Photos: INTERACT stations

- EU Horizon funded 2011-2023

INTERACT

- A CIRCUMARCTIC NETWORK OF RESEARCH STATIONS

GUIDEBOOK ON REDUCING CO_2 EMISSIONS OF ARCTIC SCIENCE

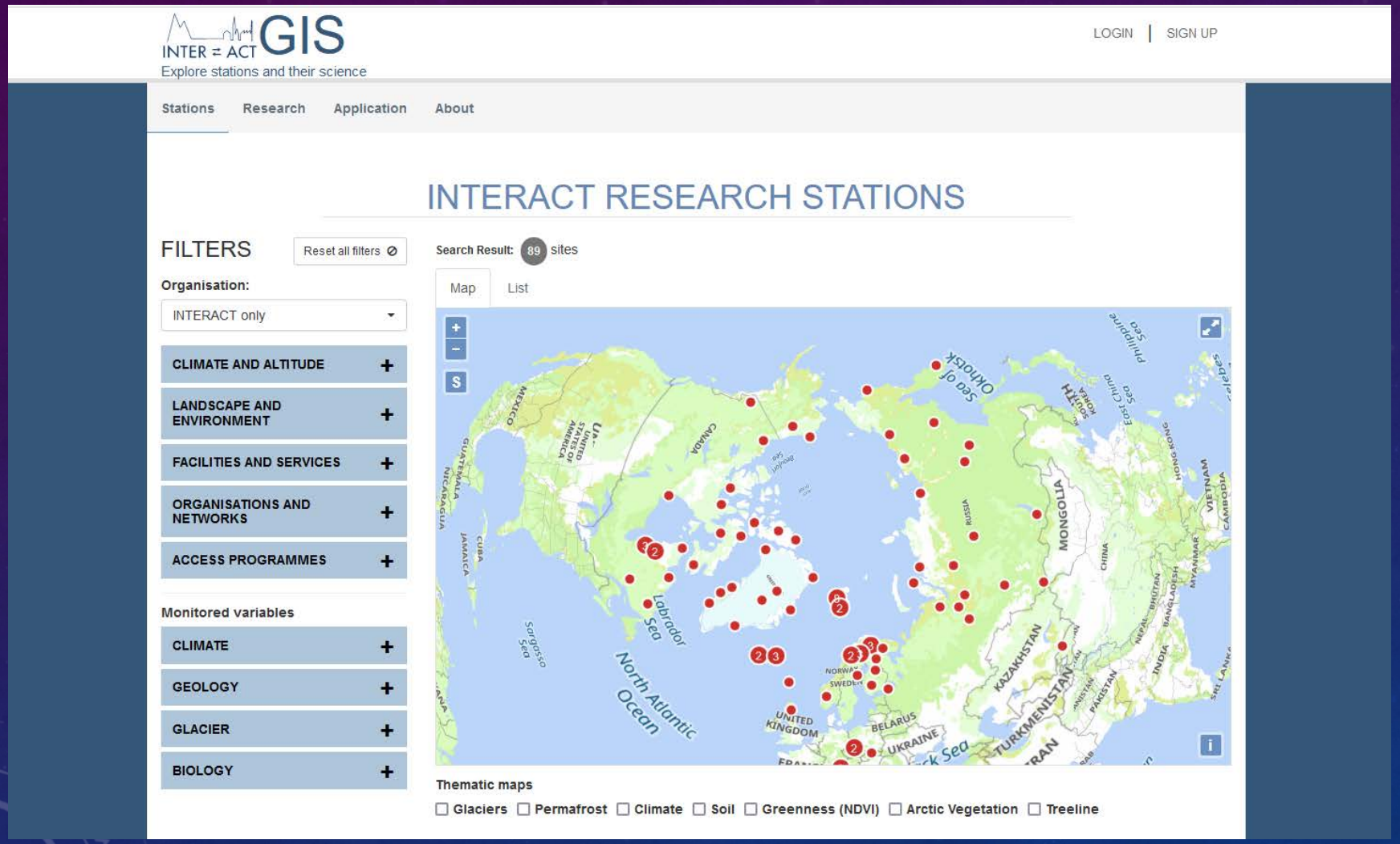
FARO Annual Meeting, 17 Feb 2023, Vienna, Austria

Photos: INTERACT stations

+70

INTERACT Research Stations

All you need to know about research stations



www.interact-gis.org

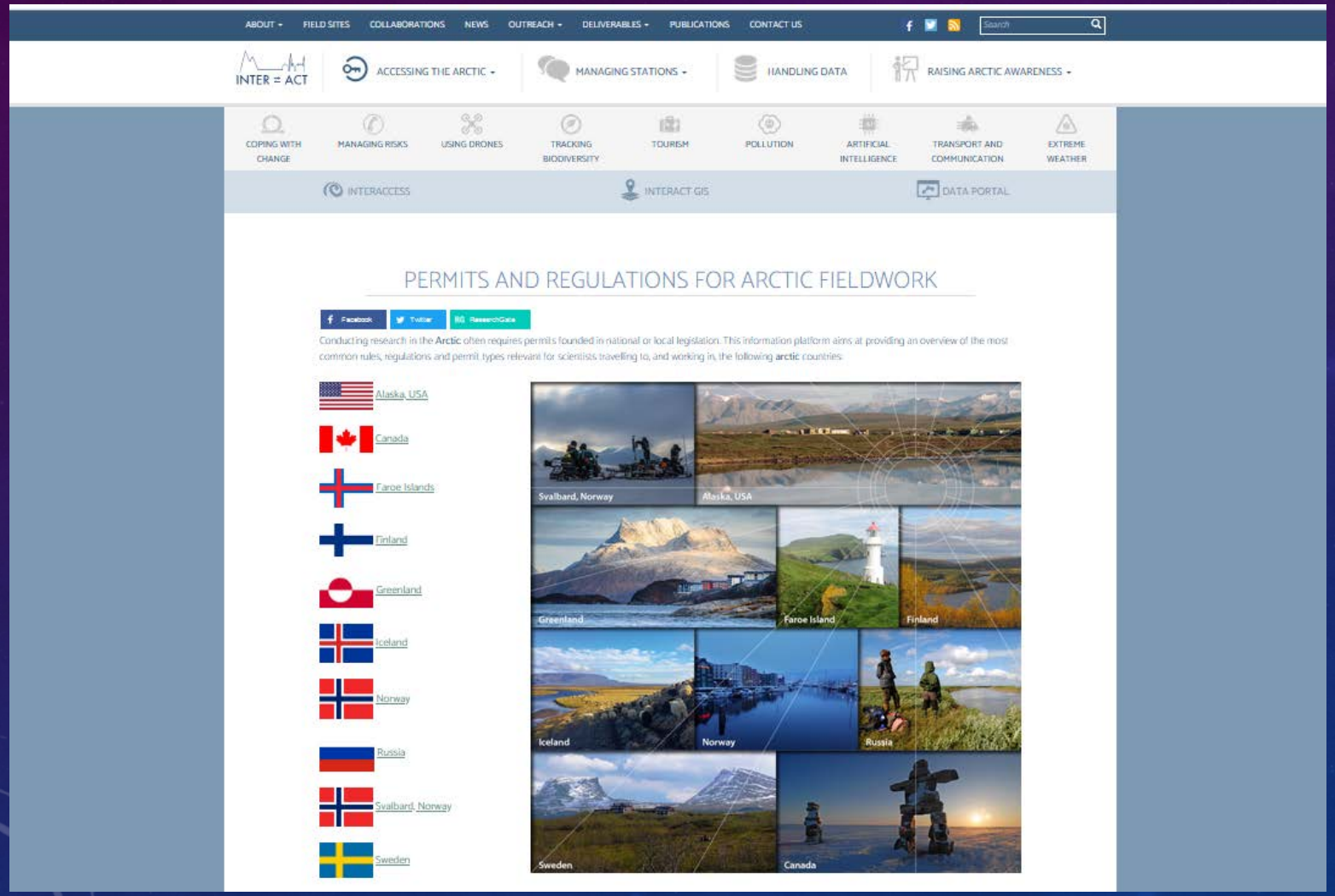
INTERACT GIS

Information on +70 stations

Search for suitable stations

Location, climate, landscape, natural environment, facilities, services, monitored variables, scientific networks, etc.

Arctic science permits and regulations



https://eu-interact.org/accessing-the-arctic/arctic-fieldwork-permits-and-regulations/

Overview of national permit systems in all arctic countries

In support of the Arctic Council's Agreement on Enhancing International Arctic Scientific Cooperation

INTERACT Publications

Other publications from INTERACT

INTERACT Station Catalogue is describing all research stations that are part of INTERACT. For each research station, the catalogue contains a description of the station, its facilities, its monitoring efforts and its natural environment.

INTERACT Science Stories contains stories of the cutting-edge arctic research being supported by INTERACT Transnational Access, as told by 138 scientists from 17 countries.

INTERACT Fieldwork Planning Handbook is a textbook for scientists to facilitate safe fieldwork and maximise the results of research and monitoring activities in the Arctic and other cold regions of the Northern Hemisphere.

INTERACT Practical Field Guide is a guide book to be taken into the field with information on best practices and safety aspects in relation to fieldwork in the Arctic.

INTERACT Research and Monitoring provides an overview of research and monitoring activities conducted at INTERACT stations. It presents an overview of scientific disciplines and monitored parameter groups and it provides recommendations for monitoring.

INTERACT Management Planning for Arctic and Northern Alpine Research Stations is a textbook in which research station managers from the INTERACT network share their knowledge of relevance to management of research stations in cold regions.

https://eu-interact.org/publication/

INTERACT Station Managers

APECS Association of Polar Early Career Scientists

INTERACT Reducing CO_2 Emissions of Arctic Science

Published Autumn 2022

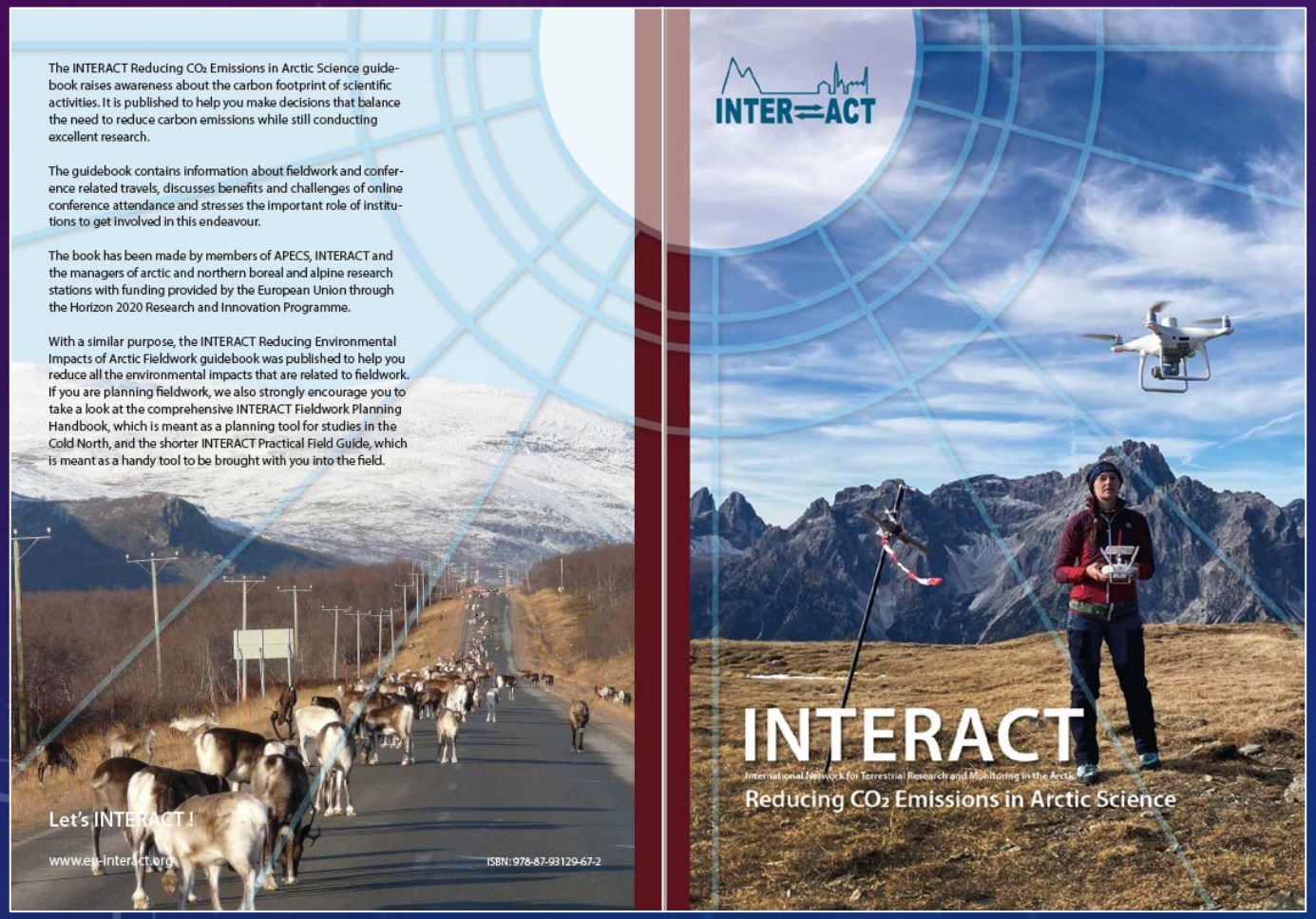


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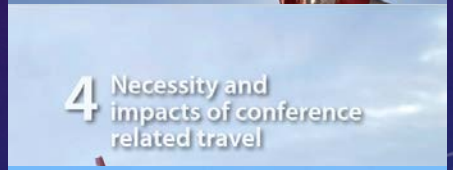
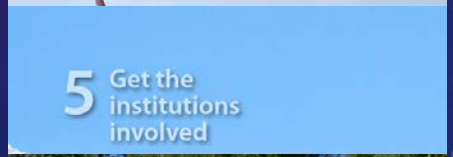
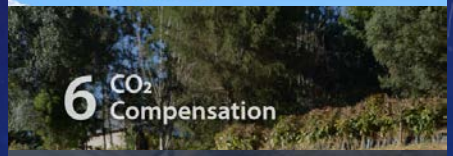
Photo: Jean-Marie Trudeau







Tips for scientists

A significant number of field locations are remote or difficult to reach using low emission forms of transport. However, there are a few things scientists can do to reduce their travel-related carbon footprint.

➔ Plan a low-carbon field trip.
If planning a field trip, ask yourself:

Is it necessary to go?
- Can I find already existing data to use instead?
- Can I get others to collect the data/samples I need?
- Can I take advantage of remote or virtual access or community and citizen science projects?
- Can data be acquired through existing remote sensing options?

If necessary to go, think about:

Transport/Travel to the Arctic
- Use online tools to calculate your expected carbon footprint for getting to the Arctic and back.
- Choose the least CO_2 emitting transport option (where you have a choice).
- Use public transport where possible.
- Prefer land-based travel over air travel.
- Choose a CO_2 efficient airline where possible.
- Share transport and logistics to fill up capacity.
- Compensate for unavoidable emissions by using carbon offsetting schemes that comply with internationally recognised standards.

Local transport
- Choose an appropriate field site that minimises your need for local transport.
- Choose the least emitting transport option.
- Use non-motorised transport (foot, ski, kayak).
- Use public transport where possible.
- Share transport and logistics to fill up capacity.

➔ Reflect on your conference/meeting participation.
Rather than conference consumerism or routine, researchers and other personnel could be encouraged to take a more reflective approach in relation to their work-related travels.

What is your motivation to go?

- What is the desired outcome of participating in the event?
- Why is it important for me to attend the event, are there others that could represent me?
- What will be my role and is it important to attend physically or can I achieve my aims through online participation?
- How many of my colleagues are going?
- Are there expected spin-offs from meeting colleagues?
- Can I combine it with other work-related visits?
- Where does the conference take place (distance to venue)?
- Are there low-carbon transport options?

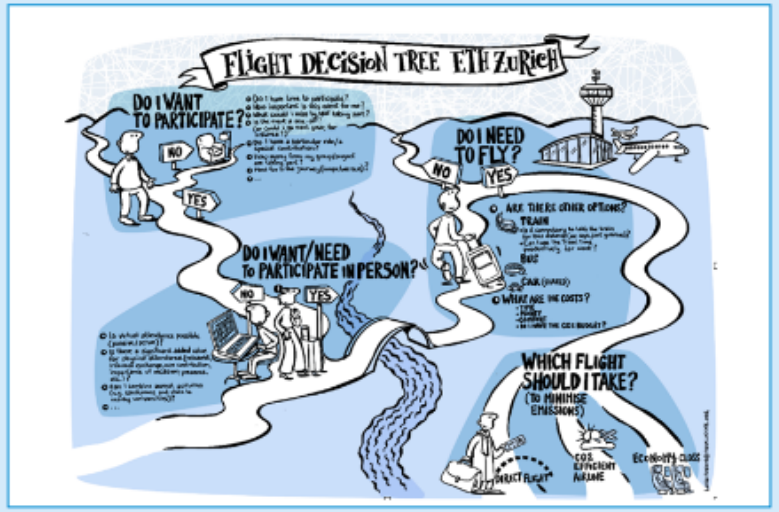
If going to the conference, prioritise low-carbon transport options.

➔ Influence your institution.

Promote a low-carbon travel policy at your institute that makes it easier for you to implement more sustainable travel choices in your life as researcher. Depending on your situation (time, family duties, finances) this might be more or less easy.

Engage in and support critical and open discussions. You could even organise events or activities to raise awareness. Inspire each other with good and fresh ideas about how to live in a more sustainable way. But, keep in mind that reasons for individual behaviour (travel choices) might be complex and different, so do not blame others if they do not follow your example.

ETH Zurich's Flight Decision Tree. Illustrator: Lucia Fabiani.



TIPS
for Scientists

Tips for conference organisers

It is advisable to develop a strategy for organising sustainable events, including a check-list of means for carbon footprint reduction. In general, several aspects have to be taken into account, e.g. travel, venue, lodging, local logistics (energy use, local transport, catering).

➔ **Choose the suitable meeting format.**

- Is an in-person conference necessary or would an online format work as well (see tables of advantages and disadvantages on pages 53-54)?
- Consider hybrid formats and work towards conditions that improve online participation.

➔ **Decarbonise conference travel.**

- **Promote low carbon travels.** Organisers can encourage participants to use trains and public transport, when it is possible, and design incentives such as a discount on conference fees for those who favour a low-carbon mode of transportation. Free conference trains/busses that collect participants on their way to the conference locations are good examples of how to save carbon emissions, while engaging in short workshops and discussions during a relaxed trip to the venue.
- **Choose a central location**, which can be easily reached by public transport. This in combination with the promotion of low-emission land-bound travel options result in a significant reduction of the carbon footprint.
- A smart way to reduce the carbon footprint related to conference travels is also to **pool conferences and meetings at major events** in the same town. Accordingly, it becomes possible to attend more meetings for a reduced CO_2 emission and cost.
- **Limit the number of attendees per institution**. Convenors of conferences or institutions can define a quota to limit the number of attendees sent by each institution. Such quotas could be included in strategies at institution level to make the organisation greener. A part of such quota system could be criteria for staff to attend physical meetings or events. Priorities could, for instance, be given to Early Career Researchers or certain categories of personnel according to its relevance for the individual and the institution.
- **Enable hybrid attendance**. Large conferences could also take the form of hybrid conferences that maximise the advantages of both in-person and digital conferencing.
- To organise **regional hubs** follows the idea of hybrid conferences. Participants can travel to well-connected locations within their own continent using land transport. Because all hubs are virtually connected with each other, global exchange is ensured. However, time zone differences and disparities in the number of participants can be an issue.
- **Change in-person conference rhythm to every second/third year.** Several conferences have become a routine and some researchers may feel that it does not make sense to attend an event just because their institution encourages them to do so. Reducing the frequency of events significantly reduces carbon emissions.

Plenary session at major Arctic conference. Photo: Elmer Topp-Jørgensen.

TIPS

for conference organisers

Tips for institutions

Research institutions play a key role in efforts to reduce CO_2 in Arctic science. Of course, a complete picture towards leading a low-carbon pathway at your institutes includes many more considerations than only looking at how to reduce travel emissions. The energy consumption in all life cycle stages of buildings, instrumentation, food provisioning, etc. needs also to be taken into account, and introduction of renewable energy within the institution (e.g. laboratories, digital infrastructure, buildings) and research facilities (research stations, research vessels) must be pursued. When making new investments, attention should be paid to carbon emissions, environmental impacts and social aspects.

Here are key aspects to take into consideration when developing a sustainable travel policy at your institute.

➔ **Develop a sustainable travel policy.**

- Develop an institution-wide commitment to CO_2 reduction as a collective objective within the institution.
- Improve monitoring and internal reporting systems for travel activities to quantify CO_2 emissions. Travel agencies might offer support.
- Develop a strict travel policy and take concrete actions (e.g. establish a travel decision tool and improve the online booking system).
- Reflect on the relevance of travels and mode of transport collectively.
- Promote low-emission transport especially for short distance and day-to-day travels.
- Improve infrastructure for more sustainable day-to-day travel.
- Prioritize online meetings, where possible.
- Encourage more flexible work life within the institution.
- Raise employee and/or student awareness and contribute to education and information at a wider level.
- Develop additional incentive schemes for employees.
- Adopt a policy which offers a free and open access to data and knowledge.

➔ **Be open for discussions and change.**

Ensure a good environment for open exchange, new ideas and meaningful communication at your institute. Most likely there will be bureaucratic, financial or administrative barriers to implement the demanded actions. Do not get discouraged, but try to develop solutions. Exchange and learn from other institutions and best practice examples.

Engagement of staff in developing institutional guidelines help create awareness and understanding of institutional guidelines to reduce CO_2 emissions. Photo: Morten Rasch.

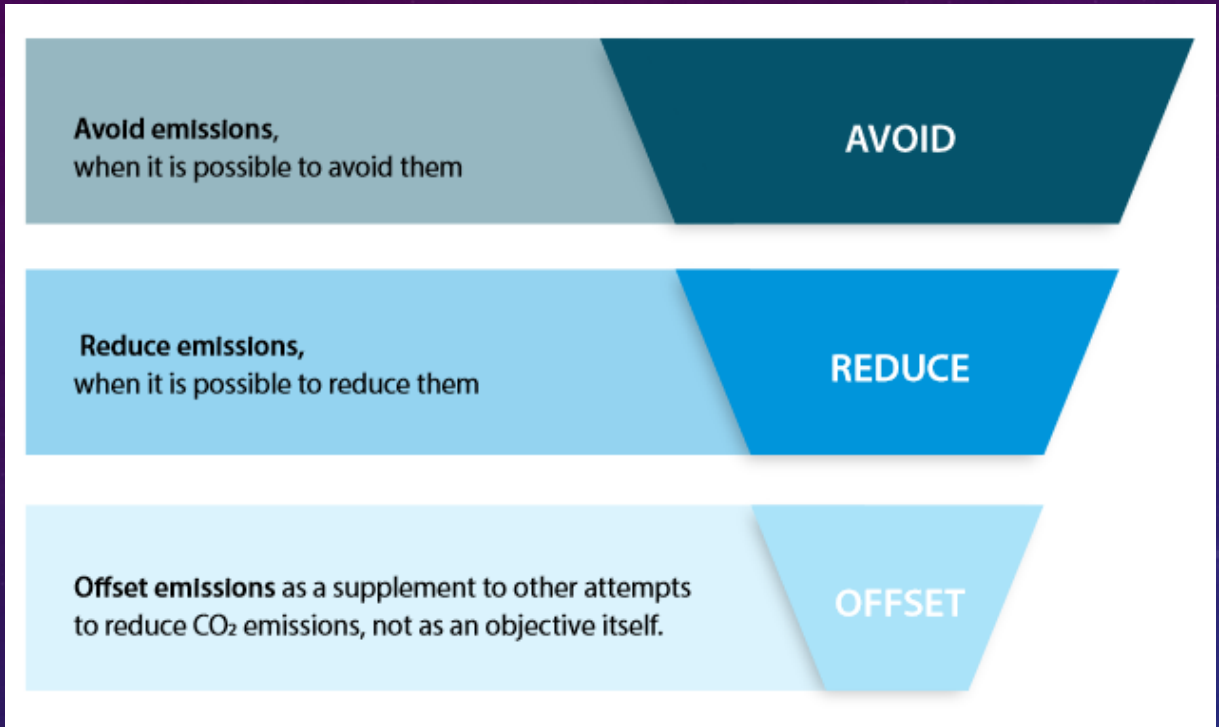
Box 7.3 The role of funding agencies

While funding agencies should ensure and support excellent research, opportunities should be developed to also encourage low-carbon research activities. Thus, it might be considered to include CO_2 reduction in the evaluation scheme, e.g. by making the use of low-emission transport and attempts to reduce the carbon footprint of research part of the funding criteria. Funding agencies have shown that they can bring about institutional change when acting collectively. Today many require that data from funded projects are made available as open access data.

TIPS

for institutions and the role of funding agencies

General guidelines



Green cities	plane is not an option
Orange cities	train or bus are the preferred options (but flights may be permitted in some cases)
Red cities	are best to reach by air.

Get started!

Individuals, **Institutions/organisations, funders**

Assess Carbon footprint and identify reduction targets and means (incentives and regulations).

Be inclusive when developing guidelines and rules to ensure ownership among all institution staff.

Monitor Carbon Footprint and adapt guidelines/rules to continuously reduce emissions.

CARBON FOOTPRINT
of this guidebook

Photo: Morten Rasch

Carbon acknowledgement

While producing this guidebook, we were aware that our project has its own CO_2 imprint. We therefore wanted to calculate this carbon footprint, but realised that this is a very complex task and not currently possible to the full extent. The calculations would include zoom meetings, emails, research on the internet, use of computers and other devices, data storage, printing and shipping.

Emissions from video calls are an increasingly important factor, when considering the carbon footprint of projects. As we did not travel, we took advantage of the pleasant possibility to interact face-to-face via ZOOM. While this might be considered a rather small contributor to the overall carbon footprint of the publication, we still decided to make a rough estimate of the CO_2 emission resulting from our ZOOM meetings. In doing so, we followed David Mytton's (2021) methodology:

(https://davidmytton.blog/zoom-video-conferencing-energy-and-emissions/).

A simple calculation of all our calls with different numbers of participants resulted in a total of 0.92 kg CO_2 produced by our ZOOM meetings.

With this carbon acknowledgement we want to reflect that we are making our own CO_2 contribution and that we, too, could not avoid but only reduce the CO_2 imprint of our everyday communication.

Just do it!

- And get your institution to take action.

Copies available here … and available online.

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