WE have to change! The carbon footprint of ECPR general conferences and ways to reduce it

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WE have to change! The Carbon Footprint of ECPR General Conferences and Ways to Reduce it

1. Introduction

1.1. Background and research agenda

The question this article deals with is grounded in a discrepancy more and more researchers from various disciplines detect with growing discomfort. They find themselves in a dilemma: While on the one hand they know much about the development of anthropogenic global warming and its disastrous consequences which often also make them try to live as carbon friendly as possible in their daily lives, the informal rules of the scientific community, particularly of the conference-business, push them to travel often long distances. Thus, scientists work-induced carbon footprints are often very large. This article focuses on travelling to scientific conferences as one of the biggest aspects of an average researcher's carbon footprint. I will estimate the travel-induced carbon emissions of the last six ECPR General Conferences, present three options in order to reduce them and evaluate the potential of these options.

2. High impact actions against global warming

According to climatologists, carbon emissions have to be reduced to 2.1 t CO_2 equivalents per capita by 2050 in order to reach the goal of limiting global warming at a maximum of 2 degree compared to the pre-industrial age (Girod, van Vuuren, & Hertwich, 2013). This is also the main goal of the Paris Agreement (UNFCCC, 2015). In order to reach the goal of a maximum warming of 1.5 degrees as the IPCC recommends in its latest special report (IPCC, 2018), an even higher reduction of greenhouse gas

(GHG) emissions is needed. Change towards these goals requires serious emission cutbacks throughout all spheres of human society, from the major industries to public infrastructure as well as individual lifestyle. In 2017 a study achieved worldwide attention when it discovered the four highest impact actions to reduce personal emissions within high developed societies (Wynes & Nicholas, 2017). The authors found by far the biggest potential for CO_2-reduction in having fewer children (one child fewer being equivalent of 58.6 t CO_2-eq per year). With this specific action being criticized methodologically for double counting (van Basshuysen & Brandstedt, 2018) and also from an ethical point of view since family planning is a human right (Pedersen & Lam, 2018), the basic idea of the study is compelling: the authors argue, that it makes most sense to push forward primarily those actions with the highest impact on reducing GHG – and not those that are in many cases promoted by government agencies and NGOs as eco-friendly behavior (e.g. upgrading to power saving light-bulbs or reusing shopping bags) but that in fact only have a low impact on emission reductions. Apart from the recommendation to have one child less, the three other recommended actions received much less attention. According to Wynes and Nicholas these actions are: "living car free (2.4 t CO_2-eq saved per year), avoiding airplane travel (1.6 t CO_2-eq saved per roundtrip transatlantic flight) and eating a plant-based diet (0.8 t CO_2-eq saved per year)" (Wynes & Nicholas, 2017, p. 1). These numbers show that a significant part of personal CO_2 emissions in developed countries results from travelling which makes the intensity of a person's mobility and the chosen mode of transportation two of the most relevant and at the same time easiest to change factors in order to reduce the personal carbon footprint.

3. Academic conferences as part of the scientific world

In the life of an academic, scientific conferences are often thought to be important events. Not only do they provide the possibility to disseminate one's own research among interested peers, but also to catch the newest developments within a discipline. Furthermore, at conferences and congresses scientists have the possibility to exchange views and ideas face to face, in direct conversation with their colleagues from around the world. These social gatherings may also help to build new research networks. Critics of the growing conference tourism instead argue that the professional, i.e. scientific profit of these events is minimal. They believe most academics to participate in conferences and congresses for two other reasons: they either travel to conferences for mere symbolic reasons[1] or they take the chance to enjoy a holiday trip for a couple of days to an interesting city which in addition they often get paid for by their home-university or a research fund. Conference organizers often even actively promote tourist activities such as guided tours or bus trips to landmarks close-by.

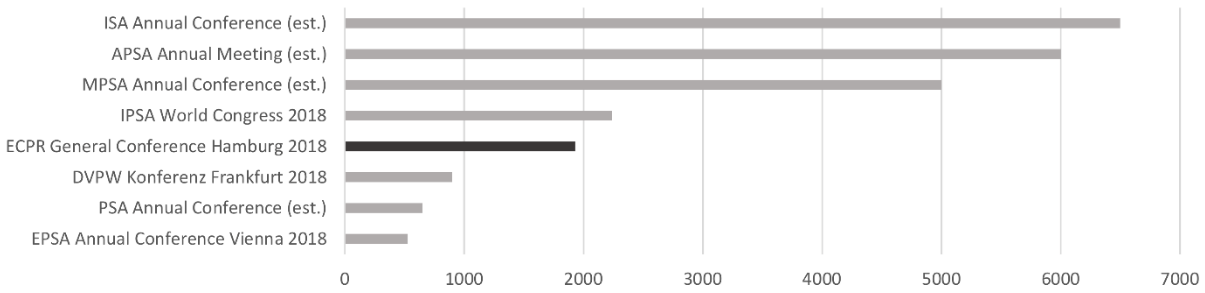
Regardless of their actual scientific added value, the fact that in today's academic sphere conferences occupy a significant amount of researchers' time clearly has to be acknowledged. Yet, in the last years, more and more scientists, particularly from disciplines related to climate and ecology have questioned the practice of flying large distances to attend academic conferences (Grémillet, 2008; Holden et al., 2017; Hoyer & Naess, 2001). They criticize not only the very high GHG emissions of scientists (compared to average citizens) which first and foremost follow from their frequent work-induced flights, even if they otherwise lead low carbon lives (Fox et al., 2009; Grémillet, 2008) but also the fact that a high carbon footprint from flying to conferences significantly reduces climate researchers perceived credibility among the general audience (Attari, Krantz, & Weber, 2016). A small number of studies also tried to estimate the carbon footprint of scientific conferences in total (Desiere, 2016; Kuonen, 2015), per attendee, or the average emissions for presenting a single scientific paper (Spinellis & Louridas, 2013). Given the seriousness of the climate crisis, it is however astonishing that the number of these works is still very limited and that they are restricted to a small subset of disciplines from the natural sciences (particularly ecological climatology and environmental studies).

Despite the fact that political science is dealing with the topic of the climate crisis in various ways – e.g. assessing the effects of climate change on security risks and conflict (Nordås & Gleditsch, 2007), analyses of actual climate policies (Delreux & Ohler, 2019) or the framing of climate change (Blue, 2016) to name but a few, there is no assessment of the carbon footprint of political science (or neighboring social sciences) conferences up to now. One reason for this lack might be that political science – in spite of all the works published during the last couple of years – is still not at the forefront of scientific work that deals with climate change and its consequences (Javeline, 2014).

4. The last six ECPR General Conferences

The ECPR General Conferences (GC) provide an interesting case for estimating the carbon footprint of major scientific conferences. For a rather small discipline – which political science still is – the GC attracts a large number of attendees. While not at the same level as the annual conferences of the three US based organizations ISA, APSA and MPSA, it is not much behind the IPSA and by far bigger than other European conferences as the German DVPW Konferenz, the PSA or EPSA annual conferences (see Fig 1).

Figure 1: Attendance at major Political Science conferences



Annotation: PSA, MPSA, APSA and ISA do not make the exact attendance numbers of single conferences public. The presented numbers for these conferences are the numbers these associations give as long term averages.

Furthermore, the participants do not only come from European countries – although Europe still dominates the General Conferences – but from around the world (see table 1) which is also a characteristic of most international scientific conferences. In order to estimate the travel induced carbon footprint of ECPR General Conferences I collected the publicly available information on paper presenters and their home-institutions from the online conference programs available at the ECPR website for the last six GCs (Bordeaux 2013, Glasgow 2014, Montreal 2015, Prague 2016, Oslo 2017 and Hamburg 2018). Since the online programs do not have to be completely congruent to the list of actual attendees (some academics may have been listed in the program but did not show up, while others may have attended without presenting a paper) they are not a perfect source for determining who actually attended the conferences. I nevertheless had to resort to this source since ECPR Central Services refused to provide me with a list of conference participants due to GDPR. Thus, every paper presenter mentioned in the online program is counted as an attendee. In the rare case that more than one presenter is listed for a single paper, I expect all presenters to have attended the conference. Table 2 gives an overview of the six conferences in terms of presenters, papers and home institutions.

Table 1: Participants of the ECPR General Conference 2018 in Hamburg by continent

Continent	**Participants**
Africa	3
Asia	75
Australia	29
Europe	1725
Central and South America	15
North America	76
Affiliation unclear	7
Total	1930

Annotation: Own calculation based on data from the ECPR website.

Table 2: Overview of the last six ECPR General Conferences

Conference	**Papers**	**Presenters total**	**Independent scholars and presenters with unknown affiliation**	**Home institutions**
Bordeaux 2013	1681	1656	64	463
Glasgow 2014	1613	1541	45	450
Montreal 2015	1351	1174	14	422
Prague 2016	1902	1663	14	503
Oslo 2017	1785	1613	6	470
Hamburg 2018	2125	1930	7	494
Total	10.457	5.992[a]	75[a]	979[a, b]

Annotation: Own calculation based on data from the ECPR website. a) each presenter who attended more *than* one GC is only counted once; b) the real number of different home institutions is probably a bit higher due to those participants for whom it was not possible to determine their affiliation.

5. Methodology for estimating the carbon footprint of ECPR General Conferences

The basic methodological approach I use to estimate the carbon footprint (*cf*) of travelling to conferences is simple and has also been applied in earlier studies (Desiere, 2016; Kuonen, 2015): I multiply two times the distance *d* a participant has to travel from his or her home institution to the conference location (= return trip) with the average greenhouse gas emissions a certain means of transportation has per km (= emission factor *e*). I distinguish between three modes of transport: by airplane, by bus and by train. Assuming that each participant only uses one means of transportation it is possible to calculate the carbon footprints for each of the three using the following formulas:

$$cf_{plane} = d_{greatcircle} \times e_{plane}$$

$$cf_{bus} = d_{roads} \times e_{bus}$$

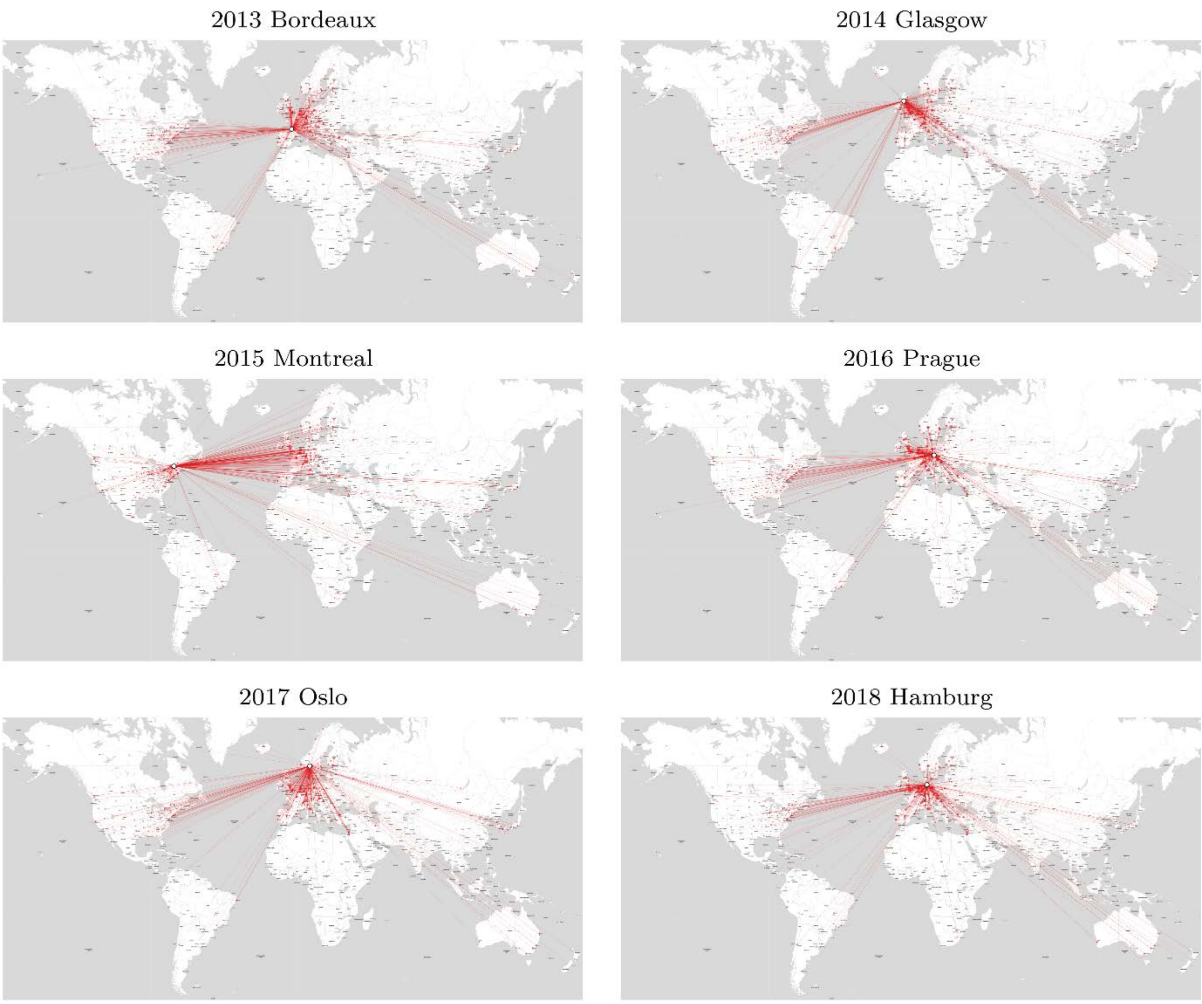
$$cf_{train} = d_{railway} \times e_{train}$$

5.1. Calculating the travel distances

The coordinates of the home institutions which are included in the web scraped lists of papers were automatically collected from Wikipedia as longitude and latitude values in the WGS 84 coordinate reference system. These data were then imported to the geographic information system (GIS) application QGIS. In this program three different GIS-analyses were conducted in order to obtain the travelling distances to the conferences by means of transportation – airplane, bus, and train.

First, I calculated the shortest distance between all presenter's home institutions and the respective conference locations using the formula of the great-circle (see Figure 2). These data can be used to approximate distances for air travel. Using the "raw" great circle distances for the estimation of the GHG emissions would nevertheless result in a systematic bias, estimating the emissions from participants who travel to the conference by airplane too low. In many cases there are no direct flights from the presenters' hometowns to the conference locations which means stopovers and thus longer travel-distances. Furthermore, aircraft often do not take the shortest route but have to fly more inefficient detours. Kettunen et al. (2005) found that the actual distances aircrafts fly are between six to ten per cent longer than the great circle routes between the departure and the destination airports. And moreover, airports are often relatively remote from the city centers so that travelling to and from the airports adds a significant portion to the GHG emissions of airline passengers. In order to account for these three points, the great circle distances are multiplied by a factor of 1.2 to obtain more realistic numbers.

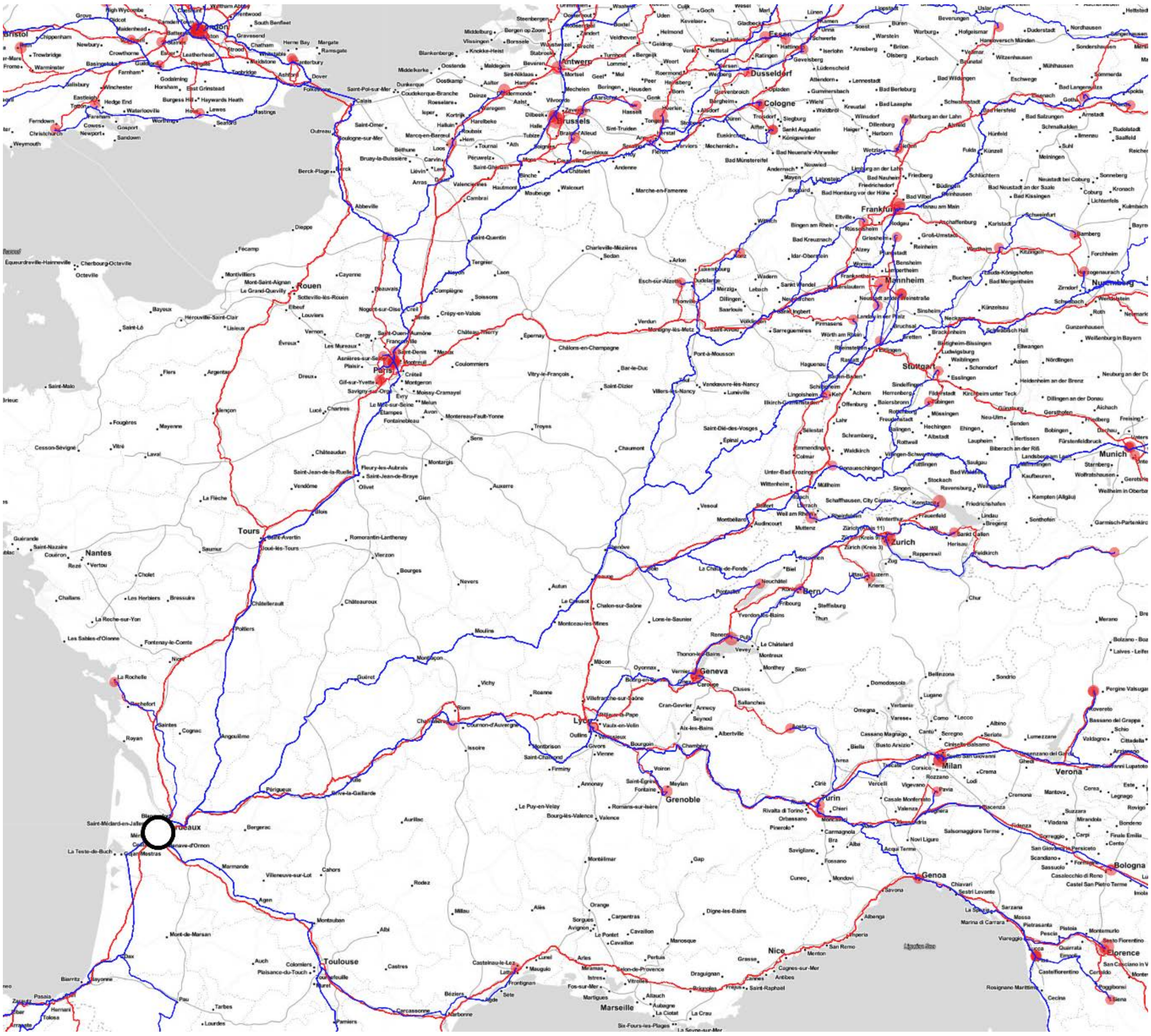
Figure 2: Great circle distances between home institutions and conference locations



Second, using the Openrouteservice API (https://openrouteservice.org/) from within QGIS, I calculated for each conference the fastest journey times by car, as well as the respective routes from the presenter's home institutions to the conference venue (see Figure 3 for a map section exemplifying the distance calculation for the 2013 conference in Bordeaux). The cartographic data underlying this endeavor comes from OpenStreetMap (https://www.openstreetmap.org/). Since Openrouteservice limits the routing to distances below 6,000 km, this street-based calculation has only been performed for those home institutions within this limit. Thus, driving times and distances could be calculated for all locations within Europe (for the five conferences in Europe) and for the North American institutions for the 2015 conference in Montreal.

Third, I performed a shortest path calculation between the home university and the conference locations based on a network of all existing railroad tracks. The vector data for this railroad network comes from https://www.naturalearthdata.com/downloads/10m-cultural-vectors/railroads/. Apart from the fastest routes by car (red lines), the map in Figure 3 also includes these shortest railway paths (blue lines).

Figure 3: Fastest connections by car (red) and shortest connections by train (blue) to the ECPR General Conference 2013 in Bordeaux



5.2. Emission factors

The second important factor necessary for the estimation of the carbon footprint is how much GHG[2] are emitted per passenger and per km for different means of transportation. These are the so called emission factors which different scientists, governmental as well as nongovernmental agencies have estimated. Since the calculation of the emission factors is based on a multitude of choices and assumptions, it comes as no surprise that we find significant variation in their values between the different sources. For example, one crucial aspect is the average passenger load factor since per capita emissions are certainly higher if a higher percentage of the seats remains empty. For railway travel another important decision is which kind of electricity mix is assumed to power the trains (or if there are even still diesel trains at work). In order to absorb potential biases from the use of emission factors that are based on unrealistic assumptions, I will use three different sources for the emission factors: 1) UBA: the German Federal Environmental Agency (*Umweltbundesamt*) publishes emission factors based on the Transport Emission Model (TREMOD 5.82), 2) EEA: the European Environment Agency published emission factors for different vehicle types in its 2014 Transport and Environment Reporting Mechanism (TERM) report, and 3) UK: the Government of the UK provides a yearly dataset including the latest conversion factors for GHG reporting which also include emission factors for different modes of travel. Table 3 shows the differences between the emission factors of these three sources. Although the table shows some major differences, the overall pattern becomes clear. Travelling by airplane is by far most climate-damaging mode of transportation, whereas traveling by bus or train emits between 3.7 and twenty times less GHG than flying. Furthermore, the biggest net-differences among the three sources in the emission factors are for travelling by plane which means that the estimations based on the three sources can also be interpreted as lower and upper bounds for the carbon footprint (with the EEA estimation probably representing the upper and the UK estimation the lower limit).

Table 3: Emission factors per passenger-kilometer in g CO_2 equivalents

Vehicle	UBA	EEA	UK
Car	139	104-158[a]	97-198[b]
Bus	32	68	28
Train	36	14	44
Airplane	201	285	163[c]

Annotations: UBA: Umweltbundesamt (German Federal Environmental Agency) TREMOD 5.82, 2017, EEA: European Environment Agency TERM-report, 2014, UK: Government of the United Kingdom conversion factors, 2018. a) dependent on size (small car vs. large car); b) dependent on size (small car vs. large car) and fuel type (diesel vs. petrol); c) long haul to/from UK in Economy class.

5.3. A realistic estimation – who flies, who travels by bus or train?

The final decision for the estimation has to be which presenter uses which means of transportation. While for a researcher from Australia there is probably only one option, attendees from Europe have different options from which they can chose for their journey – by airplane, by bus or by train. I assume that this decision primarily depends on the travel time. Having calculated the journey times by car, I assume for the baseline estimation that attendees travel land-bound if they can reach the conference venue within five hours. Otherwise they would take the airplane. In the following estimations we will also see what impact it would have if presenters chose to travel land-bound even if it takes considerably longer than five hours.

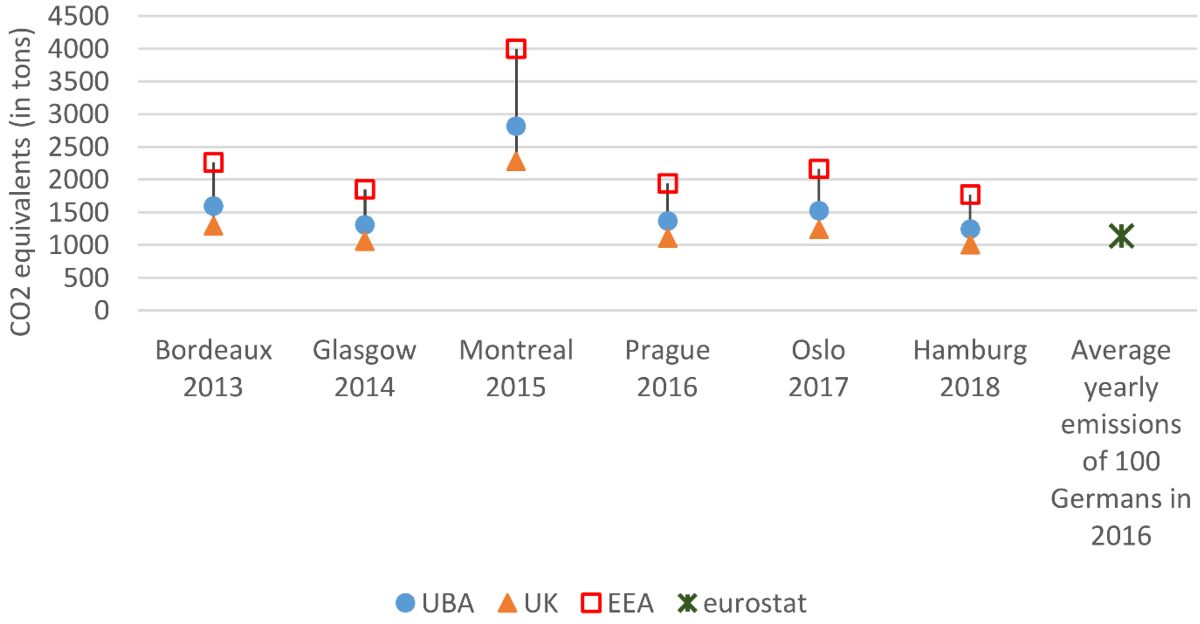
6. Results of the baseline estimation

6.1. Total emissions

Figure 4 shows the total GHG emissions of travelling to the six ECPR General Conferences using the three different sources for the emission factors and under the assumption that attendees travel by bus if they can reach the conference venue within five hours. For those participants with no affiliation available (see table 2), the average of the other participants was used to calculate the total GHG emissions. This estimation will be referred to in the following as *baseline estimation*.

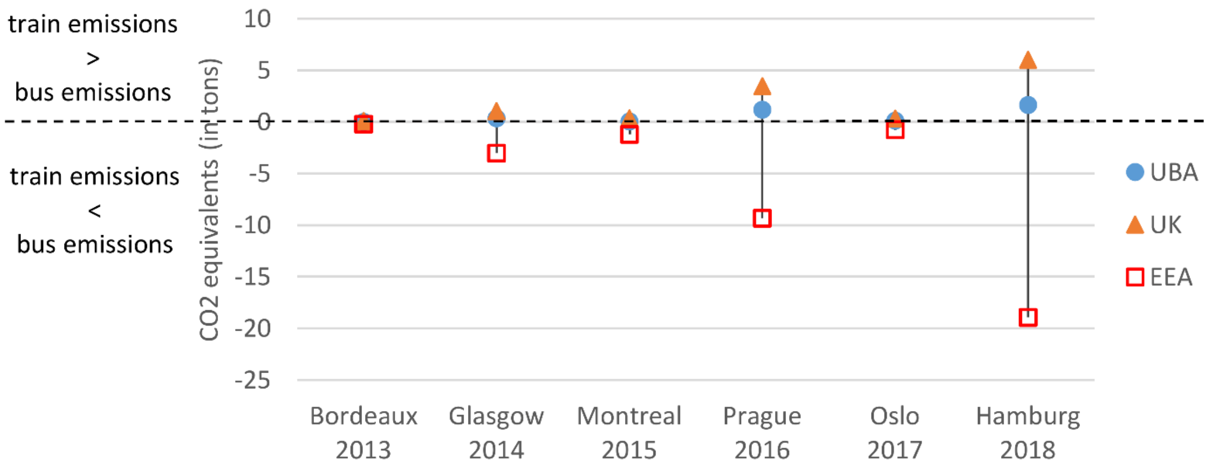
For all of the conferences within Europe the lowest estimation which is based on the UK governmental emission factors, gives values of at least 1,000 tons CO_2e. The upper limits based on the EEA are between 1,770 and 2,260 tons CO_2e. To set these numbers into comparison: The average yearly GHG emissions of 100 Germans are about 1,140 tons. Thus, an average ECPR General Conference that lasts three to four days has about the same carbon footprint (just from the travel induced emissions) as 100-150 average Germans in a whole year. Yet, there is one conference standing out considerably. It is the Montreal conference with estimated total emissions of 2,820-4,000 t CO_2e. Even though this conference had the fewest participants (1,174), the fact that all the Europeans had to travel by plane to Canada made it by far the worst conference in terms of its carbon footprint.[3]

Figure 4: Total GHG emissions of travelling to ECPR General Conferences (journeys < 5h travel time: by bus; > 5h: by plane)



In Figure 5 we see that whether attendees choose to travel by bus or by train does not make a huge difference for the total emissions. Assuming that average travel times are not much different between bus and train (a high speed train network is not available everywhere in Europe and train passengers probably need more time for transfers), it is also justifiable to use the group of attendees who is able to reach the conference venue within five hours by car/bus for the comparison with traveling by train.[4] The figure shows that for the conferences in Bordeaux, Montreal and Oslo it virtually did not make any difference if participants who could reach the conference land-bound within 5 hours would travel by bus or by train. The biggest differences can be seen for the conferences in Prague and Hamburg particularly when the EEA emission factors are applied which state rather low numbers for the train emissions. At the Hamburg conference about nineteen tons of CO_2 equivalents would have been reduced if all the participants who did not fly in, traveled by train and not by bus. This is due to the fact that Hamburg is well connected to the European high speed train network and is located quite centrally so that a bigger proportion of presenters is able to reach the conference by train. Yet, compared to the total emissions of 1,770 tons CO_2e, it is obvious that the decision between bus or train is only of marginal relevance.

Figure 5: Comparison of total GHG emissions for traveling by bus or by train (journeys < 5h travel time: bus or train; >5h: by plane)



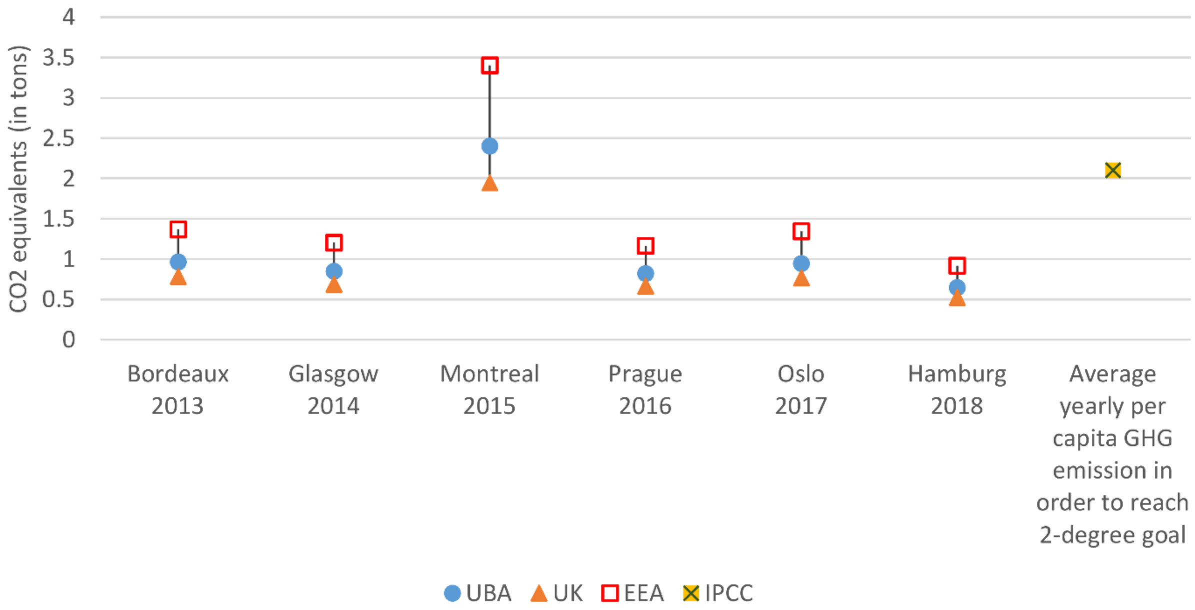
6.2. Per capita emissions

Another way of presenting the above numbers is to show the average footprint of attendees. These GHG emissions per capita can easily be compared to average per capita emissions in certain countries or to the average per capita emission needed to reach the two-degree goal. Figure 6 depicts the average GHG emission per attendee compared to these 2.1 tons of CO_2e which every human on average is allowed to emit yearly in the long run (by 2050) in order to limit global warming to a maximum of two degrees Celsius. The estimation is again based on the assumption that everyone who is able to reach the conference within 5 hours on the street network uses the bus, while the others fly.

Again the 2015 conference in Montreal stands out with an estimated carbon footprint of up to 3.4 tons CO_2e. Even the lowest estimation for this conference, based on the UK governmental emission factors, presents a picture where an average attendee emits nearly as much GHG by traveling to Montreal as humans are allowed to emit in a whole year in the long run according to the IPCC. Turning to the conferences within Europe we find estimates of carbon footprints between 500kg and 1200kg CO_2e, which is still about a quarter to a half of the yearly emissions allowed to reach the two-degree goal. Compared to an average citizen's carbon footprint even the lowest limit of GHG emissions we found

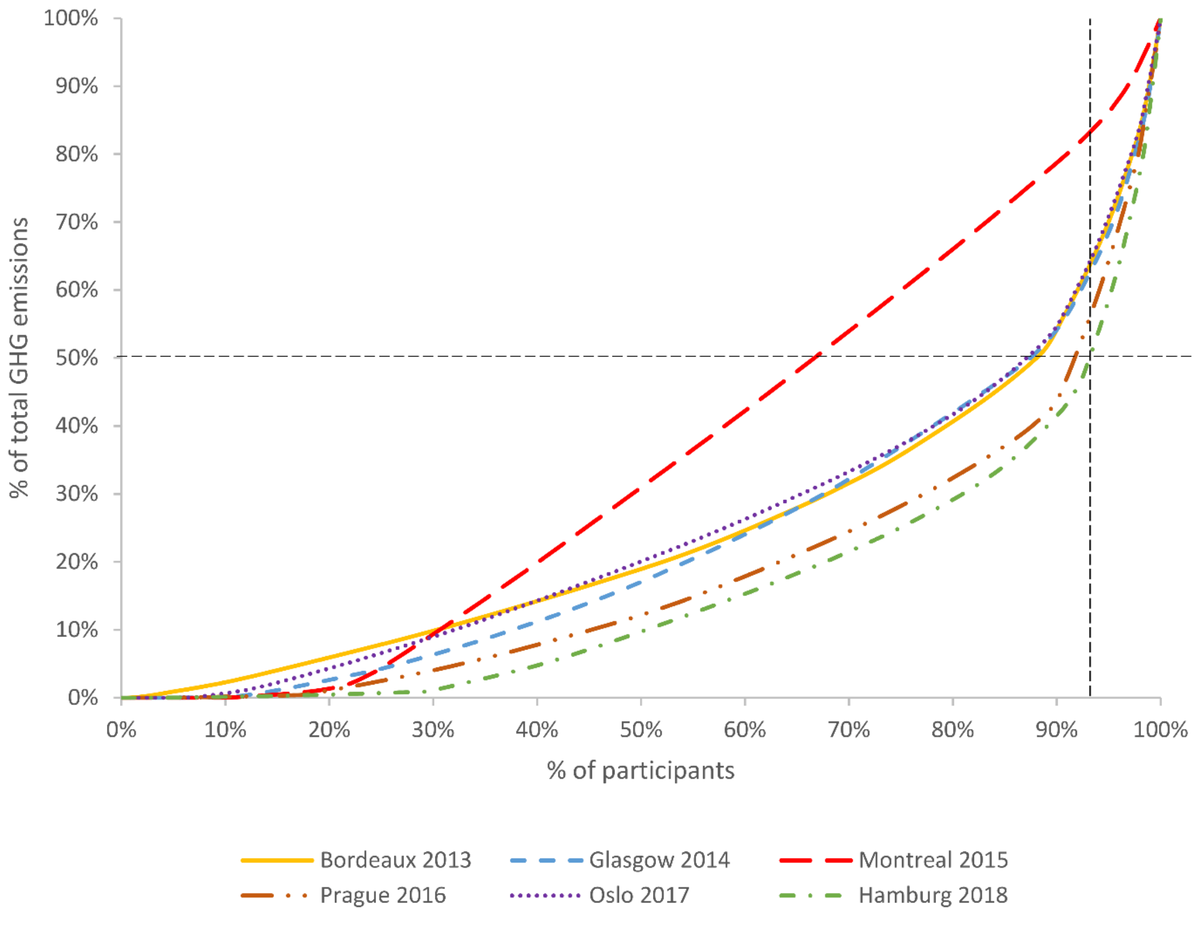
(500kg) accounts for about three per cent of an average US American, five per cent of an average German, and twenty-five per cent of an average Indian footprint. We also see that conference location matters not only when comparing Montreal to the five European locations, but also within Europe. At the Hamburg conference the average per capita GHG emissions were for example estimated between 244 and 424 kg lower than at the preceding event in Oslo. A more centrally located conference venue which is ideally well connected to the European high speed train network as it is the case for Hamburg (compared to Oslo) can therefore contribute to a significant reduction in GHG emissions.[5]

Figure 6: Average GHG emissions per attendee of travelling to ECPR General Conferences (journeys < 5h travel time: by bus; > 5h: by plane)



The presented average numbers can nevertheless be misleading, since there is a large variation between the participants' carbon footprints. The Lorenz curves in Figure 7 show that GHG emissions are far from being equally distributed among the attendees. Rather a small number of presenters accounts for the majority of the emissions. With the exception of the Montreal conference, where only a small number of participants had the possibility of traveling land-bound, all distributions are heavily skewed, with the last conference in Hamburg exhibiting the most unequal distribution of GHG emissions. Here about only seven percent of the participants accounted for half of the total emissions. To give an example, the largest carbon footprint for a participant (from the University of Canterbury, NZ) at the 2018 conference was estimated at 7.1 – 12.5 tons CO_2e which is about the same size as an average German emits per year and 3.5 to six times the emissions allowed per year to reach the two-degree goal. This also means that if the total carbon footprint of ECPR General Conferences shall be reduced, focusing on these heavy emitters has high potential.

Figure 7: Distribution of GHG emissions among attendees



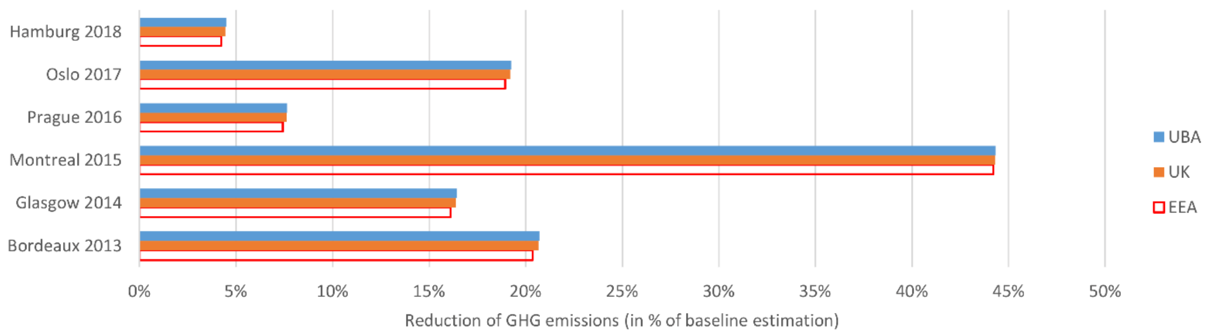
7. Possibilities to reduce the carbon footprint of ECPR General Conferences

The preceding estimations have shown how big the GHG emissions from traveling to the ECPR General Conferences have been in total and per attendee. Compared to average citizens' yearly carbon footprints and more so compared to per capita emissions that experts regard to be necessary in order to limit global warming at about two degrees Celsius, the GHG emissions from these conferences are very high. In the following paragraphs I will present some ideas how the ECPR could react in order to reduce the carbon footprint of its conferences and estimate how big the potential for GHG reduction would be.

7.1. Choosing more central conference venues

The estimations above have shown that the question where a conference takes place is important with regard to its carbon footprint. The General Conference 2015 in Montreal is an outstanding example, but there were also significant differences in the GHG emissions for those conference that took place in Europe. Particularly the 2018 conference in Hamburg exhibited a smaller carbon footprint per attendee than the one in Oslo in 2017. Thus, a more centrally located conference venue which can be reached by a larger proportion of participants via land-bound means of transportation within a reasonable amount of time has the potential to reduce the carbon footprint. In order to see how big this potential is, I performed the same estimations as above, but changing the conference venue for all six conferences to Frankfurt (Germany). Frankfurt is quite centrally located in Europe and it is very well connected to the European high speed train network which makes it a suitable comparison for the real conference venues.[6] Figure 8 demonstrates that with a conference venue in Frankfurt the GHG emissions for each of the six ECPR conferences would had been significantly lower.

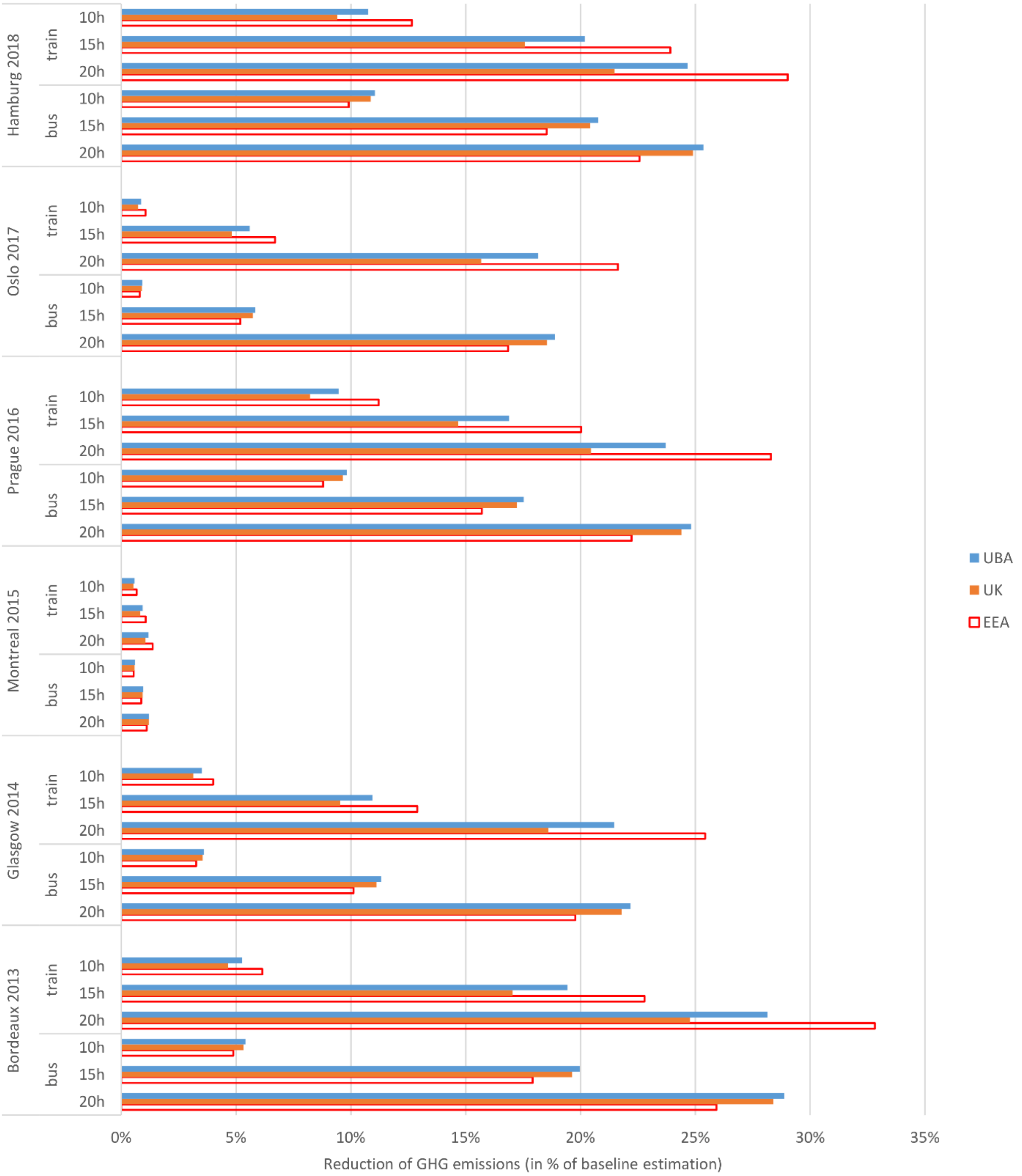
Figure 8: Potential reduction of total GHG emissions if the conferences had taken place in Frankfurt (in % of baseline estimation)



7.2. Promoting low emission travel options

The estimations showed that particularly flying is a bad option. Traveling by bus or by train are both an improvement in terms of the carbon footprint. All the above estimations assumed that only presenters who can reach the conference venue in less than five hours on the street network would choose not to fly. One option to reduce the GHG emissions would therefore be to stimulate the attendees to choose low emission travel options, even if this significantly increases their travel time compared to flying. In order to estimate the possible emission reduction, I calculated the emissions under the assumptions that attendees choose to travel by bus or train for journey times below 10h/15h/20h. Figure 9 shows the possible total reductions as percentage of the baseline estimated emissions. While for the Montreal conference the effects are negligible, accepting longer traveling times by bus or train – particularly those longer than fifteen hours – would have reduced the total GHG emissions for the other conferences significantly. Yet, there are important differences. While for the conferences in Prague, Hamburg and Bordeaux all fifteen-hours-estimations result in a reduction of 15-20 per cent, at the two more remote conferences in Oslo and Glasgow the same estimations only make up 5-10 per cent. This shows that a more central location which is good to reach by bus and/or train, can in combination with the promotion of low emission land-bound travel options result in a significant reduction of the carbon footprint. Furthermore, Figure 9 also shows that with a higher number of attendees who chose to travel by bus or train, the question which of the two land-bound means of transportation is better in terms of carbon emissions becomes more virulent. Particularly the EEA and the UK estimations differ in that regard.

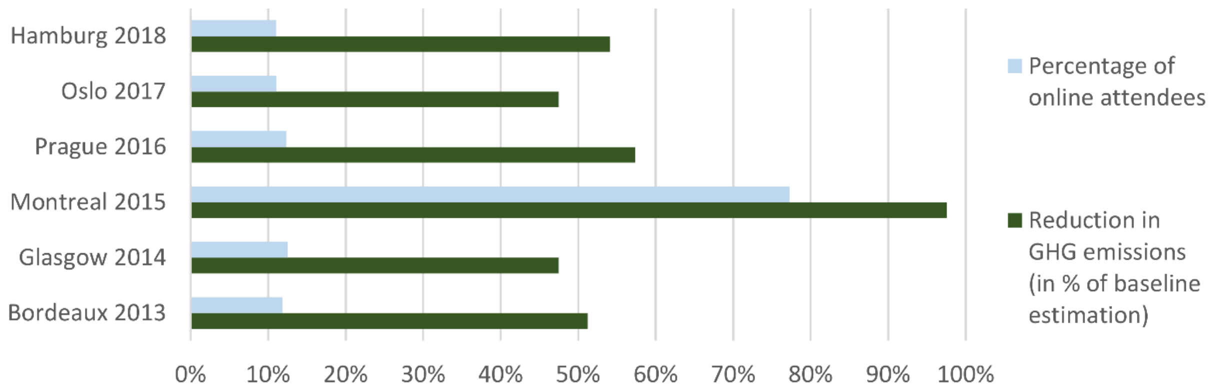
Figure 9: Potential reduction of total GHG emissions if attendees accept longer travel times by bus/train (in % of baseline estimation)



7.3. Introducing online participation particularly for researchers from far away as an alternative to regular attendance

As we saw before, a quite small group of participants accounts for a big part of the total emissions. Thus, one obvious option in order to reduce the carbon footprint of the ECPR General Conferences would be to reduce the number of participants who come from far away (particularly America and Australia). Modern communication solutions such as remote conferencing services make it possible for panelists to attend a conference from at home. They could present their research and take part in discussions just as any regular attendee. From a technical point of view, at least one participant in each panel could take part in the conference without attending it in person. Figure 10 shows the potential for the reduction of the carbon footprint if those participants whose flying distance is longer than 4,000 km attend the conference online. Except for the special case of the Montreal conference, for all other conferences about twelve per cent of the participants came from further than 4,000 km away. If they do not travel to the conference venue, this means an estimated reduction of 47-58 per cent compared to baseline estimation.

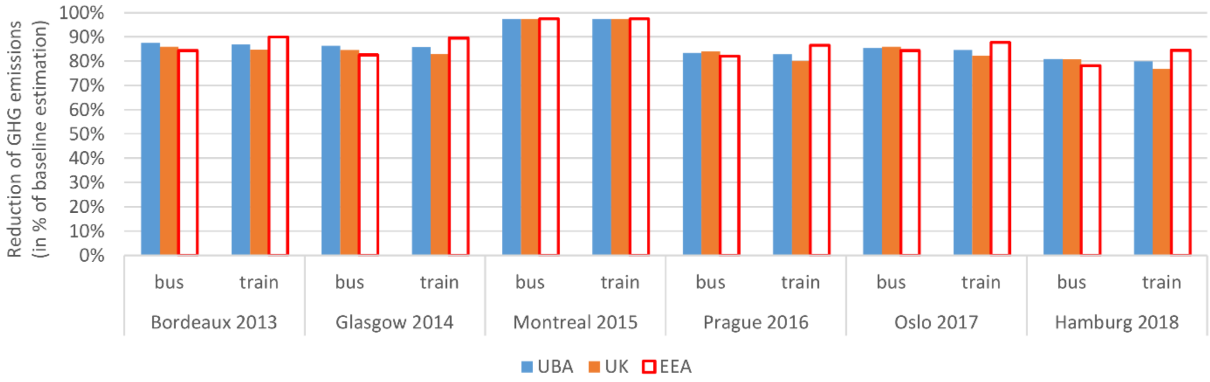
Figure 10: Potential reduction of total GHG emissions if those participants with a flight-distance > 4,000 km attend the conference online (in % of baseline estimation)



7.4. Combined effects of all three actions

The overall potential for GHG reduction at ECPR General Conferences is even higher if the three possibilities are used in combination. Figure 11 compares the baseline estimation with the maximum reduction case in which the conferences had taken place in Frankfurt, attendees travelled land-bound for travel times below 20h and all participants whose flying distance was greater than 4,000 km did not attend in person but online from at home. This maximum reduction scenario shows the huge potential that exists to reduce the carbon footprint of the General Conference: depending on the source of the emission factors and conference venue between 75 and more than 90 per cent of the GHG emissions could have been saved. In total numbers this would mean that for example the GHG emissions of the Hamburg conference could have been reduced from 1,010-1,770 to about 195-250 tons CO_2e – or expressed as average emissions per participant: from 520-920 to about 100-200 kg CO_2e.

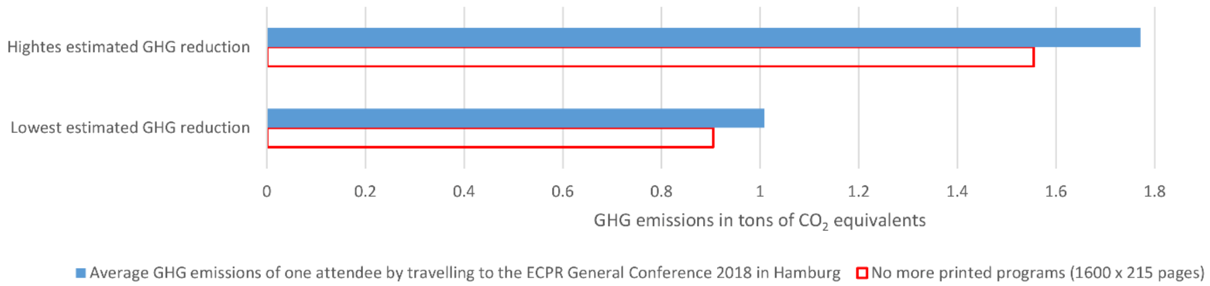
Figure 11: Maximum potential reduction of total GHG emissions if all three actions are applied (in % of baseline estimation)



7.5. For comparison: emission reduction actions taken by the ECPR

At the moment the ECPR does not take any actions to address the problem of GHG emissions caused by the journey to the General Conferences. However, the ECPR offers the attendees to choose whether they wish to receive a printed conference program in addition to the online version. Since the production of paper and the printing process also has a considerable carbon footprint, this measure can be seen as the only definite action ECPR takes to reduce the emission impact of their conferences. Yet, as the following estimation shows, this action is largely symbolic. The estimation of the carbon footprint of printing the conference program is based on emission factors (per page) from a Finnish study (Pihkola H et al., 2010) that applies a life cycle approach – from paper production to disposal – to estimate the emissions for a heatset offset printed magazine (which is a similar print product as the conference program). Figure 12 shows the potential reduction of GHG emissions if the ECPR completely abstains from handing out printed conference programs. The emissions from the whole life cycle of a 215 pages long conference program are estimated between 565 and 930 g CO_2e (mostly depending on whether recycled paper, and green energy is used for production and particularly whether after usage it is recycled or comes to a landfill). For an average number of participants of 1600, abolishing the printed program would result in a GHG reduction of 900-1500kg which is less than the average carbon footprint of an attendee at the Hamburg conference (baseline estimation) – which already had the lowest per capita emissions. Thus, while every action taken to reduce the carbon footprint of ECPR General Conferences is very welcome (also from the point of raising awareness), the optional choice not to take a printed conference program actually has a very limited impact on the emissions.

Figure 12: Potential reduction of total carbon footprint if the printed conference program gets completely abolished



8. Conclusion and recommendations for concrete actions

In this article I estimated the carbon footprint (total and per attendee) of the last six ECPR General Conferences. It became obvious that the pattern of today's conference business is far from being sustainable. Average emissions per attendee of 0.5-1.3 tons CO_2e (for the five conferences that took part in Europe) – not to mention the 1.9-3.4 tons for the Montreal conference in 2015 – cannot be justified when climate experts tell us that every human is only allowed to emit about 2.1 t CO_2e in the long run per year in order to limit global warming to two degree Celsius compared to the pre-industrial age. To make this point even more explicit – I personally ask myself quite often whether any political science paper is actually worth it to fly around the globe in order to present it, or whether the networking with colleagues at a nice bar is actually a good excuse for emitting tons of GHG. Yet, scientific conferences are still believed by many researchers to serve important tasks within science and we should thus concentrate on getting them as climate neutral as possible.

The good news is that significant improvements are possible! My estimations have shown that a combination of three measures have the potential to reduce the carbon footprint of traveling to ECPR General Conferences by at least 75 per cent. These measures are 1) selecting a more centrally located conference venue, 2) promoting low-emission land-bound travel options so that attendees choose these carbon friendlier means of transportation even if this comes along with longer journey times, and 3) introducing the option of online-participation, particularly for colleagues from far away. Other disciplines already show that the goal of climate-neutral conferences is not a phantasm, but could become reality if the organizers take the problem really serious (Bankamp & Seppelt, 2013; Bossdorf, Parepa, & Fischer, 2010).

So which concrete actions could the ECPR take?

As a starting point, ECPR could conduct a survey among the participants of General Conferences asking them about their actual traveling patterns, their routes and their chosen means of transportation (cp. Kuonen, 2015). Knowing more exactly how attendees travel to the General Conference would help to render carbon footprint estimations (as the ones in this paper) more precise and would also show which factors are causal for the choice of a specific low or high emission means of transportation.

Secondly, while it may be unrealistic to have the General Conference always in a very centrally located city such as Frankfurt, the potential GHG emissions associated with the location of the conference venue should also be taken into account when the ECPR decides about where the next conferences should take place. Venues not in Europe (as 2015 in Montreal) or on remote islands (as 2011 in Reykjavik) should be avoided while those cities that are well accessible via the European high speed network should be prioritized.

Third, ECPR should test possibilities of introducing an online participation at the conference. Encouraging examples of workshops and panels with online participation and even conferences that take place completely in the virtual sphere, e.g. via twitter, do already exist and can serve as examples (Avery-Gomm, Hammer, & Humphries, 2016). This could not only reduce the carbon footprint enormously, but could also promote the inclusion of non-European researchers who otherwise would not have the possibility to attend the General Conferences due to high travel costs.

Fourth, in order to promote land-bound travel options which in the estimations have shown to be much less climate-damaging than flying (whether participants chose a bus or a train makes only a minor difference in contrast), ECPR could also take concrete actions. These actions could take on different forms from giving simple information during the online registration in order to raise awareness for the issue of carbon emissions up to voluntary or even obligatory carbon-offset options. Furthermore, ECPR could award a prize to participants who make the greatest efforts in shrinking their carbon footprint of travelling to ECPR General Conferences. A similar system already exists at the Society for Conservation Biology which in 2015 awarded the Swarovski Optik Green Travel Award to two researchers from England who travelled to the Society's conference in Montpellier (France) by boat and bicycle (Rosen, 2017). Such an award would be cheap and easy to implement, not only to offer incentives for participants to choose carbon-neutral means of transportation but also to present the discipline in the general public as actually caring about climate change which is particularly relevant for our credibility. In terms of good publicity, ECPR could also promote the idea of a bicycle rally (star bike ride) to the respective conference venues. With images of perhaps hundreds of participants travelling hundreds of km through Europe by bike in order to attend the ECPR General Conference, we as a discipline could definitely send a strong signal out to other scientists as well as the general public.

And finally, the ECPR should document all the actions it takes to reduce the impacts of its conferences on the environment – even if these actions are minimal. This is also a matter of awareness and transparency (Holden et al., 2017).

Implementing these actions could help to make the ECPR General Conference a scientific meeting with as little negative impact on the climate as possible. Yet, this transformation can only be successful if we political scientists start to question our own conference-hopping behavior. Let me be clear: attending two to three international conferences every year – and we all know colleagues for whom these numbers may even be too low – can never be sustainable in terms of the carbon footprint. The only rational consequence of this has to be that we also reduce the numbers of conferences that we attend.

Notes

[1] Being accepted as a presenter at a prestigious conference is seen as an indicator for scientific achievements. That is also why we find conference participations in most scientific CVs.

[2] In accordance with the general usage of the term I subsume not only carbon dioxide (CO_2) to GHG, but also methane (CH_4) and nitrous oxide (NO_2). The overall GHG emissions are presented in CO_2 equivalents.

[3] The 2011 ECPR General Conference in Reykjavik had probably a similar or even higher carbon footprint. Yet, for this conference, as for the others before, no paper/presenter details were available at the ECPR website, so that I was not able to estimate the GHG emissions for them.

[4] In order to come to a more realistic estimate it would be necessary to know the average speed of a train on a given route section of the railway network (just as Openrouteservice offers for the street network). Yet, such data is unfortunately not available.

[5] For the train scenario the difference between the conferences in Oslo and Hamburg is even a bit higher than for the bus scenario: 242-434 kg CO_2e.

[6] A further argument for Frankfurt would be that it has one of Europe's largest airports (4th after London Heathrow, Paris Charles de Gaulle, and Amsterdam Schiphol) which serves a lot of direct flights to major cities, thus minimizing the need for longer travel distances due to transfers.

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