

Zoom or Room ?

Is Attending a Conference Virtually Better for the Environment?

Introduction & Background

Background

Scope 3 Emissions Program of Stanford University launched in 2021 with an objective to cut down the indirect emissions of the university to the maximum extent has identified that the 'Travel' category with emission intensity of 0.36 kg CO₂e/USD, is the fourth most emissions overarching spend category at Stanford.

As we all know COVID-19 changed the way of holding major academic conferences. Almost all conferences in the first part of this year have been moved online, typically via Zoom. So our goal is to quantify the emissions of attending a conference.

This project aims to find the most sustainable way to attend an academic conference by a faculty or a student to present the research work or ideas so as to reduce the scope 3 emissions of the university from travelling.

What are "Scope 3" Emissions?

Scope 3 emissions are not directly emitted by the university but are indirect emissions that are influenced by the university's activities and operations.

Scope of the Project

A person attends a conference for various purposes like presenting an idea, networking, learning from other speakers and presenters, travelling and local sight-seeing, and so on, but for this project only one purpose i.e., presenting research work or ideas, is considered while ignoring the others.

Functional Unit

One graduate student attending one conference over 5 days

- 4 hours per day if via zoom
- 5 hours per day if in person

We have not considered CO₂ emissions from food, accommodation, commuting between the airport and the meeting place, and personal events during the meeting. We only consider the carbon dioxide emissions caused by transportation and the use of electronic products during the meeting.



Analysis Methods and Process Flows

- In our study, we explored various scenarios for attending virtual and in-person conference
- For attending in-person, three different means of transportations were explored:
 - 1.) plane, 2.) electric vehicle (EV), and 3.) internal combustion engine vehicle (ICE)
- We compare those cases to the case where the student attends the conference virtually via laptop, with the conference location having to install equipments to accommodate such virtual conference

- The scope of our analysis includes everything from raw material acquisition to the meeting (see Figures 1 and 2)
- We utilized SimaPro to obtain information on the production phase of each "good" and other sources to calculate the use phase of each "good"
- We performed sensitivity analyses on:
 - 1.) distance travel to and from conference
 - 2.) conference attendance and hours on Zoom
 - 3.) AV equipment lifetime & use/production alloc.

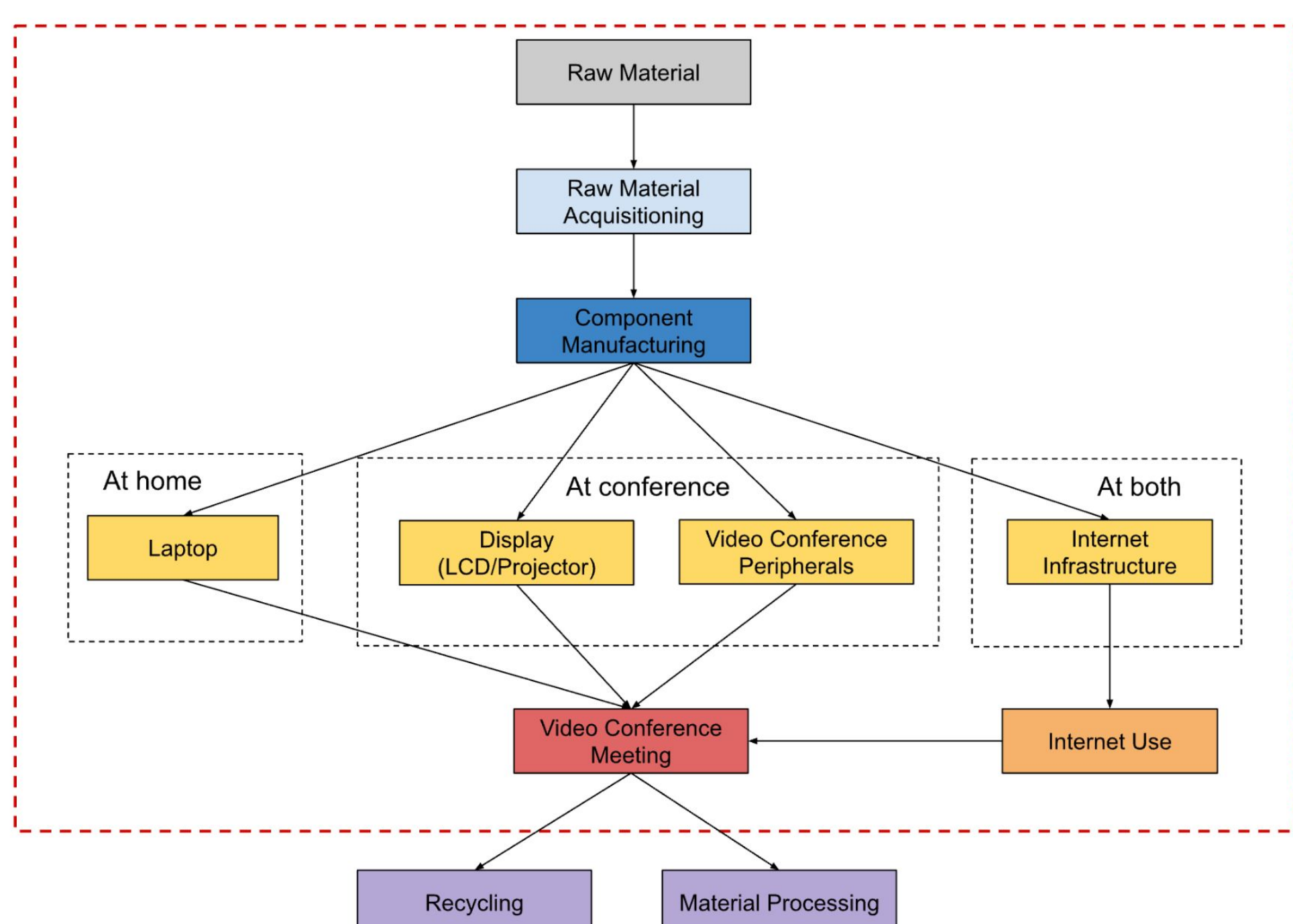


Figure 1. Process flow diagram for virtual conference case.

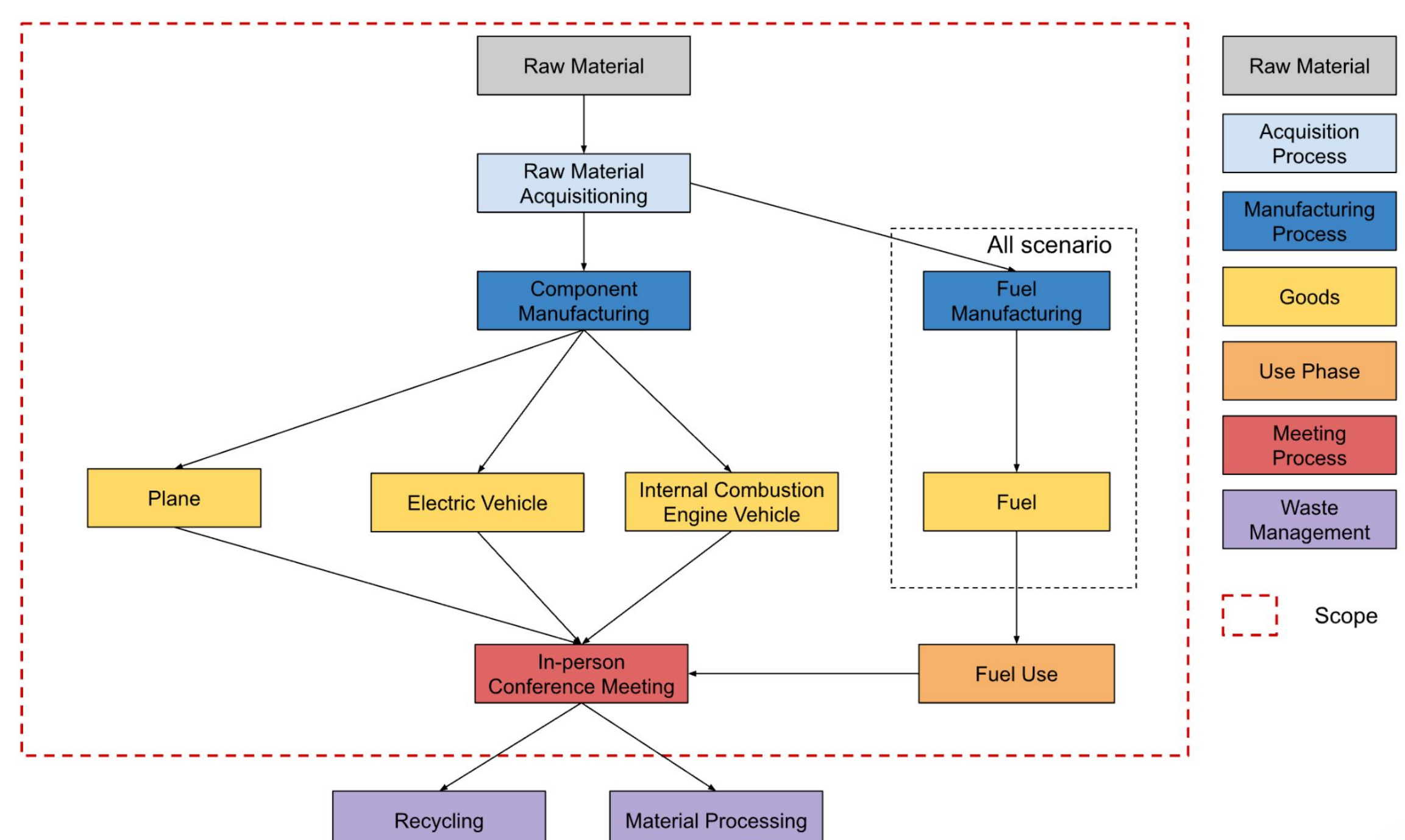
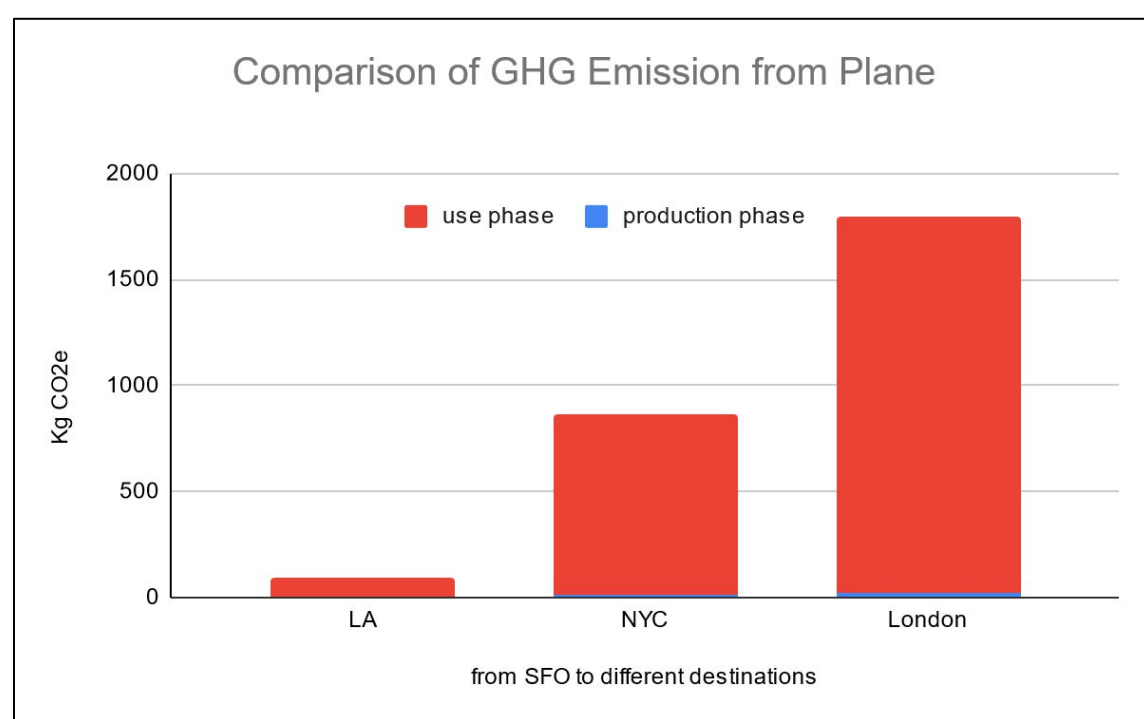


Figure 2. Process flow diagram for in-person conference case.

Quantitative Results & Analysis

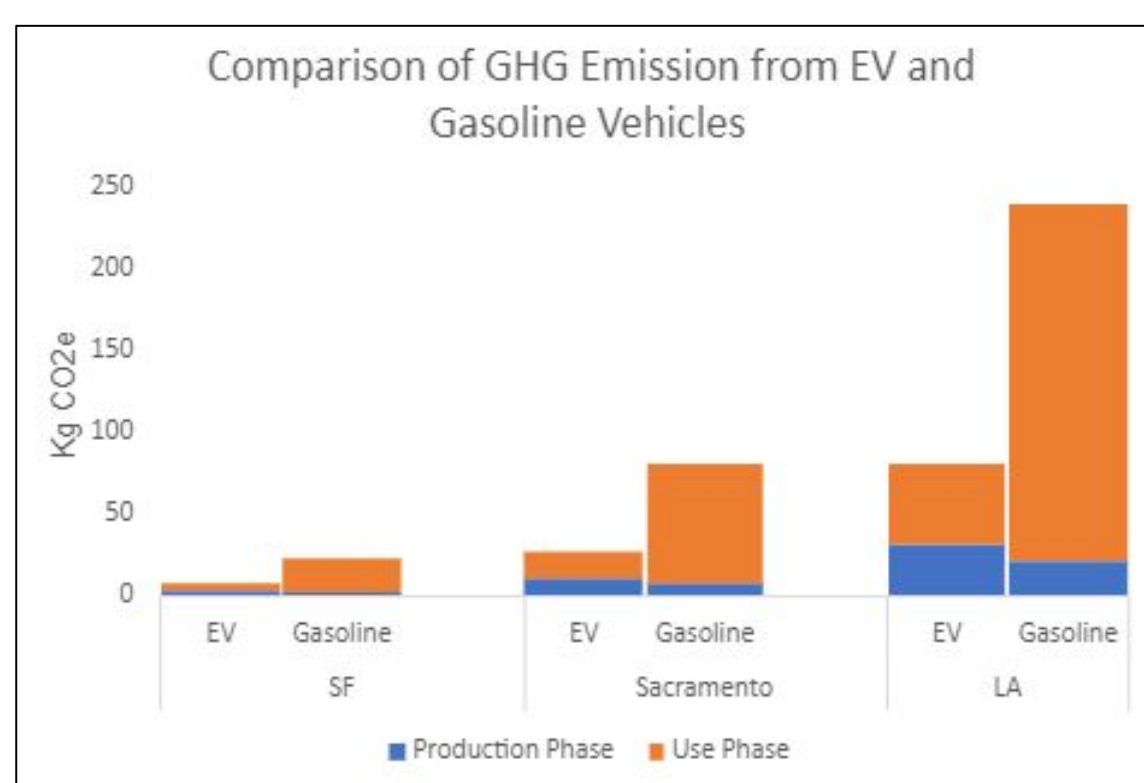
Traveling to Conference

Air Travel



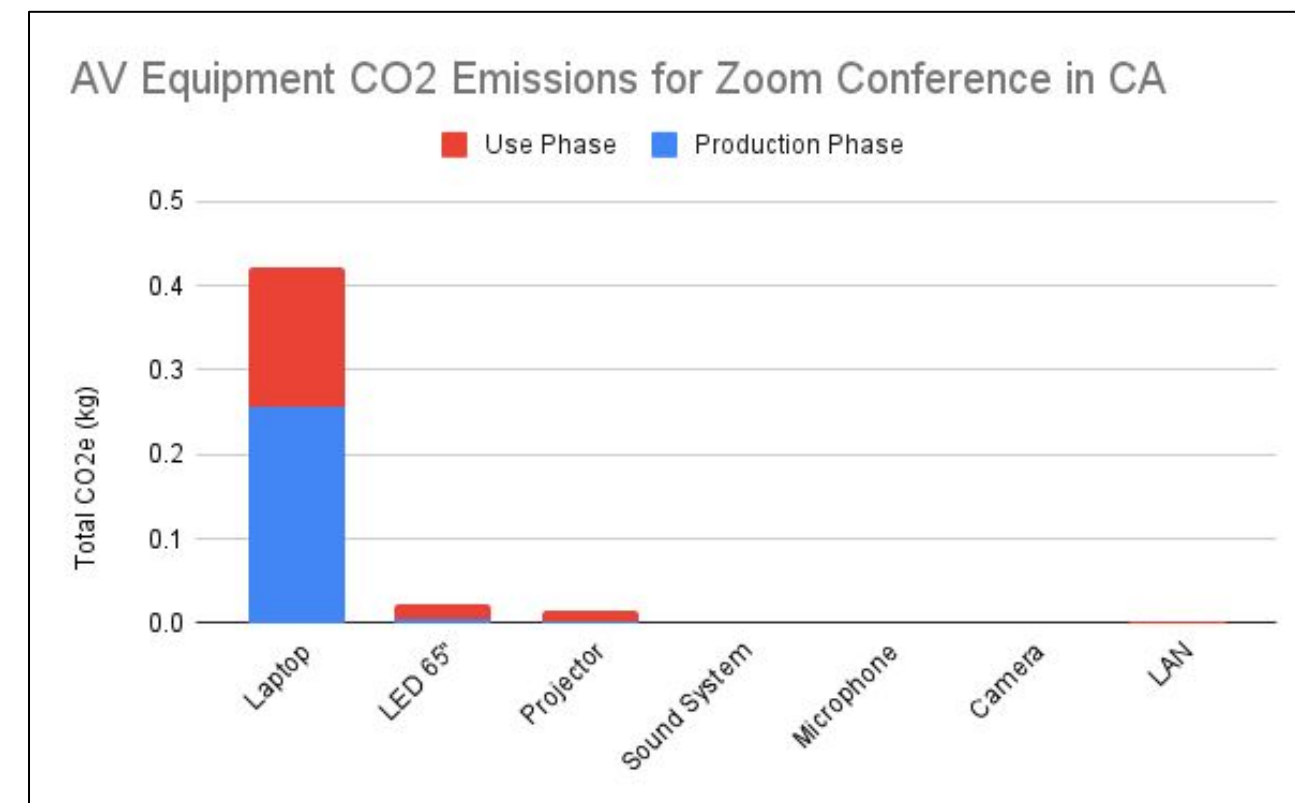
Location	Total CO2e (kg)
LA	93
NYC	868
London	1801

Vehicle Travel



Location	Total CO2e (kg)	
	EV	ICEV
SF	8	24
Sacramento	27	81
LA	81	240

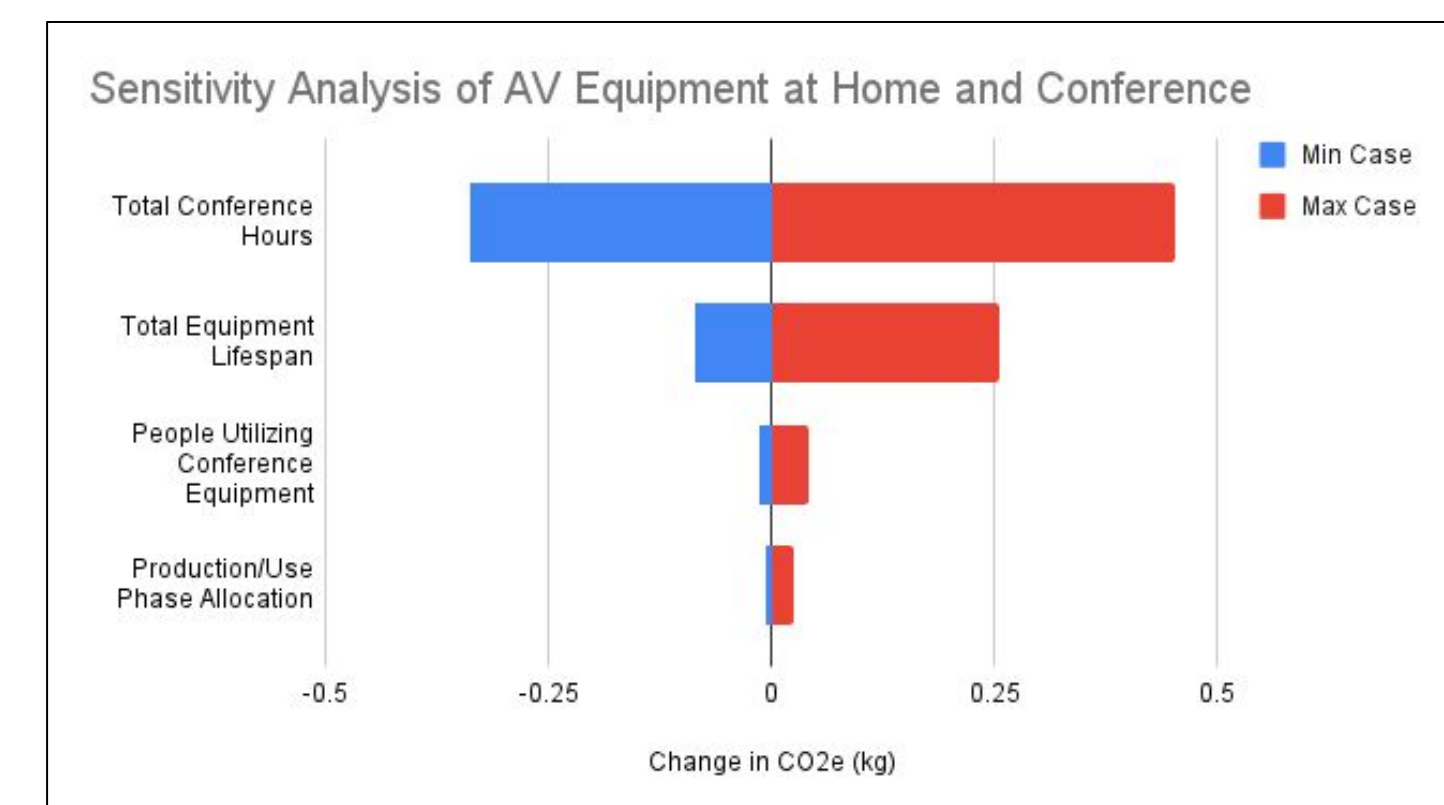
Zooming to Conference



Location	Total CO2e (kg)
CA	0.46
NOLA	0.61
NYC	0.51
London	0.52

Zoom global warming impacts greatest in NOLA due to high grid emission intensity

Sensitivity Analysis	
1	1 Hour vs 8 Hour Conference
	50% longer vs 50% shorter
2	equipment life
	50% more vs 50% less people
3	at conference over zoom
	5% of CO2 from production vs 50% of CO2 from production phase of equipment
4	



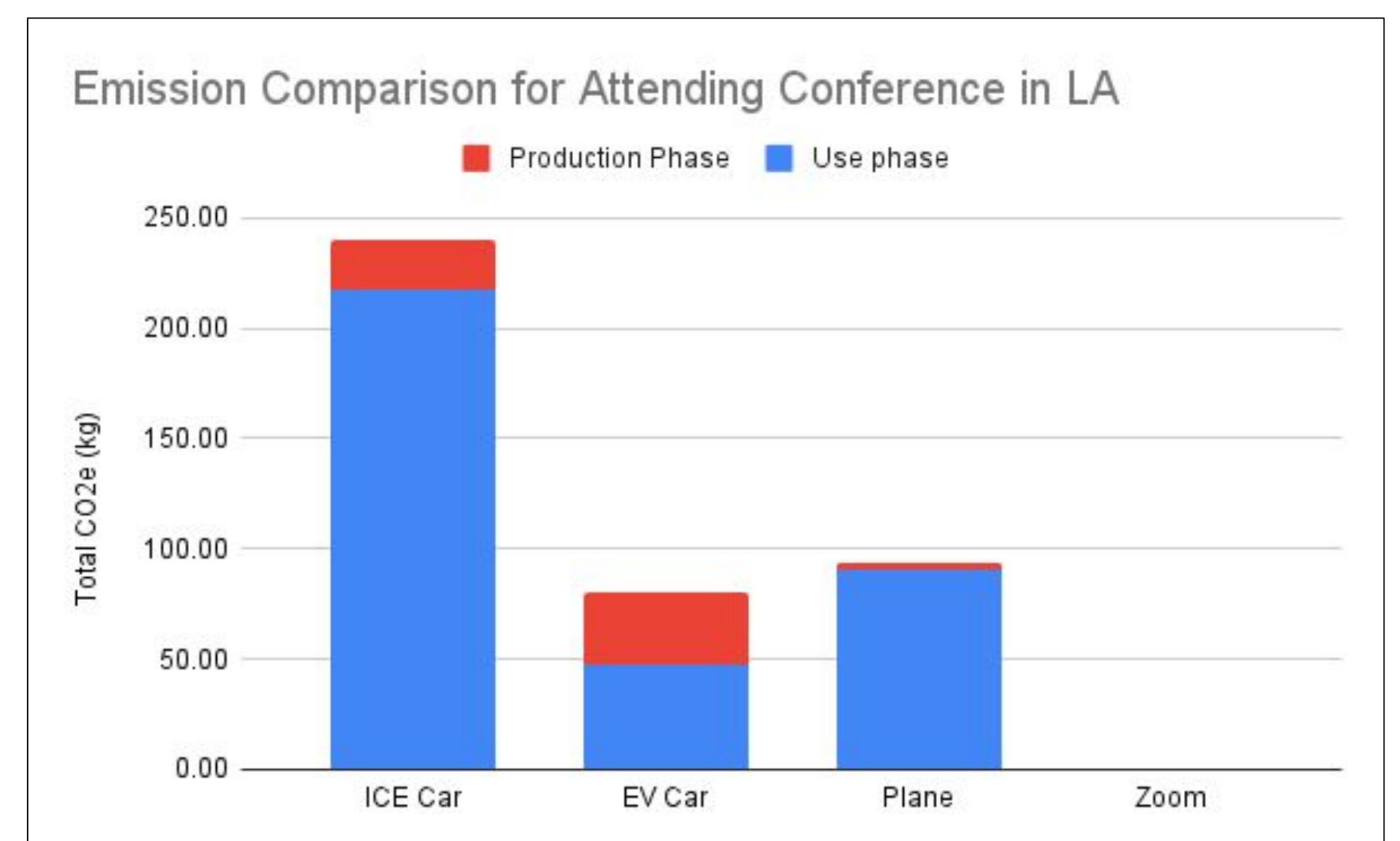
Cost & CO₂ Impact Summary for LA Conference

Attending Virtually	
Item	Cost [\$]
Registration Fee	230.00
Computer Cost	
Allocation	5.50
Electricity	0.21
Total	235.71

Attending In-Person (Plane)	
Item	Cost [\$]
Registration Fee	295.00
Flight	217.00
4 Nights Hotel (209 \$/Night)	836.00
Total	1348.00

Attending In-Person (EV-Tesla)	
Item	Cost [\$]
Registration Fee	295.00
Car Cost	
Allocation	122.51
Electricity	31.37
4 Nights Hotel (209 \$/Night)	836.00
Total	1284.88

Attending In-Person (ICE)	
Item	Cost [\$]
Registration Fee	295.00
Car Cost	
Allocation	49.95
Fuel	99.02
4 Nights Hotel (209 \$/Night)	836.00
Total	1279.97



Assumes single passenger traveling in car, or 20 passengers per plane, or 50 people watching the conference over zoom for 4 hours each day

Attending Conference Over Zoom Yields the Lowest Cost and Global Warming Impacts

Conclusions & Recommendations

- Attending conference over zoom has a significantly reduced monetary and environmental impact
- Professor and student will also want to consider the audience at the conference and potential networking opportunities that would be more valuable if the student attends the conference in-person
- Having the opportunity to travel and have some time to take their mind off of their studies and explore a new place can enable students to study more effectively during working hours
- We recommend students talk with their advisor about potential conferences they would like to attend and decide together which ones would be most worthwhile to attend in person
- We recommend students to travel to at least one conference further away from campus to have a better chance of meeting new people in their field of studying. This will also allow students to explore a new place and take their minds off of their studies for a short time