

Robin Chase: The Case Against Transportation Policy Priority One Being Electrified Personal Cars

3/17/23

Spencer McDonald

Part I. Literature Citations

- Litman, Todd. "The Costs of Automobile Dependency and the Benefits of Balanced Transportation." Victoria Transport Policy Institute, 2020.
- Sperling, Daniel, and Deborah Gordon. "Two Billion Cars: Driving Toward Sustainability." Oxford University Press, 2009.
- Newman, Peter, and Jeffrey Kenworthy. "The End of Automobile Dependence: How Cities Are Moving Beyond Car-Based Planning." Island Press, 2015.
- Chester, Mikhail, and Arpad Horvath. "Environmental Assessment of Passenger Transportation Should Include Infrastructure and Supply Chains." Environmental Research Letters, vol. 4, no. 2, 2009.
- Banister, David. "Transport Planning: Transport, Development and Sustainability." SAGE, 2011.
- Schiller, Preston L., et al. "An Introduction to Sustainable Transportation: Policy, Planning and Implementation." Routledge, 2018.

Part II. Recent News and Articles

- Yergin, Daniel. "The Major Problems Blocking America's Electric Car Future." POLITICO Magazine, 31 Aug. 2021.
- Zipper, David. "The Dangerous Promise of the Self-Driving Car." Bloomberg CityLab, 12 Oct. 2021.
- "The hidden downsides of autonomous vehicles - and how to avoid them." World Economic Forum, 2019.
- Haustein, Sonja. "The hidden value of car ownership." Nature Sustainability, vol. 4, 2021, pp. 752-753.
- Brignall, Miles. "Car sharing: is now the time to give up owning a vehicle?" The Guardian, 30 Apr. 2022.
- "The End of Car Culture." The New York Times, 29 Jun. 2013.

Part III. Questions and Answers (Summary)

Moavenzadeh Questions

Question: Moavenzadeh asks how cars can be considered easy and cheap while being expensive at the same time.

Answer: Robin Chase explains that cars appear to be easy and cheap because society subsidizes many of the negative externalities and costs associated with car travel, such as tax breaks and free parking. However, from a social perspective, cars are the most expensive mode of

transportation. People often only consider the marginal cost of travel, like the cost of fuel, and not the true cost, which includes fixed costs like depreciation and insurance. This makes cars seem cheaper and more convenient compared to other transportation options like public transit.

Question: How can the US envision land use changes to make it more like European land use, considering the intractable nature of where people live, work, and get healthcare?

Answer: Robin Chase suggests that there are huge changes ahead as infrastructure is constantly refreshed. Turning malls into mixed-use spaces and improving access to essential services can be part of the solution. As 50% of all trips in the US are less than 3 miles, she emphasizes that most people live within striking distance of essential services. Instead of focusing on an "us against them" mentality, people should recognize the need for a range of travel options without relying solely on cars. Making other modes of transportation viable and accessible while ensuring cars pay their full share can help reshape land use and urban planning.

Audience Questions

Question: How can we unlock support for biking infrastructure, density, and the 15-minute city concept among homeowners, especially given the current political climate?

Answer: Robin Chase suggests focusing on the benefits of biking infrastructure and the 15-minute city concept for parents and their children. For example, enabling children to be independent in their travels, allowing them to run errands, and connecting communities to green spaces and trails can make the idea more appealing. By emphasizing these positive aspects and the potential to improve the quality of life, support may be gained for such initiatives.

Question: What is the relative share of income spent on public transit for families living in cities and using public transit instead of owning a car?

Answer: Robin Chase does not have the specific data on the income share spent on public transit. However, she emphasizes the need for creating resilient, multimodal lifestyles that allow for various transportation options. She believes that having only one car-dependent option is not resilient, and more focus should be placed on public transit and other modes of transportation to improve the quality of life.

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various transportation options. She believes that having only one car-dependent option is not resilient, and more focus should be placed on public transit and other modes of transportation to improve the quality of life.

Question: Can you discuss the cost of delivery for goods, its effect on road space and congestion, and the state of intercity travel in the US compared to Europe?

Answer: Amazon's "free" delivery for a yearly fee contributes to the problem of not considering delivery costs. Charging for road and curb space could increase delivery costs, promoting a more efficient model. Robin suggests a \$3 per delivery charge with exceptions for local store deliveries, electric cargo bikes or vehicles, and the US Postal Service. For intercity travel, Europe's robust rail system enables car-independent lives, while the US remains car-dependent outside of cities. The US should invest in appropriate infrastructure according to densities and locations, rather than focusing solely on car-based solutions.

Question: What is the place of shared vehicle models like Zipcar now and what are the opportunities for startups and private companies to build profitable businesses and help push towards sustainable mobility?

Answer: Robin Chase emphasizes that to enable a car-independent life, a whole suite of services is needed, including walking, biking, shared bikes, Zipcar, and other options. These services cater to various life circumstances and financial capabilities, making transportation more inclusive.

Question: Is there safety data for e-bikes? How safe is it to carry kids?

Answer: Robin shares mixed feelings about e-scooters, as many riders may not have prior experience with bikes and scooters, leading to potentially unsafe behavior. She suggests better training, culture, infrastructure, and fines might address safety issues rather than outright bans. She points out that most accidents involving e-scooters are caused by cars rather than the scooters themselves, and that better training and infrastructure could make micro-mobility safer.

Part IV. Summary of Memos.

Themes from Other Memos

- The negative consequences of car-dependency and the need for a shift towards sustainable, car-independent urban development.
- The limitations of electric vehicles (EVs) as a solution to transportation problems, including issues related to safety, the environment, and resource depletion.
- The importance of a holistic approach to sustainable transportation planning that considers the interplay of urban planning, public policies, and historical car culture in the U.S.

- The need for a diverse range of transportation solutions that people can choose from, including improvements to walking and cycling infrastructure, increased access to public transportation, and the development of new mobility options such as bike-sharing, car-sharing, and ride-sharing.
- The importance of considering system-level effects rather than just personal choices when assessing the future of transportation, and the need to address issues related to the use of cars beyond simply wanting to automate and electrify them.
- The challenges of implementing car-independent lifestyles in low-density suburban areas, and the potential role of EVs in solving first- and last-mile transportation problems in these contexts.
- The importance of infrastructure in shaping transportation choices and options, and the need for policies that reflect the range of trip conditions in the U.S.
- The importance of considering the politics and power dynamics surrounding transportation policies and decision-making.

My Reflection

Robin Chase, the founder of Zip Car, gave a talk about the negative consequences of choosing cars as the primary transportation method. She explained that this decision, made years ago by the United States, still affects us today in many ways. Cars produce CO₂ emissions, pollute the air, cause safety issues, are space-inefficient, raise the cost of housing, promote a sedentary lifestyle, and create exclusionary practices. One of the worst things about cars is the pollution they produce. Cars cause a lot of greenhouse gas emissions and air pollution, which harms the environment and our health. Another problem with cars is that they encourage people to live sprawled out, which makes it hard for people who don't have cars to get around. This can lead to people being excluded from society, especially if they are economically disadvantaged. Chase also talked about how cars are not safe. The United States has one of the highest rates of car-related deaths in the world, partly because cars are getting bigger and heavier.

What I found most compelling was her insistence that electric cars are not the answer to all our problems, according to Chase. Although they don't create CO₂ emissions, they still have most of the same negative effects as regular cars. For example, electric cars still produce some pollution and rely heavily on lithium, which is not an unlimited resource. She made it clear that cars (standard and electric) are causing problems for the environment, health, and society. What I find most interesting is how little people share her sentiment, as there seems to be a general view that electric cars will solve all our problems. Overall, Robin Chase inspired me to rethink how we get around, so that we don't rely on cars so much. Biking, walking, and public transportation are some examples of alternative transportation methods that can be better for our health, the environment, and our communities.

Part V. Other Information

Other questions

- How can we address the need to focus on incentivizing other forms of transport instead of cars?
- What positive system-level effects of cars were missing from Robin Chase's argument?

- What are the challenges of promoting car-independent lifestyles in low-density areas like suburbs and how can we overcome them?
- How can we effectively address the politics involved in transportation policy and prioritize more sustainable modes of transport?
- Is it even possible to achieve a car-independent society in the US, given the current infrastructure and cultural practices around cars?

Other literature

Nykvist, Björn, and Måns Nilsson. "Rapidly Falling Costs of Battery Packs for Electric Vehicles." *Nature Climate Change*, vol. 5, no. 4, 2015, pp. 329-332.

Walker, Gordon, and Noel Cass. "Carbon Reduction, 'the Public' and Renewable Energy: Engaging with Socio-Technical Configurations." *Area*, vol. 39, no. 4, 2007, pp. 458-469.

Larminie, James, and John Lowry. "Electric Vehicle Technology Explained." John Wiley & Sons, 2012.

1920s: World Population ~2 billion



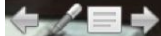


Hopes and Expectations for Personal Cars

- Expand travel distance (jobs, delivery, social)
- Clean up the streets (poop) & reduce (mis)use of horses
- New industry and job creation
- New technology! Modern! Progress!

Over the last 100 years, we have specifically and proactively made personal cars *easy* and *cheap*.

Infrastructure is destiny



Second Order Effects of Automobility

CO2 emissions

Particulate Pollution (cardiovascular illnesses, 3.4m deaths/year)

Car crash death & injury (1 death every 5 seconds; 3700/day, 1.3m year)

#2 (or #1) household expense

Space inefficient (parking & congestion)

Increases cost of housing

Encourages inactive lifestyle

Encourages sprawled land use/habitat destruction

Expensive Infrastructure

Exclusionary (requires driver's license & car)

2023: World Population 8 Billion



Let's ELECTRIFY Personal Cars

- Clean up the streets (exhaust, particulates) & reduce need for fossil fuels
- New industry and job creation
- New technology! Modern! progress!

Second Order Effects of **ELECTRIC** Automobility

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~~CO2 emissions~~

Particulate Pollution (cardiovascular illnesses, 3.4m deaths/year)

Encourages inactive lifestyle

ENVIRONMENTAL/SOCIAL/POLITICAL WARS for Lithium (& other inputs)

Second Order Effects of **ELECTRIC** Automobility

SAFETY Car crash death & injury (1 death every 5 seconds; 3700/day, 1.3m year)

ECONOMY Expensive Infrastructure
Space inefficient (parking & congestion)
#2 (or #1) household expense
Increases cost of housing

ACCESS Exclusionary (requires driver's license & car)
Encourages sprawled land use/habitat destruction

CLIMATE/HEALTH ~~CO2 emissions~~

Particulate Pollution (cardiovascular illnesses, 3.4m deaths/year)
Encourages inactive lifestyle

ENVIRONMENTAL/SOCIAL/POLITICAL WARS for Lithium (& other inputs)

SAFETY

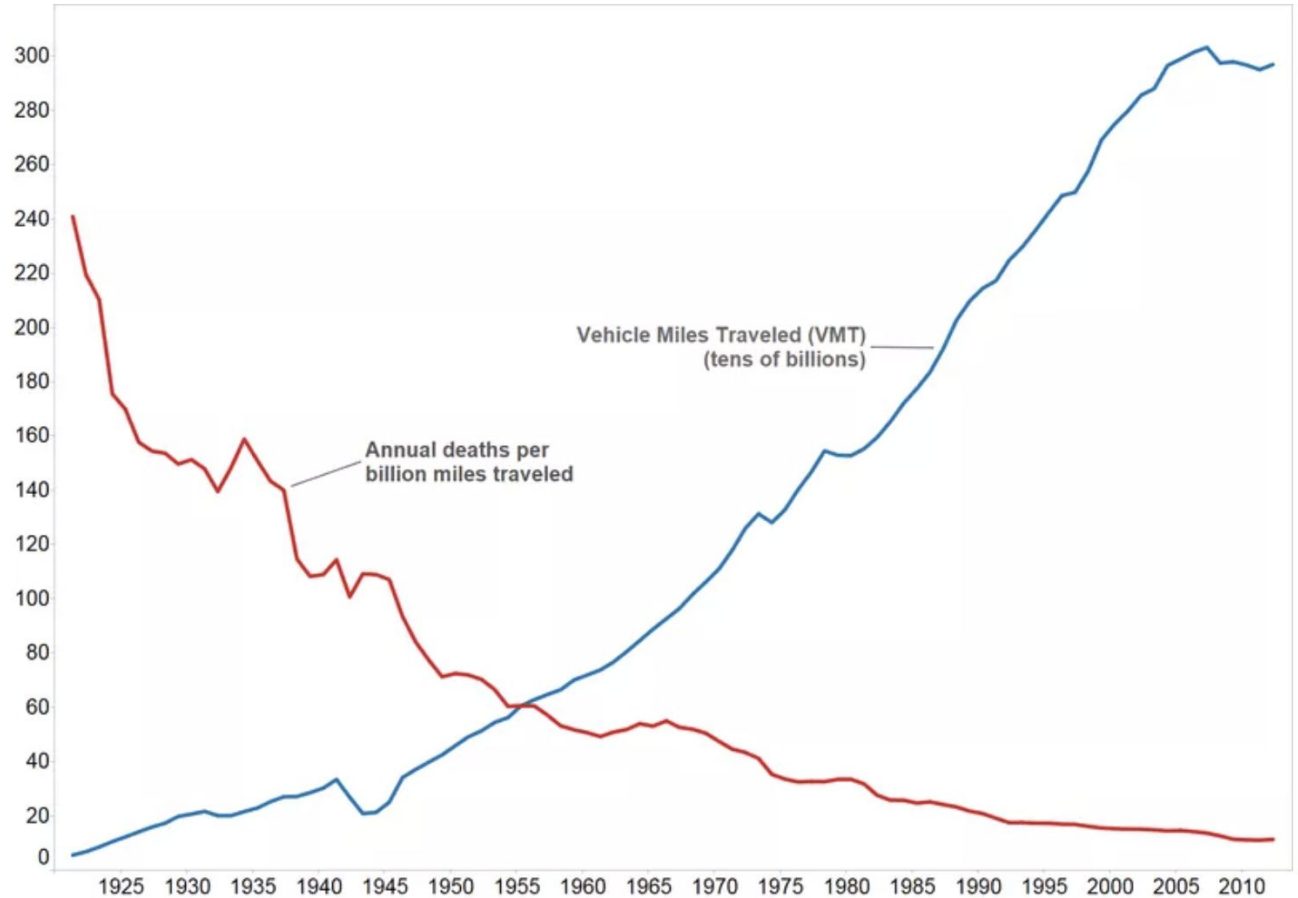
ECONOMY

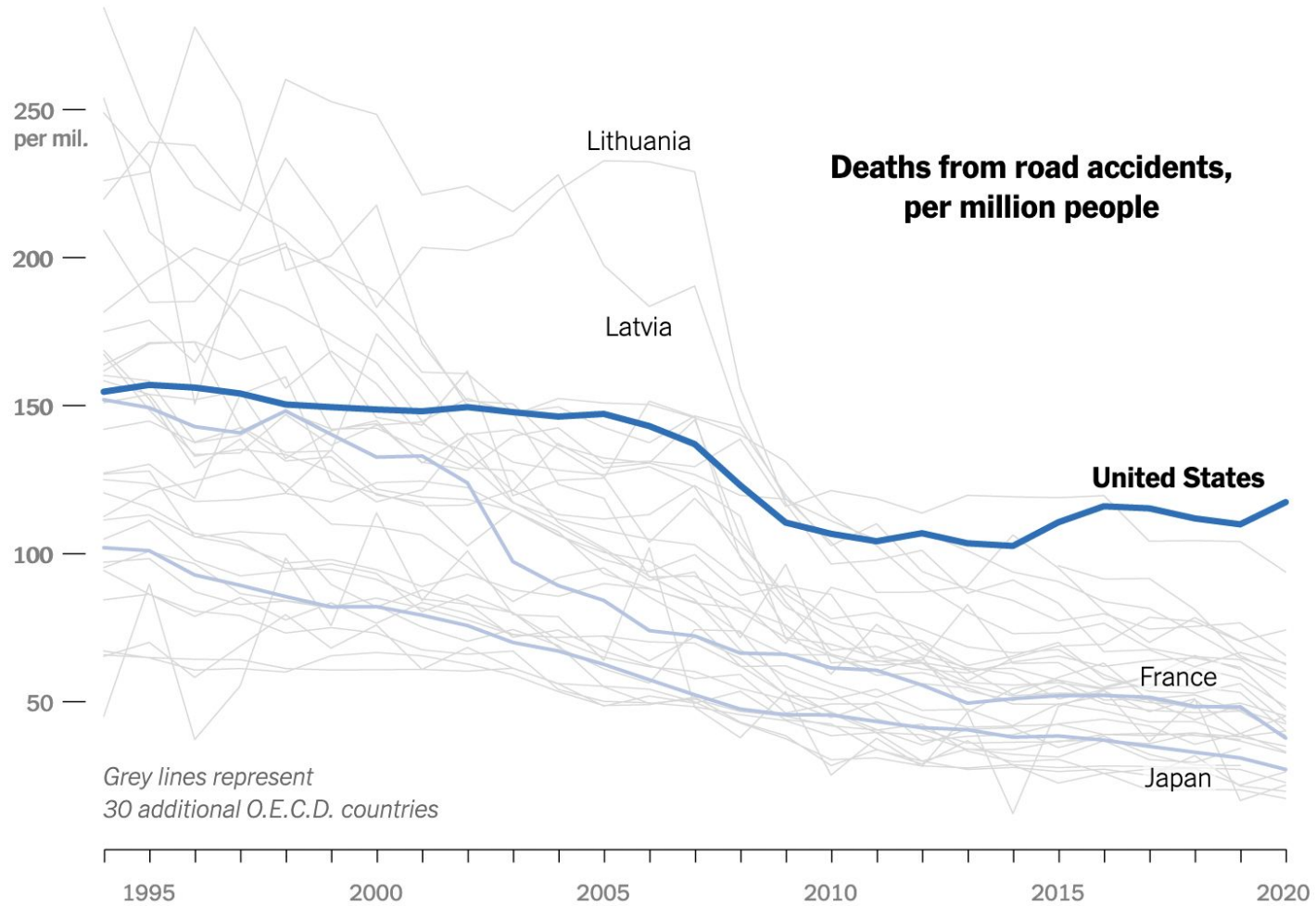
ACCESS

ENVIRONMENTAL/CLIMATE/HEALTH

US annual deaths per billion VMTs

SAFETY

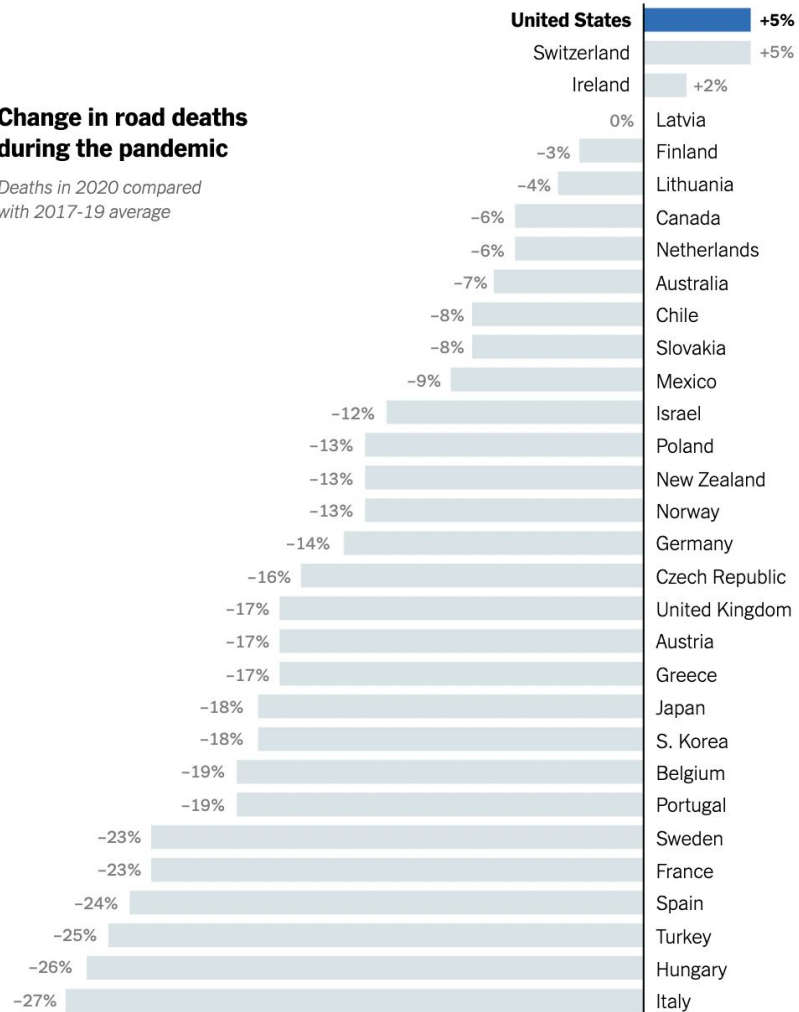




Source: Organization for Economic Cooperation and Development • The New York Times

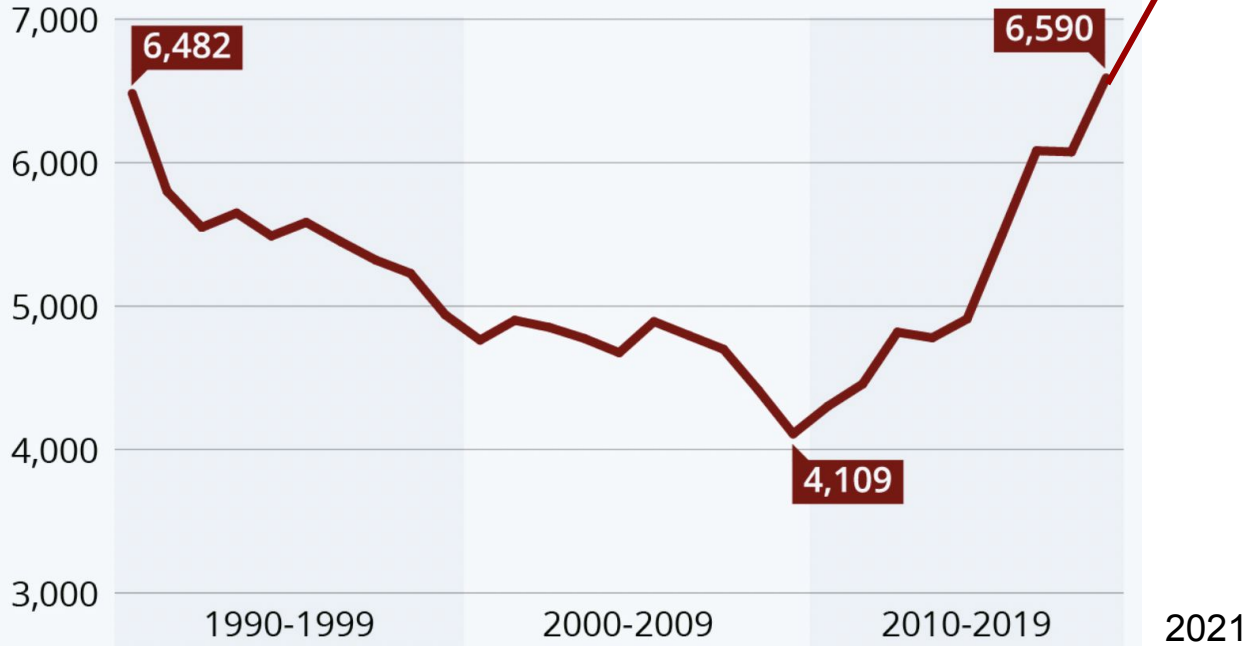
Change in road deaths during the pandemic

Deaths in 2020 compared with 2017-19 average



U.S. Pedestrian Deaths Hit Highest Level In 30 Years

Pedestrian fatalities in the U.S. by year*

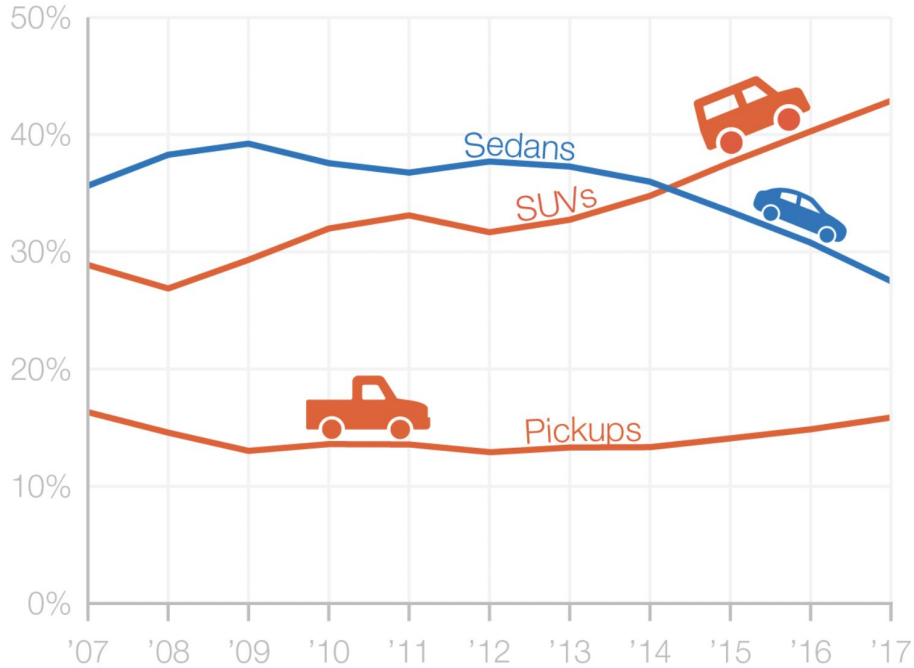


Preliminary 2022 shows a 5% increase over 2021.

* 2019 is a projection

Source: Governor's Highway Safety Association

New Car Sales by Vehicle Type (US)



Source: Smart Growth America

2015 NHTSA meta-analysis: Pedestrians are two to three times 'more likely to suffer a fatality when struck by an SUV or pickup than when struck by a passenger car.'



EVs are about 1200 lbs heavier than ICEs.

2012 [UC Berkeley study](#)

“being hit by a vehicle that is 1,000 pounds heavier generates a 40-50% increase in fatality risk”.

2022 [Vehicle Size, Weight, and Injury Risk](#)

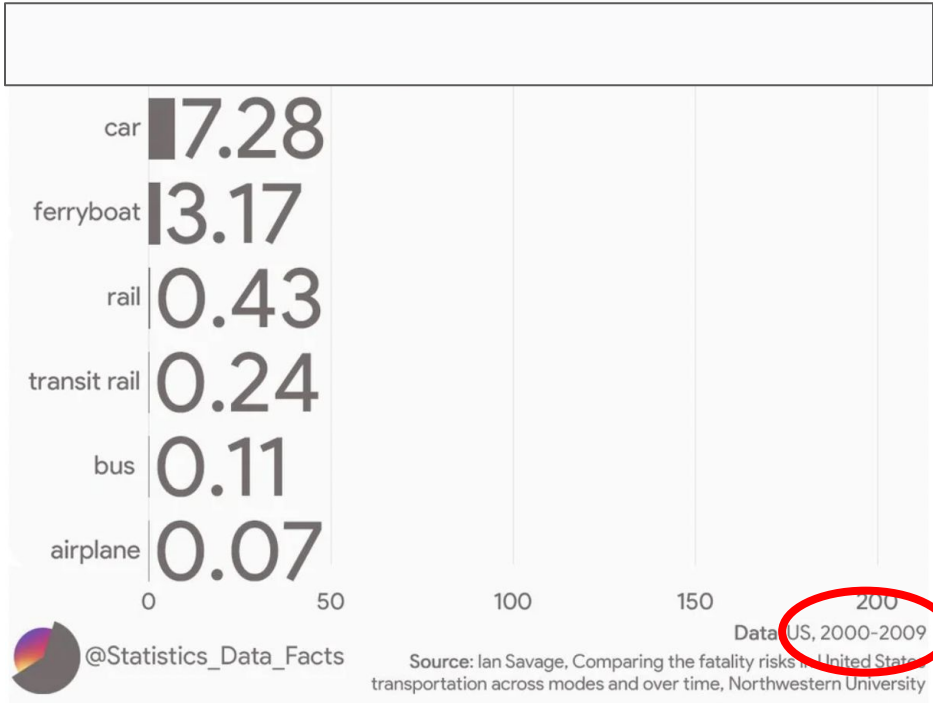
“As opposed to a homogenous scenario of having predominantly light vehicles on the road, this bimodal distribution of vehicles increases the injury risk versus the baseline. This suggests that a universally lighter fleet, once established, would lower injury risk, while a weight-wise diverse fleet would increase risk”

**From a SAFETY Perspective,
Electric vehicles don't solve current problems & do make them WORSE**

Passenger fatalities per billion passenger miles [OC]

oc

Passenger fatalities per billion passenger miles



Seeking Safety?

Get people out of cars.

ECONOMY: households

What portion of an American's income is spent on transportation?

17% of household income, on average

35%, in lowest quintile

> 50%, in median household income under \$35,000

Source: Consumer Expenditure Survey 2020

Car-Dependent
Transportation Policies
leave individuals and
households with
less resilience in times
of economic stress.

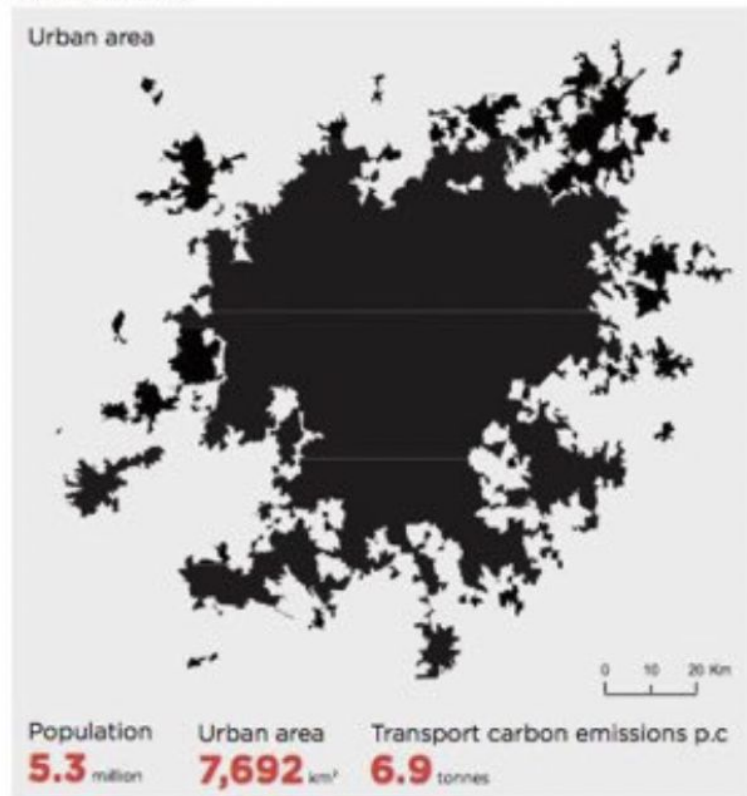
In CAR-REQUIRED cities, required parking:

- Inflates cost of housing by 25% (or more)
- Increases land requirements for retail and office use

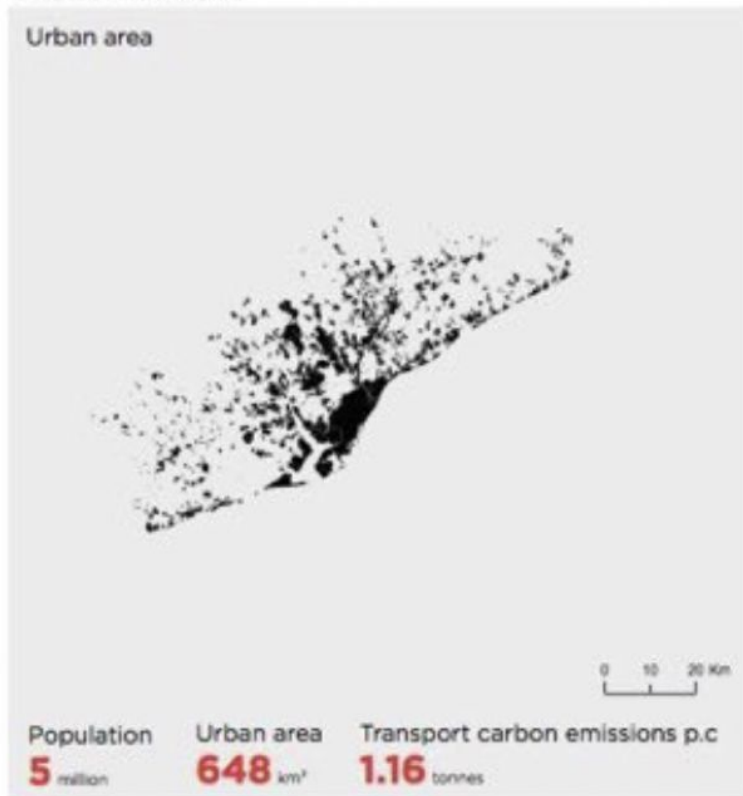
Parking Lots Little Rock, Arkansas



ATLANTA



BARCELONA



Source: LSE Cities 2014

More compact development can reduce transport emissions by an order of magnitude.

ECONOMY: government

- Increases costs of all municipal services and infrastructure
 - Pavement, electric, internet, water, sewer, subways, rail all priced per linear foot
 - Costs to move school children, elderly, disabled to services
- Increases costs of healthcare
- Car congestion slows economic growth

Conversely: Money not spent on cars/fossil fuels available for local spending

ECONOMY: private sector

“Small” EVs are not an inconsequential market

UK 2020 ebikes 160,000 e-cars 108,000

US ebike *imports*

2020 ebikes 463,000

2021 ebikes 790,000 ecars 652,000

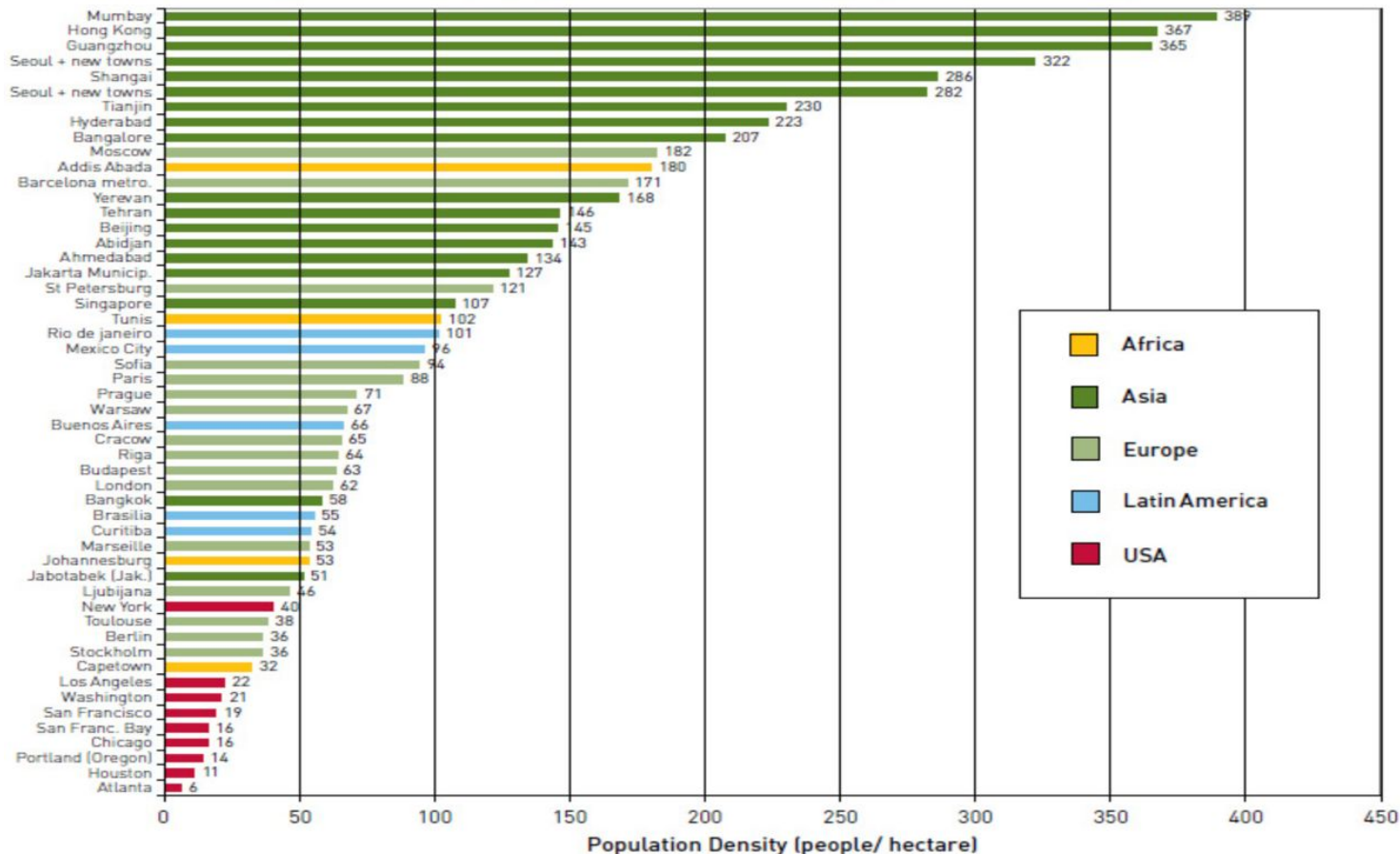
Total US ebike sales

2021 #ebikes sold in the US 3,500,000

Sources: The United Kingdom Bicycle Association [stats](#)
LEVA, [BloombergNEF](#).

ACCESS

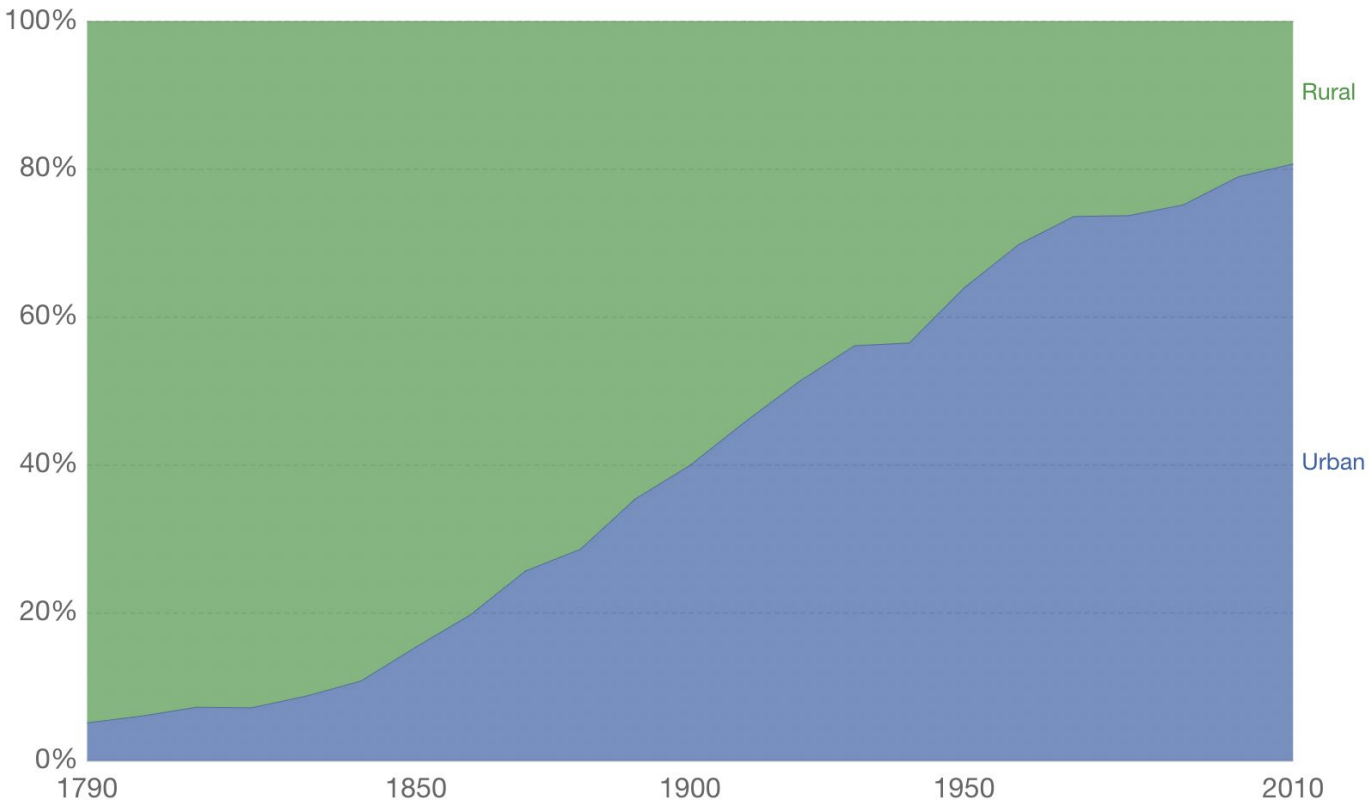
Comparative average population densities in built-up areas in 52 metropolitan areas



Urban and rural populations in the United States

Figure illustrates the size of the rural and urban populations in the United States over time. The US Census Bureau's population threshold of an urban place changes over time. The rural population is defined as any population outside urban areas. See the source tab for further information.

50% of all trips
< 3 miles (5 kms)



Source: US Census Bureau (2010)

CC BY

50%

At any given moment, about 50% of us can't use a car to get someplace.

- 25% younger than 16
- 16% are physically disabled
- ~8% of driver's have their license revoked at one time.
- 40% of households have just one car (USA)
- 20% of black households don't own a car at all (USA)
- For the poorest quintile, 32% of their income on their car (USA)

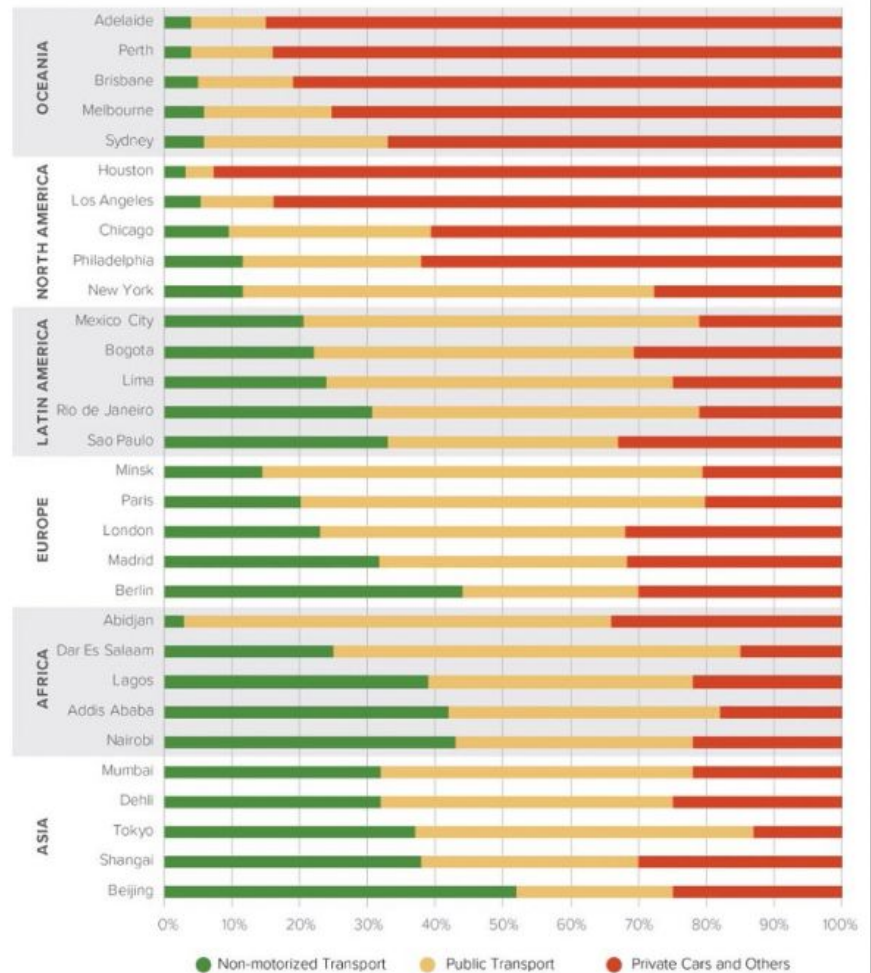
Where there are sidewalks



Where there is no sidewalk



How do people travel in cities?



ENVIRONMENT/HEALTH

Health Impacts of Automobility

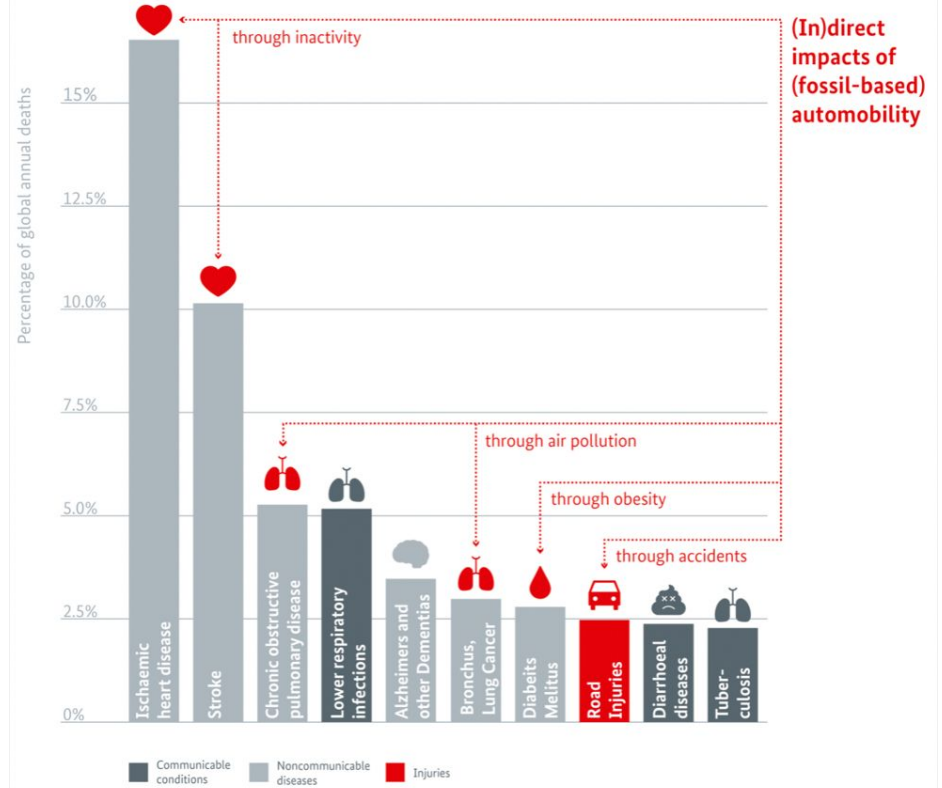
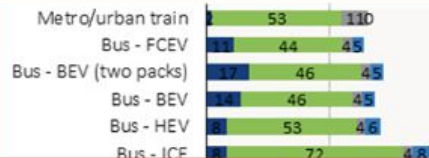


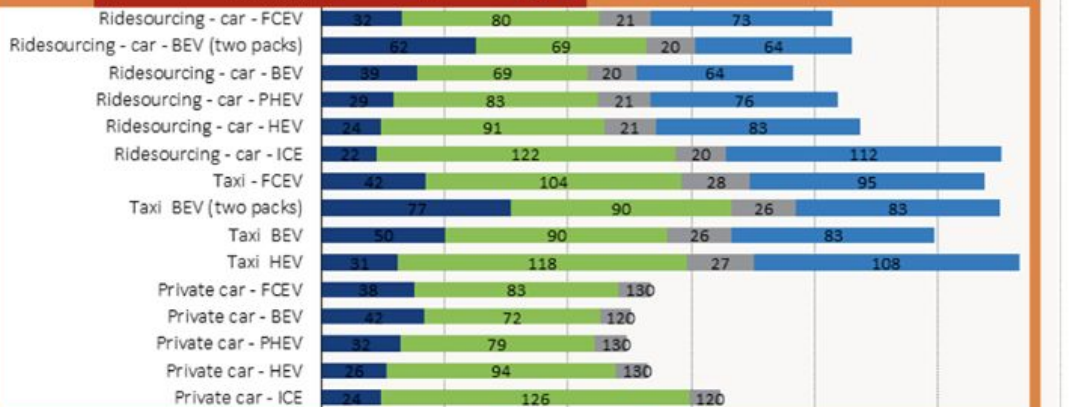
Illustration based on: WHO (2018). Global Health Estimates 2018: Deaths by Cause, Age, Sex, by Country and by Region, 2000-2016, World Health Organization. http://www.who.int/healthinfo/global_burden_disease/estimates/en/ (accessed: 20.09.2018)

Emissions per PKM

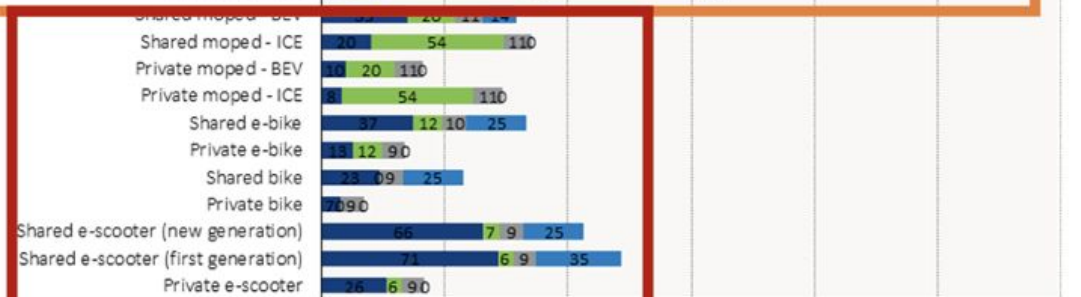
TRANSIT



CARS



MICROMOBILITY



0 50 100 150 200 250 300

GHG emissions per pkm [g CO₂/pkm]

■ Vehicle component ■ Fuel component ■ Infrastructure component ■ Operational services

TIME TO CO2 REDUCTION

For governments:

- Congestion pricing reduces car travel by 25% overnight

- Lane re-allocation to buses/bikes/pedestrians can be quick build

- Zoning and building changes important, and impactful over a decade

- New mass transit also takes 5-10 years

For people:

- Cars are a significant capital expense and therefore a major decision

- Takes 25 years to turn over the automobile fleet

- Ebikes are cheaper and therefore purchased more easily/frequently

[Global e-bike incentive programs collected here: <https://ridereview.com/incentives>]

To meet climate goals by 2040,
with status quo vehicle use,
Lithium extraction needs to be
42x greater than today

IEA (International Energy Agency)
<https://www.iea.org/reports/the-role-of-critical-minerals-in-clean-energy-transitions/executive-summary>



If Americans continue to depend on cars at the current rate, by 2050 **the US alone would need triple the amount of lithium currently produced for the entire global market**

How much lithium will be required to power US electric vehicles in 2050?

Scenarios based on 100% of vehicles on the road being electric by 2050, battery size, vehicle ownership rates, and battery recycling

Worst case

Larger battery, no change to vehicle ownership rate

483k tons of lithium

Status quo

Medium battery, no change to vehicle ownership rate

306k -37% from worst case

Optimistic

Medium battery, best case for reducing vehicle ownership rate

100k -79%

Best case

Small battery, best case for reducing vehicle ownership rate, widespread battery recycling

40k -92%

Thea Riofrancos

<https://www.climateandcommunity.org/more-mobility-less-mining>

Guardian graphic. Source: Riofrancos, et al., 2023, "Achieving Zero Emission Transportation with More Mobility and Less Mining"

Personal electrical vehicles require more lithium per rider than electric buses

- Lithium per rider (kg)
- Lithium battery capacity (kg)

Electric vehicles



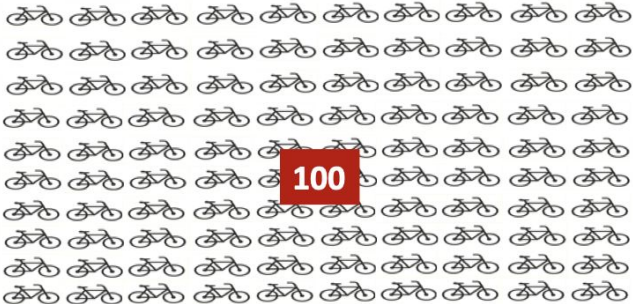
Guardian graphic. Source: Riofrancos, et al., 2023, "Achieving Zero Emission Transportation with More Mobility and Less Mining"

HOW HEAVY AN ELECTRIC BATTERY DO WE NEED TO MOVE ONE PERSON?

1 EV Pickup battery (~2,000 lb) = 2 sedan batteries = 55 golf cart batteries



= 225 e-bike batteries.



Hummer battery (~3,000 lbs) = Honda Civic car



**For the price of a single gallon of gas,
you can power an electric bike for 2,000 miles.**



**Lithium/cobalt
1 car or 250 ebikes**

INFRASTRUCTURE IS DESTINY

It will NEVER make sense, to move one 150 lb person in a 2-3 ton vehicle

- Not from a safety perspective
- Not from a climate perspective
- Not from a geo-political perspective
- Not from an urban perspective
- Not from an affordability perspective
- Not from an access perspective
-

2023: World Population 8 Billion



Second Order Effects of **ELECTRIC** Automobility

SAFETY Car crash death & injury (1 death every 5 seconds; 3700/day, 1.3m year)

ECONOMY Expensive Infrastructure
Space inefficient (parking & congestion)
#2 (or #1) household expense
Increases cost of housing

ACCESS Exclusionary (requires driver's license & car)
Encourages sprawled land use/habitat destruction

CLIMATE/HEALTH ~~CO2 emissions~~

Particulate Pollution (cardiovascular illnesses, 3.4m deaths/year)
Encourages inactive lifestyle

ENVIRONMENTAL/SOCIAL/POLITICAL WARS for Lithium (& other inputs)

Second Order Effects of Car Independence

Healthier people; fewer transport deaths & injured

Higher % of population mobile

More money for local economy

Cost of housing decreases

More land for agriculture & wildlife

More economic and individual autonomy

More mobility resilience (multi-modal options robust)

Reduced per capita emissions (more efficiencies with density)



Our goal

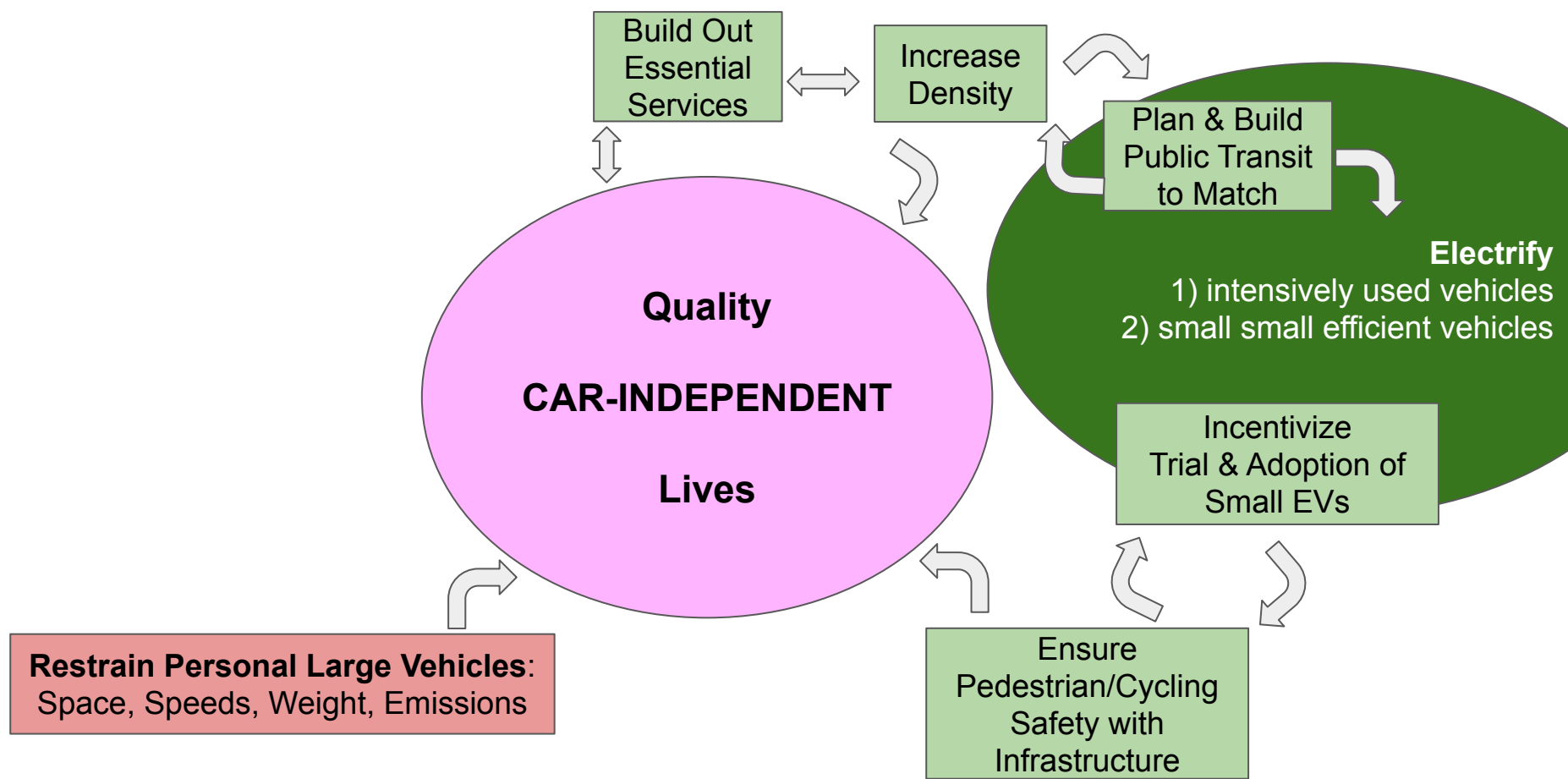
Percent / # of people with zero carbon transport footprint

Percent / # of people living *quality* car independent lives

Our guide

Resource efficiency & planning for *all* people

Unused but Relevant Slides



Bing AI says:

There could be many reasons why politicians do not support it, but some possible ones are:

- **They have a different ideological orientation** that favours individual freedom and choice over collective welfare and responsibility.
- They face **political pressure** from powerful interest groups, such as car manufacturers, oil companies, or road builders, who benefit from maintaining the status quo.
- They are **afraid of losing votes** from car-dependent or rural constituencies who might perceive sustainable transport as a threat to their lifestyle or livelihood.
- They **lack long-term vision** and prefer to focus on short-term gains or popular measures that do not address the root causes of transport problems.

Source:

<https://nyc.streetsblog.org/2023/03/05/paging-kevin-roose-our-conversation-with-the-bing-chatbot-was-much-better-than-yours/>

Who has political clout?

- Car manufacturers
- Fossil fuel companies

Who has marketing power?

- Car manufacturers
- Fossil fuel companies

WE HAVE FACTS ON OUR SIDE.

GOAL IS CAR INDEPENDENCE

(more safe, more affordable, more accessible, more environmental, more healthy)

- More safe infrastructure
- More constraints on cars (size, speed, street allocation, regulations that match goals)
- More vital neighborhoods (15 min access)

EMOTIONS

- More trial of ebikes/micromobility
- More elevating narrative of this lifestyle

https://twitter.com/Sean_Tuff/status/1627515708426051586?s=20

Bike accommodation on Rural Roads

No new ROW required
Shoulder in different color
Add a rumble strip!



Road to Salamanca, Spain

Health & Recreation. Air pollution (particulate matter 2.5 or PM2.5), represents [the largest environmental health risk factor](#) in the United States with [higher levels linked](#) to more cardiovascular problems, respiratory illness, diabetes and even birth defects. Black and brown populations suffer disproportionately ([American Lung Association](#)). Shifting the short trips from cars to walking or biking will reduce air pollution and thus reduce the associated negative health impacts. (Source: NAS).

Obesity rates in children have tripled since 1974, and today 40% of adult Americans are obese, costing us over \$176 billion a year (Source: [CDC](#)). Incidence of obesity is higher in Black and Hispanic populations. Blacks are 54% less likely to be active regardless of where they live .

Returning US obesity rates to 2000 levels would result in a health cost savings of \$88 billion annually. *One year's savings alone would finance the building of between 1.8 and 18 million miles of bicycle/trail miles.* The Freedom Network would make daily walking, biking, or movement on any small vehicle safe and therefore inviting once again. Research published in *Preventative Medicine* in 2018 estimated that one kilometer of cycling generates health benefits of \$0.62.

Prevalence of obesity among US. adults (1997-2018)

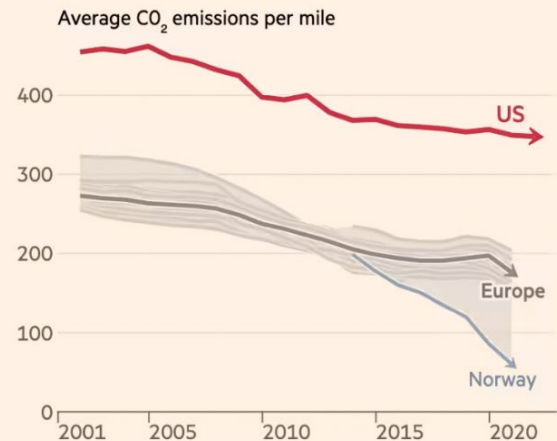
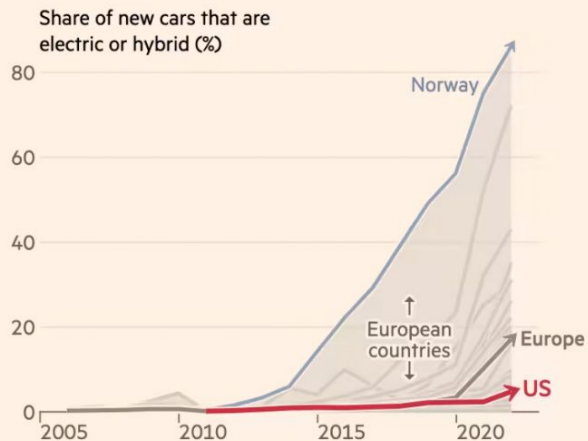
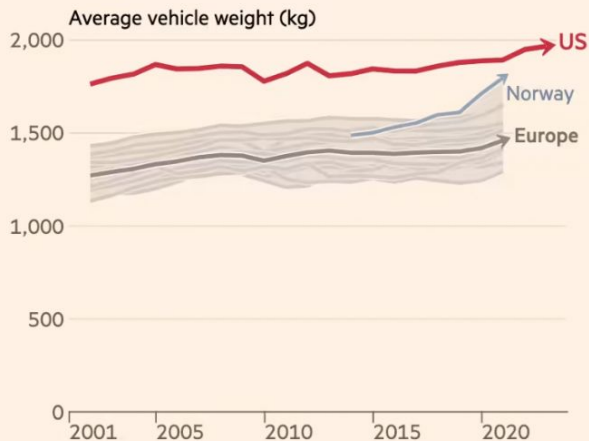
Source CDC



“Implementation of the plan keeps California economy on track for continued growth of the economy and jobs. This includes high-road jobs tied to industries such as zero-emission car and truck manufacturing that position California as a major competitor in the global clean-energy marketplace.”

American cars are much larger than European ones, and coupled with slow adoption of EVs this means they emit twice as much CO₂ per mile

Evolution of vehicle size, electrical vehicle adoption and vehicle emissions, US vs Europe



New Research Shows That E-Bikes Are Outpacing Electric Cars Sales in the U.S.

INDUSTRY PROFESSIONALS PREDICT THAT MORE THAN 1 MILLION E-BIKES WILL BE SOLD IN THE STATES THIS YEAR.

BY MOLLY HURFORD Published: Apr 27, 2022



 **Mike Hudema**  @MikeHudema · Nov 9

Paris is working to become a '15-minute city' where everything you need is located locally within 15 mins. Every street will have a bike lane, 60,000 parking spots are being removed & replaced with parks. They aren't done yet.

We have the solutions implement them.

#ActOnClimate

How Five U.S. Cities Built 335 Miles of Bike Lanes in 24 Months



Bike lanes can take forever to build in the U.S. A new project offers a proven playbook to fast-track bike lane networks.

YASMIN GARAAD AUGUST 24, 2022



PIONEERS
OF CHANGE

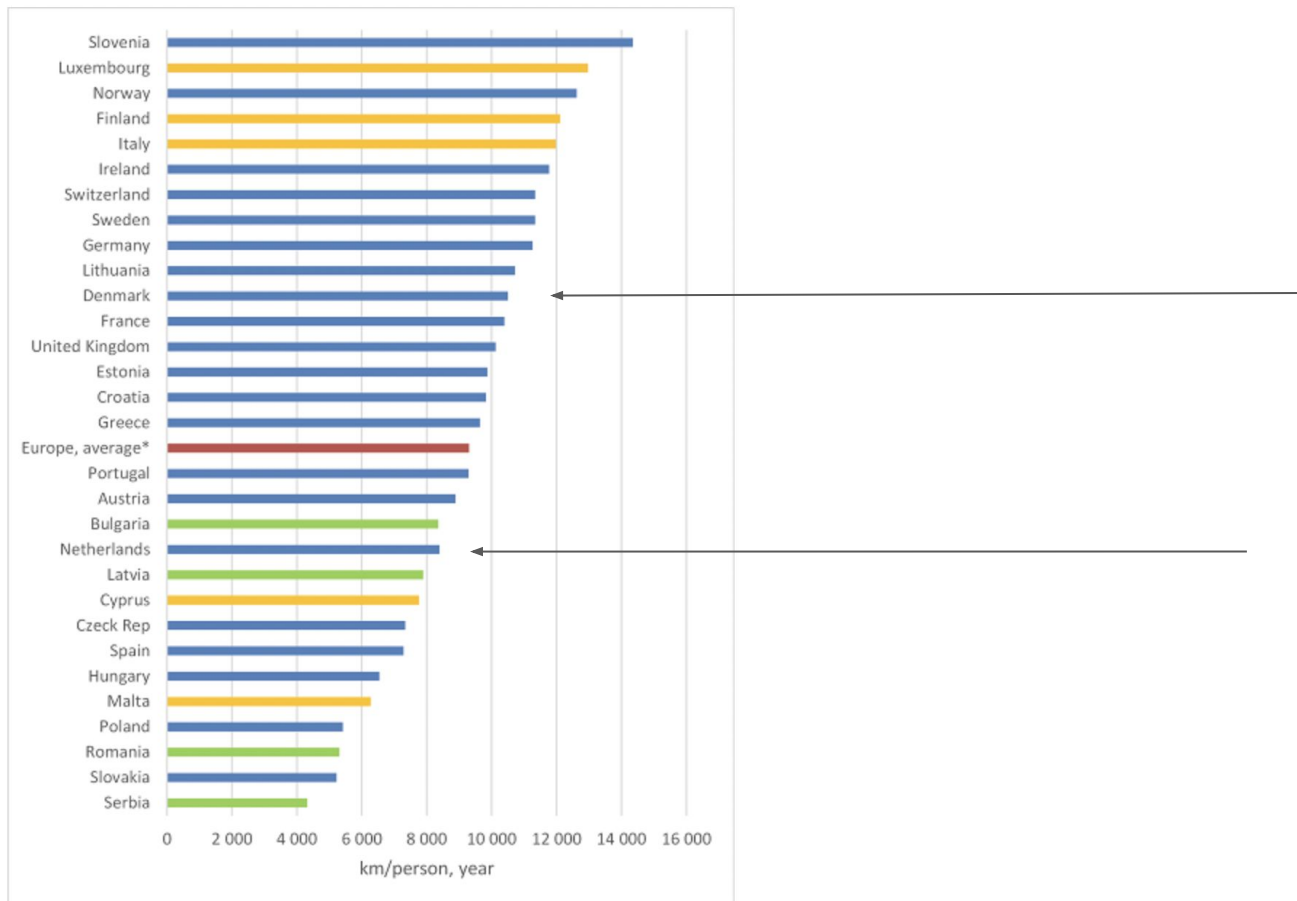
WORLD
ECONOMIC
FORUM

1:04 / 1:44  



Modern Paris sewers constructed 1880-1914
Tens of thousands of “water carriers” lost their jobs

Figure 2: Car travel mileage per person in 2018



* European average calculated as the arithmetic average of individual countries presented in the figure.

Source: Odyssee Database

Top 20 countries for EV sales

Electric vehicle sales as a percentage of overall car sales in 2021

