



Smart cities – Technology, management and governance

Substitution of tram line 179 with smart bikeway

TRAM LINE 179

- The tram line 179 Milano-Limbrate was opened in 1882 and from 1939 is managed by ATM (azienda trasporti milanese).
- Recently it was plagued by security and maintenance issues and it has been facing constant interruptions and ride reductions.





MAIN GOAL

- ▶ Creating a way for bicycles and pedestrians to substitute the tram line 179 which covers SP44 and links Limbiate(MB), Paderno Dugnano(MI) and other town halls in the north of Milan with the first stop of the yellow underground Comasina M3. Our idea arises from the structure and strategical position of this street: straight and passing through many town halls.
- ▶ Nowadays the line only works during the peak times and its target is composed by people aged between 14 and 65 and therefore able to use means of transport like bikes and scooters.

- Departure: Limbiate (MB)
- Arrival: Comasina M3 (MI)
- Municipalities crossed: Varedo (MB) – Senago (MI)- Paderno Dugnano (MI) – Cormano (MI)
- Line length: 10,1km
- Travel time: 45'approximately



Use of the tram¹

MORNING

To Milan		To Limbiate	
Town hall	Passengers	Town hall	Passengers
Limbiate	697	Limbiate	135
Varedo	95	Varedo	43
Senago	145	Senago	39
Paderno	635	Paderno	142
Cormano	259	Cormano	96
Milano	15	Milano	363

AFTERNOON

To Milan		To Limbiate	
Town hall	Passengers	Town hall	Passengers
Limbiate	448	Limbiate	117
Varedo	65	Varedo	36
Senago	70	Senago	12
Paderno	233	Paderno	107
Cormano	114	Cormano	101
Milano	4	Milano	1409

¹ <https://www.amicitram.eu>



Mobility solution

- Our solution aims to extend solutions already implemented in Milan by some companies like Lime, Mobike, Helbiz Italia which provide bicycles and scooters around the city (more than 10 000 rents per day). All these companies use free-flowing sharing (without fixed rent stations) which allows the right distribution of the means of transport according to user needs.

Means of transport

- Nowadays, the main vehicles used are bicycles and scooters. For the bikes the solution can be traditional or electric and for the scooters only the electric version. A traditional bike can reach 12-15 km/h while both the electric vehicles top at around 22-25km/h.



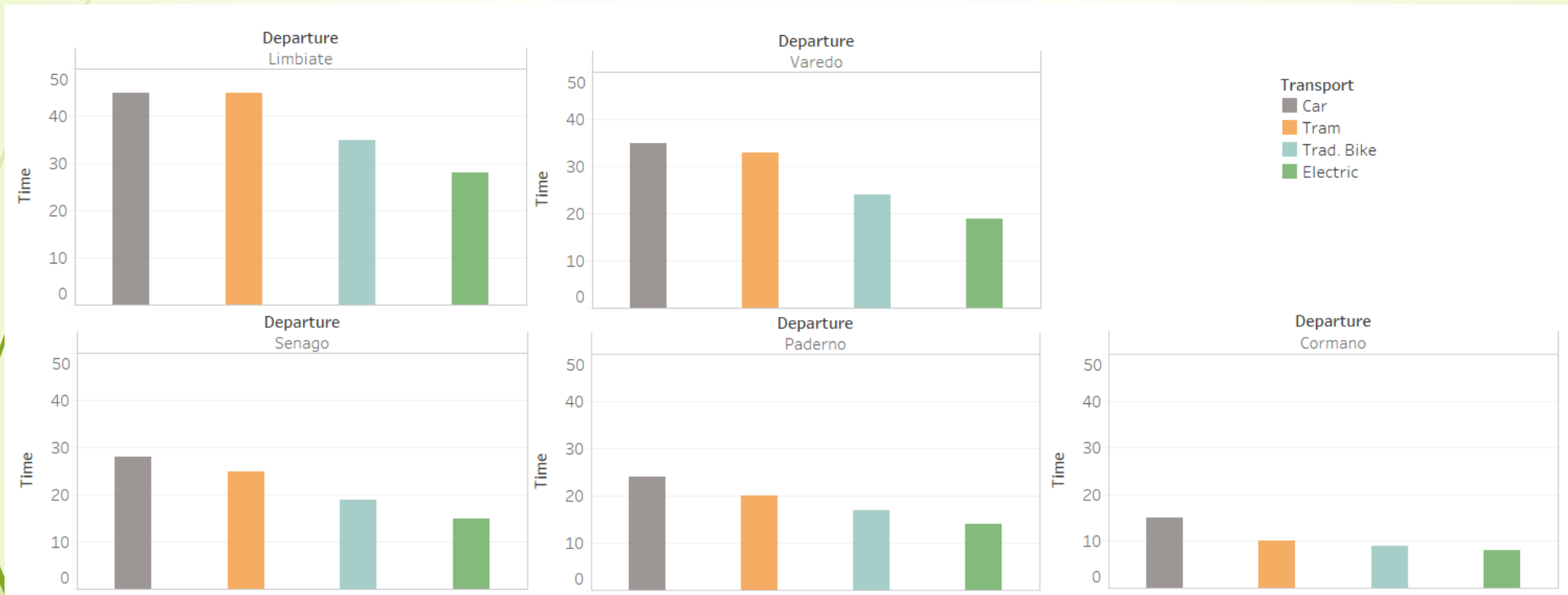


Advantages

- Travel time
- Congestion reduction
- Economic saving
- Sustainability
- Physical activity

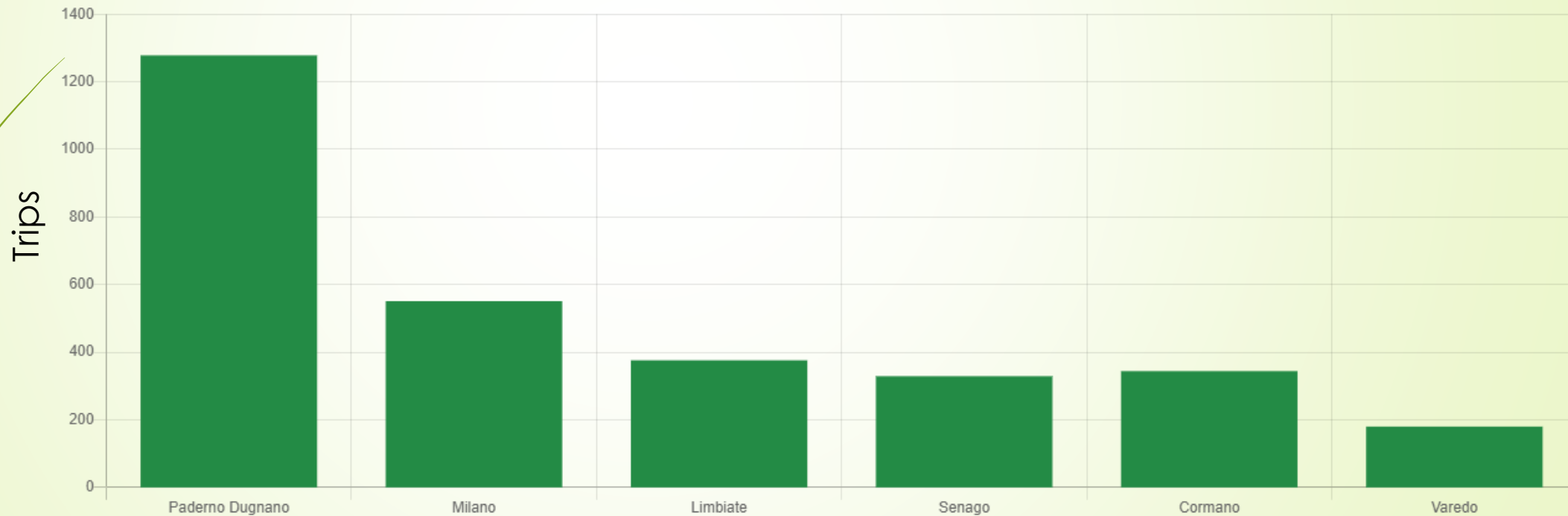
Travel time

During peak times as the morning and late afternoon, on the SP44 there is heavy traffic. Below we compare different travel times to reach the underground station of Comasina M3 calculated in said hours:



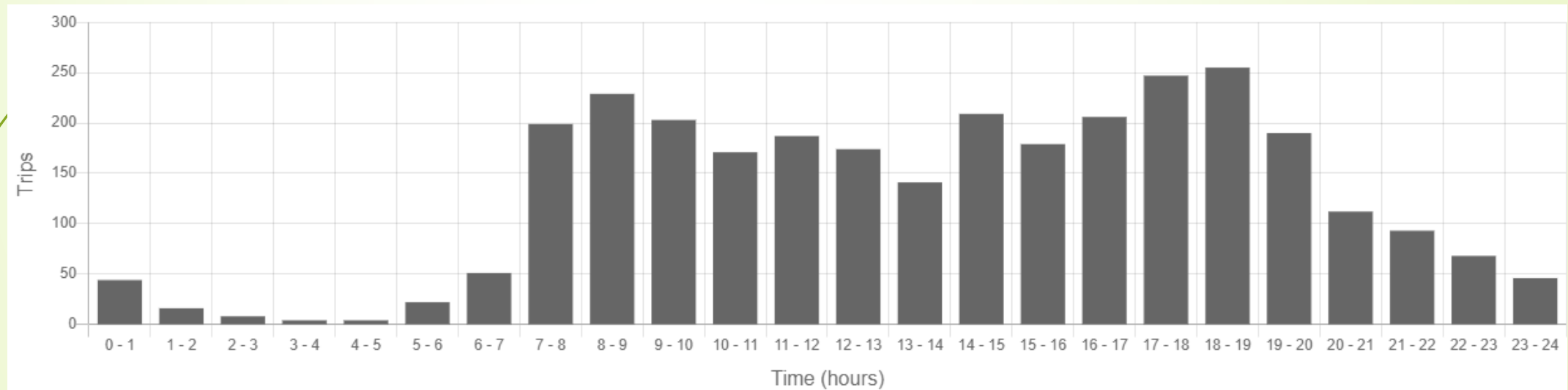
Congestion reduction

Below, the daily average number of vehicles that transit through SP44 divided by departure's town hall (average calculated over 1 week):



Congestion reduction

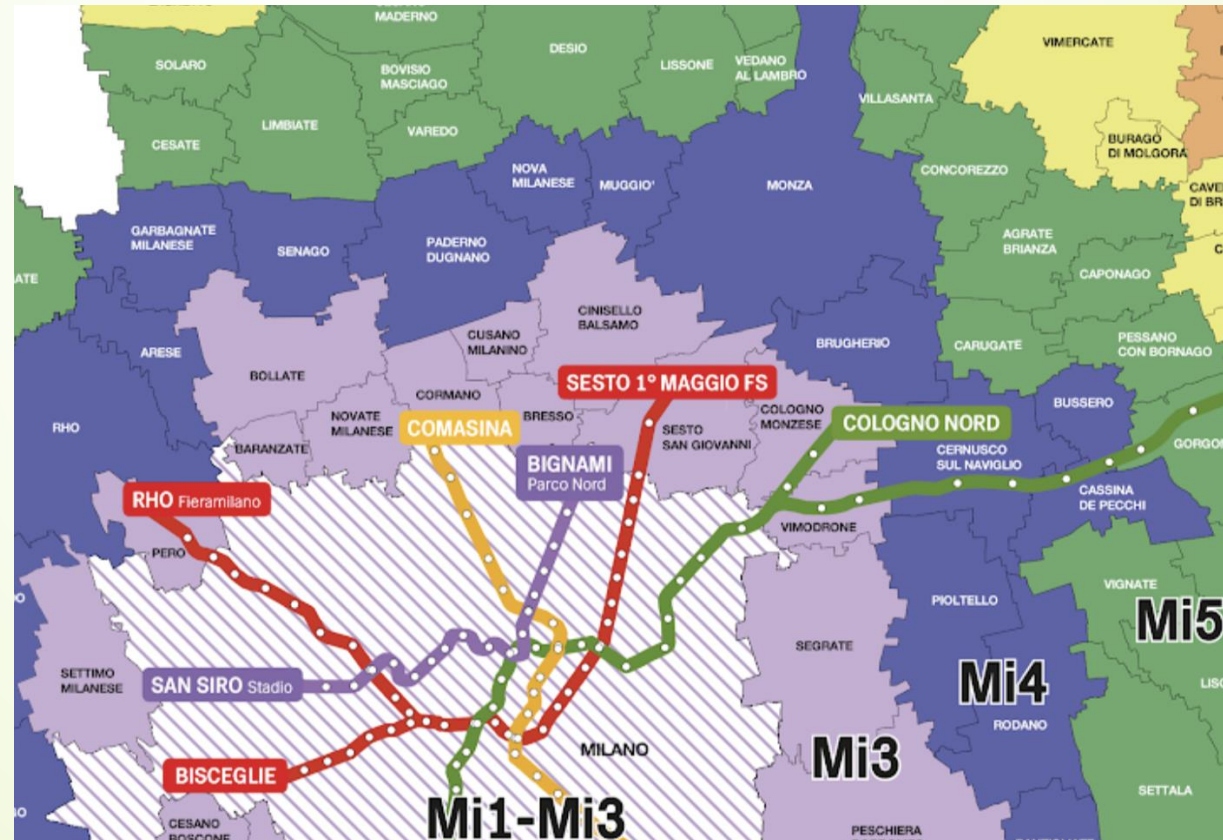
Below, the daily average number of vehicles that transit through SP44 divided by time slot (average calculated over 1 week):



Economic saving

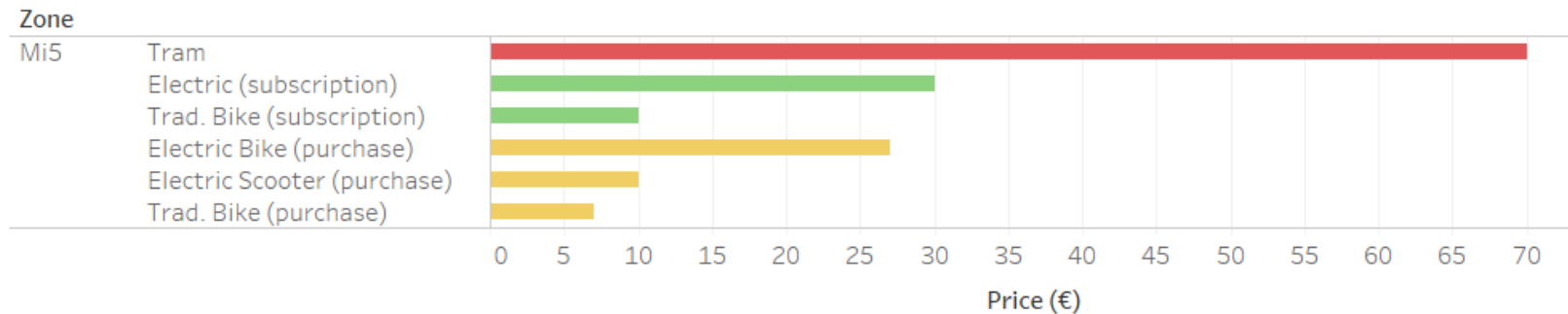
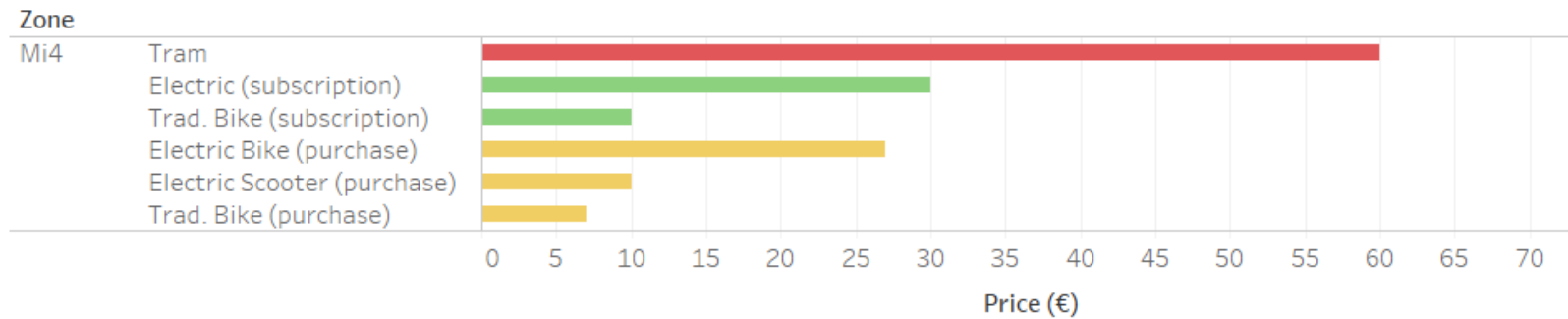
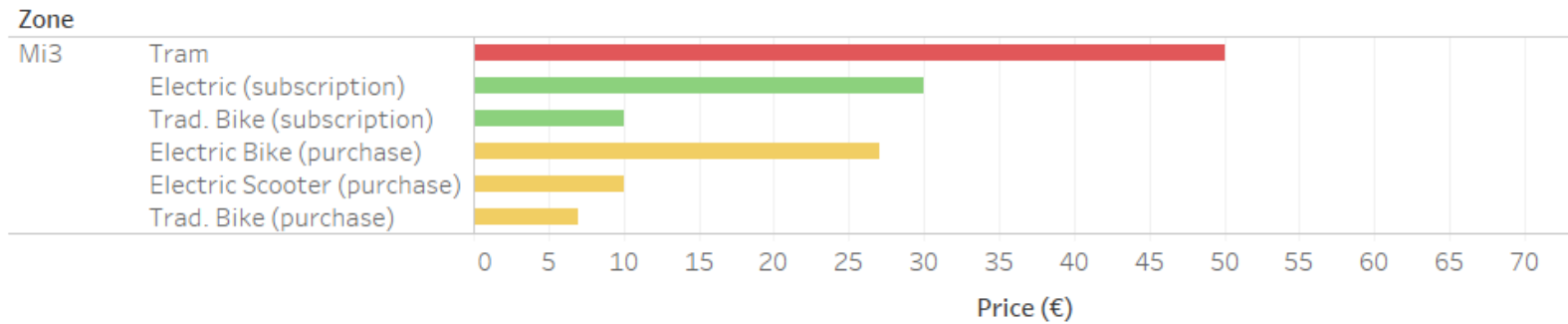
Thanks to sustainable mobility, the cost per user will gradually decrease as you move away from the center of Milan.

Below the subdivision by zones of the hinterland of Milan¹:



¹ <https://www.atm.it/>

Economic saving



Economic saving

Below the monthly subscription and purchase costs:

- Monthly subscription for electric means¹ (scooter or bike) : 30€
- Monthly subscription for traditional means² : 10€
- Purchase of scooter: 400€ (11€/month)³
- Purchase of electric bike: 1000€ (27€/ month)³
- Purchase of traditional bike: 250€ (7€/ month)³

¹ <https://helbiz.com/>

² <https://mobike.com/global/>

³ monthly cost calculated for a life-cycle of 3 years



Challenges

- Climate conditions
- Management of elderly users and disabled users

Possible solutions



Investimenti pubblici per sostenibilità

- Bikeway costs average around 50 000€ and 150 000€ per km based on the implemented safety measures, asphalt type and implementation. Therefore, the total cost of this projects will oscillate between 500 000€ and 1 500 000€¹.
- With regards to investments, european initiative Life ², translated into different projects by business corporations offers contributions to sustainable projects. For example, Assolombarda³ offered in 2020 450 million euros to promote environmental friendly projects with a non-repayable funding of up to 60% with limits of 3M€ and 36 months to completion.

¹ <http://www.fiab-onlus.it/download/prezpist.pdf>

² <https://ec.europa.eu/easme/en/life>

³ <https://www.assolombarda.it/>

Before and after...

