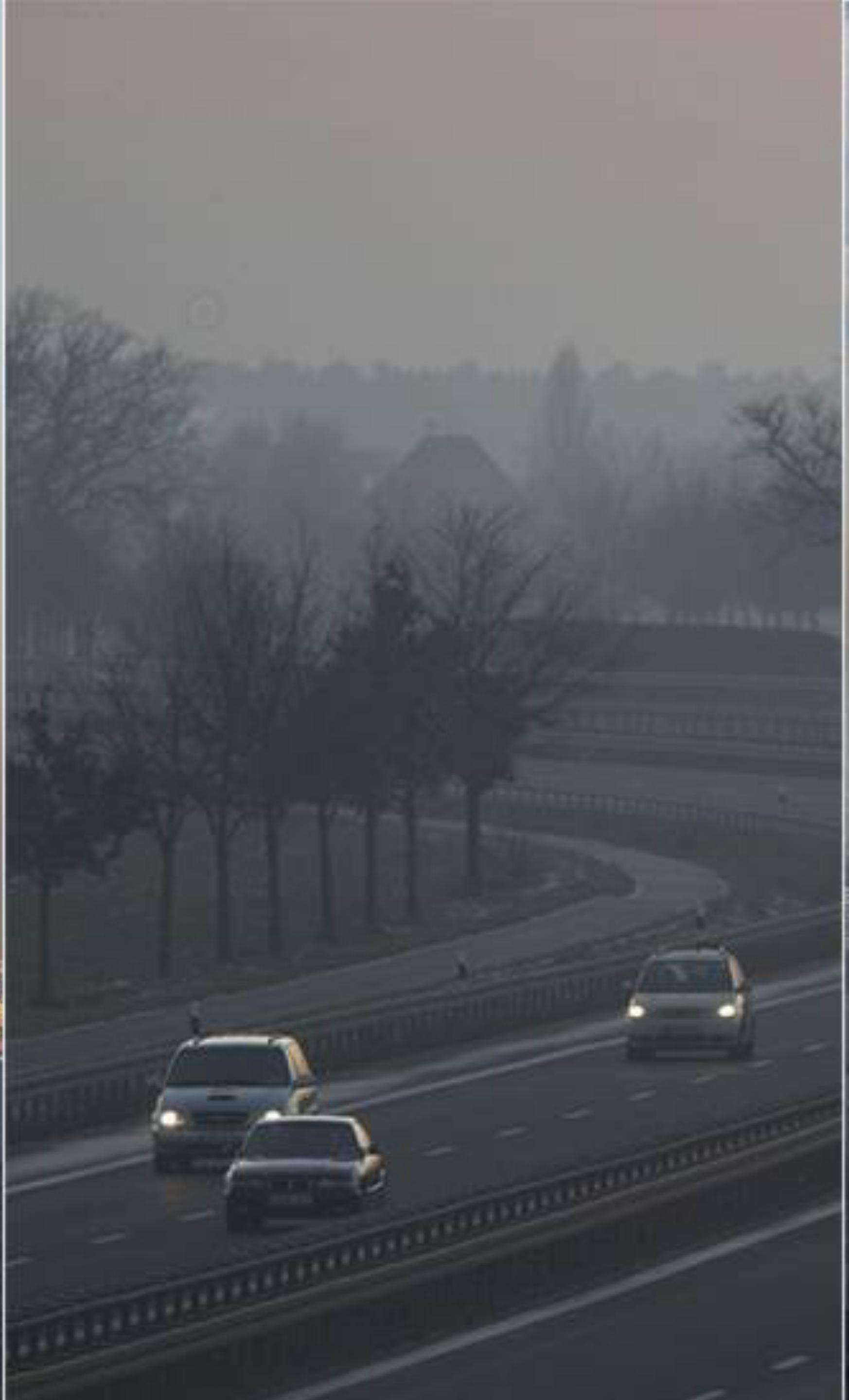
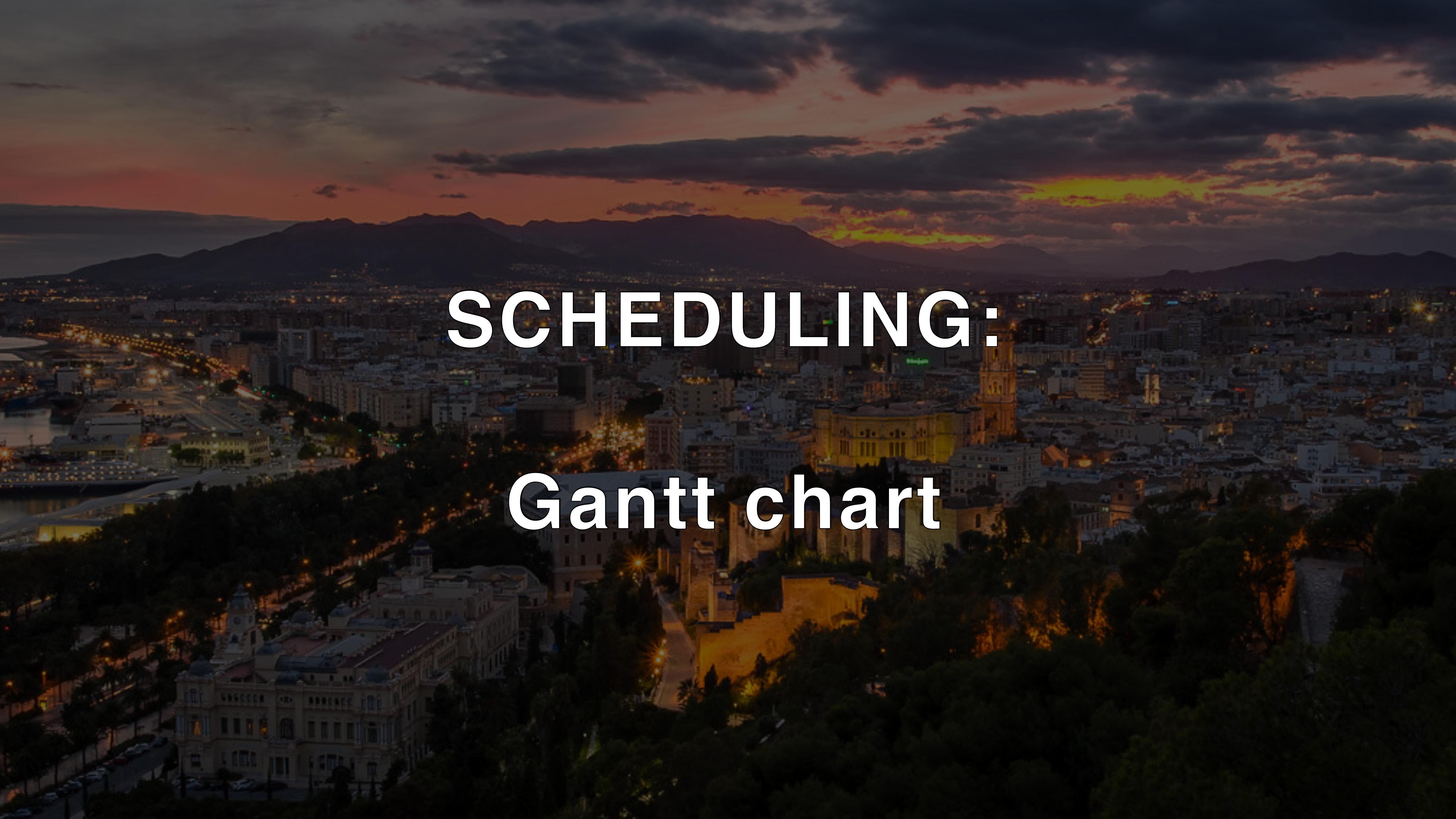
The background of the slide is a photograph of a city at dusk or night, viewed from an elevated position. The city lights are visible in the streets and buildings, and the sky above is filled with dramatic, colorful clouds ranging from deep orange to dark grey.

# Reducing contamination indicators in Spain by city mobility improvements based on open data

Cédric Prieels  
Eduardo Ruiz Ruiz  
Fernando Solar Iglesias  
Nicolò Trevisani





The background image shows a panoramic view of a city at dusk or night. The sky is filled with dramatic, colorful clouds ranging from deep orange to dark grey. In the foreground, there's a dense urban area with numerous buildings and streets. A prominent church with a tall, illuminated steeple is visible in the center-right. The city extends towards a range of mountains in the distance, which are also partially obscured by the clouds.

# SCHEDULING:

## Gantt chart

## **DATA ANALYSIS TIMELINE: Our data is expected to be extracted from 3 main sources**

### **Polls:**

- Set up of the different questions, along with control questions and randomization process to avoid collecting any personal data (2 weeks)
- Distribution of the poll (open for 3 months)
- Analysis of the results in order to exactly define the project (2 weeks)

### **Open data:**

- Gathering of the data from different sources and curation (2 months)
- Data analysis in order to define the project (2 months)

### **Eventual new sensors:**

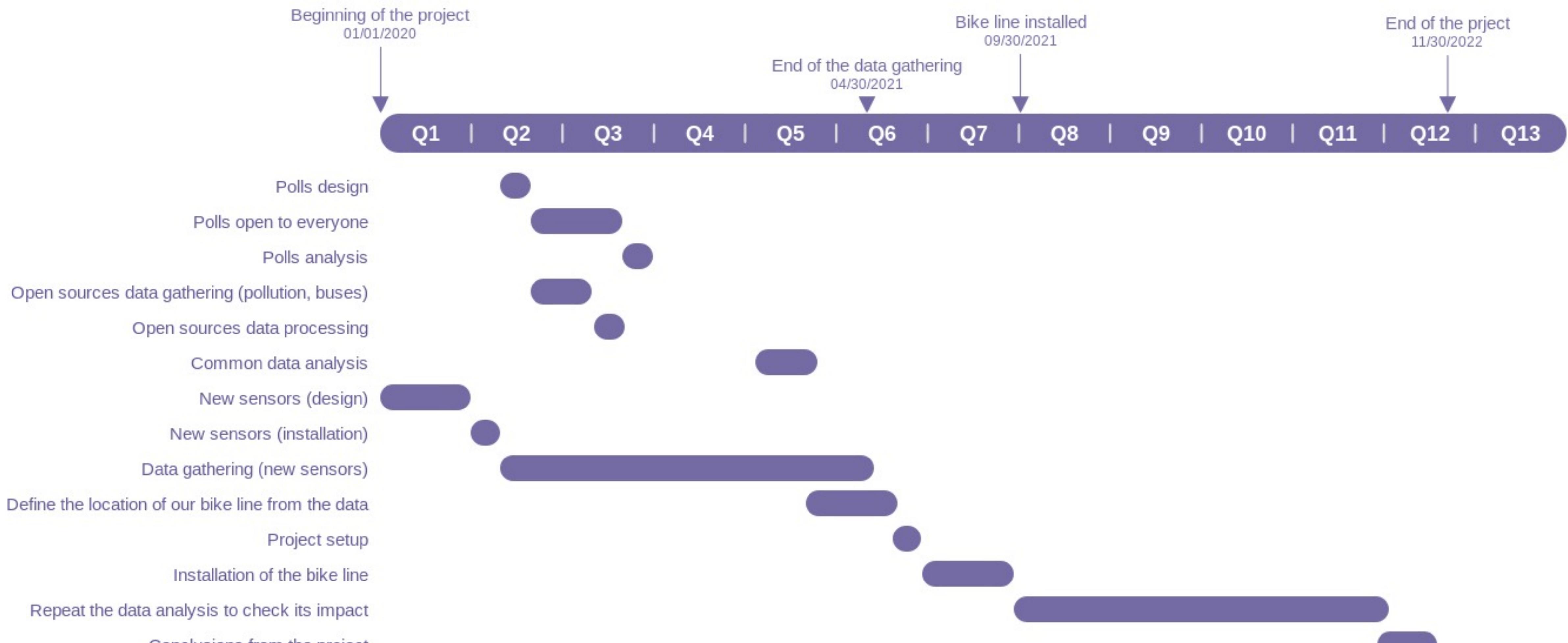
- Depending on the previous results, some additional sensors may be needed
- In this case, the best option would be to work with Urban Clouds directly, so that they could setup these sensors and maintain them without the need for R&D (around 4 months in total)

**ACTUAL PROJECT TIMELINE:** Once the project completely defined and the data from the different sensors analyzed for at least a year, to avoid any fluctuation of the air quality depending on the season, the actual project will be launched:

- Project set up and funding (3-4 months)
- Actual installation of the bike line (2-6 months, depending on its location)

**Finally, after the installation, the analysis will be repeated to check for its impact:**

- New data analysis for a year to check the air quality and traffic flow improvement in this area (12 months)
- Final report written and published (3 months) -> end of 2022



Made with [www.gantt.io](http://www.gantt.io)

The background image shows a panoramic view of a city at dusk or night. The sky is filled with dramatic, colorful clouds ranging from deep orange to dark grey. In the foreground, the city's buildings are illuminated with warm lights, and a road with moving vehicles is visible. In the distance, a range of mountains is silhouetted against the bright horizon.

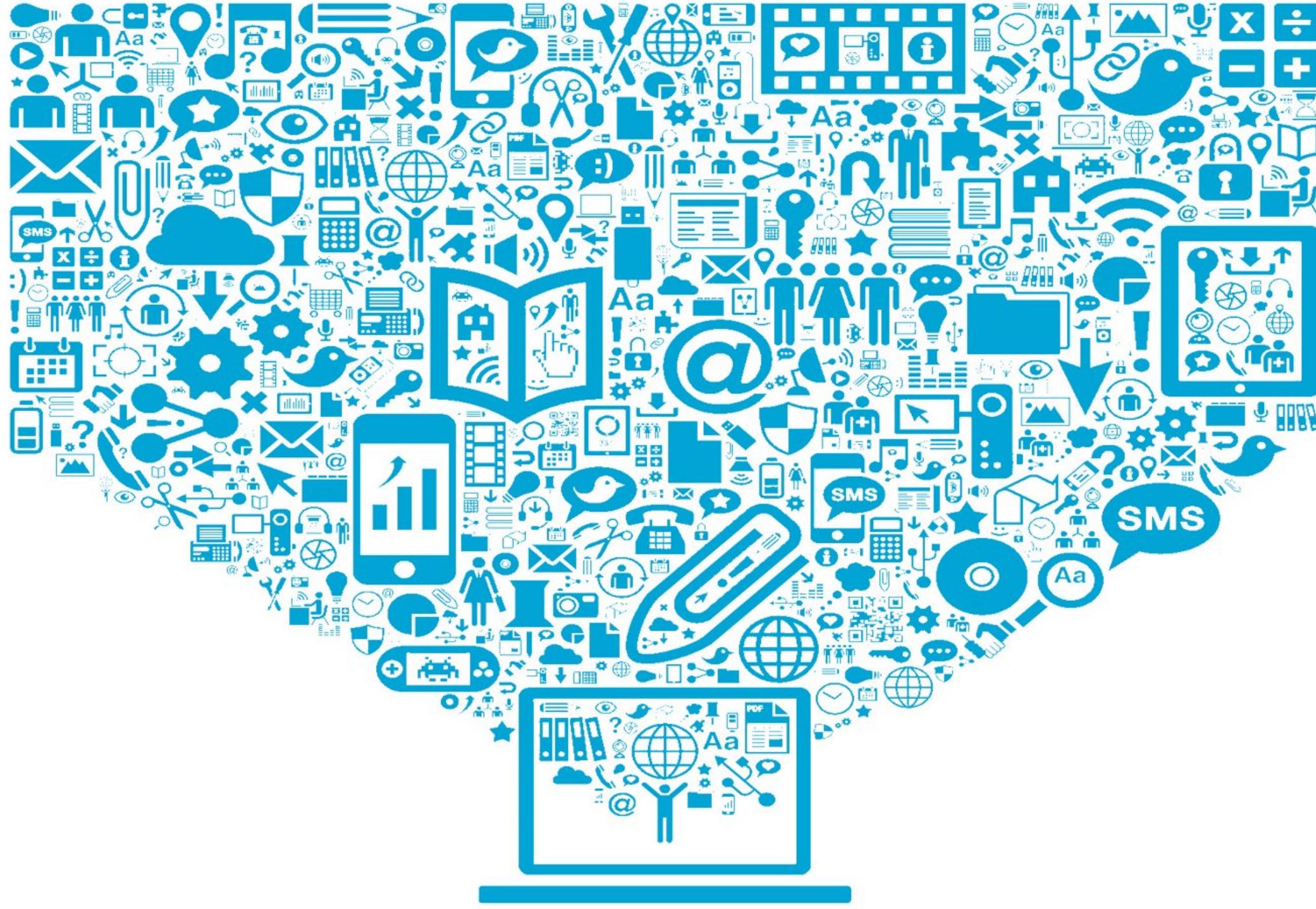
# DATA SOURCES: Repositories and its curation

**Instituto  
Nacional de  
Estadística**



**Datos Abiertos  
Ayuntamiento de  
Málaga**





The Dublin Core Metadata Initiative®

*Making it easier to find information.*

XML

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1  <?xml version="1.0" encoding="UTF-8" standalone="no"?><?xml-stylesheet type="text/xsl" href="/webservices/
catalog/xsl/searchRetrieveResponse.xsl"?>
2  <searchRetrieveResponse xmlns:oclcterms="http://purl.org/oclc/terms/"
3      xmlns:dc="http://purl.org/dc/elements/1.1/"
4      xmlns:diag="http://www.loc.gov/zing/srw/diagnostic/"
5      xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
6
7      <dc:title>Porcentaje de personas de 16 y más años que usualmente no se desplazan caminando o en
bicicleta, por comunidad autónoma de residencia y motivos por los que no lo hacen</dc:title>
8      <dc:creator>Instituto Nacional de Estadística</dc:creator>
9      <dc:subject>desplazamiento;españa;bicicleta;caminando;encuesta</dc:subject>
10     <dc:description>Resultados de la encuesta de Hogares y Medio Ambiente del 2008</dc:description>
11     <dc:publisher>Instituto Nacional de Estadística</dc:publisher>
12     <dc:contributor></dc:contributor>
13     <dc:date>2008</dc:date>
14     <dc:type>Dataset</dc:type>
15     <dc:format>text/csv</dc:format>
16     <dc:format.extent>1.9 kB</dc:format.extent>
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18     <dc:source></dc:source>
19     <dc:language>es_ES</dc:language>
20     <dc:relation></dc:relation>
21     <dc:coverage.temporal>2008</dc:coverage.temporal>
22     <dc:coverage.espacial>España</dc:coverage.espacial>
23     <dc:rights>Se permite reutilización con cita</dc:rights>
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25     <dc:accrualMethod>Encuesta</dc:accrualMethod>
26     <dc:accrualPolicy>Cerrado</dc:accrualPolicy>
27     <dc:audience.educationLevel>Educación obligatoria</dc:audience.educationLevel>
28
29
30 </searchRetrieveResponse>
```

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1 <?xml version="1.0" encoding="UTF-8" standalone="no"?><?xml-stylesheet type="text/xsl" href="/webservices/
catalog/xsl/searchRetrieveResponse.xsl"?>
2 <searchRetrieveResponse xmlns:oclcterms="http://purl.org/oclc/terms/"
3   xmlns:dc="http://purl.org/dc/elements/1.1/"
4   xmlns:diag="http://www.loc.gov/zing/srw/diagnostic/"
5   xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
6
7   <dc:title>Calidad del aire 2018</dc:title>
8   <dc:creator>Urban Clouds</dc:creator>
9   <dc:subject>contaminación;aire;calidad;málaga</dc:subject>
10  <dc:description>Datos del 2018 asociados a la calidad del aire en Málaga. Los atributos que contienen _APP
    se refieren a medidas tomadas con Appmosfera. Los atributos que contienen _M se refieren a medidas tomadas con
    SMAQ_mobile. Los atributos que contienen _F se refieren a medidas realizadas con SMAQ_fija. Los gases que no
    contienen ninguno de los atributos anteriores (p. ej. o3, o3_level,...) se corresponden al cálculo agregado de
    SMAQ mobile y SMAQ fijas. Las medidas se toman en ug/m3 (microgramos / metro cúbico). Atributos con el texto
    global (p.ej. "iuca.level_APP_global") corresponde a los globales calculados de cada dispositivo o el global de
    todos los dispositivos. En los IUCA (Indice Urbano de Calidad del Aire) no se tiene en cuenta PM1.</
    dc:description>
11  <dc:publisher>Datos Abiertos Ayuntamiento de Málaga</dc:publisher>
12  <dc:contributor></dc:contributor>
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25  <dc:accrualMethod>Sensores</dc:accrualMethod>
26  <dc:accrualPolicy>Cerrado</dc:accrualPolicy>
27  <dc:audience.educationLevel>Educación obligatoria</dc:audience.educationLevel>
28
29 </searchRetrieveResponse>
```

**The datasets we used were  
already in good shape**

**Only a small amount of curation  
was needed**

# Instituto Nacional de Estadística



**Used comma for  
floating numbers:**

**1,55 -> 1.55**

# Datos Abiertos Ayuntamiento de Málaga



**Categorial variables  
translated to numbers:**

**Good -> 4**

**Moderate -> 3**

**Unhealthy-low -> 2**

**Unhealthy -> 1**

**Unhealthy-high -> 0**

The background image is a wide-angle aerial photograph of a city at dusk or night. The sky is filled with dramatic, colorful clouds ranging from deep orange to dark grey. In the foreground, the city's buildings are visible, with many windows lit up. A prominent, brightly lit building with a classical facade is situated in the center. The city extends towards the horizon, where dark mountains are silhouetted against the lighter sky.

**DATA SHARING:**

Making data reusable

# GitHub

# zenodo

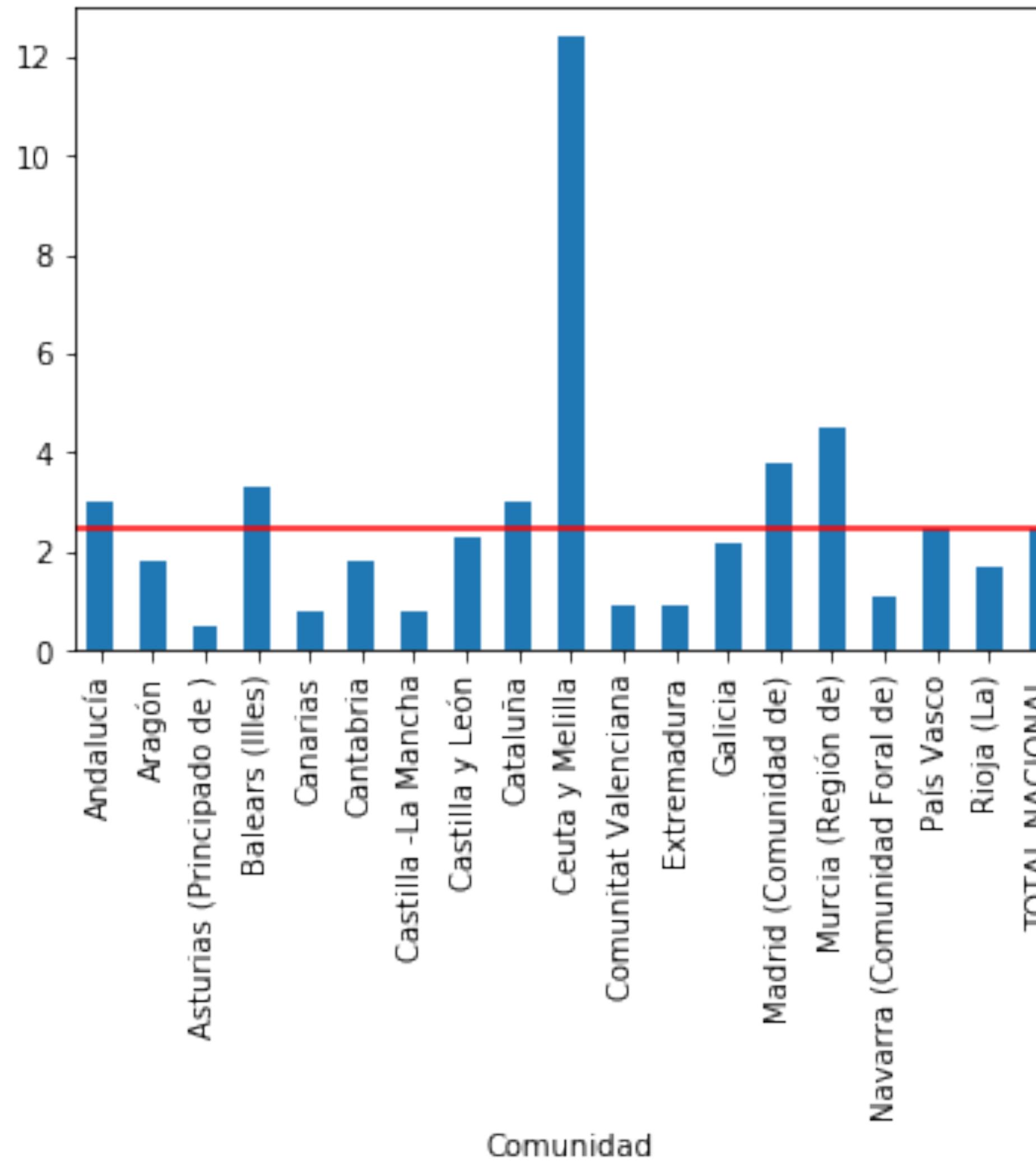
The background image shows a panoramic view of a city at dusk or night. The sky is filled with dramatic, colorful clouds ranging from deep orange to dark grey. In the foreground, the city's architecture is visible, with numerous buildings and streets illuminated by artificial lights. A prominent church tower with a tall spire is visible in the center-right. The city extends towards a range of mountains in the distance, which are also partially obscured by the low-hanging clouds.

# DATA ANALYSIS:

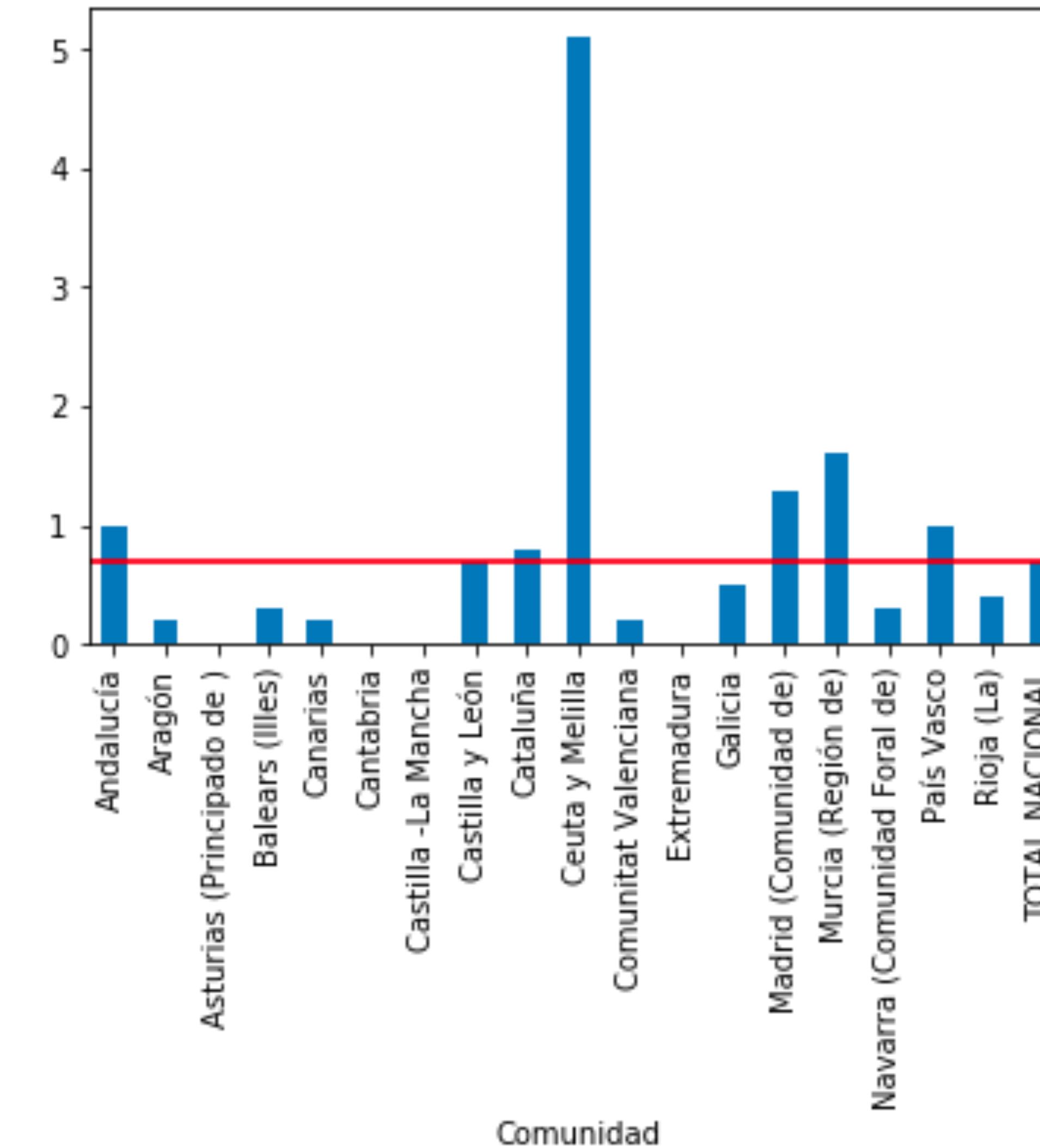
## From data to information

# CITY SELECTION: Why don't you use the bicycle?

Falta de una red completa de carriles bici

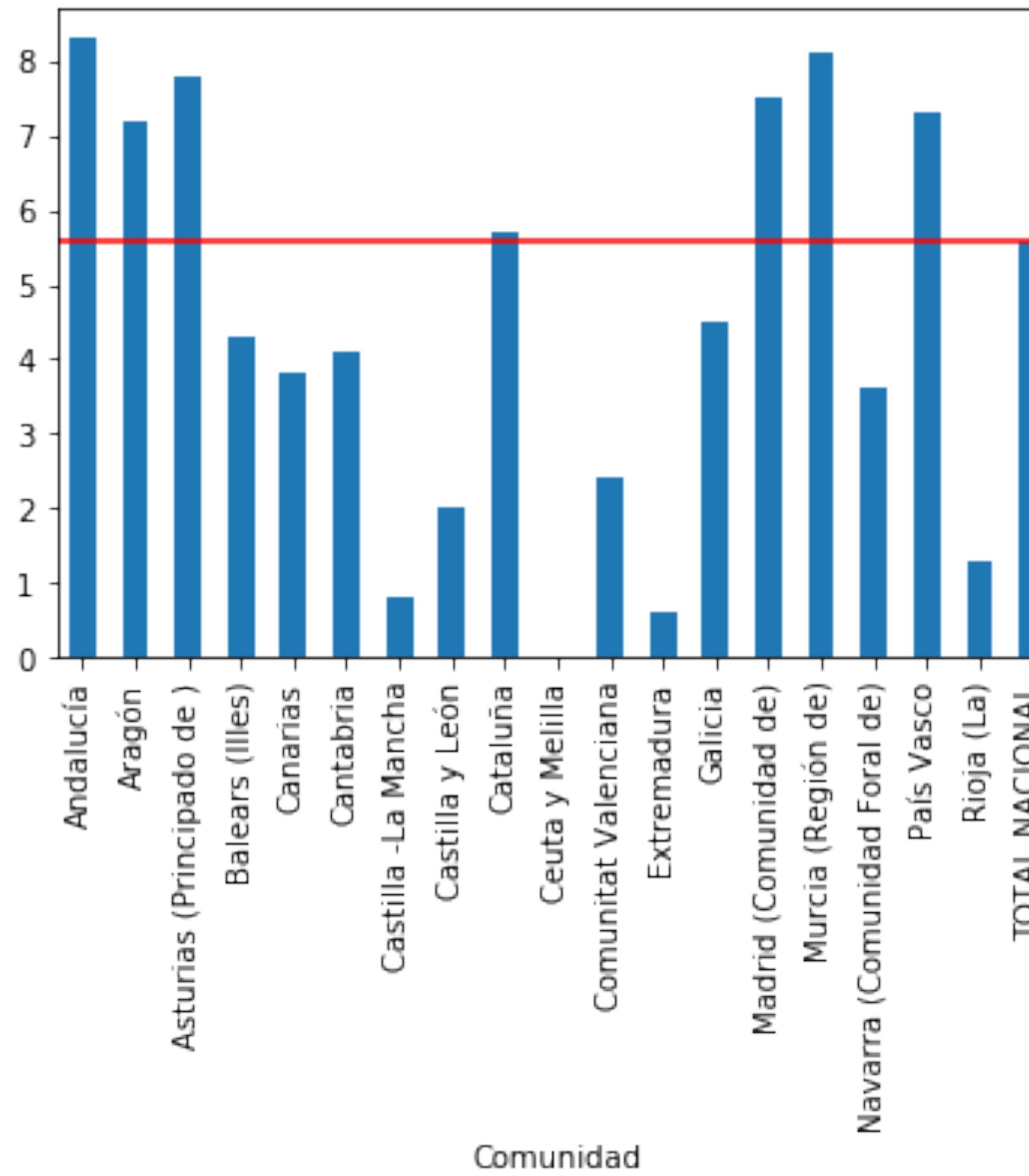


Falta de instalaciones de aparcamiento de bicicletas

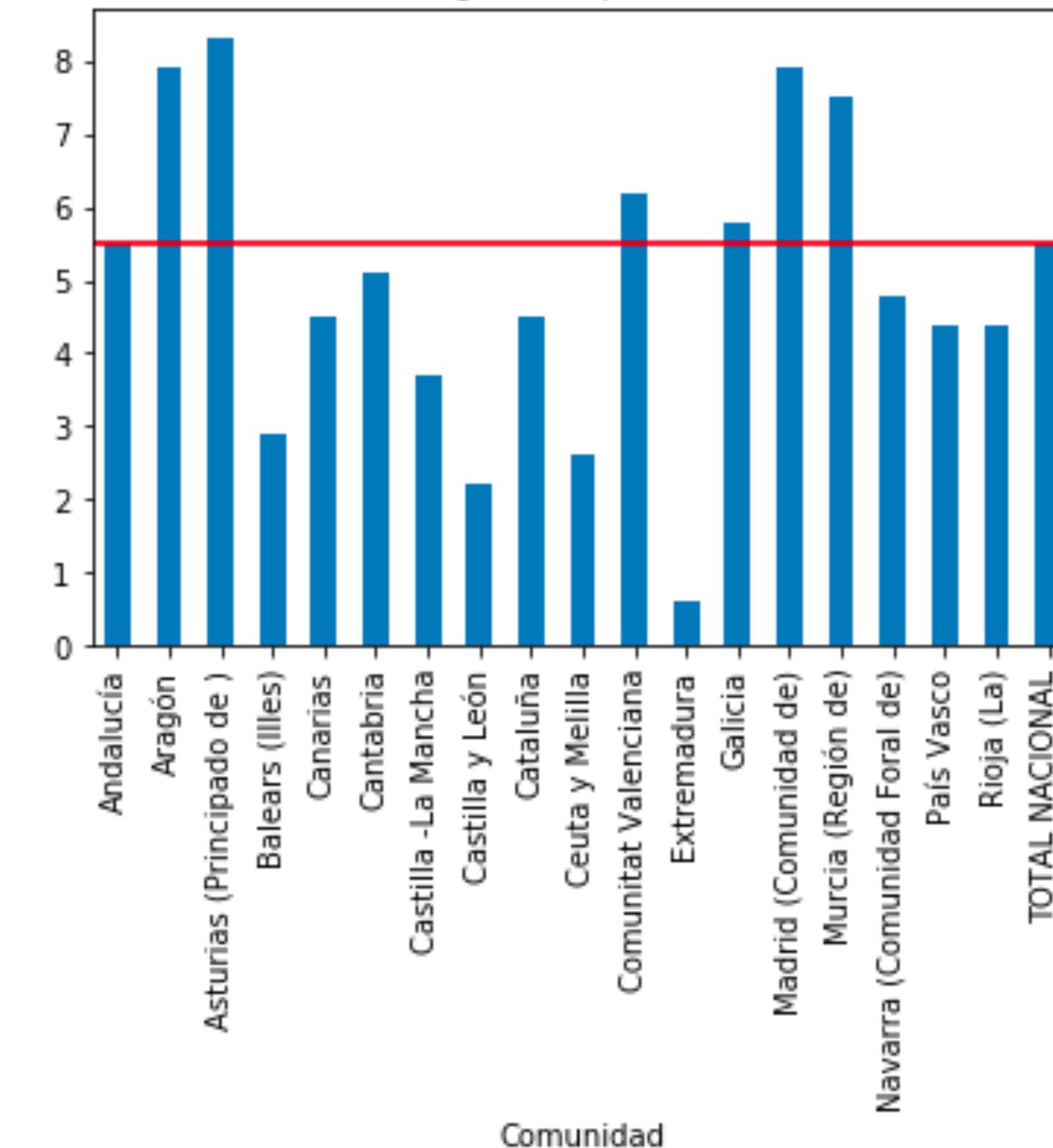


# CITY SELECTION: Why don't you use the bicycle?

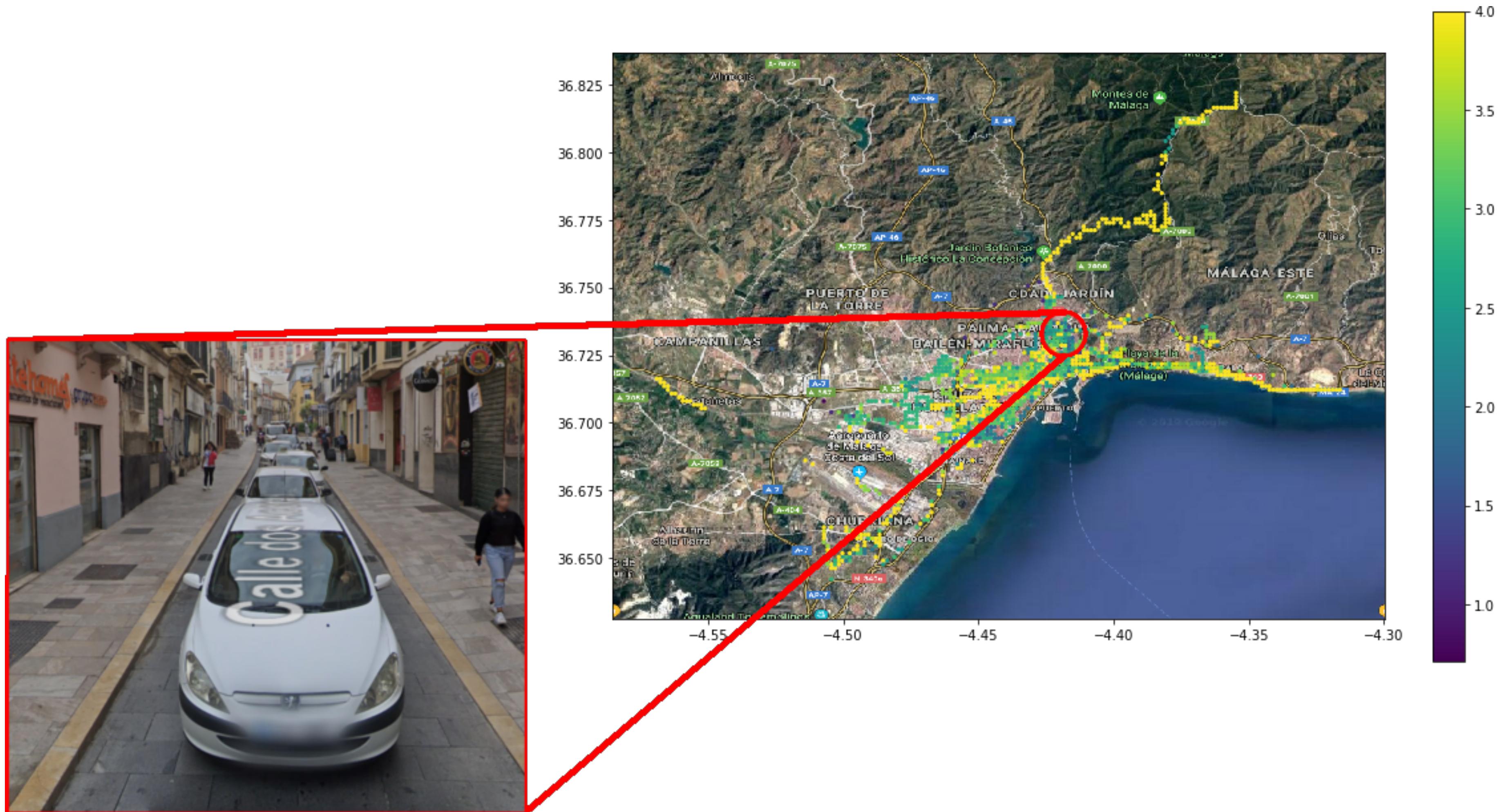
Demasiado tráfico



Seguridad personal



# Where do we put the bike lane? What is the most polluted part of the city?



# CONCLUSIONS



- Thanks to open data, we managed to identify a street in Malaga where the installation of a bike lane would improve the traffic and air quality conditions;
- To give more solidity to the results, additional data (e.g. bus stops, parking locations) could be included in the analysis;
- Some difficulties we faced that limited our work:
  - Lack of more detailed data (e.g. grouped by province) about bicycle use;
  - Data from Ceuta and Melilla, which are more suitable targets than Malaga are missing.

The background image shows a panoramic view of a city at dusk or night. The sky is filled with dramatic, colorful clouds ranging from deep orange to dark grey. In the foreground, there's a dense urban area with many buildings and streets illuminated by streetlights. A prominent church with a tall, light-colored tower is visible in the center-right. The city extends towards a range of mountains in the distance, which are also partially obscured by the clouds.

Thank you for your attention.  
Questions?