regional and trans-regional working groups involving ski resorts.
- Promote the establishment of local working groups in order to involve different stakeholders in the development of a long-term transition vision for the Alpine Region.
- Promote the adoption of long-term climate adaptation plans through the Covenant of Mayors.
- Promote the collaboration between business organizations, research centers and public authorities through specific measures and the identification of tourism as a regional S3 priority.

### SKI RESORT OPERATORS

- Implement the Smart Altitude Toolkit in the ski resort operations: this will allow the first energy audit to be carried out and to set both short-term as well as long-term adaptation goals.
- Invest in qualified personnel able to assess the long-term goals and to prepare a place-based adaptation plan.
- Involve different stakeholders in the definition of the future roadmap.

### LOCAL STAKEHOLDERS

- Promote the establishment of a local/regional working table on winter tourism.
- Promote and facilitate the adoption of low-carbon measures in your region.

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# Further reading

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# Smart Altitude

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FOR ALPINE WINTER TOURISM TERRITORIES