

World Conference on Transport Research WCTR 2026

Lectern presentation

Working next door:

*An evaluation of a coworking space intervention in a living
lab on commuting and housing space demand*

Noah Balthasar

Jana Z'Rotz

Dr. Thao Thi Vu

Prof. Dr. Timo Ohnmacht

Lucerne University of Applied Sciences and Arts (HSLU)
Institute of Tourism and Mobility (ITM)

Business

July 31, 2026

FH Zentralschweiz



Agenda

- 1)** Rationale of the study
- 2)** Living lab research
- 3)** Intervention
- 4)** Data & Method
- 5)** Results
- 6)** Conclusion
- 7)** Recommendations (Future research / Policy)

Rationale of the study:

Teleworking, mobility and housing space demand in Switzerland

Telework: Work conducted outside the employers' office (home-office and work in third places, e.g. coworking spaces, cafés, on the move).

- **Teleworking: 1/3 of Swiss employees** telework at least occasionally: **+90% since 2014** (FSO, 2024).
- **Mobility:** Mean daily travel distance for work purposes per person increased from 6.5 km in 1994 to 8.6 km in 2015: **+37%** (BFS/ARE, 2017).
- **Housing space demand:** Increased from 30.0 m² in 1970 to 46.6 m² per person in 2024: **+55%** (FSO, 2025). Effects of telework on housing space demand (e.g., due to an additional home-office room) (Z'Rotz et al. 2026)

Coworking spaces (CWS) are shared workspaces.

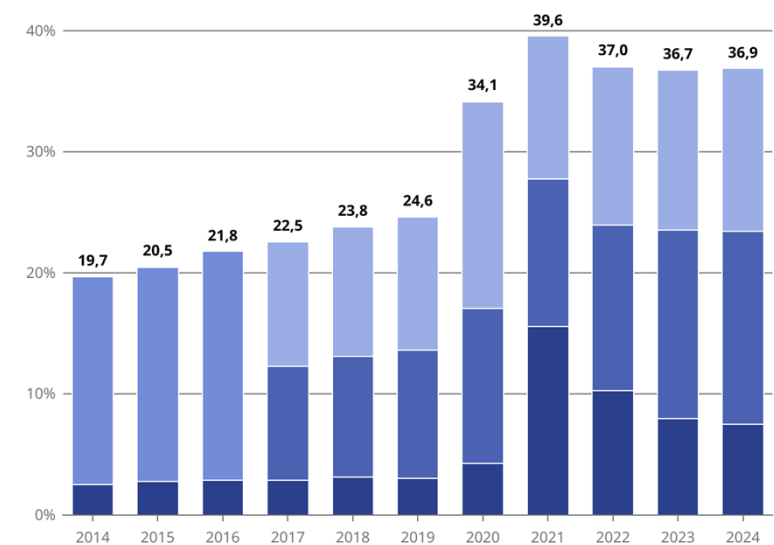
To what extent do residential CWS decrease

- motorised commuting distances and emissions
- housing space demand due to the externalisation of home-office infrastructure (separate rooms, work corners/places)?

Teleheimarbeit

Erwerbstätige (ohne Lehrlinge), in %

■ Normalerweise (>50% der Arbeitszeit) ■ Gelegentlich (oder regelmässig aber <50%)
■ Regelmässig aber < 50% der Arbeitszeit ■ Gelegentlich



In 2021, Zeitreihenbruch: Neuformulierung der Frage nach Arbeitsort und Hinzufügung eines Bezugszeitraums (letzten 4 Wochen)

Datenstand: 19.05.2025
Quelle: BFS – Schweizerische Arbeitskräfteerhebung (SAKE)

gr-d-16.04-30902a-ind
© BFS 2025

Living lab research

Living lab (LL): Real-world setting for testing transformative change based on interventions, co-designed between users, researchers and public/private actors (Voytenko et al., 2016)

LL Suurstoffi

- municipality of Risch-Rotkreuz
- 1'500 residents, 2'000 students, 2'500 employees
- well connected by public transport
- high share of motorised individual transport

Baseline survey (Balthasar et al., 2023) shows:

65% of inhabitants can telework - of these:

- 59% have a separate home-office room at home
- 6% already used a CWS



Intervention: Test a Coworking Space

- **SPACES:** CWS in Suurstoffi with flexible workspaces, meeting rooms, ergonomic furniture, lounge areas etc.
- **Recruitment of testers:** through a teleworker survey in the LL
- **Target group:** teleworkers with home office use ≥ 1 day/week, little/no coworking experience
- **Testers:** 13
- **Trial period:** three months free access to SPACES (February – April 2025)
- **Attendance check:** via registration at Check-in-Desk

Research Questions (RQ's):

- What are the overall experiences of the testers with the CWS?
- How does mobility behavior differ between CWS-days vs. non-CWS-days?
- Do residential coworking spaces (CWS) reduce residents' need for a dedicated home office room in their dwelling when considering a future relocation?



 **SPACES.**

ZugEstates

 **COWORKING
SWITZERLAND**



Data

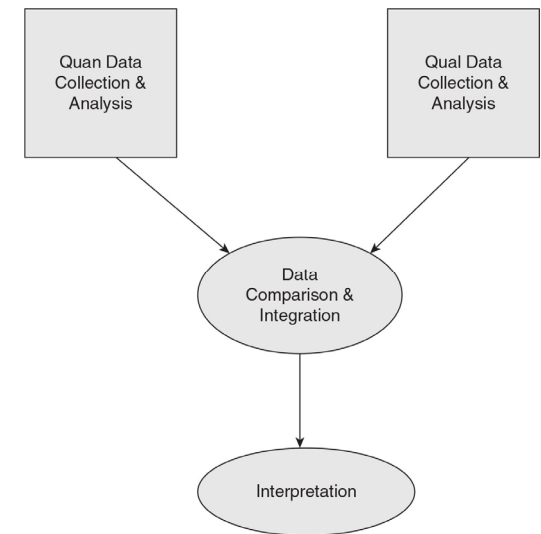


Source	n	Time
Teleworker survey in LL Suurstoffi	86	Nov 2024 - Jan 2025
Recruitment of testers at the end of the teleworker survey (Thus, includes information <u>before</u> the intervention of testers)	13	
Tester survey regarding information <u>during</u> the intervention	13	May 2025 - Jun 2025
3 month app-based GPS-mobility-tracking <u>during</u> the intervention	6	Feb 2025 - Apr 2025

Mixed Method Research Design (MMRD)

MMRD combines:

- **Broad**, structured data (quantitative): survey, tracking
- **Deep**, contextual data (qualitative): open-ended responses
- Goal: a complete understanding through **integration**



DeCuir-Gunby, J. T., & Schutz, P. A. (2016).

In this study:

- Quantitative data: descriptive, background
- Qualitative data: ten open-ended items → six thematic dimensions based on theory
 - *Thee for «hosting potential»*: Ease of accessing/using the CWS (Kaufmann, 2011, 2012a, 2012b)
 - *Thee for «affordances»*: What the space enables per user (Gibson 1979/2014; Norman 1988; Hadavi et al. 2015) → sixteen inductive sub-codes e.g. mentioning of opening hours, exchange, commute substitution etc.
- Quantitative data and open-ended responses were combined to validate each other

Comparison of sample characteristics

Variables	Categories	Swiss working population	LL Teleworkers (n=86)	Testers (n=13)
Age	Years (mean)	42.5	40.4	41.8
Gender	Male	54 %	55 %	84 % (11/13)
	Female	46 %	43 %	8 % (1/13)
	Not stated	–	2 %	8 % (1/13)
Household	Single-person	37 %	19 %	8 % (1/13)
	Couple, no children	27 %	25 %	15 % (2/13)
	Family with children	29 %	50 %	77 % (10/13)
	Other household types	7 %	6 %	0 % (0/13)

Testers of the intervention are more or less the same age as the Swiss working population and the LL Teleworkers, predominantly male and predominantly from family households.

LL Teleworkers (n=86)

Indicator	Category	LL Teleworkers (n=86)
Work pattern	Work outside the home often or always	79%
Mobility	Mean one-way commute distance	32.7 km
	Main transport mode	PT 43% / Car 37% / Active 18% / Other 2%
	Mean commuting CO ₂	9.8 kg/week
	Telework savings potential vs. no-telework baseline (mean)	5.2 kg/week
Housing	Mean living area	100.3 m ²
	Mean home-office room size	14.1 m ²
CWS	Interest in working in a CWS (1 = fully disagree; 5 = fully agree)	3.1

Indicator	Home-office room (n=45)	No home-office room (n=34)	t-test
Mean commute distance, km	34.1	31.5	t = 0.20, p = 0.841
Mean CO ₂ /week, kg	5.6	7.0	t = -0.52, p = 0.608
Mean living area, m ²	110.4	89.0	t = 2.81, p = 0.007

Teleworker with a home-office room use more living area.

Experiences of testers based on qualitative quotes in the survey (n=13)

Days worked in SPACES (total)	Min.	Max.	Mean	Mean / month
	1	8	4.0	1.3
The CWS ...	Exemplary Statements			
... is welcoming.	<i>"Very easy and friendly access." (P02, translated)</i>			
... offers variety and flexibility.	<i>"Different seating styles throughout, easy to change the environment you're working in." (P11)</i>			
... provides a modern, professional atmosphere.	<i>"Modern office, variety." (P01, translated)</i>			
... creates a pleasant working environment.	<i>"The aura of the place is just amazing." (P09)</i>			

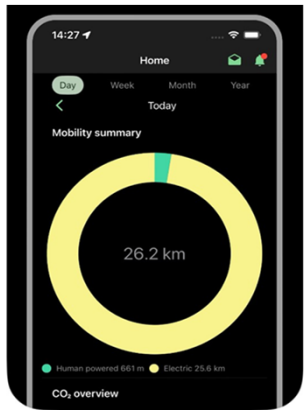
Mobility: Workplace use in a typical workweek (Survey)

Workplace / attendance time per week (mean)	LL Teleworkers (n=86)	Testers before (n=13)	Testers during Intervention (n=13)	Δ (mean)
Regular Office	2.2	1.3	1.2	- 0.1
Home-office	1.9	2.8	2.5	- 0.3
On the move	0.6	0.9	0.8	- 0.1
CWS	0.1	0	1.6	+ 1.6

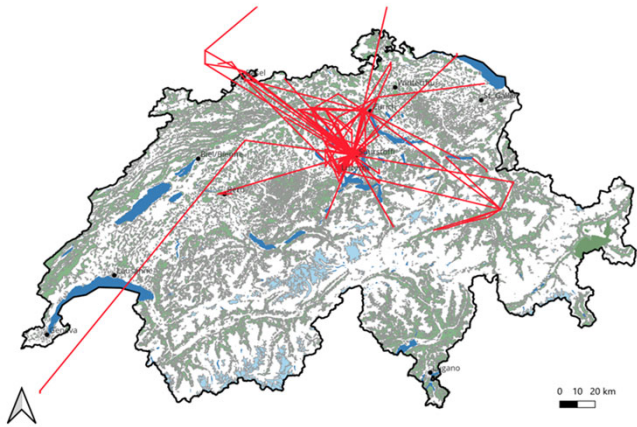
Indicator	LL Teleworkers (n=86)	Testers before (n=13)	Testers during Intervention (n=13)	Δ (%)
Commuting distances (km/week)	163	144	87	- 39%
Commuting CO ₂ (kg/week)	6.4	1.0	0.8	- 17%

Mobility: Total travel distance and CO₂ (n=6) (Tracking)

	Non-CWS days				CWS days				Total
n days	155				11				166
n trips	845				43				888
	Mean	SD	Min.	Max.	Mean	SD	Min.	Max.	Δ (mean diff.)
Total travel distance (km/day)	77.2	86.5	0.3	594.0	41.6	80.5	0.3	268.0	-35.6
Total travel CO ₂ (kg/day)	6.0	11.7	0.0	86.0	2.6	5.5	0.0	18.5	-3.4



HSLU July 31, 2026



Housing space: Future need for an own home-office room

Agreement with the statement "**With a residential CWS available...**".

(1 = fully disagree; 5 = fully agree)

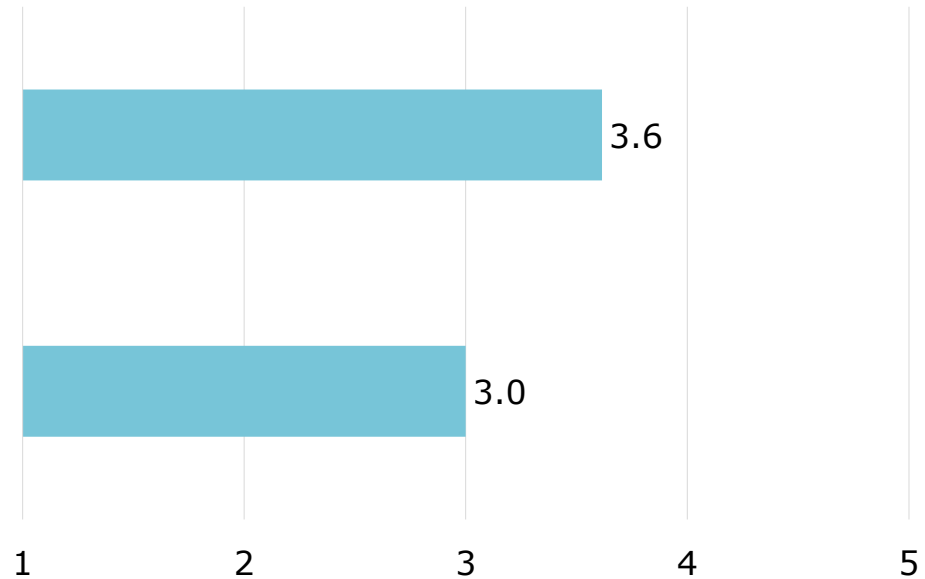


... I would no longer need to work from home. (n=13)

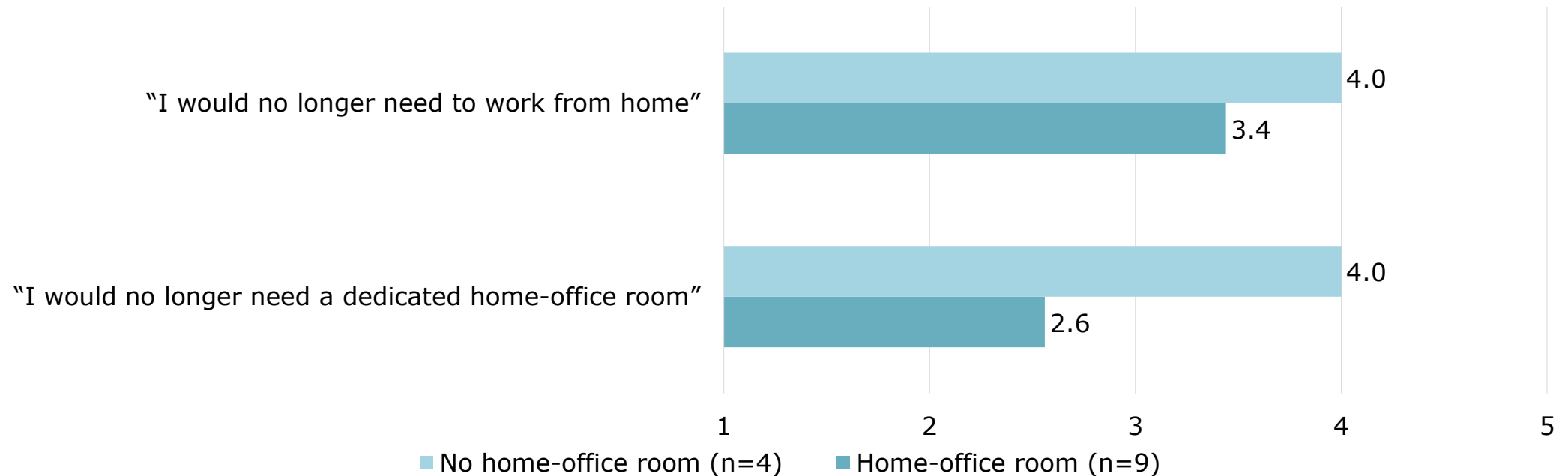
3.6

... I would in the future no longer need an own home-office room in my apartment. (n=13)

3.0



Housing space: by home-office room availability



(1 = fully disagree; 5 = fully agree)

Overall neutral mean for **"I would no longer need a dedicated home-office room"** (3.0, n=13), but: testers with a room tend to disagree about giving it up (2.6).

Housing space: Future need for an own home-office room (n=13)

Rating	The CWS ...	Statement(s)
Positive	... enables concentrated work outside the home.	<i>"It structures my working day better than working exclusively from home." (P04, translated)</i> <i>"Possibility to work in a focused and undisturbed way." (P04, translated)</i>
	... creates spatial separation between work and private life.	<i>"Knowing that a coworking spot is available eases the situation between home office and private life." (P08, translated)</i> <i>"Better separation, especially in the evening." (P13, translated)</i>
	... allows to have meetings outside the home.	<i>"Particularly positive: separate, closed rooms for meetings." (P13, translated)</i>
Negative	... lacks infrastructure for certain work tasks.	<i>"Sometimes I need a big monitor or have long calls and then I stay home." (P06)</i>
	... has restricted opening hours that limit flexible use.	<i>"The opening hours don't always match my working schedule." (P04, translated)</i>

Integration: Profiles

Profile	Commuting distance (one-way, mean)	Home-office / times per week		No working from home (mean)	No own home-office room (mean)	Statement
		before the intervention (mean)	after the intervention (mean)			
Mostly externalisation (n=4) - CWS replaces home-office room - Walk replaces a motorised commute - More strict work-home separation	27.8 km	2.5	1.8	4.0	3.8	"I swapped Spaces one-to-one for my home workspace [...]. (P10, translated)
Conditional use (n=7) - CWS used for tasks compatible with available infrastructure - Home-office room used for other work	17.3 km	3.4	3.3	3.6	2.7	"My home office is better set up and quieter, making it easier to concentrate on work." (P07, translated)
Symbolic availability (n=2) - CWS not used regularly - The added value lies in knowing that there is an alternative for special occasions	30.0 km	1.0	1.0	3.0	2.5	"Knowing that a coworking spot is available eases the situation between home office and private life." (P08, translated)

Conclusions

A LL intervention of this kind provides an opportunity to **explore** the mechanisms through which residential CWS may influence mobility behaviour and perceptions of individual housing space requirements.

Key findings in light of the RQs:

- 1. User experience:** Residential **CWS are** perceived as adequate and **highly valued** third places for work. **But:** actual utilisation during the trial period remained moderate, with an average usage frequency of 1.3 visits per month.
- 2. Mobility:** Mobility-related **CO₂ emissions** across all trip purposes were **lower** on **CWS days** than on non-CWS days, indicating potential net reductions in transport-related emissions associated with CWS use. **But:** drivers differ between testers.
- 3. Perception of housing space demand:** Participants expressed **no clear preference** regarding the reduction of a dedicated home office room (less m²) when considering a future residential relocation in scenarios where residential CWS are available. **But:** testers without a dedicated room will be more likely to be able to do without a home office in the future if a CWS is available, suggesting that access to CWS may influence decision making processes for housing space (i.e. choices for # rooms).

Recommendations

Future Research & Policy Debates:

- Why low use when highly appreciated? How and why does the home-office room hinder the rise of CWS?
- How can the provision of residential CWS in housing areas be used to promote smaller size dwellings?



Thank you!

Lucerne School of Business
Institute of Tourism and Mobility ITM
Noah Balthasar
Research Associate

Phone direct +41 41 228 42 99
noah.balthasar@hslu.ch

Literature (1)

Balthasar, N., Z'Rotz, J., Ohnmacht, T. et al. (2023). Die «Suurstoffi» als Reallabor. Ergebnisbericht. Hochschule Luzern – Wirtschaft, Luzern.

Bundesamt für Statistik (BFS). (2025). *Teleheimarbeit*. Swiss Federal Statistical Office. <https://www.bfs.admin.ch/bfs/de/home/statistiken/kultur-medien-informationsgesellschaft-sport/informationsgesellschaft/gesamtindikatoren/volkswirtschaft/teleheimarbeit.html>

Bundesamt für Statistik (BFS) & Bundesamt für Raumentwicklung (ARE). (2023). *Mobilitätsverhalten der Bevölkerung: Ergebnisse des Mikrozensus Mobilität und Verkehr 2021* (BFS-Nummer: 840-2100). Swiss Federal Statistical Office. <https://www.bfs.admin.ch/asset/de/24165261>

DeCuir-Gunby, J. T., & Schutz, P. A. (2016). Developing a mixed methods proposal: A practical guide for beginning researchers. Sage Publications.

Federal Statistical Office (FSO). (2024). *Working conditions — Place of work and teleworking*. Swiss Federal Statistical Office. <https://www.bfs.admin.ch/bfs/en/home/statistics/work-income/employment-working-hours/working-conditions/place-work.html>

Federal Statistical Office (FSO). (2022). *Swiss Labour Force Survey (SAKE) 2022*. Swiss Federal Statistical Office. <https://www.bfs.admin.ch/bfs/de/home/statistiken/arbeits-erwerb/erhebungen/sake.html>

Federal Statistical Office (FSO). (2025). *Housing in Switzerland — Floor space per occupant*. Swiss Federal Statistical Office. <https://www.bfs.admin.ch/bfs/en/home/statistics/cross-sectional-topics/housing-switzerland.html>

Voytenko, Y., McCormick, K., Evans, J., & Schliwa, G. (2016). Urban living labs for sustainability and low carbon cities in Europe: Towards a research agenda. *Journal of Cleaner Production*, 123, 45–54. <https://doi.org/10.1016/j.jclepro.2015.08.053>

Z'Rotz, J., Wanzenried, G., & Amstutz, S. (2026). Exploring the relationship between telework and housing space: Empirical evidence for Switzerland. *Urban Transitions*, 6, 100042. <https://doi.org/10.1016/j.ubtr.2026.100042>

Literature (2)

Kaufmann, V. (2011). *Rethinking the city: Urban dynamics and motility*. EPFL Press.

Kaufmann, V. (2012a). A territory's hosting potential. *Mobile Lives Forum*. <https://en.forumviesmobiles.org/marks/territorys-hosting-potential-1103>

Kaufmann, V. (2012b). *Re-thinking the city*. Routledge. <https://doi.org/10.4324/9781315782768>

Kaufmann, V., Bergman, M. M., & Joye, D. (2004). Motility: Mobility as capital. *International Journal of Urban and Regional Research*, 28(4), 745–756. <https://doi.org/10.1111/j.0309-1317.2004.00549.x>

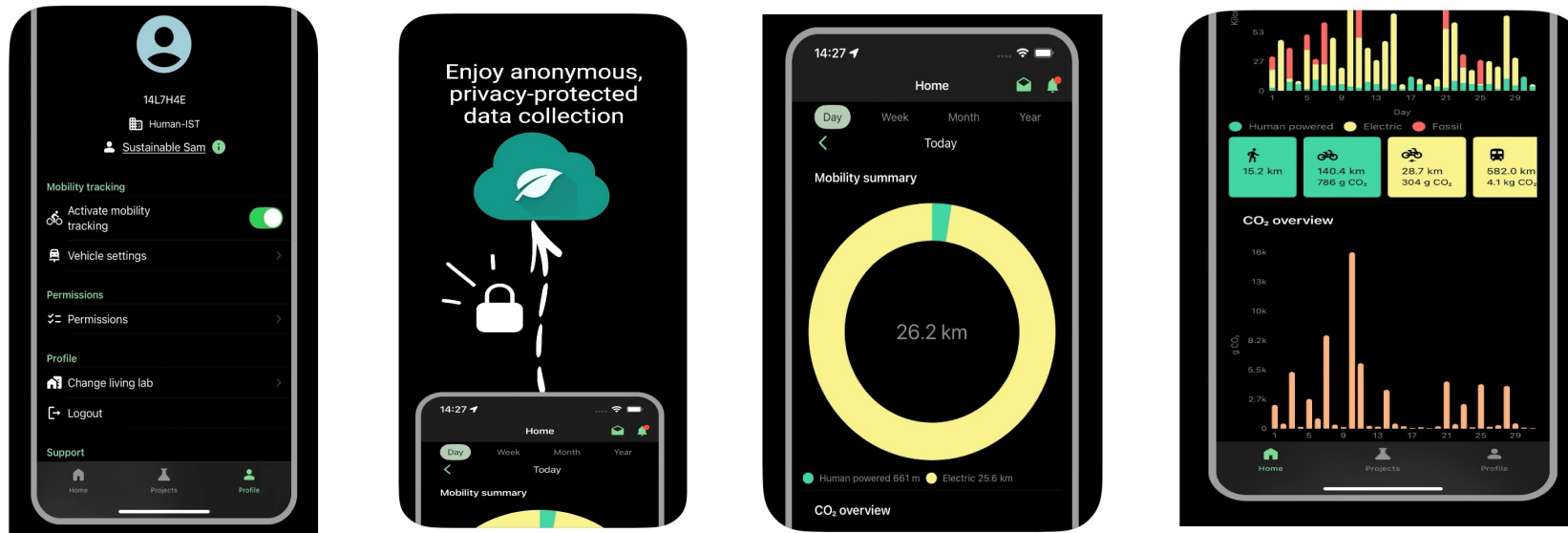
Gibson, J. J. (2014). *The ecological approach to visual perception: Classic edition*. Psychology Press. (Original work published 1979)

Norman, D. A. (1988). *The psychology of everyday things*. Basic Books.

Hadavi, S., Kaplan, R., & Hunter, M. C. (2015). Environmental affordances: A practical approach for design of nearby outdoor settings in urban residential areas. *Landscape and Urban Planning*, 134, 19–32. <https://doi.org/10.1016/j.landurbplan.2014.10.001>

Tool for tracking: 6 participants

100 CHF Migros gift card for participation.



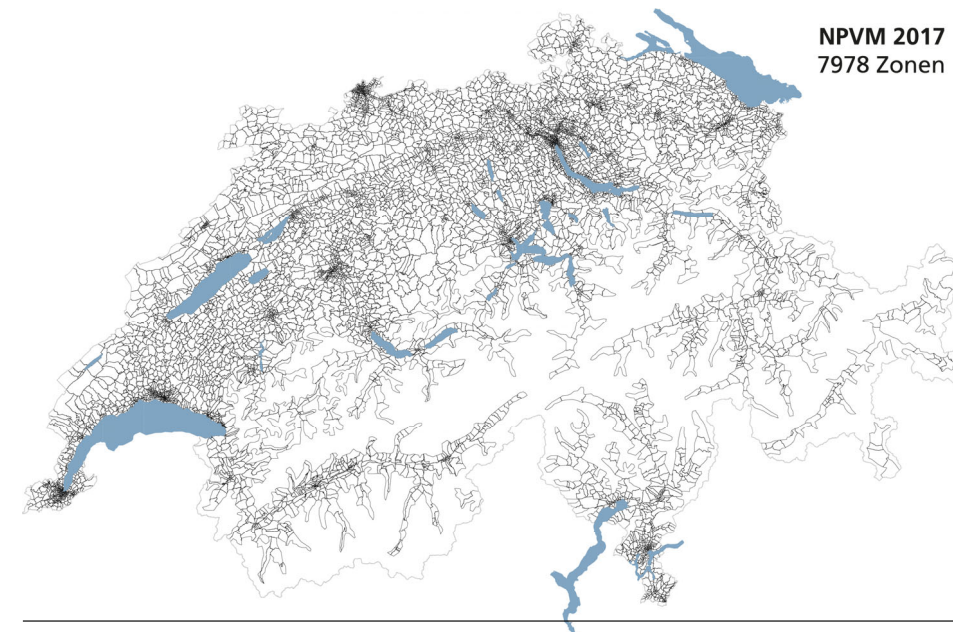
- **Resolution:** 1.2 km x 1.2 km square
- A trip was defined as a continuously recognised movement longer than **250 m**
- Movements below this threshold were not registered as trips
- Trips can be aggregated on day

CO₂ of participants (n=6)

Participant	Commuting distance (km)	n days (total)	CWS days (total)	CWS days (mean CO ₂ -eq. kg)	Non-CWS days (mean CO ₂ -eq. kg)	Result
P1	20.4	58	3	0.2	5.7	Reduction
P2	77	77	3	6.6	5.8	Addition
P3	0.2	9	1	2.0	2.1	Reduction
P4	0.2	6	1	0.0	32.4	Reduction
P5	99.5	4	2	3.4	1.7	Addition
P6	5.5	12	1	0.0	0.7	Reduction
Total		166	1.8 (mean)	2.6	6.0	Reduction

Calculating CO₂ emissions from commuting

- Study participants report on **number of workdays per week**, **workplace ZIP code**, and **mode of transportation (MoT)** for their commute
- **Matching of** residence and **workplace via ZIP codes** with the federal transportation model's traffic zones
- **Inclusion of commuting distance** in the survey
- Combination of distances per MoT and commuting with **CO₂ equivalence factors based on mobitool factors (Swiss standard)**



MoT	CO ₂ -Fractors [gram CO ₂ -eq.]
Passenger cars, diesel, gasoline (fleet average)	186.4
Passenger cars, battery electric (fleet average)	89.8
Trains, regional rail, commuter rail	8.2
By bicycle	5.6
On foot	0