

Decarbonization of transport

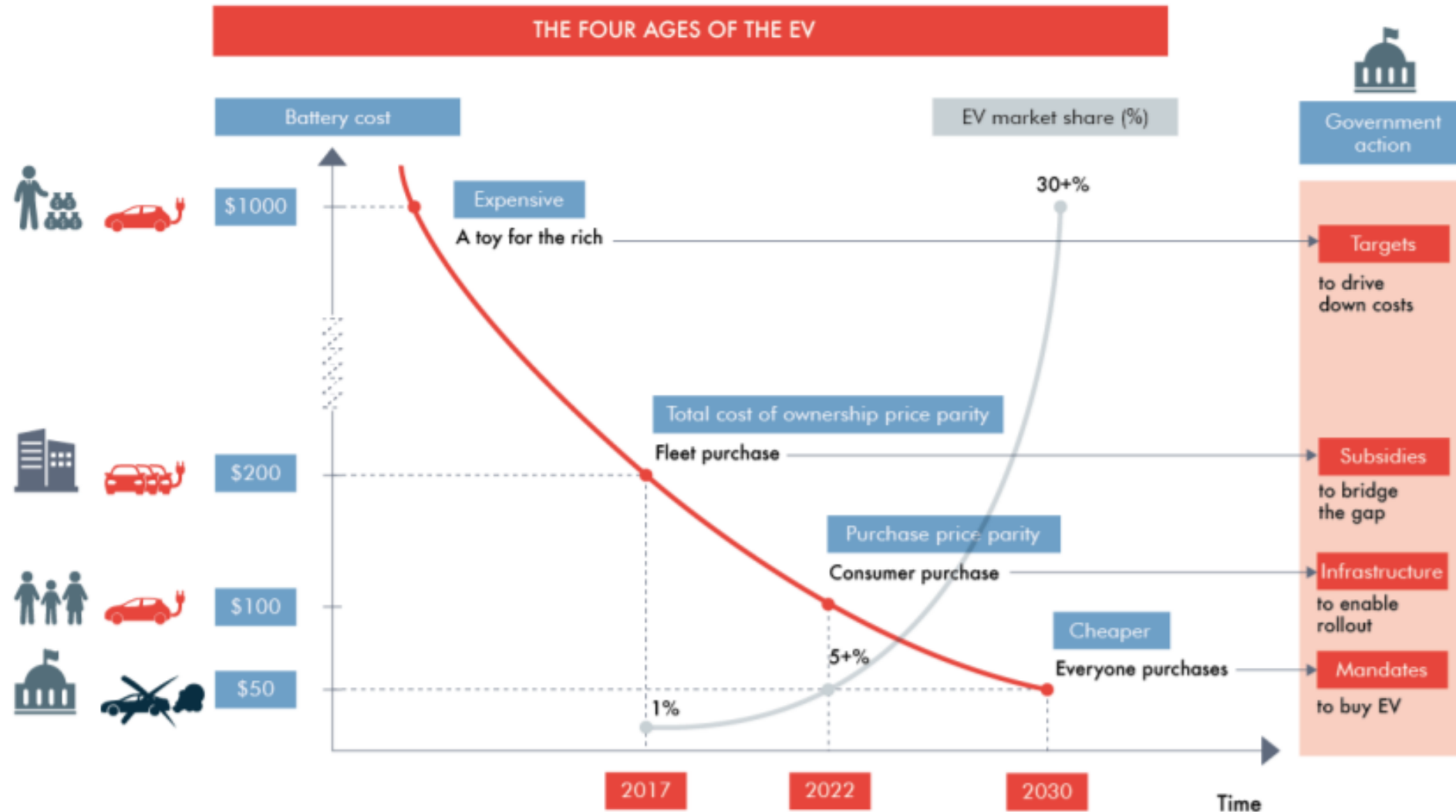
Jan Osička

Step 1: Electrification of transport



ICEVs and EVs reached cost parity between 2017 and 202x

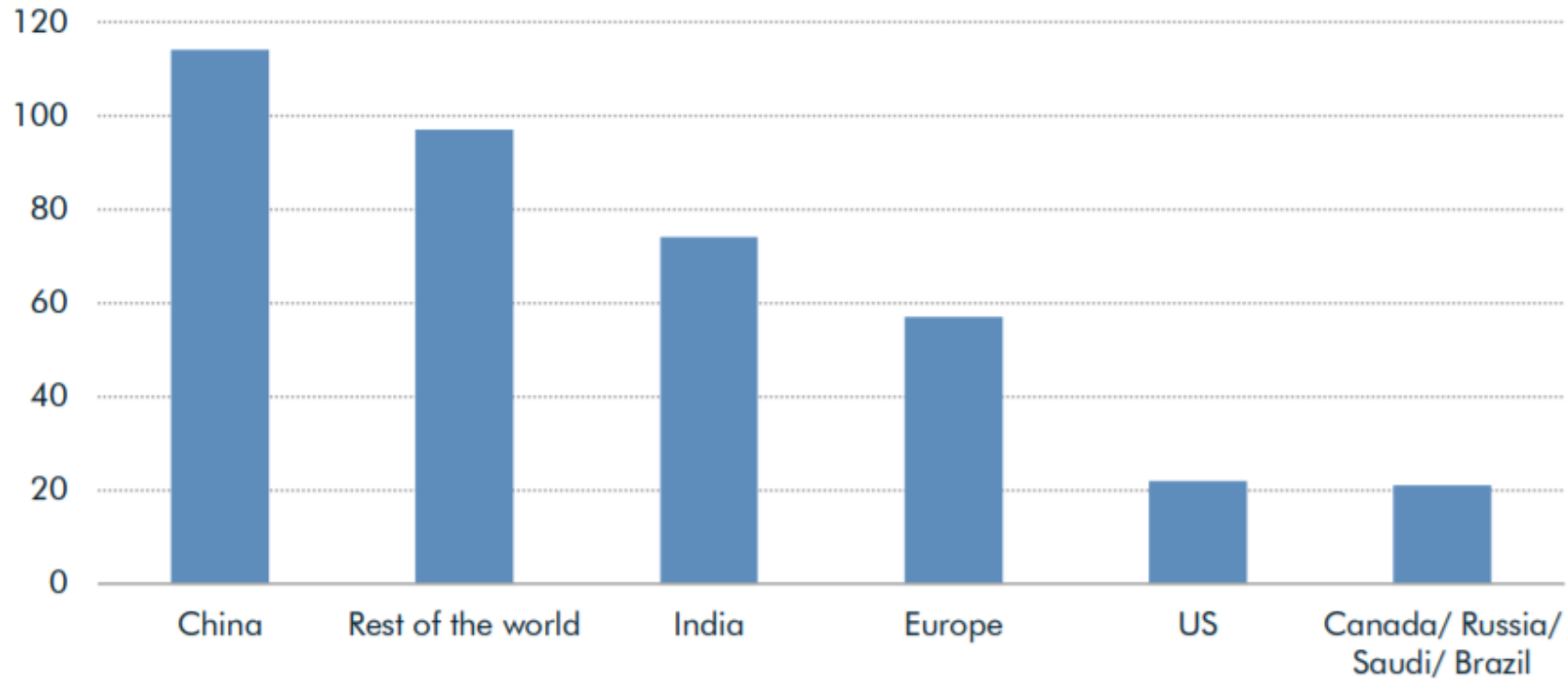
FIGURE 13: THE FOUR AGES OF THE EV



Source:
[Carbon Tracker](#)

Nearly 400k lives saved annually

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

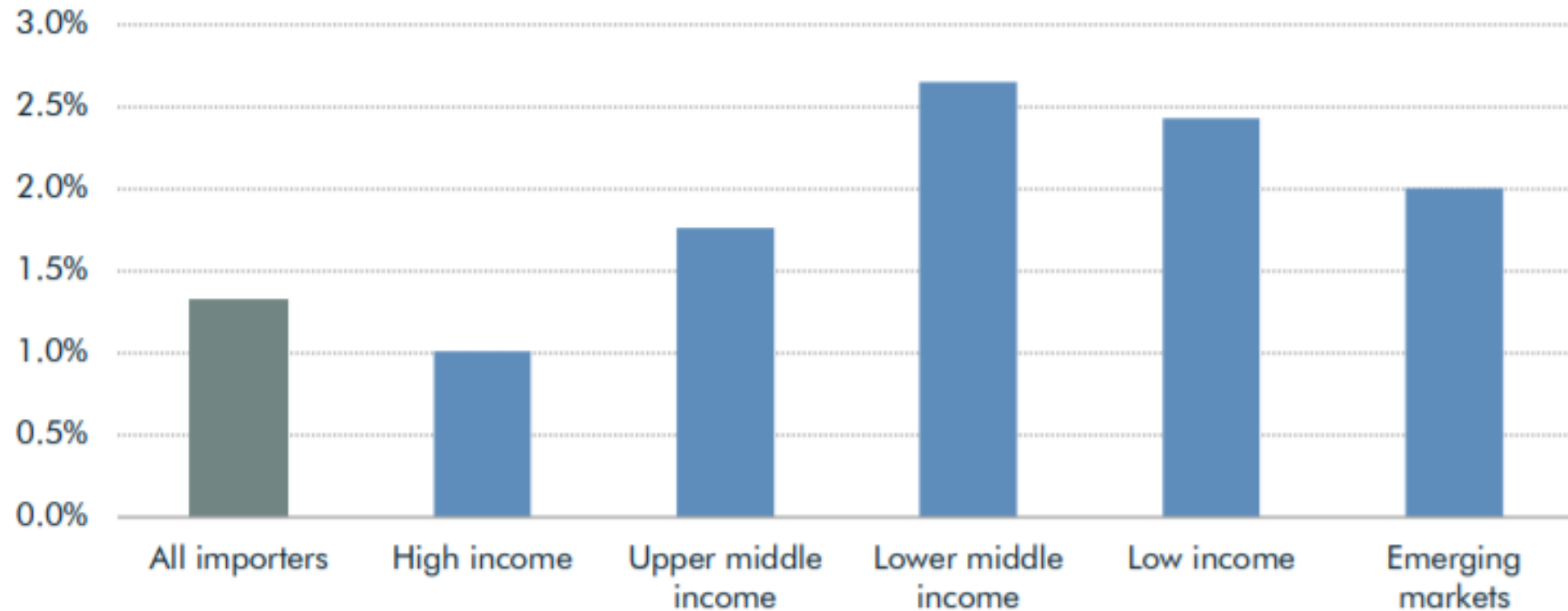


Source: ICCT

Source:
[Carbon Tracker](#)

Billions of dollars saved by removing import

FIGURE 5: OIL IMPORTS AS % OF GDP 2017



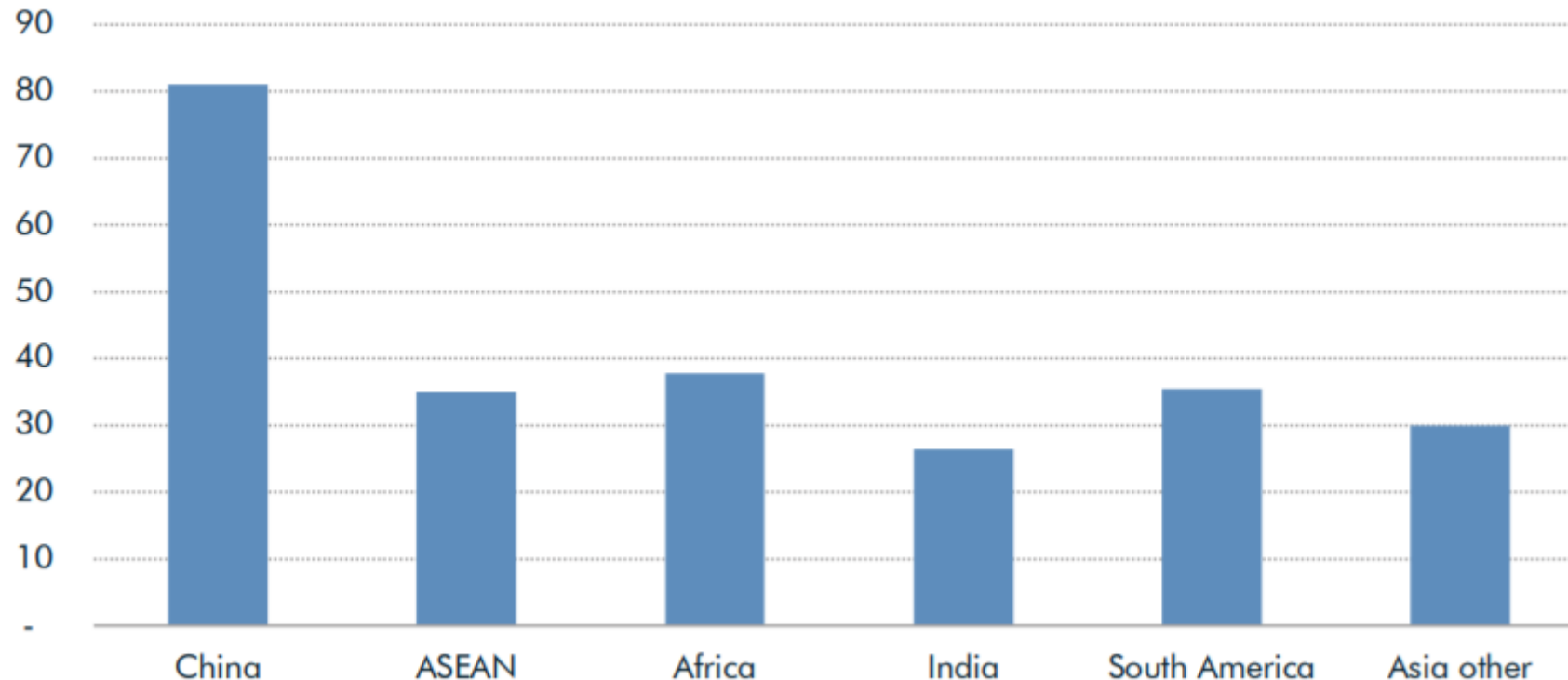
Source: World Bank

=> 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.

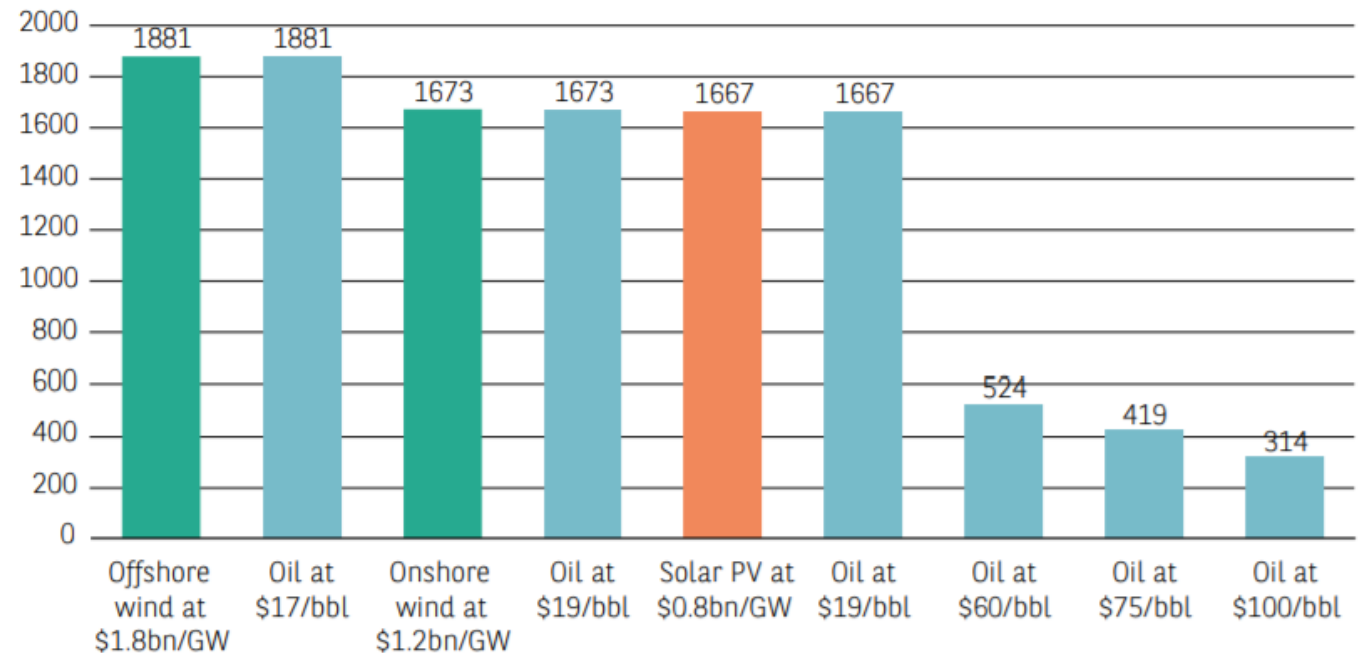
Owning an ICEV assumes importing ca. 10,000 USD worth of gasoline
Owning an EV assumes procuring ca 1,000 USD worth of solar generation equipment

Source:
[Carbon Tracker](#)

A thought experiment: Energy return on capital investment

- USD 100 bn invested in:
 - Oil supply, refining, retail + ICE
 - vRES electricity supply + BEV
- Assumptions:
 - Light duty vehicles (~36% of the market)
 - Timeframe: 25 yers
 - LCOE solar: 65 USD/MWh
 - LCOE wind: 60 USD/MWh
 - LCOE offshore wind: 70 USD/MWh
 - Oil price: 60 USD/b
 - Supply and conversion efficiency (G): 10%
 - Supply and conversion efficiency (D): 19%
 - Supply and conversion efficiency (E): 50%

Figure 28: Net EROCI from new renewables projects in tandem with EVs versus oil used for diesel LPVs (TWh)

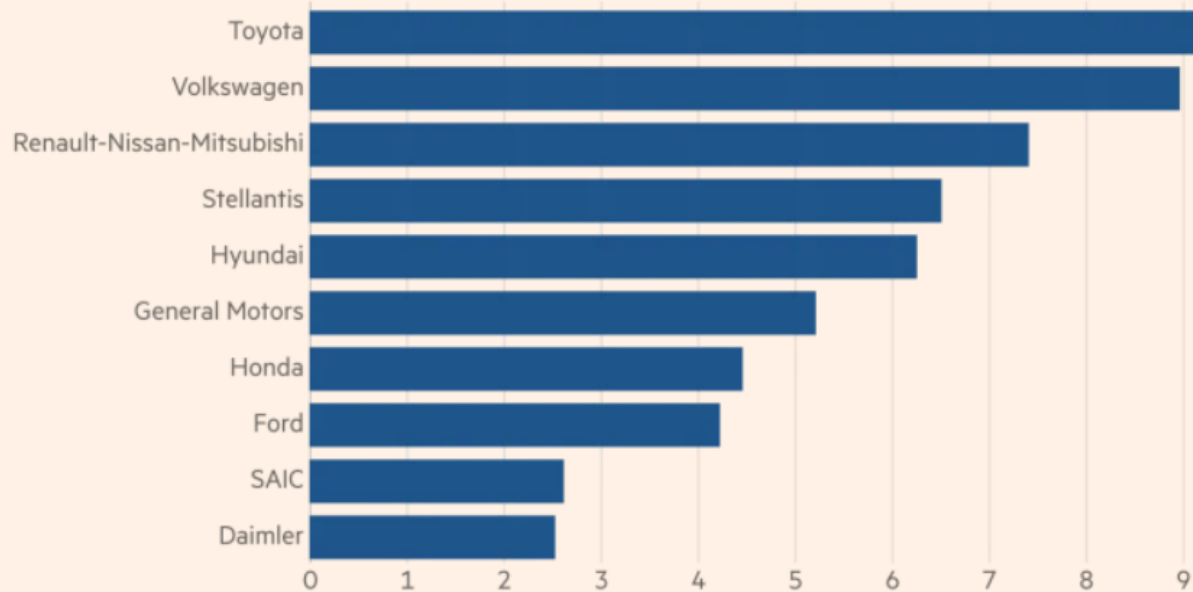


Source: BNP Paribas Asset Management estimates.

Carmakers already know...

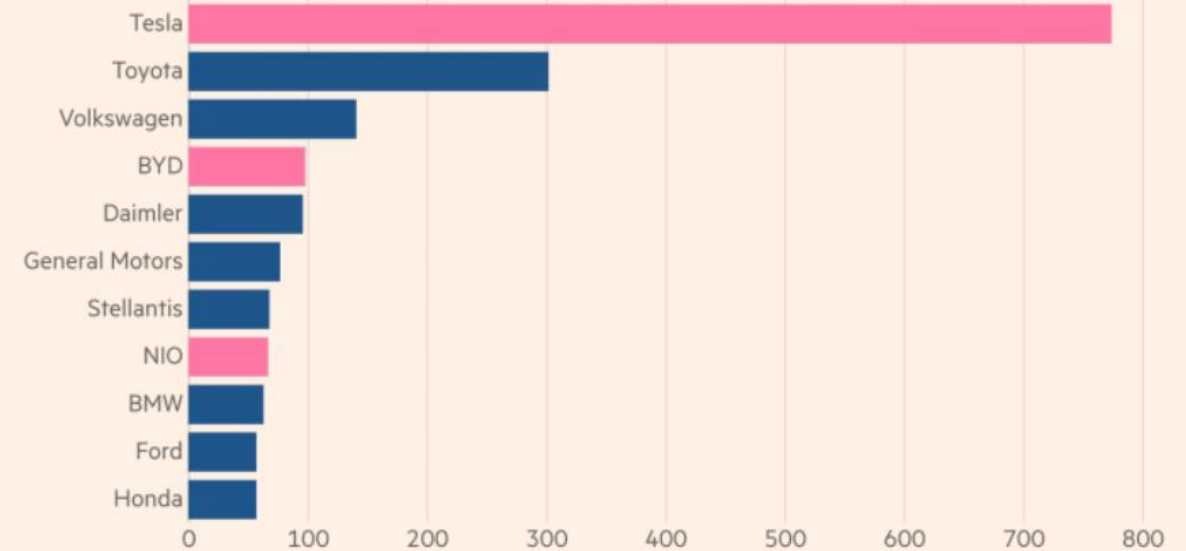
The world's biggest car companies

By unit sales in 2020 (m)



Leading car companies by market capitalisation (\$bn)

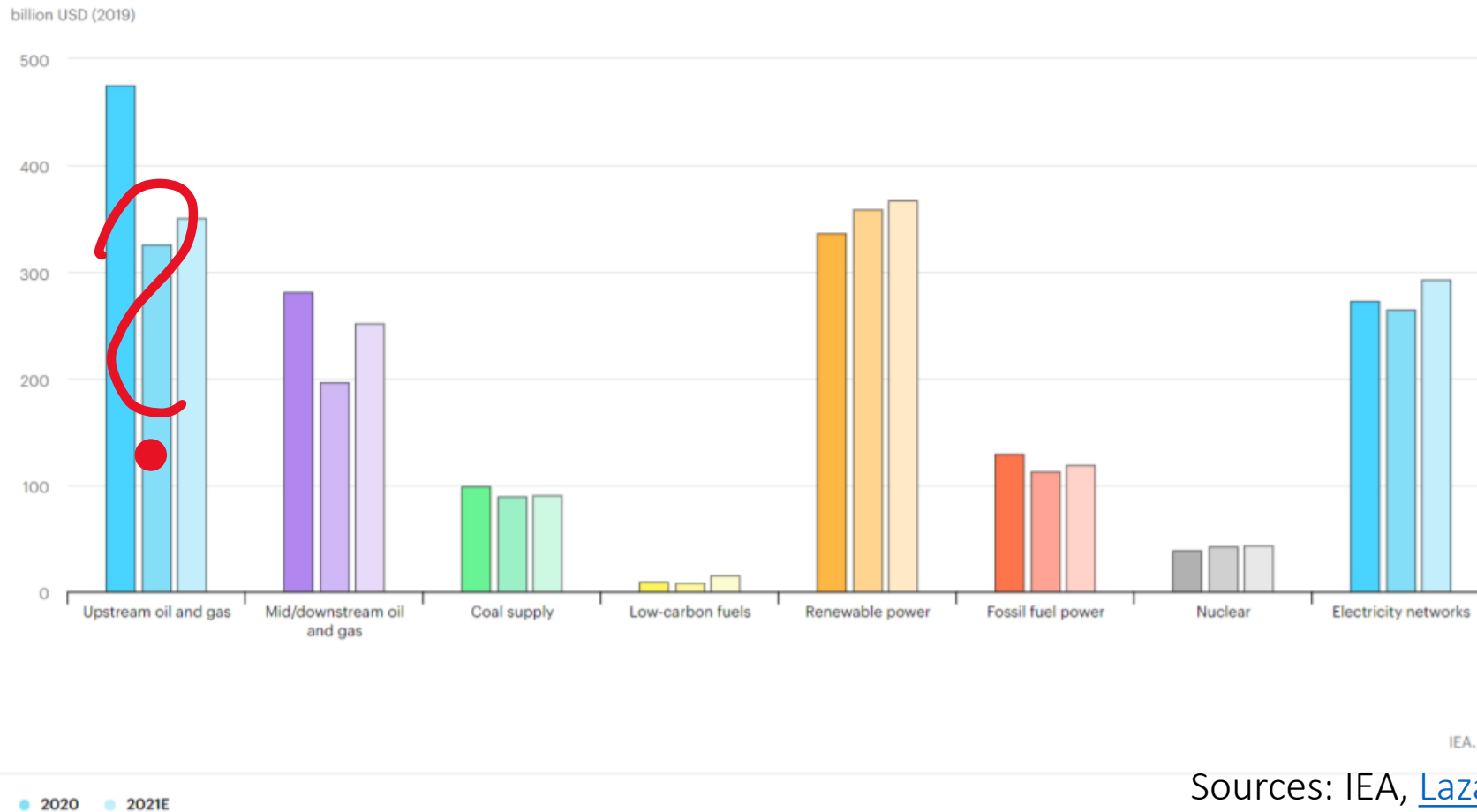
Electric/hybrid vehicles-only



Source: Sentieo
© FT

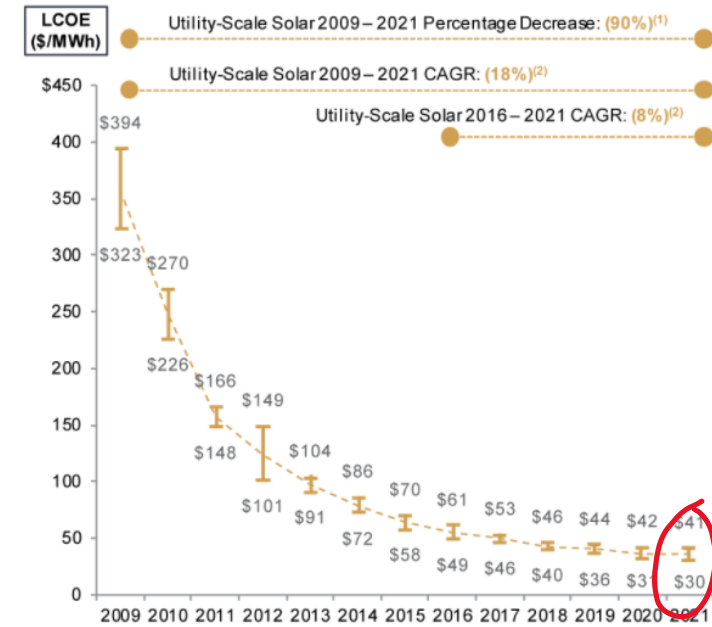
...O&G industry does not

Global energy supply investment by sector, 2019-2021

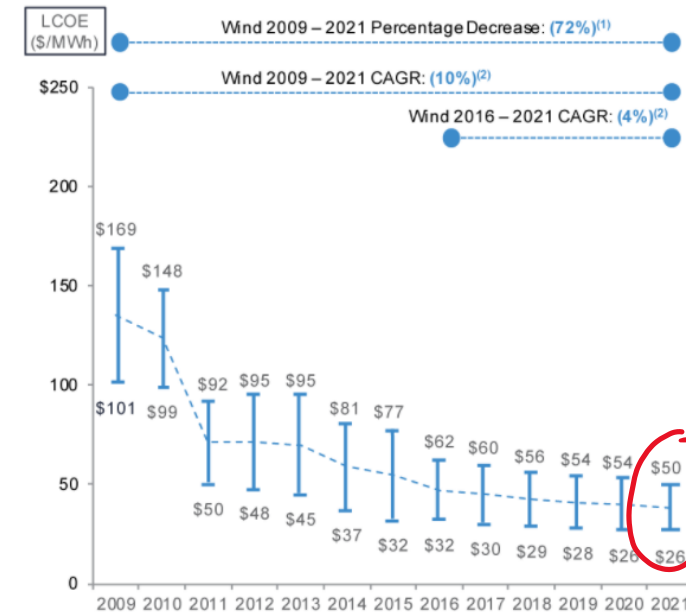


Sources: IEA, [Lazard](#)

Unsubsidized Solar PV LCOE



Unsubsidized Wind LCOE



EVs widely underestimated by the O&G industry

Consensus thinking stemming from:

- A generations-long growth of demand
- Supplier-based thinking instead of consumer-based thinking
- Past and present earnings hide loss of value of the core assets
- Expectations of business as usual
- Incumbency treated as an advantage

Source: [Carbon Tracker](#), [Mattioli 2020](#)

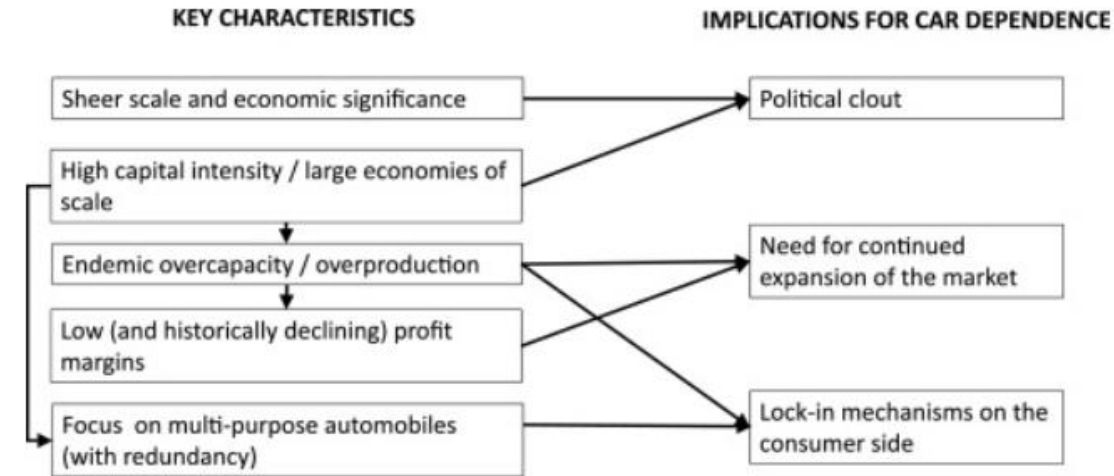
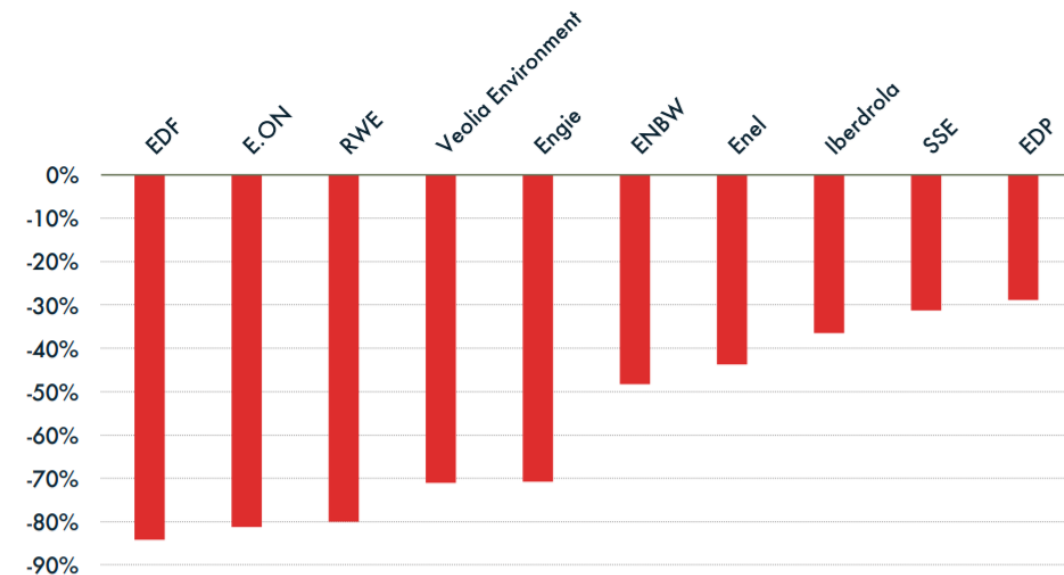


FIGURE 5 - PERFORMANCE OF EUROPEAN ELECTRICITY STOCKS DEC. 2007 - DEC. 2018



Step 2: What is step 2, actually?

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- Cars are great individually but terrible collectively
- E-mobility is a critical juncture in the development of transportation
- Much more profound changes are desirable

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

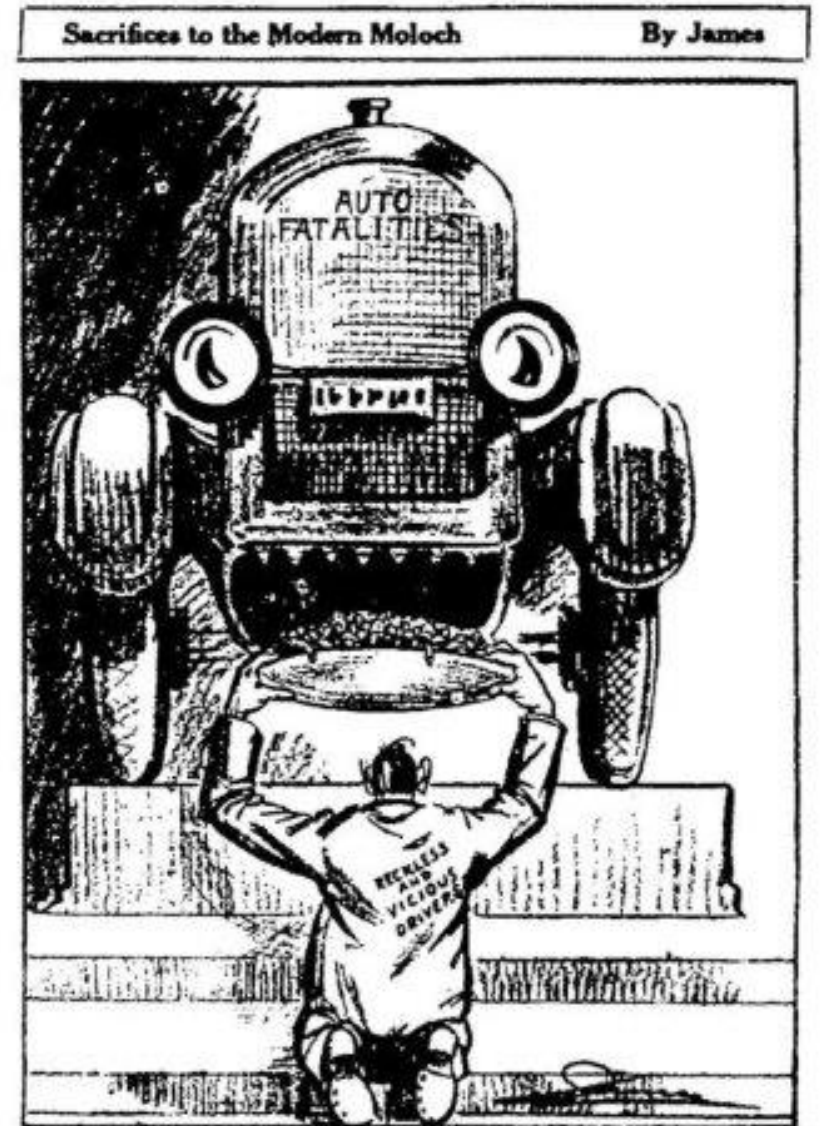
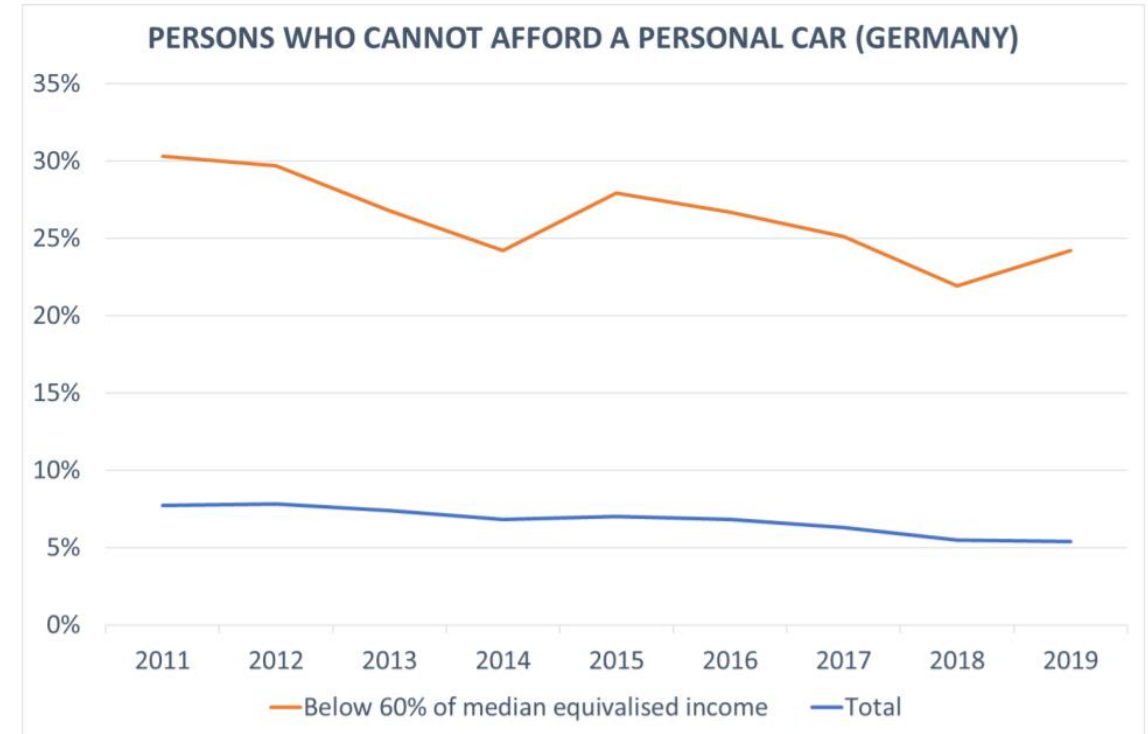


Figure 1.3
Cartoon by "James," *St. Louis Star*, November 6, 1923, p. 14.

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

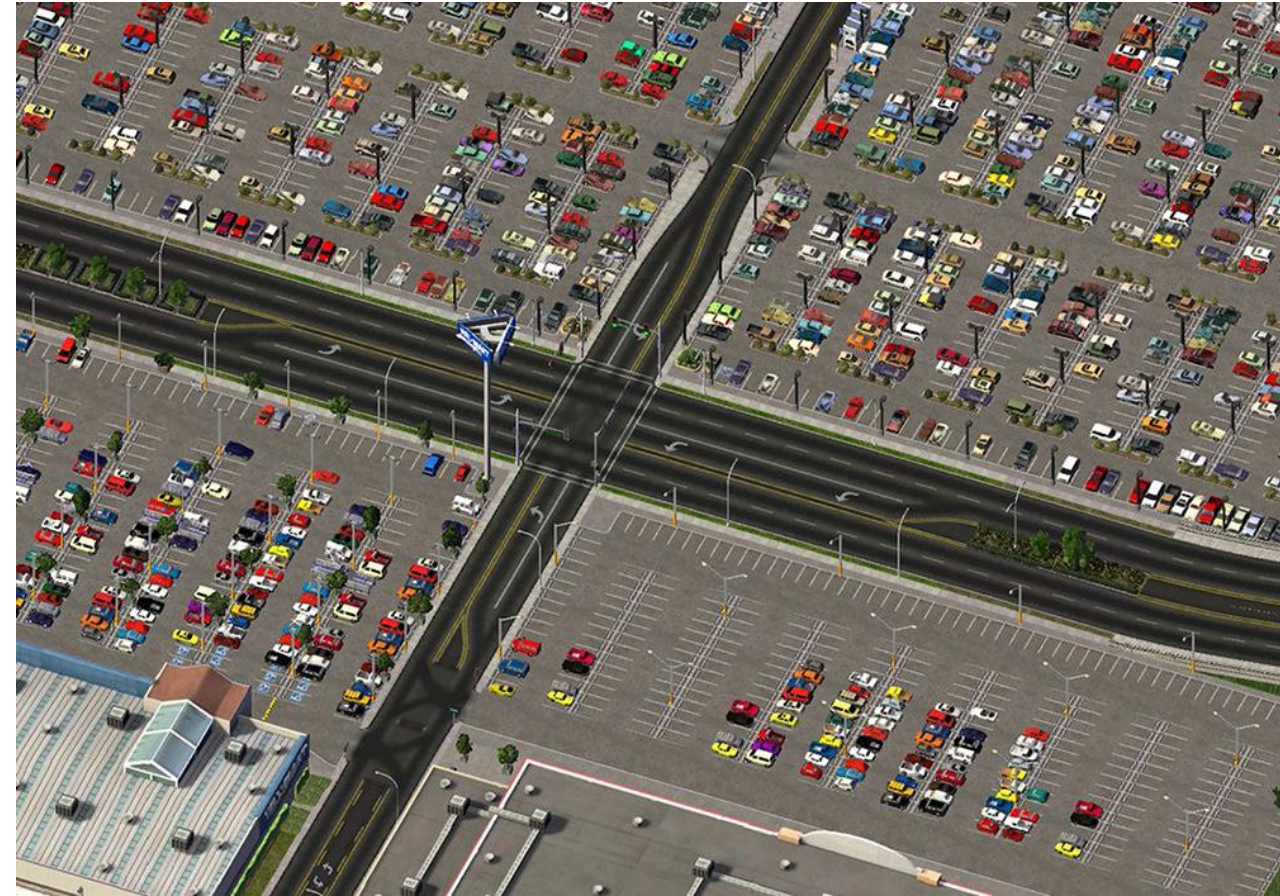


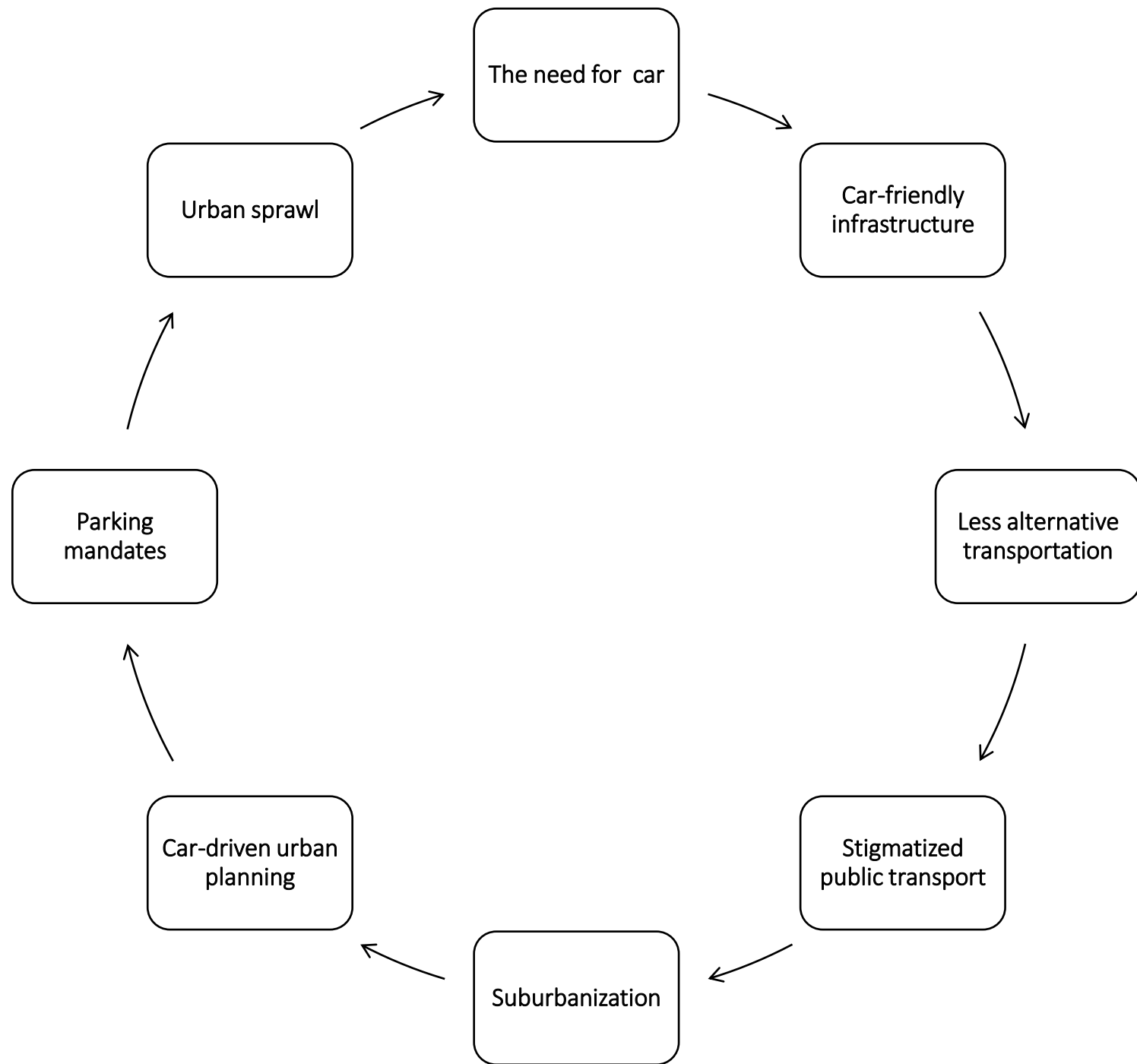
Sources: [Mattioli 2016](#), [Mattioli 2021](#)

Cars (not people) define cities



SimCity: tweaked vs. realistic





Step 2: towards a new mobility paradigm

- Dissolving the political economy of car
- Dissolving the “car culture”
- Normalizing alternative transport