

# COVID-19 as real-life experiment in transport. Lessons for the mobility transition?

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# Outline

- Introduction: coupling as a chance
- Emission reductions by pandemic and lockdown
- Air Transport
- Mobility, transport, traffic in lockdown and beyond
-

# Introduction

# Projects, Data, Sources


## Mobicor – Mobilität in Zeiten der Corona-Pandemie: Wie ändert sich das Verhalten der Menschen im Verkehr?

Partner:

- WZB
- INFAS
- Motiontag
- TU Berlin

Gefördert durch das Bundesministerium für Bildung und Forschung (BMBF)

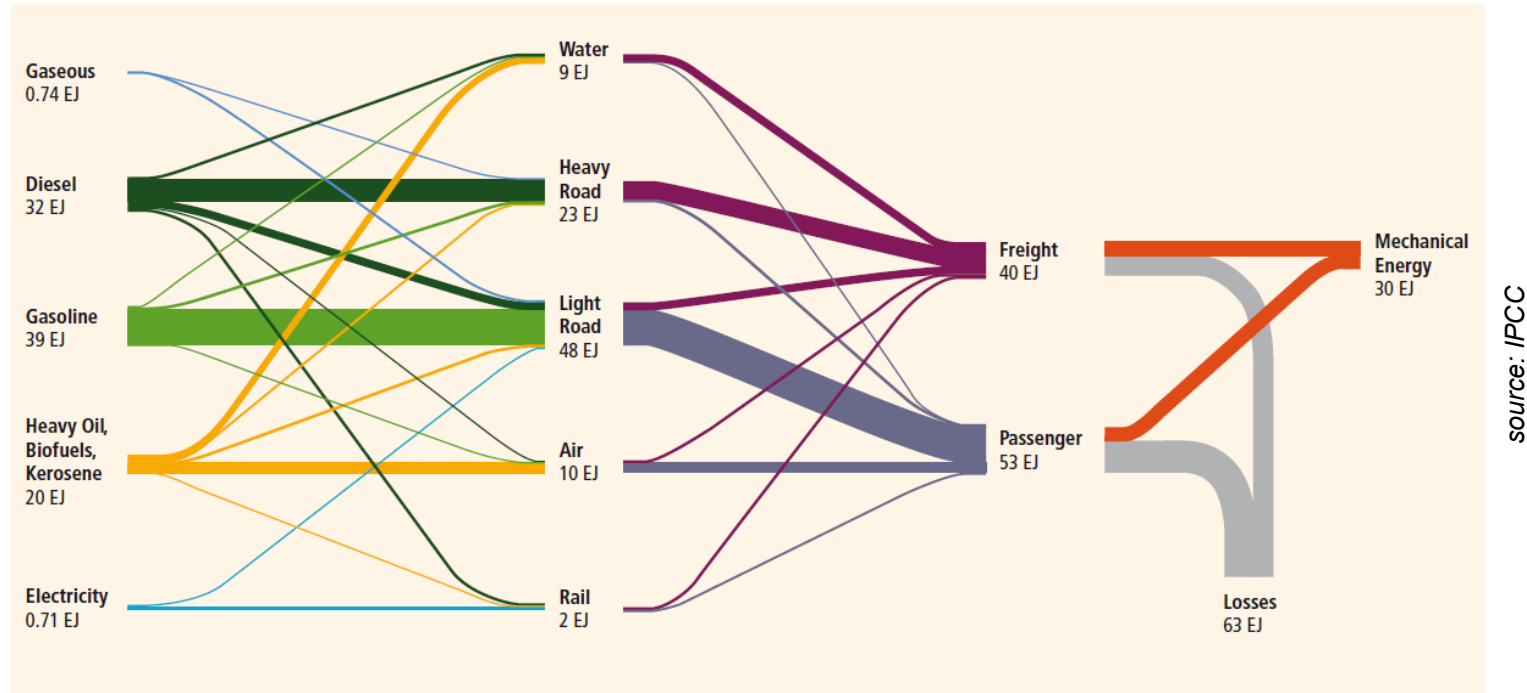
*Swiss*

- **MOBIS-COVID-19**, Partner: IVT ETH Zürich, Statistisches Bundesamt Schweiz 
- 
- Intervista (für BA Statistik): Verkehrsmittelnutzung und Mobilitätszweck während Lockdown-Phase
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*Other*

- Eurocontrol
- Google
- Kastle system

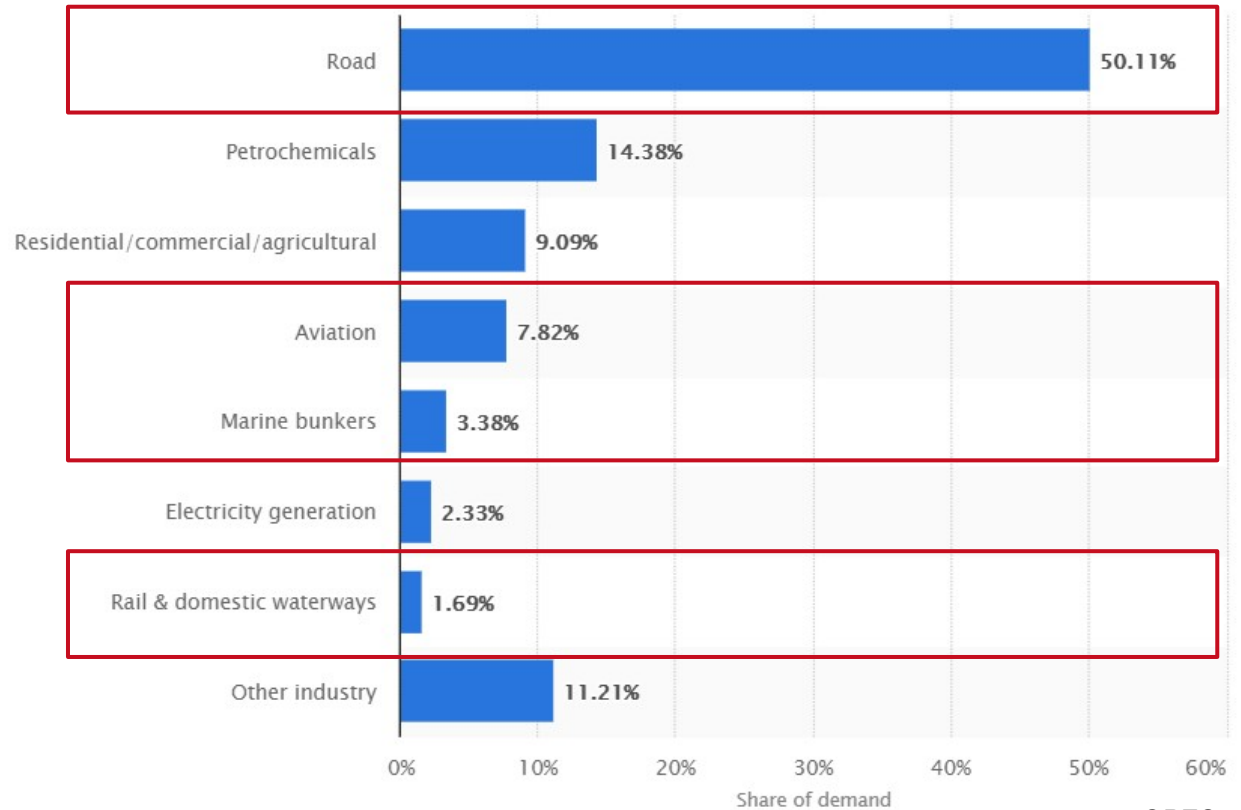
# Mobility needs mobile energy



**Figure 8.5** | Final energy consumption of fuels by transport sub-sectors in 2009 for freight and passengers, with heat losses at around two thirds of total fuel energy giving an average conversion efficiency of fuel to kinetic energy of around 32 %. Note: Width of lines depicts total energy flows. (IEA, 2012d).

## Oil goes to transport

## Distribution of oil demand in the OECD in 2017 by sector\*



source: OPEC

# De-Coupling ?

- Last year two major studies on decoupling came out
  - Hickel, Jason; Kallis, Giorgos (2020): Is Green Growth Possible? In: New Political Economy 25 (4), S. 469–486. DOI: 10.1080/13563467.2019.1598964.
  - Wiedenhofer, Dominik; Virág, Doris; Kalt, Gerald; Plank, Barbara; Streeck, Jan; Pichler, Melanie et al. (2020): A systematic review of the evidence on decoupling of GDP, resource use and GHG emissions, part I: bibliometric and conceptual mapping. In: Environmental Research Letters 15 (6), S. 63002. DOI: 10.1088/1748-9326/ab8429.  
Haberl, Helmut; Wiedenhofer, Dominik; Virág, Doris; Kalt, Gerald; Plank, Barbara; Brockway, Paul et al. (2020): A systematic review of the evidence on decoupling of GDP, resource use and GHG emissions, part II: synthesizing the insights. In: Environmental Research Letters 15 (6), S. 65003. DOI: 10.1088/1748-9326/ab842a.
- Both show: **no (absolute) decoupling happening**
- Is this also a chance?.

# De-Coupling ?

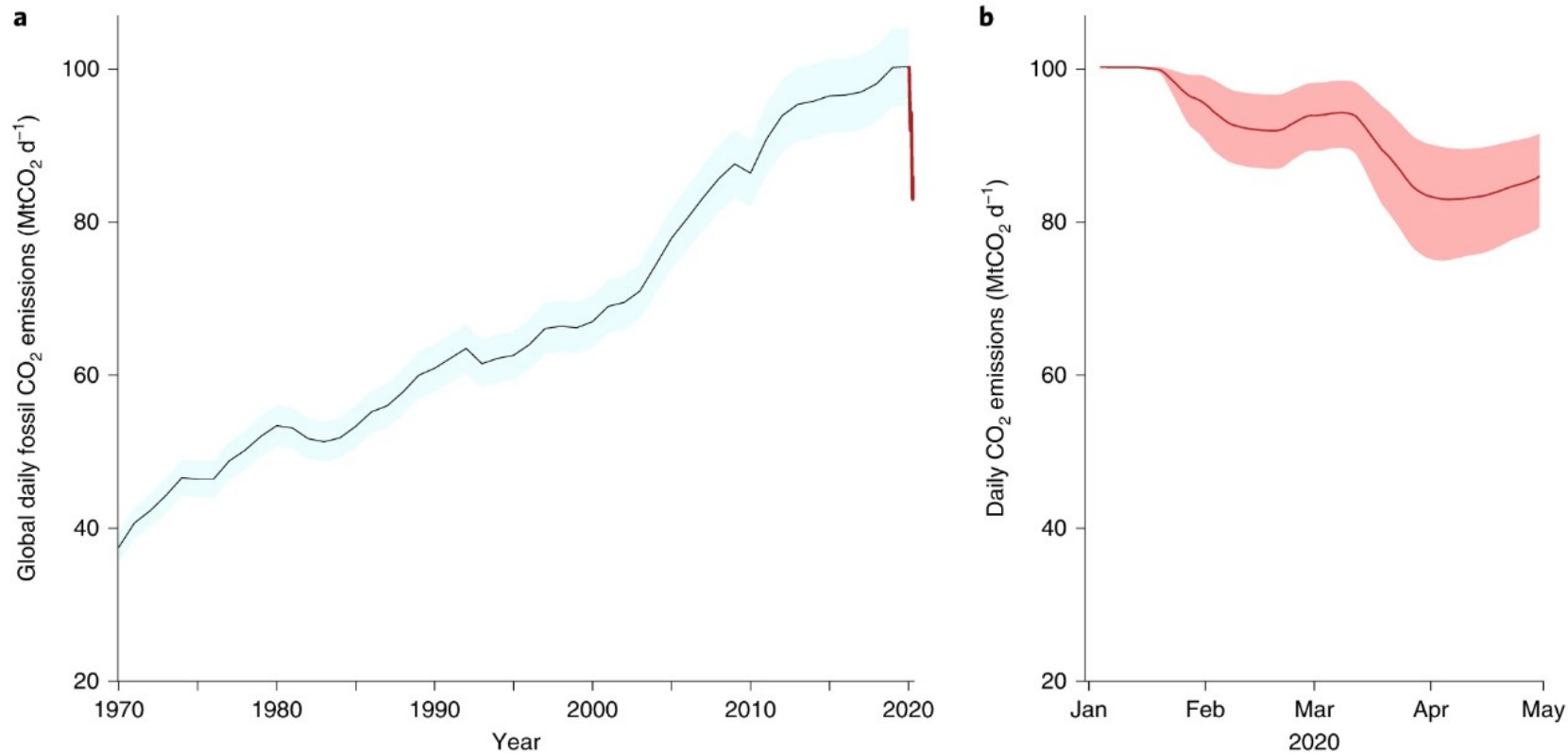
- „we find that: (1) there is **no empirical evidence that absolute decoupling from resource use can be achieved on a global scale** against a background of continued economic growth, and (2) absolute decoupling from carbon emissions is highly **unlikely to be achieved at a rate rapid enough to prevent global warming** over 1.5°C or 2°C, even under optimistic policy conditions.“  
(Hickel, Jason; Kallis, Giorgos (2020): Is Green Growth Possible? In: New Political Economy 25 (4), S. 469–486. DOI: 10.1080/13563467.2019.1598964.
- „We conclude that large rapid absolute reductions of resource use and GHG emissions **cannot be achieved through observed decoupling rates**,...“,  
Wiedenhofer, Dominik; Virág, Doris; Kalt, Gerald; Plank, Barbara; Streeck, Jan; Pichler, Melanie et al. (2020): A systematic review of the evidence on decoupling of GDP, resource use and GHG emissions, part I: bibliometric and conceptual mapping. In: Environmental Research Letters 15 (6), S. 63002. DOI: 10.1088/1748-9326/ab8429.  
And: Haberl, Helmut; Wiedenhofer, Dominik; Virág, Doris; Kalt, Gerald; Plank, Barbara; Brockway, Paul et al. (2020): A systematic review of the evidence on decoupling of GDP, resource use and GHG emissions, part II: synthesizing the insights. In: Environmental Research Letters 15 (6), S. 65003. DOI: 10.1088/1748-9326/ab842a.
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# De-Coupling ?

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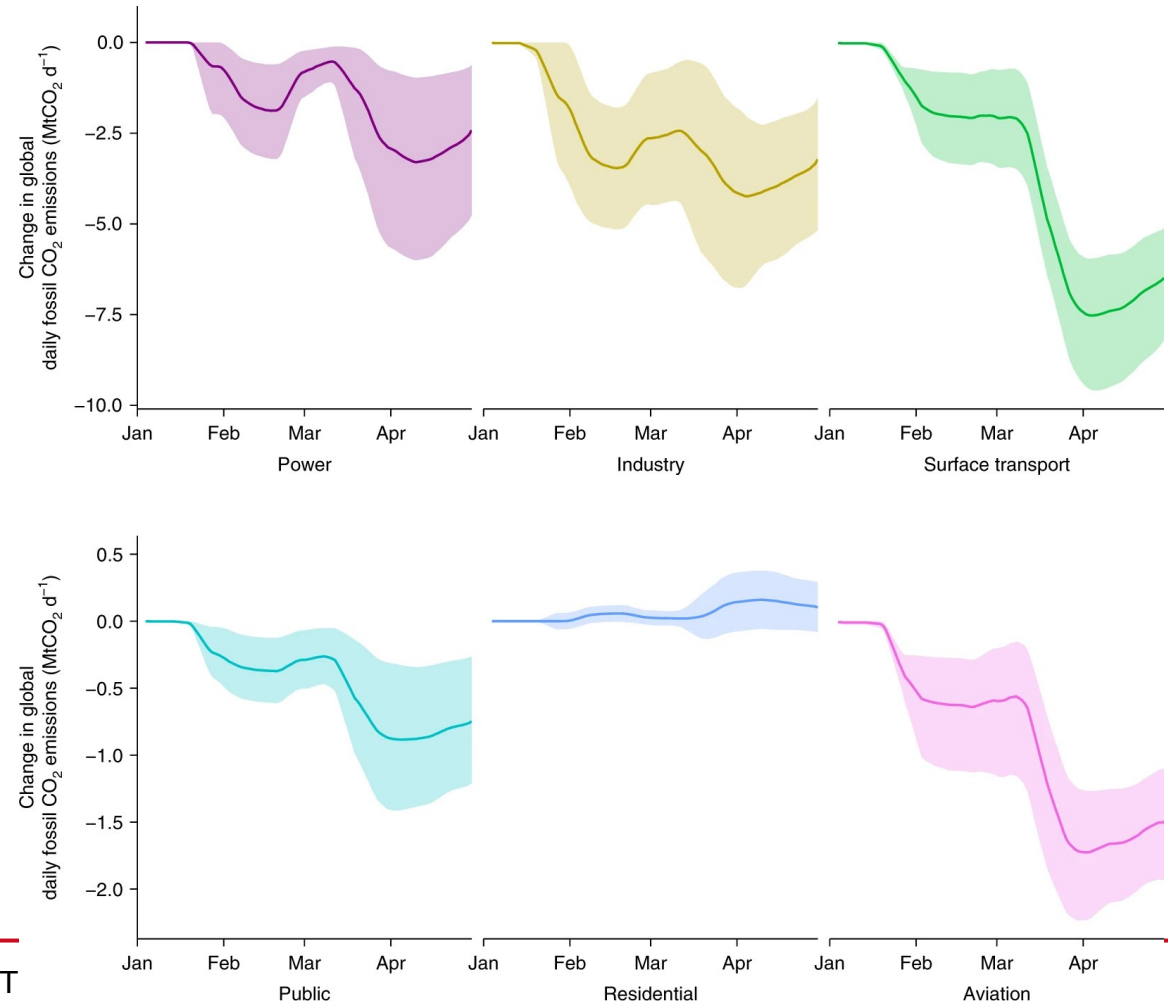
# Emmissions



**a**, Annual mean daily emissions in the period 1970–2019 (black line), updated from the Global Carbon Project<sup>1,3</sup> (Methods), with uncertainty of  $\pm 5\%$  ( $\pm 1\sigma$ ; grey shading). The red line shows the daily emissions up to end of April 2020 estimated here.

**b**, Daily CO<sub>2</sub> emissions in 2020 (red line, as in **a**) based on the CI and corresponding change in activity for each CI level (Fig. 2) and the uncertainty (red shading; Table 2). Daily emissions in 2020 are smoothed with a 7-d box filter to account for the transition between confinement levels.

# Emmissions by sector



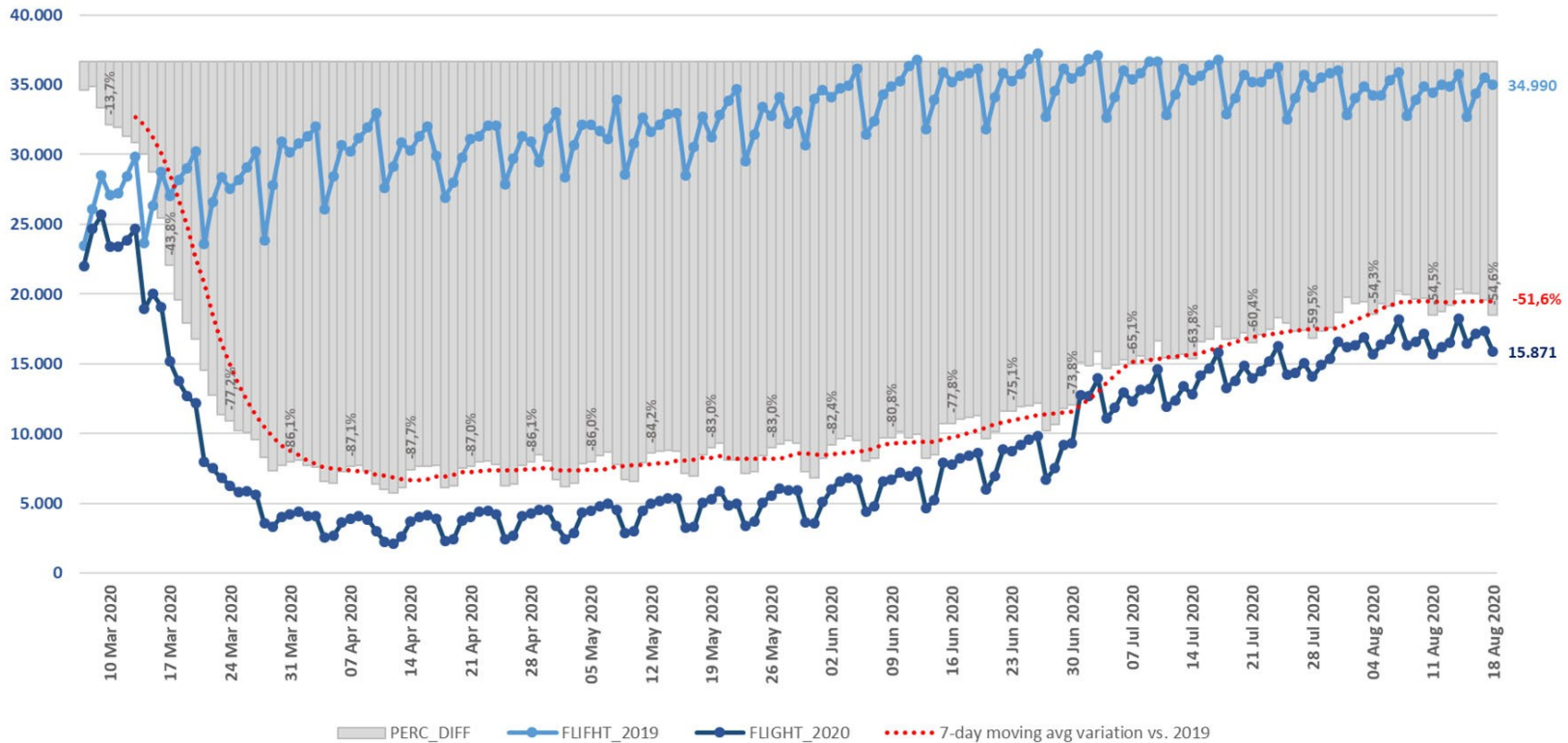
## Emission reductions January - April

- January- April
- total change in emissions: **-8.6%** or  $-1,048$  ( $-543$  to  $-1,638$ ) MtCO<sub>2</sub>,
- power sector: **-7.4%** or  $-3.3$  ( $-1.0$  to  $-6.8$ ) MtCO<sub>2</sub> d<sup>-1</sup>
- industry sector: **-19%** or  $-4.3$  ( $-2.3$  to  $-6.0$ ) MtCO<sub>2</sub> d<sup>-1</sup>
- public sector: **-21%** or  $-0.9$  ( $-0.3$  to  $-1.4$ ) MtCO<sub>2</sub> d<sup>-1</sup>
- surface transport: **-36%** or  $-7.5$  ( $-5.9$  to  $-9.6$ ) MtCO<sub>2</sub> d<sup>-1</sup>
- aviation sector: **-60%** or  $-1.7$  ( $-1.3$  to  $-2.2$ ) MtCO<sub>2</sub> d<sup>-1</sup>

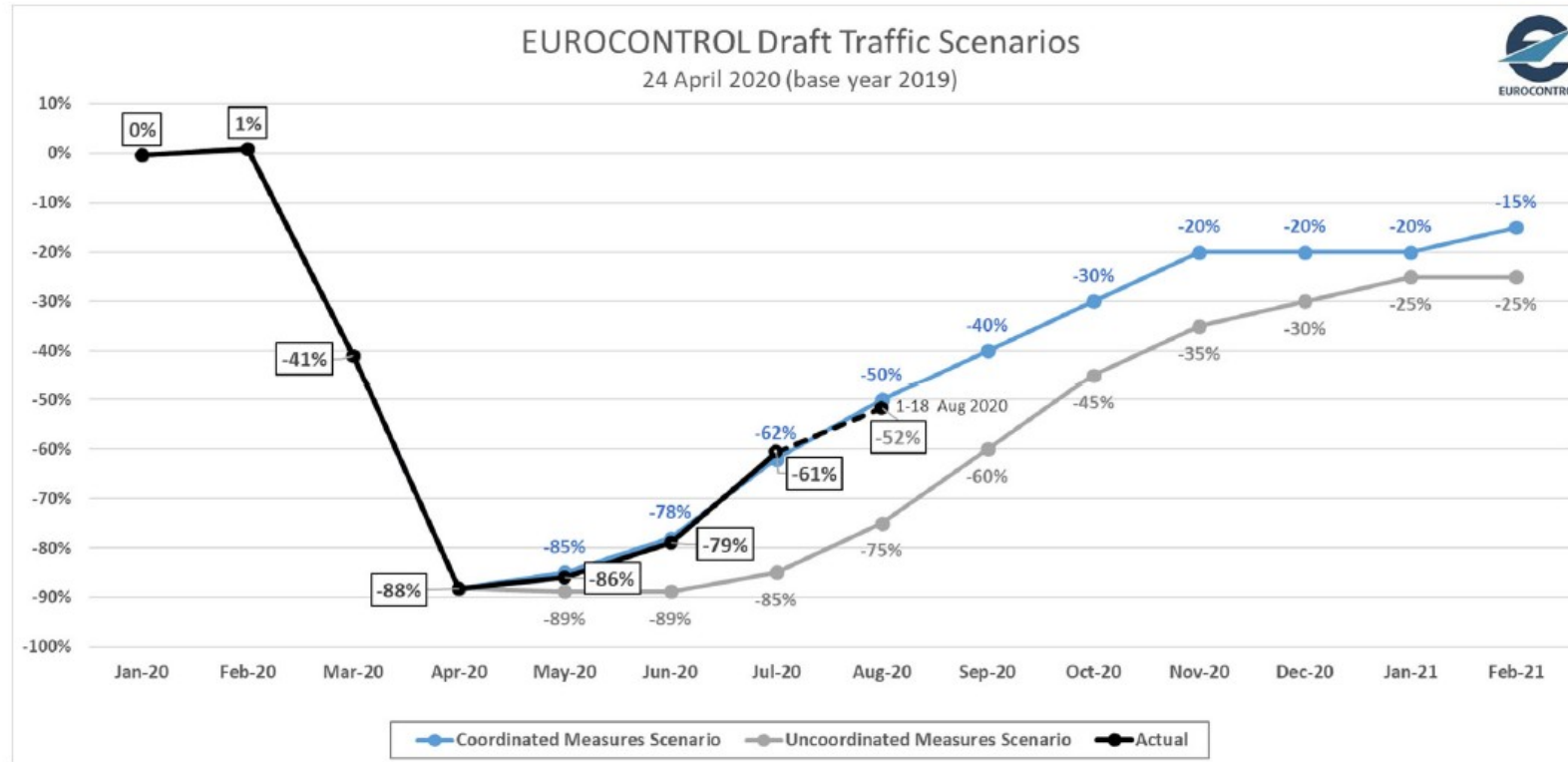
# Air Transport

# Air Traffic Europe

EUROCONTROL Network  
Daily Variation (Flights) compared with equivalent days in 2019



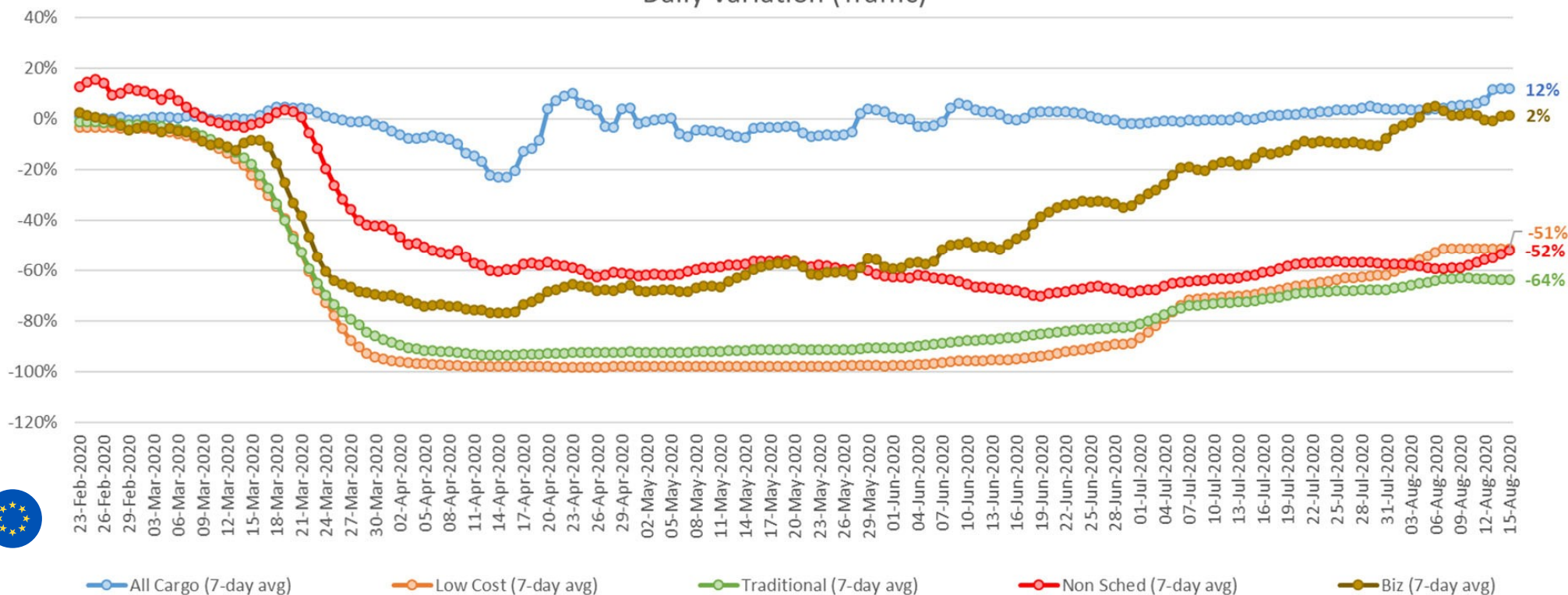
# Air Traffic: Scenarios





# Market segments

Market segments in EUROCONTROL Network  
(compared with equivalent days in 2019)  
Daily Variation (Traffic)



- Winners: Business Aviation (+2%) und All-Cargo
- Low-cost recorded a faster recovery (-51% vs 2019) than the other two segments (Traditional: -64% and Charter: -52%)

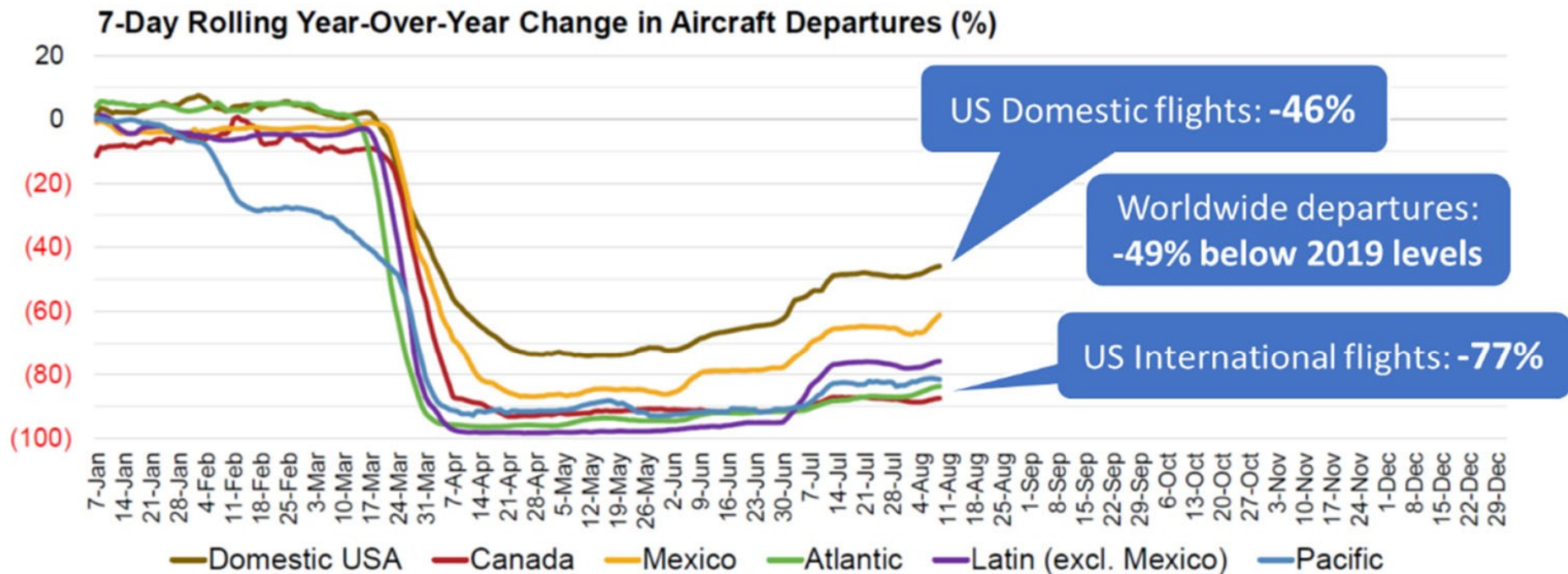


## National/international decreases

REGION	04-08-2020	18-08-2020	%	vs. 2019
Intra-Europe	13.724	13.641	-1%	-49%
Europe<->Asia/Pacific	241	266	+10%	-67%
Europe<->Mid-Atlantic	50	51	+2%	-69%
Europe<->Middle-East	319	372	+17%	-79%
Europe<->North Atlantic	382	374	-2%	-73%
Europe<->North-Africa	248	289	+17%	-76%
Europe<->Other Europe	231	341	+48%	-73%
Europe<->South-Atlantic	37	40	+8%	-80%
Europe<->Southern Africa	136	155	+14%	-49%



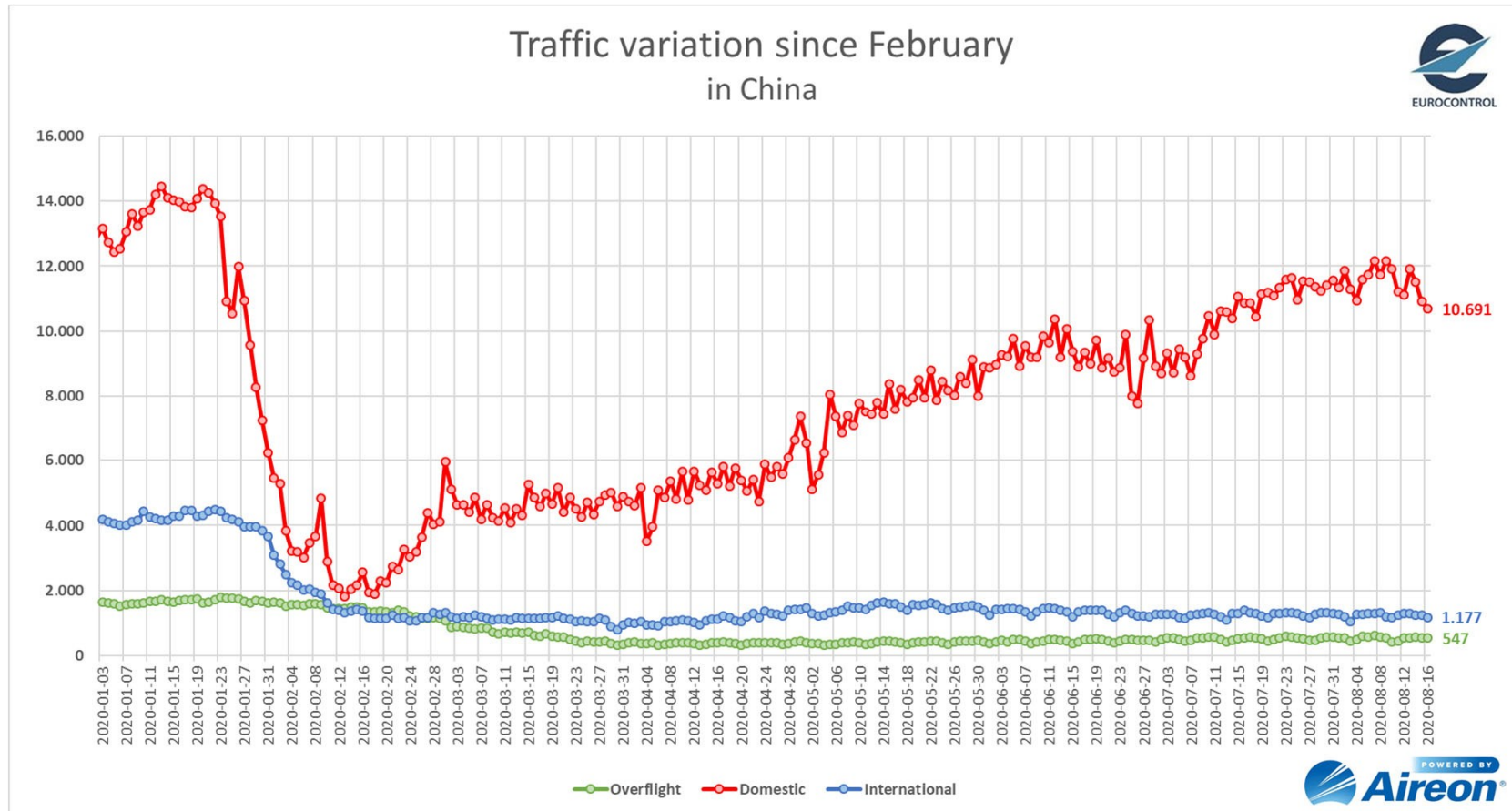
# Situation US



Source: A4A member passenger airlines as reported to A4A on a consolidated company basis (including branded code share partners)



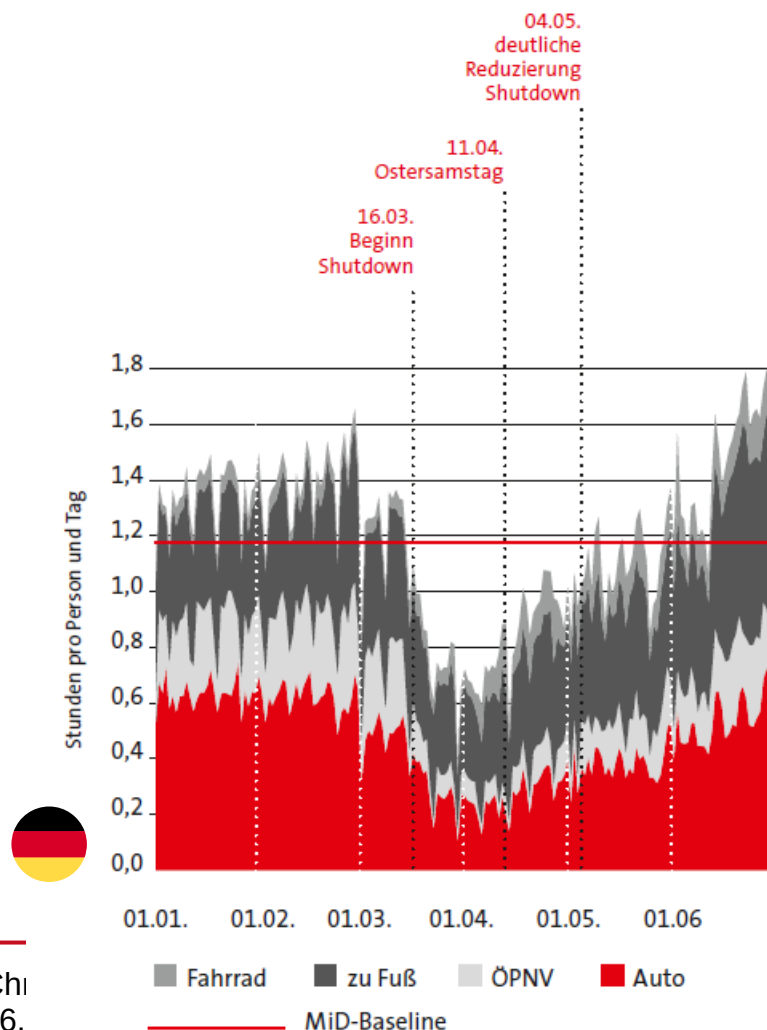
# Situation China



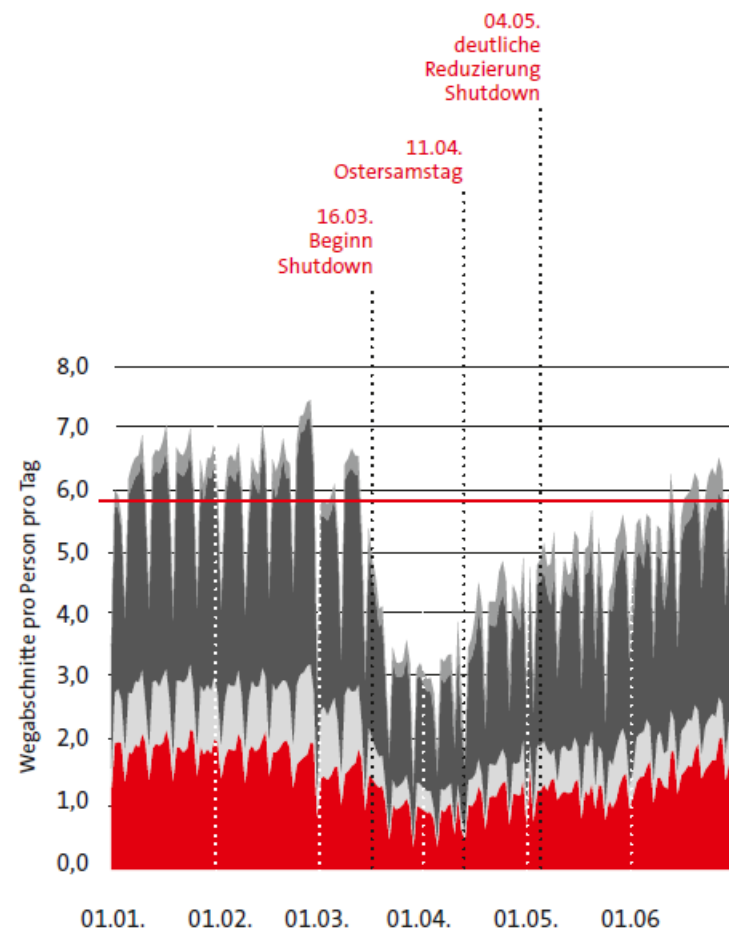
# Mobility, transport, traffic in lockdown and beyond

# Mobility reduction in lockdown and pandemic

Unterwegszeit pro Tag und Person  
Angaben in Stunden



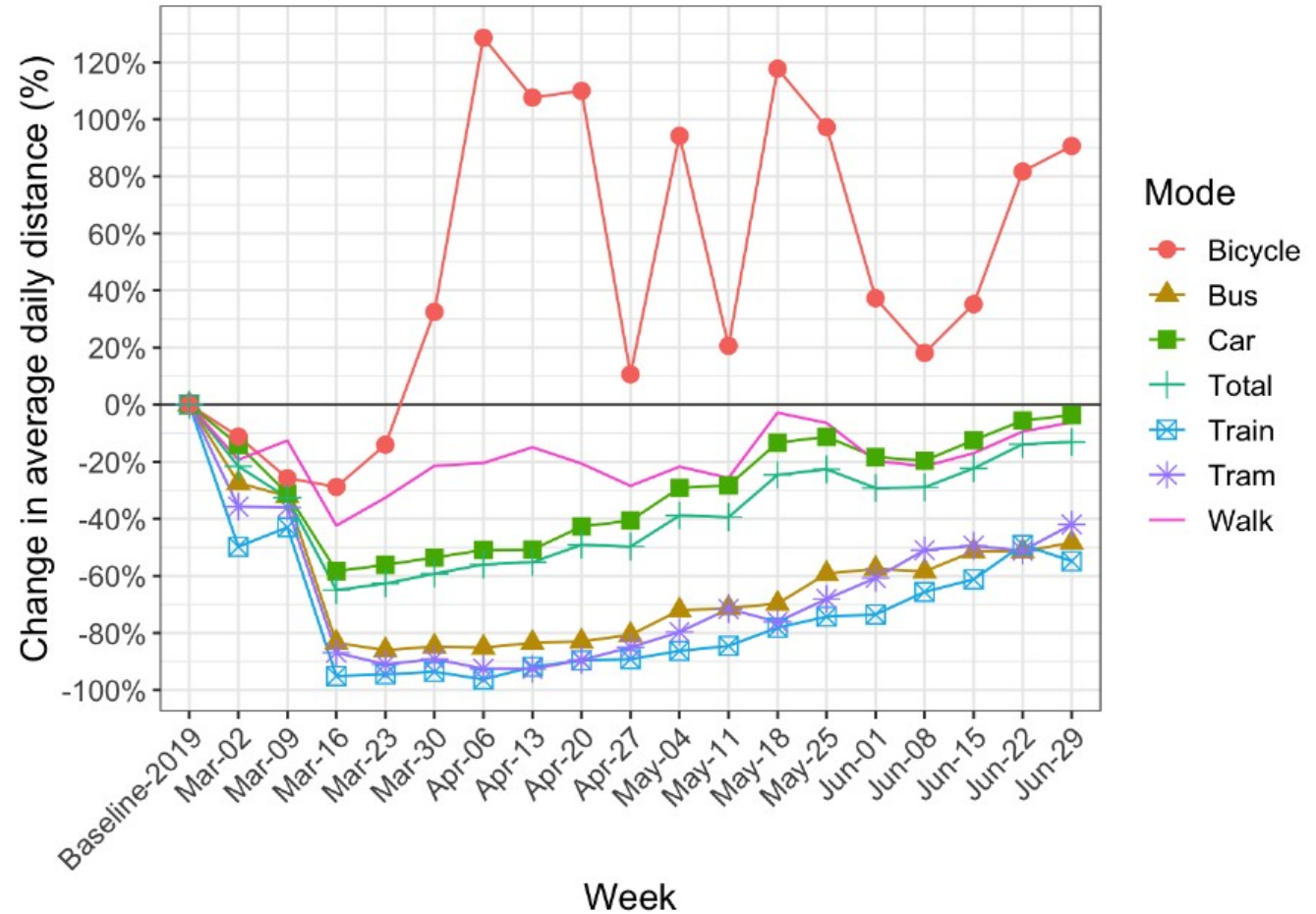
Wegeabschnitte pro Tag und Person  
Angaben in Mittelwerten



Fußabschnitte auf Wegen einzeln ausgewiesen, etwa der Fußweg zur Haltestelle  
Tracking-Ergebnisse Eigenstudie MOTIONTAG

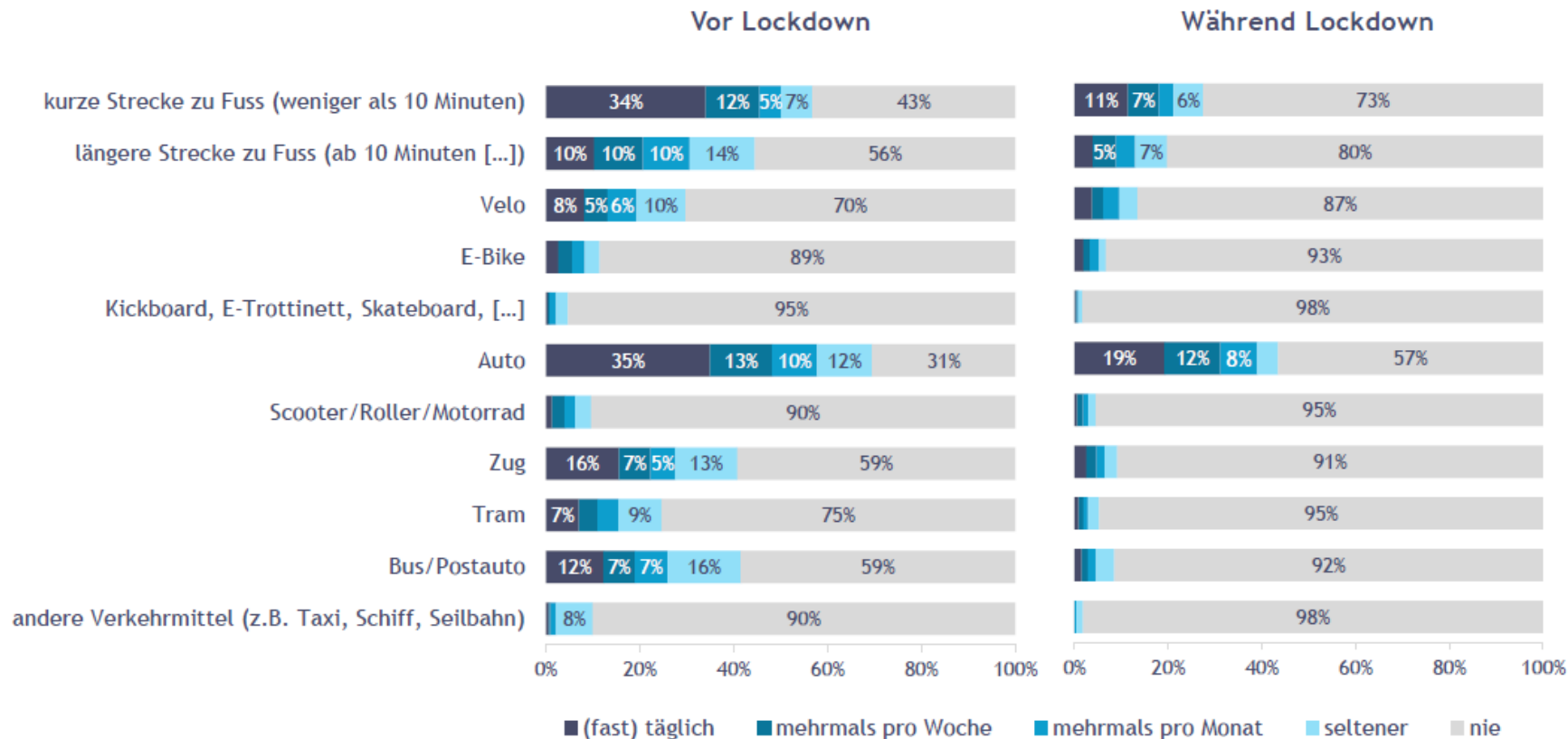


# Mobility reduction in lockdown and pandemic





# Lockdown



intervista AG | Bundesamt für Statistik | Report Verkehrsmittelnutzung und Mobilitätszweck während Lockdown-Phase | 03.06.2020

# Lockdown vs now

Retail & recreation

**-52%**

compared to baseline



Parks

**+78%**



Transit stations

**-39%**

compared to baseline



Workplaces

**-18%**

compared to baseline



Retail and recreation

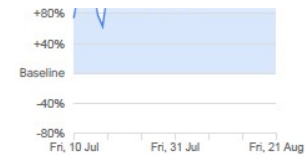
**-10%**

compared to baseline



**+137%**

compared to baseline



Public transport

**-19%**

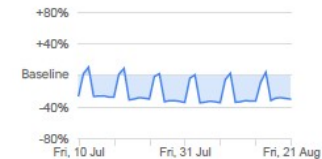
compared to baseline



Workplaces

**-30%**

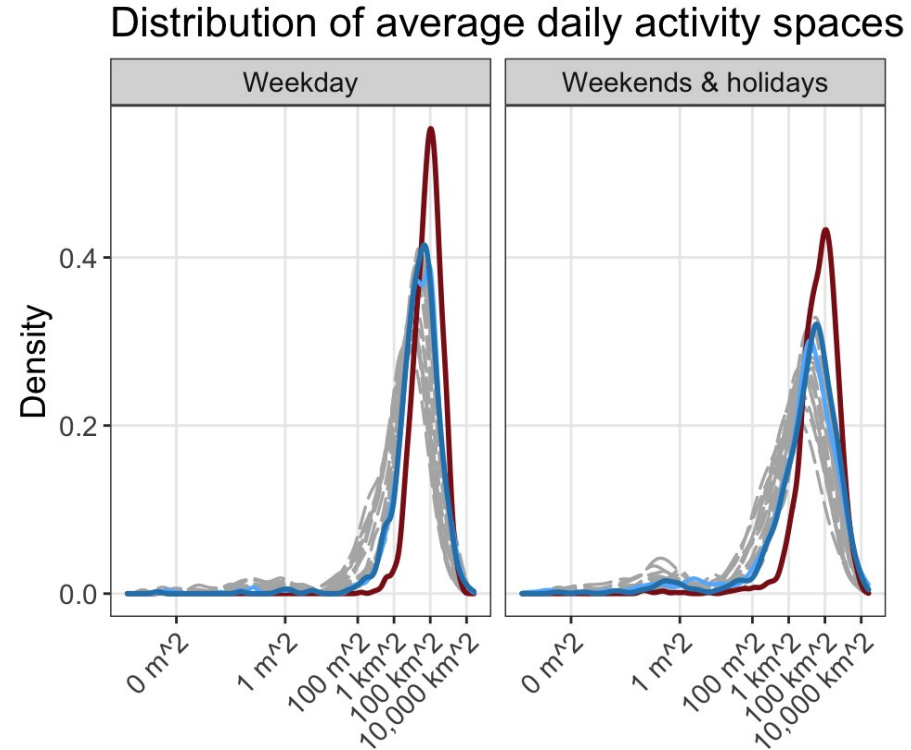
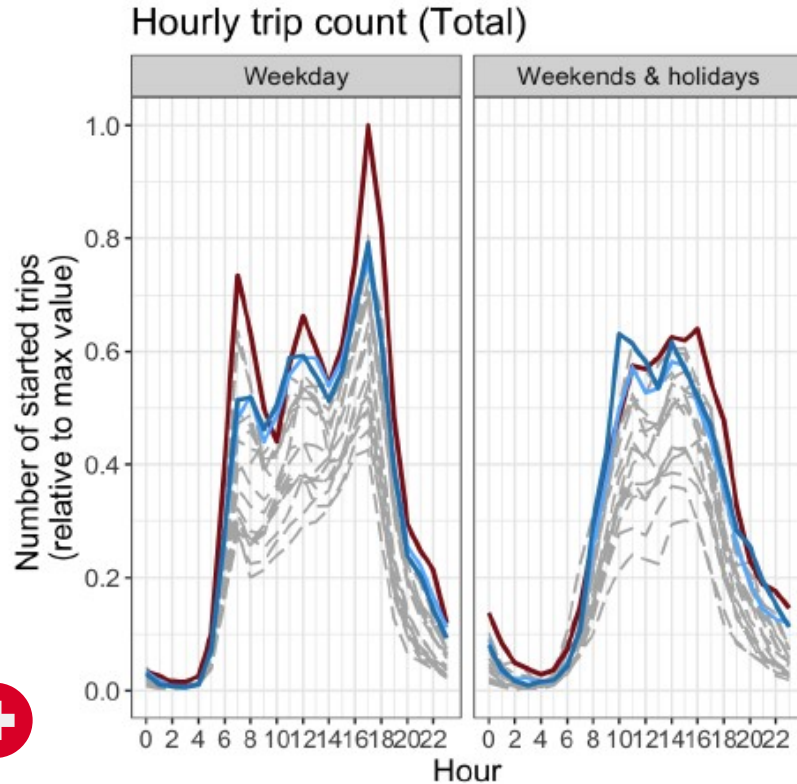
compared to baseline



**April 2020**

**August 2020**

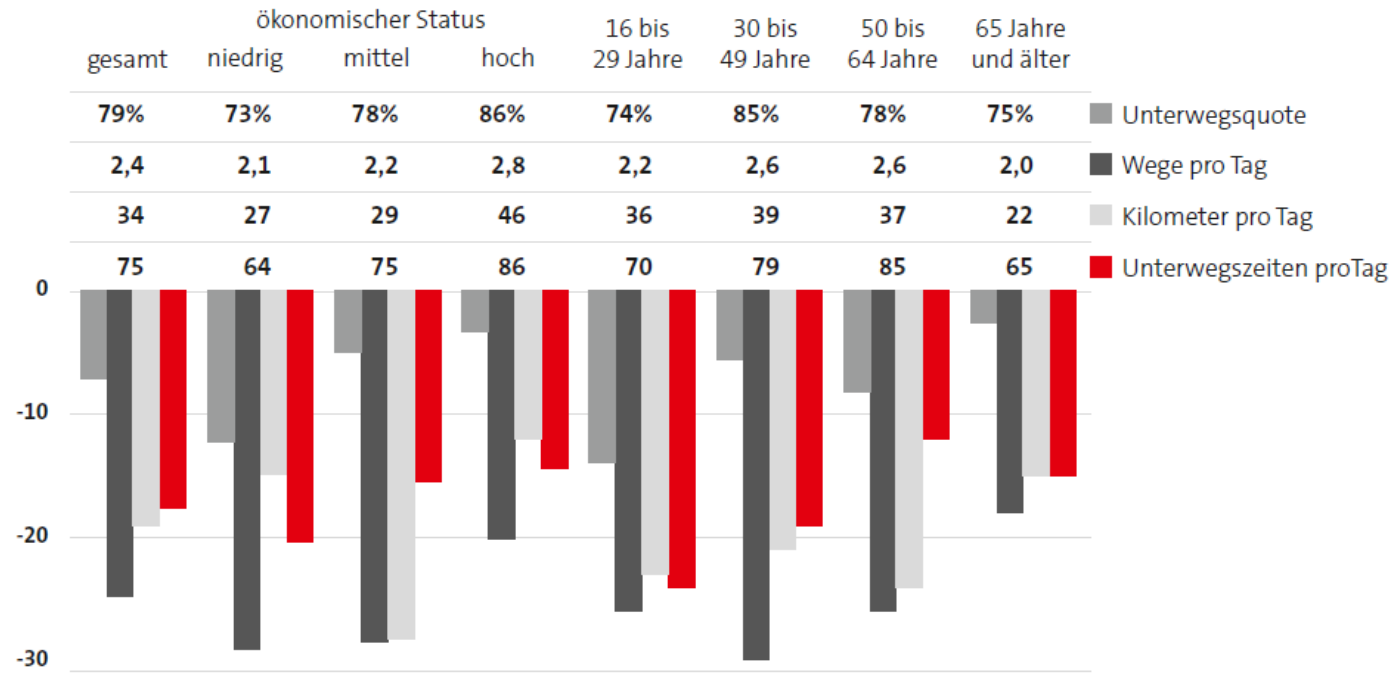
# COVID-19 and transport – overview I (Switzerland)



# Mobility reduction by income and age

Mobilitätsrückgänge in Prozent im Corona-Mai gegenüber MiD-Mai, Tageswerte pro Person nach Teilgruppen

Mittelwerte und Rückgang in Prozent gegenüber dem MiD-Ausgangswert

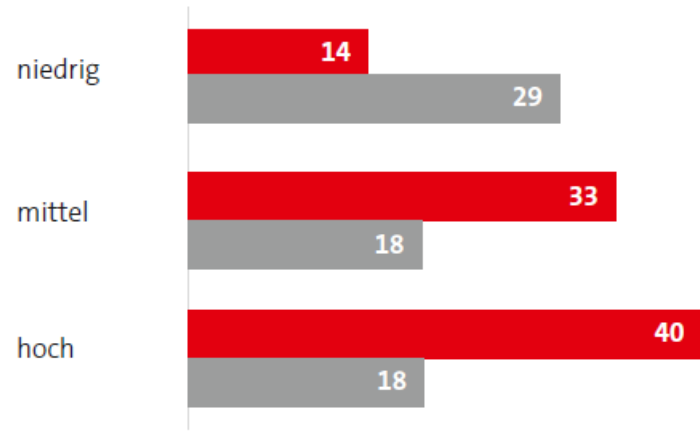


# Home Office

# Empty offices

## Anteile Homeoffice und Kurzarbeit nach ökonomischem Status

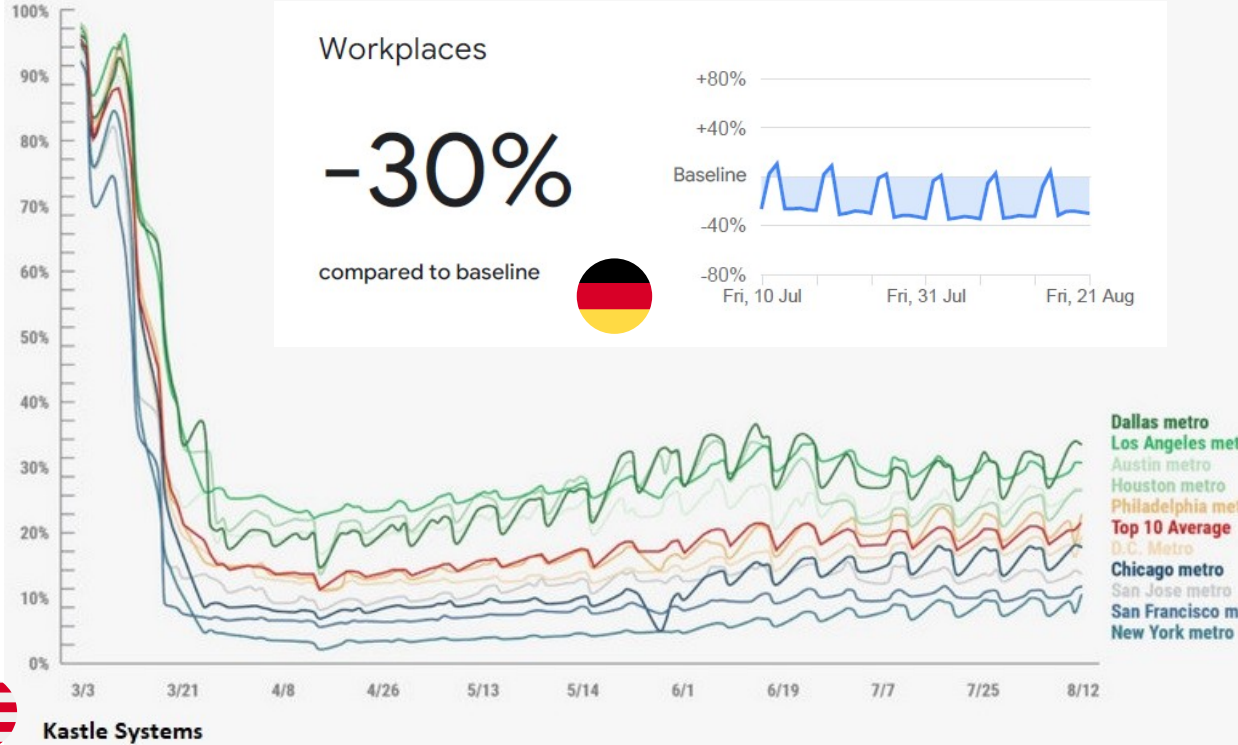
Angaben in Prozent, nur Erwerbstätige\*



■ Homeoffice ■ Kurzarbeit

\*einschließlich Selbständige und Beamte  
Personen ab 16 Jahren, MOBICOR 1. Welle 2020

## OCCUPANCY OVER TIME – MARCH 3 TO AUGUST 12



# Older Trends

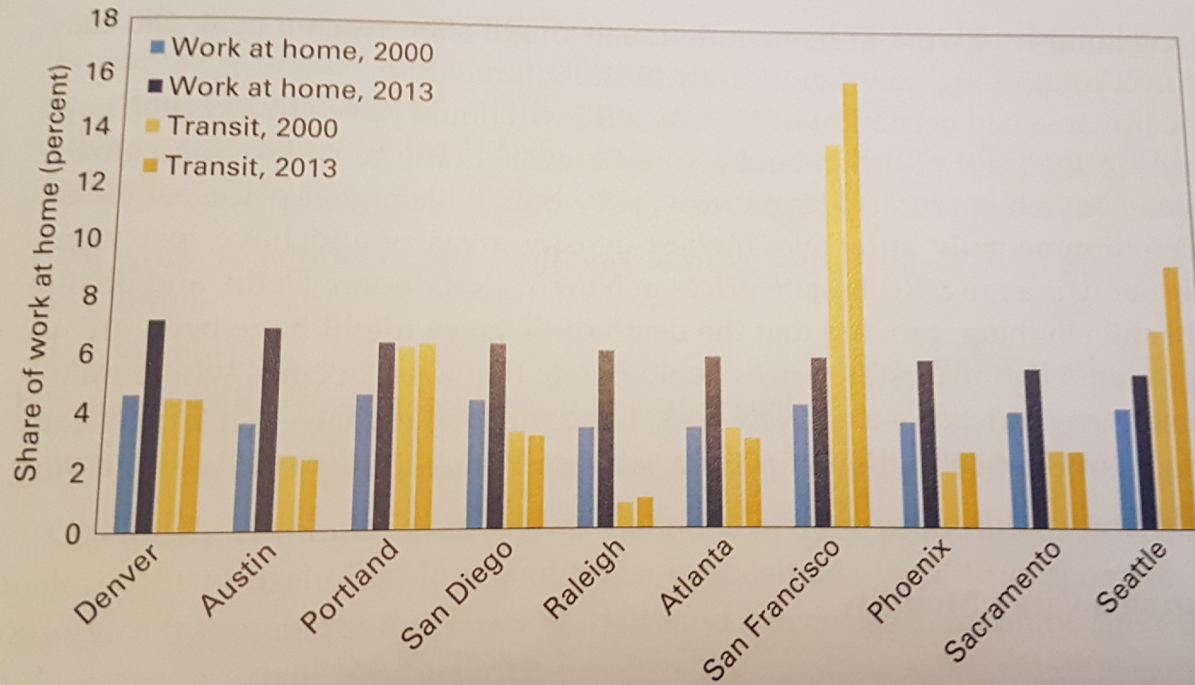


Figure 5.1  
Mode share work at home versus public transport in some US cities. Source: Wendell Cox, *New-Geography*, May 30, 2015.

source: A. Bertaud,  
Order without Design, 2018



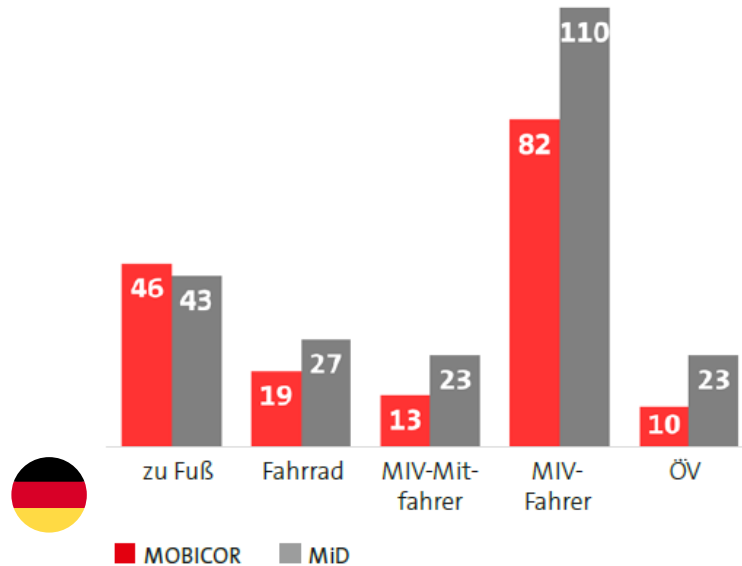
# Winners and Losers in the modal competition



# Transport volume per mode

Verkehrsaufkommen pro Tag absolut  
nach Hauptverkehrsmittel

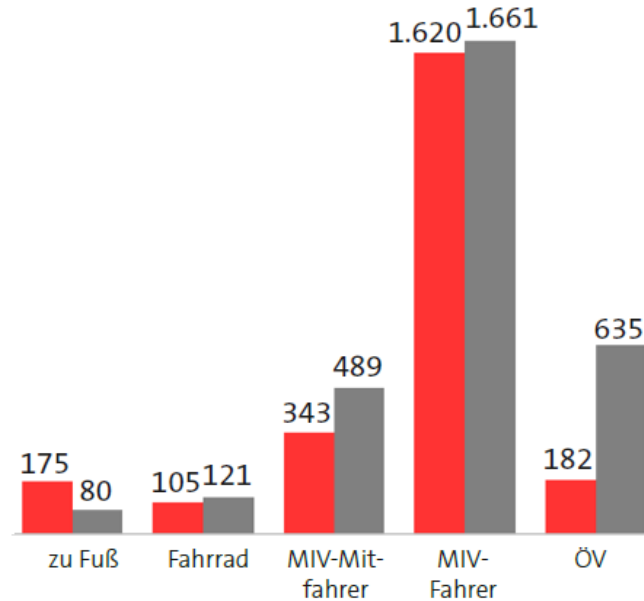
Hochrechnung in Millionen Wegen



MID-Referenzmonat Mai und Ergebnisse MOBICOR 1. Welle 2020, Personen ab 16 Jahren

Verkehrsleistung pro Tag absolut  
nach Hauptverkehrsmittel

Hochrechnung in Millionen Personenkilometern

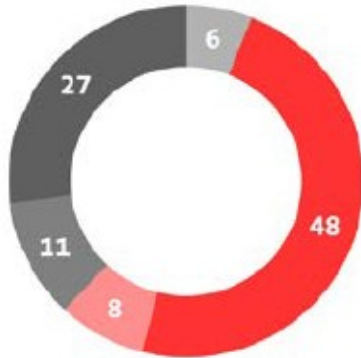


# Modal Split

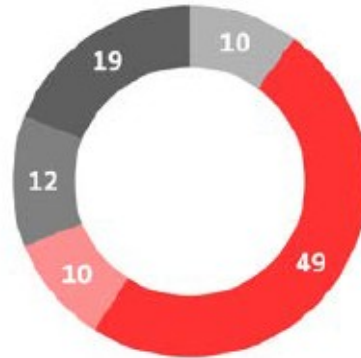
## Modal-Split-Vergleich

Angaben in Prozent

MOBICOR

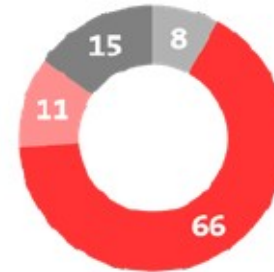


MiD

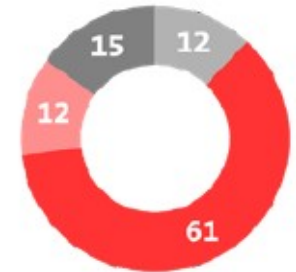


Zum Vergleich: alle Wege ohne Wege zu Fuß

MOBICOR



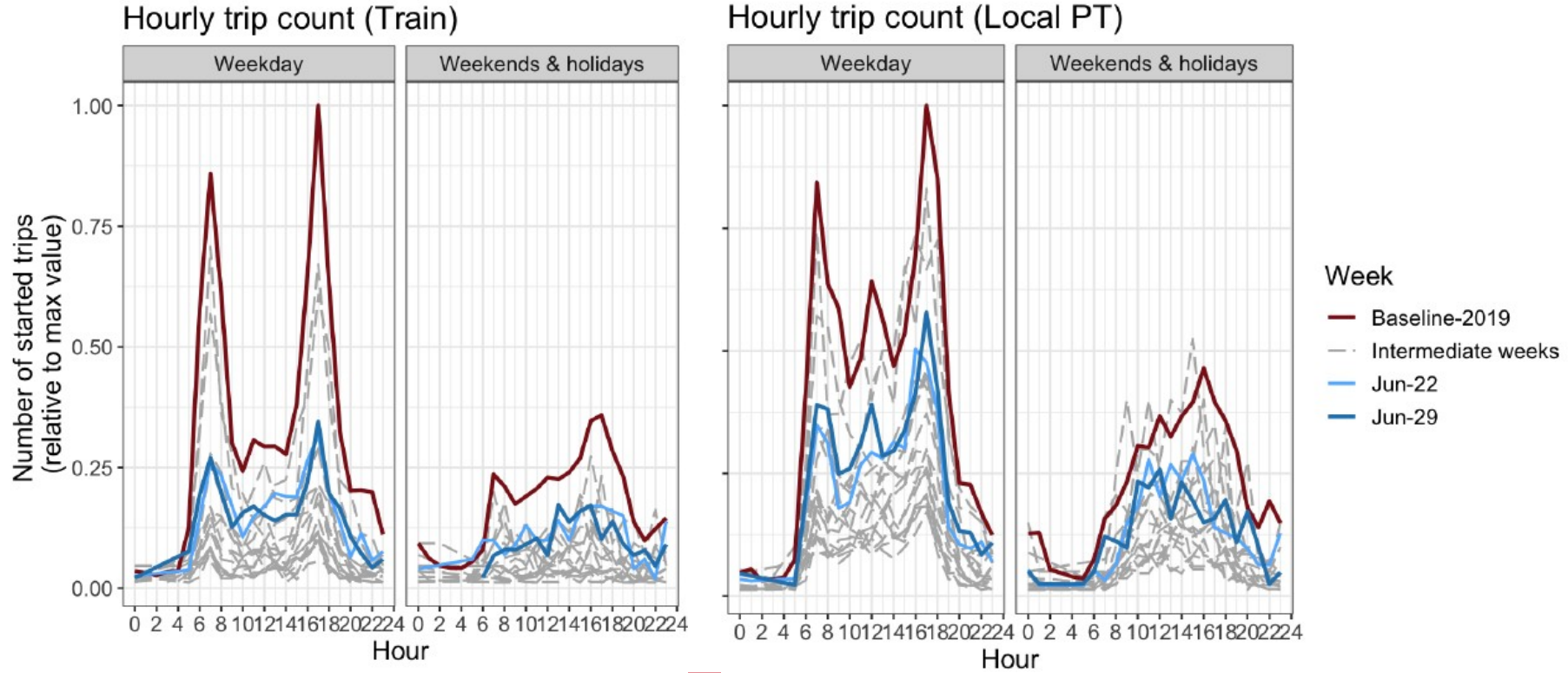
MiD



ÖV MIV-Fahrer MIV-Mitfahrer  
Fahrrad zu Fuß



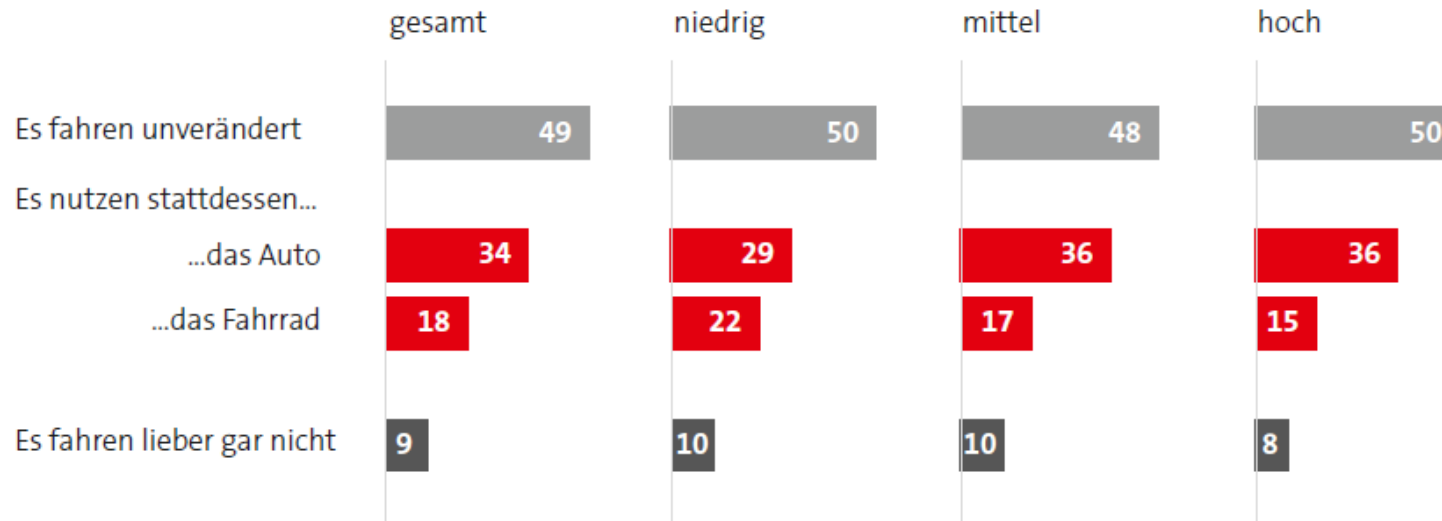
## Losers: community & mass transit



# Public transport's lost users

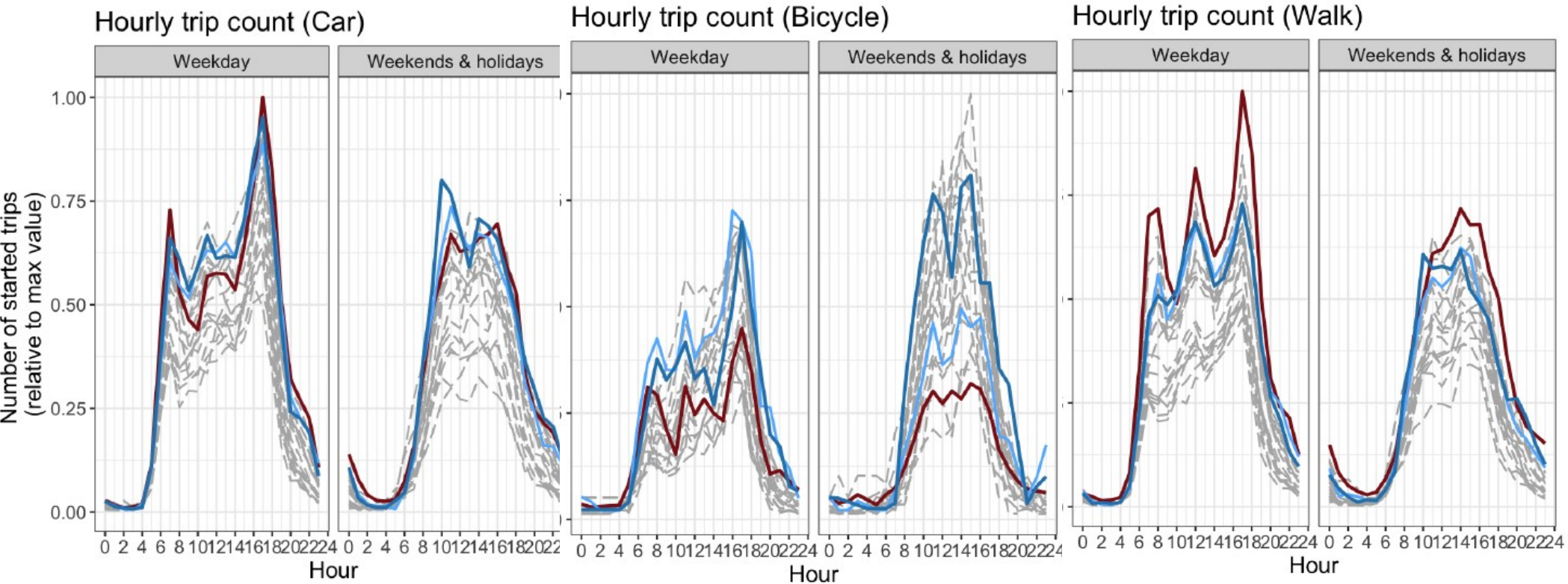
## Alternative Verkehrsmittelnutzung zum öffentlichen Verkehr

Angaben in Prozent, Mehrfachnennungen möglich



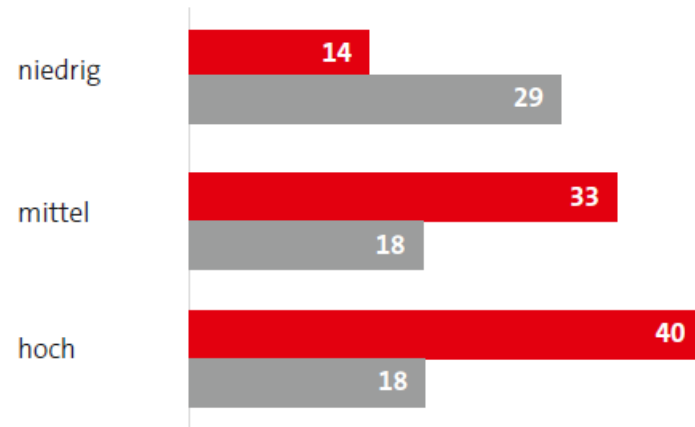
1.500 Befragte, Personen ab 16 Jahren, MOBICOR 1. Welle 2020

# Winners: individual Transport



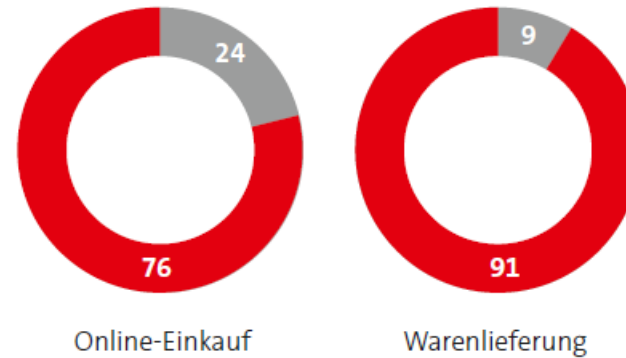
### Anteile Homeoffice und Kurzarbeit nach ökonomischem Status

Angaben in Prozent, nur Erwerbstätige\*



### Verstärkter Online-Einkauf und Warenlieferung nach Hause

Angaben in Prozent



■ Homeoffice ■ Kurzarbeit

■ ja ■ nein

\*einschließlich Selbständige und Beamte  
Personen ab 16 Jahren, MOBICOR 1. Welle 2020

# Discussion

# Road to a sustainable life style

Retail & recreation

**-52%**

compared to baseline



Transit stations

**-39%**

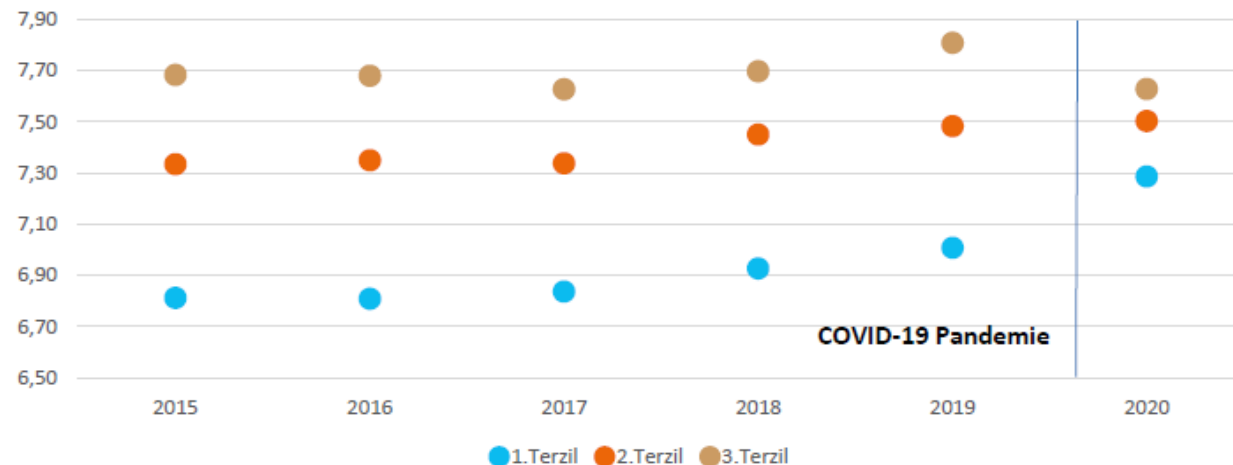
compared to baseline



Workplaces

**-18%**

compared to baseline



Parks

**+78%**

compared to baseline



Residential

**+6%**

compared to baseline





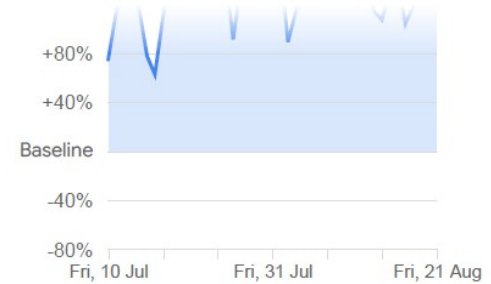
## Some thoughts and findings

- Accelerated trends
  - Home Office
  - Online retail and door2door delivery
- Discontinuities
  - Community and mass transit in question
  - Break-down of air traffic
- Questions
  - is mass and community transit still a viable route?
  - Is more transport/traffic reduction possible?
  - Will air traffic come back?
  - Trend to Home Office accelerates
  - Is reduction of economic activity the way to the mobility transition

Parks

**+137%**

compared to baseline

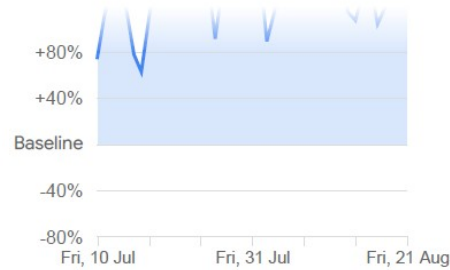


# Reste

Parks

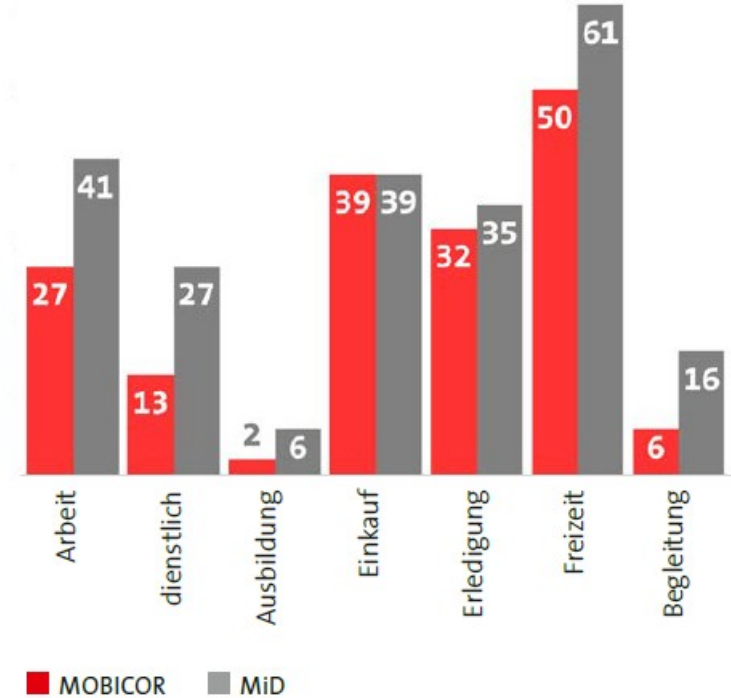
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compared to baseline



## Verkehrsaufkommen pro Tag absolut nach Hauptwegezweck

Hochrechnung in Millionen Wegen



MiD-Referenzmonat Mai und Ergebnisse MOBICOR 1. Welle 2020, Personen ab 16 Jahren