

White Paper: **Striving towards Environmental Sustainability in High Energy Physics, Cosmology and Astroparticle Physics**

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Please get involved!

"It is unequivocal that human influence has warmed the atmosphere, ocean and land ... Human-induced climate change is already affecting many weather and climate extremes in every region across the globe."

– Climate Change 2021: The Physical Science Basis: Summary for Policy Makers. Intergovernmental Panel on Climate Change, 2021.

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"Global surface temperature will continue to increase until at least mid-century under all emissions scenarios considered ... unless deep reductions in CO₂ and other gas emissions occur in the coming decades."

– Climate Change 2021: The Physical Science Basis: Summary for Policy Makers. Intergovernmental Panel on Climate Change, 2021.

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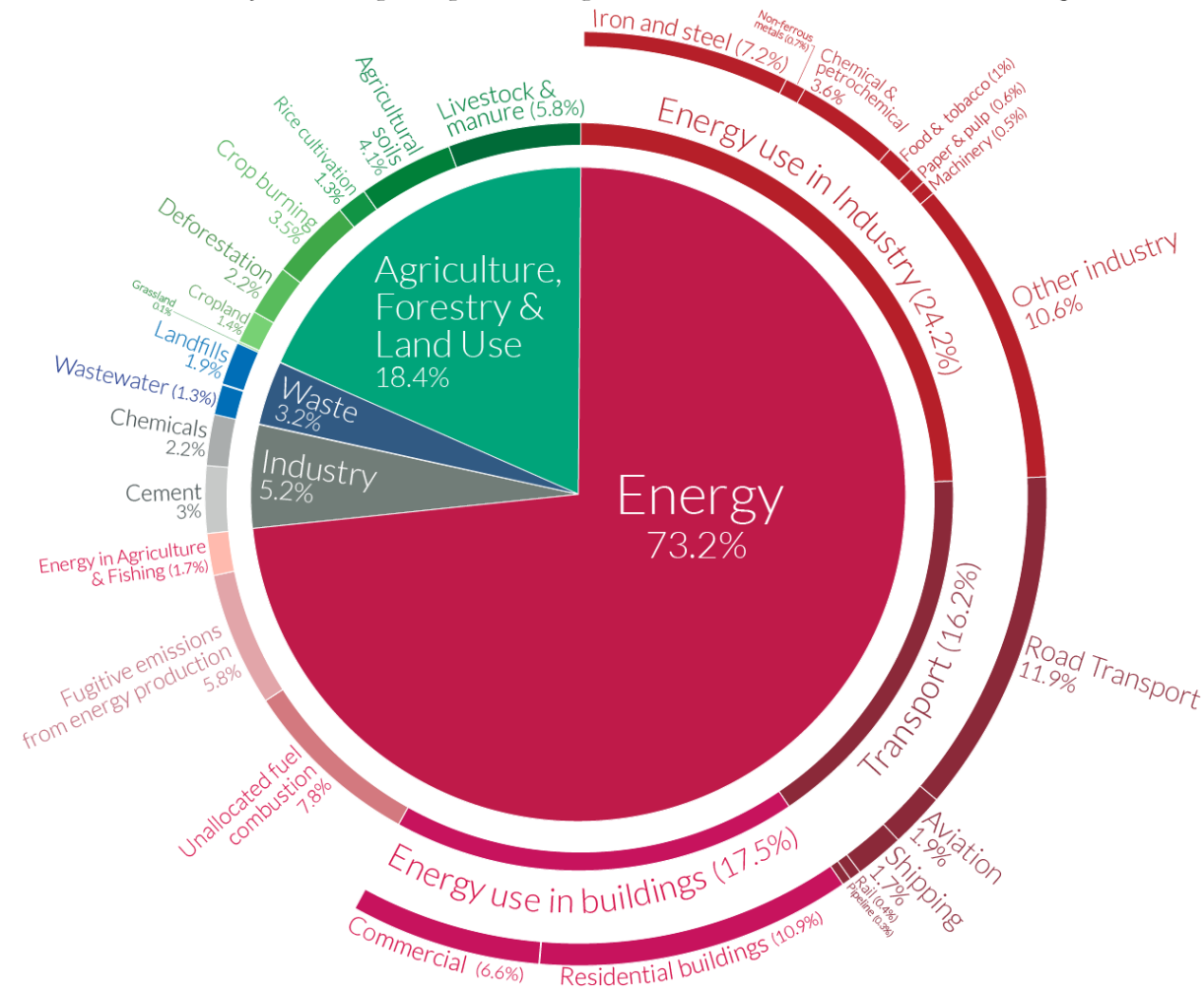
As a global community of scientists and citizens,
we have moral and pragmatic obligations to act.

Please get involved!

Global greenhouse gas emissions by sector

Our World
in Data

This is shown for the year 2016 – global greenhouse gas emissions were 49.4 billion tonnes CO₂eq.



OurWorldinData.org – Research and data to make progress against the world's largest problems.

Source: Climate Watch, the World Resources Institute (2020).

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Food

- Conferences
- Canteens



Waste

- Consumables
- Computing



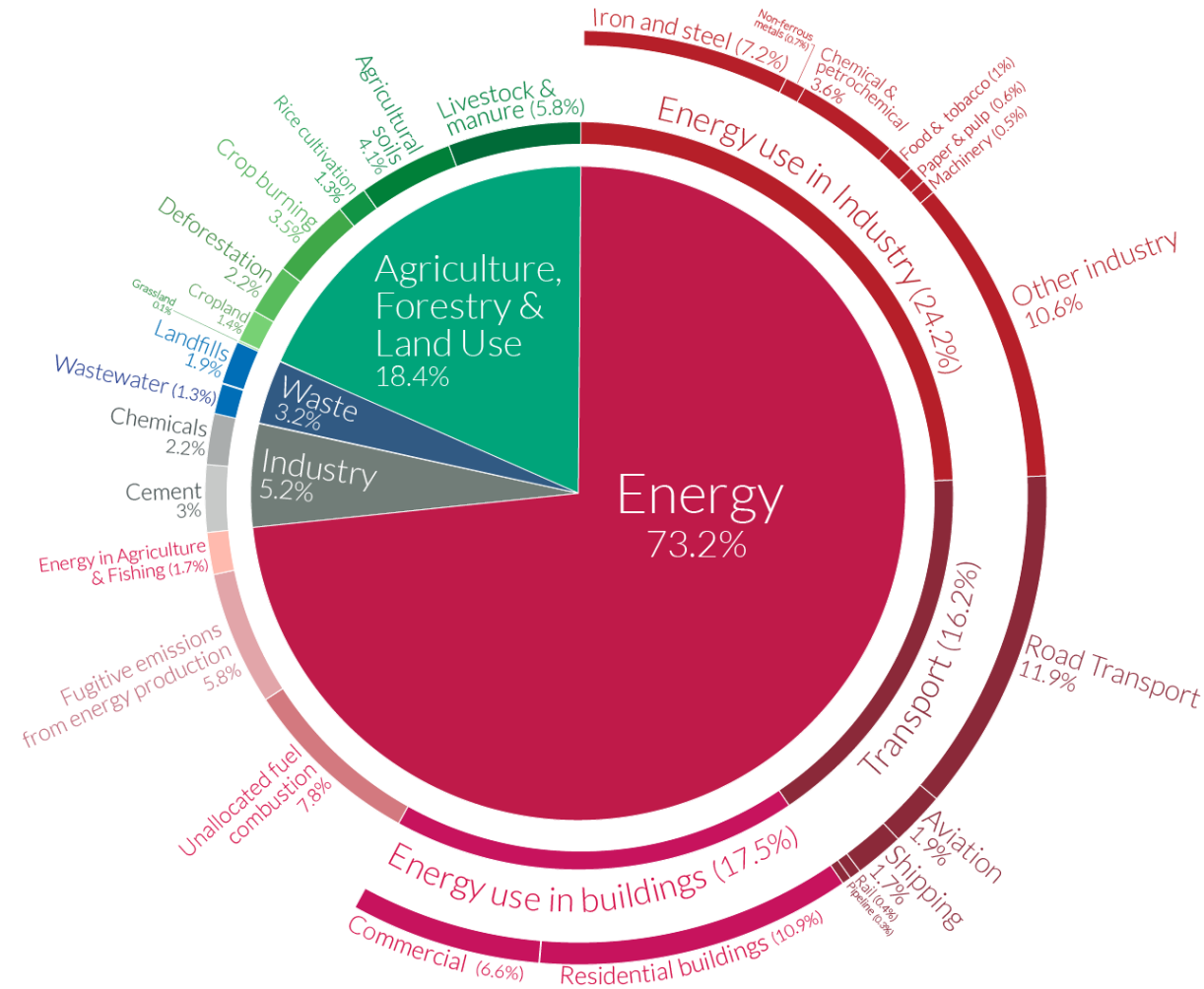
Energy

- Usage
- Source
- Facilities

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Technology

- Experimental infrastructure



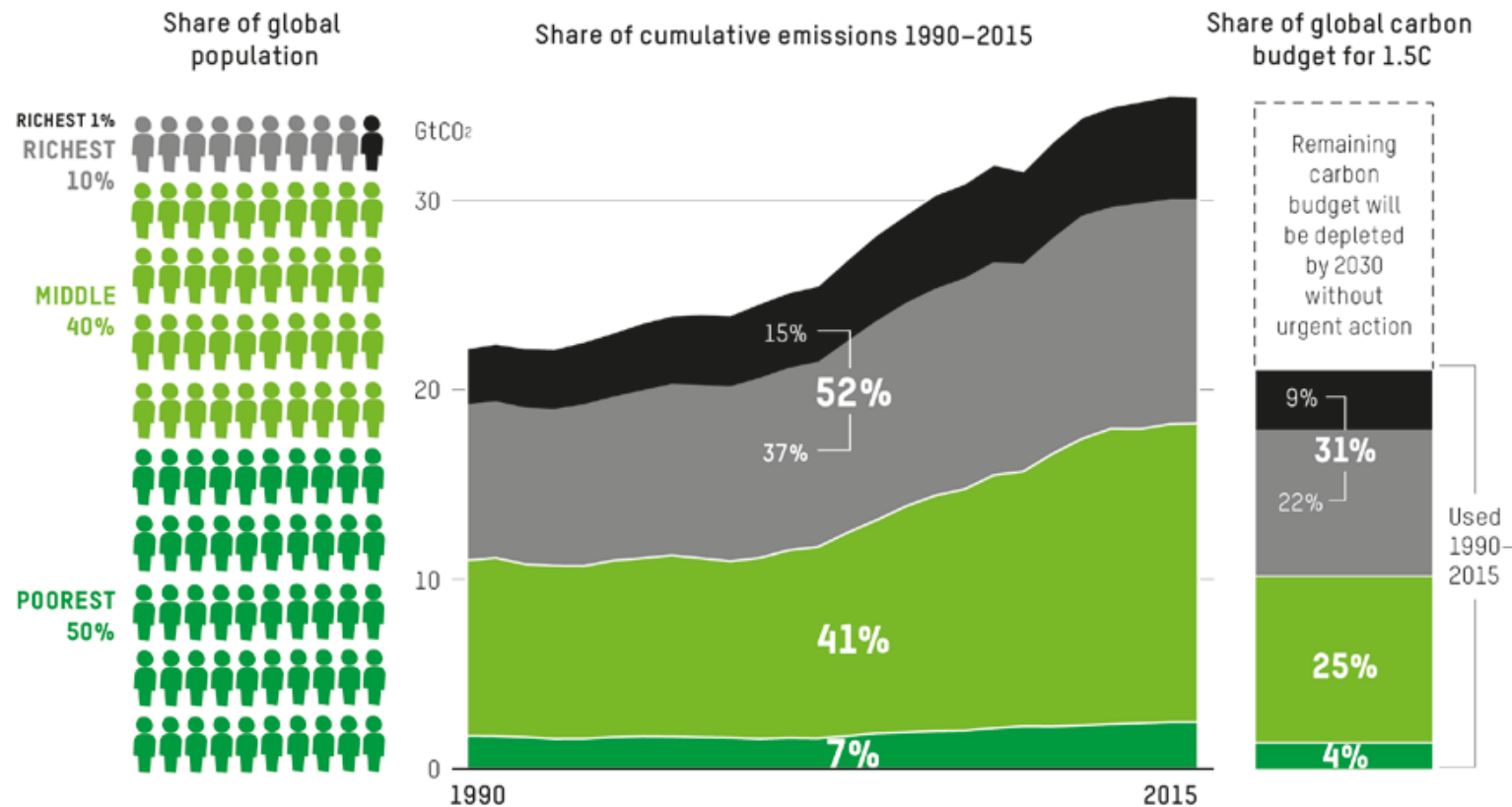
Computing

- Analysis
- Simulation
- Communication



Travel

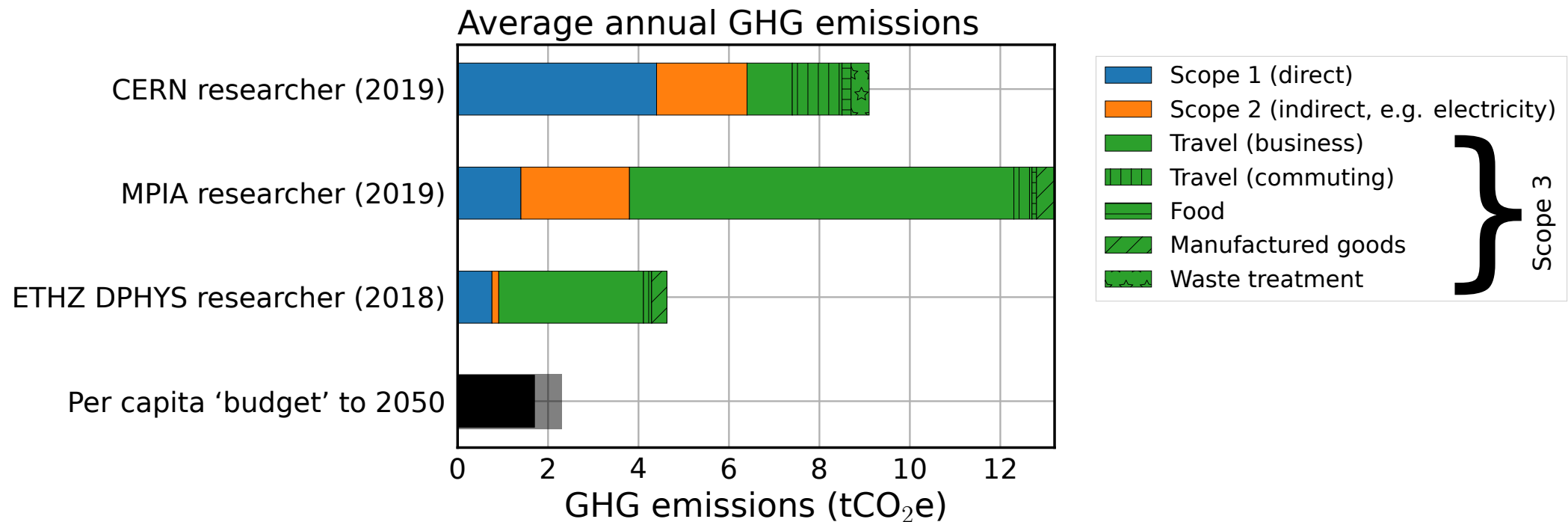
- Conferences
- Collaboration



Per capita income threshold (SPPP2011) of richest 1%: \$109k; richest 10%: \$38k; middle 40%: \$6k; and bottom 50%: less than \$6k.
Global carbon budget from 1990 for 33% risk of exceeding 1.5C: 1,205Gt.

This figure, appearing in the white paper, is reproduced from [Gore 2020] with the permission of Oxfam, Oxfam House, John Smith Drive, Cowley, Oxford OX4 2JY, UK, <https://www.oxfam.org.uk/>. Oxfam does not necessarily endorse any text or activities that accompany the materials.

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CERN Scope 3 data excludes procurement, ETHZ Scope 3 data is incomplete. Total emissions are assigned to individual researcher as follows: each individual emissions category was divided by the nominal number of users for that resource, be it total number of employees, or researchers, or users (CERN). This is distinct from the procedure in [Jahnke et al. 2020], where all emissions were equally distributed amongst researchers only. Data from: CERN [CERN 2019, 2020, 2021], MPIA [Ivanova et al. 2017, Jahnke et al. 2020] and ETH [Beisert et al. 10].

Figure from the white paper, see <https://sustainable-hecap.github.io/>.

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Origins and aims of the White Paper

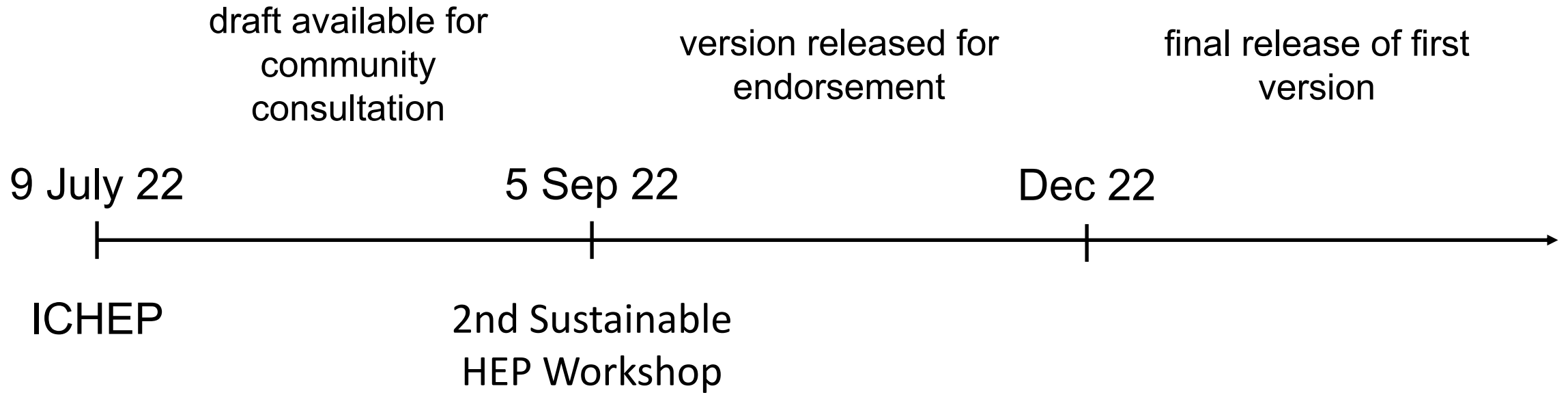
- The initiative began at the first **Sustainable HEP Workshop**, hosted by CERN, 28 – 30 June 2021.
- The aim is to **state our concerns** as a group of **concerned physicists**,
to build upon and consolidate existing work and efforts, and
to **reflect** upon how we **as a community** can make **positive changes** w.r.t.
environmental sustainability and **social justice**.

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Assessing, reporting on, and undertaking coordinated efforts to limit our impacts on the world's climate and ecosystems must become an integral part of how we plan and undertake all aspects of our research.

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Timeline



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Accessing the draft

- The white paper **working draft** is available on the **online platform**:

<https://sustainable-hecap.github.io/>

- If you want to get involved or have comments and suggestions, you can get in touch via the online platform.

Please get involved!

“The truth is: the natural world is changing.
And we are totally dependent on that world. It
provides our food, water and air. It is the most
precious thing we have and we need to defend it.”
– Sir David Attenborough

Please get involved!

Please get involved.

Please get involved!

2nd sustainable HEP workshop (5 – 7 Sept 2022):

<https://indico.cern.ch/event/1160140/>

1st sustainable HEP workshop (June 2021):

<https://indico.cern.ch/event/1004432/>

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References

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N. Beisert et al. [Online]. Available: <https://ethz.ch/content/dam/ethz/special-interest/phys/departement/departement/CO2-DPHYS-201020v3.pdf>

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