WORLD CLIMATE RESEARCH PROGRAMME

WCRP's future carbon footprint

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Brussels, Belgium

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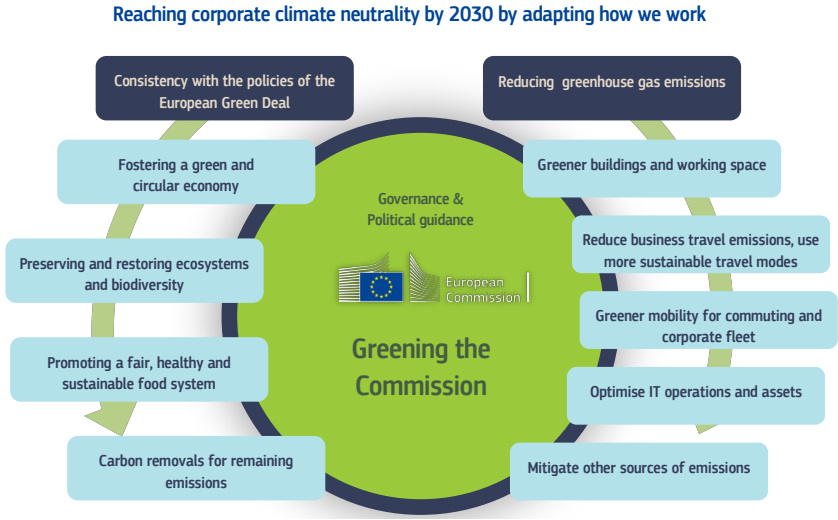
Background

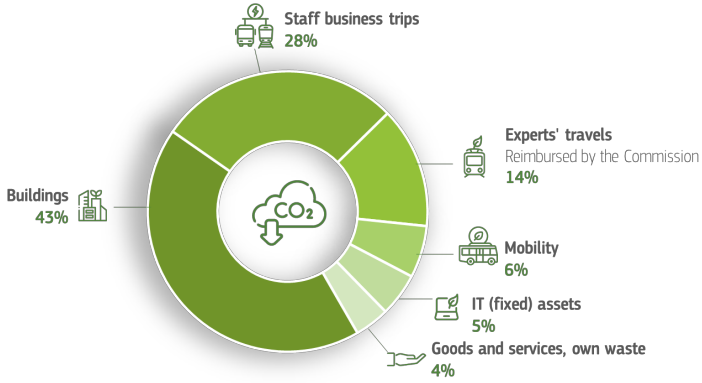
- WCRP has a responsibility as a leader in facilitating international climate research to take account of the emissions generated from travel to meetings and events.
- There is a push from the WCRP community to reduce WCRP carbon emissions, by reducing in-person meetings (prioritising travel to meetings that benefit greatly from face to face contact), and by finding solutions to reduce the carbon footprint of travel (e.g., setting up regional hubs, aligning with other meetings)
- To set goals and monitor progress, we need to calculate the carbon emissions from travel in a universally agreed way against a baseline.
- We need to provide clear and meaningful information that can be acted on, but also not overly burden the activities with administrative procedures.

We are not alone …

European Commission : Greening the Commission.

Objective: Net Zero by 2030.





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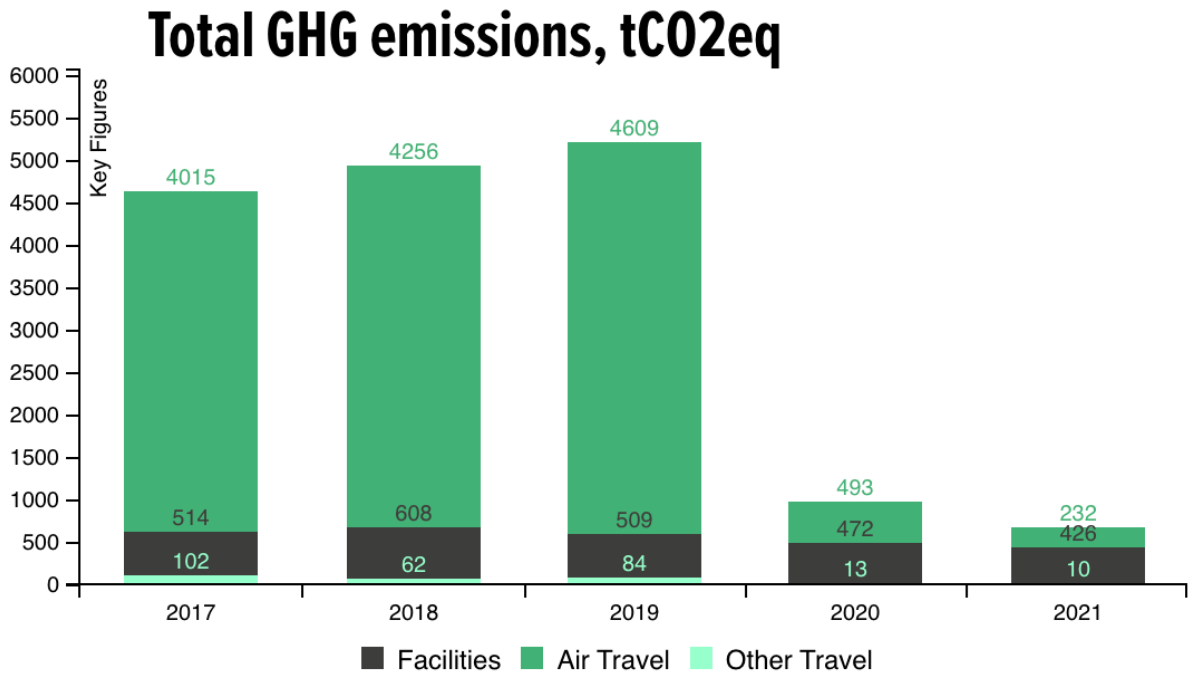
… but not in a similar position

WMO emissions are primarily due to air travel

Note the massive reduction in 2020-2021 😉



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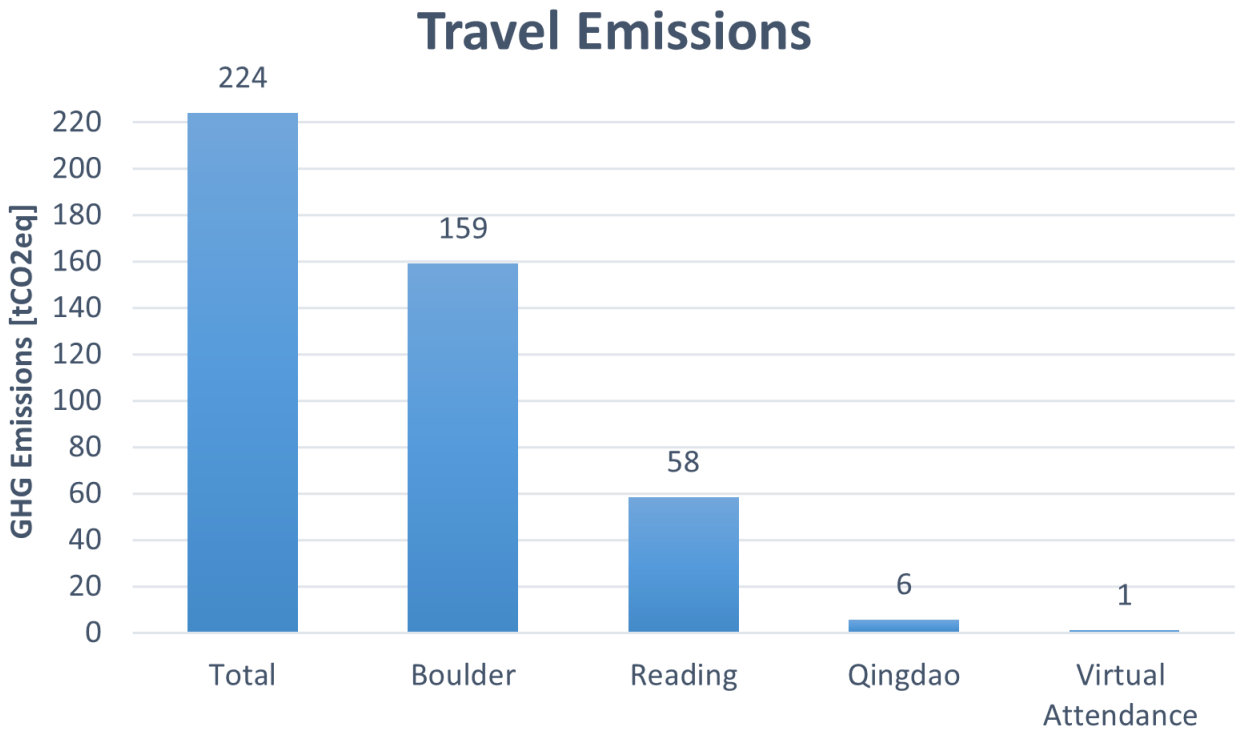
SPARC General Assembly

- Multi-hub approach (US/Europe/China)
- Registration requested every attendee to provide their travel details to attend the conference
- **Average travel carbon → 885 $kgCO_2eq$ per attendee**
- The multi-hub model reduced the travel carbon footprint by a factor of up to 4.1 (depending on location).



See SPARC's full slides outlining the multi-hub approach on the JSC-44 webpage (publication pending)

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SLC Meeting in London

- Hybrid approach
- Post-meeting estimate of travel carbon emissions
- **Total (kg CO_2): 15,000 +/- 3,000 for 25 people, i.e. 600 per person**
- BUT only 9 people came from outside Europe

id	type of meeting	WCRP event or external?	trip date (arrival)	trip date (departure)	origin city	country	final destination city	country	travel mode	distance origin city and final destination, one way (km) (optional)
01-23-00001	SLC Meeting	WCRP	06.03.23	10.03.23	Amman	Jordan	London	UK	air	3683
01-23-00002	SLC Meeting	WCRP	06.03.23	10.03.23	Edinburgh	UK	London	UK	HRS	535
01-23-00003	SLC Meeting	WCRP	06.03.23	10.03.23	Granada	Spain	London	UK	air	1646
01-23-00004	SLC Meeting	WCRP	06.03.23	10.03.23	Bremen	Germany	London	UK	air	594
01-23-00005	SLC Meeting	WCRP	06.03.23	10.03.23	Oslo	Norway	London	UK	air	1227
01-23-00006	SLC Meeting	WCRP	06.03.23	10.03.23	Cambridge	UK	London	UK	rail	80
01-23-00007	SLC Meeting	WCRP	06.03.23	10.03.23	Edinburgh	UK	London	UK	HRS	535
01-23-00008	SLC Meeting	WCRP	06.03.23	10.03.23	Suva	Fidschi	London	UK	air	17652
01-23-00009	SLC Meeting	WCRP	06.03.23	10.03.23	Zurich	Switzerland	London	UK	air	789
01-23-00010	SLC Meeting	WCRP	06.03.23	10.03.23	Daejeon	Republic of Korea	London	UK	air	8861
01-23-00011	SLC Meeting	WCRP	06.03.23	10.03.23	Sao Paulo	Brazil	London	UK	air	9460
01-23-00012	SLC Meeting	WCRP	06.03.23	10.03.23	Denver	USA	London	UK	air	7497
01-23-00013	SLC Meeting	WCRP	06.03.23	10.03.23	Pune	India	London	UK	air	7338
01-23-00014	SLC Meeting	WCRP	06.03.23	10.03.23	Amsterdam	Netherlands	London	UK	HRS	358
01-23-00015	SLC Meeting	WCRP	06.03.23	10.03.23	New York	USA	London	UK	air	5540
01-23-00016	SLC Meeting	WCRP	06.03.23	10.03.23	Paris	France	London	UK	HRS	341
01-23-00017	SLC Meeting	WCRP	06.03.23	10.03.23	Toulouse	France	London	UK	rail (+ HRS)	884
01-23-00018	SLC Meeting	WCRP	06.03.23	10.03.23	Sydney	Australia	London	UK	air	17020
01-23-00019	SLC Meeting	WCRP	06.03.23	10.03.23	Zurich	Switzerland	London	UK	air	789
01-23-00020	SLC Meeting	WCRP	06.03.23	10.03.23	Geneva	Switzerland	London	UK	air	784
01-23-00021	SLC Meeting	WCRP	06.03.23	10.03.23	Jena	Germany	London	UK	rail (+ HRS)	816
01-23-00022	SLC Meeting	WCRP	06.03.23	10.03.23	Yokosuka	Japan	London	UK	air	10083
01-23-00023	SLC Meeting	WCRP	06.03.23	10.03.23	Exeter	UK	London	UK	rail	254
01-23-00024	SLC Meeting	WCRP	06.03.23	10.03.23	Liverpool	UK	London	UK	HRS	285
01-23-00025	SLC Meeting	WCRP	06.03.23	10.03.23	New York	USA	London	UK	air	5540

The way forward for travel

Guidelines on reducing carbon emissions from travel

- An annual carbon footprint calculation is needed
- The calculation would include travel to JSC and steering group meetings, conferences, workshops, activity meetings, and travel of those acting as an official representative of WCRP to a meeting or event
- This information (via an Excel template) would be sent to the WCRP Secretariat, and the carbon calculation would be completed externally
- A detailed report would be presented annually to the JSC (closed report) and a summary report (WCRP-wide statistics only) would be made available publicly
- **Goal: to reduce travel from the 2023 baseline (excl. OSC) by 75% by 2030**
- WCRP should publish best practices guidelines on reducing the carbon footprint of WCRP for travel, meetings and other activities

Beyond travel…

We can expect a push from our activities to lead by example. How do we lead and support these efforts?

[Future of Climate Modelling Workshop Report]

- ***Achieve net zero climate resilient modeling.*** Our community needs to lead by example and transition to net zero emissions as fast as possible … The computers, data storage and data transfer need to be as efficient as possible and powered by renewable energy. …
- We urge WCRP to work with its many stakeholders to develop a credible net zero emissions pathway.
- *Specifically, we recommend that WCRP develops a carbon footprinting method based on the Barcelona Computing Centre's protocols, …*
- *WCRP should make having transparent carbon footprinting and a published net zero pathway as a prerequisite for joining future intercomparison efforts.*

CMIP6 C footprint

Work led by Mario Acosta (BSC), CPMIP (Computer Performance MIP), part of IS-ENES2 project

- Only 9 Modelling centres provided data (out of more than 50...)
- Large discrepancies in terms of Energy used and carbon intensity.

Plan for CMIP7 ?

- C emission reduction ambition? Needs to be part of the CMIP7 planning.

- "Enforce" modelling centers to monitor and report

- Task team for CMIP7 C footprint (could it be part of the climate models documentation task team)?

CMIP6 Experiments: Institutions/Models	Useful SY	Total Energy Cost (Joules)	PUE	CF (g CO2/kWh)	Total Carbon Footprint (CO2)
EC-Earth	28,105	1.24E+12	1.35	357	165t
CNRM-CERFACS	47,000	6.18E+12	1.43	40	97t
IPSL	75,000	8.72E+12	1.43	50	172t
CMCC	965	1.61E+12	1.84	408	329t
UKMO	37.237	2.67E+13	1.35	87	868t
DKRZ	1,276	4.09E+11	1.19	184	24t
NCC-NORESM2	23,096	1.69E+12			
NERC	640	2.17E+12	1.10	0	
MPI	24,175	6.20E+11	1.19	184	37t

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Discussion

- JSC to endorse the travel guidelines
- We need the 2023 baseline ⇒ Need to start monitoring NOW
- JSC to recommend alternating face to face and virtual meetings for the JSC meetings and all core activities
- WCRP's leading role in reducing the wider carbon footprint of climate modelling (CMIP7)?
- Direct vs indirect emissions (no double accounting)
- WCRP position on carbon emissions offsetting?
- Align WCRP greening strategy to EC greening plan?