Integrating Activities for Advanced Communities

D2.10- Check list for environmentally friendly stations

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PU	Public	X
PP	Restricted to other programme participants (including the Commission Services)	
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Publishable Executive Summary

A series of meetings was held with INTERACT station managers at INTERACT Station Managers' Forum meetings to discuss what should be included in a check list for environmentally friendly stations. The work took its outset in deliverables of INTERACT II on reducing the environmental impact of research stations headed by the Princess Elisabeth '0-emission' station in Antarctica. Station managers came up with a list of environmental concerns to address and related recommendations. This was integrated with previous INTERACT publications from INTERACT I and II to produce the Checklist presented here.

1. Check list for Environmentally friendly stations

1.1. Developing the check list

A key aim of INTERACT is to build capacity for operating research station. Research station should aim at having a minimal impact on the natural environment, both for ethical reasons and not to influence the science that goes on at the stations. In some remote areas research stations may be the most important contributor to local environmental impacts.

INTERACT II had a task that focused on technologies for reducing environmental impacts of research stations. Based on this, INTERACT station managers were asked to identify key environmental impacts and related recommendations at a number of Station Managers' Forum meetings. This information was fused with information from previous INTERACT publications to produce below Check list for environmentally friendly stations:

- INTERACT Management Planning Handbook for Arctic Research Stations - https://eu-interact.org/publication/interact-management-planning-arctic-northern-alpine-research-stations-examples-good-practices/ (INTERACT 1).

- D3.11- INTERACT Report on Reducing Environmental Impacts at Arctic and Northern Alpine Research Stations - https://eu-interact.org/app/uploads/2019/07/D3-11.pdf (INTERACT II).

1.2. The checklist

Checklist for environmentally friendly stations

Research stations impact the environment in many different ways; emissions from transport, electricity and heat production, resource use, disturbance of natural ecosystems, waste generation and emissions to the local environment to name a few. Considering all of these aspects is a huge task - but paramount for operating an environmentally friendly station in often remote and cold environments.

This checklist is meant as a tool for research stations and provides an overview of the topics that need to be considered when working to reduce the environmental impact of station operations.
Station managers are advised to consult relevant chapters in INTERACT publications for detailed descriptions and inspiration on how to deal with the different topics. Please note, that the list may not be exhaustive for all stations.

The checklist is divided into general topics and sub-categories. For each of the sub-categories an 'X' indicates whether the general environmental impacts relate to:

'Greenhouse gas emissions' - Greenhouse gas emissions contributing to Global Warming.

'Environmental impacts' – All types of environmental impacts, including pollution, waste generation, destruction of natural environment, wildlife disturbance, etc.

'Resource use' – The use of renewable and non-renewable resources (except fossil fuels) for production of materials, equipment, food, etc. impacting global land use and share of globally available resources.

The column to the right can be used by the station to 'tick off' the topics as that has been considered and addressed by the station (all topics may not be relevant for all stations).

Checklist topics	Greenhouse gas emissions	Environmental impacts	Resource use	Tick off if topic considered
Environmental management				
Develop an environmental policy and apply the concept of reducing, reusing and recycling throughout station operations	X	X	X	
Conduct an environmental impact assessment	X	X	X	
Develop rules and guidelines for staff and visitors	X	X	X	
Plan environmentally friendly facility development	X	X	X	
Develop monitoring of environmental impacts, incl. energy use, water use and disposal, waste generation and field activities	X	X	X	
Develop an environmental management plans	X	X	X	
Infrastructure and logistics				
Transport				
Recommend least emitting transport mean/route to station	X			
Off grid (no public transport): Coordinate logistics to fill capacity	X			
Develop policy/guidelines for online vs physical conference participation, workshops, courses, meetings, etc.	X			
Offer remote and virtual access to limit need for travels by scientists	X			
Introduce electric vehicles for local transport (where electricity comes from renewable resources)	X			
Consider carbon compensation (should not replace reduction efforts)	X			
Buildings				
Consider using environmentally friendly building materials		X		
Choose durable, certified building materials and prioritise locally produced materials	X	X	X	
Conduct an energy audit of buildings and plan improvements	X			
When building new or renovating, consider energy efficient and environmental friendly design and technologies	X	x	x	
When building new or consider to upgrade buildings, consider minimising/mitigating local environmental impacts		x		
Consider storage facilities' ability to minimise transport of equipment/chemicals/etc. to and from the station and allow early shipment of goods with less emitting transport mean (e.g. ship/train)	X	X	X	

Interior and house technologies				
Buy sustainably produced and durable products	X	X	X	
Offer environmentally friendly cleaning and personal care products		X		
Prioritise energy efficient and environmentally friendly machinery, appliances and light sources	X	x		
Regulate electricity and heat to experienced demand	X			
Kitchen				
Prioritise organic, locally produced food and food with a low carbon footprint	X	X		
Minimise packaging when bringing food to the station, store properly and keep track of expiry dates	X	X	X	
Adjust amounts to number of consumers and have plan for leftovers to minimise food waste	X	X	X	
Field activities				
Develop procedure for assessing the environmental impact of field projects		X		
Develop rules and guidelines to minimise disturbance of wildlife, avoid damaging vegetation and minimise local emissions and pollution risks, including for: - Transport, working and camping in the field - Setting up instruments - Manipulation studies		X		
Produce map depicting designated travel routes, study sites, reference areas, sensitive areas, protected areas, hazards, etc., and make it available to visitors		X		
Offer/demand the use of renewable energy for operating field instrumentation	X			
Provide infrastructure for wireless transfer of data from field instrumentation to station and beyond	X	X		
Energy				
On grid: Purchase energy from renewable resources if available Off grid: Introduce renewable energy systems to the widest possible extent for station operations and field activities, include energy storage	X			
Ensure energy efficiency of machines, instruments (see also 'Interior and house technologies' above)	X			
Implement technology and control system to efficiently manage energy flow	X			
Develop behavioural guidelines for staff and visitors to minimise energy consumption	X			
Consider to involve external expertise to make an audit and provide recommendations	X			
Water				
Limit water use by: - Implementing water saving technologies - Developing behavioural guidelines for staff and visitors		X	X	

- Reusing treated waste water (without compromising human health)		X		
Prevent harmful substances from entering spill water and export to proper treatment facility		X		
Off grid: Treat spill water to ensure that discharge is not harmful to the environment. Consider exporting to treatment plant if sufficient removal or dilution of compounds are not possible or environment is vulnerable.		X		
Solid waste				
Implement the concept: Reduce, reuse, recycle	X	X	X	
Buy durable products	X	X	X	
Reduce packaging before sending goods to the station		X		
Develop rules and guidelines for staff and visitors to minimise waste production		X		
Establish sorting system enabling reuse, recycling or proper disposal of components, including hazardous substances		X	X	
If using incinerators, use state-of-the art machinery as well as recommended burning temperatures to reduce emissions of harmful substances		X		