

# Car harm and the possibilities of car space

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Natural  
Environment  
Research Council

1. Car harm
2. Car space
3. Alternatives

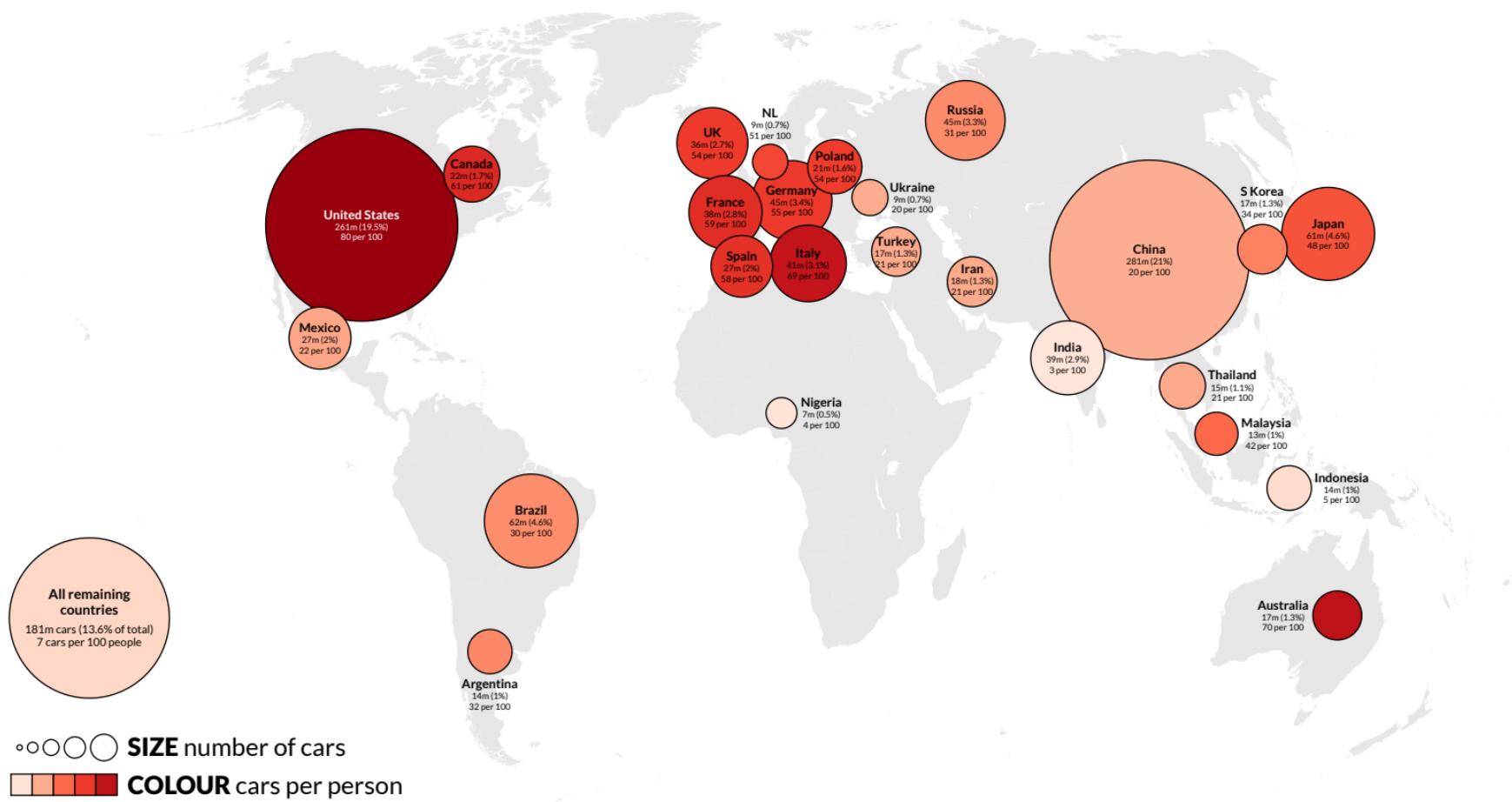
- 1. Car harm**
- 2. Car space**
- 3. Alternatives**

# Automobility

The “system of automobility” is

“ an interlocking system of cars, highways, fuelling infrastructure, automotive companies, government policies, and car cultures ”

\* Sheller 2018, p. 13; see also Sheller and Urry 2000



# Car harm

Automobility harms people and the environment (“car harm” for short).

That is, the system produces many negative consequences.



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Car harm: A global review of automobility's harm to people and the environment

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## Abstract

Despite the widespread harm caused by cars and automobility, governments, corporations, and individuals continue to facilitate it by expanding roads, manufacturing larger vehicles, and subsidising parking, electric cars, and resource extraction. This literature review synthesises the negative consequences of automobility, or car harm, which we have grouped into four categories: violence, ill health, social injustice, and environmental damage. We find that, since their invention, cars and automobility have killed 60–80 million people and injured at least 2 billion. Currently, 1 in 34 deaths are caused by automobility. Cars have exacerbated social inequities and damaged ecosystems in every global region, including in remote car-free places. While some people benefit from automobility, nearly everyone—whether or not they drive—is harmed by it. Slowing automobility's violence and pollution will be impracticable without the replacement of policies that encourage car harm with policies that reduce it. To that end, the paper briefly summarises interventions that are ready for implementation.

## Keywords

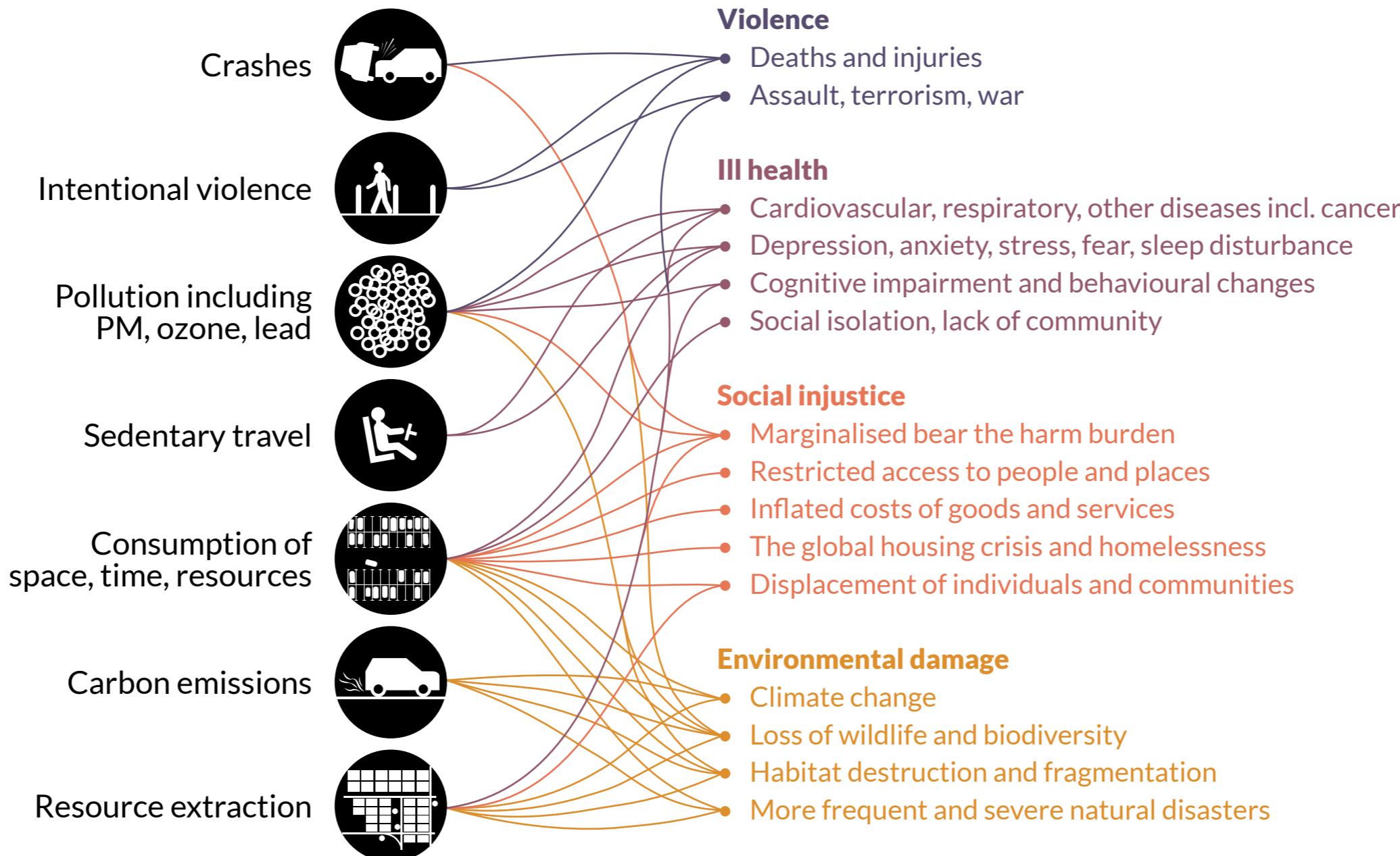
Automobility; Externalities; Traffic fatalities; Pollution; Public health; Social justice

## EXTERNALITIES

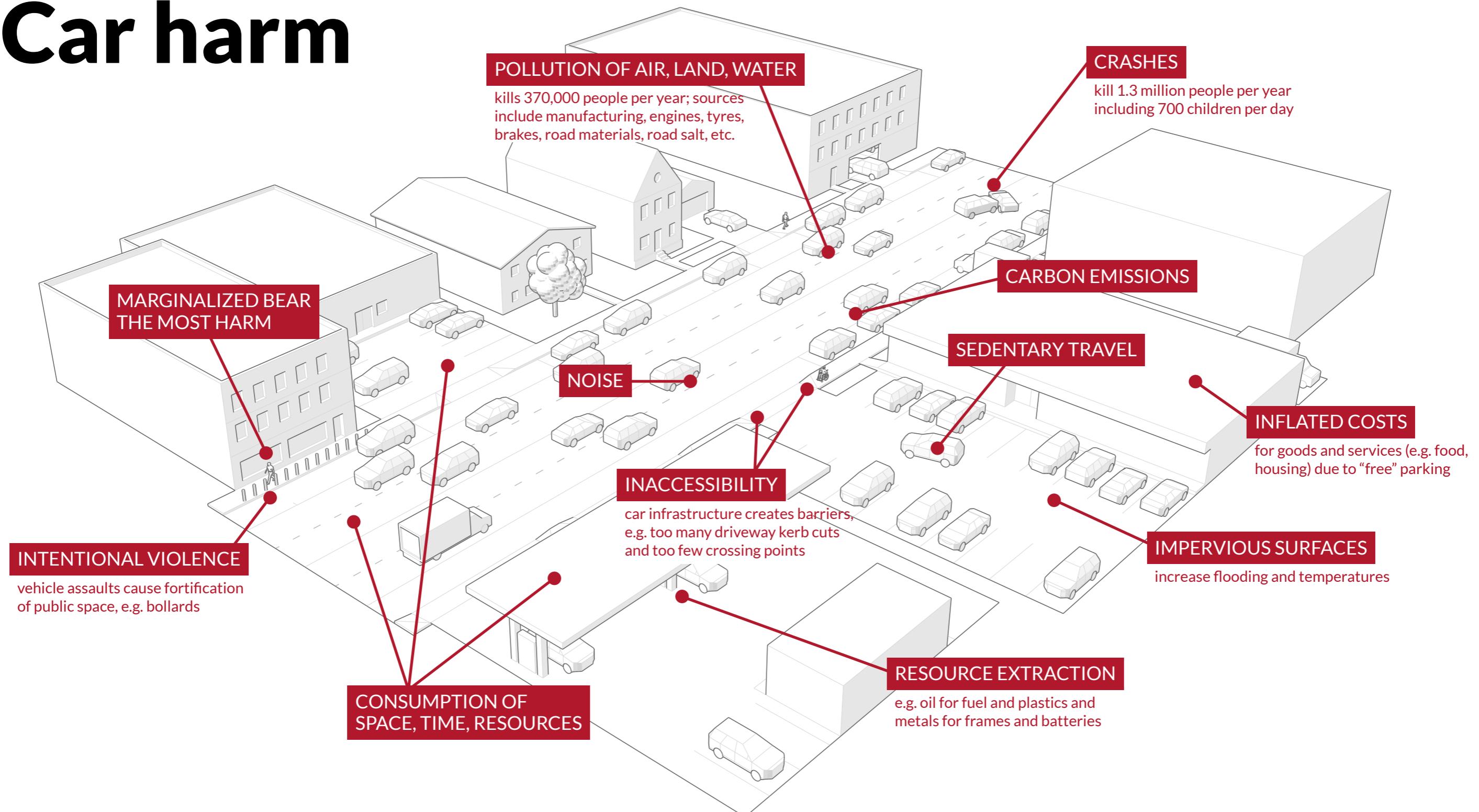
of cars and automobility

## HARM

to people and the environment



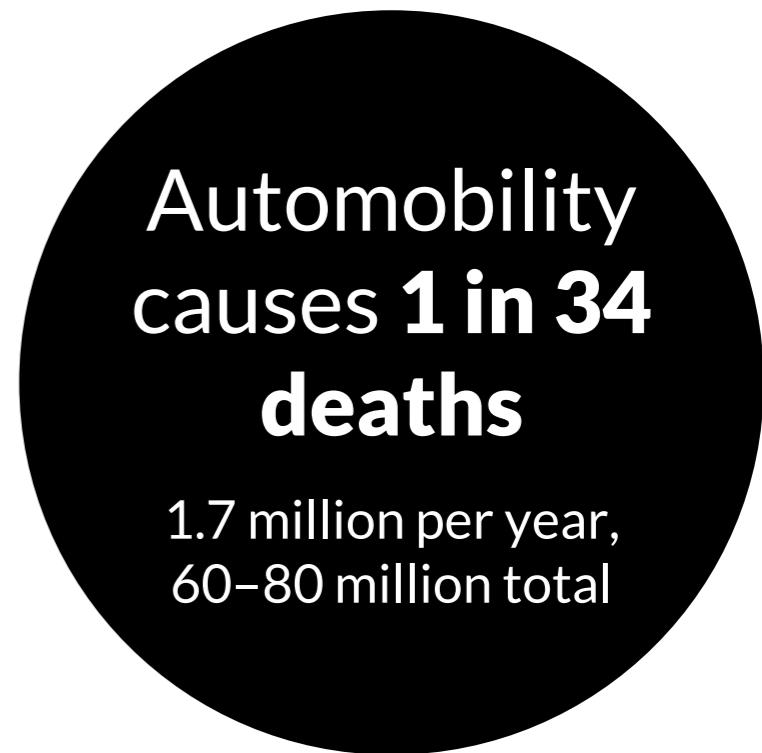
# Car harm



# Summary

Since their invention, cars and the system of automobility have...

- killed an estimated **60–80 million** people,
- injured at least **2 billion**,
- created or exacerbated social inequities, and
- damaged ecosystems in every global region.



# What to do?



# Alternatives to the status quo

Few of these harms are helped by either electric or autonomous vehicles.\*

What about policy solutions, e.g. redesigning cities to prioritise human and environmental health?

\* Henderson 2020

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# Scale

Many forms of car harm are attributable to the large **scale** of motor vehicles.

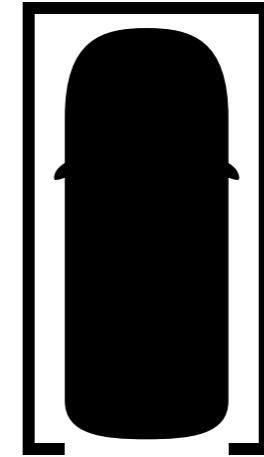
- 
- mass
  - dimensions
  - speed
  - quantity

# Scale

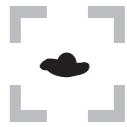
A car is at the scale of about 20 people:

- off-street car parking space is 25–33m<sup>2</sup> compared to 1–2m<sup>2</sup> for a person\*
- typical UK car weighs 1,700kg compared to 78kg for average UK adult\*\*

25-33m<sup>2</sup>



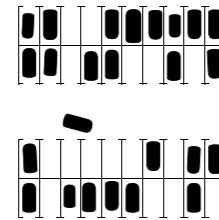
1-2m<sup>2</sup>



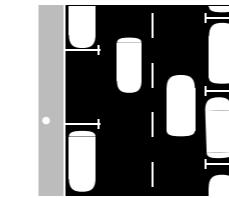
\* Crist et al. 2022; Héran et al. 2011; Shoup 2011; US Department of Transportation 2022; Willson 2013

\*\* Hill and Amaral 2021; UK National Health Service 2022

# Typology of car space



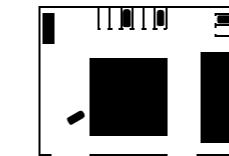
CAR PARKS  
(PARKING LOTS)



TRAVEL LANES



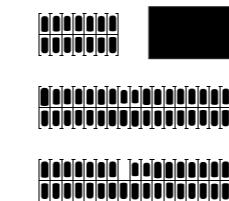
MULTI-STORY CAR PARKS  
(PARKING STRUCTURES)



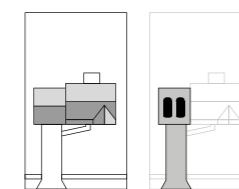
PETROL (GAS) STATIONS



ON-STREET PARKING



CAR DEALERSHIPS AND  
RENTAL FACILITIES



RESIDENTIAL DRIVES  
AND GARAGES



MAINTENANCE FACILITIES

# Measuring car space

- Goal: measure the space dedicated to (designed for) cars in GB urban areas.
- Using GIS techniques and Ordnance Survey data.

Image: Google Earth



> Layers



3D



-

+

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# So what?

What could—or should—we do with our urban spaces if our **societal values, norms, and goals** conflict with the car-dominated status quo?



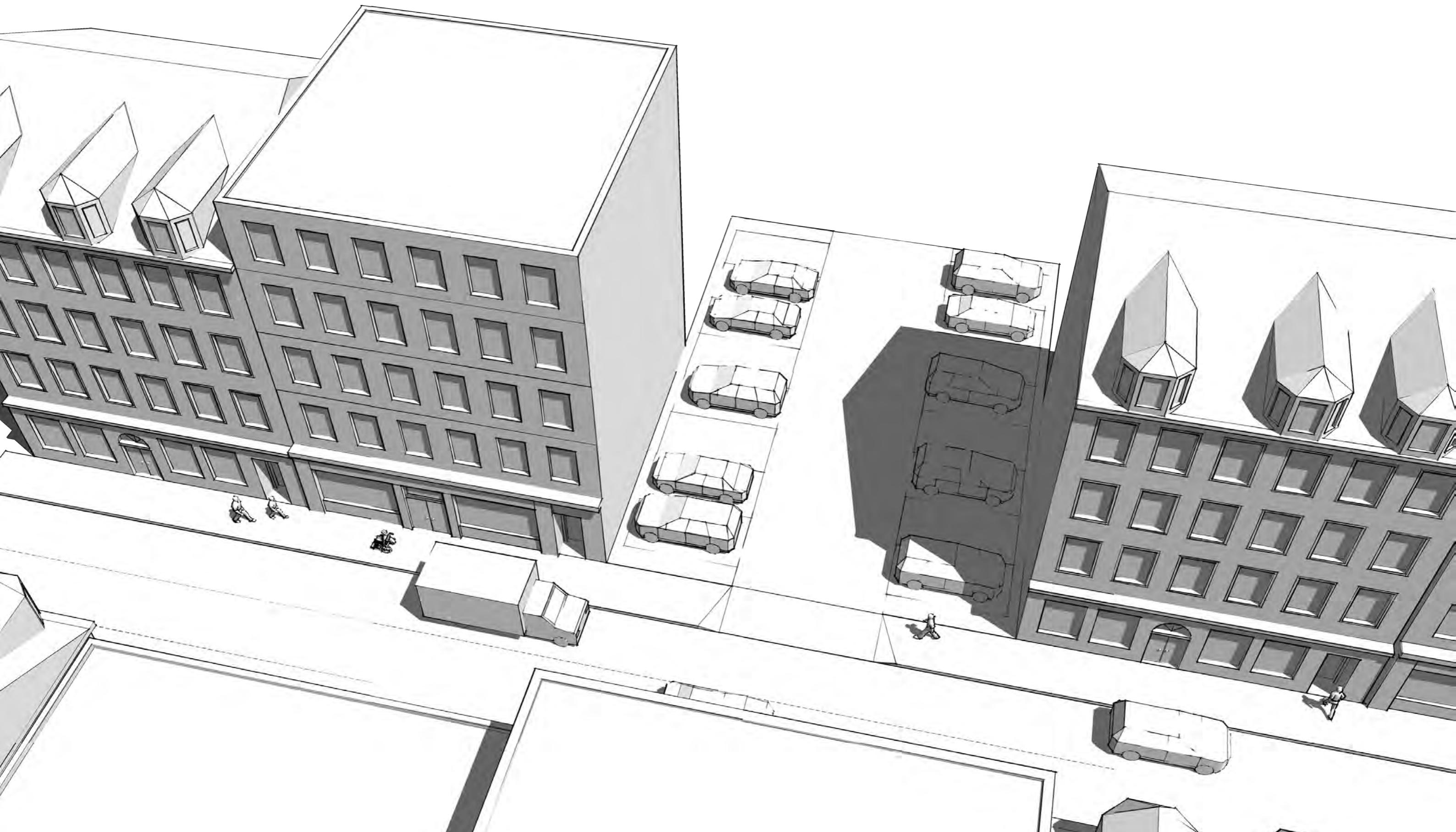
e.g. climate change mitigation,  
restoring ecosystems,  
reducing social inequities

# Repurposing car space

**Housing crisis** → convert car parks into public housing

# **Car parks to housing**

Consider a  $500\text{m}^2$  car park with 16 parking spaces.  
If replaced with public housing, how many people  
could live there?



# Car parks to housing

- Leave 1/3 of lot for garden space. This gives  $333\text{m}^2$  footprint.
- 4-5 story building with 4 levels of housing.
- On housing levels, 80% of area is liveable space. The other 20% is corridors, stairs, lifts, etc.
- This gives  $267\text{m}^2$  per level.
- Multiply by 4 for total liveable space of  $1,067\text{m}^2$ .
- Allocating  $26\text{m}^2$  per person,\* then...

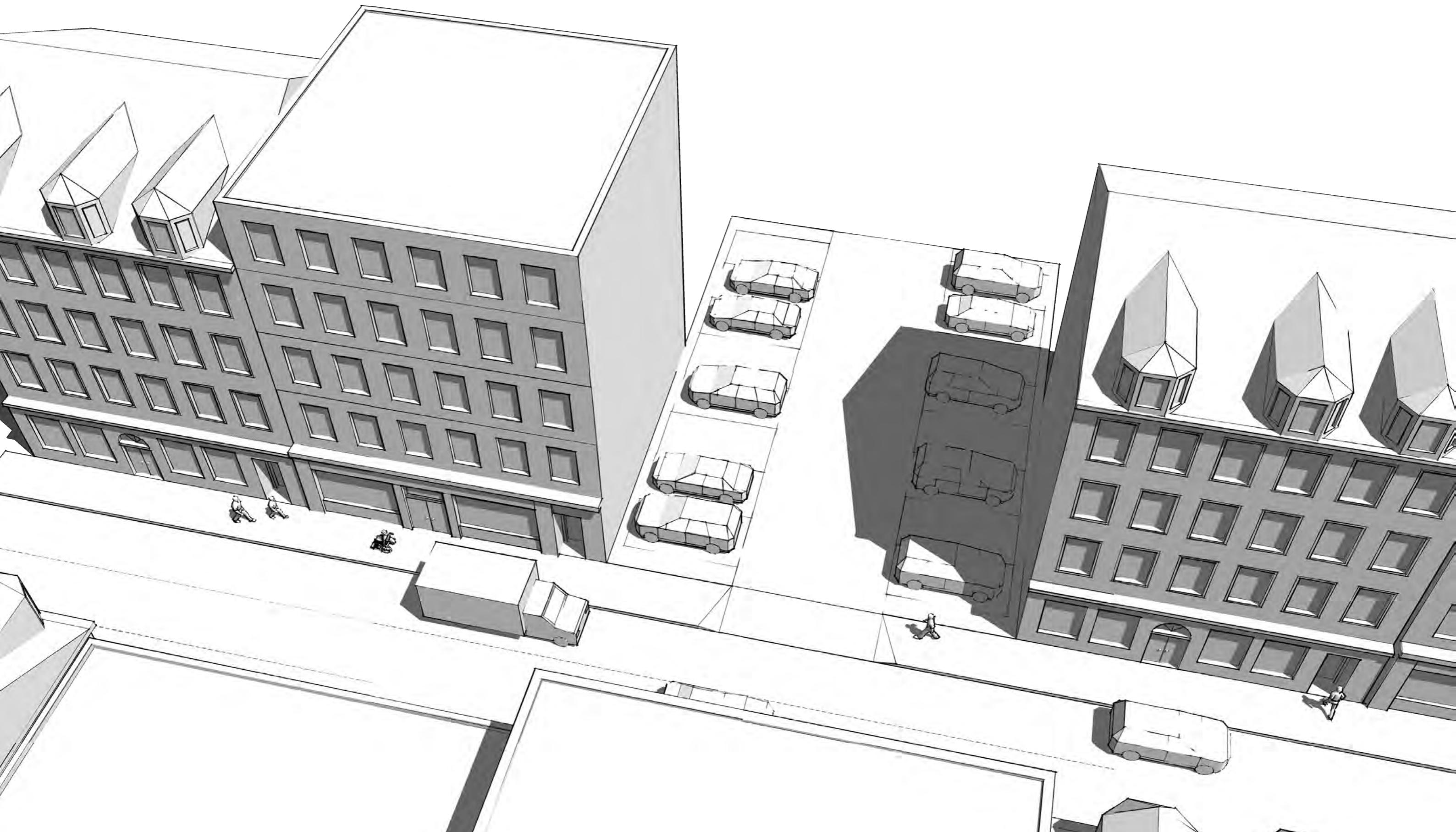
\* Özer and Jacoby 2023; Gleeson and Finnerty 2021

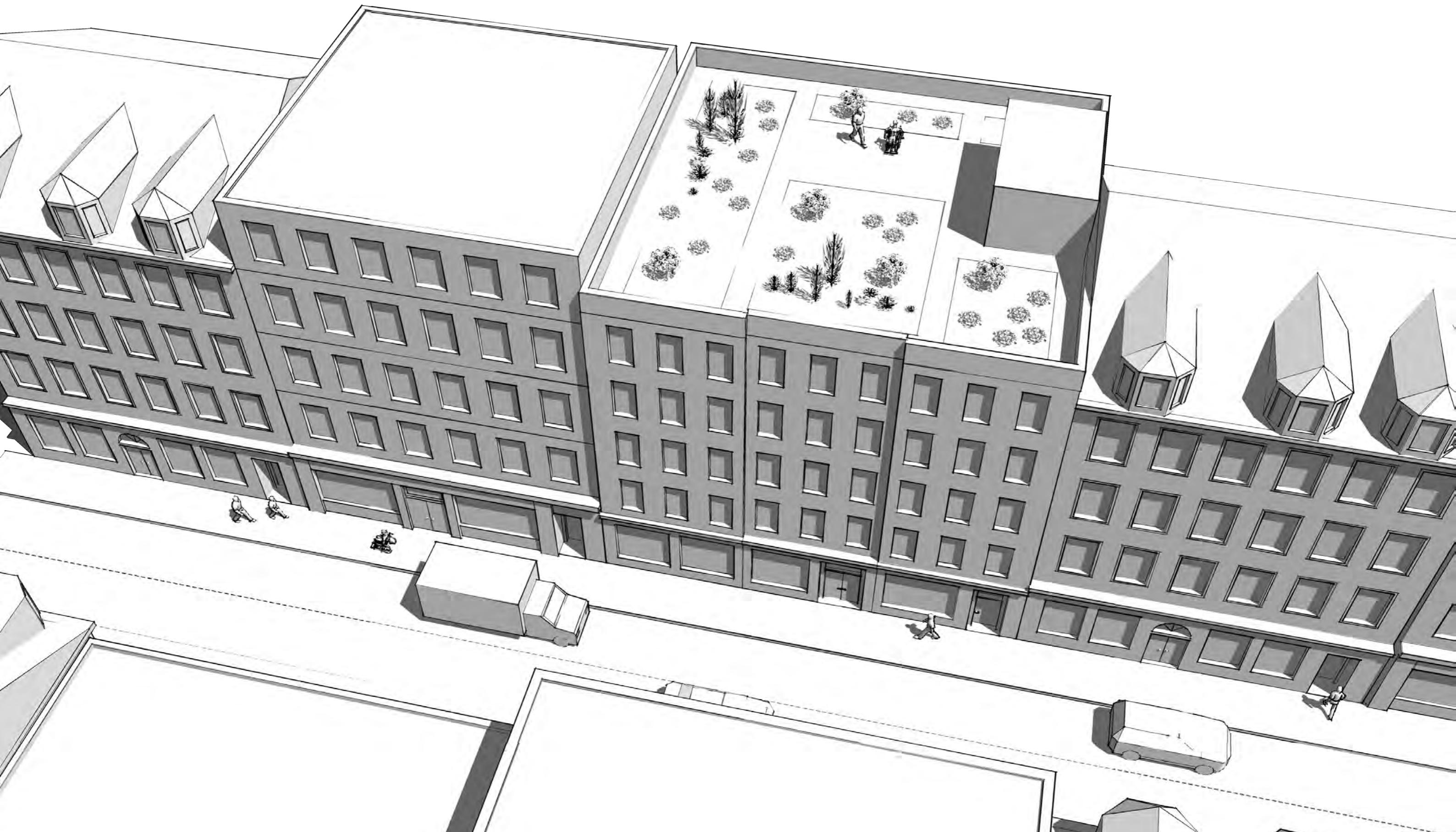
# Car parks to housing

- Leave 1/3 of lot for garden space. This gives 333m<sup>2</sup> footprint.
- 4-5 story building with 4 levels of housing.
- On housing levels, 80% of area is liveable space. The other 20% is corridors, stairs, lifts, etc.
- This gives 267m<sup>2</sup> per level.
- Multiply by 4 for total liveable space of 1,067m<sup>2</sup>.
- Allocating 26m<sup>2</sup> per person,\* then...

**41 people could live here.**

\* Özer and Jacoby 2023; Gleeson and Finnerty 2021





# Car parks to housing

- Each person requires 12.2m<sup>2</sup> of the former car park.
- This is about equal to a small on-street parking space or less than half of an off-street space.
- Thus **each parking space can house 2.5 people** or a typical UK household (2.36 people).\*

\* UK Office for National Statistics 2024

# Alternative land uses

**Housing crisis** → convert car parks into public housing

# Alternative land uses

**Housing crisis** → convert car parks into public housing

**Flooding** → reduce impermeable surfaces

**Biodiversity loss** → convert car space to vegetation

**Distant food production** → grow instead of park on shop roofs

**Lack of green / blue space** → replace streets with streams



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