Targeting car use disincentives in home-to-campus commuting:

project S.U.S.T.A.I.N. – *Specific User Sustainability Through Accurate Index Number*

UAS Spring Conference – Berlin, April 1–3, 2019
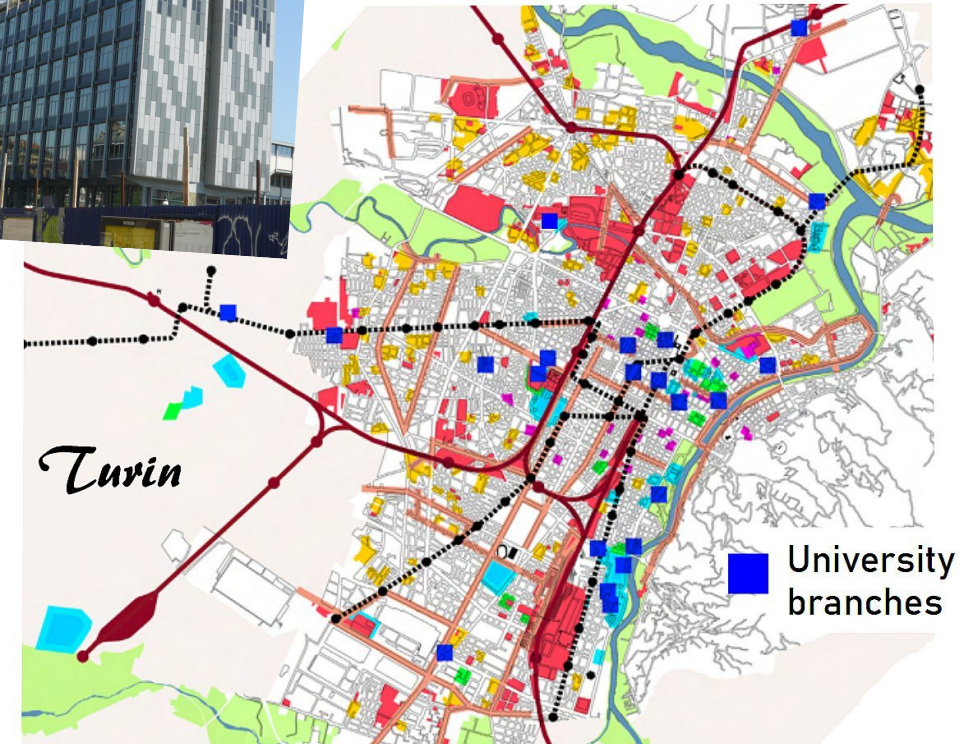
Andrea Scagni

Head of Mobility Team
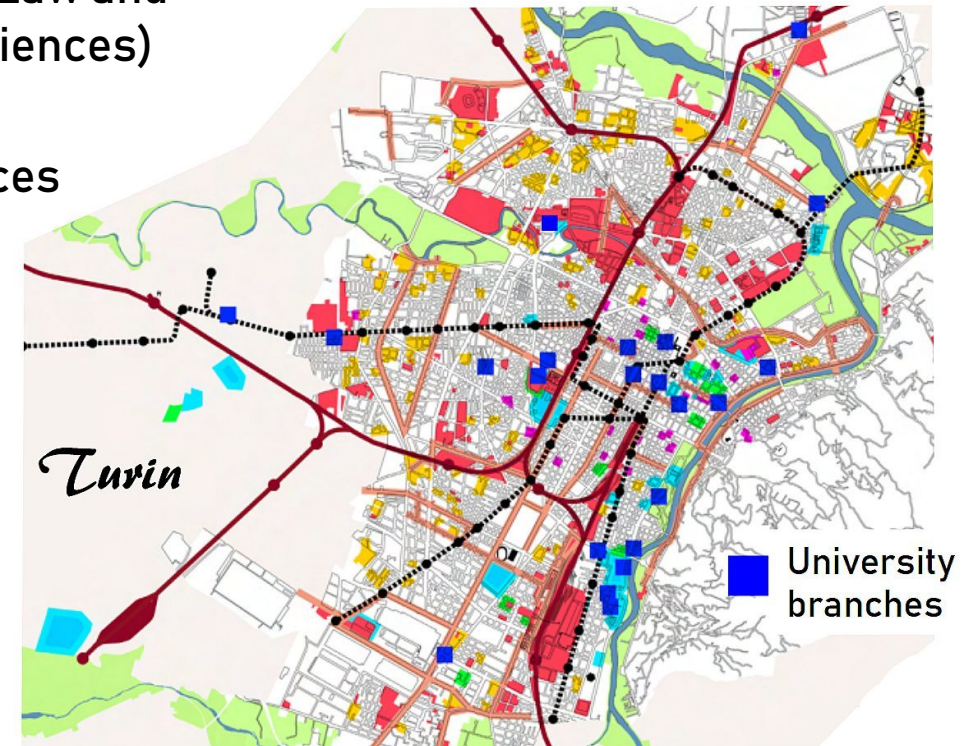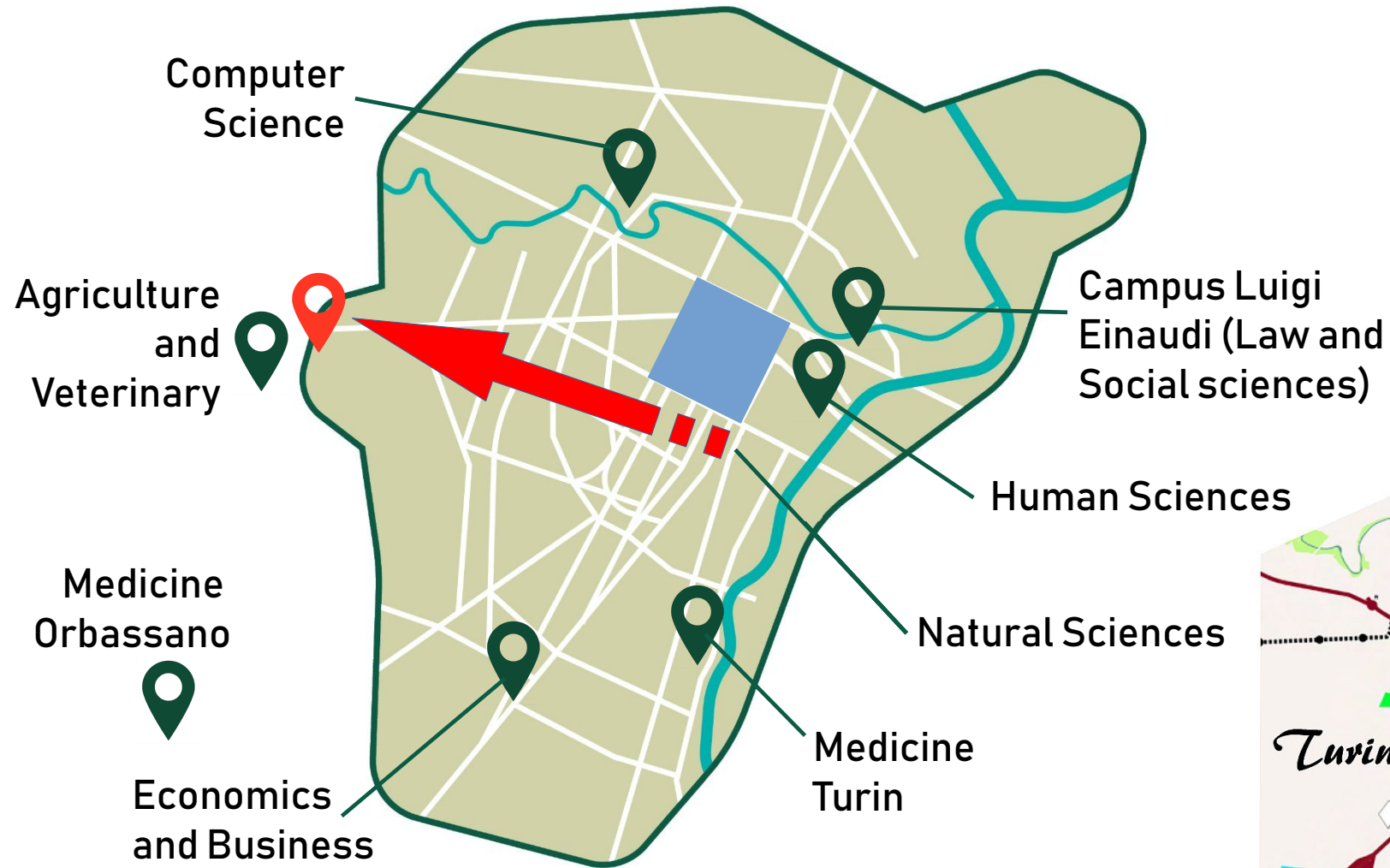UniTO Green Office

Micol Maggiolini

staff
UniTO Green Office

UniTo – the University of Turin

- A large, mega–atheneum with a sparse structure, about 120 branches in different locations around the city (and the suburbs)
- Its daily activities induce a significant part of the Turin metropolitan area mobility
- With a community of around 75.000, distances covered every single day are way above 100.000 kms.

Turin

University branches

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Seven main campuses

Computer Science

Agriculture and Veterinary

Campus Luigi Einaudi (Law and Social sciences)

Human Sciences

Medicine Orbassano

Natural Sciences

Medicine Turin

Economics and Business

Turin

University branches

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Coming from where?

Origin – destination matrix

Foreign countries 1157

TO prov **24039**

TO city **17289**

168

1121

1409

498

1016

1387

2268

6827

Aosta

Verbania

Biella

Novara

Vercelli

Torino

Asti

Alessandria

Cuneo

12764

Italy excl. Piedmont
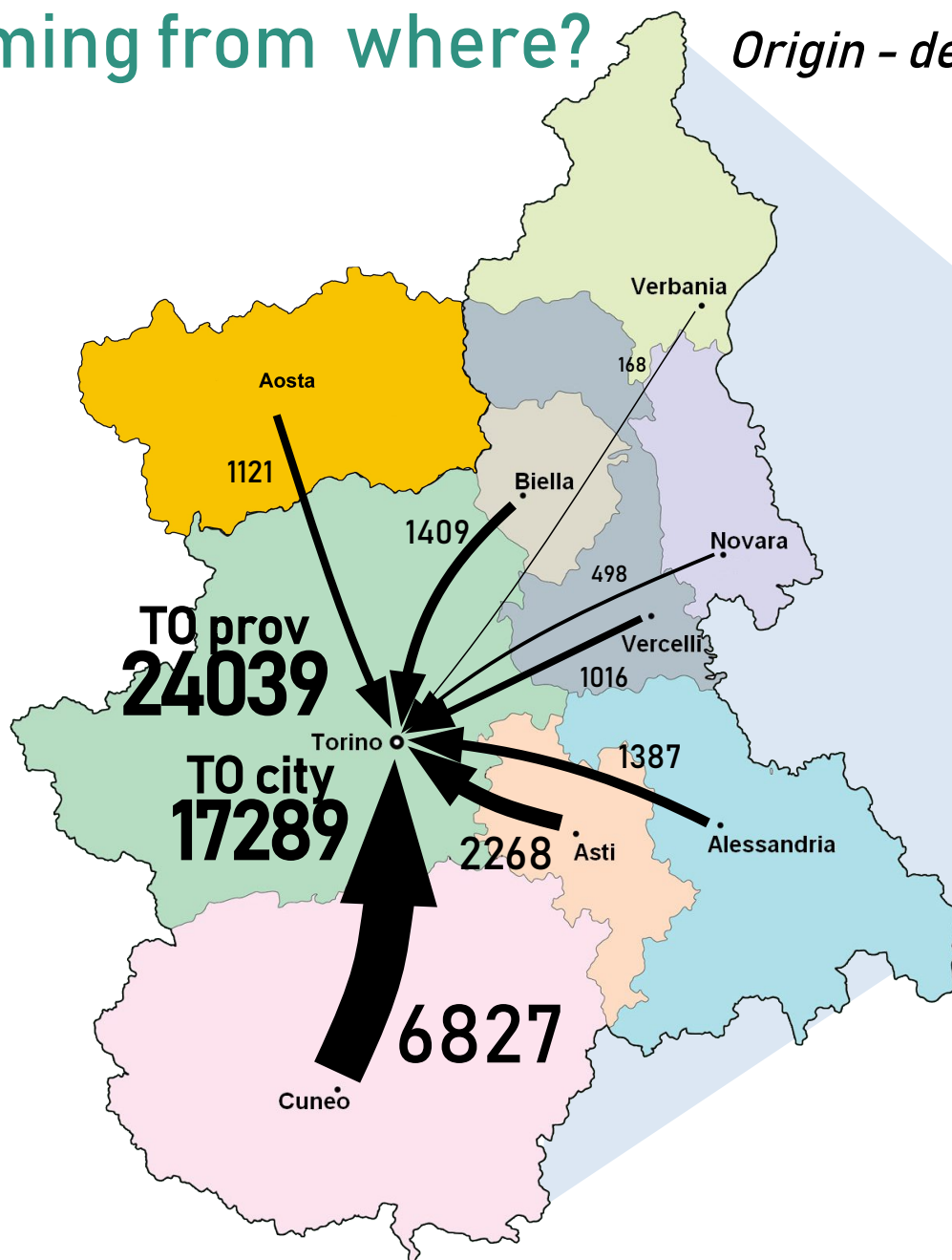
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UniToGO – *Green office*

- A dedicated team that works with a combined *research + action* approach on all topics concerning the sustainability of the university day-to-day activities

  - Created at the end of 2016, includes people from faculty, students, staff and is granted specific funding

    - It is an active member of the RUS (*Rete Università Sostenibili*) national network

      - Organised in 5 working groups:

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Working Groups
Each group has an academic, a technical, a researcher representative and several students involved for thesis projects.

| Energy | Green Public Procurement | Mobility | Food | Waste |

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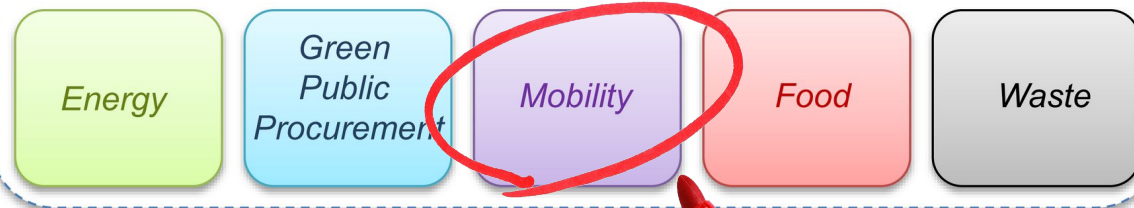
UniToGO - *Sustainable mobility working group*

- The main goal is to build cultural, normative and structural conditions that can motivate the members of the UniTo community to <u>change their mobility choices towards sustainability</u>

The *Modal share* of home-to-work and home-to-school should should increase for:

- *active mobility* (walking & cycling)
- Regional and local public transport (road or rail)
- Standard or new forms of *sharing mobility*

UniTo GO

Let's go to university in a better way

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UniToGO - *Sustainable mobility working group*

The 3 STEPS of our approach:

Learn

- Acquire data and information on the present status of mobility choices and on the accessibility of all university buildings and locations, both internal and from public road network;
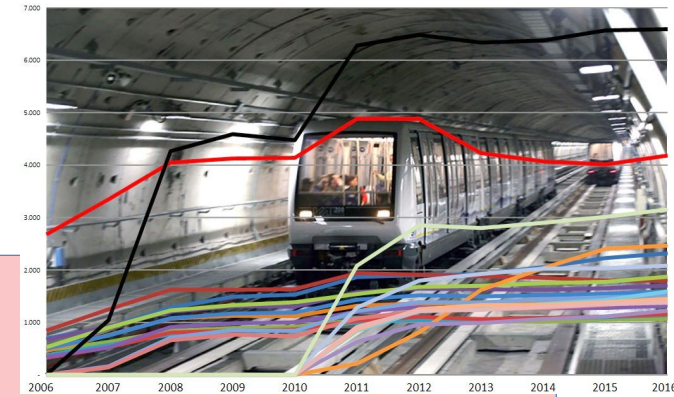
Engage & motivate

- Increase the community awareness on the potential for a cleaner, more efficient mobility as part of an overall effort to improve environmental standards of the Athenaeum;
- create a wide network with other higher education institutions, local authorities, firms and associations to develop and share a joint approach to sustainability combining scientific, technical and administrative know-how

Change

- define and apply incentive policies with economic bonuses and tariffs, regulation and rationalization of parking spaces;
- Analyse the urban road and local transport networks that reach and serve university locations, develop goals and proposals to improve their ability to favour sustainable mobility

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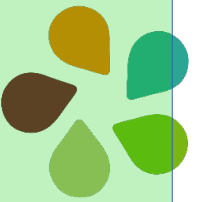
The Network of the working group

Local partners

- Piedmont Region

- Agenzia per la Mobilità

- 5T (data analysis)

- Turin Metropolitan Authority
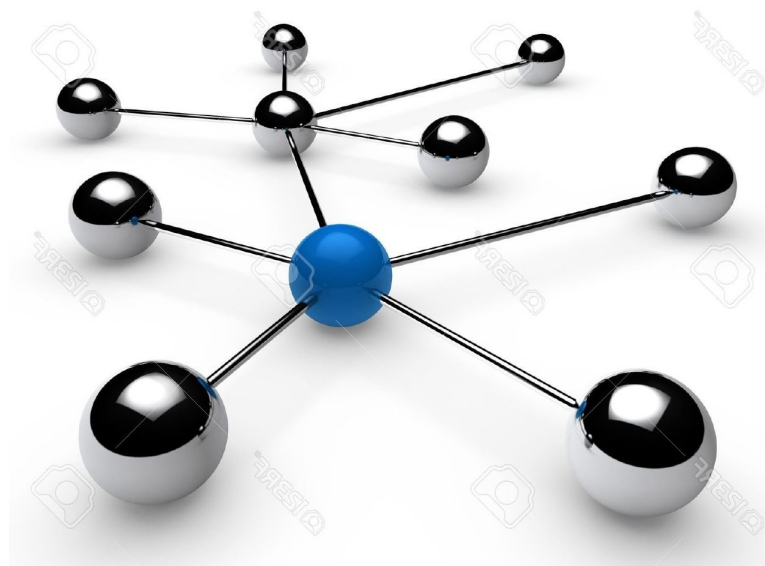
- City of Torino

- GTT (public transport)

- To-Bike (bike sharing)

- Fiab (grassroots advocacy)

Inside Unito

- University governance

- Administration branch

- Press office

- Sustainability Report

- Personnel Training Branch

- Part-time students

- GreenTo (grassroots advocacy)

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MobilitaUniTo: *the mother of all surveys*

A local promotion event

- On-line questionnaire, both PC and mobile friendly
- 17.500 responses
- 2 units of dedicated staff

A deep insight on behaviour and choices

- Detailed, possibly multimodal *home2university* journey with info on each stretch mode and time
- Separately reported by season and weather
- Bike (and other) sharing specific section
- Subjective perception of critical issues regarding cycling and public transport (and the combination)
- Mobility assets and options actually available to the individual
- Travelling between university locations

MobilitaUniTo: *a glimpse on the results*

Multimodality

n. stretches	%
1	52,7%
2	29,4%
3	14,4%
4	3,2%
5	0,3%
Total	**100,00%**

Fully sustainable journeys

- Staff — 61%
- Faculty — 55%
- Students — 81%

(0% 10% 20% 30% 40% 50% 60% 70% 80% 90%)
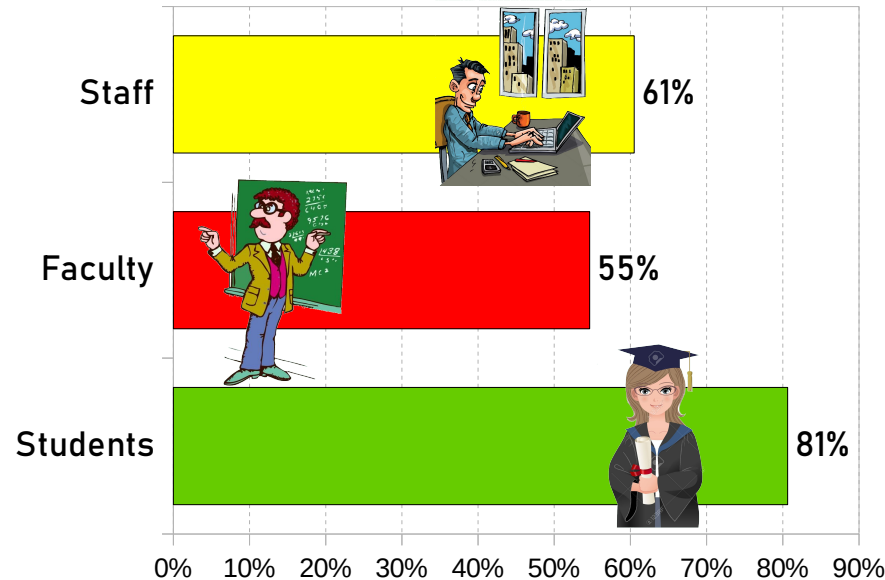
Cycling on the home2univ journey (summer)

- Students — 9%
- Faculty — 19%
- Staff — 14%

Bus/van sharing
Rail
Bus
Cars as passenger
Carpooling
Tramway
Car as driver
Subway
Motorcycle
Bike sharing
Bicycle
Walking

(4,5 5,0 5,5 6,0 6,5 7,0 7,5 8,0)

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Detailed travel solutions — Winter ← → Summer

Winter
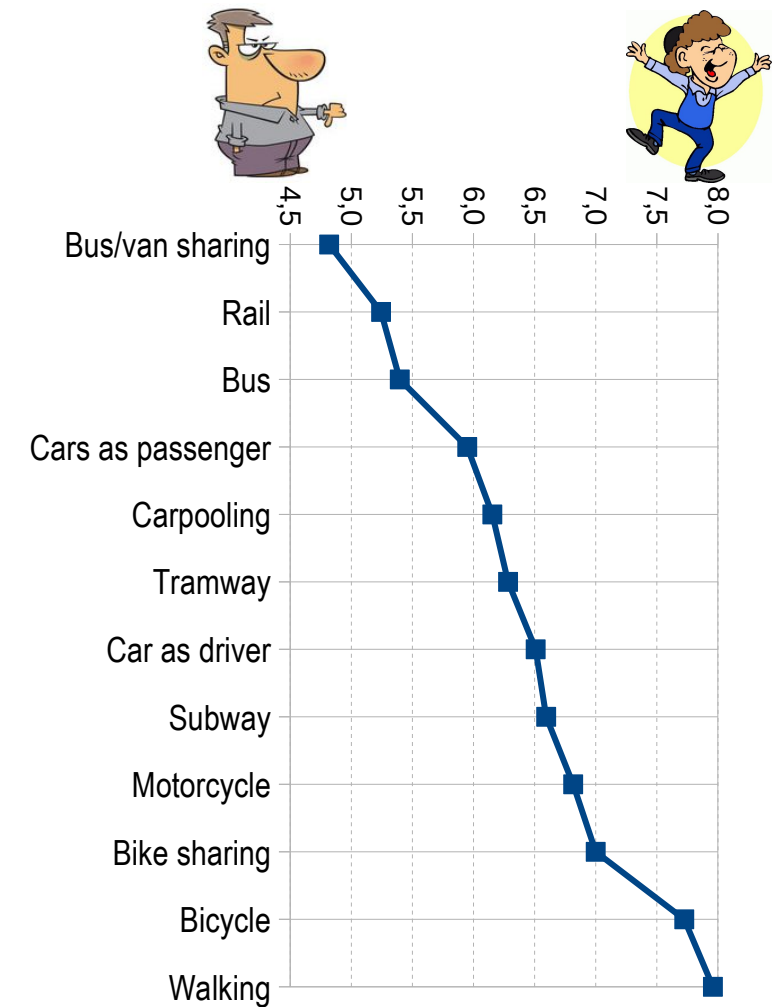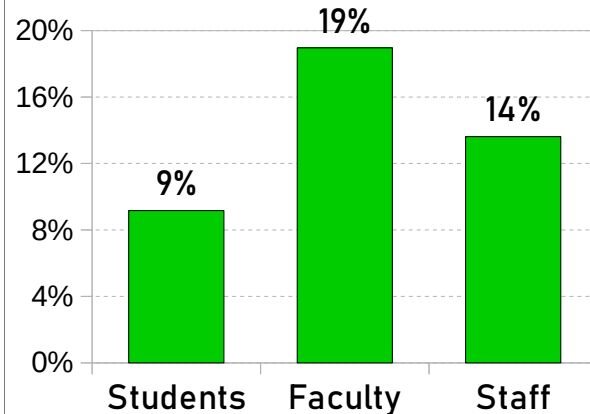
Section 1	Section 2	Section 3	Sect. 4	% cases	N. of people	distance (Km).
Road transport				20,9%	14.410	9,4
Car				15,5%	10.705	22,0
Walking				11,0%	7.630	4,9
Road transport	Walking			9,1%	6.290	12,4
Road transport	Road transport			7,4%	5.140	18,6
Train	Road transport			6,2%	4.290	57,9
Bicycle				3,9%	2.710	5,2
Car	Train	Road transport		2,6%	1.795	57,8
Train	Road transport	Walking		2,4%	1.635	54,3
Road transport	Road transport	Walking		1,9%	1.340	19,2
Train	Walking			1,8%	1.235	70,3
Car	Walking			1,7%	1.155	24,5
Car	Road transport			1,6%	1.085	28,3
Car	Train	Road transport	Walking	1,2%	810	55,5
Road transport	Road transport	Road transport		1,0%	705	18,6
Car	Road transport	Road transport		1,0%	680	30,3
Car	Train	Walking		0,9%	630	69,9
Car	Road transport	Walking		0,9%	615	27,3
Motorcycle/scooter				0,6%	410	10,1
Walking	Road transport			0,5%	375	11,7
Walking	Road transport	Walking		0,5%	375	11,7
Walking	Road transport	Road transport		0,5%	360	16,0
Sharing Mobility				0,5%	360	9,7
Walking	Train	Road transport		0,5%	325	43,9
Train	Road transport	Road transport		0,5%	320	46,1
Road transport	Train	Road transport		0,4%	285	52,2
Train				0,4%	270	56,1
Walking	Train	Road transport	Walking	0,3%	220	38,9
Walking	Road transport	Road transport	Walking	0,3%	210	18,0
Car	Road transport	Road transport	Walking	0,2%	155	28,4

Summer

	Section 1	Section 2	Section 3	Section 4	%
0,83	Road transport				17,3%
0,91	Car				14,1%
1,13	Walking				12,5%
0,89	Road transport	Walking			8,1%
1,93	Bicycle				7,6%
0,92	Road transport	Road transport			6,8%
0,94	Train	Road transport			5,9%
0,93	Car	Train	Road transport		2,4%
0,98	Train	Road transport	Walking		2,3%
1,17	Train	Walking			2,1%
1,01	Road transport	Road transport	Walking		2,0%
0,91	Car	Walking			1,5%
0,96	Car	Road transport			1,5%
2,72	Sharing Mobility				1,4%
2,04	Motorcycle/scooter				1,2%
0,98	Car	Train	Road transport	Walking	1,1%
1,10	Car	Train	Walking		1,0%
1,05	Car	Road transport	Walking		0,9%
0,91	Road transport	Road transport	Road transport		0,9%
0,93	Car	Road transport	Road transport		0,9%
1,04	Walking	Road transport	Walking		0,6%
1,00	Walking	Road transport			0,5%
0,93	Walking	Road transport	Road transport		0,5%
0,97	Train	Road transport	Road transport		0,4%
0,92	Walking	Train	Road transport		0,4%
0,96	Road transport	Train	Road transport		0,4%
0,98	Train				0,4%
1,00	Walking	Train	Road transport	Walking	0,3%
1,00	Walking	Road transport	Road transport	Walking	0,3%

Bicycle parking: *inventory*

- Quantity
- Safety
- Efficient use of space
- Easy to access and close to the site

The Rectorate: obsolete, inefficient

The new Social Sciences Campus: Good, but.. still not enough

REPORT SULLA CICLABILITÀ
DISPONIBILITÀ RASTRELLIERE

Economia e Amministrazione aziendale
- stazioni Tobike : 1 stazione con 28 postazioni
- rastrelliere comunali: 12 archi
- rastrelliere universitarie: 36 posti bici

Agraria e Medicina Veterinaria
- stazioni Tobike : 1 stazione con 14 postazioni;
- rastrelliere comunali: no;
- rastrelliere universitarie: 1x8 posti; 2x 10 posti; 3 archi;

Polo scientifico di via Giuria (Scienze Geologiche, Chimica, Fisica, Farmacia, Neuroscienze)
- stazioni Tobike : 2 stazioni con 15 postazioni ciascuna;
- rastrelliere comunali: 12 archi ; 11 rastrelliere con 2 posti ciascuna;
- rastrelliere universitarie:2 archi;

Medicina (Molinette)
Dipartimento di Biotecnologie Molecolari e Scienze per la salute
- stazioni Tobike : 1 stazione con 21 postazioni (Piazza nizza 46);
- rastrelliere comunali: 12 archi;
- rastrelliere universitarie: no
Dipartimento di Neuroscienze (sede di c.so Massimo D'Azeglio)
- stazioni Tobike : 1 stazione con 15 postazioni (c.so Raffaello ang. c.so Massimo D'Azeglio) ;
- rastrelliere comunali: no;
- rastrelliere universitarie: no;
Dipartimento di Neuroscienze (sede di via Cherasco)
- stazioni Tobike : 1 stazione con 18 postazioni (piazza Polonia) ;

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Bicycle parking: *new opportunities and solutions*

- **Protected spaces for 100% safe parking**

Car parking: *new smart data-based policies*

We want to disincentive car use… but how?

Please… use your car less!

Animistic prayer?

Desperate cry?

Emotionally charged advice?

PLEASE.

>>>>> leverage car parking rules!

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Enter project S.U.S.T.A.I.N.: *Specific User Sustainability Through Accurate Index Number*

Background

- In 2012 the new Campus "Luigi Einaudi" (CLE) was opened, aggregating many teaching and research activities and involving several thousands people

- Due to existing laws it had to include a *large car parking* (about 500 places), to avoid a "car plague" on the neighbourhood environment

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Enter project S.U.S.T.A.I.N.: *Specific User Sustainability Through Accurate Index Number*

<mark>History</mark>

- It remained largely unoccupied for years (monthly fee of 10€ – low but not free)

- It became a sought-after commodity in 2017 when public areas around the campus became toll parking at prices 7 times higher than the internal parking fees

Enter project S.U.S.T.A.I.N.: *Specific User Sustainability Through Accurate Index Number*

History

- It remained largely unoccupied for years (monthly fee of 10€ – low but not free)

- It became a sought-after commodity in 2017 when public areas around the campus became toll parking at prices 7 times higher than the internal parking fees

65€/month

Project S.U.S.T.A.I.N.: *Specific User Sustainability Through Accurate Index Number*

General approach

- Explore ways to move beyond generic, broad appeals in the vein of "*please care for the environment*", "*please use your car less*" that just invoked individual goodwill

- Establish innovative and rational criteria to promote sustainable mobility through the whole university

- Acknowledge that different people may have differing constraints and needs in terms of mobility, involving heterogeneous levels of actually achievable sustainability

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Project S.U.S.T.A.I.N.: *Specific User Sustainability Through Accurate Index Number*

General approach

- Explore ways to move beyond generic, broad appeals in the vein of "*please care for the environment*", "*please use your car less*" that just invoked individual goodwill

- Establish innovative and rational criteria to promote sustainable mobility through the whole university

- Acknowledge that different people may have differing constraints and needs in terms of mobility, involving heterogeneous levels of actually achievable sustainability

- Obtain best results through data-based combination of choices and opportunities

- Optimizing the overall sustainability levels while allowing for special needs and more difficult situations to maintain less environmentally friendly journey modes

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Project S.U.S.T.A.I.N.: *Specific User Sustainability Through Accurate Index Number*

Main goals

1) *Allow access to car parking to those who most need it, disincentive others* ➡ Equity 👍

2) *Obtain information seamlessly and transparently from web platform* ➡ Efficiency 👍

**3)** *Establish, test and deploy criteria easily extensible to other contexts* ➡ Extendability 👍

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Project S.U.S.T.A.I.N.: **S**pecific **U**ser **S**ustainability **T**hrough **A**ccurate **I**ndex **N**umber

Allocation criteria:

- Family related constraints (number and age of children, not self-sufficient elderly parents or relatives)

- Eco-friendly cars (electric, hybrid, sharing and pooling)

- <u>Journey sustainability index</u>

  - For any couple of origin-destination locations look at the comparative advantage, in terms of duration, of the

    - standard door-to-door car journey, versus the

    - *best multimodal solution* involving active mobility plus public transport (including sharing) of any kind.

  - Automatically computed through already existing geographical routing engines maintained by the Piedmont Region to power web platforms offering transport info to citizens (*www.muoversinpiemonte.it*)

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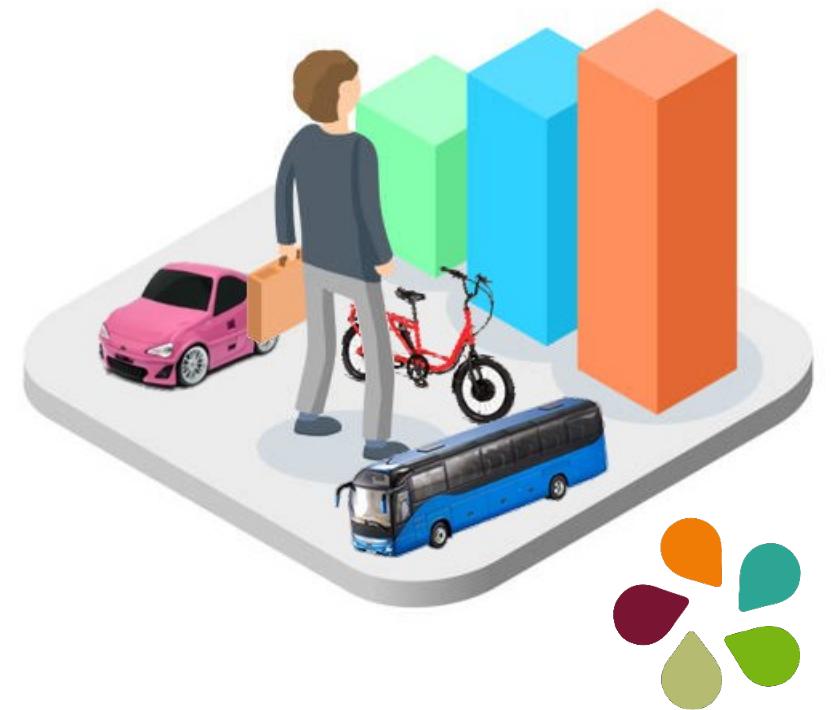
Project S.U.S.T.A.I.N.: *Specific User Sustainability Through Accurate Index Number*

First Stage

- the Campus identified as the single arrival location;

- isochrone mapping of the whole region spatially classified in terms of home-campus travel time in two different journey modes:
  - unimodal car only;
  - multimodal combinations of any kind, but excluding own car.

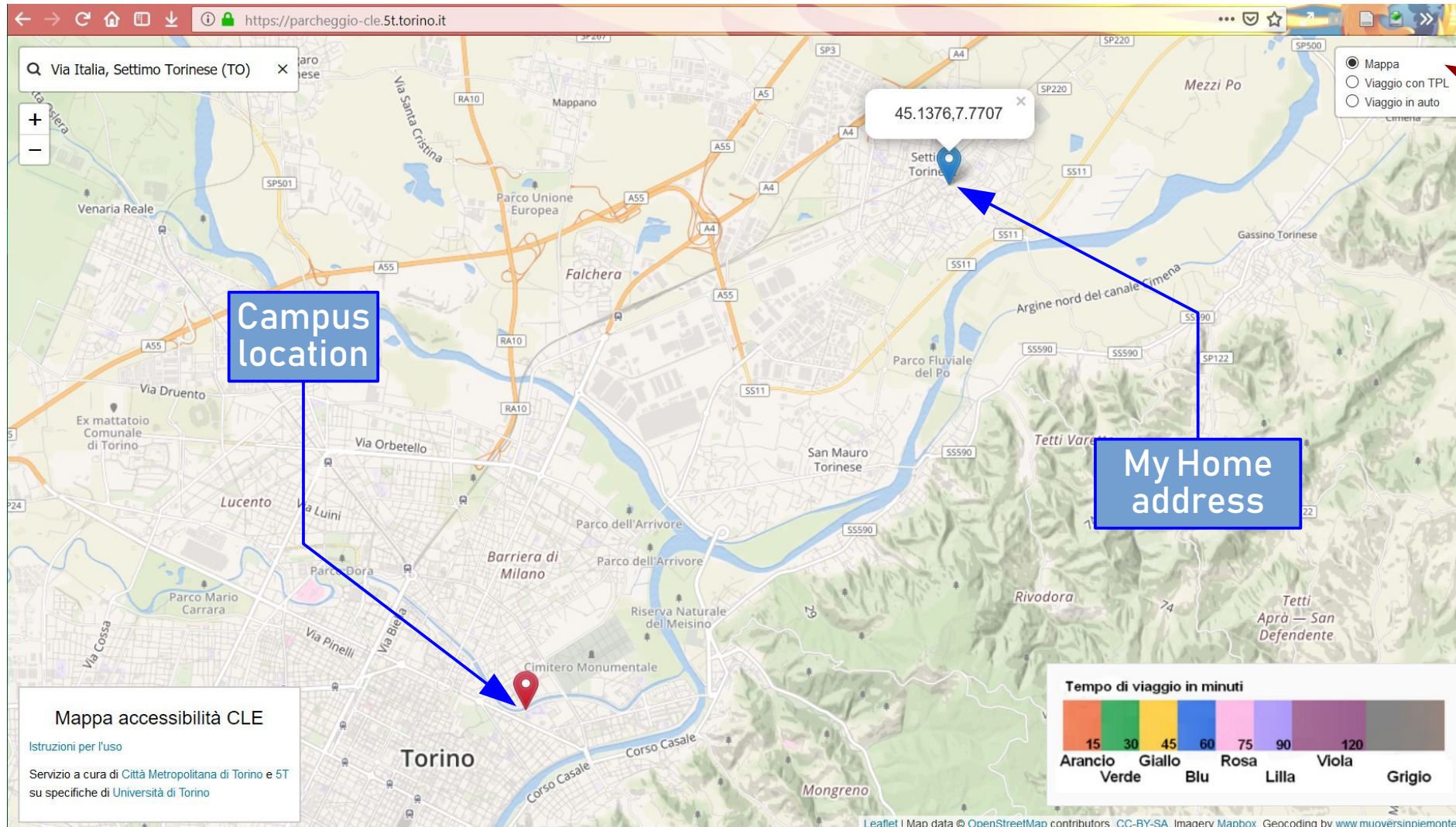- The mappings drew areas from where the campus could be reached in the two modes within specific time frames.
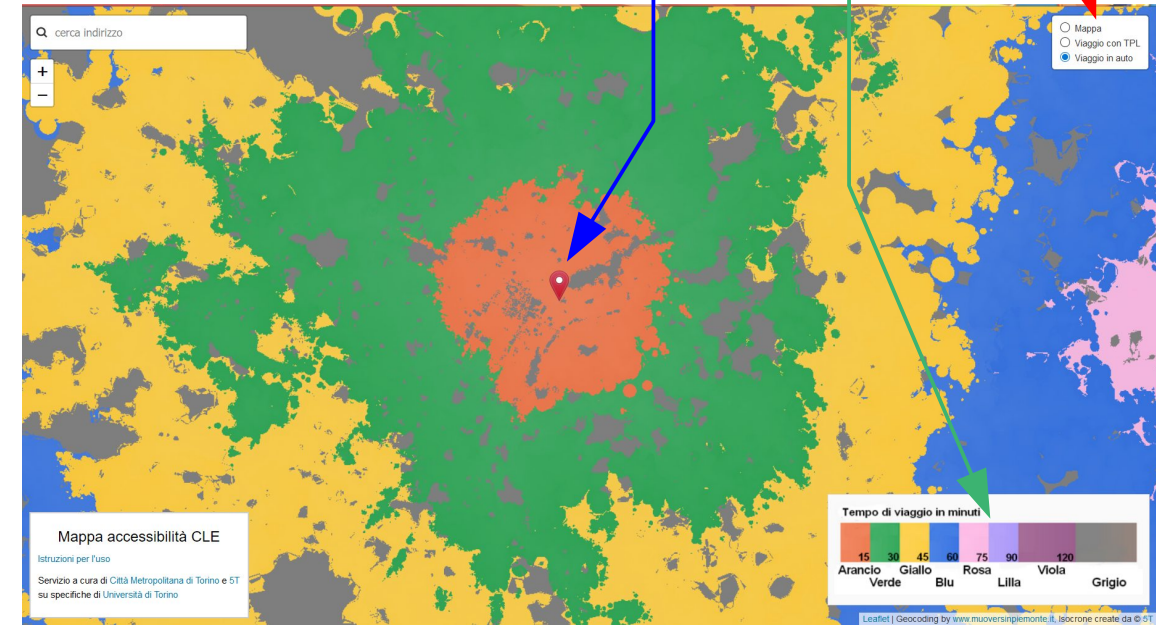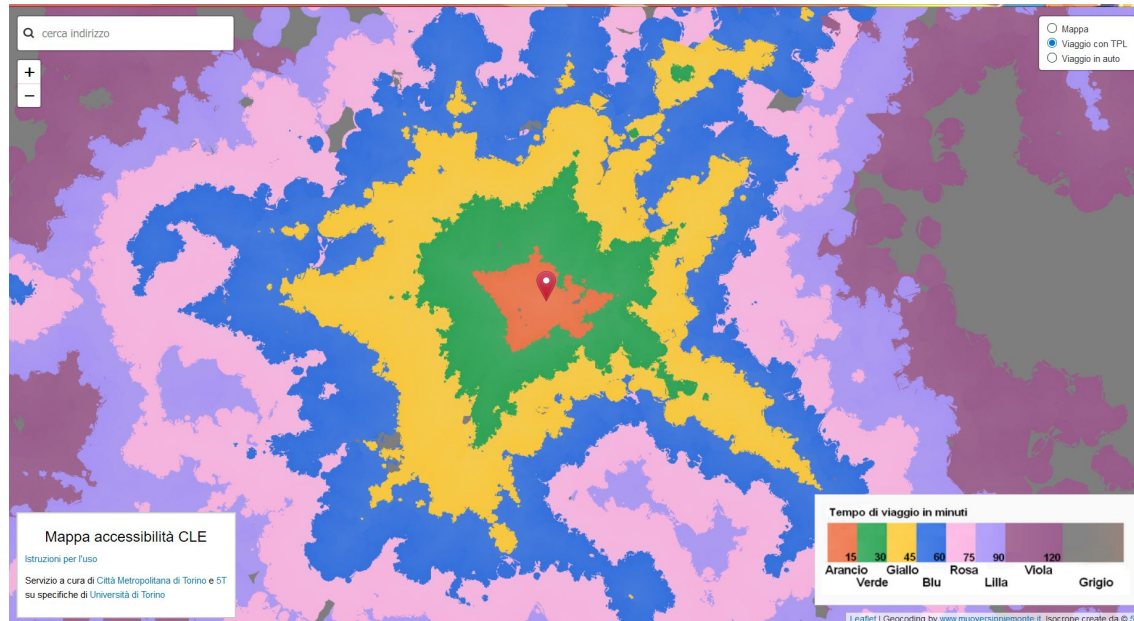
Journey mode

Isochrone timeframe

Central Turin

1) Where do I live?

➔ Enter the town to get a placeholder at its center; drag it to precise address with mouse

2) How fast can I travel to the Campus in a sustainable way?

➔ Look at the color where my home is on the "viaggio con TPL" map layer
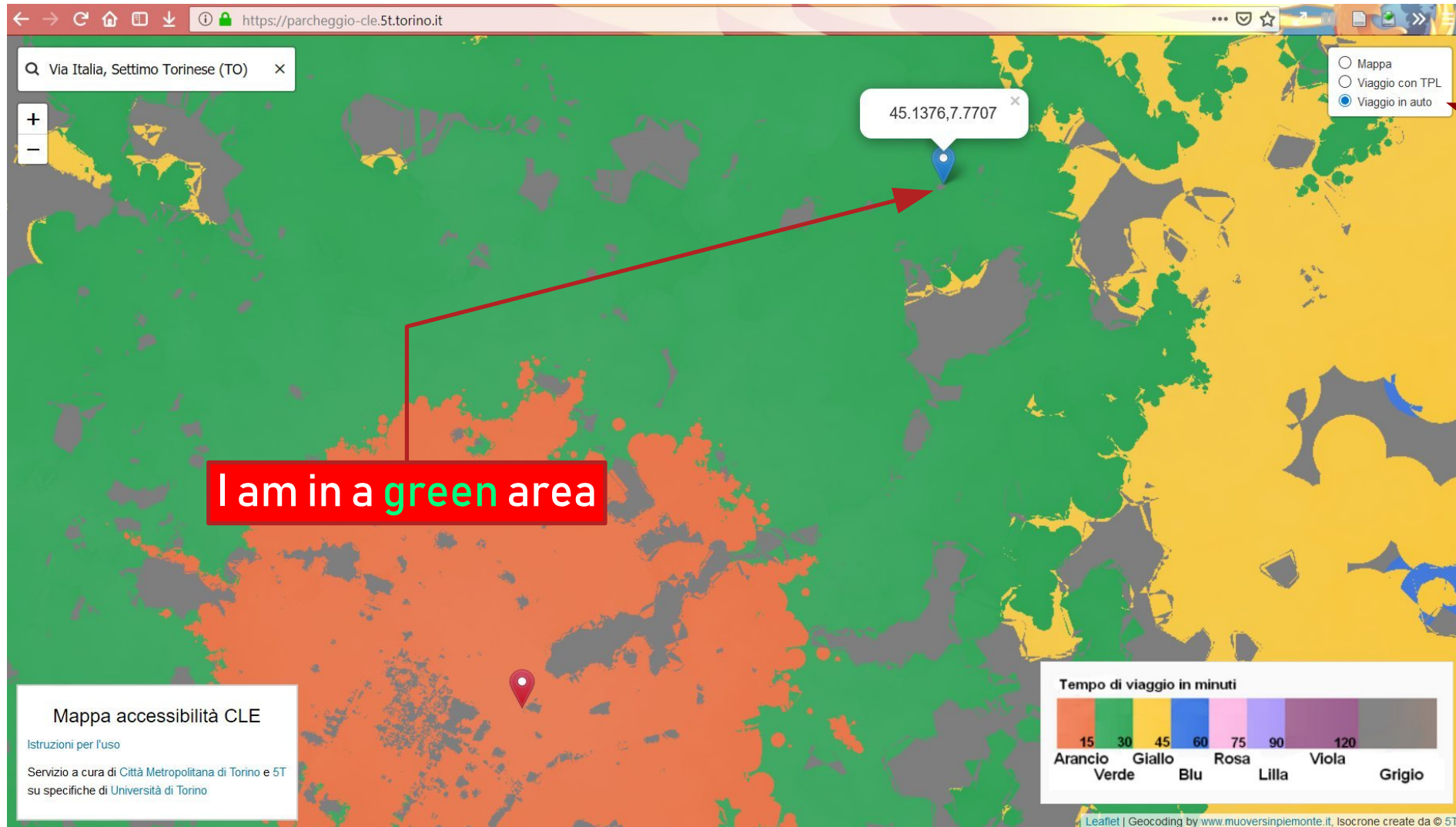

I am in a blue area
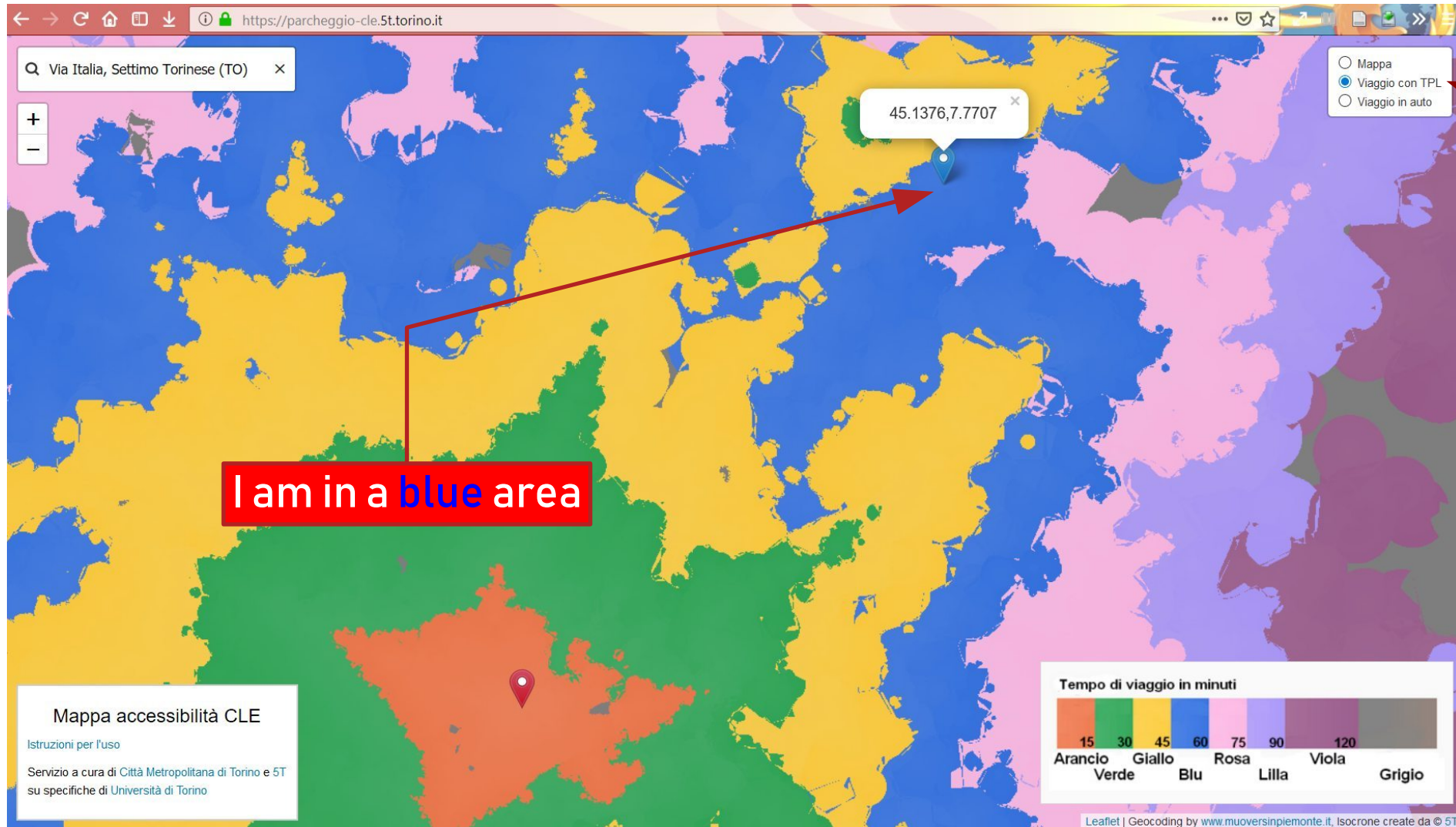
Isochrone map showing approximate journey times with the most efficient modal combination of active mobility and public transport arriving at the campus around 9.00

3) How fast can I travel to the Campus with my own car?

➔ Look at the color where my home is on the "viaggio con auto" map layer

I am in a green area

Isochrone map showing approximate journey times with own car arriving at the campus around 9.00

First Stage

- The individual has to identify the <u>colours</u> of his home area in the two mappings on the web platform; this simple information is then processed through an *ad hoc* algorithm that translates it into a final number.

- The index is derived as a function of the difference of isochrones on the two mappings (*car only* and *sustainable*) for any home address of a community member submitting a permit request.
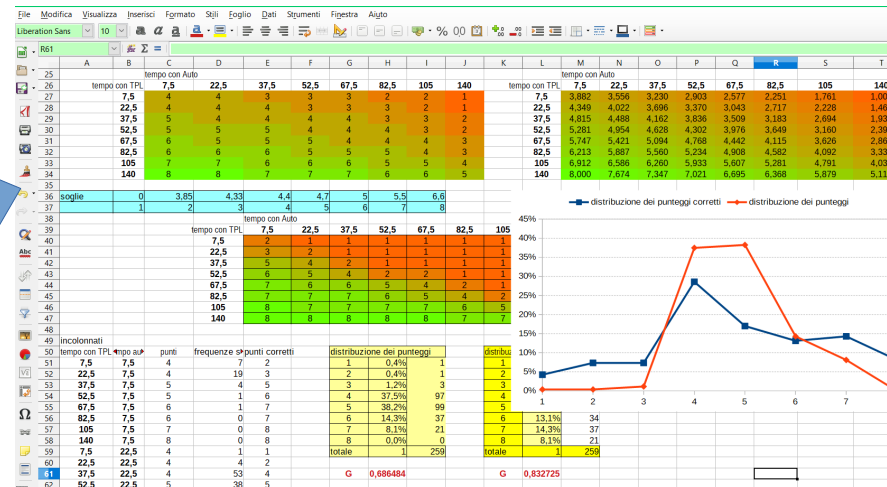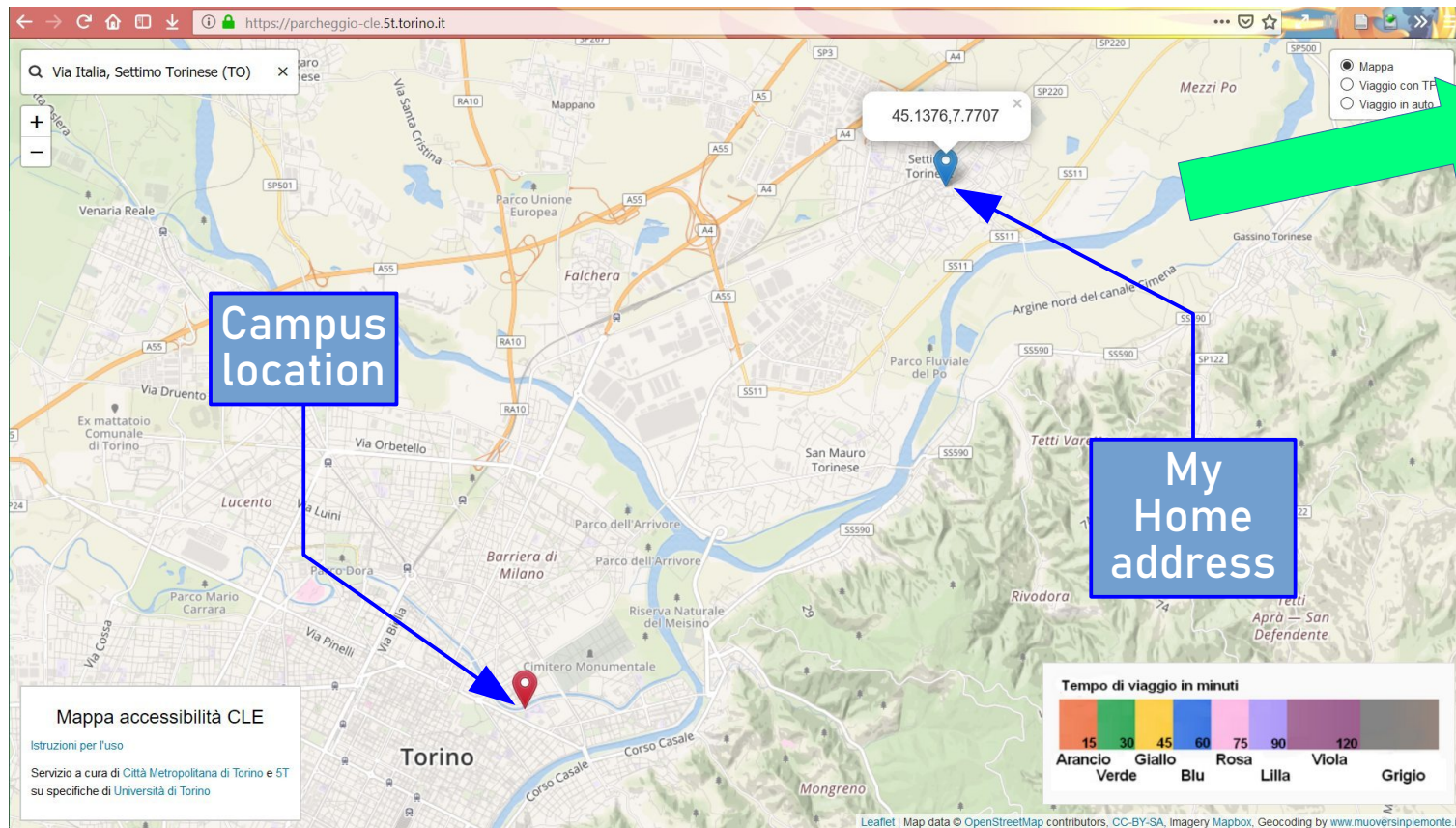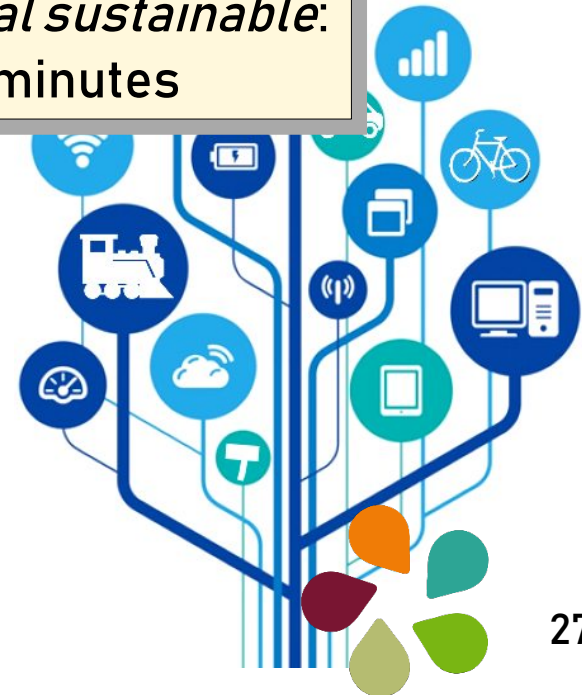

Sustainability index

Project S.U.S.T.A.I.N.: *Specific User Sustainability Through Accurate Index Number*

Second Stage (2019/20)

- Web platform will compute in real time specific journey times in the two modes exactly based on any source and destination points
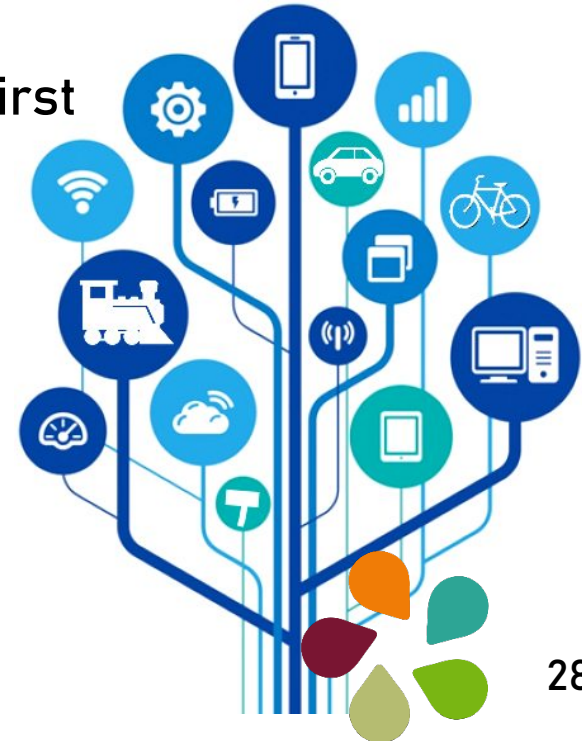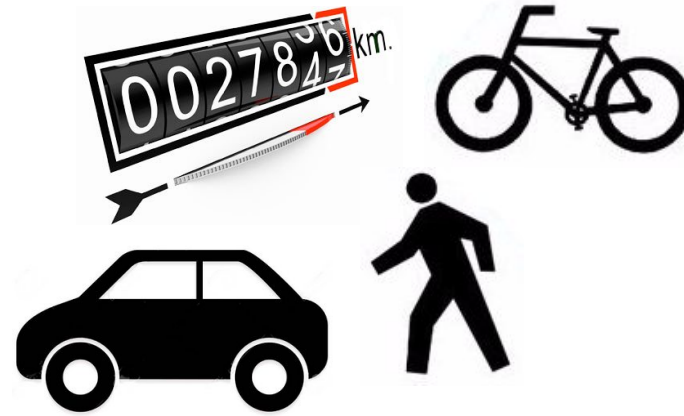

Car only:
28 minutes

Multimodal sustainable:
46 minutes

Project S.U.S.T.A.I.N.: *Specific User Sustainability Through Accurate Index Number*

Second Stage (2019/20)

- The engine will be configurable by:

  - setting mode-specific constraints
    - no more than *XX* km. on foot
    - no more than *YY* km. by bike
    - Allow for bike sharing use
    - no more than *ZZ* by car – when fully sustainable option may not exist, first few miles by car could allow connection to public transport network

  - specific travelling hours during the day
    - *"I usually reach the campus (or destination) at 11"*

  - possible constraints on number and timing of intermediate connections
    - Allow for a maximum of **2** connections along the journey
    - Allow for a maximum of **20** minutes waiting time for each connection
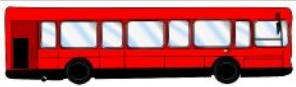   - Allow for a maximum of **500** m. distance between stops

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Project S.U.S.T.A.I.N.: *Specific User Sustainability Through Accurate Index Number*

Second Stage (2019/20)

- algorithm computing index will not involve travel times only, but examine also:

  - [comfort and ease]() of the sustainable travel options:
    - length and mode of the first and last stretch
    - number and length of transfers for intermediate connections
    - their timing compared to "ideal" connection time (e.g. too risky if under 10 minutes, too long if above 15 minutes)
    - Presence of cyclepaths on possible stretch by bicycle/bike sharing

  - the involved transportations services running frequency during the whole day or for particular time frames

City Bus Timetable

Buses to and from the City will run at these times:

Depart Bus Station	Arrive in the City	Depart the City	Arrive at Bus Station
9 o'clock	10 o'clock	11 o'clock	12 o'clock
10 o'clock	11 o'clock	12 o'clock	1 o'clock
11 o'clock	12 o'clock	1 o'clock	2 o'clock
12 o'clock	1 o'clock	2 o'clock	3 o'clock
1 o'clock	2 o'clock	3 o'clock	4 o'clock
2 o'clock	3 o'clock	4 o'clock	5 o'clock
3 o'clock	4 o'clock	5 o'clock	6 o'clock
4 o'clock	5 o'clock	6 o'clock	7 o'clock
5 o'clock	6 o'clock	7 o'clock	8 o'clock
6 o'clock	7 o'clock	8 o'clock	9 o'clock
7 o'clock	8 o'clock	9 o'clock	10 o'clock
8 o'clock	9 o'clock	10 o'clock	11 o'clock

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