CLIMATE FRIENDLY CLIMATE RESEARCH POLICY BRIEF "FEASIBILITY ASSESSMENT"

July 7th 2014

This policy paper outlines a feasibility assessment to reduce the carbon footprint of research and research programming. A qualitative and quantitative analysis of 'Climate Friendly Research' was conducted in three main areas:

Greening research infrastructure – Forms of guidelines or initiatives for greening research infrastructure (e.g. EMAS) seem to be well known and welcome but scarcely widespread

Greening events – Guidelines for green events are hardly known and applied in research organisations but science professionals indicate the necessary, positive disposition to organize and participate in green events

Greening communication – In general technological solutions, especially Skype, to reduce face-to-face meetings are broadly known and applied. However, there is significant potential to increase their use and to implement more sophisticated systems

The material presented here is based in particular on the JPI CLIMATE – Climate Friendly Climate Research project, coordinated by the Austrian Alliance of Sustainable Universities.

Overview/Background

Climate change research and research programming, especially in terms of publicly funded research programs, aim to support society in tackling the grand societal challenge of climate change and to underpin the necessity of reducing the carbon footprint of its activities. Ironically, the carbon emissions of universities and research organizations as well as international research programming – are high and in some regions on the rise.[1] This is due to the considerably carbon-intensive working style that researchers, research policy-makers and their institutions have developed, fuelled by growing expectations of international cooperation, low air fares and an increasing use of resource-intensive infrastructures. However, crucial to scientific communication is also credibility, which can be severely undermined by such activities, which are often inconsistent with the message that climate scientists in particular advocate.

In consideration of the grand societal challenge of climate change that is central to research efforts initiated by JPI CLIMATE, the Governing Board of JPI CLIMATE adopted the JPI CLIMATE sustainability principle of "taking into account the challenges of climate change in the work of the JPI, based on active reflection of operations (e.g. "green meetings") and formulating the endeavour of constant improvement of the operations' climate performance" or, as Erica Thompson (2011) from Imperial College London recently stated, to "making our actions consistent with our scientific predictions".

But more importantly than the issue of credibility is the example set by the research system. Science can offer society positive role models. Scientists and other staff from the research sector are making a strong statement if they communicate to both the public and decision-makers that they are actually acting in line with the implications of their findings and working towards reducing the steadily increasing ecological and carbon footprint of the research system.

Introduction

This policy brief presents the results of a feasibility assessment that builds on work in Climate Friendly Climate Research Policy Briefs "Problem Analysis" and "Existing Solutions" (see resources at the end of this brief). This includes the identification of existing barriers to the identified solutions in the system of research and research programming. Accordingly, this work package will assess the feasibility of the solutions identified in the previous work package to reduce the carbon footprint of research and research programming.

[1] See CFCR policy brief "Problem Analysis".

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Methodology

This work package used a mixed-methods approach and used both quantitative as well as qualitative research. An extensive quantitative inquiry (online questionnaire, n=153) was conducted to target stakeholders of the research system (science professionals, research coordinators, programme managers), organized in JPI CLIMATE and the national (climate) research networks (Alliance of Sustainable Universities in Austria, Climate Change Centre Austria). The questionnaire was based on the solutions identified in CFCR Policy Brief "Existing Solutions" and structured accordingly. Respondents for the quantitative part came from Austria, Belgium, Denmark, Finland, France, Portugal, and Spain. The quantitative research was complemented by eight expert interviews with stakeholders from the research system in Austria and Germany. In addition to the interviews, the CFCR research project was partially conducted as a real world experiment, the results of which were included into the qualitative assessment.

Analysis

The following analysis is organized in the three main issues previously identified in CFCR Policy Brief "Existing Solutions": research infrastructure, events, and virtual communication technologies.

General attitude of science professionals to climate friendly research

The general mood for more climate friendly research seems to be overwhelmingly positive, which could be used by organisations and policy-makers to implement green regulation. Around 94% of respondents think it is (very) important to green activities in their organisations (for detailed figures see chart 1 below) and their own work activities. This suggests that the problem of anthropogenic drivers of climate change is present in a researcher's work environment. Evidence from previous CFCR Policy Briefs indicate that there is a need to adapt the institutional infrastructure accordingly.

Logically, the broad support for greening activities declines when measures touch upon the daily work routine of science professionals (see below). Nevertheless, the broad support for greening institutions indicates a favourable environment for increased regulation. Especially, measures in the area of commuting habits, reduction of business trips, energy-efficiency of equipment, and use of material resources have general support, as about ¾ of the respondents signalled willingness to change in the respective categories. The extent of their willingness is outlined in more detail in the subsequent chapters. In general, it is mostly the lack of accessibility of alternatives (42%), time constraints (38%), and missing institutional incentives (36%) that prevent the respondents from acting personally. Except for time constraints, these are exactly the barriers that could be tackled by the policies proposed in this research project.

Chart 1

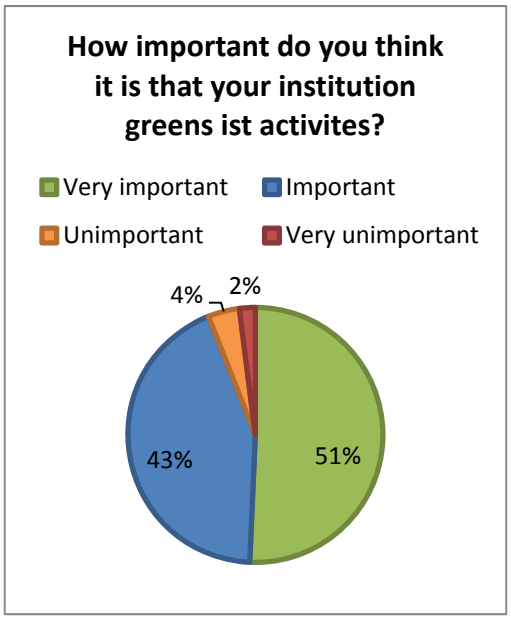
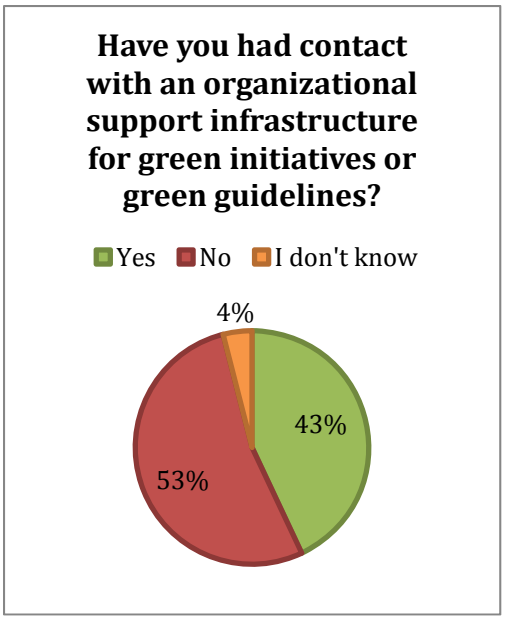


Chart 2



Greening research infrastructure

Guidelines for greening the infrastructure such as green procurement, green buildings, or environmental management seem to be well known (74%) by science professionals. Chart 2 above shows that already 43% have had contact with some kind of support infrastructure for green initiatives or guidelines (e.g. advisor, officer). Accordingly, a more systemic implementation of audit schemes such as the EU Eco-Management and Audit Scheme (EMAS) or green building certifications such as LEED (see CFCR Policy Brief "Existing Solutions") seem to be not only necessary, but would also face low levels of resistance or opposition when considering the broad support for greening activities (see above). In terms of equipment change the research community is a little less open to change.

Although ¾ of respondents welcome more energy-efficient equipment, only around 50% would reduce the frequency of equipment change, which would be necessary to deal with scarce resources (e.g. precious metals) more responsibly. Hence, science professionals could welcome an adoption of sustainable procurement guidelines as those outlined in CFCR Policy Brief "Existing Solutions".

Practical experiences with and barriers to audit schemes

In practice the picture is a little bit more difficult. Experiences at universities with audit schemes such as EMAS indicate that broad support for greener activities cannot be equated with low resistance when it comes to the implementation of climate friendly measures. In fact, it is largely the level of environmental awareness of an institute's personnel that determines the ability to implement guidelines or audit schemes. Organisations with a higher level of awareness seem to be more open to change than organisations with a lesser level. In all cases the general acceptance by science professionals and staff is crucial. Green guidelines and initiatives seem to be less present and facing more resistance in organisations with low levels of awareness. In the latter the discussion does not centre on the positive environmental (and societal) benefits, but on the negative bureaucratic and restrictive nature of new policies.

Further barriers in terms of audit schemes are also an institute's structure. Especially at bigger universities and research organisations the structure in different branches, departments, teams and working groups is often very heterogeneous and not easy to comprehend. Different segments of an institute naturally have different levels of emissions and resource usage, which hinders comparability and accountability. Furthermore, for an inhomogeneous structure it is difficult to come to terms with a single, global sustainability strategy. Other reasons why audit schemes are often difficult to implement are the missing organizational structure (e.g. officer) and missing measuring devices and trainings.

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The extent to which audit schemes are being implemented also depends on budgetary constraints. Whereas in the beginning of a certification period an audit scheme such as EMAS actually saves money due to increased efficiency in resource use, in later years necessary and significant investments in the infrastructure result in short-term budgetary pressure (but also long-term gains). Consequently, the longer a scheme is being used the more difficult and costly to achieve necessary improvements.

In general the biggest barrier to more climate friendly research is the budget. Current accounting procedures fail to include positive effects in future budget periods, which makes green investment decisions oftentimes difficult (e.g. buying expensive LED light bulbs now and save money due to less electricity consumption in the future). The assigned budget is also based on traditional calculations, which omit the necessity to take green investments into account. Thus, e.g. procurement decisions have to be made against more expensive energy-efficient equipment, as the allocated budget leaves no room for their purchase. Naturally investment also favours more substantive needs of organisations as for example new job creation is preferred to the insulation of buildings. As real estate of organisations is often rented and not owned a more climate-friendly infrastructure does not always mean that green investment has to be made by the institute itself but nevertheless results in higher rents.

All in all interview data suggests, however, that the adaptation of an audit scheme rather saves than costs money due to efficiency gains and often has positive indirect side effects such as increased attractiveness of organisations and an advantageous treatment by authorities. Hence, incentivizing organisations to green their research infrastructure might be in their own good.

Greening events

Green meetings or green events are organized in ways, which minimize the environmental impact of its activities. Event planners apply increasingly environmentally preferred practices to travel and local transportation, resource and energy use, venue selection, food provision and disposal, accommodation, and waste management for conducting more sustainable gatherings.

Thus, greening research events such as climate friendly organized workshops or scientific conferences is one important means to make research more climate friendly. The results of the quantitative inquiry show that it is also a field with big potential for improvements. 71% of science professionals either say that there are no or that they do not know of any guidelines for events and meetings in their organisations that specifically take ecological criteria into account (see chart 3 below). In only about 23% of the cases an organizational support infrastructure can be found, which helps science professionals to organize events more environmentally friendly.

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Chart 3

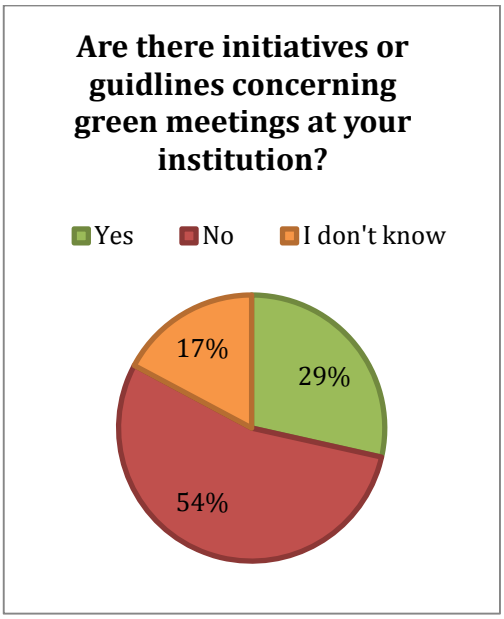
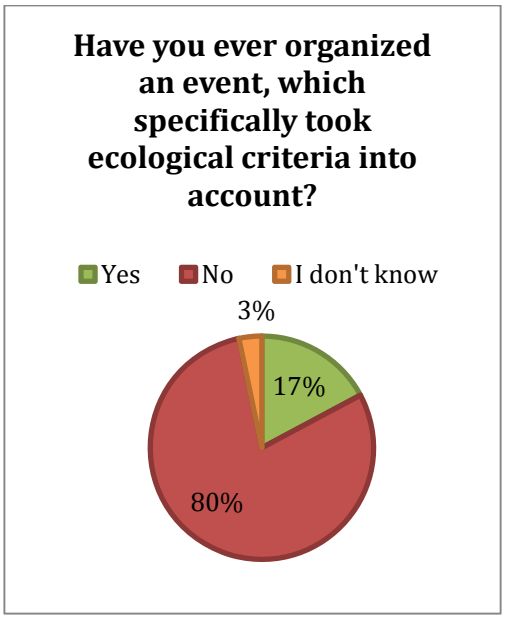


Chart 4



Figures for organizing green events shown in chart 4 above send an even clearer message. Around 80% have never organized a meeting that takes ecological criteria into account. Of those 80% around 71% (strongly) agree to organize a green event in the future, whereas another 23% are neutral to that matter and only 6% disagree. Hence, an introduction of green event criteria appears feasible.

Asked why science professionals had never organized a green event although they potentially would, 48% say that there is nothing that actively prevents them to do so. However, there are also shortcomings in the institutional framework that constitute active barriers. Accordingly, around 30% state that that an organizational support infrastructure and regulation as well as incentives are missing. The fear of increased costs due to a green organization only prevents 20% from organizing. A lack of incentives by funding partners and missing financial support only account for 15% respectively.

Picking out catering and amount of distributed paper as two minor elements of conferences in terms of organisation confirms the general positive attitude towards green events. 82% of science professionals think it is (very) important to offer more regional, seasonal, organic, and meat-less options at meetings. Beside this broad support this could also mean reduced costs for organizers of meetings. Additionally, almost 90% think it is (very) important to reduce the amount of distributed paper at conferences.

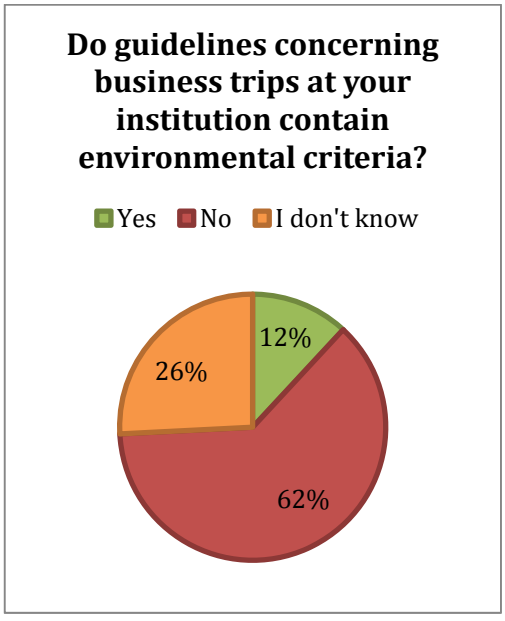
This suggests that a green event infrastructure has either to be developed more systemically or better advertised and supported in organisations where it already exists. Especially the extensive willingness of science professionals to organize green events suggests that if guidelines such as the UNEP Green Meeting guideline (see CFCR Policy Brief

"Existing Solutions") would be more broadly promoted and adopted, they would also be widely accepted and used. It appears that a necessary disposition towards green meetings is present and a broader implementation feasible, only guidelines are missing or are not being promoted sufficiently. Some of these guidelines for green meetings could be easily implemented, such as a reduction of paper or a change in the catering choice. Mobile devices such as laptops, tablets, and smartphones facilitate a digitalization of information traditionally distributed on paper.

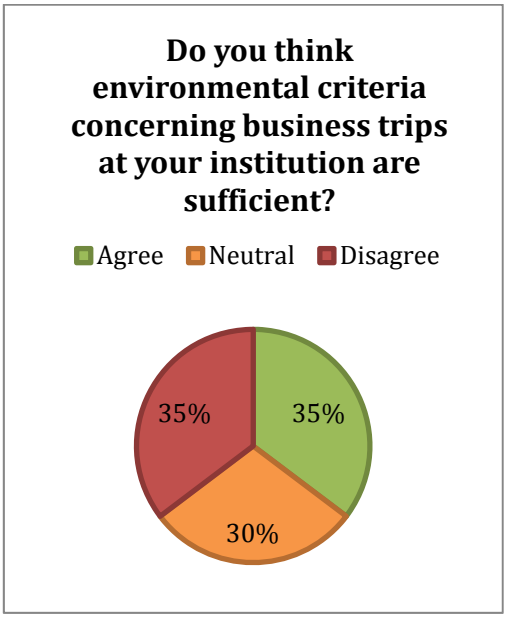
Travel and transportation

As around 70% of emissions in the area of research events stem from travel and transportation (see CFCR Policy Brief "Existing Solutions"), in the light of greening research events also the business travel practices of science professionals were being analysed. Not surprisingly, about 88% of the respondents state that guidelines for business trips do not contain any environmental criteria or they do not know of any (see chart 5 below). If criteria exist, only 35% think they are sufficient (see chart 6 below). Accordingly, this seems to be a logical starting point for making research more climate friendly. Guidelines in organisations should be adapted to include environmental criteria in order to reduce the total number of business trips and/or the amount of their emissions, as business travel is mostly booked by science professionals themselves (60%) or by an institute secretary (34%).

CFCR – Chart 5



CFCR – Chart 6



When it comes to the means of transport for business travel, cars and flights are far more popular than buses or trains, albeit trains are also more popular than buses. Whereas 75%

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of respondents have used a car for business travel up to five times, almost 90% of respondents have never used a long-distance bus and around 95% have never used a night-train in the past 12 months. However, 73% have used a train for business travel at least once. At the same time, only around 1/3 of the respondents did not fly a distance of more than 750km with about 50% flying between one and five times and about 20% for more than 5 times. A different picture can be observed for short-distance flights below 750km: 68% never flew such distances, 20% for one to three times and only 10% more than five times.

With 61% the willingness to refrain from flights below 750km is surprisingly high, 54% of which state that there is nothing that really prevents them from using trains or buses instead. The most preventive barriers are missing guidelines/regulation (21%) in or incentives (29%) by organisations. The most important argument for people who do not want to refrain from short-distance flights is the long travel time (93%) or inconvenient connections (29%).

In general it appears that there is a favourable attitude towards potential policy changes, especially in the area of short-distance flights. Currently it is also the guidelines, which actively prevent science professionals from using alternatives as they clearly demand the most economic choice. If science professionals could be incentivised by their organisations through guidelines/regulation or an institutional support infrastructure that helps them to find alternatives, short-distance flights could be further reduced and replaced by train or bus travel. A significant barrier constitutes the bus and train infrastructure that often prevents alternatives from being a viable solution. Long travel times are perceived as exhausting, especially the older one gets. In this regard, a reduction in flights above 750km is even more difficult to achieve. One solution could be the CO2-compensation for flights which cannot be avoided, offered by companies such as atmosfair (see CFCR Policy Brief "Existing Solutions"). However, as long as travel expenses for flights are increasingly being paid for, research professionals will make use of them.

This research project was also set out to test climate friendly research practices as a hands-on experiment. Ironically, during the course of the project, it was an extreme weather phenomenon that prevented some of the project members to travel to a JPI governing board meeting from Vienna, Austria to Bonn, Germany by train. As a consequence to the flooding in central Europe in summer 2013, train tickets had to be cancelled on short notice and replaced with flight tickets to make it to the meeting in time. Of course, such circumstances are rather an exception; nevertheless they already exemplify potential difficulties due to extreme weather events, their increased number and intensity arguably stemming from a change in climate.

Practical experiences with and barriers to green meetings

The results above show that green meetings are neither applied nor known to a wider range of science professionals. Organisations that do have green event guidelines often

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adopt them due to the personal preferences and interests of individuals in a decision-making capacity. As explained above, one major barrier to climate friendly research in terms of meetings, thus, is the lacking prominence of green meeting guidelines. As was the case with a greening of the research infrastructure in general, the personal attitude or interest in the matter still is the decisive factor.

Once a decision is made to adopt green event guidelines, the first barriers to an implementation are of an administrative and financial nature. Guidelines have to be individually adapted to the institute, as reference policies such as the UNEP Green Meeting Guide do not always fit the institutional setting. With more and more guidelines being developed also by research organisations (see CFCR Policy Brief "Existing Solutions"), the weight of such administrative barriers seems to decrease. Furthermore, an institutional support infrastructure (e.g. officer, adviser) has to be created to have an access point for science professionals that want to apply green meeting guidelines. Creating such an infrastructure naturally requires financial resources and (at least part-time) workforce.

Thus, active support by the current institutional infrastructure is needed to implement green meeting guidelines. Furthermore, it would also be beneficial if financial incentives were set by the institute to foster and promote the organization of green meetings. In organisations with green event guidelines, the lack of financial incentives to organize green events constitutes an indirect barrier to a broader application of guidelines. Such incentives could for example be reduced renting costs for rooms.

Once green event guidelines are known, it is important to eliminate barriers to the organization of green events. The most common reservations of science professionals are the fear of higher costs and increased time-effort. However, experience shows that green events, if at all, do not substantially cost more than events organized in the traditional sense. In contrast, money can potentially be saved by paperless conferences, e.g the omittance to send out printed invitations and calls for papers, or a more seasonal, regional and meat-less diet. The organization of a green event indeed results in more working time and labour, albeit only in the beginning. When switching to a green organization of events, traditional working and organization habits have to be scrutinized and broken with, which demands time and effort. However, these demands diminish over time when new organization practices are being established into the day-to-day workflow. Experiences at organisations with green event guidelines show that science professionals new to the organization of green events, start with the low hanging fruits first and increase their efforts as they get more experienced and accustomed to the organization.

Noteworthy are also positive side effects such as an improved image of or an emotional attachment to conferences that specifically take ecological criteria into account. In times of an ever more competing environment of scientific conferences a green organization is still a distinctive feature that let organizers stand out among competitors. Participants also tend to build an emotional attachment to such meetings and turned out to be a helpful feedback mechanism when it comes to further ecological improvements of an event.

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Although a climate friendly organization, which considers the use of resources, the dietary choice, waste management, eco-friendly accommodation, and energy efficiency is important, its overall effect can be easily compromised when choosing a peripheral venue and thus increase travel time and distance. As outlined above travelling and transportation to events, such as project meetings or conferences, is the aspect that causes most of the emissions by individual science professionals. It is, thus, of major importance to opt for venues, which are easily accessible by public transport. Conference tourism and the professional need to be present at as many conferences as possible fundamentally undermine the efforts to make research more climate friendly. As long as the institutional setting is arranged in a way, which favours those who travel more, no satisfying reduction can be achieved in terms of green events. However, such barriers can be reduced. Even if there are possibilities to use trains or busses instead of short-distance flights, participants often do not (care to) know about them as flying is convenient and still cheap. Informing participants about available connections and facilitating their (local) transport by reduced fares, has proven to be a successful measure to direct transportation from air to rail.

All in in all, the general mood for an introduction of green event guidelines seems to be quite positive among science professionals. Increasing the popularity of guidelines can potentially facilitate a more mainstream organization of green events. Until now the introduction of green meeting guidelines largely depends on interested individuals. Although single science professionals can, with their efforts, serve as change agents, a top-down implementation of guidelines is more effective to ensure a comprehensive application.

Greening communication

Synchronous online communication has become a valid option for the co-operation of distant project teams as well as conferences and workshops. The use of such technologies can reduce the carbon footprint in many ways.

In general technological solutions to reduce face-to-face meetings are broadly known and applied as around 87% of science professionals indicate to have used them (see chart 7 below). The remaining 31% mainly did not use them because of a preference for personal meetings (67%) or because of a lack of affinity and knowledge (28%). The latter suggests that an organizational support infrastructure in the form of trainings could foster virtual communication by eliminating reservations, show time advantages, and train personnel.

Most commonly used is Skype with 84%, which is even more popular than telephone conferences, which does not surprise given its technological advance (e.g. video conferencing possible, accompanying text chat). With 48% almost half of the science professionals asked have experiences with online conference systems such as Adobe Connect or WebEx, but only 23% have used online collaboration tools such as Google

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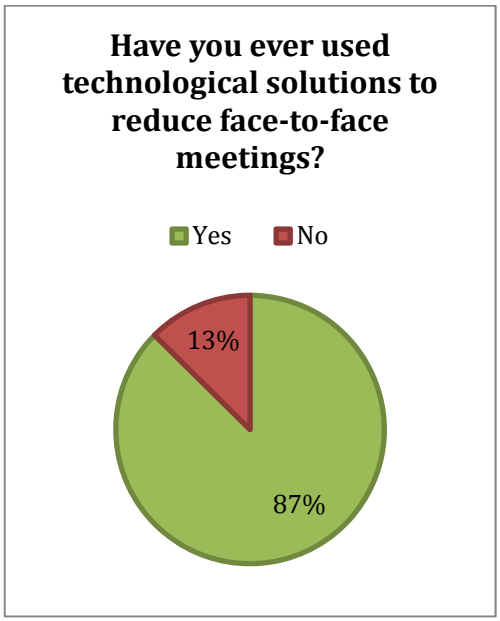
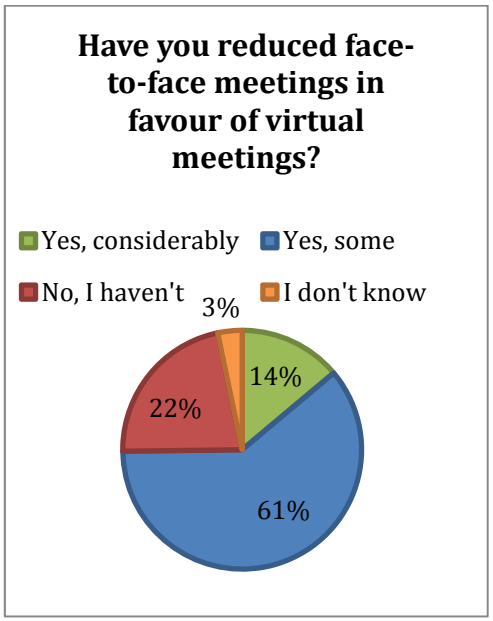
Docs/Google Drive. The use of web conferencing such as Google Hangouts (4%) or virtual worlds e.g. Second Life (1%) is basically non-existent.

CFCR – Chart 7



CFCR – Chart 8



One major barrier to a more comprehensive use is technological difficulties experienced during the use of online communication tools. Only about 25% usually do not experience any obstacles. Comparable obstacles are a slow Internet connection (46%), software (44%) or hardware (42%) difficulties. Furthermore, 27% see a missing support infrastructure as an obstacle to use online communication tools. Around 52% of science professionals state that there is an organizational support infrastructure (e.g. advisor, representative, officer) for virtual communication at their institute. In turn 48% of respondents say that there is no such infrastructure or that they do not know of any.

Although a use of virtual communication tools is widespread, chart 8 above shows that the intensity with which it is used signals potential for improvement. When asked about how much face-to-face meetings have been reduced in the past, only 14% of science professionals have reduced them considerably, 61% to some extent, and 22% not at all.

Science professionals were also asked which measures could facilitate virtual communication to reduce face-to-face meetings even further. Those who have already reduced meetings predominantly find a support infrastructure (60%) or additional equipment (60%) necessary to further facilitate virtual communication. Furthermore they think more incentives by their organisations (37.5%) would also be useful, but only 26% that there is a need for more regulation or guidelines. More incentives by organisations with about 60% are even more important to those who did not reduce face-to-face meetings in the past. However, only 27% see a need for guidelines and regulation at their

institute. Almost equally important are also additional hardware and equipment (53%) and a support infrastructure (47%). Both groups think that virtual communication can mainly be used for communication in project meetings. A difference can be observed when it comes to an application in the daily work of a researcher. 37.5% of those who have not reduced face-to-face meetings prefer virtual communication in their daily work, whereas it is around 2/3 of those who have reduced these meetings.

In summary the data suggests that the most important measure to be taken to facilitate virtual communication is the creation and/or adaptation of support infrastructures. On the one hand, it would help those who already use virtual communication to further apply it in their day-to-day work and additionally reduce meetings in person. On the other hand it would help to include the group of science professionals who has never used virtual communication (to reduce face-to-face meetings). In this regard, especially trainings seem to be a useful measure to educate those with a lack of affinity. Trainings could also help move science professionals from simple technologies with limited functional abilities such as Skype to more advanced tools such as Adobe Connect in order to harvest the full potential of technological solutions. A support infrastructure can, furthermore, be used to increase the popularity of different tools such as Adobe Connect and eliminate reservations as well as explicitly promote the tool's advantages.

The willingness of science professionals to use virtual communication technologies seems to be wide as their advantages are evident (e.g. saving of time and resources). The demand of science professionals for additional hardware shows that besides a support infrastructure one major barrier still seems to be equipment, which does not fit the requirement of new communication tools. However, this barrier is debatably hard to eliminate as it can, again, be traced back to ill-designed accounting practices, which do not take ecological criteria into account. The time and money saved when science professionals omit to meet in person is not being accounted for. Additional equipment as well as hard- and software are considered additional expenses, their positive economic and ecological effects are mostly not being considered. However, a switch to virtual communication does not automatically result in a necessity to buy new equipment, as the example of this research project shows below.

As with the organization of green meetings making more use of virtual communication tools takes time and, thus, financial resources. Firstly science professionals have to be sufficiently trained. Subsequently, it takes time for science professionals themselves to get used to user interfaces, functions, and the utilization of virtual communication tools and include them into their working routines. The use of these tools simply takes time and effort to practice their application.

Above data also shows that science professionals would favour positive incentives to increase the use of virtual communication technologies. However, the demand for additional guidelines and regulation in this area seems to be lower as in other areas such as greening events or the research infrastructure in general. Nevertheless, the potential to increase the use of technology to reduce face-to-face meetings is obvious. If organisations

or funding partners would incentivize research personnel to make more use of virtual tools, travel expenses and emissions could be further reduced.

As was the case with green events a decisive factor not to make a more extensive use of virtual communication is the general lack of awareness about its potential as well as its positive ecological effects. If guidelines or an extensive support infrastructure is being set up this still mostly happens for economic reasons only. Ecological considerations are then only of minor or no importance. This lack of awareness about the possibilities could also be overcome if incentives would be included in funding programmes. So far hardly any funding programme includes guidelines or regulation concerning the preference of virtual communication to meetings in person.

Developments in the scientific community and the travel practices in modern society have further erected cultural barriers to virtual communication, which limit the applicability of technological solutions (e.g. conference tourism, see above). However, for this project the utilization of such communication tools has proven to be particularly useful. Especially for project meetings Adobe Connect turned out to be a viable solution, albeit some technical difficulties, which resemble those observed in the quantitative enquiry. The hardware requirements for online conferencing are astonishingly low (headset and computer), although a fast Internet connection is a vital prerequisite. Yet, the duration of virtual meetings apparently needs to be lower than for personal meetings as online conferencing seems to be more demanding for participants in terms of concentration and focus. In this research project it was the aim to replace the largest part, but not all, face-to-face meetings in favour of virtual communication. The usefulness of physical personal presence is especially important at the beginning of a research project for all the members of a group to personally get to know each other. However, after a kick-off meeting a switch to virtual communication with regular online conferences has adequately replaced meetings in person, which saved a lot of time as well as financial and ecological resources. It could be observed that meetings get increasingly efficient as members learned how to create a productive meeting environment and disturbances are reduced to a minimum.

Policy recommendations and conclusion

The general mood for more climate friendly research seems to be overwhelmingly positive, which could be used by organisations and policy-makers to implement green regulation. Although individual science professionals can serve as change agents by making their research more climate friendly, a top-down implementation of guidelines is more effective to ensure a comprehensive application.

Greening Research Infrastructure

- Forms of guidelines or initiatives for greening research infrastructure (e.g. EMAS) seem to be well known and welcome but scarcely widespread
- Especially in the beginning, audit schemes have positive financial effects and gain in attractiveness
- However, ill-designed accounting practices create budgetary constraints and an implementation of audit schemes is subject to the awareness and motivation of institute personnel

Greening Events

- Guidelines for green events are hardly known and applied in research organisations but science professionals indicate the necessary, positive disposition to organize and participate in green events
- To remove existing barriers, missing support infrastructures, guidelines, and incentives need to be established to make the matter more prominent in the community and point out obvious advantages (e.g. distinctive feature)
- Guidelines for business travel need to be adapted to include environmental criteria, regulation, and incentives as they are largely absent or insufficient and the willingness of science professionals to refrain from short-distance flights is higher than expected
- Significant barriers constitute bus and train infrastructures, flights could, however, be reduced by organizers of green events informing about alternatives to air travel (e.g. rail connections)
- CO_2 compensation programmes should be used for unavoidable air travel
- Conference tourism and the professional need to be present at as many conferences as possible fundamentally undermine the efforts to make research more climate friendly. As long as the institutional setting is arranged in a way, which favours those who travel more, no satisfying reduction can be achieved in terms of green events.

Greening Communication

- In general technological solutions, especially Skype, to reduce face-to-face meetings are broadly known and applied. However, the intensity with which they are used can be further increased. Tools going beyond Skype should be introduced as they will further improve the efficiency of online meetings.

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- The most useful measure to facilitate virtual communication is a more widespread creation and/or adaptation of support infrastructures at organisations which informs and eliminates reservations of science professionals
- Support infrastructures are also needed for training personnel to harvest the full potential of technological solutions such as Adobe Connect
- Science professionals need to be incentivized by their organisations or funding partners to increase the use of virtual communication technologies and reduce the amount of business travel

The most preventive barriers to climate friendly research are easily identified as they are of structural and budgetary nature, whereas the latter is contingent to the former. They are the reason research organisations fail to take up a pioneering role in terms of sustainable development, which ought to be expected of them.

To overcome the structural barriers nothing less than a paradigm change is necessary. It would start with a change in the assessment of a researcher's performance only in terms of the number of excellent (meaning mainstream) publications, international presence at conferences, and participation in research projects. As long as the environment for science professionals and their organisations stays at this competitive level, critical thinking, which is not in conformity with the system, will be driven out and disintegrative thinking will be continued. However, a change in values and the creation of an ecological awareness in all parts of life can only be the result of critical and integrative thinking away from the boundaries of disciplines towards greater inter-disciplinarity.

Awareness building is further undermined by the tendency to close, neglect, or provide less funding for organisations, which do not fit in the mainstream (research) ideology as there added value is not be seen. A number of points are important to achieve an ecologicalisation of a researcher's everyday life. Organisations need to include environmental management into their portfolios and build structures (e.g. Office(r), task Force, etc.) that facilitate a sustainable development. An active building of awareness is currently missing but is paramount. Incentives and regulation needs to be designed in such a way as to favour those who include ecological criteria in every dimension of their daily work life. Funding partners need to fundamentally scrutinize their requirements and what exactly it is they are and want to fund (e.g. include CO_2 compensation). Calls for projects and proposals themselves have to necessarily include climate friendly aspects.

Universities and research organisations have always been one big driver of change in human development. It is, thus, necessary for them to assume a pioneering role again, this time in terms of their sustainability efforts. Especially best-practice examples could help to promote the topic and support those who lack behind. Therefore they need to be publicly presented to a wider audience and made more accessible. For a wider adaptation more cooperation between research organisations is vital and should be facilitated through networks and communication strategies.

About JPI CLIMATE

The Joint Programming Initiative on Connecting Climate Knowledge for Europe (JPI CLIMATE) acts as a strategic platform for aligning national research priorities in the area of climate research and also for launching joint funding activities. It has fourteen member countries (Austria, Belgium, Denmark, Estonia, Finland, France, Germany, Ireland, Italy, Norway, Spain, Sweden, the Netherlands, and the United Kingdom).

JPI CLIMATE contributes to coordinated knowledge development and connecting that knowledge to decision-making on climate change adaptation and mitigation. By connecting science and decision making processes JPI CLIMATE aims to provide the knowledge necessary to meet the challenge of making Europe both climate-friendly and climate-proof, and reach the target of becoming a energy-efficient, low carbon society.

In consideration of the grand societal challenge of climate change being central to research efforts that are initiated by the JPI, it seeks to contribute to mitigating the carbon footprint of its work and activities. In doing so, JPI CLIMATE is committed to increasing the credibility of climate impact research and function as a role model for other groups of society in terms of responsible, climate-friendly science and research.

About the Alliance of Sustainable Universities in Austria

The Alliance of Sustainable Universities in Austria was founded in 2012 as an informal network of universities that aims at promoting sustainability issues in Austrian universities and thus to contribute to a more sustainable society. Currently nine Austrian universities are members of the network. Through its common appearance, the Alliance strengthens sustainability issues generally and also provides added motivation to its members to integrate sustainability at their institutions and adds support to these efforts. The main objectives of the alliance are to exchange good and best practice-experiences and to start joint activities in the fields of research, education, operations, society/knowledge transfer and identity, which are conducted in the framework of working groups. Within the Alliance the participating universities have committed to developing a sustainability strategy as part of the performance agreements for 2013-2015 that each university negotiates with the Austrian ministry for Science, Research and Economy.

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Authors

Kirchhoff, Tobias*; Getzinger, Günter**; Helgenberger, Sebastian***; Pawloff, Adam***; Röthler, David****; Schmitz, Dominik***; Zagel, Bernhard*****

* Vienna University of Economics and Business

** Alpen-Adria University, Klagenfurt, Vienna, Graz

*** University of Natural Resources and Life Sciences, Vienna

**** PROJEKTkompetenz.eu, Austria

***** University of Salzburg

Contact

Adam Pawloff, MA (project lead)

Centre for Global Change and Sustainability

University of Natural Resources and Life Sciences, Vienna

Borkowskigasse 4

1190 Vienna

Austria

Tel: ++43 1 47654 7703

Email: adam.pawloff@boku.ac.at

Further CFCR Policy Briefs and Recommendations

Schmitz, D. et. al. (2014): CLIMATE FRIENDLY CLIMATE RESEARCH POLICY BRIEF "PROBLEM ANALYSIS".

Zagel, B. et. al. (2014): CLIMATE FRIENDLY CLIMATE RESEARCH POLICY BRIEF "EXISTING SOLUTIONS".

Getzinger, G. et. al. (2014): CLIMATE FRIENDLY CLIMATE RESEARCH - RECOMMENDATIONS

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