SMARTGREENS 2022
11th International Conference on Smart Cities and Green ICT Systems
Online Streaming | 27 - 29 April, 2022

Air-Break

Co-producing healthy clean commuting air spots in town

Bike2Work

A Shift Towards Sustainable Mobility

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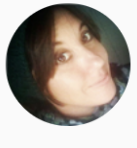

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FONDAZIONE BRUNO KESSLER

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Agenda

- **Background and Motivations**
- **Bike2Work**: Objectives, Features and Management
- The Bike2Work **Supporting Tools**
- **Experimental Results**
- **Conclusions and Future Work**

Air-Break

Background and Motivations

AIR BREAK - Sustainable Mobility Campaigns

https://airbreakferrara.net/

AIR BREAK campaigns' aim is to **raise citizens' awareness** on the possibilities and advantages offered by the available sustainable mobility services and to encourage a **collective shift towards more sustainable mobility habits**

RAISE AWARENESS

Reach and engage citizens. Make them aware of sustainable mobility options and of the impact of their daily choices

BEHAVIOR CHANGE

Promote a voluntary change towards more sustainable habits combining virtual and real incentives

COMMUNITY BUILDING

Contribute to the creation of a community of active users; target different user segments, deploy segment-specific actions; create synergies with other local initiatives

MEASURABLE OUTCOME

Produce measurable outcomes, in terms of impact (engagement, retainment, awareness, behavior change) and of end-user experience

AIR BREAK - Gamified approach for behavioural change

Designed and planned 4 sustainable mobility campaigns:

- **Ferrara Play&Go** - target: whole citizenry, sustainable mobility
- **Ferrara Bike2Work** - target: employees, home-to-work mobility
- **Kids Go Green** - target: primary and secondary school students and their families, home-to-school mobility
- **High school mobility challenge** - target: high school students, home-to-school and free-time mobility

Bike2Work: Objectives, Features, and Management

Ferrara Bike To Work

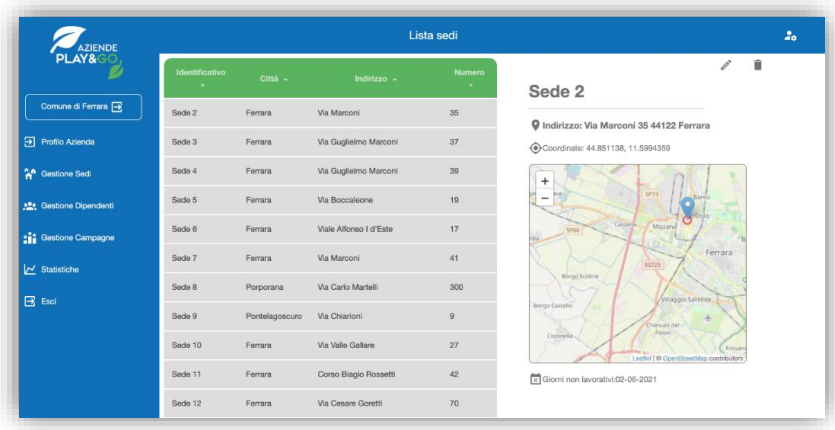
Target: employees of private/public companies

Un'iniziativa di

Realizzata nel contesto del progetto Air-Break

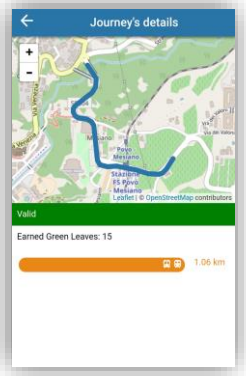
The specific objectives of this initiative are:

- To support **workers** in switching to sustainable mobility habits resulting in reduced CO2 emissions.
- To support **private/public companies** in the adoption of policies, initiatives, and the development of urban mobility plans.
- To increase the perception of corporate (ecological) Social Responsibility and **improve Total Quality Management (TQM) within companies**.
- To **increase the attractiveness of sustainable transport modes** (i.e., Bike)



How it works:

- Every trip made is automatically validated by the **Ferrara Play&Go** application.
- A reward (0.20 €/km) is recognized for each valid trip.
- Each employee, using the **Play&Go Aziende Web App** can view a set of information during his participation in the campaign trips made with related Km; means used (i.e., Bike); validation status of trips and relative routes.



Active since May 15, 2021

Companies - Participation LifeCycle

The Bike2Work **Supporting Tools**

Ferrara Play&Go

Players earn Green Leaves points based on km traveled with sustainable means

- Itineraries are planned/tracked by players and verified by the system.

Personalized challenges

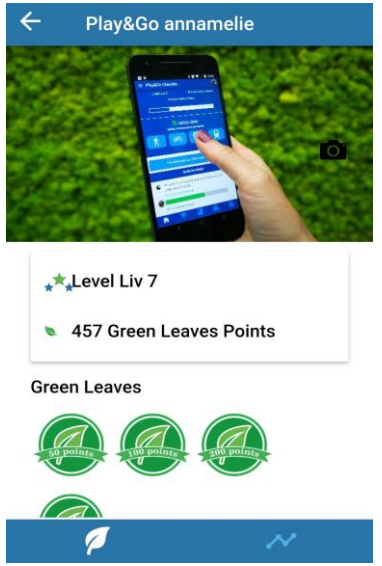
- Weekly personalized challenges based on player profile and city policies.
- Single and multi-player challenges – competitive and collaborative.
- Green Leaves bonus for won challenges.

Other **game concepts and dynamics**:

- Weekly and global leaderboards, badge collections, levels, personalized game content unlock, personal mobility diary

In **BIKE2WORK**:

- **employees** can **track trips by bike** and can visualize the trips on a realworld map.
- **Real-time tracking** while they are recording them during their journey.
- **Past trips stored** in the employee's profile.

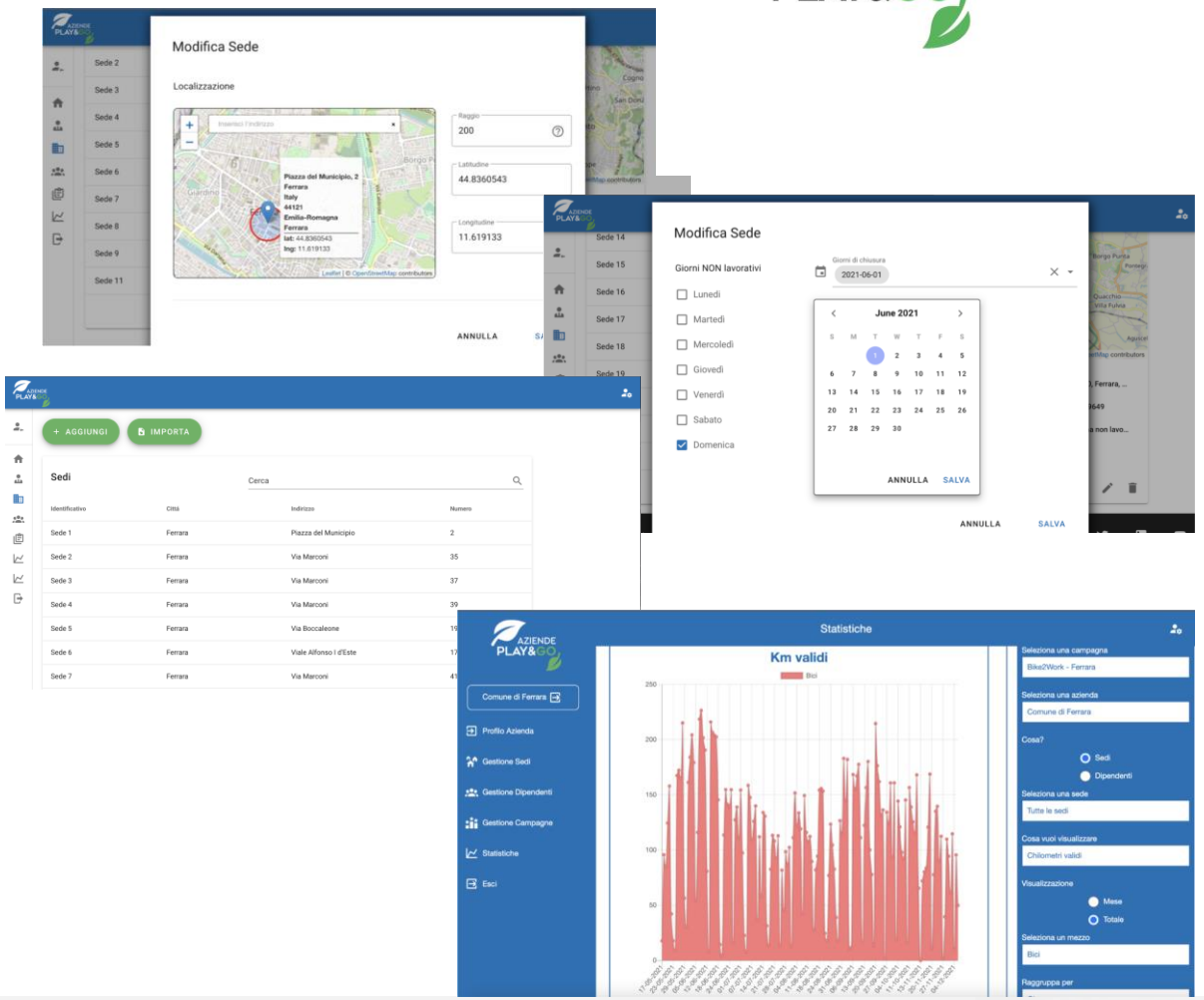


Web Console - Mobility Managers (MM)

https://admin.playngo.it

- **MMs can configure and manage all information related to their company, headquarters and employees**:
  - Manual or massive import (i.e., CSV files) of headquarters and employees data.
  - Definition of **non-working days** and **holidays**.

- **Campaign Statistics**
  - To filter and visualize the information necessary **to understand the progress of the initiative**
  - **Aggregated** information about the **trips, kilometers, CO2 saved,** made by the different employees of the different headquarters.



Air-Break

Experimental Results

Initial Results

May 15, 2021 – 31 December 2021.

55 Companies

537 Employees

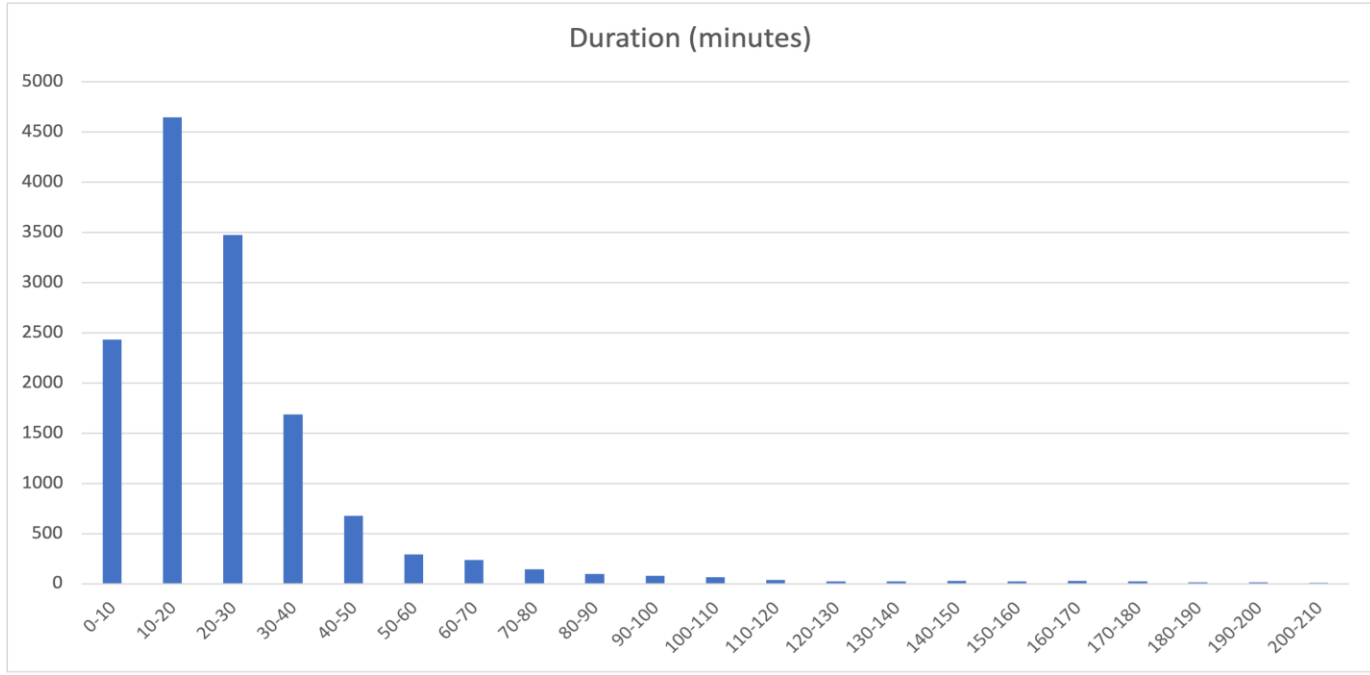
93.542 sustainable Kms

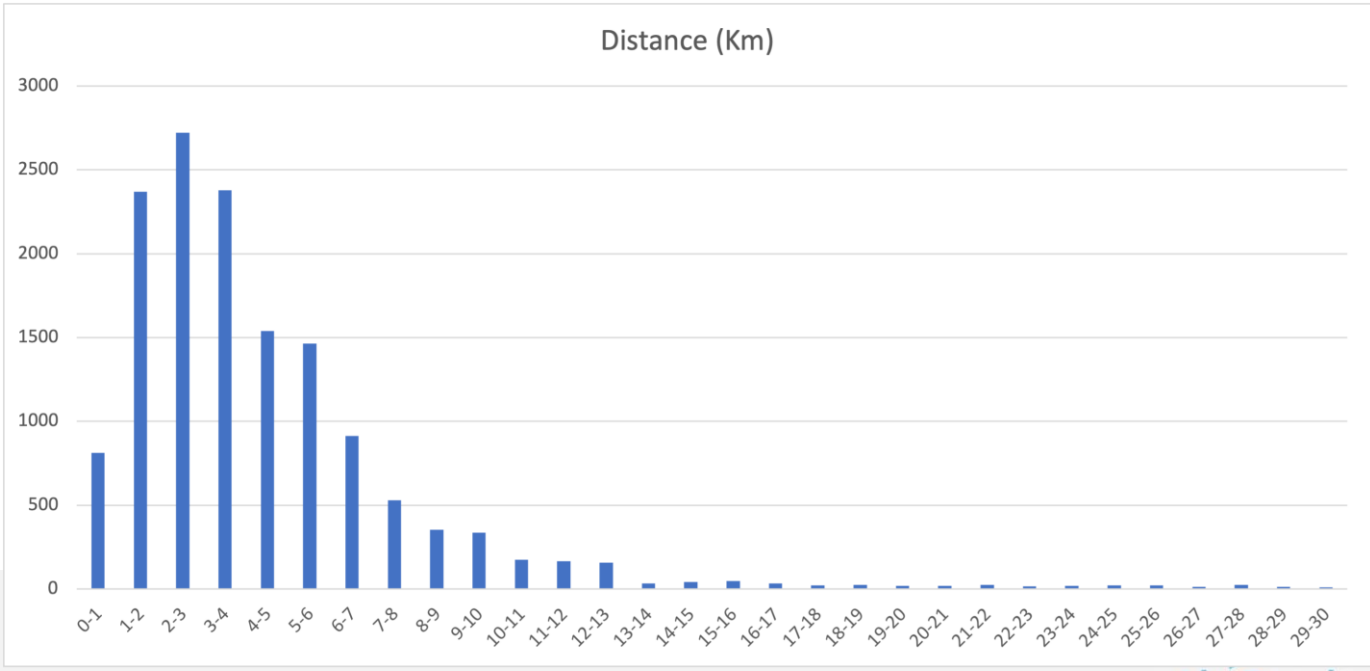
15 Tons of CO2 saved

24.491 sustainable trips

- The most frequent trips are between **10 to 20 minutes** and the ones covering a **distance of 2-3 Km**.
- The **average ride duration** is 35 minutes for an **average distance** of 5 Km.
- Taking 20 Km/h as a reference for standard urban cycling speed we could therefore say that

BIKE2WORK commuters on average do not rush to work, but rather enjoy their ride.





Data Analytics

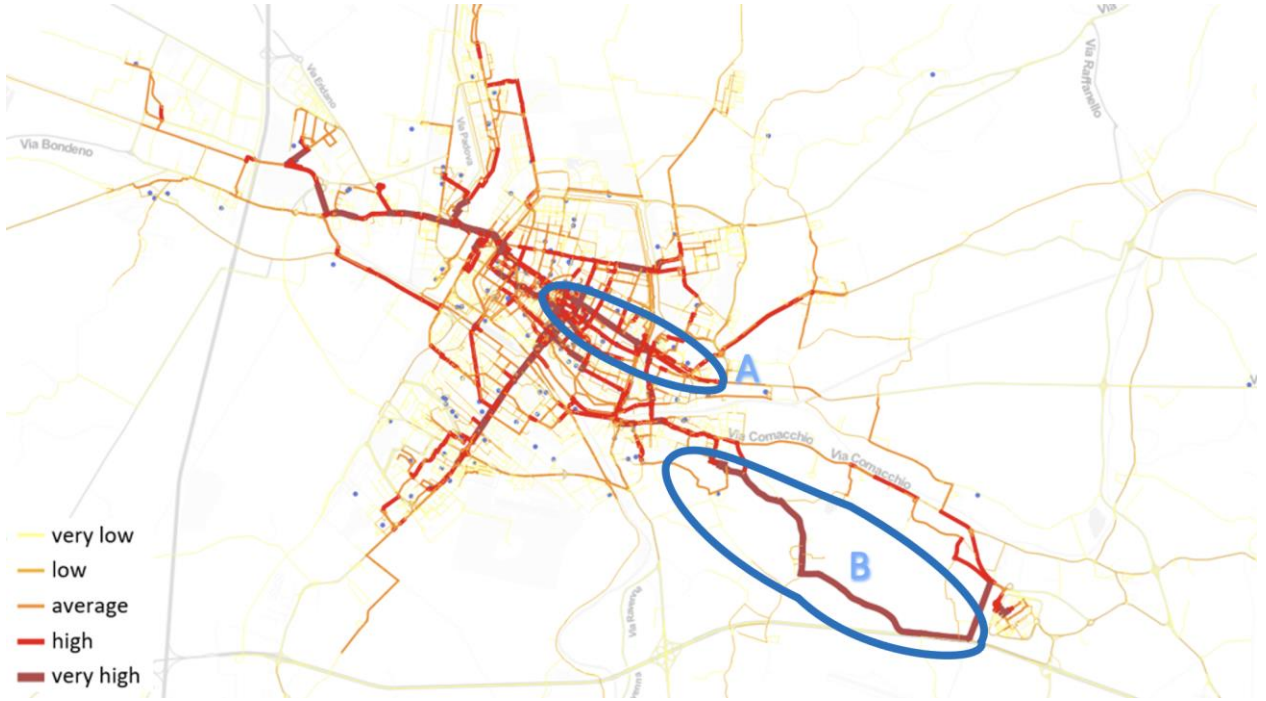
1. An **ingestion procedure** has been developed to get **anonymized raw GPS data** from Ferrara Play&Go.
2. **Map-matching algorithm** that reconstructs each trip from the raw GPS logs using the **OpenStreetMap** road network.

- the red triangles identify **single GPS data record**s (in this case very distant from each other);
- the blue line, connecting the GPS data into a sequence, represents a **GPS trajectory**;
- the yellow line describes a possible **reconstruction of the path followed.**

GPS logs (**in orange**) and companies locations (**in blue**) from Ferrara Play&Go.

Impact

Map of BIKE2WORK commuters in Ferrara (at December 2021).



Set of **automatic procedures** to calculate **different indicators** at single road segment, by timestamp.

- What are the most used routes within the city?
- Do they match infrastructures for bikers and pedestrians?
- What are the critical points for cyclist/pedestrian safety?
- Where are cyclists riding the wrong way?

A. **A street** which cuts the city centre from east to west and which in the western part **is lacking dedicated cycle lanes despite being very popular.**

B. **The new cycle lane**, opened in early 2021, **appears to be widely used by commuters** working at AUSL and University.

An interactive map has also been made available online - http://metropolidipaesaggio.it/progetti-pilota/mappa-tragitti-cittadini/

Conclusions and Future Work

- **Home-to-work sustainable mobility** campaign defined and executed in the context of the **AIR BREAK project.**

- **Software Platform** implemented to support the **Mobility Managers** and the **Employees** throughout the campaign and to understand the **progress and the impact** of the running initiative.

- We will continue running the campaign for the **next two years** (till October 2023).

- Systematic (**quantitative and qualitative**) **analysis** using the collected data:
  - Achieved **environmental impact**
  - **User Experience**

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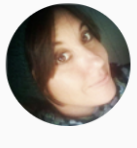

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