



**THIRD WORLD SYMPOSIUM  
ON SUSTAINABILITY  
SCIENCE AND RESEARCH**

Sustainability Futures: Challenges  
and Opportunities Towards a More  
Sustainable World

April 8

## **Mobility carbon footprint of the University of A Coruña (Spain)**

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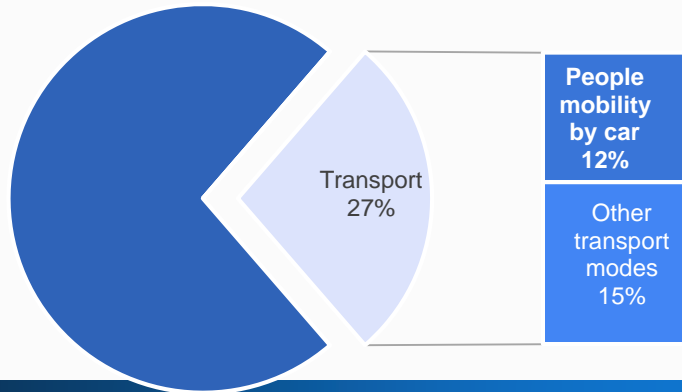
# INTRODUCTION

## Why is it important to analyze our mobility?

WHO: “The transport sector is the fastest growing contributor to climate emissions”

EF of mobility:

- occupation of natural spaces by transport infrastructures
- resources and waste of industry
- greenhouse gas emissions into the atmosphere in trips → **Climate Change**  
mainly CO<sub>2</sub> → **Carbon Footprint**



**Total greenhouse gas emissions. EU-28 (2016)**

Source: European Environment Agency (EU)

# INTRODUCTION

- About 50% of the overall UDC EF is due to traveling to the centers.
- The aim is to calculate the CO<sub>2</sub> emissions of people transportation to/from UDC centers.
- UDC traveling Carbon Footprint map: to facilitate the autonomous study and research by UDC community members.
- Offer a personalized report, while anonymous data is incorporated into the Carbon Footprint map.
- Citizen Science and Emaptic tool



# MATERIALS AND METHODS

Multidisciplinary and complementary elaboration

- Office for the environment: technical contents  
[https://www.udc.es/sociedade/medio\\_ambiente/](https://www.udc.es/sociedade/medio_ambiente/)
- CartoLAB: tool development through Emapic  
<https://cartolab.udc.es/>
- FerroTrans, research group in transportation:  
statistical treatment of data (in-depth analysis)  
[https://caminos.udc.es/hosting/ferroca/index\\_i.html](https://caminos.udc.es/hosting/ferroca/index_i.html)



Oficina de Medio Ambiente  
UNIVERSIDADE DA CORUÑA



**emapic**  
mapping  
your feelings

 **FERROTRANS**

## **MATERIALS AND METHODS:** Methodology for data analysis

UDC EF OF MOBILITY (ha/year) <sup>1</sup>

Carbon footprint (t CO<sub>2</sub>/year)

- Different emission factors among emitter transport modes and number of occupants
- CO<sub>2</sub> fixation capacity of local forestland: 6,27 t CO<sub>2</sub>/ha

<sup>1</sup>Ecological footprint (ha/year): EF-M is the ecologically productive local territory necessary to absorb the carbon footprint (Rees & Wackernagel, 1998)

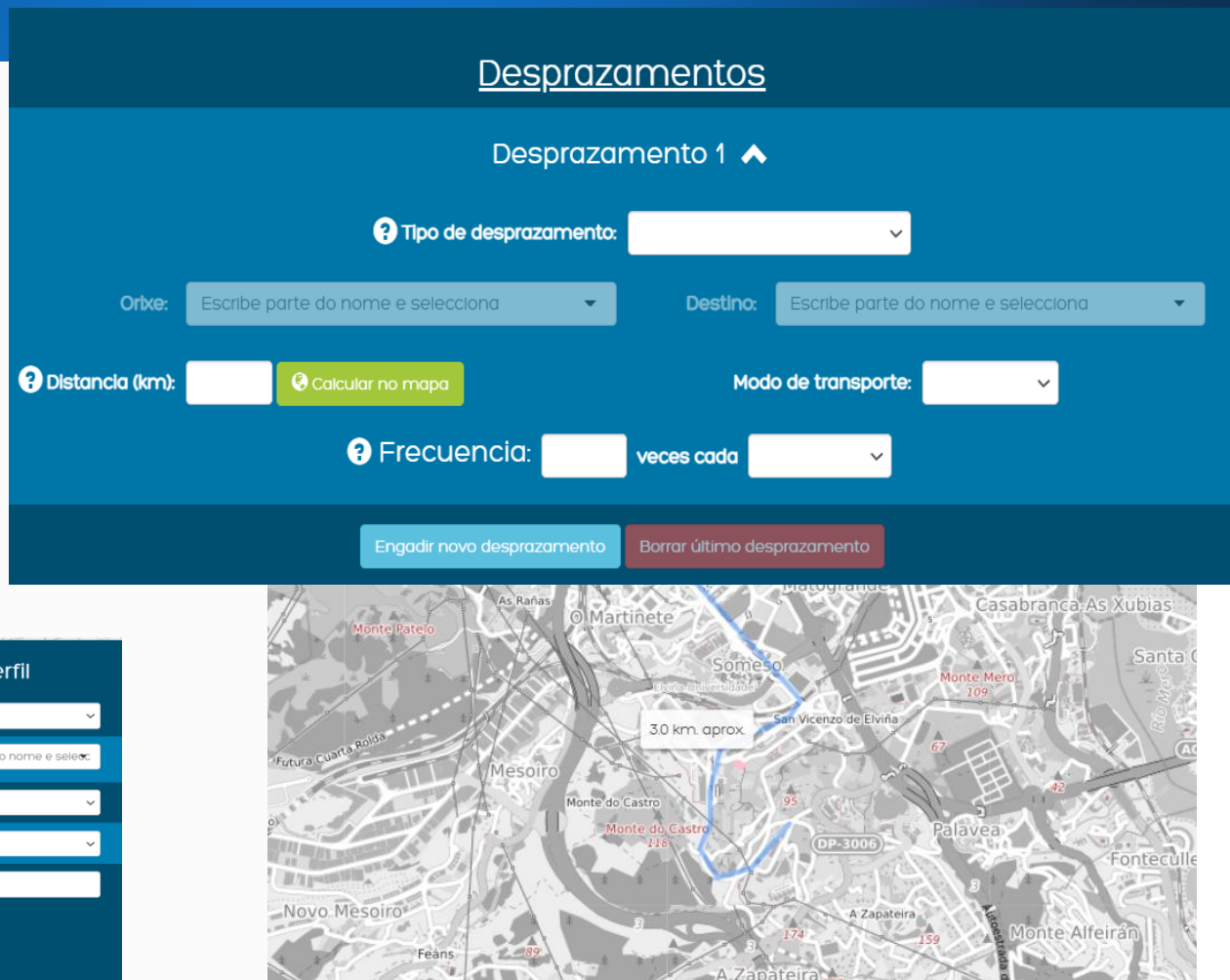
# RESULTS

1. THE TOOL
2. HOW USERS MANAGE THE TOOL
3. ABOUT DIRECT EXTRACTABLE INFORMATION FROM THE TOOL
4. ABOUT ADDITIONAL ESTATISTICAL TREATMENT OF DATA

<https://emapic.es/custom/mobilidade-desprazamentos-udc>

# RESULTS: (1) THE TOOL

Data entry is done in three windows



## RESULTS: (1) THE TOOL


- Geolocation
  - a) Automatic or manual for mobile devices
  - b) Manual for computers or devices without GPS
- Personal report
- Download
- Go to complete map of contributions
- Link to European Parliament News for more information

### A túa posición

No seguinte paso pedirámosche a posición do teu domicilio durante o curso. Non é preciso que deas a posición exacta se non queres, podes indicar un lugar preto, sexa na mesma rúa ou na rúa do lado.

Por defecto tentaremos localizar a túa posición actual automaticamente, para o cal o teu navegador che pedirá permiso. Se prefires facelo manualmente ou a localización automática non funciona, deberás buscar manualmente a túa posición no mapa.

Se o ves necesario, aínda podes revisar as túas respostas, volvendo atrás coa frecha da parte inferior. Senón, preme en «Rematar» para indicar a localización do teu domicilio.



 Rematar

### Moitas grazas por participares nesta enquisa.

Os teus resultados son:

As emisións de gases de efecto invernadoiro derivadas dos teus desprazamentos vinculados á UDC son de: **8,28 kg CO<sub>2</sub>/ano**

Estas emisións equivalen a un **17% a da media da UDC** (segundo datos da última medición global de 2016).

A Pegada Ecolóxica (PE) dos teus desprazamentos vinculados á UDC equivale a **0 gha** (hectárea global de terreo produtivo). Como as superficies forestais galegas teñen unha produtividade maior que a media mundial, a superficie de forestada galega para absorber as emisións da túa mobilidade sería de **0 ha**.

Cunha mobilidade similar á túa, a comunidade universitaria da UDC precisaría **2022 ha de bosque** para absorber as emisións, unha superficie **18 veces a da suma das superficies arboradas** nos campus da UDC actualmente.

Aproveita a marxe de mellora que estea na túa man para reducir a pegada ecolóxica. Con cerca do 50% dos desprazamentos, o coche particular (case sempre cun único ocupante) achega o 90% da PE da UDC. Por esta orde: camiñar, bicicleta, autobús/tren, coche compartido, permiten reducir a PE dos nosos desprazamentos. Pénsaal

Pegada ecolóxica media por desprazamentos na UDC de tódolos usuarios: 973,09 kg CO<sub>2</sub>/ano

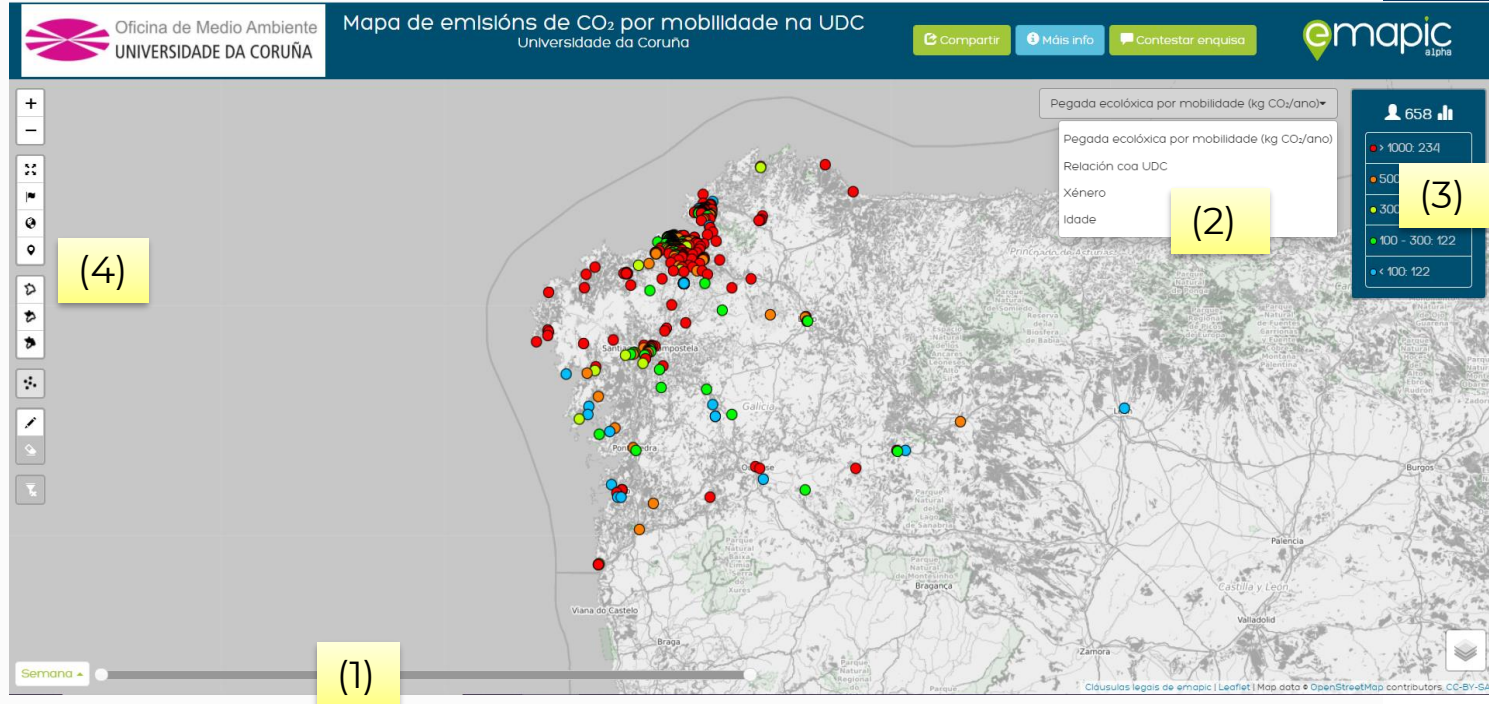
[Máis info](#) [Mapa con tódalas respostas](#) [Descargar os meus datos](#)



# RESULTS: (2) HOW USERS MANAGE THE TOOL

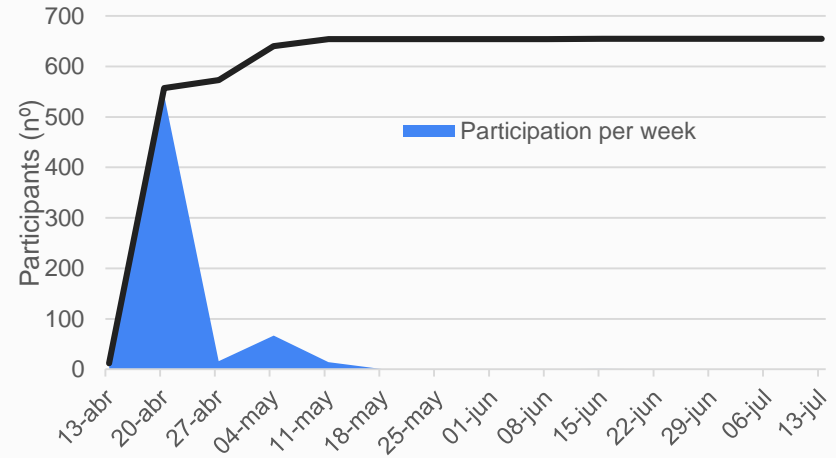
## Filters and options

- (1) Date week-year
- (2) Drop-down menú
- (3) Statistics and downloads
- (4) Filters bar



## RESULTS: (3) ABOUT DIRECT EXTRACTABLE INFORMATION FROM THE TOOL

- 658 participants (05/04/2021)
- Survey: April 2020, during an online teaching period due to the COVID-19



- 13-20 april 2020: 84,4% contributions

# RESULTS: (3) ABOUT DIRECT EXTRACTABLE INFORMATION FROM THE TOOL

## EF-M (kg CO<sub>2</sub>/year)

Pegada ecológica por mobilidade (kg CO<sub>2</sub>/ano)  
Pegada ecológica media das respostas visíveis: 1490,68 kg CO<sub>2</sub>/ano

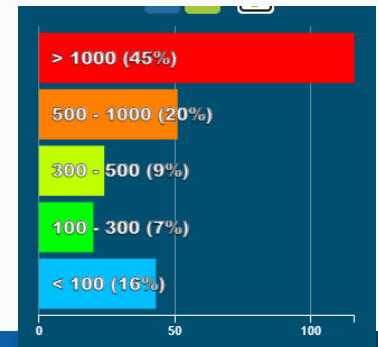
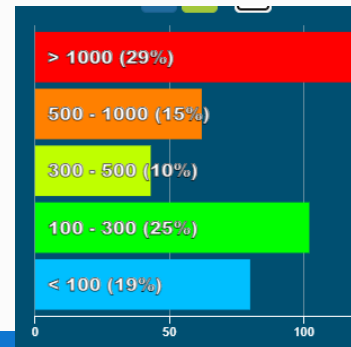


Dynamic average of holdings at real time  
1490,7 kg CO<sub>2</sub>/year

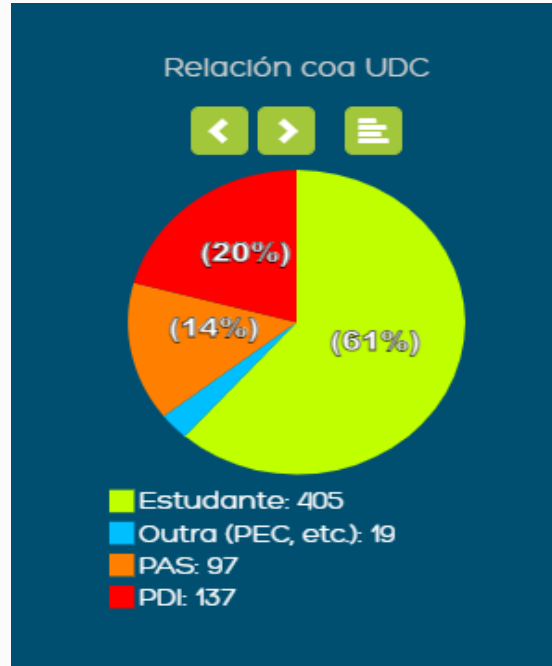
Direct information accessed by users  
from the map

Students (61%)  
1156,25 kg CO<sub>2</sub>/year

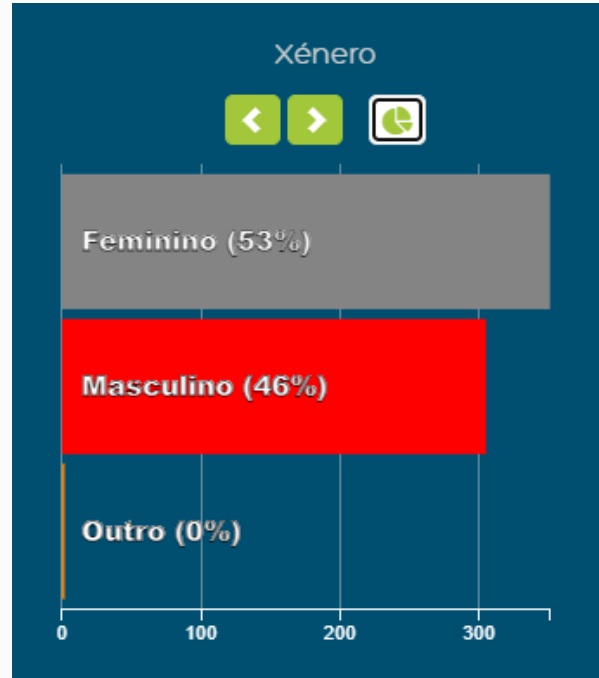
Personal (39%)  
2018,1 kg CO<sub>2</sub>/year



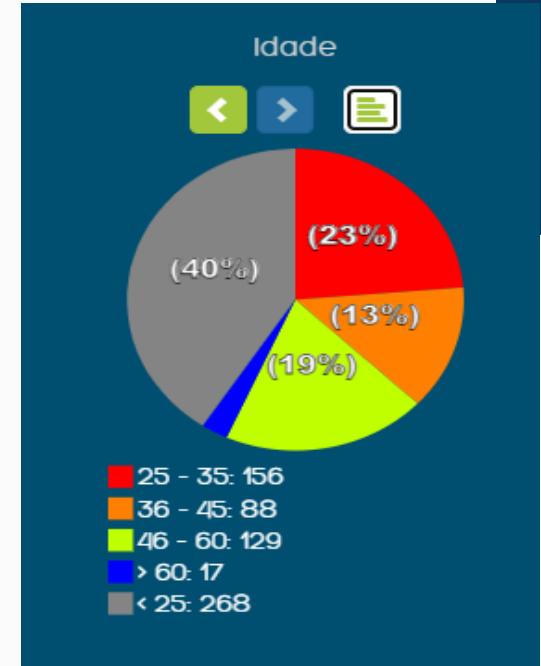
## RESULTS: (3) ABOUT DIRECT EXTRACTABLE INFORMATION FROM THE TOOL



University community group



Gender



Age groups

## RESULTS: (4) ABOUT ADITIONAL ESTATISTICAL TREATMENT OF DATA

### Ecological footprint of UDC in hectares

Conversion factor 6,27 tCO<sub>2</sub>/ha·year

VCC: campus to campus route

VNO: non-ordinary or special route

VOC: ordinary route residence → campus

VOD: ordinary return route residence → home

Route tipe				
VCC	VNO	VOC	VOD	Total
27,5	104,0	3.121,9	856,2	<b>4.109,6</b>

## RESULTS: (4) ABOUT ADITIONAL ESTATISTICAL TREATMENT OF DATA

Extra information from de download file and statistical analysis (hectares)

Per capita	Student	PAS	PDI	Total
media	0,15	0,19	0,26	0,18
mediana	0,05	0,10	0,12	0,08

Colective	Total
Students	3.274,1
PAS	234,8
PDI	600,7
Gender	
Men	2.547,9
Women	1.561,7

Transport Mode	Total
Bicycle	0,0
Walking	0,0
Car with passengers	543,5
Car alone	3.174,4
Van	6,6
Motorbike	20,4
Plane	58,0
Ship	0,2
Bus	203,5
Train	102,9
<b>Total</b>	<b>4.109,6</b>

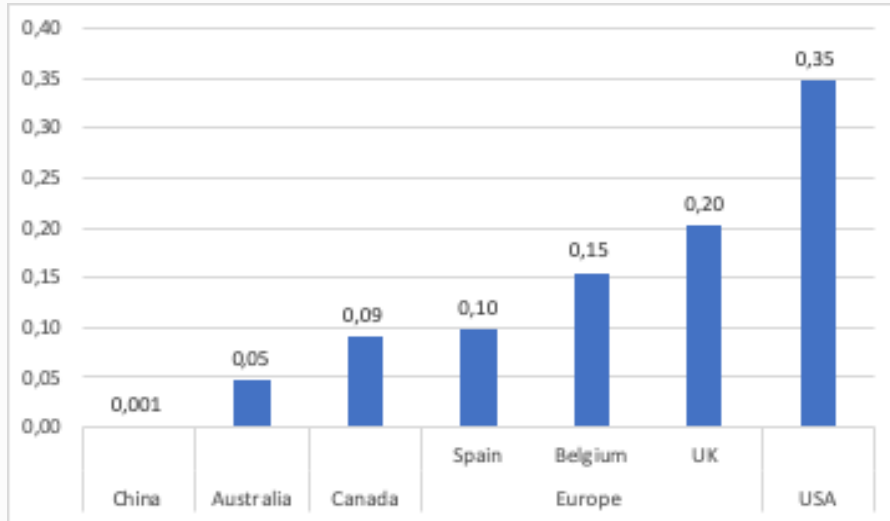
## MAIN CONCLUSIONS

- Car alone is responsible of 77,2% of EF-M
- 20.742 persons UDC → 0,18 ha/person due trips to UDC
- Community group segregation: 0,15 ha/student vs. 0,23 ha/worker
- Gender segregation:
  - 46% men responsible of 62% EF-M → 6,28 kgCO<sub>2</sub>/year/man
  - 63% women responsible of 38% EF-M → 3,15 kgCO<sub>2</sub>/year/woman
- This dynamic tool can be used autonomously by university centers and groups, providing information on initial direct results to both promoters and users, which enhance their educational power.

# MAIN CONCLUSIONS

Is UDC carbon footprint much compared to other universities?

EF-M pc (gha) in higher education



The EF-M pc of UDC is **0,18 gha** on average (median 0,08 gha), comparable to that of other universities analyzed.

However, it is higher than the value obtained in 2008 and 2016 using a different tool.

- ✓ The next step is to review and improve tool performance.



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