



ISEE Statement: Greening the International Society for Environmental Epidemiology

Introduction: Why it is critical to fight climate change and other environmental disruptions

Our planet is currently undergoing environmental changes of unprecedented pace and magnitude, including climate change, globalized pollution, biodiversity loss, and changes in land use. All these changes are interconnected and driven by anthropogenic forces. Climate change is the most iconic, and together with biodiversity loss the most worrying of these changes, given their capacity to severely disrupt the life system upon which humanity relies, and the irreversibility of some of these changes.

The Intergovernmental Panel on Climate Change's (IPCC) Special Report: Global Warming of 1.5 °C confirmed the scientific consensus that the Earth is undergoing rapid global climate change and that human contributions are driving this increase (IPCC 2018). The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) also concluded that the biosphere was already altered to an unparalleled degree, which threatens all dimensions of human health (IPBES 2019).

Climate change has already created conditions that affect public health, as outlined in the ISEE Policy Committee's statement (Al-Delaimy & Krzyzanowski 2019). The 2019 Lancet Countdown documented that children will suffer directly from climate change (Watts et al. 2019). Climate change will affect people's health as a result of their increased exposure to elevated temperatures, more frequent, severe, or longer-lasting extreme weather events; higher transmission rates of food-borne, water-borne- and vector-borne diseases; increases in air pollution from molds, pollens, and the burning of fossil fuels; and mental health stressors. Natural disasters such as floods and hurricanes are worsening as temperatures and sea levels rise. The impacts are felt most among those living in poverty. Biodiversity sustains human health by providing access to fundamental resources, regulating environmental hazards, and nourishing cultural and spiritual life (Millenium assessment 2005). Although the health consequences of biodiversity loss have been less frequently considered by the scientific community than the health consequences of climate change, they are potentially dramatic.

Actions to limit climate change, to restore nature, and to reduce globalized pollution are urgently needed to reduce the current burden of these changes, to avoid the worst,

irreversible scenarios, and to ultimately save future generations. Expert groups (IPCC and IPBES) make it clear that these objectives are still achievable, but that they require deep, rapid and ambitious modifications of our societies. Worldwide, individuals, institutions, non-governmental organizations, and states are changing to address this unprecedented situation.

The need for individual AND collective actions

At the current rate of greenhouse gas emissions, the global temperature will be +1.5°C higher than pre-industrial revolution levels by 2040. To have a fair chance to stay below +2°C (a threshold considered highly dangerous), net emissions should become null before 2050; i.e., carbon emissions would be entirely absorbed by carbon sinks (which are mostly oceans and forests). Plus, greenhouse emissions need to be divided at least by 2 in less than 12 years. To achieve this, a massive decarbonization of energy production, transport, and agriculture is needed. It is considered feasible by experts, and could even be associated with massive social, economic and health benefits (IPCC, 2018).

Another illustration of the efforts required is the current situation with the COVID-19 pandemic. It was estimated that the pandemic would result in a decrease by 4% of the French GES emissions for the year 2020, as a result of the sheltering and economic disruption. To comply with the Paris agreement, however, French GES emission should decrease by 6% at least each year.

It is likely that most of the ISEE members are aware of this scientific knowledge, and of the health implications, and that they are willing to act.

Individual actions will not be sufficient, however, because they are constrained by the socio-technical choices made at collective levels. For instance, a study in France found that the mean annual carbon footprint in France is 10.8 tCO_{2e}, a number that needs to drop to 2 tCO_{2e} to comply with the Paris agreement. Individuals adopting “heroic” environmentally friendly behaviors could achieve at best a 25% reduction in their carbon footprint. Less “heroic” behaviors could lead to a 5-10% reduction. In other words, more than 75% of the emissions decrease can only be achieved through collective, systemic changes (Carbone 4, 2019).

In this context, ISEE has a duty to reduce its footprint, pursuing several objectives:

- Being consistent with the values of the ISEE members who are already engaged in deep individual changes.
- Facilitate and motivate those individual changes.
- As a collective organization, act to change the socio-technical references of the society, i.e., invent sustainable ways to organize scientific exchanges, and share best practices and experience.
- As an organization producing guidance and comments on key environmental health issues, being consistent in speech and in action.

In this document, we discuss some aspects of these challenges.

Values, knowledge, willingness to act and action

Most ISEE members have a good understanding of the situation and of what is at stake. However, transforming knowledge into an action is not straightforward. Values, beliefs in the efficiency of changing behaviors, technical constraints, and peer interactions are all playing a role in the adoption of new ways of life. The efforts that are required are so large (not necessarily in terms of realization, but certainly in terms of shifting the way of thinking and going against the routine), that they cannot depend only on factual scientific knowledge. People need to be deeply convinced that changing behaviors is fair, and can be convinced in intellectual and/or emotional ways.

There is a need for debate and discussion on those issues among members. Specific sessions should be organized during conferences for thorough discussion among members. For instance, a serious game on climate change could be organized as a social activity and a way of educating people about the science of climate change (e.g. <http://climatecollage.org/>), a discussion on ways to cope with ecological grief could be included in the program, debates on the role of science versus activism, and sharing of good practices to reduce the environmental footprint of science.

Some members are likely already very involved in changing behaviors, with new lines of conduct that may prevent them from participating in future ISEE conferences if greening solutions are not adopted. Those people might, for example, refuse to fly to attend the conference.

Most ISEE members are already taking less definitive actions. The success of the carbon compensation during the last ISEE conference illustrates this willingness to act. However, ISEE has the duty to be even more ambitious, because we are in such a state of emergency that every gram of CO₂ matters.

The environmental and social responsibility of ISEE: every gram of CO₂ matters

Integral to this discussion is the ethical obligation of the collective membership of ISEE to be proactive in not contributing to anthropogenic greenhouse gas (GHG) emissions. ISEE has long been a leader in defining what constitutes ethical behaviors among environmental epidemiologists – and formally accepting responsibility to practice those behaviors – in the context of conducting research, as well as the translation of that research to evidence-based guidance for environmental strategies and policies that protect human health and natural systems. Although ‘ethical behavior’ can have many nuanced definitions – as a professional society, ISEE has integrated into its Ethics Guidelines for Environmental Epidemiologists (2012) Basic Ethics Principles from the public health and environmental epidemiology disciplines; those principles include but are not limited to: Protect the most vulnerable; Environmental justice; the Precautionary Principle; Protect the public interest over any other interests; and Scientific integrity.

The damage to human health and well-being, and to natural systems, associated with climate change transects each of those principles and challenges us to make clear decisions that are in keeping with our collective ethical responsibilities. Climate change is having and will increasingly have disproportionate deleterious impacts on vulnerable

populations, e.g., children, medically underserved, and peoples living in under-resourced communities and nations least resilient to extreme weather events or slow-moving disasters – which almost by definition is an issue of environmental justice given those most impacted are in most cases those who contribute least to GHG emissions. Although there is some uncertainty about how and where inter-seasonal or inter-annual environmental changes will play out, there is little or no uncertainty that rising atmospheric concentrations of GHG are linked to rising global temperatures that are translating to significant often synergistic disturbances of earth's climate systems with adverse consequences on humans and ecosystems. Thus – if we are to abide by the precautionary principle – we must not use uncertainty in timing or location of ‘outcomes’ (or occurrence of climate change-mediated stressors) as an excuse to postpone actions to curtail the ultimate exposure of concern – anthropogenic GHG emissions.

ISEE has a responsibility to rise to the ethical challenges posed by the climate crisis. ISEE scientific meetings are important venues for scientists to share ideas and results from research projects, identify new collaborators, and plan future work. Yet ISEE meetings also have a large carbon footprint, primarily because they entail a large amount of international travel. In 2013 the ISEE meeting in Basel worked towards a “Greener” conference by limiting printed materials (with a printed program available only upon request), choosing regional, seasonal and organically grown food, and reducing raw meat consumption (Kunzli et al. 2013, 2016). But ISEE has not yet developed a formal statement to ensure that these efforts continue.

Virtual conference versus physical conferences; which one is a real “loss of chance” for humanity?

Key to the greening of ISEE conference is the matter of airplane transportation. Without flying, the international attendance of physical conference would be much reduced. The interest of gathering a large group of people at the same location is to favor networking, to advance careers, and to get a good overview of what is currently going on in the environmental epidemiology community. It answers to the value of internationalism, diversity and inclusion. However, the price to pay is high in terms of CO₂ emissions. Transportation to the conference venue is a key issue for the ISEE Conference, especially long-range airplane transportation. For instance, traveling from Paris to Washington, D.C. to attend an ISEE conference would represent about 1 tCO₂eq, i.e. 50% of the target of 2 tCO₂eq per year; this leaves few options for transport, food and energy consumption for the rest of the year.

We know of no comprehensive study of environmental epidemiologists’ carbon footprints, but the literature on university academics and researchers in general indicates that per capita emissions tend to exceed those of the population at large, and long-distance flying is one of the biggest contributions (Wynes et al 2019; Balmford et al 2017).

The U.S. Environmental Protection Agency estimated that the largest share (28.9%) of greenhouse gas emissions in the U.S. in 2017 was generated by the transportation sector, primarily from the burning of fossil fuels for cars, trucks, ships, trains, and planes. (US EPA 2019) An estimated 27.5% of greenhouse gases generated in the U.S. are due to electricity production, 22.2% from industry, 11.6% from businesses and homes using

fossil fuels for heat and handling of waste, and 9% from agriculture such as from livestock and other activities. The emissions profiles of other countries vary from that of the U.S. in many ways, but energy, transport and food systems are substantial contributors globally. (<https://www.c2es.org/content/international-emissions/>).

Carbon offsetting is a popular option, and better than doing nothing, but it has many limitations (Becken 2017). Clearly, we need to stop adding GHG into the atmosphere. Plus, it is actually difficult to identify relevant carbon offsetting programs. So, the strategy should really focus on reducing emissions, and use offsetting as a solution only when reduction is not feasible.

Considering the high level of emissions associated with flying, and the emergency to decrease emissions, is it still ethical to sponsor/attend annual in-person conferences, when those conferences primarily benefit ISEE and its members, especially those who attend, but in the face of climate change are not in the interest of the broader public – of society or the environment? As a science-based organization and collective of scientists – is our scientific integrity not better demonstrated by taking action to not contribute to the climate crisis by holding in-person conferences less frequently or placing a moratorium on in-person conferences that have large carbon footprints that cannot easily be offset by other actions?

If we organize only virtual conferences, will it be a lost opportunity for the planet, in the sense that science will become poorer, while lobbyists opposing climate actions and still meeting in person will grow stronger? To that argument, we suggest that five decades of science on climate change, and of scientific meetings, have been useless in slowing down emissions. Quite the opposite, recent efficient actions have been performed by local activists, sometimes children, who were using the new technologies and social media to organize virtual, international sharing of actions. Plus, before the democratization of planes, and long before the internet, scientists have always been able to communicate and create an international work of ideas and distance collaborations.

Using our collective ingenuity and the extraordinary communications technology available in the 21st Century – can we not identify a near-carbon-free mechanism by which to foster the exchange of knowledge/ideas and the social connection so important to the scientific process? Such a self-imposed moratorium, along with demonstration of creative communications solutions, also sets a critically important example for other professional societies and organizations that host in-person meetings to rethink their operations in the context of social and environmental responsibilities in this rapidly narrowing opportunity to combat the climate crisis.

Development of a long-term strategy to obtain carbon neutral ISEE conferences

The above considerations make an argument for setting targets consistent with international climate change goals, and then working systematically to achieve these targets. It is important to consider the question ‘what constitutes sufficient action aimed at GHG emission reduction to meet the agreed upon “degree of ethical obligation to be proactive”?’ Should ISEE consider placing a three-to-five year moratorium on holding in-person annual conferences? Or if ISEE annual conferences continue to be in-person

events, is it sufficient to ensure every aspect of the event is implemented in accordance with sustainable practices (e.g., reusable, recyclable, compostable materials, minimizing food waste, supporting active transportation and/or mass transportation, etc.) – and is to the extent possible ‘decarbonized’?

Many professional organizations are facing the question about how to organize sustainable conferences, and it would be useful to share ideas and experiences on this question. (Jäckle 2019, Zotova et al. 2020).

Below are listed some ideas that must be taken into account when organizing physical or virtual conferences. They do not substitute for a debate on the ethical questions stated above but provide a vision of all the practical aspects that need to be considered.

Issues to consider when organizing a physical conference

Food & Water

Meat and dairy production are strong drivers of climate change and biodiversity loss, as large-scale production relies on the artificialization of natural landscape, and deforestation (i.e. destruction of a natural carbon sink). The carbon footprint of a non-vegetarian diet is approximately twice the carbon footprint of a vegetarian diet (between 2X and 3X depending on the estimates). Red meat (lamb, beef, pork) and cheese have the largest environmental footprint. Individual actions (such as consumption of a plant-based diet), if taken up by millions of people, could help to reduce these greenhouse gas emissions. The carbon footprint of food is usually underestimated by people. Limitations to the adoption of a low-meat diet are habits, social norms, and lack of ideas on how to cook vegetarian dishes.

Water saving also results in energy saving; energy is used to heat water, and to pump and purify it.

Giveaway items

Giveaway items should be eliminated, because even so called environmentally friendly items (reusable bags, bottles) are polluting, and contribute to the accumulation of useless products. Almost everyone has numerous reusable bags and water bottles at home. Giving away these items could be replaced by symbolic actions (e.g., planting trees), or allocating the budget used for giveaway items to the funding of a local project consistent with ISEE values. Organizing friendly social events that would result in nice memories also would be more valuable than giveaway items.

Air conditioning

Virtually all conference locations are air-conditioned, whatever the outdoor temperature. Conference organizers should request that the indoor temperature be kept to a reasonable value compared to the outdoor temperature, in order to reduce energy consumption. Lighting should be turned off when not in use.

Issues to consider when organizing a virtual conference

Digital sobriety needs to be developed, as information technology consumes non-renewable resources and energy. Digital transition could be helpful to reduce GHG emissions, but not in the way it is done today. Development of websites, apps, and other information technology supporting the conference should take this into account, favoring contractors who are aware and engaged on those issues.

Future Considerations for ISEE

While the discussion with ISEE members is continuing, ISEE is now committing to exploring ways to reduce the carbon footprint for the annual international meetings of the Society and embracing the organization of decarbonized scientific conferences. ISEE pledges to undertake the following actions and to develop quantitative objectives and regular feedback to the ISEE members about the Society's efforts towards sustainability.

- To annually reduce the environmental and carbon footprint of ISEE conferences, until they reach an impact compatible with the Paris agreement
- To align with the values of ISEE members who are already engaged in changing ways of life, so that they will continue to attend ISEE meetings
- To raise awareness among ISEE members who are not yet engaged in such changes
- To incentivize companies contracting with ISEE for the organization of the conferences to propose environmentally and socially responsible options
- To serve vegetarian meals at lunches and dinners at ISEE conferences
- To select contracts that favor seasonal, local, healthy food, respecting the cultural background of the ISEE members
- To eliminate plastic and disposable materials as much as possible
- To reduce food and water waste (depending on local regulations)
- To select hotels with a sustainability policy, if possible.

ISEE will also explore the following:

- Organizing on-line conferences (+: less travel, -: less contact between people, technical difficulties to access the materials in some places, digital pollution)
- Network of simultaneous conferences set together at different venues easily accessible without planes, and connected together through the internet (+: less travel, possibility of contacts, -: limitations of the possible venues, lack of mixing between continents).
- Organizing a conference every 2 or 3 years (+: less travel, - more difficult to sustain ISEE membership).
- Finding completely different ways of interacting. Science was able to develop in periods, not so long ago, when airline travel was much less accessible!

ISEE commits to keeping the vision of a green ISEE Conference high on the Society's agenda for the health of current and future generations.

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