

## WP T3 Smart Altitude Toolkit

### A.T3.1 Decision-making criteria

#### D.T3.1.2 Smart Altitude Toolkit online interface

<b>Project acronym:</b>	<b>Smart Altitude</b>
<b>Project name:</b>	Alpine winter tourism territories demonstrating an integrated framework for a low-carbon, high-impact and resilient future
<b>Programme priority:</b>	Priority 2 - Low Carbon Alpine Space
<b>Programme specific objective:</b>	SO2.1 - Establish transnationally integrated low carbon policy instruments

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0.1	Draft	07/08/2020	FBK
0.2	Final	19/08/2020	FBK
<b>Notes:</b>			

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## Table of Contents

<b>1. Introduction .....</b>	<b>3</b>
<b>2. The Home Page .....</b>	<b>4</b>
<b>3. Login .....</b>	<b>6</b>
<b>4. About.....</b>	<b>7</b>
<b>5. Tools .....</b>	<b>13</b>
<b>6. Replicators.....</b>	<b>27</b>
<b>7. Contact .....</b>	<b>28</b>
<b>8. Viewing statistics .....</b>	<b>29</b>

## 1. Introduction

This deliverable describes the new Smart Altitude Online Toolkit, available at: <https://smartaltitude.eu>.

This new web portal is designed to provide a low carbon decision support system to two categories of ski resort stakeholders:

- ski resort operators: 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 (based on what defined in the Deliverable D.T3.1.1);
- 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 recommendations and roadmaps developed in WP T4 will be reported here.

At the drafting date of this deliverable (07/08/2020), contributions for ski resort operators have been completed, while contributions for ski resort policy makers (currently not available from WP T4) will be included in the coming months.

The new Smart Altitude Online Toolkit has been widely promoted through the News section on the Smart Altitude website (<https://www.alpine-space.eu/projects/smart-altitude/en/news-events/news/news-overview>), the Smart Altitude Newsletter of the first half of 2020, the project brochure, the project flyer for replicators and the Smart Altitude Webinar Series.

## 2. The Home Page

In the Home Page, from top to bottom, the following elements have been inserted:

- See Figure 1:
  - Logo of the Smart Altitude project
  - Logo of FBK as creator of the Smart Altitude Online Toolkit
  - “About Smart Altitude Project” link to the official website of the Smart Altitude project: <https://www.alpine-space.eu/projects/smart-altitude/en/home>
  - “Login” button to register and access the personal area of the website
  - Menu Bar with the link to the main sections of the website: ABOUT, TOOLS, REPLICATORS, CONTACT
  - Graphic contextualization of the project (mountains, skier, snowflake with CLIMATE / ENERGY / WATER)
  - Smart Altitude Online Toolkit motto with invitation to use it "FOR A RESILIENT FUTURE IN THE ALPS: Discover the Smart Altitude tools and design new strategies for adapting ski areas to climate change"
  - Link to the video of the Smart Altitude project

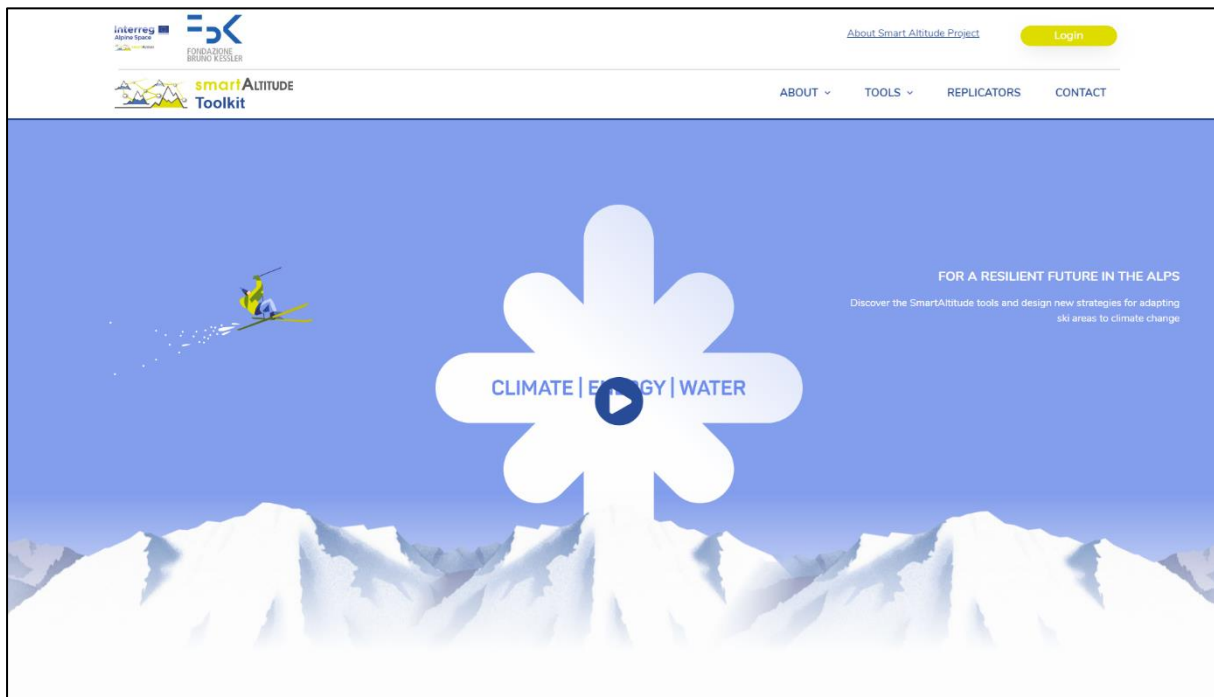


Figure 1: Smart Altitude Online Toolkit – Home Page – 1

- See Figure 2:
  - Brief explanation of what the Smart Altitude Toolkit is
  - Graphical representation of the six steps that make up the decision-making criteria: AUDIT, SET PRIORITIES, PLAN, IMPLEMENT, MONITOR, COMMUNICATE



Figure 2: Smart Altitude Online Toolkit – Home Page – 2

- See Figure 3:
  - Brief explanation of what the Smart Altitude project is
  - “Download Brochure” button

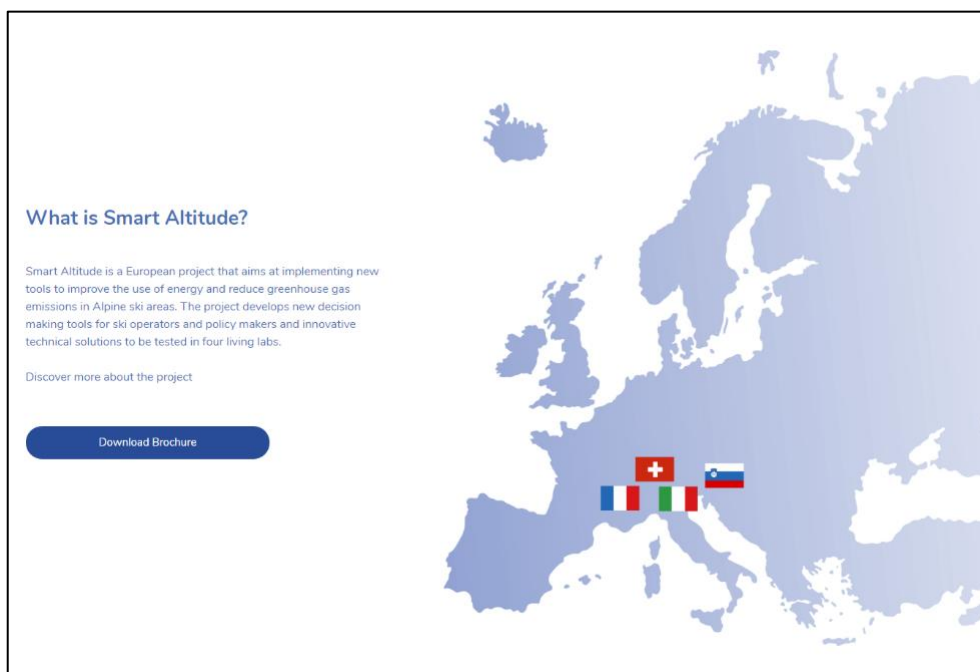


Figure 3: Smart Altitude Online Toolkit – Home Page – 3

- See Figure 4:
  - Invitation to join the Smart Altitude Community to share experience, ask information or become a replicator
  - Link to the email address [infosmart-altitude@fbk.eu](mailto:infosmart-altitude@fbk.eu) to ask for information
  - Logos of the partners of the Smart Altitude project
  - Smart Altitude project logo and European flag with indication of co-financing



Figure 4: Smart Altitude Online Toolkit – Home Page – 4

### 3. Login

In the Login section, from top to bottom, the following elements have been inserted:

- See Figure 5:
  - Information request for registration (email, password, confirm password, organization)

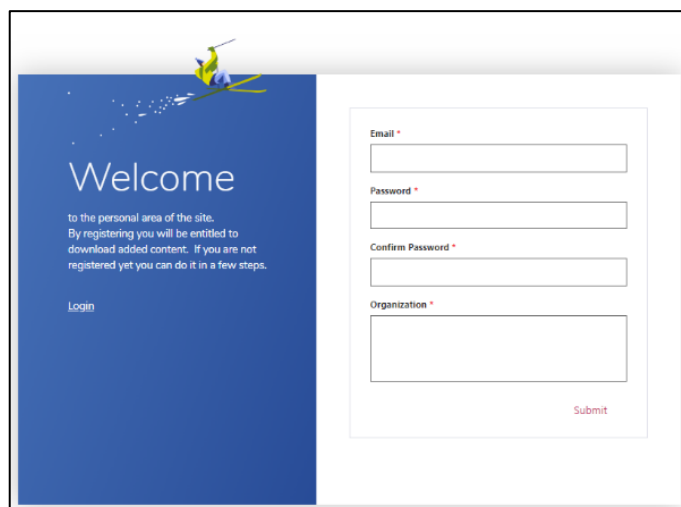


Figure 5: Smart Altitude Online Toolkit – Login – 1

- See Figure 6:
  - Information request for login (username or email address, password)

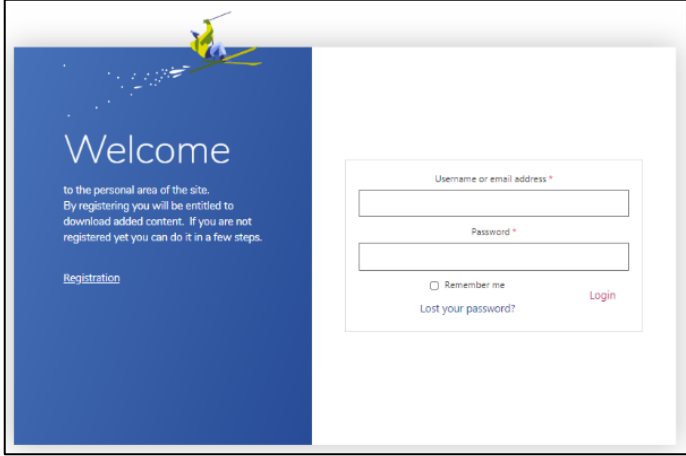


Figure 6: Smart Altitude Online Toolkit – Login – 2

## 4. About

In the About section, from top to bottom, the following elements have been inserted:

- See Figure 7:
  - Answer to three key questions:
    - Why Smart Altitude? (Winter tourism is a key driver for the Alpine economy)
    - Why climate change? (Climate change affects significantly winter tourism)
    - What solutions to adopt? (Alpine territories can adopt adaptation and mitigation strategies)



Figure 7: Smart Altitude Online Toolkit – About

In the About/Adaptation section, from top to bottom, the following elements have been inserted:

- See Figure 8:
  - Description of what adaptation strategies are and their purposes



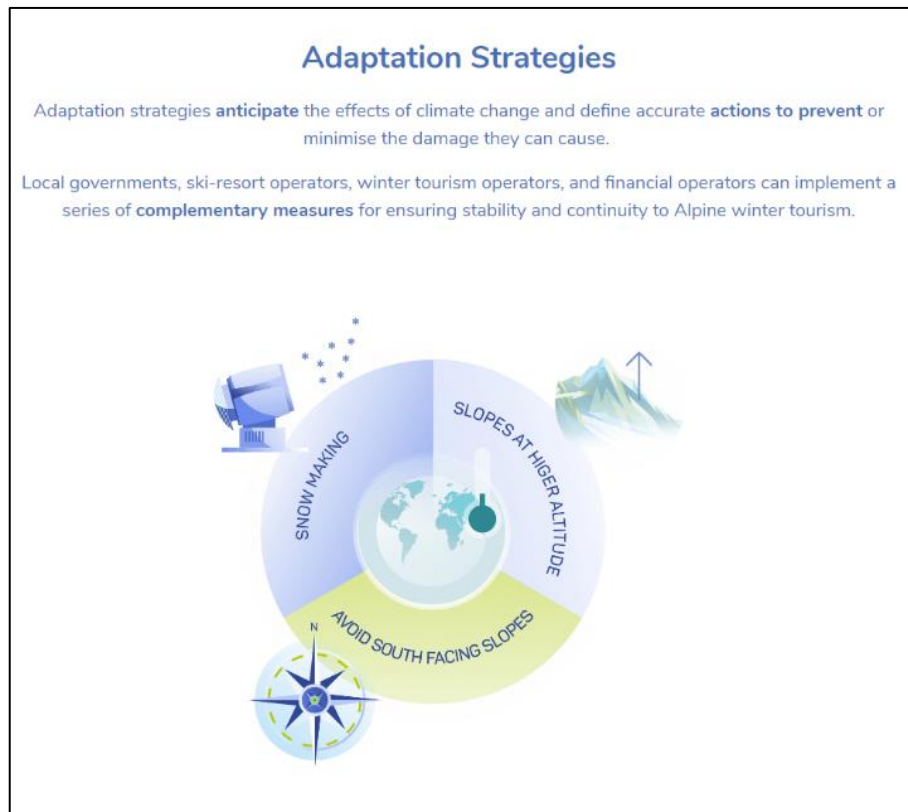


Figure 8: Smart Altitude Online Toolkit – About – Adaptation – 1

- See Figure 9:
  - Detailed description of the different types of adaptation measures associated with the different stakeholders

## What are complementary adaptation measures?

Different stakeholders can adopt related adaptation measures

<b>Ski Operators</b>	<p>Ski resorts can adopt measures of two main kinds:</p> <p><b>Technological measures:</b></p> <ol style="list-style-type: none"> <li>1) Optimize snowmaking process;</li> <li>2) Shifting slopes to higher altitudes;</li> <li>3) Avoid south facing slopes;</li> <li>4) Increase snow shading (through tree cover along slope margins);</li> <li>5) Improve weather forecasting to support programming of the ski season</li> </ol> <p><b>Business-model measures:</b></p> <ol style="list-style-type: none"> <li>1) Build ski conglomerates between low and high-altitude resorts;</li> <li>2) Revenue diversification targeting new segments as natural, cultural, experiential, wellness, enogastronomic tourism;</li> <li>3) Marketing by providing incentives or guarantees to overcome skiers' reluctance to book a ski holiday because of uncertain snow conditions.</li> </ol>
<b>Local governments</b>	<p>Local governments can:</p> <ol style="list-style-type: none"> <li>1) define <b>long-term</b> regional and local adaptation <b>plans</b>;</li> <li>2) influence the level of <b>public awareness</b> of climate change effects;</li> <li>3) provide financial support through <b>tax breaks or subsidies</b> on adaptation investments;</li> <li>4) provide <b>capacity building</b> as technical support or dedicated training;</li> <li>5) invest in <b>experiential tourism</b>.</li> </ol>
<b>Financial operators</b>	<p>Financial operators can:</p> <ol style="list-style-type: none"> <li>1) provide <b>weather insurances</b> to cover the negative effects of adverse winter seasons;</li> <li>2) offer <b>climate adaptation investment products</b></li> </ol>

Figure 9: Smart Altitude Online Toolkit – About – Adaptation – 2

In the About/Mitigation section, from top to bottom, the following elements have been inserted:

- See Figure 10:
  - Description of what mitigation strategies are and their purposes

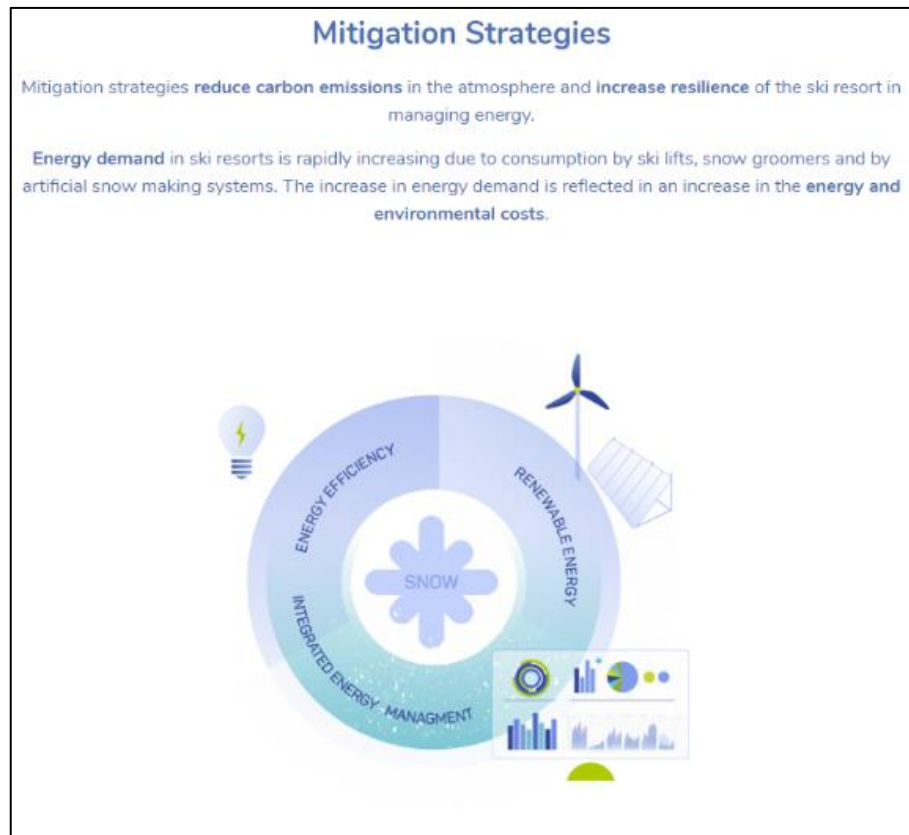


Figure 10: Smart Altitude Online Toolkit – About – Mitigation – 1

- See Figure 11:
  - Detailed description of the different types of mitigation measures associated with the different levels

What are mitigation measures?	
Ski resort-operators can adopt different mitigations measures at different levels	
Overall ski resort	Monitoring and Integrated Energy Management System (IEMS)
Ski Lifting	Monitor and implement an EMS
	Assess ski lifts energy efficiency
	Implement renewable energy sources (e.g. PV)
	Implement speed control measures (e.g. based on the number of entrances)
	Replace old ski lift systems with modern technology
Snow Making	Optimal water management (flow rates, height differences, main and secondary reservoirs, water concessions)
	Through the analysis of the pumps for the distribution of water and their working points, interesting ideas can be found for the reduction of unnecessary oversize, operation outside the optimum range, replacement of inefficient pumps
	Replace old snow-making systems with modern technology
	Implement an automated snow making system
	Plan which kind of snow making system is the most effective for the ski resort (Fan gun, Hybrid/tower, Hybrid/high-pressure)
	Implement renewable energy sources
Snow Grooming	Verification of the systems available for the management of the snow groomers' park and for the management of the snow groomers' routes. The advantages are several: <ul style="list-style-type: none"> <li>• reduction of maintenance costs;</li> <li>• reduction of fuel consumption through the optimization of routes;</li> <li>• control of the work on the slopes (thickness of the snow);</li> <li>• online monitoring of the machines (e.g. position, speed, with advantages for safety and consumption)</li> </ul>
	Replace old grooming machines with newer ones
	Implement hybrid/electric snow groomers
Buildings	Assess the energy consumption of the ski resorts building and improve the heating system and ventilation
	Replace indoor and outdoor lighting with energy-efficient lightbulbs and an automated lighting control
	Improve the energy efficiency of building envelopes
	Implement heat recovery
	Implement renewable energy sources for heating and electricity

Figure 11: Smart Altitude Online Toolkit – About – Mitigation – 2

## 5. Tools

In the Tools section, from top to bottom, the following elements have been inserted:

- See Figure 12:
  - Description of how the tools are part of the six steps decision-making criteria, what they focus on and for whom they are designed



Figure 12: Smart Altitude Online Toolkit – Tools

In the Tools/Audit section, from top to bottom, the following elements have been inserted:

- See Figure 13:
  - Description of the step 1 “Audit” and of the tool 1 “Wi-EMT”
  - Button to register and download the tool 1 “Wi-EMT”



Figure 13: Smart Altitude Online Toolkit – Tools – Audit

In the Tools/Set Priorities section, from top to bottom, the following elements have been inserted:

- See Figure 14:
  - Description of the step 2 “Set Priorities” and of the tool 2 “WebGIS”
  - Button to go to the WebGIS

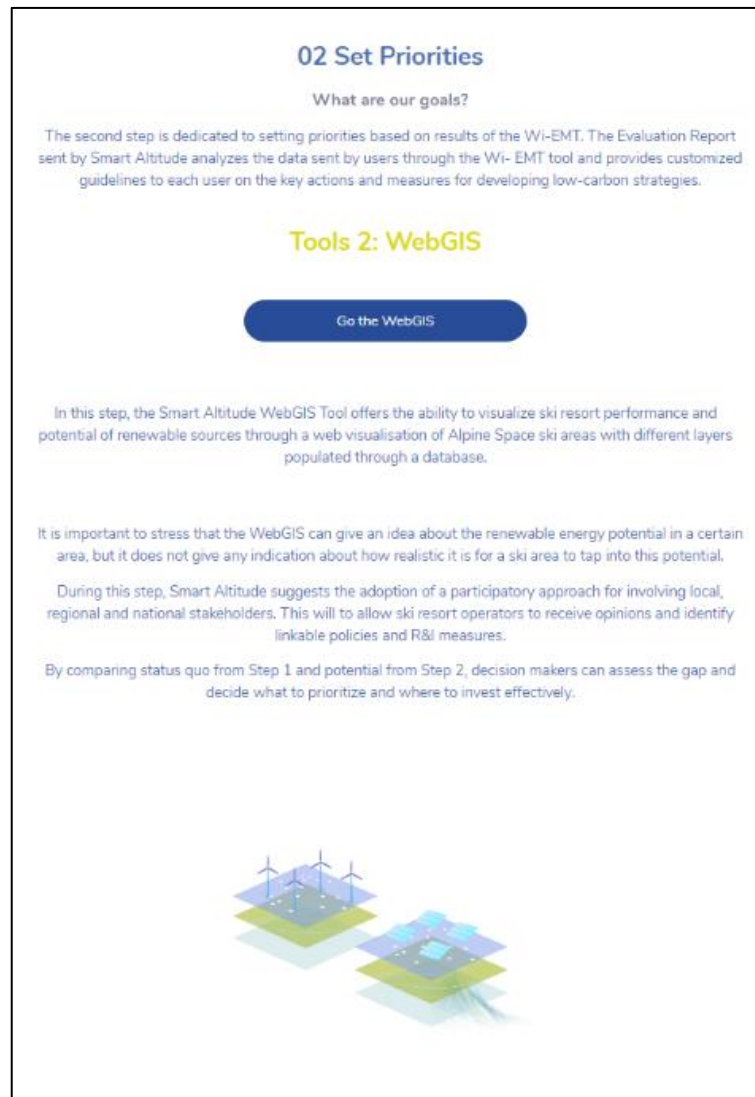


Figure 14: Smart Altitude Online Toolkit – Tools – Set Priorities

In the Tools/Plan section, from top to bottom, the following elements have been inserted:

- See Figure 15:
  - Description of the step 3 “Plan” and of the tool 3 “Implementation Models”
  - Buttons to register and download the 5 Implementation Models

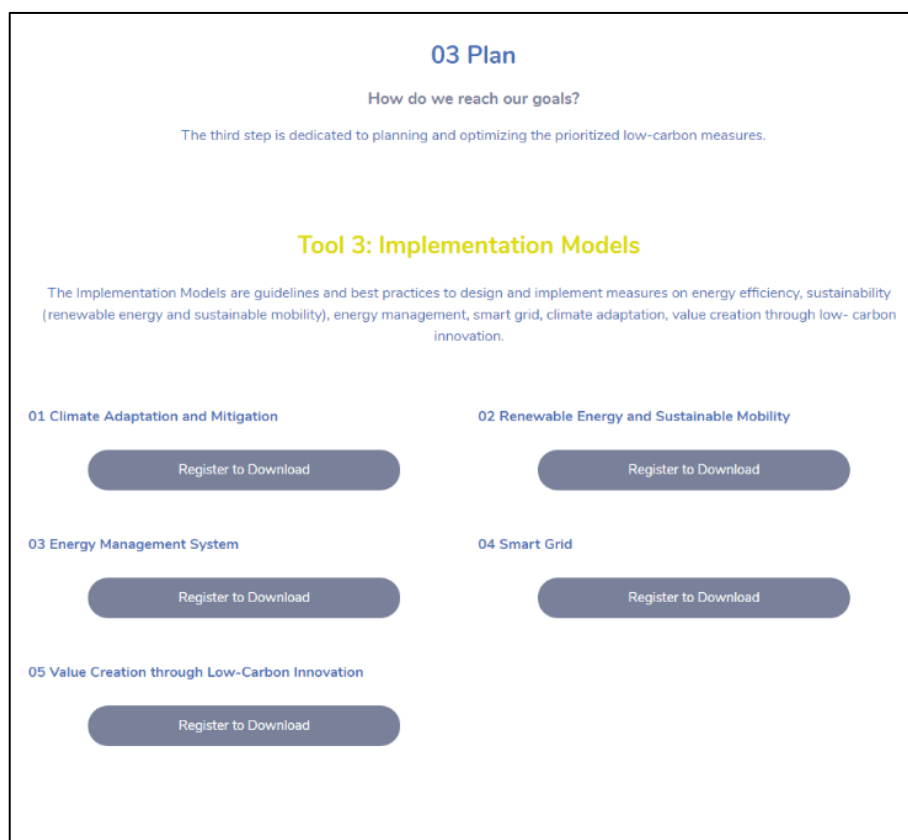


Figure 15: Smart Altitude Online Toolkit – Tools – Plan – 1

- See Figure 16:
  - Description of the Webinar Series with the Webinar Programme

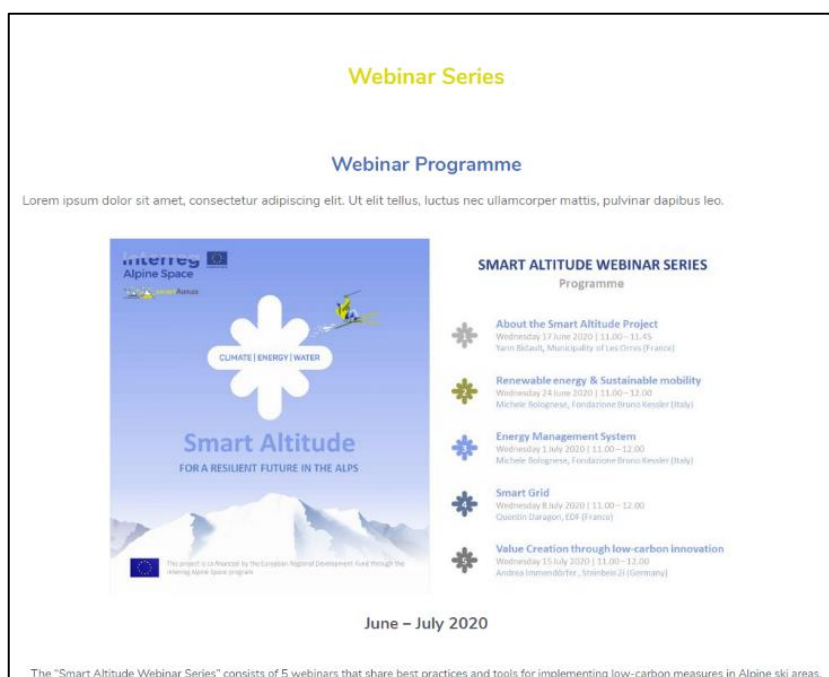



Figure 16: Smart Altitude Online Toolkit – Tools – Plan – 2



- See Figure 17:
  - Description of the 5 Webinars with title, date, presenters, topic
  - Buttons to read more about each Webinar

### Webinar #1



**About the Smart Altitude Project**

Wednesday 17 June 2020 | 11.00 - 11.45

Beni Balazs, Municipality of Les Orres (France)

**17 June 2020**

The first seminar presents the Smart Altitude Project and the six-steps approach for adopting climate mitigation and adaptation strategies in Alpine ski resorts.

[Read More](#)

### Webinar #2



**Renewable energy & Sustainable mobility**

Wednesday 24 June 2020 | 11.00 - 11.30

Michèle Rodriguez, Evénementaire Brian Roudier (Italy)

**24 June 2020**

The second webinar presents tools and best practices for integrating renewable energy (eg. PV and geothermal heating) and sustainable mobility in ski areas.

[Read More](#)

### Webinar #3



**Energy Management System**

Wednesday 1 July 2020 | 11.00 - 12.00

Michèle Rodriguez, Evénementaire Brian Roudier (Italy)

**1 July 2020**

The third webinar introduces the key elements and components for designing, adopting and implementing an integrated energy management system.

[Read More](#)

### Webinar #4



**Smart Grid**

Wednesday 8 July 2020 | 11.00 - 12.00


Quentin Gougeon, ESR (France)

**8 July 2020**

The fourth webinar presents the experience of Les Orres's Living Lab in developing an innovative smart grid model for managing energy over an entire ski area.

[Read More](#)

### Webinar #5



**Value creation through low-carbon innovation**

Wednesday 15 July 2020 | 11.00 - 12.00

Andrea Isenhardt, Stralbach IT (Germany)

**15 July 2020**

The final webinar describes innovative models for creating new value and additional revenue streams through the implementing low-carbon measures

[Read More](#)

Figure 17: Smart Altitude Online Toolkit – Tools – Plan – 3

- See Figure 18:
  - Through the "Read More" button of each Webinar you can access a specific page where you can visualize the recording video of each Webinar (YouTube channel) and download the presentations

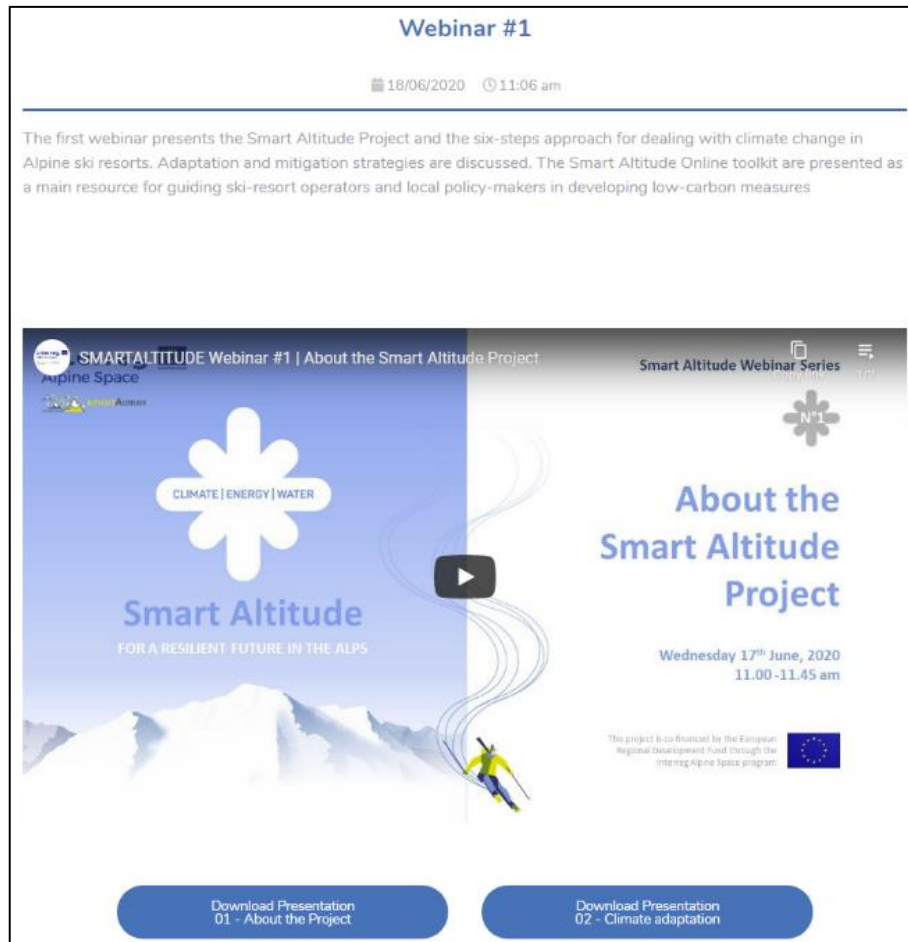


Figure 18: Smart Altitude Online Toolkit – Tools – Plan – 4

In the Tools/Implement section, from top to bottom, the following elements have been inserted:

- See Figure 19:
  - Description of the step 4 “Implement” and of the tool 4 “Living Labs”
  - By clicking on each Living Lab it is possible to access a dedicated page

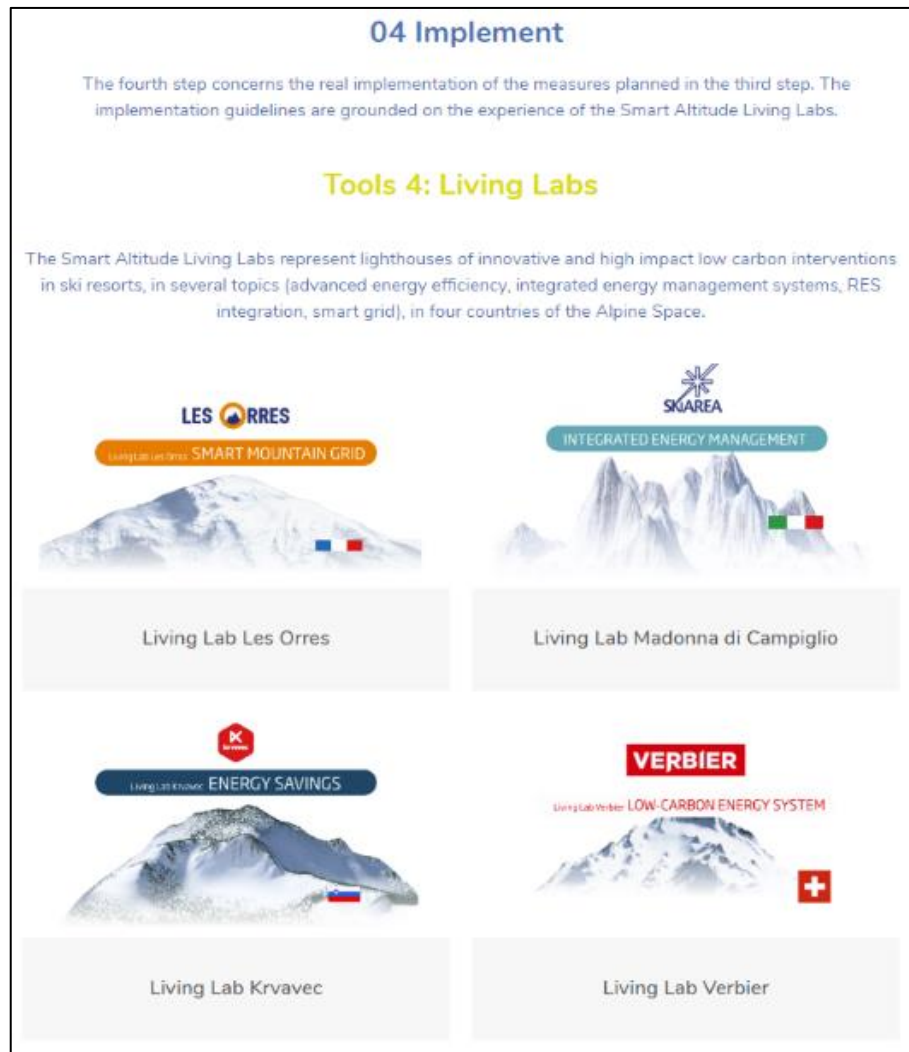


Figure 19: Smart Altitude Online Toolkit – Tools – Implement – 1

- See Figure 20:
  - The following information is summarized in the dedicated page of each Living Lab: characteristics of the ski resort, challenge, solution
  - Clicking on each Living Lab leads to the official web page



Figure 20: Smart Altitude Online Toolkit – Tools – Implement – 2

In the Tools/Monitor section, from top to bottom, the following elements have been inserted:

- See Figure 21:
  - Description of the step 5 “Monitor” and of the tool 5 “Monitoring System”



Figure 21: Smart Altitude Online Toolkit – Tools – Monitor – 1

- See Figure 22:
  - Description of the Monitoring System in the Living Labs
  - By clicking on each Living Lab it is possible to access a dedicated page

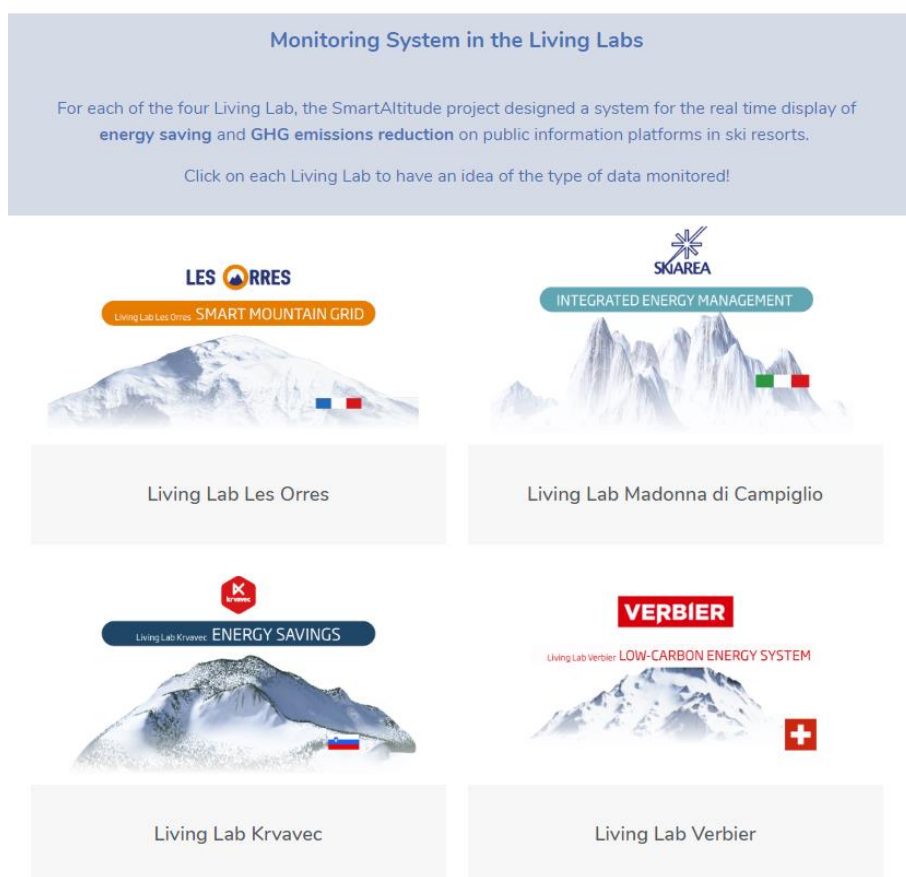


Figure 22: Smart Altitude Online Toolkit – Tools – Monitor – 2

- See Figure 23 and Figure 24:

- The following information is summarized in the dedicated page of each Living Lab: real time display of energy consumption reduction and real time display of GHG emission reduction

## Living Lab Les Orres | France

### Monitoring

#### 01) Real time display of energy consumption reduction

MITIGATION MEASURES for Les Orres		2018-2019	2019-2020	2020-2021
Overall ski resort	Monitoring and Integrated Energy Management System (IEMS)	10-20%	10-20%	10-20%
Ski Lifting	Monitor and implement an EMS	10-20%	10-20%	10-20%
	Assess ski lifts energy efficiency	10-20%	10-20%	10-20%
	Implement renewable energy sources (e.g. PV)	n.a.	n.a.	n.a.
	Implement speed control measures (e.g. based on the number of entrances)	n.a.	n.a.	n.a.
	Replace old ski lift systems with modern technology	1-2%	1-2%	1-2%



#### Snow Making

Optimal water management (flow rates, height differences, main and secondary reservoirs, water concessions)	10-20%	10-20%	10-20%
Through the analysis of the pumps for the distribution of water and their working points, interesting ideas can be found for the reduction of unnecessary oversize, operation outside the optimum range, replacement of inefficient pumps	10-20%	10-20%	10-20%
Replace old snow-making systems with modern technology	1-2%	1-2%	1-2%
Implement an automated snow making system	10-20%	10-20%	10-20%
Plan which kind of snow making system is the most effective for the ski resort (Fan gun, Hybrid/tower, Hybrid/high-pressure)	10-20%	10-20%	10-20%
Implement renewable energy sources	n.a.	n.a.	n.a.

#### Snow Grooming

<p>Verification of the systems available for the management of the snow groomers' park and for the management of the snow groomers' routes. The advantages are several:</p> <ul style="list-style-type: none"> <li>• reduction of maintenance costs;</li> <li>• reduction of fuel consumption through the optimization of routes;</li> <li>• control of the work on the slopes (thickness of the snow);</li> <li>• online monitoring of the machines (e.g. position, speed, with advantages for safety and consumption)</li> </ul>	10-20%	10-20%	10-20%
Replace old grooming machines with newer ones	1-2%	1-2%	1-2%
Implement hybrid/electric snow groomers	n.a.	n.a.	n.a.

Buildings

Assess the energy consumption of the ski resorts building and improve the heating system and ventilation	10-20%	10-20%	10-20%
Replace indoor and outdoor lighting with energy-efficient lightbulbs and an automated lighting control	5-10%	5-10%	5-10%
Improve the energy efficiency of building envelopes	n.a.	n.a.	n.a.
Implement heat recovery	n.a.	n.a.	n.a.
Implement renewable energy sources for heating and electricity	n.a.	n.a.	n.a.

Figure 23: Smart Altitude Online Toolkit – Tools – Monitor – 3

02) Real time display of GHG emission reduction

MITIGATION MEASURES for Les Orres		2018-2019	2019-2020	2020-2021
Overall ski resort	Monitoring and Integrated Energy Management System (IEMS)	15-25%	15-25%	15-25%
Ski Lifting	Monitor and implement an EMS	15-25%	15-25%	15-25%
	Assess ski lifts energy efficiency	10 – 20%	10 – 20%	10 – 20%
	Implement renewable energy sources (e.g. PV)	0 – 1%	0 – 1%	1 – 5 %
	Implement speed control measures (e.g. based on the number of entrances)	n.a.	n.a.	n.a.
	Replace old ski lift systems with modern technology	1-2%	1-2%	1-2%



#### Snow Making

Optimal water management (flow rates, height differences, main and secondary reservoirs, water concessions)	10-20%	10-20%	10-20%
Through the analysis of the pumps for the distribution of water and their working points, interesting ideas can be found for the reduction of unnecessary oversize, operation outside the optimum range, replacement of inefficient pumps	10-20%	10-20%	10-20%
Replace old snow-making systems with modern technology	1-2%	1-2%	1-2%
Implement an automated snow making system	15 – 25%	15 – 25%	15 – 25%
Plan which kind of snow making system is the most effective for the ski resort (Fan gun, Hybrid/tower, Hybrid/high-pressure)	10-20%	10-20%	10-20%
Implement renewable energy sources	0-1%	0-1%	1-5%

#### Snow Grooming

<p>Verification of the systems available for the management of the snow groomers' park and for the management of the snow groomers' routes. The advantages are several:</p> <ul style="list-style-type: none"> <li>• reduction of maintenance costs;</li> <li>• reduction of fuel consumption through the optimization of routes;</li> <li>• control of the work on the slopes (thickness of the snow);</li> <li>• online monitoring of the machines (e.g. position, speed, with advantages for safety and consumption)</li> </ul>	10-20%	10-20%	10-20%
Replace old grooming machines with newer ones	1-2%	1-2%	1-2%
Implement hybrid/electric snow groomers	n.a.	n.a.	n.a.

Buildings

Assess the energy consumption of the ski resorts building and improve the heating system and ventilation	10-20%	10-20%	10-20%
Replace indoor and outdoor lighting with energy-efficient lightbulbs and an automated lighting control	5-10%	5-10%	5-10%
Improve the energy efficiency of building envelopes	n.a.	n.a.	n.a.
Implement heat recovery	n.a.	n.a.	n.a.
Implement renewable energy sources for heating and electricity	0-1%	0-1%	1-5%

Figure 24: Smart Altitude Online Toolkit – Tools – Monitor – 4

- See Figure 25:
  - Example of Monitoring System with type of data to consider

Example of Monitoring System	
This table provides an example of the data that can be monitored to go towards climate-neutral strategies in ski resorts.	
Type of Data	Measurement Unit
1) Reduction of energy consumption and CO2 emission <b>for snow production</b>	kWh and tCO2
2) Reduction of energy consumption and CO2 emission <b>for ski lifts</b>	kWh and tCO2
3) Reduction of energy consumption and CO2 emission <b>for snow groomers</b>	kWh and tCO2
4) Reduction of energy consumption and CO2 emission <b>for service buildings</b>	kWh and tCO2
5) Reduction of energy consumption and CO2 emission <b>for entire resort</b>	kWh and tCO2

Figure 25: Smart Altitude Online Toolkit – Tools – Monitor – 5

In the Tools/Communicate section, from top to bottom, the following elements have been inserted:

- See Figure 26:
  - Description of the step 6 “Communicate” and of the tool 6 “Web and Social media”

- Button to go to the example of the Smart Altitude dedicated webpage in the website of the Skiarea Campiglio Dolomiti di Brenta

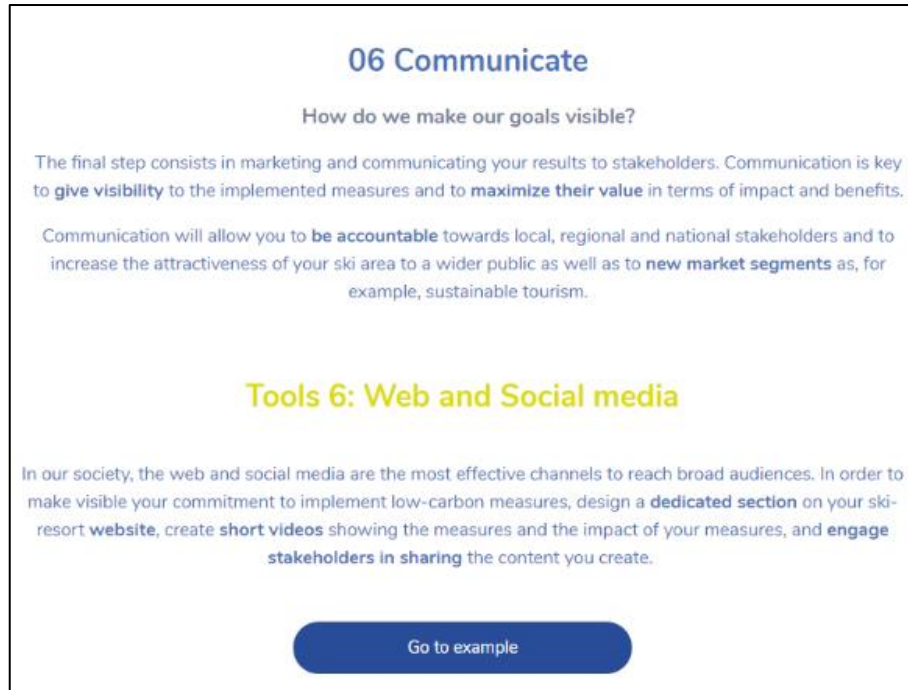


Figure 26: Smart Altitude Online Toolkit – Tools – Communicate

## 6. Replicators

In the Replicators section, from top to bottom, the following elements have been inserted:

- See Figure 27:
  - Description of the replication effort in Smart Altitude
  - Description of who are the replicators
  - Description of what are the benefits for replicators
  - Description of what is the label “Smart Altitude Replicator”
  - Button to register as replicator (see the Login section)
  - Button to download the flyer for replicators

## Replicate SmartAltitude

The replication of the SmartAltitude approach is a key driver for creating a network of stakeholders actively engaged in developing low carbon measures for a resilient winter tourism in the Alps.

### Who are the replicators?

Replicators are primarily **ski-resort operators** and **local policy-makers** who want to develop low-carbon measures in their ski-resorts and territories. Financial operators, public and private organizations, municipalities and citizens can be engaged in the **participative approach** proposed by SmartAltitude.


### What are the benefits for replicators?

Replicators have access to all **SmartAltitude tools and consultancy** for auditing, planning and implementing low-carbon measures.

By being involved in a network of highly engaged European ski-resorts, replicators receive **constant updates** on the state-of-the-art measures and **best practices** for improving energy efficiency, water management and low-carbon strategies.

### What is the label "SmartAltitude Replicator"?

At the end of the process, the replicators will receive the quality label "SmartAltitude replicator" to **signal commitment** in developing measures and strategies for low-carbon winter tourism in Alpine territories.



## Become a Replicator

Do you want to become a replicator? Click the link and fill in the form. You will have direct access to the online toolkit and you will be contacted by one of our team member to start your journey.

Register as replicator

Flyer for Replicators

Figure 27: Smart Altitude Online Toolkit – Replicators

## 7. Contact

In the Contact section, from top to bottom, the following elements have been inserted:

- See Figure 28:
  - Email contacts of the Project Coordinator (Yann Bidault - Les Orres) and of the Communication Manager (Chiara Pellegrini - FBK)



Figure 28: Smart Altitude Online Toolkit – Contact

## 8. Viewing statistics

This paragraph presents the viewing statistics of the new Smart Altitude Online Toolkit at the date of writing of this deliverable (07/08/2020).



Figure 29: Smart Altitude Online Toolkit – Number of views and visitors

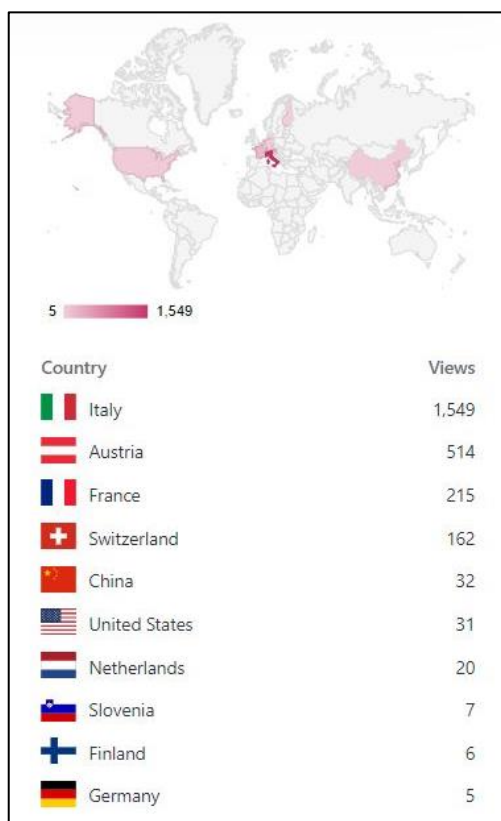


Figure 30: Smart Altitude Online Toolkit – Views by country

Posts & pages		
Title		Views
Homepage		937
Login		248
plan		226
Tools		218
Replicators		149
Set priorities		120
implement		104
Audit		104
About		84
communicate		66

Figure 31: Smart Altitude Online Toolkit – Post & pages

Referrers		
Referrer		Views
Search Engines		56
WordPress Dashboard		23
alpine-space.eu/project-news-0	...	7
WordPress Android App		7
mail.google.com/mail/u/0/	...	5
urlsand.esvalabs.com	...	5
Facebook		4
alpine-region.eu/skiresortsgets	...	3
linkedin.com	...	3
youtube.com	...	3

Figure 32: Smart Altitude Online Toolkit – Referrers



Figure 33: Smart Altitude Online Toolkit – Visitors per month

Video	Visualizzazioni	Tempo di visualizzazione (ore)	Iscritti	Impressioni	Percentuale di clic delle impressioni
<input type="checkbox"/> Totale	170	7,5	5	1.770	3,2%
<input type="checkbox"/> SMART ALTITUDE   Webinar #2 Renewable energy and sustainable ...	62 36,5%	2,4 31,6%	3 60%	1.291	0,9%
<input type="checkbox"/> SMART ALTITUDE   Webinar #1 About the Smart Altitude Project	55 32,4%	1,8 24,0%	1 20%	63	23,8%
<input type="checkbox"/> Smart Altitude Official Video	19 11,2%	0,5 6,6%	-1 -20%	31	45,2%
<input type="checkbox"/> SMART ALTITUDE   Webinar #4 Smart Grid	14 8,2%	0,5 6,5%	0 0%	45	11,1%
<input type="checkbox"/> SMART ALTITUDE   Webinar #3 Energy Management System	13 7,7%	1,8 23,9%	0 0%	165	3,6%
<input type="checkbox"/> SMART ALTITUDE   Webinar #5 Value Creation through low carbon i...	4 2,4%	0,5 6,9%	0 0%	147	1,4%
<input type="checkbox"/> Smart Altitude   Madonna di Campiglio Living Lab	3 1,8%	0,0 0,6%	0 0%	28	10,7%

Figure 34: Smart Altitude Online Toolkit – Visitors YouTube