

Mobility @ CERN

Ll. Miralles. SMB

- CERN Mobility Mandate
- Enterprise Mobility Plan
 - Content
 - Context
- Status Mobility @ CERN
 - Diagnostic displacements
 - Diagnostic existing mobility catalogue
- Measures under study

- **FHR Director**
 - Sets annual objectives
 - Sponsors CERN mobility plan
 - Monitors progresses
- **SMB Department Head**
 - Represents CERN mobility outside CERN on strategic matters
 - Decides on mobility related activities
 - Manages resources for mobility services
- **SMB-SIS Group Leader**
 - Is responsible for mobility services on site
 - Operates CERN mobility center
- **CERN Mobility Coordinator**
 - Represents CERN mobility outside CERN on technical matters
 - Proposes CERN mobility plan
 - Coordinates CERN mobility working group
- **CERN Mobility Working Group**
 - Communication link with departments
 - Contribute to the development of CERN mobility plan

Mobility general objectives

M1 Optimiser l'offre et la gestion du stationnement.

- M1.1 Favoriser un taux de rotation en phase avec les usages dans les zones desservies.*
- M1.2 Mettre en place une gestion différenciée des parkings longue, moyenne et courte durée.*
- M1.3 Privilégier l'utilisation des zones de stationnement pour les usages professionnels.*
- M1.4 Envisager les parkings en étage (aérien, enterré) dans le cadre de nouveaux développements.*

Parking management

Communication

M2 Promouvoir les offres alternatives de transport inter, et intra-sites.

- M2.1 Encourager les déplacements en mode doux (piétons/vélos) par des mesures d'aménagement et d'incitation.*
- M2.2 Favoriser le covoiturage et augmenter l'attractivité et l'offre des navettes.*
- M2.3 Renforcer et diversifier l'offre de véhicules en libre-service.*

M3 Favoriser un accès efficace et fluide aux sites du CERN.

- M3.1 Optimiser la fluidité des accès au CERN.*
- M3.2 Améliorer la hiérarchie du réseau routier à l'intérieur du domaine CERN.*
- M3.3 Favoriser les synergies avec les services de transport public et les initiatives d'offre d'infrastructure de transport.*

Infrastructure



- 8 meetings /year
- Topics studied:
 - CERN Carpool
 - CERN car/bikes fleet
 - CERN access inter / intra sites
 - Soft mobility
 - Safety
 - **Mobility plan**
 - IoT @ Mobility

CERN mobility Working Group

- ACCU
- AP
- BE
- EN
- EP
- FHR sector
- HSE
- IT
- TE
- TH
- SMB-SIS
- SMB

- Presentations

CERN car fleet data analysis SMB/CITEC

Solutions en mobilité

Plan de mobilité

Sondage mobilité et 1ères analyses de diagnostic

Meyrin, le 19 mars 2018

Smart Mobility SMB

Internet of Things workshop

SMART Mobility @ CERN

07/11/2017 Frédéric Magnini, Ana Lacarcel, Alberola

Survey data analysis SMB/CITEC

Solutions en mobilité

Plan de mobilité

Présentation de l'enquête mobilité au GT

Meyrin, le 16 juillet 2018

- New entrance Esplanade des Particules
- New entrance B
- Preveessin Crossroad
- Modification of Meyrin west traffic plan. Route Salam.
 - Integrate one-way roads
 - Dedicated cycling paths and walkways
 - Improved road signage
- Road layout around restaurant 2
 - Integration of 2 roundabouts for better speed control
 - Dedicated cycling paths and walkways
 - Bus stop
 - Reorganising parking for improved safety
- Entrance E
 - Double lane at site entrance for increased traffic flow
 - Dedicated cyclist and pedestrian turnstile gate for improved safety
- Bike
 - Bike fleet renovation
 - Bike shelters inventory.
 - Self maintenance stations



- The general framework:
 - CERN's willingness to take into account sustainable development issues related to mobility
 - Provide a response to cantonal demand made to large companies to make their induced mobility more sustainable
 - The intention to develop an EMP is included in the CERN Masterplan 2030
- CERN's mobility objectives (Masterplan 2030):
 - Optimize parking supply and management (reduce the pressure on parking at Meyrin site)
 - Promoting alternative offers of inter and intra-site transport, and in particular improving the safety of the movements of all modes of transport inside the sites
 - Promote efficient and fluid access to the sites

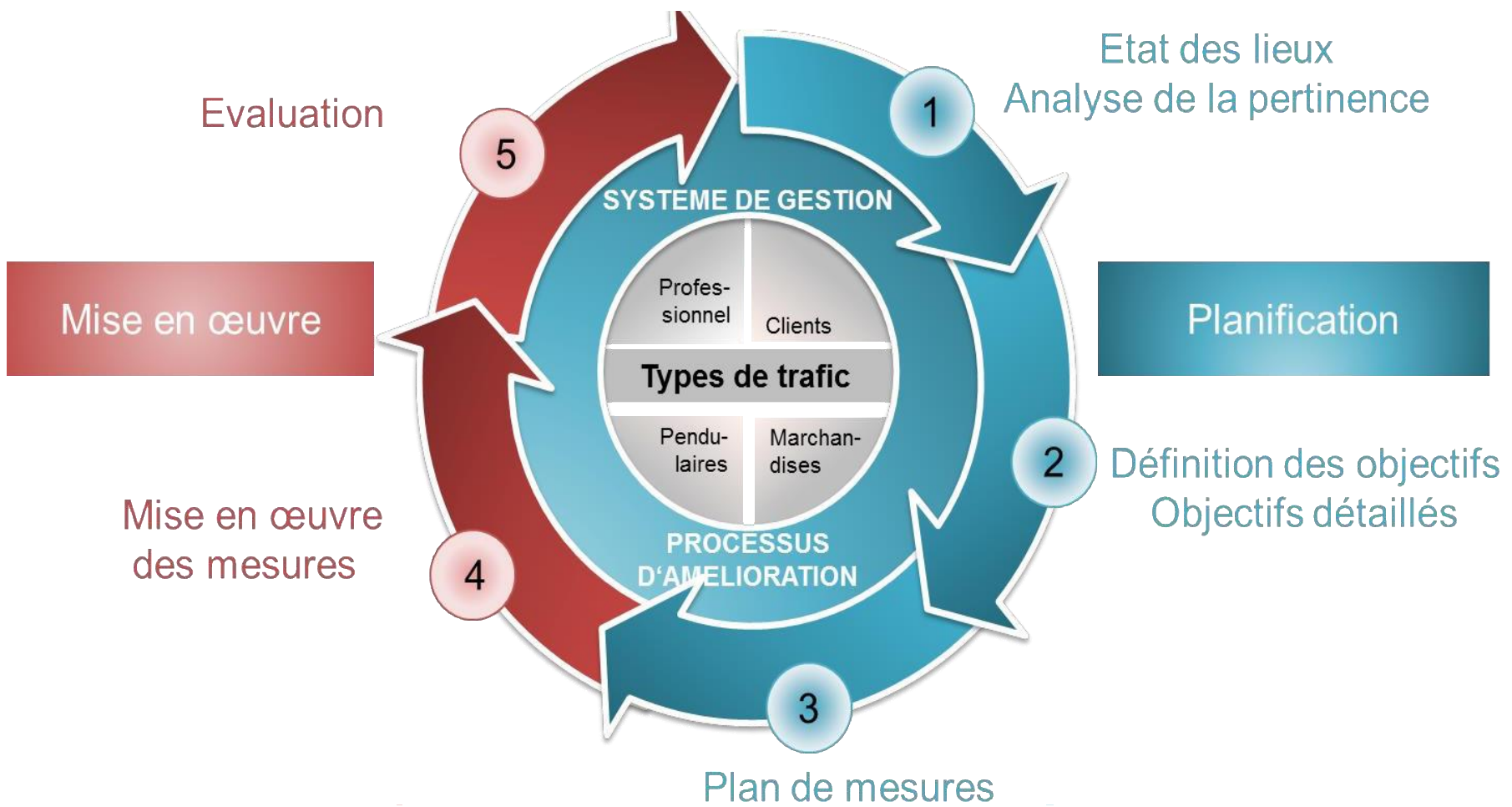
Implementation of measures to facilitate employee travel

- Equal treatment of all modes →
- Taking into account the constraints of employees and the company →
- Dynamic and evolutive management of mobility →
- Active and continuous communication →
- Restore equity at the level of transport. Incentives/encouragement
- Complete action plan adapted to the context, optimization of available resources
- Regular monitoring and adaptation of the plan
- Appropriation of the plan and objectives

***EMP**. Enterprise **M**obility **P**lan

- The stakes of an EMP:
 - Reduce the saturation of transport networks in peak hours and the pressure on parking at destination
 - Optimize professional transportation services to minimize the cost / benefit ratio
 - Explore all ways to reduce noise and pollutant emissions to meet the objectives of federal ordinances (OPB and OPAir)
 - Achieve energy savings in the total amount of travel generated by a company

A dynamic (living) and cyclical process of continuous improvement



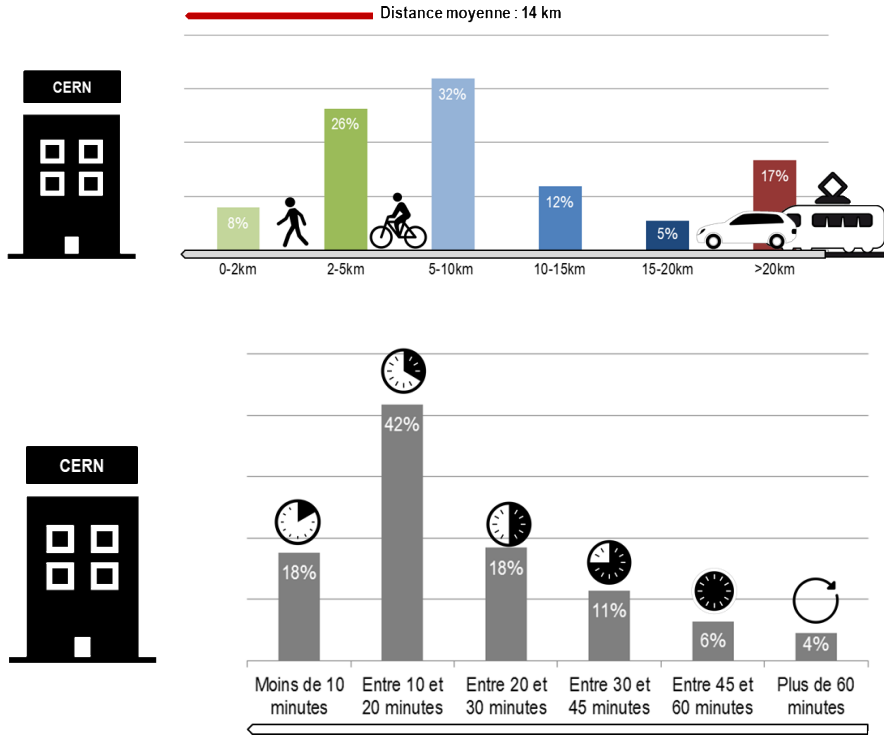
Methodology:

- Collect and analyse basic data (CERN specificities, travel constraints, usage statistics of transport modes available, etc.)
- Identify the current travel habits of employees and the degree of satisfaction / use of existing mobility management measures
- Propose ways to optimize current mobility measures and complete the catalogue
- Evaluate costs vs. potential savings from measures and estimate their environmental impact
- Define an implementation plan and means to facilitate the acceptance of change

- A mobility survey was sent to all CERN staff (around 2,800 staff and 7,200 users) during the spring of 2018.
- 4,300 responses were collected, including 3,160 in English and 1'140 in French
- Overall rate of return of 43%, but 75% for CERN staff
- Good representativeness

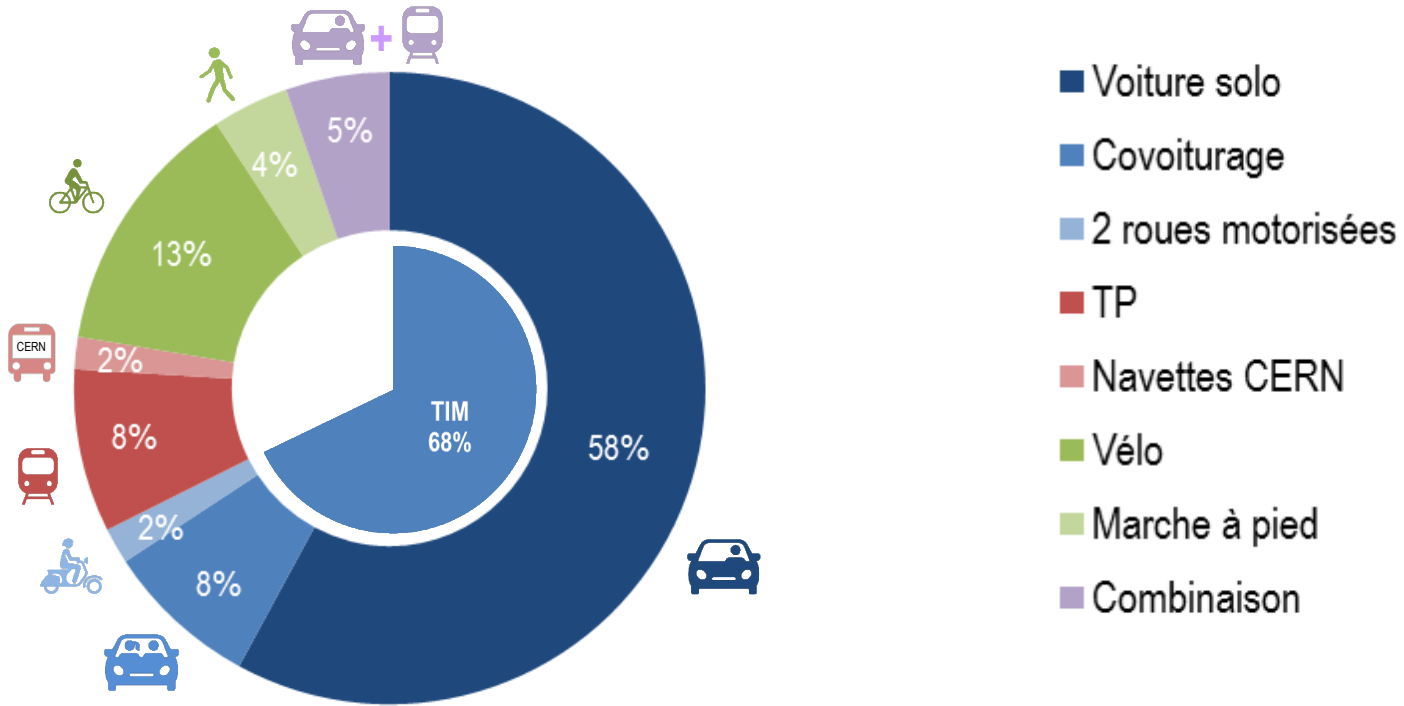
Arrivals between 6:30 and 9:30. Half population arrives between 7:30 and 8:30. At 9 am 85% of the population is present on the CERN site.

Departures between 16:30 and 19:00 or later. More than half population leaves the site between 5:30 pm and 6:30 pm. At 18:30 three quarters of the population left the site.

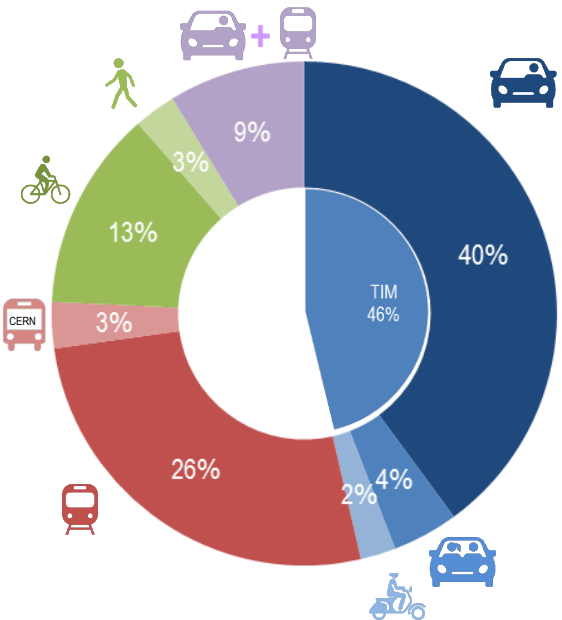


Commuting movements - Current modal shares (all collaborators)

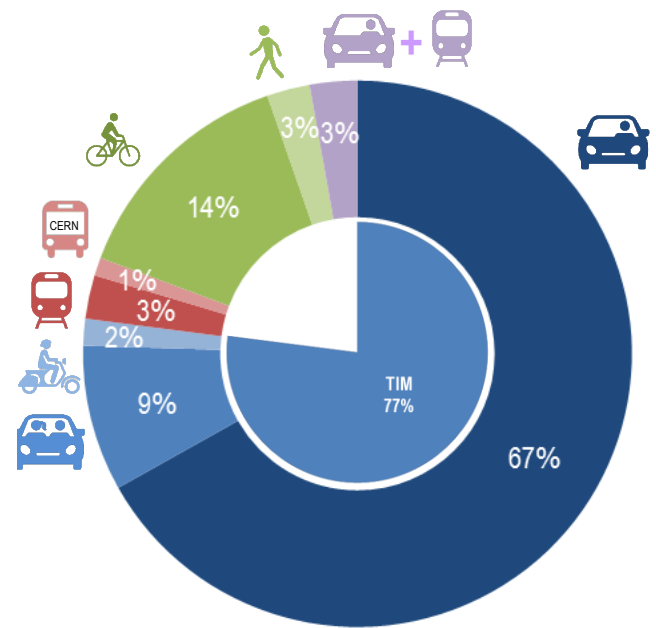
- Modal car share "solo" of about 60% (similar to the 2014 survey)
- Modal share TIM (motorized personal transport) overall of 70%
- Modal share TP (public transport) of about 10% (of which 2% for CERN shuttles)
- Modal share MD (soft mobility) less than 20% (but 13% of people on bike!)

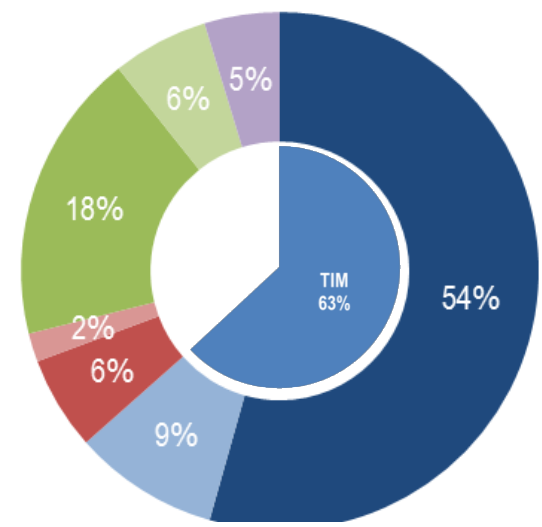
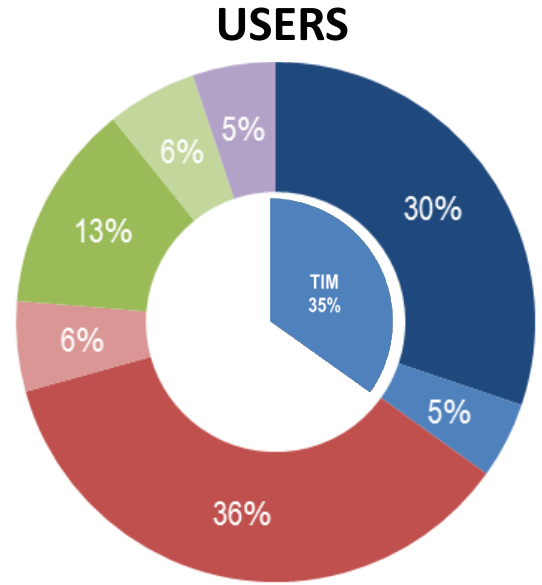
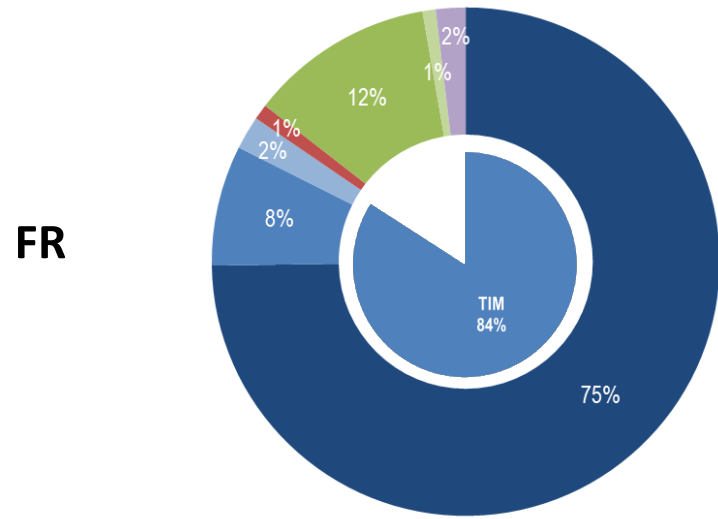
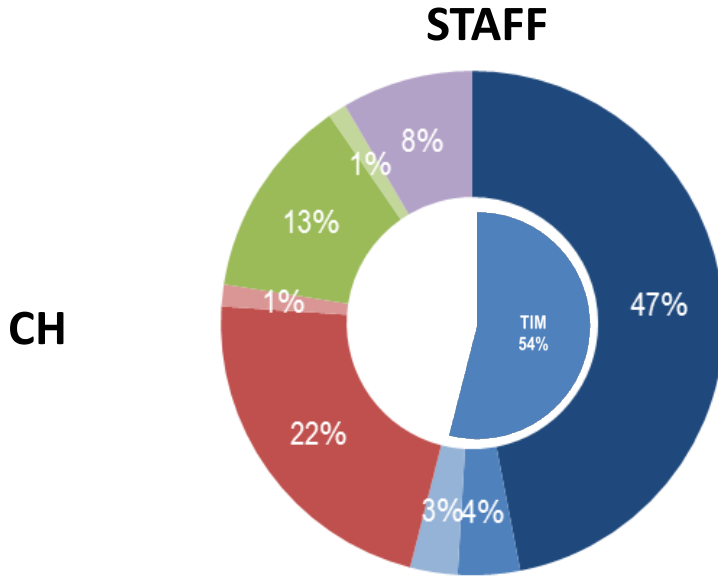


Modal share	CH	FR
Solo	40%	67%
Carpooling	4%	9%
TP	29%, 3% navettes	4%, 1% navettes
MD	16%	17%
Combinaison	9%	3%



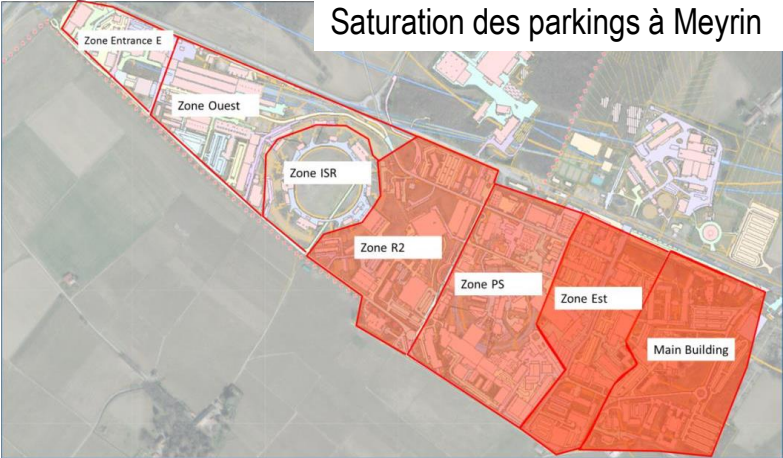
- Voiture solo
- Covoiturage
- 2 roues motorisées
- TP
- Navettes CERN
- Vélo
- Marche à pied
- Combinaison





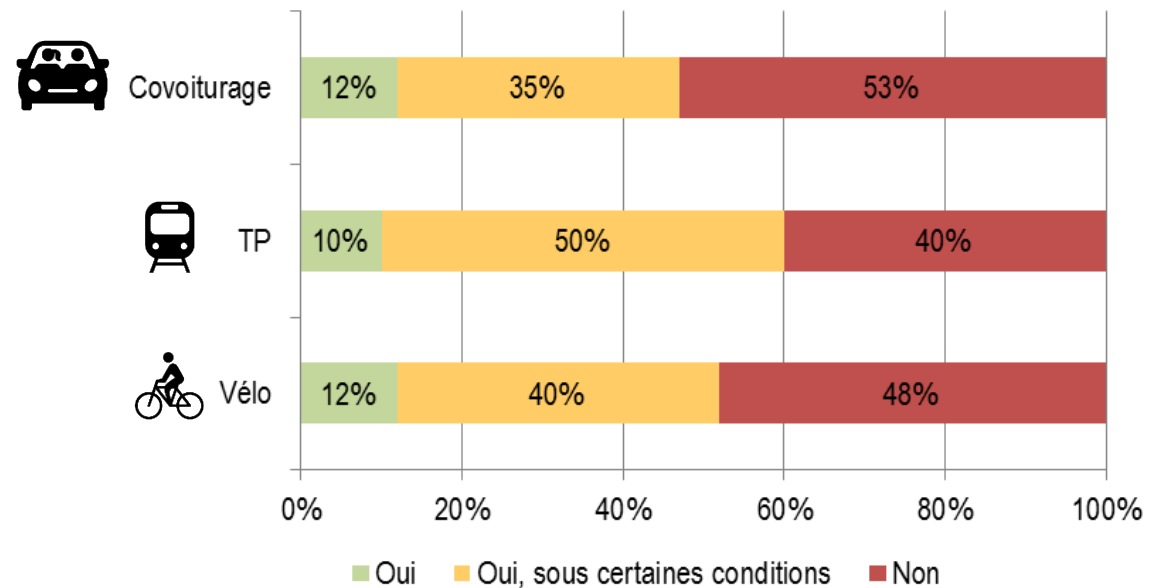
- Voiture solo
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- Half of solo drivers generally say they find a place to park easily, 13% find rarely, if ever, room in the desired area.
- If parking was charged, personnel would be willing to pay an amount of:
 - Staff: 12 CHF/month on average, **median to 0 CHF**
 - Users: 11 CHF/month on average, **median to 0 CHF**
 - motorists are only willing to pay a "symbolic" amount to ensure a place
- If the pricing proves to be higher than the desired amount:
 - 60% of personnel would maintain their current modal habits, only 15% would be willing to change their habits
 - One-quarter of solo drivers are totally against with the idea of parking fees



- Conditions for carpooling: solutions for a return home in case of emergency (58%), exchange platform (53%), means of transport available for business trips (31%), privileged parking at destination (30%)
- Conditions for the use of TPs: improved accessibility (88%), occasional use of the private car possible (49%), purchase subsidies (37%)
- Conditions for using the bike: improved safety on the journey (65%), alternatives in winter (52%), occasional use of the private car (41%), changing rooms / showers (35%)
- 8% completely opposed to any change

Opening to a change of mobility mode



To meet the strong demand for professional displacements several types of vehicles are available:

- More than 800 long-term leasing vehicles
- 70 Short-Leasing service cars
- Access to rental fleet to cover specific needs
- 35 cars in car-sharing
- 4 CERN shuttle tours
- Nominal CERN bicycle loan.

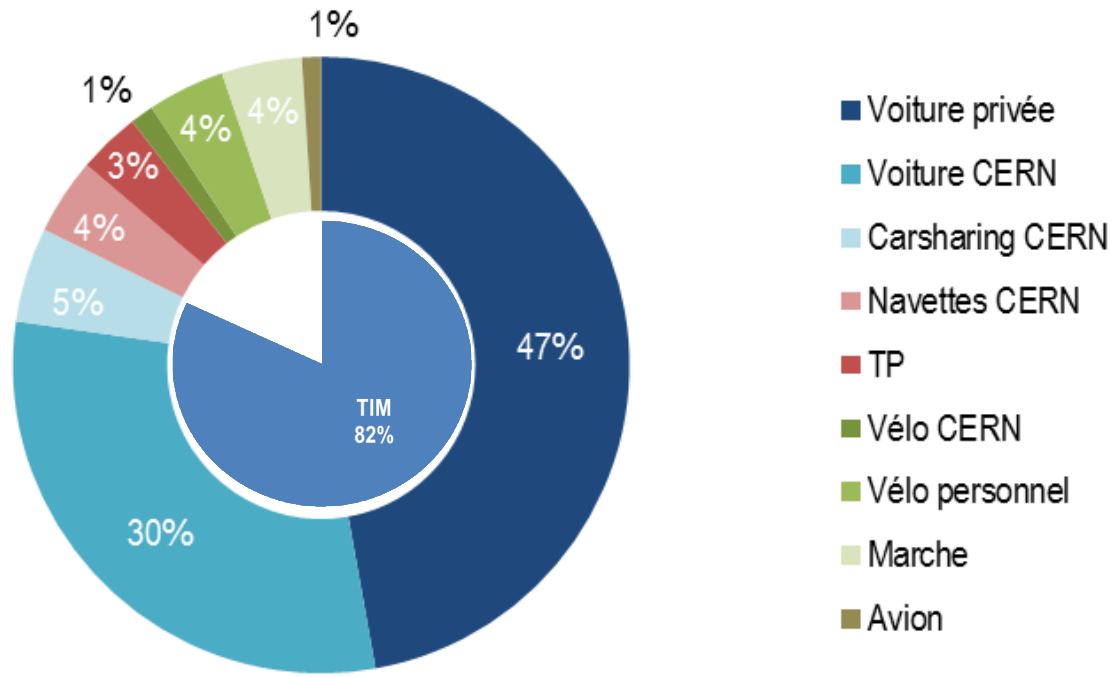
The objective is to analyse the use of these different types of vehicles and services in order to optimize the offer as much as possible.

- TIM share, 82%
 - Nearly half of employees use the private car
 - CERN cars or car sharing are used at 35%

- TP share: 7% (Shuttles very little used - 4%)
- MD share: 9% (CERN bike very little used - 1%)
- Other: 1% use the plane frequently for their business trips

Use of the private car for reasons of flexibility mainly
As a general rule (70%), they find a parking space at their place of destination

40% of employees often walk within the Meyrin site
More than 50% are only moderately satisfied with the current conditions,
A third are very satisfied and less than 5% are dissatisfied



During 2015, CERN started to equip its service vehicles with a GPS system allowing the routes of the entire fleet to be traced.

A database collected over a period of three months (September to December 2017) has been analysed. Over this period, more than 90% of the fleet was equipped.

The main elements coming out of the study are:

- 50% of journeys correspond to travel times of less than 5 minutes;
- 15% of trips are less than 2 minutes;
- A wide geographical dispersion of the points of destination
- Half of the data correspond to internal trips on the Meyrin site;
- 20% of trips include parking times of less than 5 minutes, and 10% of less than 2 minutes.



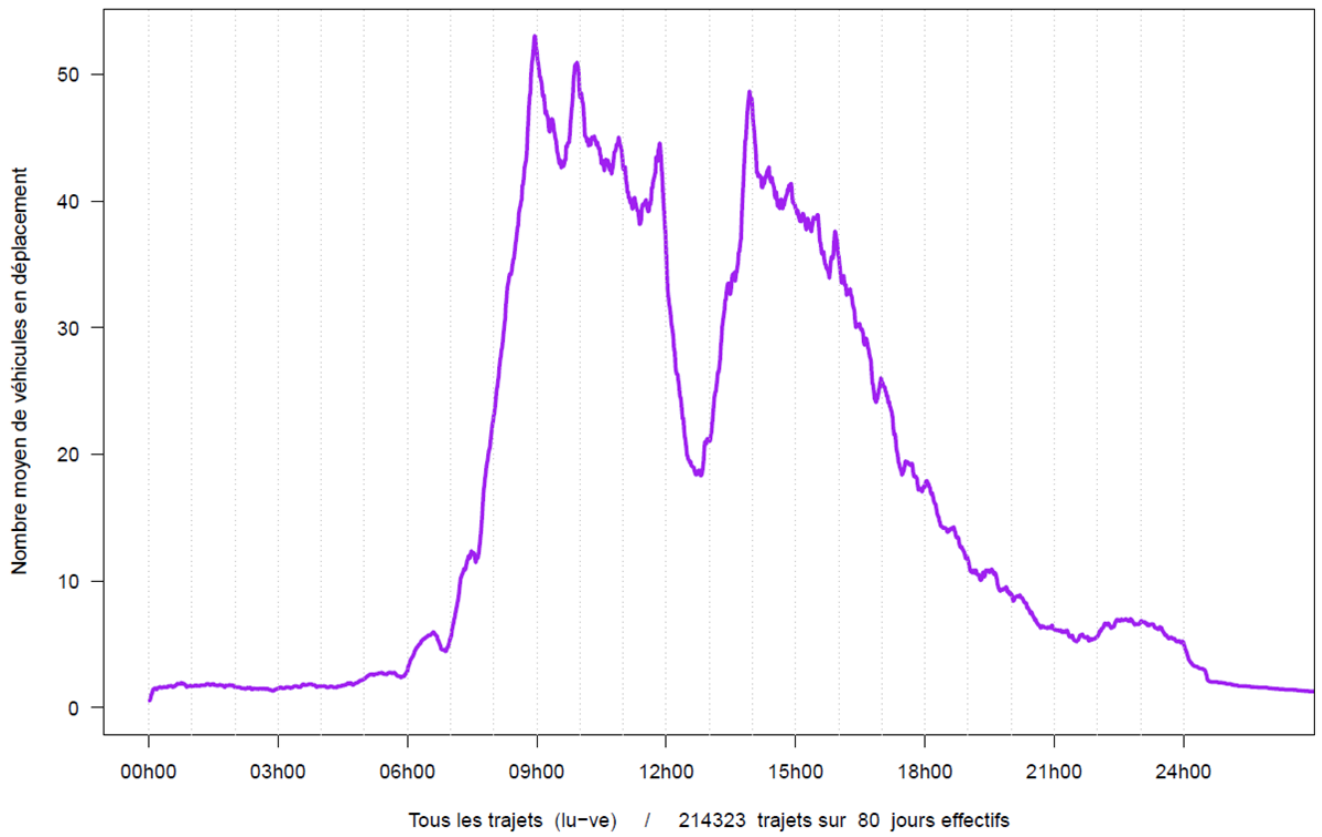
Status Mobility @ CERN



On average, there are rarely more than 50 CERN vehicles traveling at the same time (less than 10% of the fleet).

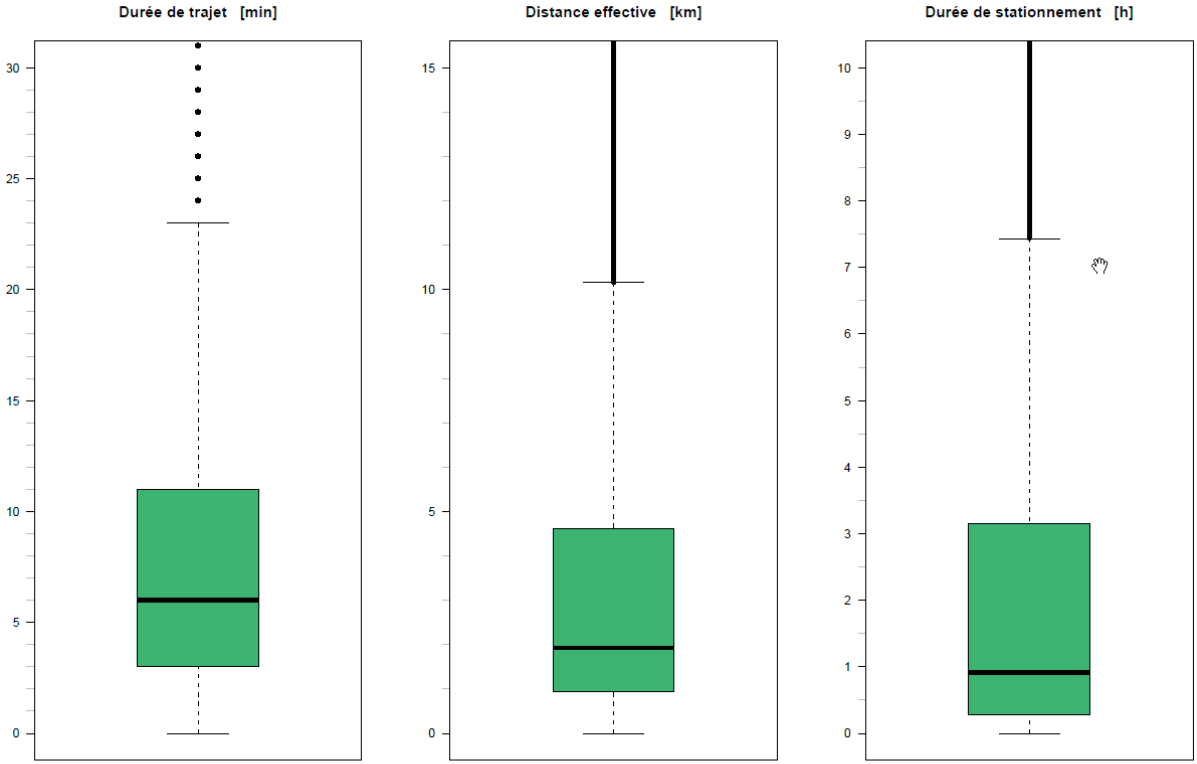
This does not mean that all other vehicles are available, many vehicles are temporarily parked the time of an intervention or a meeting, but it still demonstrates a potential for fleet optimization.

Courbe des utilisations journalières



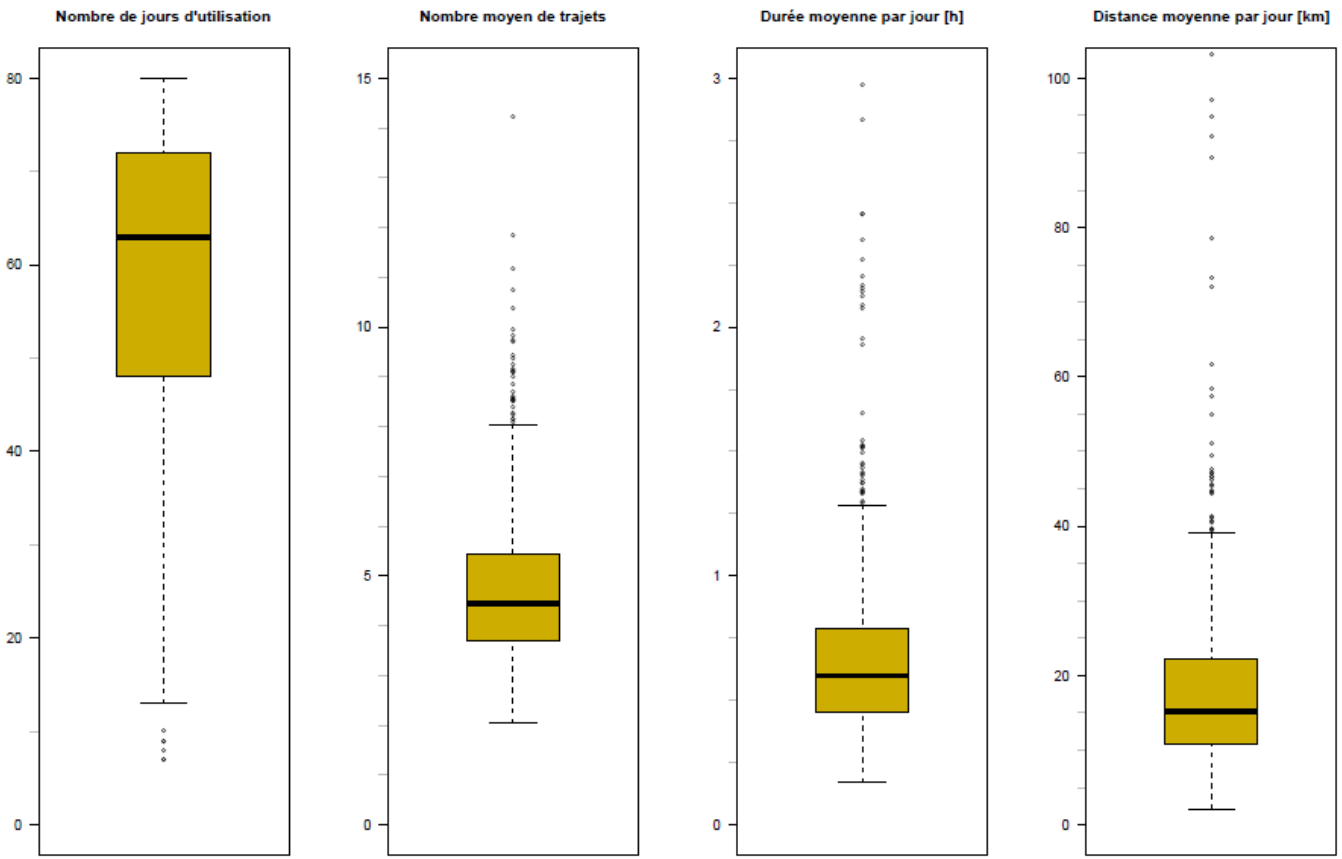
The main results looking at the characteristics of the trips, 7:00 to 19:00, working days:

- Travel time: average 9 minutes, median 6 minutes
- Distances made: mean 3.8 km, median 1.9 km
- Parking time: average 8 hours, median 55 minutes



Tous les trajets lu-ve (7h-19h) / 20114 trajets sur 80 jours effectifs

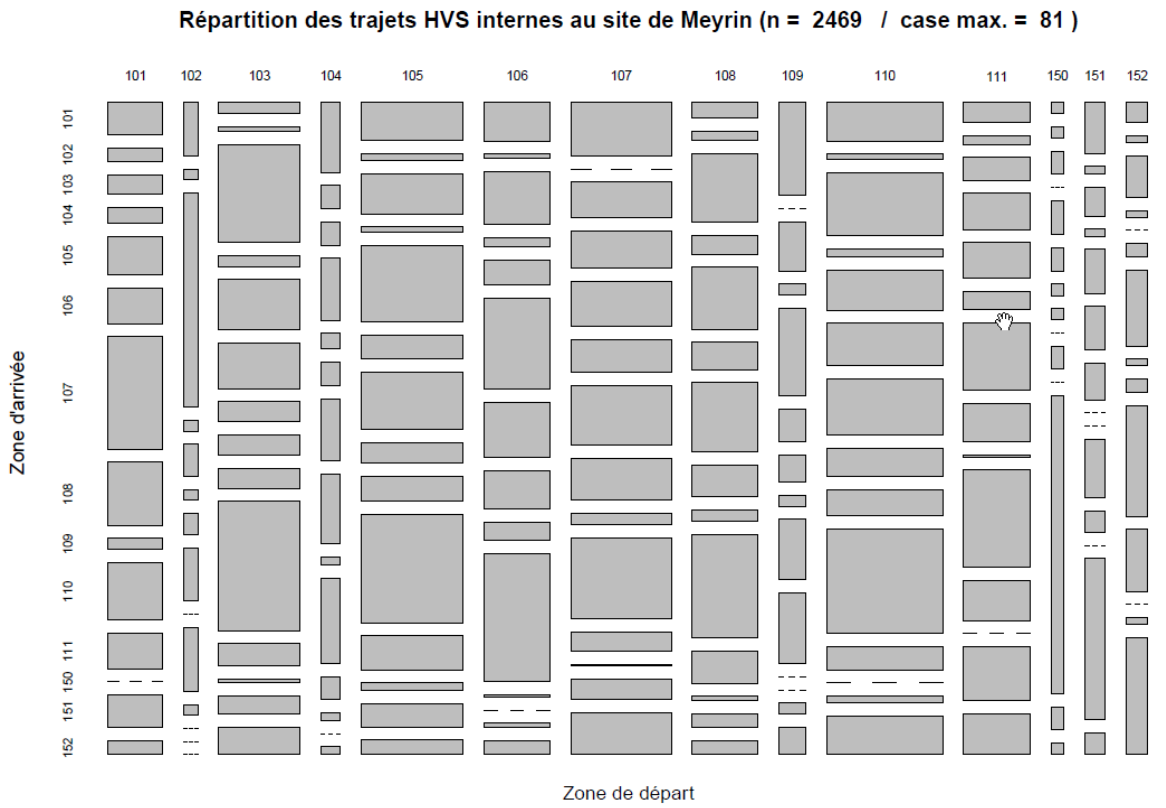
- CERN vehicles used quite uniformly on working days
- Average hours of use per day low, 30 and 45 minutes
- Distances 10 to 22 km



Données agrégées par véhicule HVS (jours ouvrés uniquement) / 672 véhicules sur 80 jours effectifs

The Mosaic Plot demonstrate a large distribution of travel throughout the Meyrin site, with a virtual absence of convergent flow, except on the 7:45-8am time slot.

The possibility to respond to this request with shuttles running on predefined lines will be complicated.



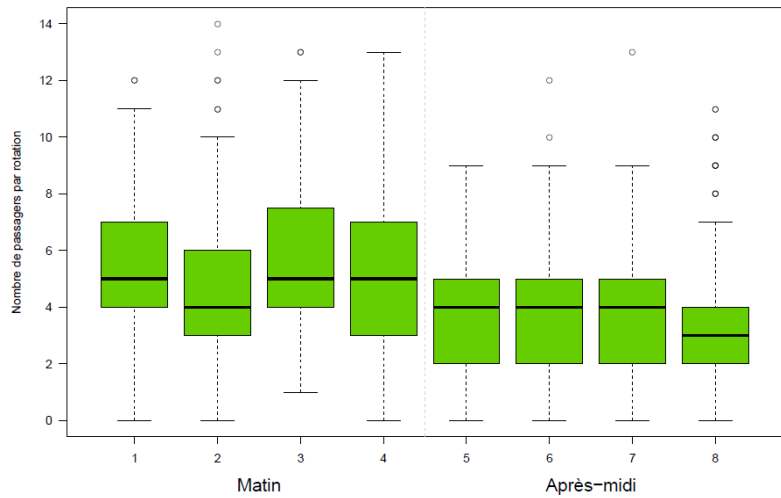
Tous les trajets HVS entre 13h45 et 14h00 (lu-ve)

Low frequentation 2 to 7 pax

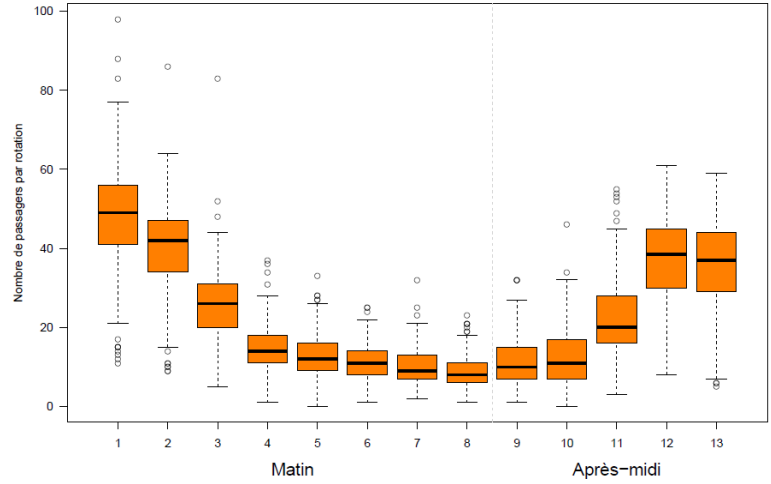
SHUTTLES

Good frequentation am/pm

Circuit 1: Distribution du nombre de passagers sur les 8 rotations quotidiennes

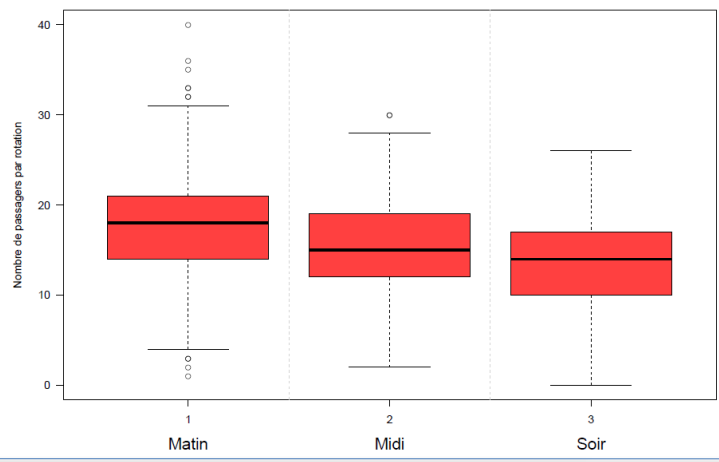


Circuit 2: Distribution du nombre de passagers sur les 13 rotations quotidiennes



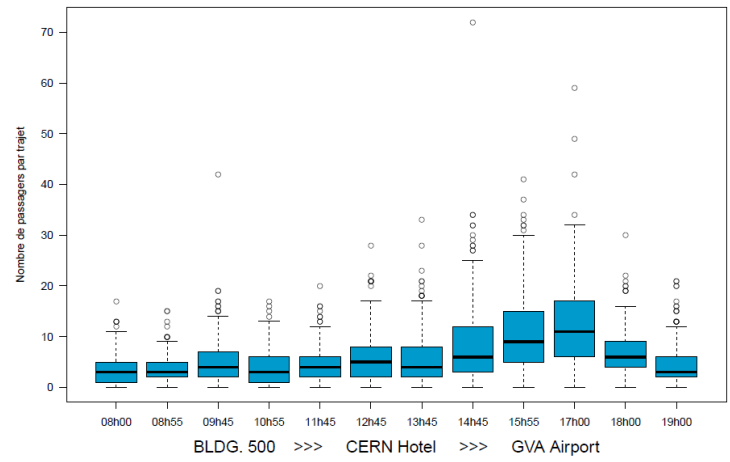
Good frequentation

Circuit 3: Distribution du nombre de passagers sur les 3 rotations quotidiennes



Good frequentation asymmetric

Circuit 4: Nombres de passagers sur les 12 allers quotidiens vers l'aéroport



SATISFACTION ON CURRENT CERN MOBILITY OFFER

- Car fleet
 - 60% staff use CERN service cars, 70% at least once a month
 - 40% users use CERN service cars, 54% at least once a month
 - ☒ 90% completely or partially satisfied with this offer (staff & users)
 - ☒ Improvements are desired on fleet diversity and procedure complexity
- Car sharing
 - 25% staff and users use car sharing occasionally, staff: 1/3 at least 1 /month, users 55% at least 1/month
 - 70% of staff feel totally or partially satisfied
 - 85% of users feel totally or partially satisfied
 - ☒ Improvements are desired on fleet diversity and procedure complexity
- Bikes
 - 37% users use CERN bikes, 20% every day
 - 15% staff use CERN bikes
 - 85% feel totally or partially satisfied with this offer (staff & users)
 - ☒ Improvements are desired on equipment

SATISFACTION ON CURRENT CERN MOBILITY OFFER

- Shuttles
 - 80% of users use shuttles, 20% at least 1/week
 - 66% of staff use shuttles, 3% at least 1/week
 - Line 4 "Airport" is the most used by users, but in a very punctual way
 - Improvements are desired in frequency and schedules
- CERN Mobility center
 - Knowledge of Mobility center. 66% of staff know it, 50% of users know it
 - Knowledge of the services offered. 75% staff & users knows the services proposed
 - Improvements are desired in communication and emplacement

Thirty measures are classified in 9 main domains:

- CERN shuttles (NA)
- CERN cars (VO)
- CERN bikes (VE)
- Accessibility (ACC)
- Parking (STA)
- Carpooling (CO)
- Public transport (TP)
- Soft mobility (MD)
- Communication / work organization (COM)

For each measure, are evaluated:?

- The related CERN Masterplan mobility objective
- ? The type of displacement (commuting / inter-site prof / in-site prof / prof off-site)
- Cost vs. potential savings
- ? The environmental impact (% reduction of CO2 emissions)

NA1	Optimization of line 1	-30t CO2/y
DESCRIPTION		
<p>This measure can be split in two steps:</p> <ul style="list-style-type: none"> • In the short term, the objective is to increase the frequency of shuttle 1 by doubling the number of rides (from 18 to 36 rides per day) in adequacy with TPG tramway timetables. • In the longer term, an autonomous shuttles system would be offered with a two-way service and an increased number of rides (18 rides per day, each way). 		
RATIONALE		
<p>This optimization measure is justified by the actual underuse of shuttle 1 (for half the rides, there are only 2 to 7 people transported) which can be explained by the restricted time range, a deficient interfacing with the tramway and an inefficient route.</p>		
VO1	Long-term fleet reduction	-225t CO2/y
DESCRIPTION		
<p>This measure proposes to reduce the long-term car fleet by maintaining vehicles with specific equipment <u>needs</u>.</p> <p>This measure is accompanied by:</p> <ul style="list-style-type: none"> • A transfer of vehicles in the free-floating system (VO2 measure) • A transfer of vehicles in the vanpooling (CO2 measure) • A phasing out of the long-term fleet balance 		
RATIONALE		
<p>At present, these cars are used for very short distances (half of the rides do not exceed 5 minutes and 2 km). And never more than 10% of the CERN fleet is used at the same time.</p>		

VE1-VE2-VE3	Increase the CERN bike fleet	-10t CO2/y
DESCRIPTION		
<p>1/ As of 2019, CERN plans to increase its fleet with 150 bikes.</p> <p>2/ One objective is to diversify the fleet by offering different bike sizes</p> <p>3/ A bike sharing service accessible through a mobile application or using a CERN badge could also be put in place.</p>		
RATIONALE		
<p>Based on the mobility survey, the current fleet is insufficient, in particular during the summer due to the large amount of students. In addition, the offering is not considered optimal and the system is judged complex.</p>		

ACC2	Persons with reduced mobility (PRM)	
DESCRIPTION		
<p>This measure aims at taking into account persons with reduced mobility in existing or future projects, with the installation of access ramps at the site entrances, for example. The creation of shuttle stops inside the site should also consider the specific needs of those users, and respect the <u>LHand</u> (legislation related to handicapped persons).</p>		
RATIONALE		
<p>The lack of accessibility for PRM can be observed on the whole site but is particularly visible at the entrance gates.</p>		

MD2	Cycle and foot paths	-10t CO2/y
DESCRIPTION		
<p>Increasing the share of soft modes also includes the development of dedicated infrastructures, among which secured itineraries. A 200m network for pedestrians and 300m network for cycles is considered for defining which itineraries should be created on site.</p> <p>Discussions should be initiated with neighbouring <u>collectivities</u> in order to improve itineraries outside of the site.</p>		
RATIONALE		
<p>The absence of itineraries restricted to soft modes as well as their lack of safety were repeatedly mentioned in the mobility survey.</p>		

COM2	Mobility intranet	
DESCRIPTION		
<p>Reorganise and regularly update the intranet pages dedicated to mobility.</p> <p>Integrate an exchange platform for carpooling and vanpooling.</p> <p>A monthly mobility newsletter would be published on the intranet, informing about new measures, potential changes and new collaborators.</p>		
RATIONALE		
<p>The mobility survey showed a lack of knowledge of current mobility management measures. Communication is key to a successful mobility plan.</p>		

The French traffic rules applies to the French part of CERN

AND

The Swiss traffic rules applies to the Swiss part of CERN

You must respect these rules at anytime



If an accident occurs:

-with private material damage: fill in an amicable accident report to be sent to your insurance company.

If the owner is not available (parked vehicle) call CSA (78877) who will put you in touch with him/her.

-with CERN material damage: call the CSA (78877)

-with physical injuries: call the CSA (78877), the Swiss or French authorities will come to fill in the report.

CERN-specific rules of conduct:

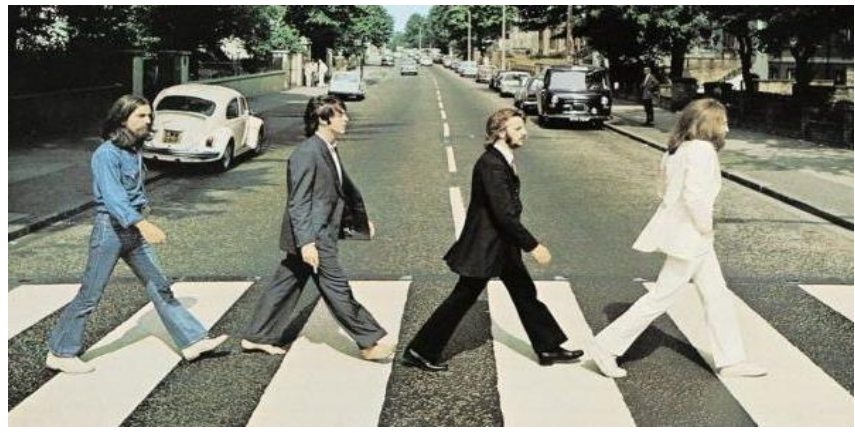
The general speed limit is **50 km/h**
(It can be reduced occasionally in specific zones)



Vehicles, other than two-wheelers,
may not overtake other vehicles



You must stop
and give priority
to pedestrian entering
protected crossings



Pedagogical radars are
installed in specific
locations that display your
speed

QUESTIONS?



THANK YOU FOR YOUR ATTENTION