

IS-ENES3 Carbon Footprint Action 7:

Action 7 (started March 2021) gathers volunteers willing to contribute to **elaborations of ways and paths to start a “1.5 transition” in our work and objectives using numerical modelling and HPC.**

Claire Lévy (CNRS) and the Carbon Footprint Action 7 group

Carbon Footprint for our numerical modeling and HPC work

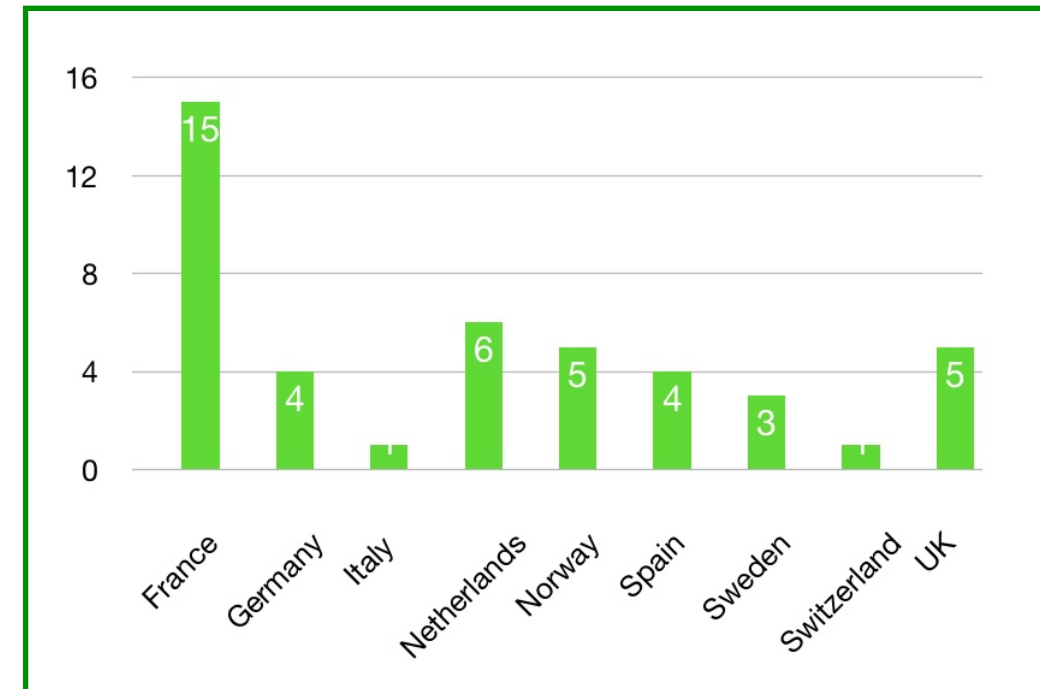
Results of first discussions (May):

- As contributors to IPCC reports, we are concerned by their conclusions (reducing carbon footprint, Paris Agreement, towards -55% in 2030).
- We want to have a scientific approach on these complex subjects, starting by a careful look at carbon footprint in our work.
- Doing non-efficient things will be counterproductive.
- Concerning HPC, a number of options and stakeholders (not only us!) at play
- We believe it will be useful to give our opinion on the bests solutions for us, to be able to carry our work.

-> Some collective thinking from us makes sense

Short survey sent to IS-ENES3 and ESIWACE

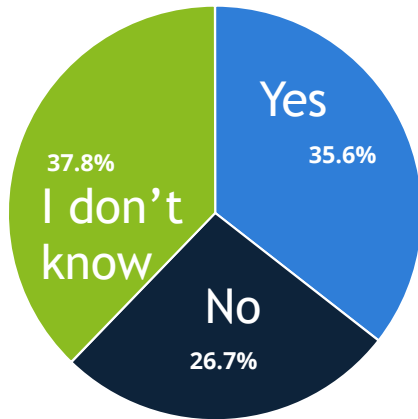
- Survey elaborated by the group.
- Sent to is-enes @ esiwace mailing lists = more than 200 experts
- Only 44 answers < 22 %, not much!
- Not significant quantitatively
- Qualitatively, some information



Survey's results (1): Evaluation of carbon footprint at work

Did your team or laboratory evaluate its yearly carbon footprint during recent years?

[Chart options »](#)



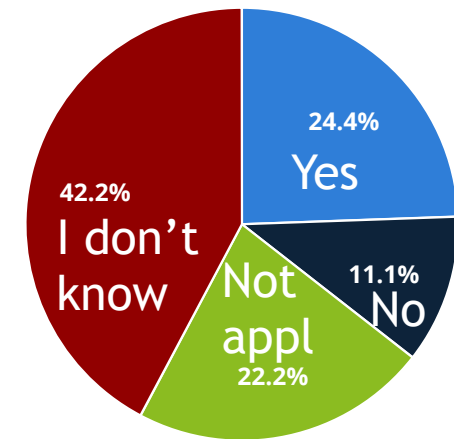
Yes	16
No	12
I dont know	17

Tick year(s) for which this evaluation has been done:

2018	5
2019	9
2020	9
None	12
I dont know	19

Does this evaluation include the energy or carbon footprint of the HPC resources?

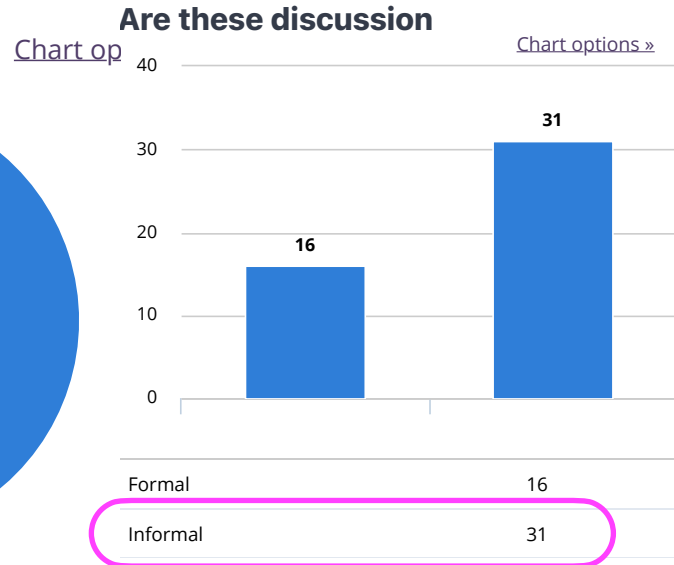
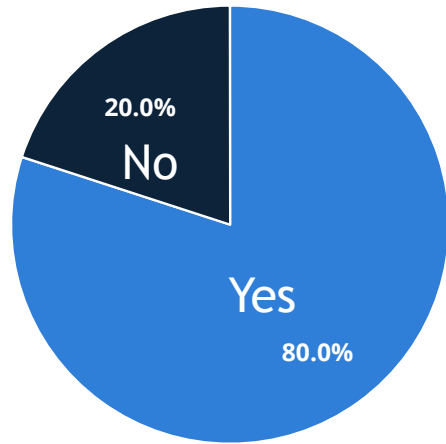
[Chart options »](#)



Yes	11
No	5
Not applicable	10
I dont know	19

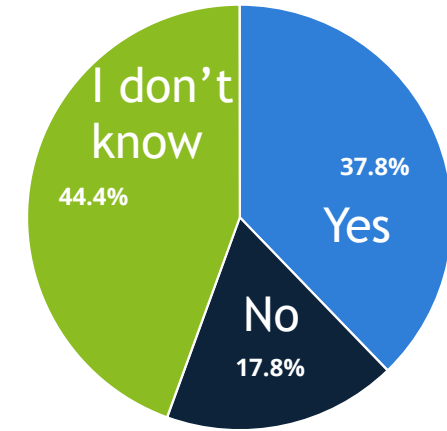
Survey's results (2): What about discussing it?

Do you have some discussions at work about the carbon footprint of HPC?



Yes	36
No	9

If these discussions do take place, does your team consider changing working practices (use of HPC) in order to reduce the carbon footprint?

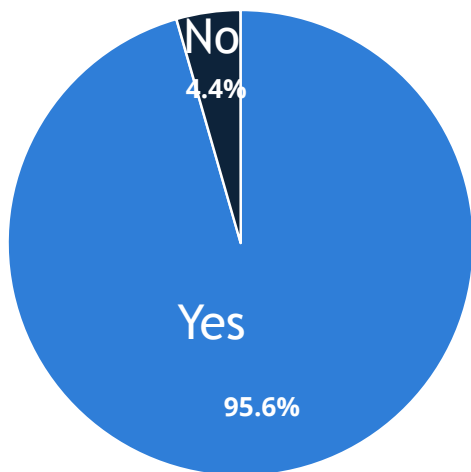


Yes	17
No	8
I dont know	20

Survey's results (3):

Personally, do you think it makes sense to reduce your carbon footprint at work (in general: HPC, travels etc...)?

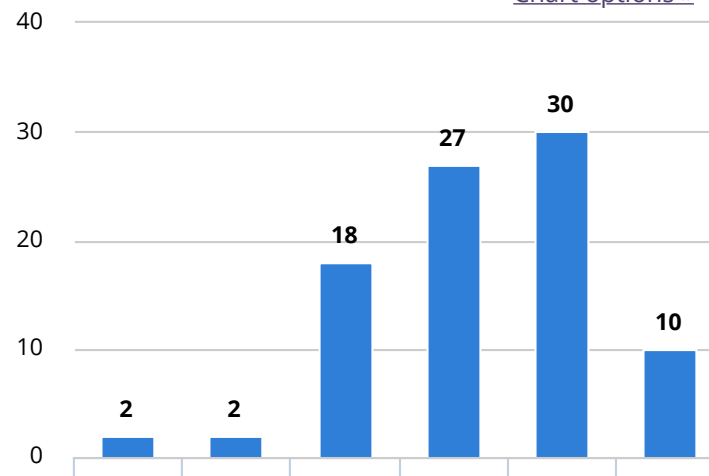
[Chart options »](#)



Yes	43
No	2

Status

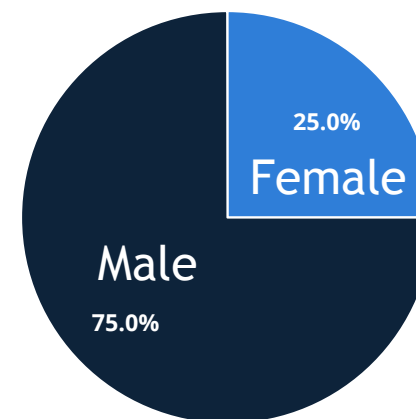
[Chart options »](#)



Student	2
PhD	2
Expert in climate sciences	18
Expert in computing sciences and HPC	27
Permant position	30
Temporary position	10

Gender

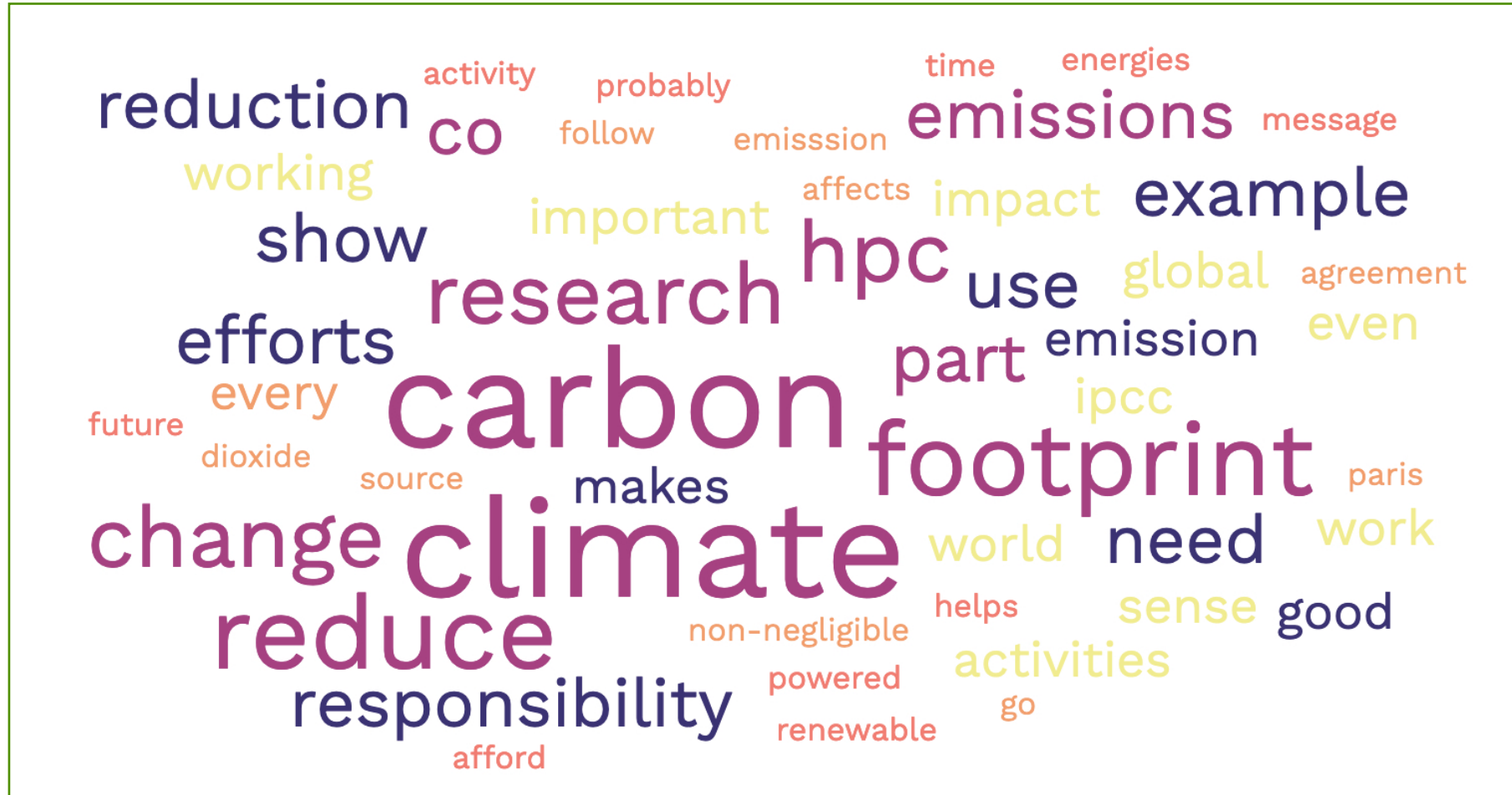
[Chart options »](#)



Female	11
Male	33

Survey's results (4):

Briefly explain the reason(s) of your answer (yes or no) above:



Much more in the complete answers: a large diversity of options, ideas:

Survey's results (5):

Briefly explain the reason(s) of your answer (yes or no) above:

All of the sentences communicate something valuable. a few quotes illustrating what could be further discussed:

If we, who are very conscious of the climate change and the reason of it, cannot reduce quickly our professional carbon footprint, then why the rest of world could succeed?

There are other variants on this theme, e.g., “practice what we preach”:

More often than not, we tend to use more resources than needed to minimize the time of running an application as we tend to prioritize speed rather than efficiency. In reality, there are very few occasions on which we really need to get the results ASAP.

A contrarian perspective:

For HPC I'm very skeptic. I'm afraid of the 'rebound' effect : we will use the technological progress to increase our computation, not to reduce the carbon footprint. Otherwise we will be out of the race, unless everybody plays the same game.

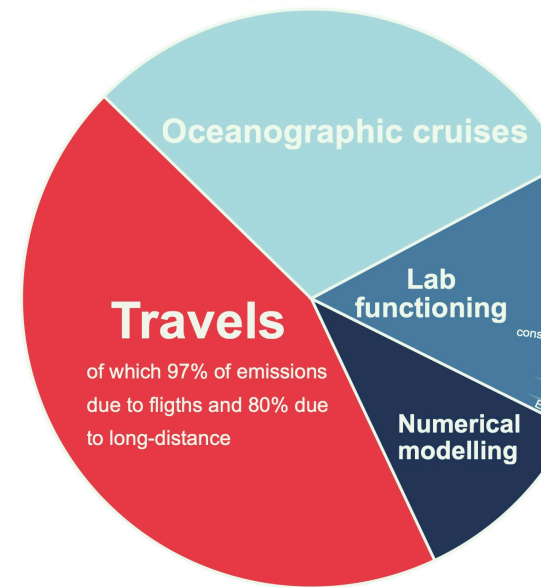
Finally, someone brought up an aspect which should be underlined:

Much of the data that is produced is never (thoroughly) analyzed. We can be much smarter about this.

At this stage: about our HPC carbon footprint ?

- Looking at our Carbon footprint at work is first step (cf. action lead by M. Acosta)
- Once travels by plane are reduced, HPC Carbon footprint is a significant part
- Our community is of course not the only player here, and we usually prefer, in our work, to have some equations and try to solve them...
- But it does make sense to elaborate how to reduce it: choose options allowing us to make good work:
 - Evaluate the carbon (e.g. energy) footprint our our applications
 - Give some collective thinking on how to reduce it (Improve performances? Move to GPU ? Reevaluate the need to continue increasing resolution? Better share costly simulations? Others?)
 - These are questions addressing directly the ways we are choosing to do our sciences
 - We are in a relevant position to elaborate and disseminate our answers

As a « first guess »:
1750 tCO₂e
emitted by LOCEAN in 2018



You are welcome to participate. Please register on the Action 7 mailing list:

<https://lists.enes.org/mailman/listinfo/is3-esi2-hpc1p5> or send a message to sophie.morellon@lsce.ipsl.fr.

THE CONSORTIUM

Coordinated by CNRS-IPSL, the IS-ENES3 project
gathers 22 partners in 11 countries



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