

Decarbonization of transport

Jan Osička

Global CO₂ emissions from transport

This is based on global transport emissions in 2018, which totalled 8 billion tonnes CO₂.
Transport accounts for 24% of CO₂ emissions from energy.



74.5% of transport emissions
come from road vehicles



OurWorldinData.org – Research and data to make progress against the world's largest problems.

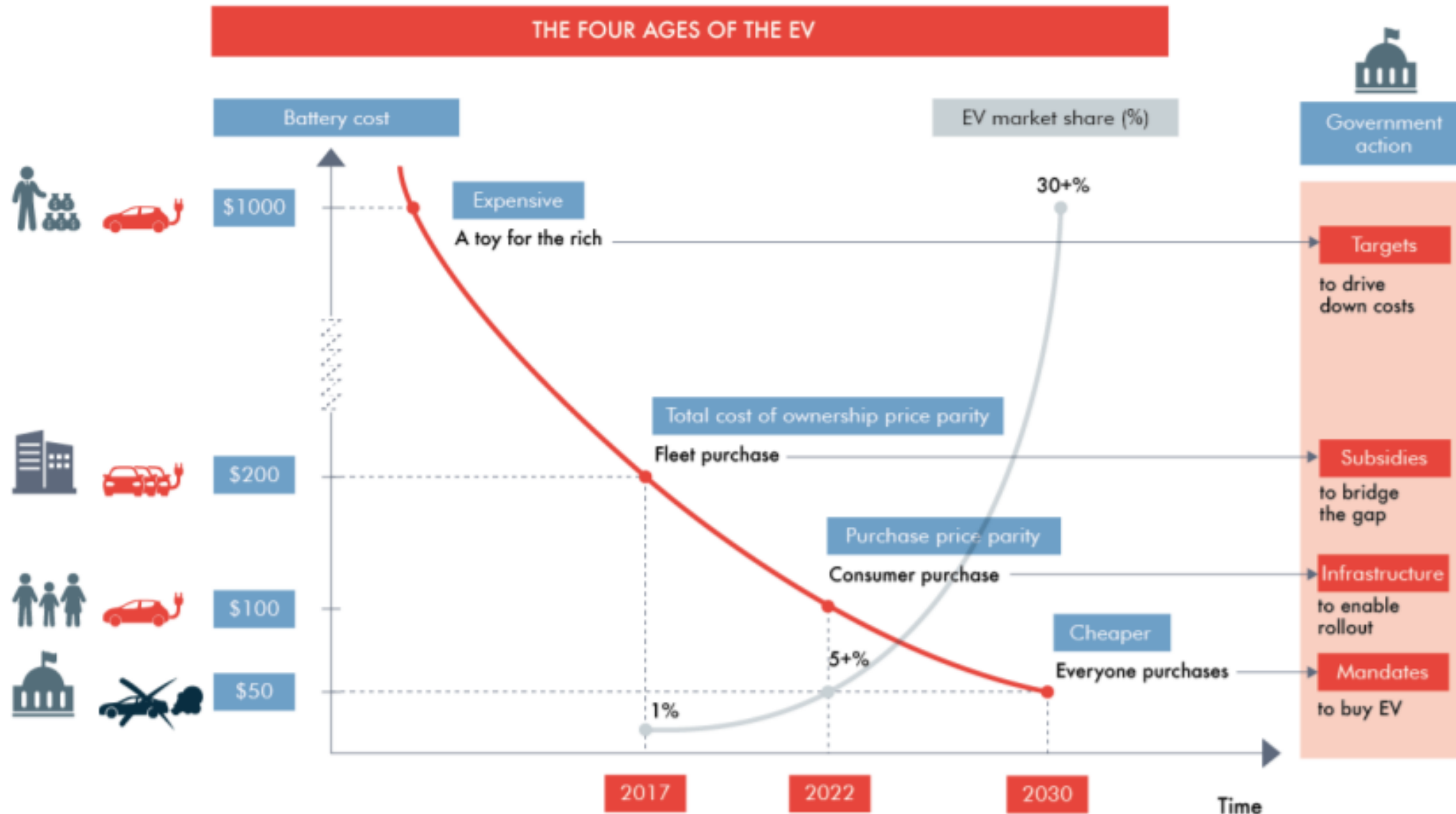
Data Source: Our World in Data based on International Energy Agency (IEA) and the International Council on Clean Transportation (ICCT).

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Step 1: Electrification of transport



ICEVs and EVs reached cost parity between 2017 and 202x

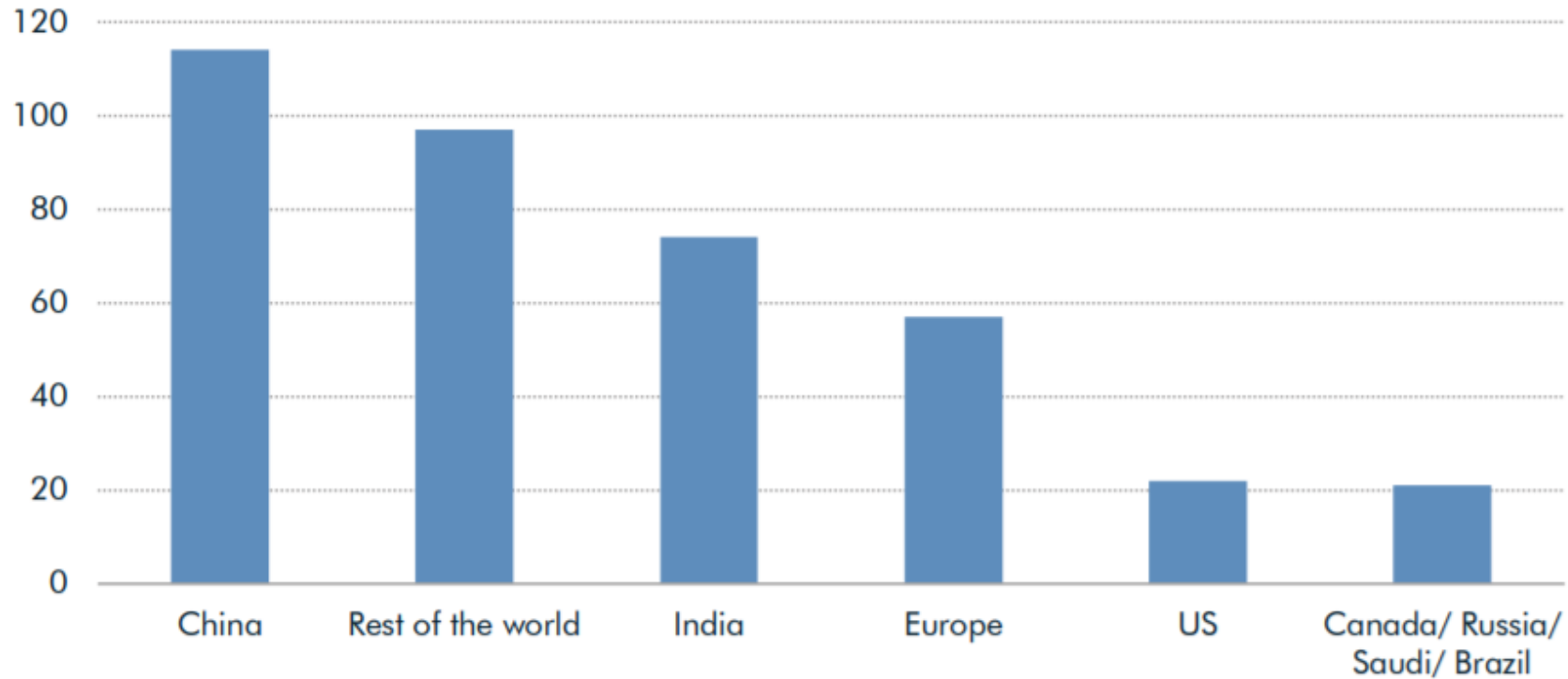


Source:
[Carbon Tracker](#)

As a policy-maker, why should you want EVs?

Air pollution kills

FIGURE 9: TRANSPORT RELATED DEATHS FROM AIR POLLUTION 2015 (TH)



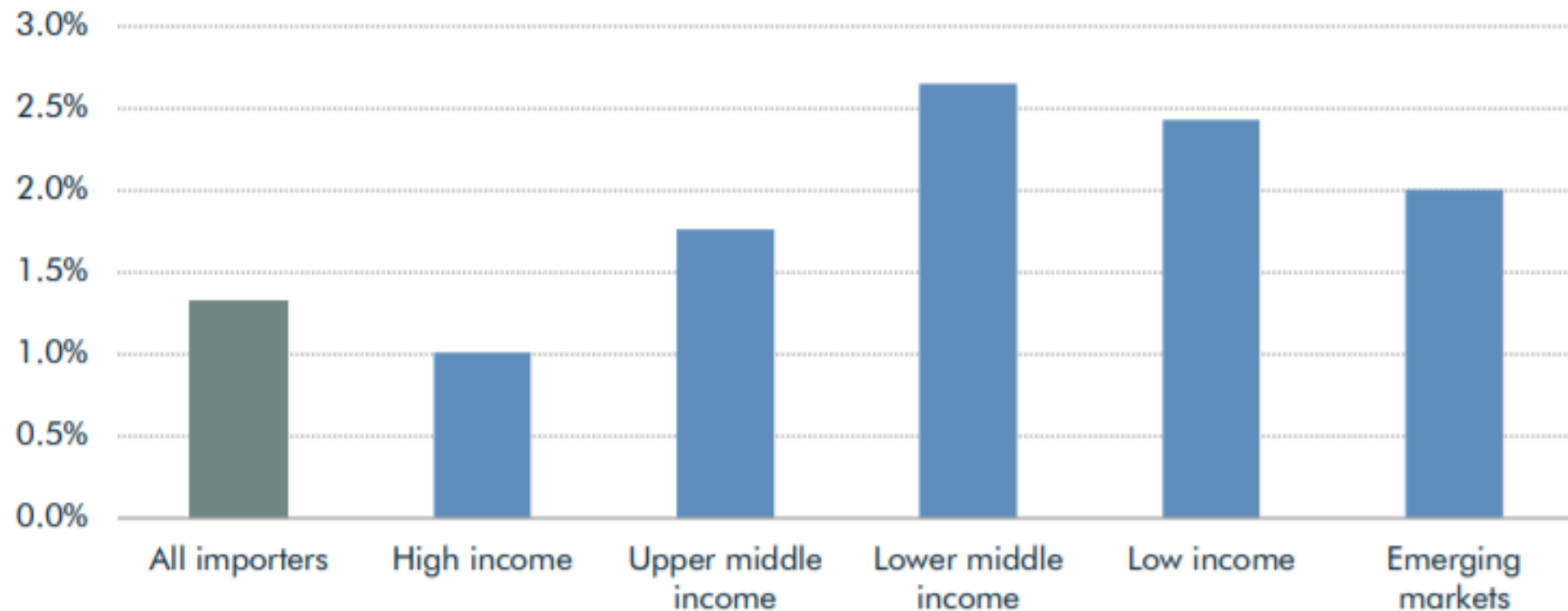
Source: ICCT

Note: there are other significant sources of traffic pollution, e.g., resuspension and wear

Source:
[Carbon Tracker](#)

Billions of dollars saved by removing import

FIGURE 5: OIL IMPORTS AS % OF GDP 2017



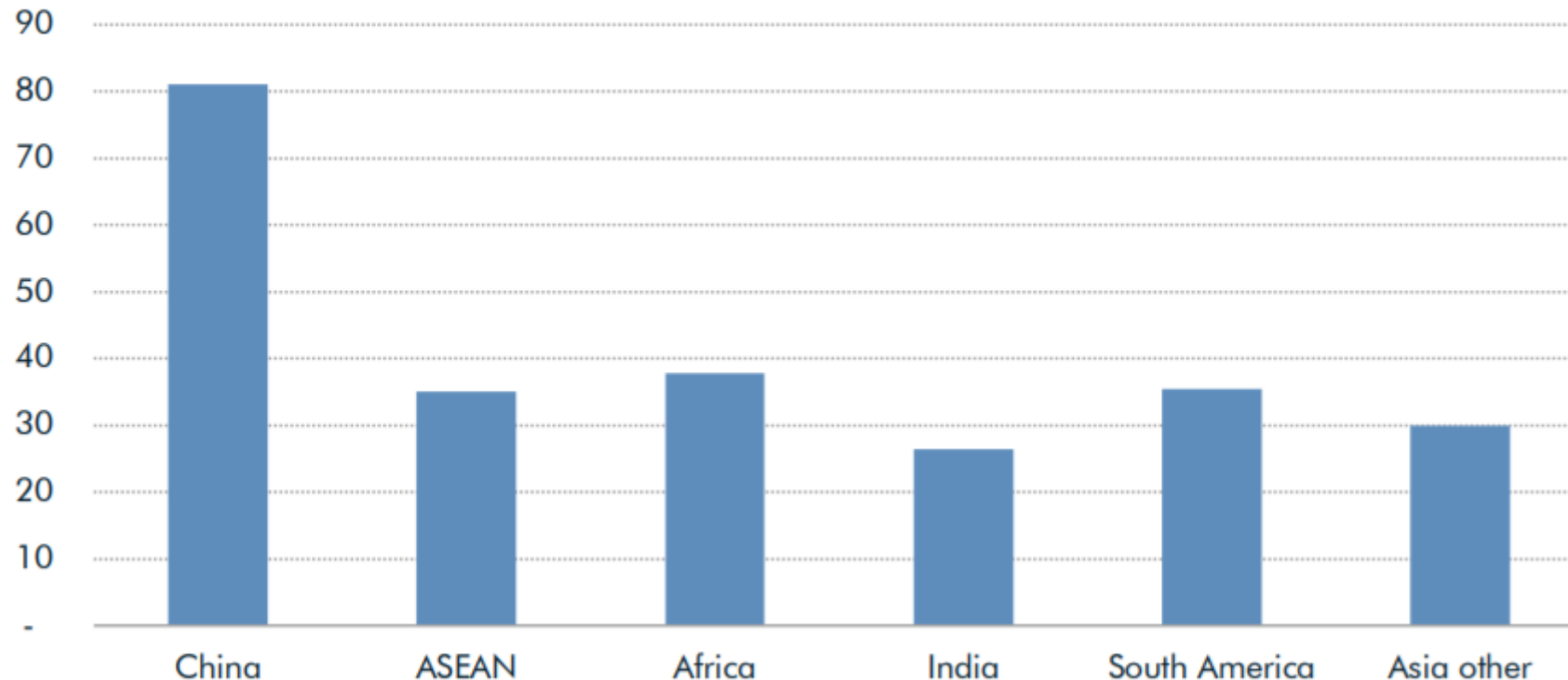
Source: World Bank

=> More than enough to finance the e-mobility infrastructure

Source:
[Carbon Tracker](#)

Billions of dollars saved by removing import

FIGURE 11: 2030 ANNUAL SAVINGS ON OIL IMPORTS FROM A SWITCH TO ELECTRICITY (\$BN)

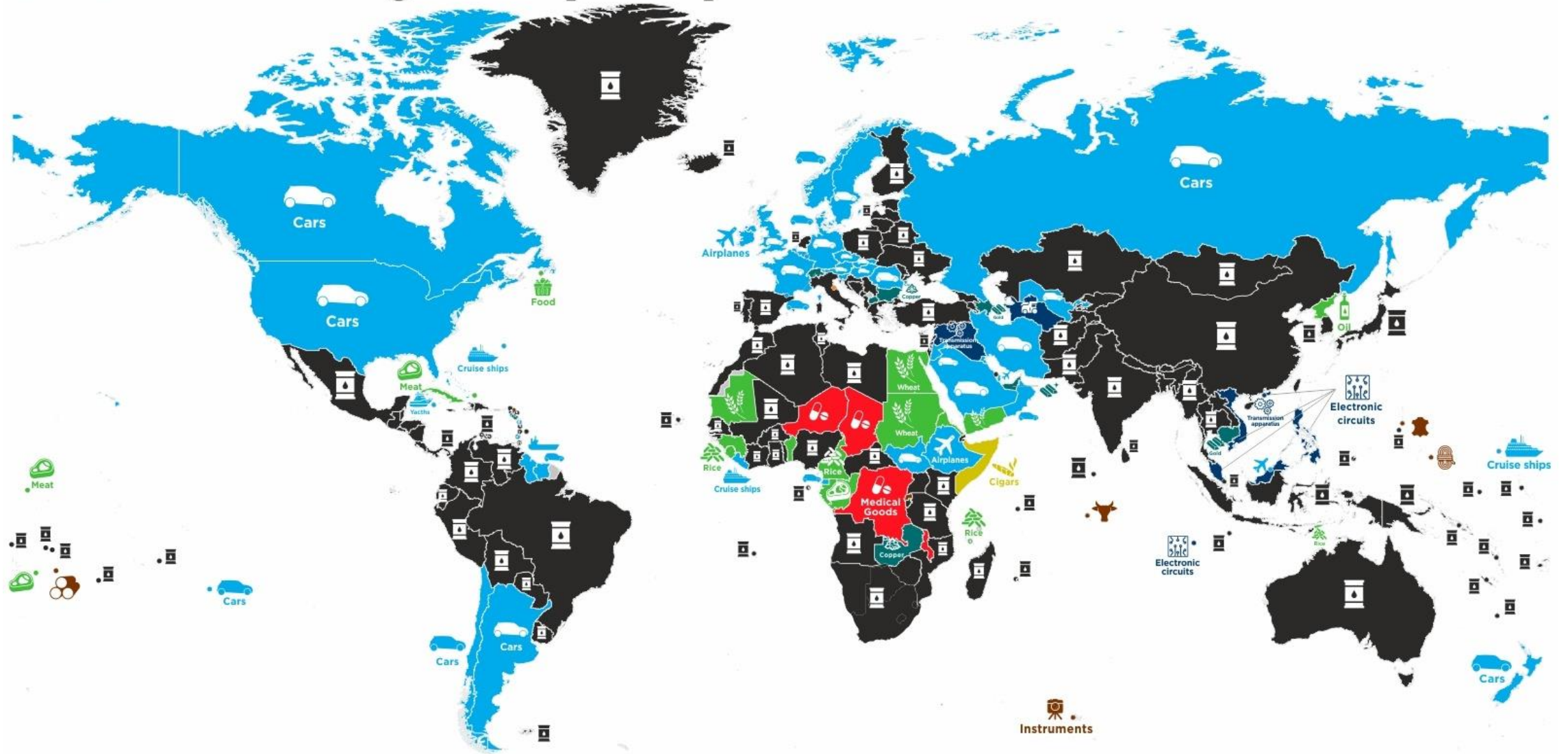


Source: IEA WEO 2020, Carbon Tracker estimates.

Owning an ICEV assumes importing ca. 10,000 USD worth of gasoline
Owning an EV assumes procuring ca 1,000 USD worth of solar generation equipment

Source:
[Carbon Tracker](#)

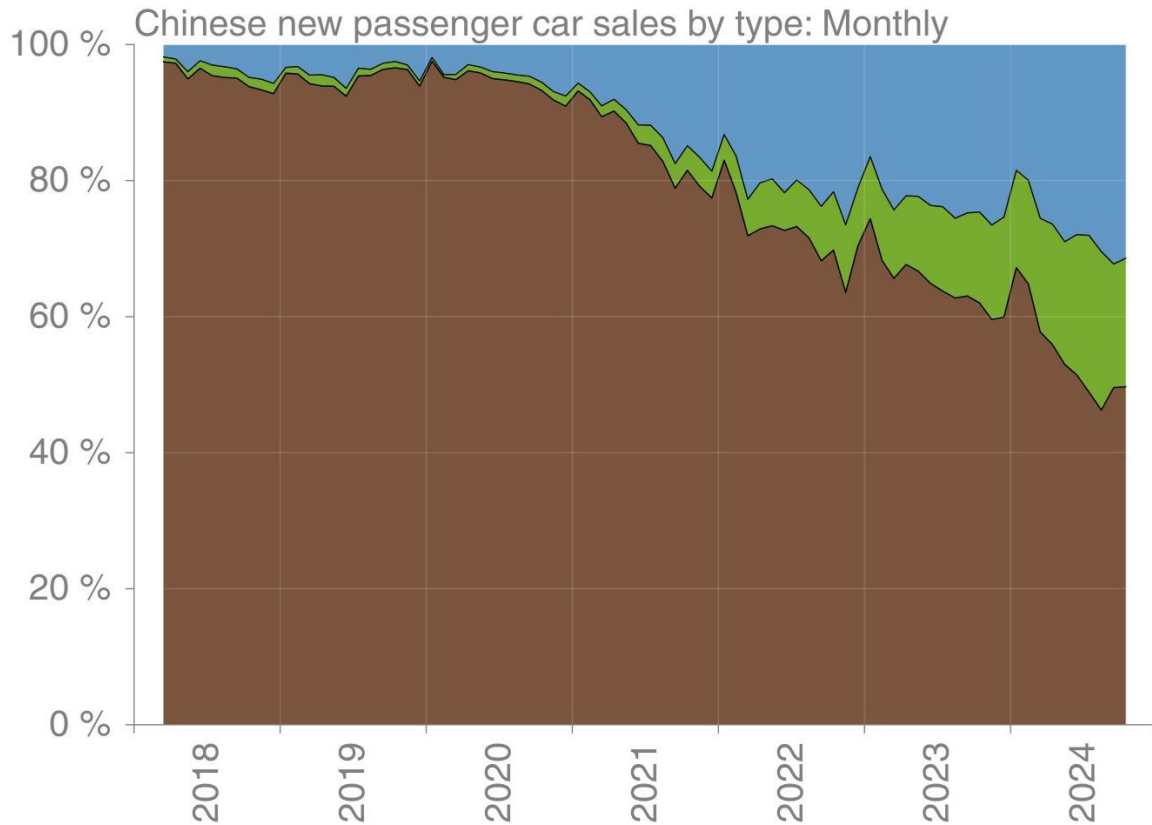
Each Country's Top Import in World



Product Category	Color	Icon
Drugs & Beverages	Yellow	None
Electrical Energy	Orange	None
Food	Green	Leaf
Machinery	Dark Blue	Gear
Medical Goods	Red	Pill
Oil	Black	Barrel
Ores	Teal	Rock
Vehicles	Light Blue	Car
Other	Brown	Microscope
N/A	Grey	None

Article & Sources:
<https://howmuch.net/articles/top-import-around-the-world>
UN Comtrade Database 2018 - <https://comtrade.un.org>
CEPII - BACI - <http://www.cepii.fr/CEPII/>

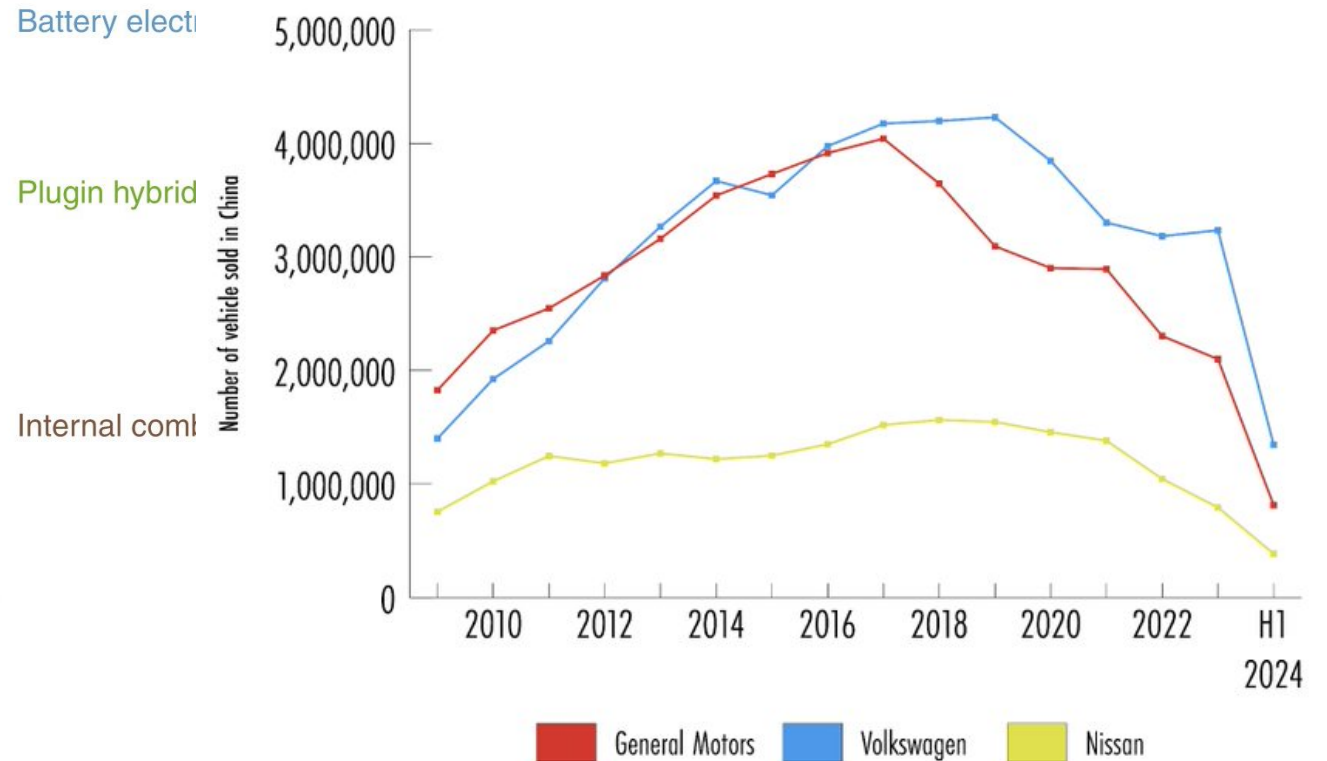
Carmakers already know...



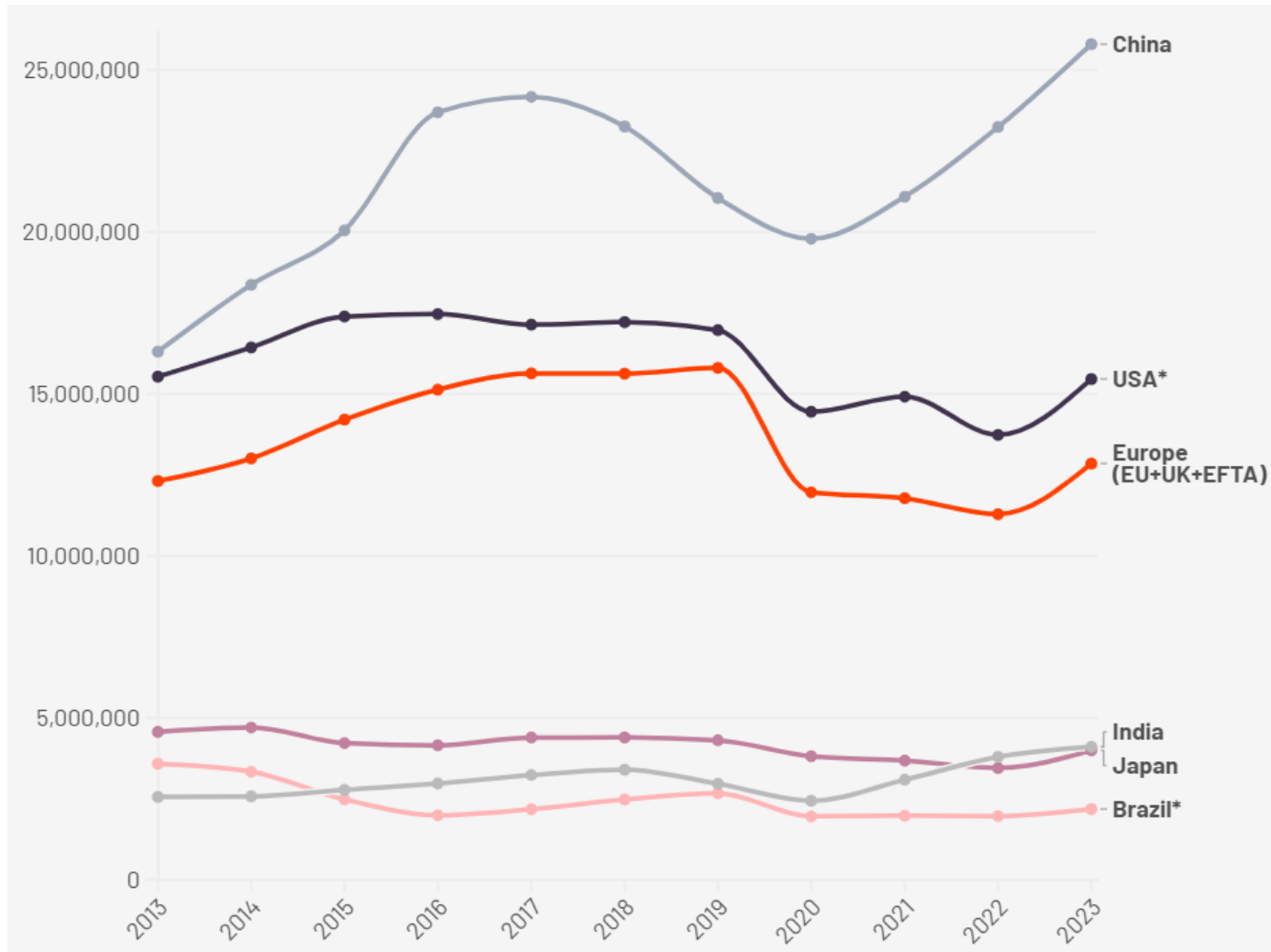
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Seismic Changes

China used to be their largest market by far, but sales are dropping fast

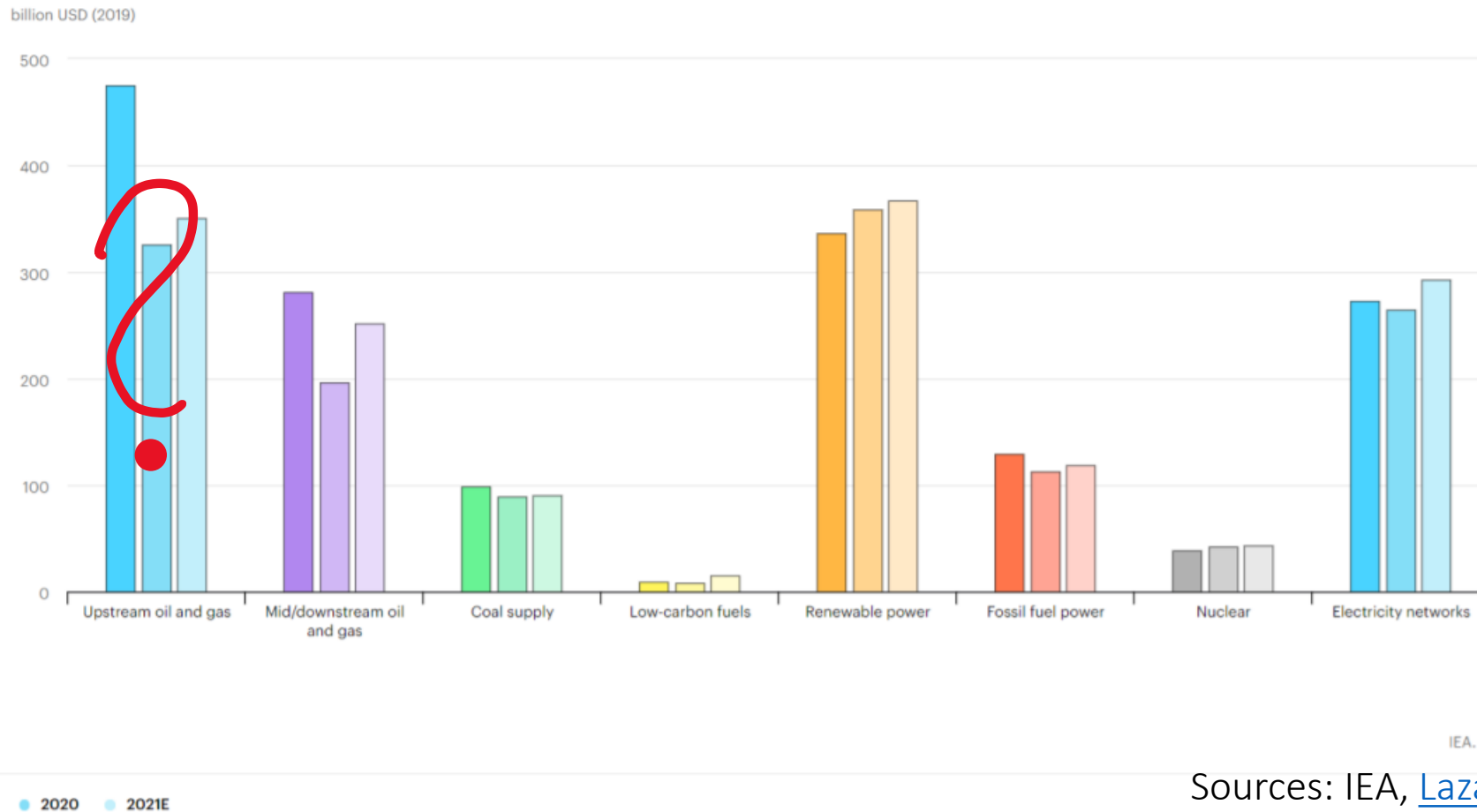


Carmakers already know...



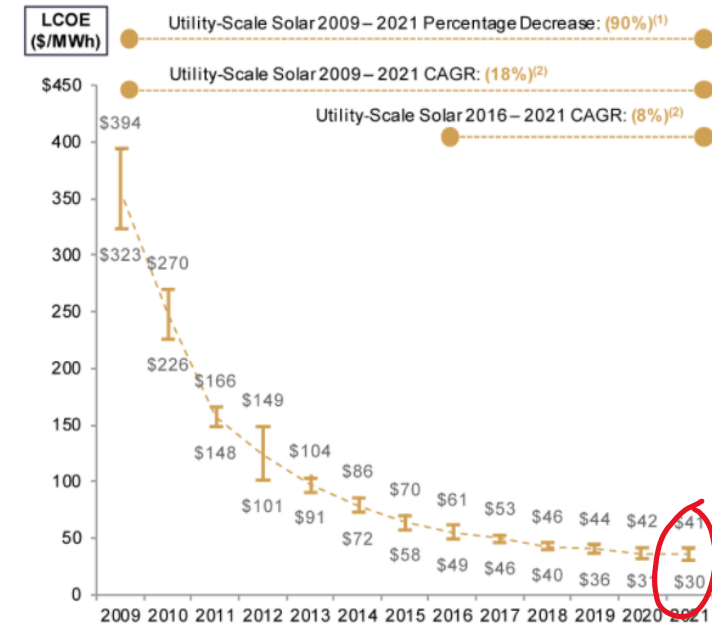
...O&G industry does not

Global energy supply investment by sector, 2019-2021

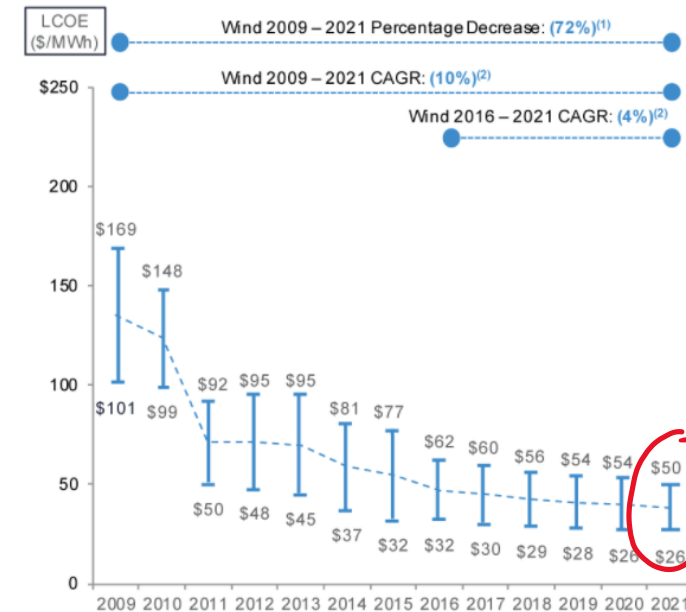


Sources: IEA, [Lazard](#)

Unsubsidized Solar PV LCOE



Unsubsidized Wind LCOE



Step 2: What is step 2, actually?

Car culture: What does car mean to you?



Step 2: What is step 2, actually?

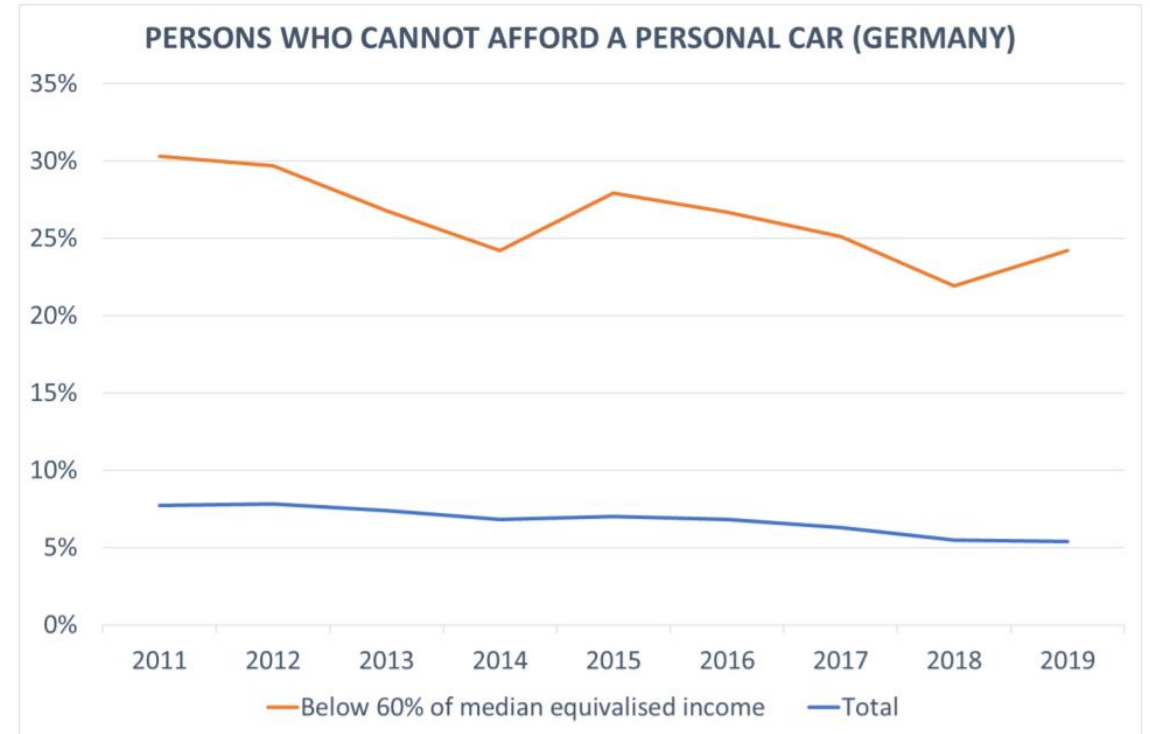
- Cars are great individually but terrible collectively
- E-mobility is a critical juncture in the development of transportation
- Much more profound changes are desirable
- (The car) culture being among the biggest obstacles

Cars kill

- 1.3 million killed annually in road accidents
- Road traffic injuries leading cause of death for people aged 5-29
- More than half of all road traffic deaths are among vulnerable road users

Car dependency causes transport poverty

Notion	Definition
Mobility poverty	A systemic lack of (usually motorised) transport that generates difficulties in moving, often (but not always) connected to a lack of services or infrastructures
Accessibility poverty	The difficulty of reaching certain key activities – such as employment, education, healthcare services, shops and so on – at reasonable time, ease and cost
Transport affordability	The lack of individual/household resources to afford transportation options, typically with reference to the car (in developed countries) and/or public transport
Exposure to transport externalities	The outcomes of disproportionate exposures to the negative effects of the transport system, such as road traffic casualties and chronic diseases and deaths from traffic related pollution. Often considered within the US literature from an environmental justice perspective



Sources: [Mattioli 2016](#), [Mattioli 2021](#)

Car dependency causes transport poverty

Lifetime car costs as percentage of net income/wealth				
Net income - 1-Person Household		Opel Corsa	VW Golf	Mercedes GLC
		352,974	403,179	679,167
Wealthy	52,654,323 €	1%	1%	1%
Millionaires	5,265,432 €	7%	8%	13%
Senior employee	2,726,707 €	13%	15%	25%
Outstanding specialist	1,857,901 €	19%	22%	37%
Specialist	1,372,493 €	26%	29%	49%
Semi-skilled worker	1,118,376 €	32%	36%	61%
Unskilled worker	990,982 €	36%	41%	69%

Source: [Gössling et al. 2022](#)

Cars are energy- and space-inefficient

STRUCTURAL WASTE IN THE MOBILITY SYSTEM

CAR UTILISATION¹



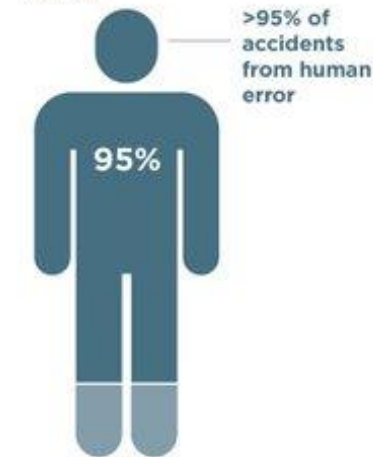
TANK-TO-WHEEL ENERGY FLOW - PETROL



● Productive use

DEATHS AND INJURIES/ YEAR ON ROAD

30,000 deaths in accidents and 4X as many disabling injuries²



LAND UTILISATION:

5%

Road reaches peak throughput only 5% of time and only 10% covered with cars then

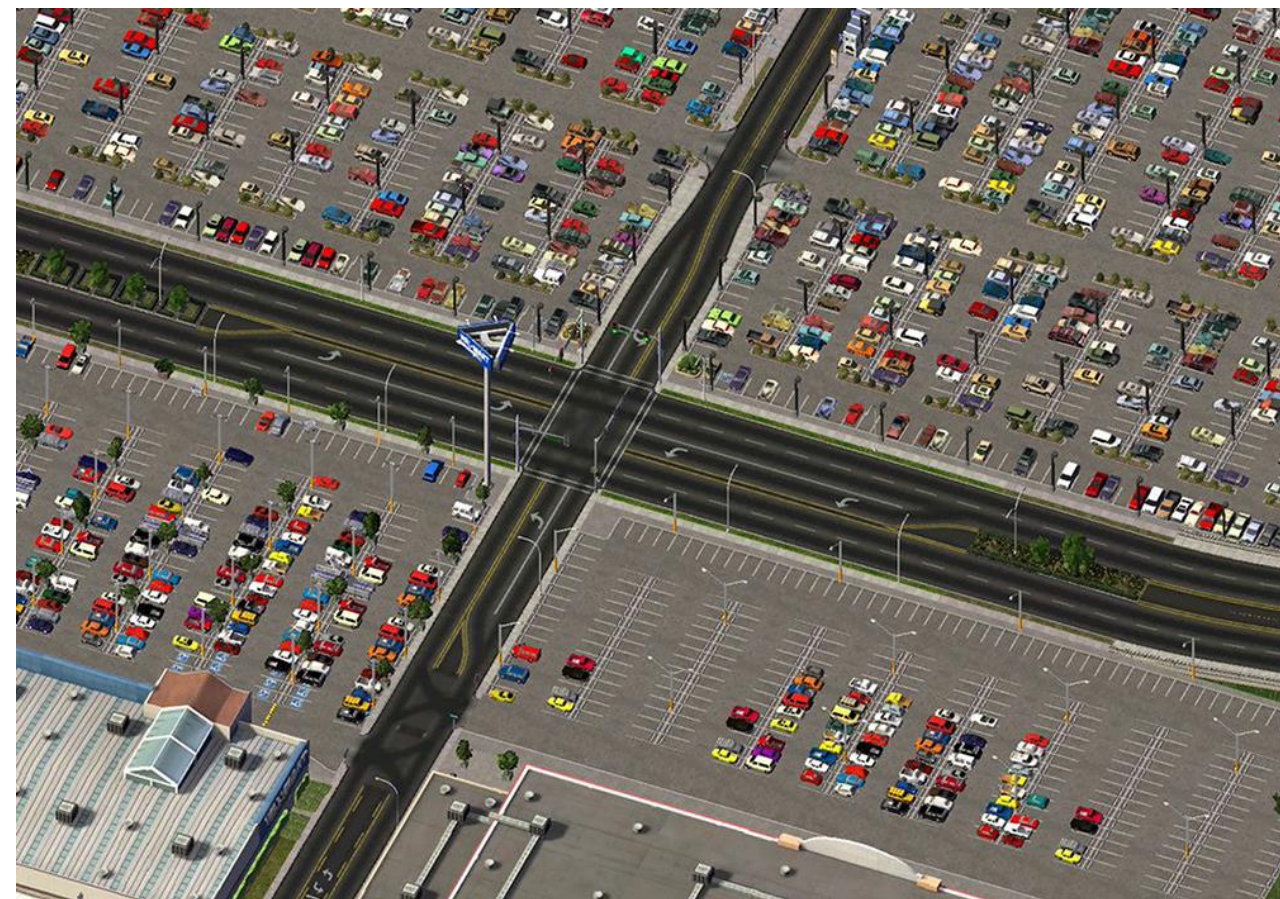
50%

50% of most city land dedicated to streets and roads, parking, service stations, driveways, signals, and traffic signs

¹ Based on car parked number for France and productive vs. unproductive driving time in US. ² For every death on Europe's roads there are an estimated four permanently disabling injuries. ³ Based on average car weight of 1.4 tonnes and average occupation of 1.5 passengers of 75 kg.

Source: EU Commission mobility and transport, accident statistics; www.fueleconomy.gov; EEA car occupancy rates data; S. Heck and M. Rogers, *Resource revolution: How to capture the biggest business opportunity in a century*, 2014; Centre d'études sur les réseaux, les transports, l'urbanisme et les constructions publiques.

Cars define cities



Induced traffic



Cars enable urban sprawl

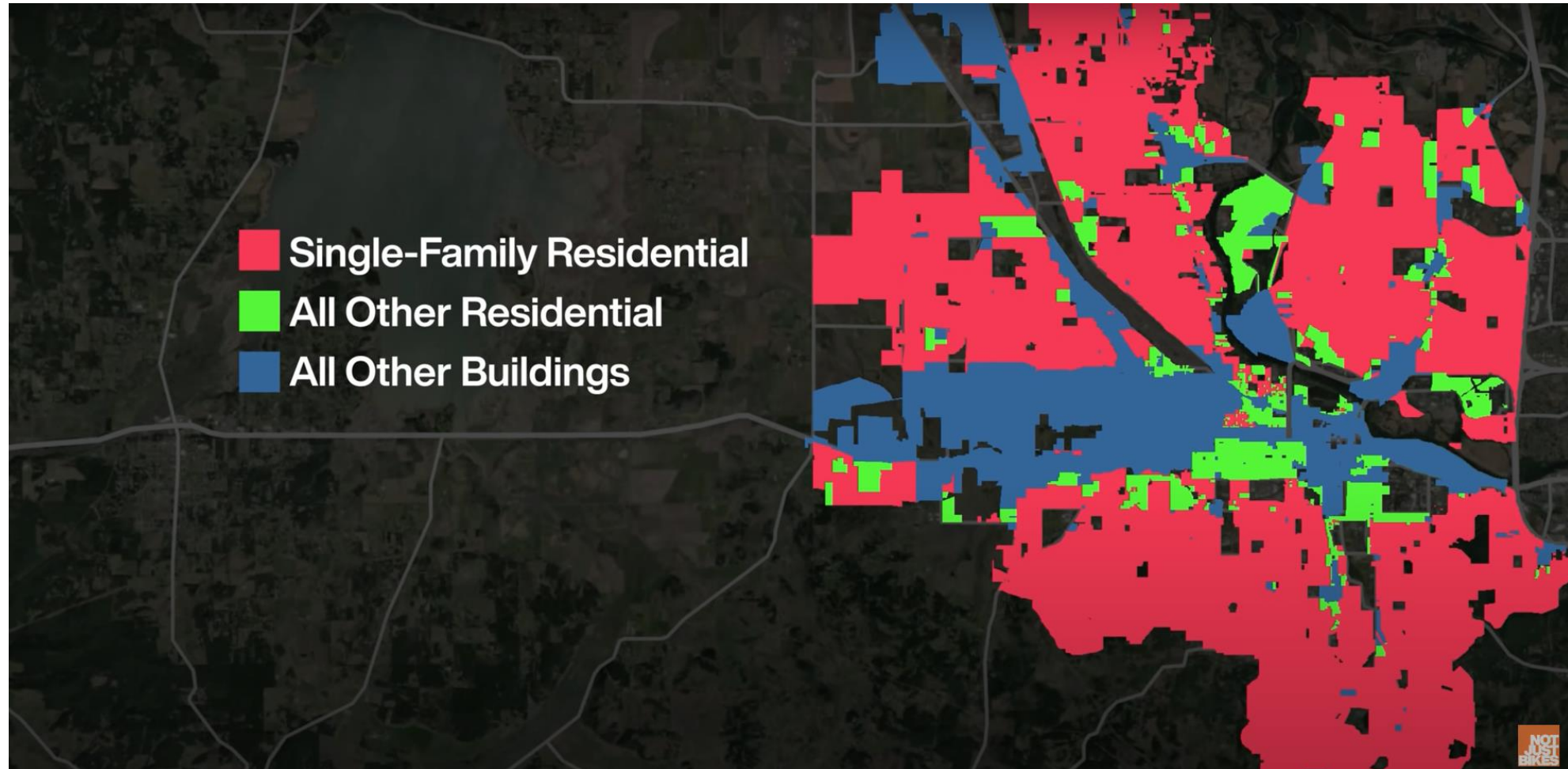


Urban sprawl makes cities poor

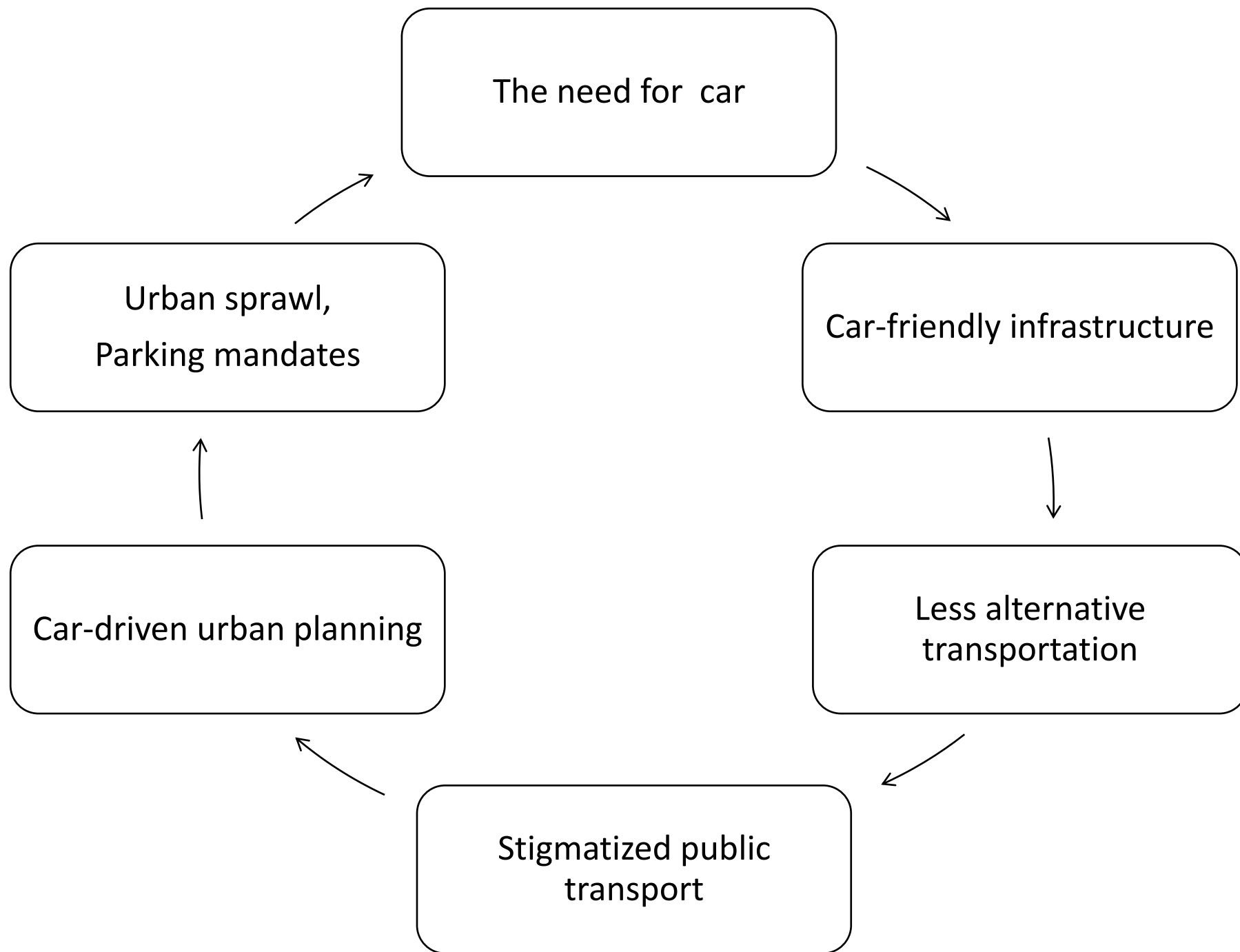
	LOW DENSITY	MEDIUM DENSITY	HIGH DENSITY
RESIDENTIAL	 <p>-\$1,381</p>	 <p>\$1,498</p>	 <p>\$3,061</p>
MIXED-USE	 <p>\$2,540</p>	 <p>\$3,515</p>	 <p>\$10,472</p>
COMMERCIAL	 <p>\$551</p>	 <p>\$9,614</p>	 <p>\$12,051</p>

Data:
Eugene
(OR, USA)
Source: [Not Just Bikes](#)

Urban sprawl makes cities poor



Data:
Eugene
(OR, USA)
Source: [Not Just Bikes](#)



Step 2: What is step 2, actually?

- Cars are great individually but terrible collectively
- E-mobility is a critical juncture in the development of transportation
- Much more profound changes are desirable
- “Motonormativity” (car culture) is preventing us from reflecting on these issues dispassionately.
- Cars continue to be held to a different standard.

Car culture – “motonormativity”

Normal

Radical

Accepting traffic fatalities

Wanting to prevent traffic fatalities

Accepting excessive speeds

Wanting slower speeds

Accepting unsafe streets

Wanting safer streets

Accepting pollution

Wanting less pollution

Accepting compromised youth & senior mobility

Wanting youth & senior mobility

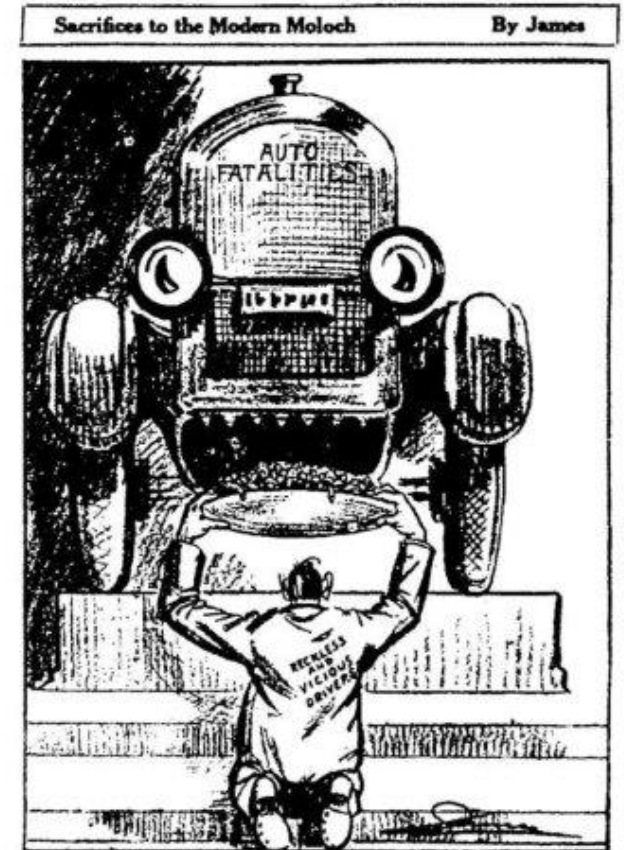


Figure 1.3
Cartoon by "James," *St. Louis Star*, November 6, 1923, p. 14.