Your Virtual Event’s Environmental Footprint

What impact does a virtual event have on carbon emissions and other environmental impacts? And what can you do to minimize your event’s footprint?

The U-M President’s Commission on Carbon Neutrality recommends promoting video conferencing as an alternative to in-person meetings and travel. Due to the pandemic, many of us are now more comfortable with virtual meetings and events, opening up new opportunities.

**Event Environmental Footprint Factors**

In most cases, virtual events have a smaller environmental footprint than in-person events. An exception: smaller meetings in which all attendees are local and hosts take action to make the event sustainable.

For example, an event with local attendees which makes efforts to be sustainable has a negligible difference in footprint compared to a virtual event.

<table>
<thead>
<tr>
<th>Factor</th>
<th>In-Person</th>
<th>Virtual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Travel</td>
<td>Travel impacts vary greatly depending on distance. Local is the least, followed by regional. The greatest carbon impact will be from anyone traveling by air. If many attendees are traveling by air, this factor becomes the largest footprint.</td>
<td>None</td>
</tr>
<tr>
<td>Space</td>
<td>Heating and cooling are typically the most carbon-intensive needs for any building space, especially large event rooms. The greater your space usage, the larger this footprint. If traveling, attendees also stay in hotels. Emissions from space usage can be mitigated by choosing venues that source from renewable energy.</td>
<td>None. (Typically, attendees of a virtual event do so in a space they already use on a daily basis, so no additional heating/cooling is needed.)</td>
</tr>
<tr>
<td>Tech and Lighting</td>
<td>If your event uses large projectors, electrified exhibit spaces, or advanced AV or lighting equipment, your energy use will go up.</td>
<td>Although attendees probably use their computers daily, they are likely generating additional carbon emissions by additional video-conferencing, streaming, and data exchange. The more live-video and large data exchange (e.g. emailing large video and PowerPoint files to all attendees), the greater the carbon footprint. Still, it’s miniscule compared to in-person.</td>
</tr>
<tr>
<td>Food</td>
<td>Food provided at the event can create additional carbon emissions compared to what your attendees would eat on a normal day, especially if there is lots of food waste, disposable packaging, and/or higher impact food choices (e.g. beef, cheese).</td>
<td>None</td>
</tr>
<tr>
<td>Materials and Waste</td>
<td>Production and disposal of materials distributed at an event can really add up, especially if they include lots of paper printouts, decorations, or giveaways.</td>
<td>None, typically</td>
</tr>
</tbody>
</table>

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Your effort supports U-M’s greenhouse gas reduction goal: Reduce scope 1 and 2 greenhouse gas emissions by 25% by 2025.
Event Type Footprints

Because each event and each attendee is different, it is difficult to predict or calculate the footprint of your specific event. Instead, here are examples of events that have had full carbon impact analyses:

**Very large international scientific conference (26,000 people)**
- 69,300t travel (most from international flights)
- 99.9% savings if virtual
- Prevented emissions = 1,445 American families’ annual emissions

**Large international conference (5,000 people)**
- 7,188t travel + 523.9t venue/hotel/energy use
- 124.4t for intense virtual reality conference (98% savings)
- Prevented emissions = 158 American families’ annual emissions

**Regional meeting (Chicago, w/ 500 people from Midwest)**
- 0.78t travel (all driving, some carpooling) + 7.6t venue/hotel/food for 1 night/2 days
- 90% savings if virtual
- Prevented emissions = 0.2 American families’ annual emissions

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**Carbon Footprint Examples**

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**OTHER COMMON EMISSION SOURCES**

<table>
<thead>
<tr>
<th>Event Type</th>
<th>Carbon Footprint</th>
</tr>
</thead>
<tbody>
<tr>
<td>Car from A2 to Detroit</td>
<td>17 kg</td>
</tr>
<tr>
<td>1 night hotel room</td>
<td>16 kg</td>
</tr>
<tr>
<td>1 day operating large conference center</td>
<td>19,900 kg/day</td>
</tr>
<tr>
<td>1 day operating Palmer Commons</td>
<td>3440 kg/day</td>
</tr>
</tbody>
</table>

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A study by Global CO2 Initiative researchers at the U-M College of Engineering showed that over 60% of carbon emissions from a larger virtual conference are associated with network data transfers (uploading and downloading data such as video calls, streaming, etc.). Their study also includes a calculator for estimating the carbon footprint of your event. Internet use accounts for over 3% of global greenhouse gas emissions—and has only grown since the pandemic. Although still a small piece of the pie, now is a good time to instill carbon-friendly habits!

- Have attendees turn off their webcams if not needed, like during a keynote speaker or long presentation.
- Encourage attendees (especially those watching on small screens) to watch videos in standard definition (SD) instead of high definition (HD).
- Provide opportunities for text-based communication through services such as Discord or Slack.
- Ask presenters to compress media files before sharing with attendees.
- Remind attendees to delete unneeded emails and files after the event.

Reducing the Impact of a Hybrid or In-Person Event
What about a hybrid event? Or if it really needs to be in-person?

- If your event draws people from all over, consider having regional hubs instead of all in one location. This can eliminate the carbon emissions from air travel while maintaining the benefits of in-person collaboration.
- Consider hosting your event in person only every other year. This not only lowers your footprint by half, it also increases participation and equity by allowing less well-funded colleagues to attend in the virtual years. (e.g. European Astronomical Society 2020 was the largest in history.)
- If in-person, skip giveaways, send out materials digitally, and serve low-carbon food. See the U-M Office of Campus Sustainability - Sustainable Event Tips for more ideas.
Resources and Links

Additional Resources

TerraPass Carbon Calculator (not an endorsement, simply an example)
EPA Greenhouse Gas Equivalencies Calculator
U-M Carbon Neutrality Plans
Nearly Carbon Neutral Conference Guide (from UC Santa Barbara)
Michigan Catering - Low Carbon Menus
U-M ITS Videoconferencing Guides
Reducing Carbon Emissions of Academic Travel

Educational Links

https://www.icao.int/environmental-protection/Carbonoffset/Pages/default.aspx
https://ccafs.cgiar.org/bigfacts/#theme=food-emissions
https://www.sciencedaily.com/releases/2021/01/210114134033.htm
https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100U8YT.pdf
https://www.hotelfootprints.org/footprinting
https://ocs.umich.edu/resources/sustainability-data/building-energy-data/
https://github.com/milankl/CarbonFootprintAGU
https://www.kqed.org/science/1966164/covid-19-is-pushing-scientific-conferences-online-maybe-thats-where-they-belong
http://css.umich.edu/factsheets/carbon-footprint-factsheet
https://www.sfu.ca/sca/projects---activities/streaming-carbon-footprint.html
https://www-nature-com.proxy.lib.umich.edu/articles/d41586-020-02057-2?sf236038067=1
https://www.biorxiv.org/content/10.1101/2020.04.02.022079v1.full.pdf
https://www-nature-com.proxy.lib.umich.edu/articles/s41550-020-1207-z