

# Reducing the carbon footprint of a research lab: how to move from individual initiatives to collective actions?

Claire Lauvernet<sup>1</sup>, Céline Berni<sup>1</sup>, Marina Coquery<sup>1</sup>, Leslie Gauthier<sup>1</sup>, Louis Héraut<sup>1</sup>,  
Matthieu Masson<sup>1</sup>, Louise Mimeau<sup>1</sup>, **Jean-Philippe Vidal<sup>1</sup>** and the Riverly Downstream  
team

<sup>1</sup>INRAE, UR RiverLy, France

15 april 2024

# Engaging a research lab in an environmental transition path

## The lab

### RiverLy

**Interdisciplinary research unit** for the management and restoration of river systems and their catchments working on: Multiscale Eco-Hydrology, Ecotoxicology, Microbial Ecotoxicology, Environmental Chemistry, Diffuse Pollution, Catchment Hydrology, and River Hydraulics (150+ people)

## The institutional context

INRAE



INRAE (2021) Corporate Environmental Responsibility

## The team

### RiverLy Downstream

- ▶ Group of a 5-15 people including the 3 focal persons for sustainable development at RiverLy (see Gauthier et al., 2023)
- ▶ “Downstream” for downstream impact of research practice

## The research community context

### Labos 1point5

International, cross-disciplinary collective of academic researchers who share a common goal: to better understand and reduce the environmental impact of research, especially on the Earth's climate

---

<https://www.inrae.fr/en/about-us/inrae2030/social-and-environmental-responsibility>

<https://labos1point5.org/>

Quantifying and monitoring the carbon footprint

Awareness rising

Coming up with concrete actions

# Quantifying and monitoring the carbon footprint

## GES1point5 tool



## Labos 1point5 tool

- ▶ Lab self-assessment
- ▶ National compilation to estimate the carbon footprint of the French research community

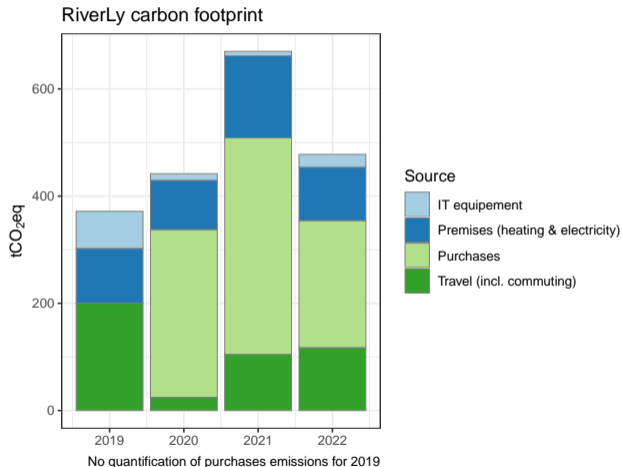
## Scientific paper

Mariette et al. (2022). An open-source tool to assess the carbon footprint of research. *Environmental Research: Infrastructure and Sustainability* 2, 035008 (3). DOI: [10.1088/2634-4505/ac84a4](https://doi.org/10.1088/2634-4505/ac84a4)



# Quantifying and monitoring the carbon footprint

## Application to our lab




## Key findings

- ▶ New post-covid regime for travels with less flights
- ▶ Apparent reduction in purchases (to be confirmed)
- ▶ Top-down constraints on heating

# Awareness rising

Within RiverLy

## Climate day in the lab (sep. 2022)



- ▶ 40+ attendees (25%)
- ▶ one-day full agenda
  - ▶ Dedicated awareness workshop on individual carbon footprint **NOS VIES BAS CARBONE**
  - ▶ Experience sharing with another French geosciences lab: 
  - ▶ Identification of possible actions to reduce the lab carbon footprint



# Awareness rising

## Within RiverLy

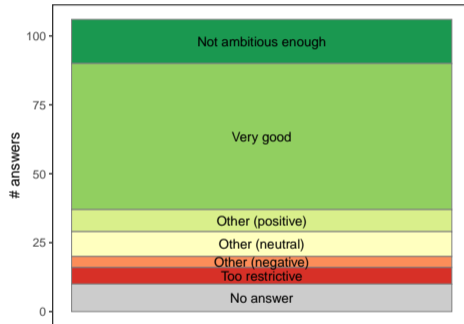
### Climate day in the lab (sep. 2022)

- ▶ 40+ attendees (25%)
- ▶ one-day full agenda
  - ▶ Dedicated awareness workshop on individual carbon footprint 
  - ▶ Experience sharing with another French geosciences lab: 
  - ▶ Identification of possible actions to reduce the lab carbon footprint

### Online survey on the acceptability of actions (Spring 2023)

- ▶ 103 responses (60%)
- ▶ Various questions on purchases, travels, food, research, commitment

How would you describe a carbon emission reduction of 10% per year for each RiverLy research team?



# Coming up with concrete actions

## Agreeing on an objective

### Charter RiverLy in transition

- ▶ Trajectory of **-10%/yr** reduction on carbon emissions relative to 2022
- ▶ Preserving the positive impact of our research on the society
- ▶ Unanimously approved by the Lab Council (Oct. 2023)

**RÉPUBLIQUE FRANÇAISE**  
*Liberté  
Égalité  
Fraternité*

**INRAE**

**Charte RiverLy en transition**

**RiverLy**  
Adoptée à l'unanimité en conseil d'unité le 3 oct. 2023

Les conséquences du changement climatique induit par les activités anthropiques émettrices de gaz à effet de serre s'accroissent<sup>1</sup> et deviennent de plus en plus prégnantes dans notre quotidien. La diversité des événements climatiques extrêmes de ces dernières années confirme qu'un certain nombre de points de rupture climatique sont sur le point d'être franchis<sup>2</sup>.

L'empreinte carbone actuelle des français est d'environ 10 tonnes CO<sub>2</sub>e/pers/an, dont environ 1 tonne pour l'empreinte carbone des services publics qui inclut nos métiers de la recherche<sup>3</sup>. Or, pour limiter le réchauffement à +2°C, chacun d'entre nous devra émettre un peu moins de 2 tCO<sub>2</sub>e/pers/an<sup>4</sup>. Si l'ensemble de la population terrestre émettait autant qu'un français moyen, la limite des 2°C serait dépassée en 2034. Dans sa Stratégie Nationale Bas Carbone et pour respecter ses engagements pris lors des Accords de Paris de 2015, la France s'engage à réduire ses émissions de gaz à effet de serre de 40% en 2030 par rapport à 1990, puis à atteindre la neutralité carbone à l'horizon 2050 en divisant par 6 ses émissions<sup>5</sup>.

Le bilan des émissions de gaz à effet de serre (BGES), réalisé à Riverly par le groupe RiverLy Downstream à l'aide de l'outil GESpointS<sup>6</sup>, a évalué nos émissions pour les années 2019 et 2021 à environ 700 tCO<sub>2</sub>e/an, soit de l'ordre de 6 tCO<sub>2</sub>e par agent et par an dans le seul cadre du travail.

**Nous souhaitons contribuer à l'effort commun de réduction de la part de l'empreinte carbone nationale liée aux services publics.** En tant que membres d'une unité de recherche publique, nous avons de plus un devoir d'exemplarité pour les raisons suivantes :

- nous devons montrer une cohérence entre nos pratiques professionnelles et les messages d'alertes qui émanent de nos travaux de recherche ;
- nous sommes parmi les mieux informés ;
- nous sommes responsables de la formation d'une partie de la génération suivante.

Nous pensons qu'une recherche de qualité avec et pour la société est compatible avec un effort de réduction de nos émissions et une préservation de la qualité de vie au travail. Nous nous inspirons de laboratoires ayant déjà rendu public leur engagement écoresponsable et adopté des mesures concrètes pour réduire leurs émissions.

**L'unité de recherche Riverly s'engage à se donner les moyens financiers, humains et organisationnels pour suivre annuellement ses émissions de GES, et les réduire de 10% par an jusqu'en 2030 par rapport au BGES 2022, tout en conservant nos objectifs de développement de l'impact positif de nos recherches sur la société et l'environnement.** L'unité de recherche Riverly s'engage également à participer au Réseau des laboratoires en transition<sup>7</sup> Labos1point5, qui vise à favoriser les échanges, promouvoir et faire de la veille sur les pratiques vertueuses, mais aussi faciliter le passage à l'action.

La présente charte s'accompagnera de mesures concrètes pour tous les aspects de la vie de l'unité et les modalités de suivi de leur empreinte environnementale, dans les domaines du transport, de la consommation d'énergie et de biens, ou encore de la gestion des déchets. Ces mesures seront décidées de manière collégiale et révisées périodiquement afin d'ajuster la trajectoire carbone de l'unité.

Centre  
Lyon-Grenoble-Auvergne-  
Rhône-Alpes

5 rue de la Doux  
CS 20244  
69625 Villeurbanne  
Cedex

<sup>1</sup> IPCC (2021) : [https://www.ipcc.ch/report/ar6/wg2/downloads/report/ipcc\\_ar6\\_wg2\\_chapter2.pdf](https://www.ipcc.ch/report/ar6/wg2/downloads/report/ipcc_ar6_wg2_chapter2.pdf)  
<sup>2</sup> Armstrong McKay et al. (2022) : <https://doi.org/10.1038/s41586-022-03399-9>  
<sup>3</sup> IPCC (2022) : [https://www.ipcc.ch/report/ar6/wg2/downloads/report/ipcc\\_ar6\\_wg2\\_chapter2.pdf](https://www.ipcc.ch/report/ar6/wg2/downloads/report/ipcc_ar6_wg2_chapter2.pdf)  
<sup>4</sup> [https://www.ipcc.ch/report/ar6/wg2/downloads/report/ipcc\\_ar6\\_wg2\\_chapter2.pdf](https://www.ipcc.ch/report/ar6/wg2/downloads/report/ipcc_ar6_wg2_chapter2.pdf)  
<sup>5</sup> Herette et al. (2022) : [https://www.ipcc.ch/report/ar6/wg2/downloads/report/ipcc\\_ar6\\_wg2\\_chapter2.pdf](https://www.ipcc.ch/report/ar6/wg2/downloads/report/ipcc_ar6_wg2_chapter2.pdf) et [https://www.ipcc.ch/report/ar6/wg2/downloads/report/ipcc\\_ar6\\_wg2\\_chapter2.pdf](https://www.ipcc.ch/report/ar6/wg2/downloads/report/ipcc_ar6_wg2_chapter2.pdf)  
<sup>6</sup> [https://www.ipcc.ch/report/ar6/wg2/downloads/report/ipcc\\_ar6\\_wg2\\_chapter2.pdf](https://www.ipcc.ch/report/ar6/wg2/downloads/report/ipcc_ar6_wg2_chapter2.pdf)

# Coming up with concrete actions

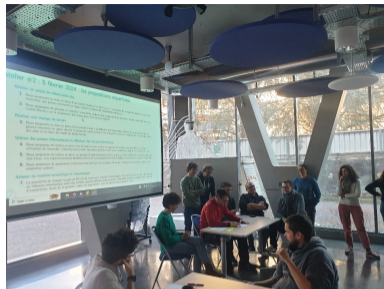
## Reaching collective decisions

### Learning new skills!

- ▶ “Facilitate a participatory approach to reducing the environmental impact of my lab” (Nov. 2023)
- ▶ Training offered by INRAE to lab contact persons for sustainable development (see Gauthier et al., 2023)

### Participatory workshops (Jan.-Feb. 2024)

- ▶ 50+ participants (30%)
- ▶ Three 2 1/2 h workshops
- ▶ Technique of **imperfect proposals** (to be improved)
- ▶ Teams of 6 persons working each on 1 specific proposal
- ▶ Detailed timing of slots for thinking and taking comments in



# Coming up with concrete actions

## Reaching collective decisions

### Everyday activities addressed

- ▶ Long distance travelling
- ▶ Performing chemical/biological analyses
- ▶ Purchasing scientific/IT hardware
- ▶ Setting up a PhD/research proposal
- ▶ Carrying out a field survey
- ▶ Using PCs and performing scientific computations
- ▶ Carrying out a lab experiment
- ▶ Organising a seminar

# Coming up with concrete actions

## Reaching collective decisions

### Everyday activities addressed

- ▶ Long distance travelling
- ▶ Performing chemical/biological analyses
- ▶ Purchasing scientific/IT hardware
- ▶ Setting up a PhD/research proposal
- ▶ Carrying out a field survey
- ▶ Using PCs and performing scientific computations
- ▶ Carrying out a lab experiment
- ▶ Organising a seminar

### Example of an imperfect proposal...

“We propose to drastically reduce the frequency of air travel by replacing air travel with videoconferencing, by train travel when it takes less than 6 hours (one way), by limiting the number of stopovers by plane, and or by extending stays to regroup missions”

# Coming up with concrete actions

## Reaching collective decisions

### Everyday activities addressed

- ▶ Long distance travelling
- ▶ Performing chemical/biological analyses
- ▶ Purchasing scientific/IT hardware
- ▶ Setting up a PhD/research proposal
- ▶ Carrying out a field survey
- ▶ Using PCs and performing scientific computations
- ▶ Carrying out a lab experiment
- ▶ Organising a seminar

### Example of an imperfect proposal...

“We propose to drastically reduce the frequency of air travel by replacing air travel with videoconferencing, by train travel when it takes less than 6 hours (one way), by limiting the number of stopovers by plane, and or by extending stays to regroup missions”

### ... becoming a less imperfect proposal! (summary of)

For taking flights (for travels longer than 6h by train)

#### 1. Decision process

- ▶ Traveller to prepare a document with a pitch on motivations and a carbon cost with e.g. the [Lobos 1.5 travels simulator tool](#)
- ▶ Team leader to issue a recommendation
- ▶ Lab head to validate
- ▶ Team leader to organise a yearly collective discussion based on the good practice guide

#### 2. Good practice guide to be set up based on

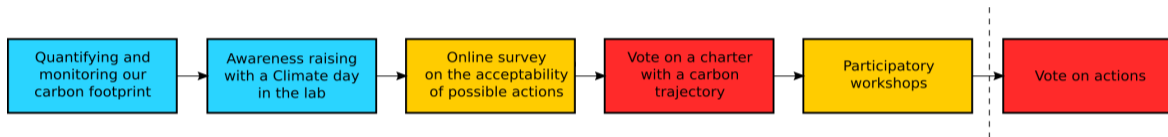
- ▶ Priorizing travel types: field survey, networking, conference
- ▶ Bonus/penalty system: junior researcher for networking and conferences, personal footprint history, case-by-case assessment





# Reducing the carbon footprint of a research lab: how to move from individual initiatives to collective actions?

Process overview and take-home messages



## Take-home messages

- ▶ Long process with large and sustained efforts required on awareness raising
- ▶ Crucial support from the institute and from the lab head
- ▶ Essential to involve everyone for any collective progress
- ▶ Encourage people to attend workshops by conditioning their vote on participation

# Reducing the carbon footprint of a research lab: how to move from individual initiatives to collective actions?



Follow us on the [Labs 1point5](#) network [Transition 1point5!](#)

The Riverly Downstream team  
INRAE, RiverLy

# References



Gauthier, L. et al. (2023). "How to make a sustainable development approach successful across all scales of a research institute? Crossed views at INRAE". In: EGU General Assembly 2023 (Vienna, Austria, Apr. 24–28, 2023). DOI: [10.5194/egusphere-egu23-7600](https://doi.org/10.5194/egusphere-egu23-7600).



INRAE (2021). *Responsabilité sociétale et environnementale INRAE. Plan d'action 2021-2025*. INRAE. 39 pages.



Mariette, J. et al. (2022). An open-source tool to assess the carbon footprint of research. *Environmental Research: Infrastructure and Sustainability* 2, 035008 (3). DOI: [10.1088/2634-4505/ac84a4](https://doi.org/10.1088/2634-4505/ac84a4).



Vidal, J.-P. et al. (2023). "How to collectively engage in reducing the carbon footprint of a research lab?" In: EGU General Assembly 2023 (Vienna, Austria, Apr. 24–28, 2023). DOI: [10.5194/egusphere-egu23-3462](https://doi.org/10.5194/egusphere-egu23-3462).