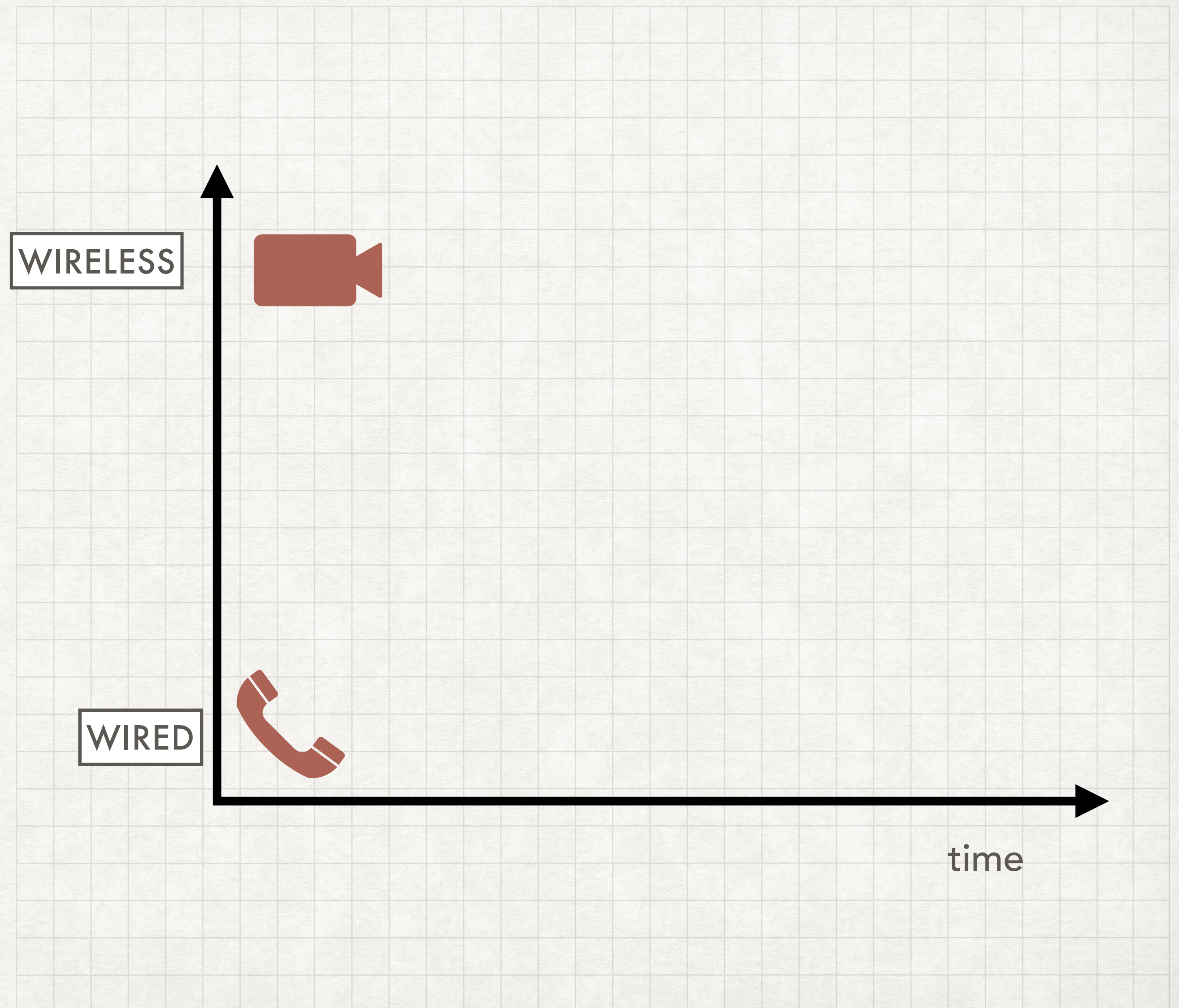
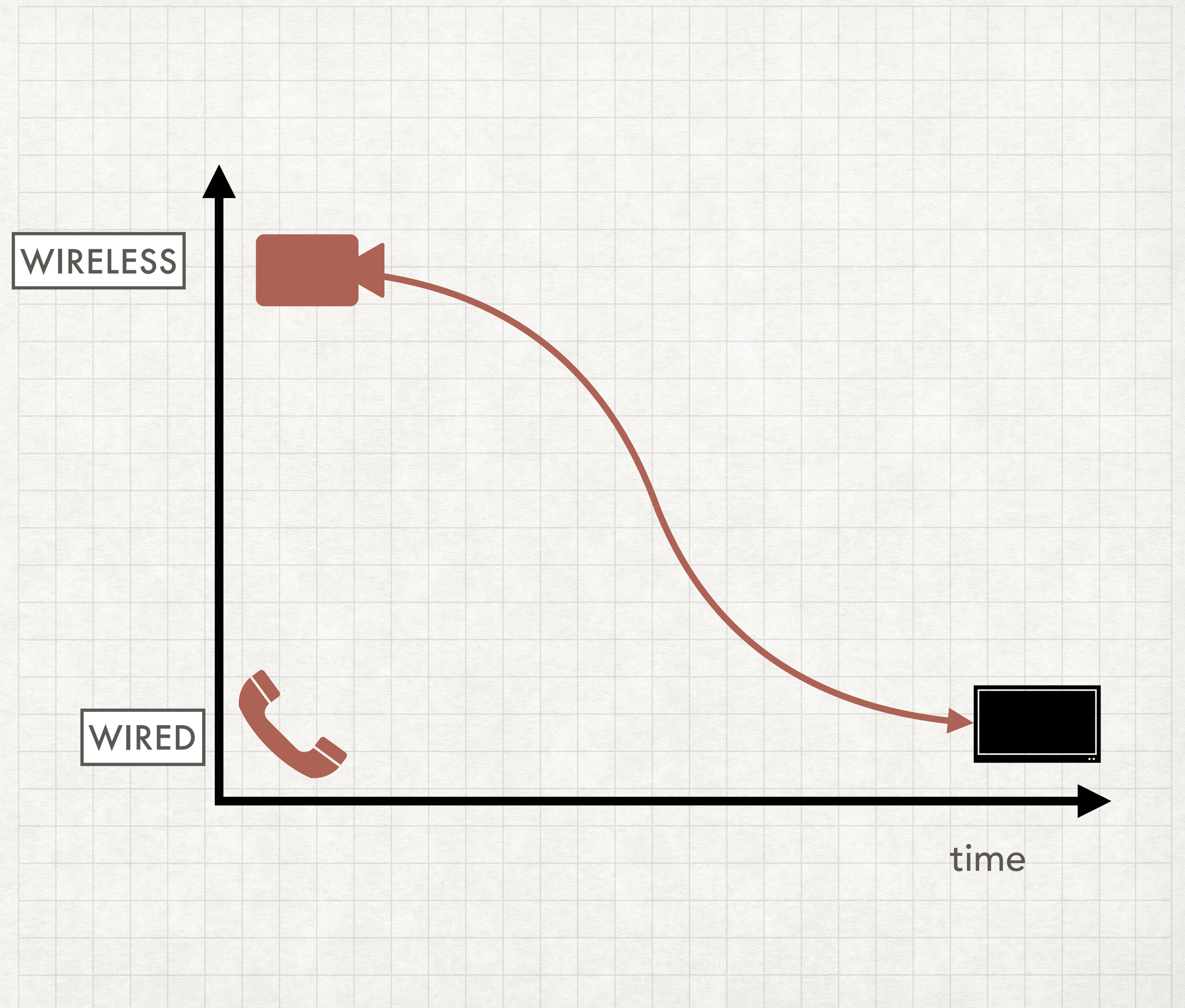
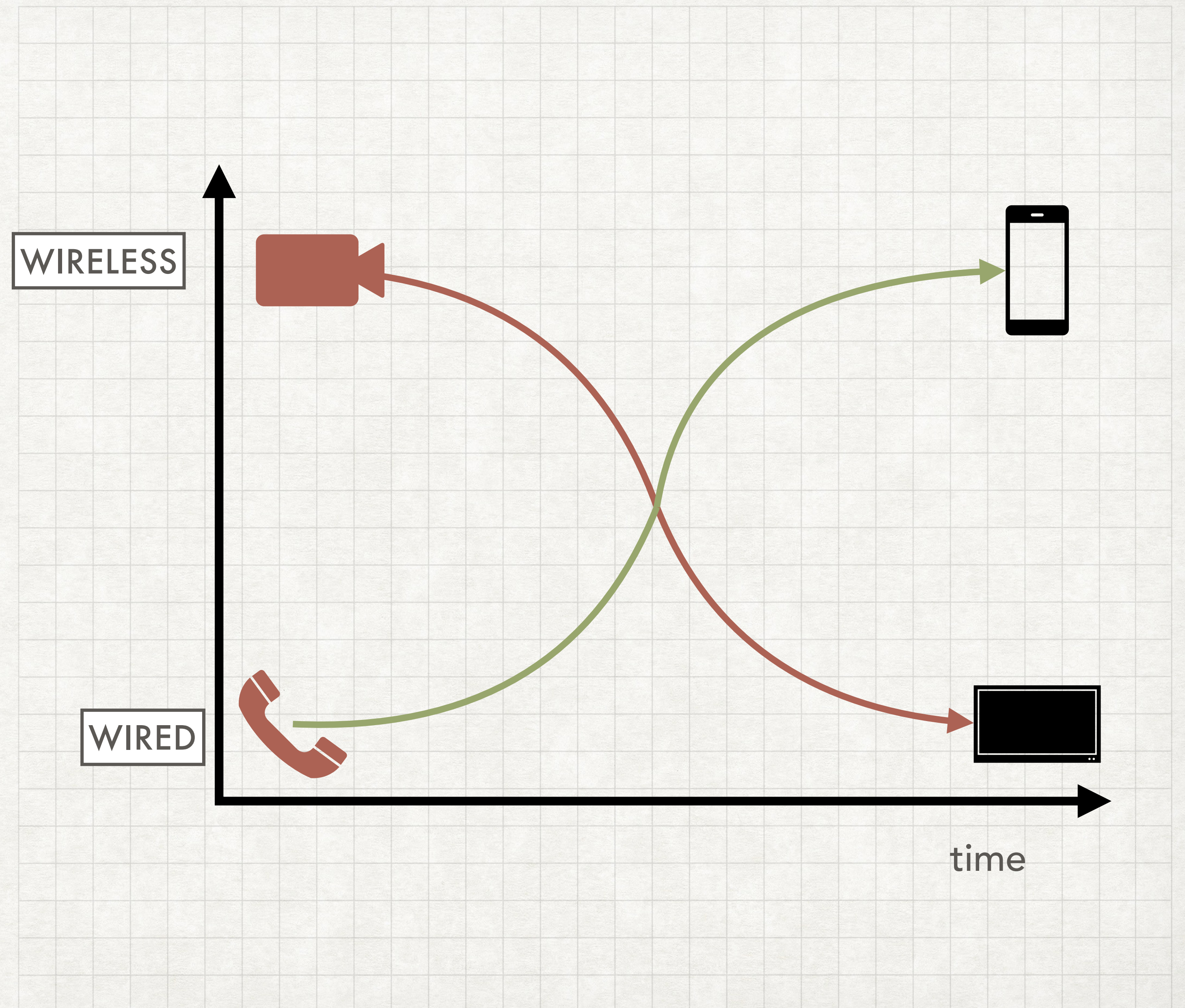


TOWARD MICROMOBILITY

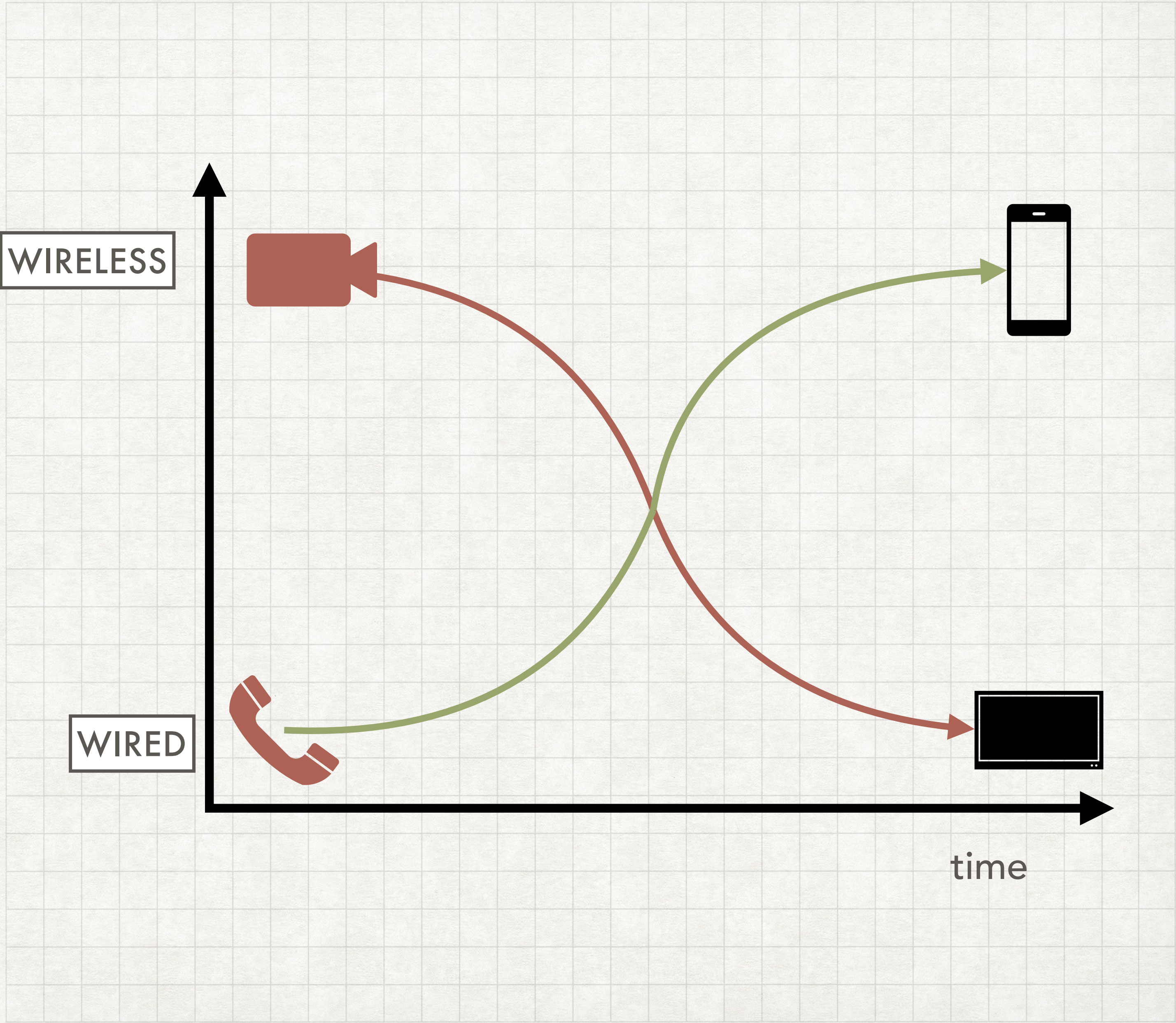




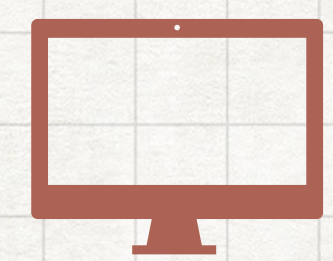




NEGROPONTE SWITCH



CONTINUOUS

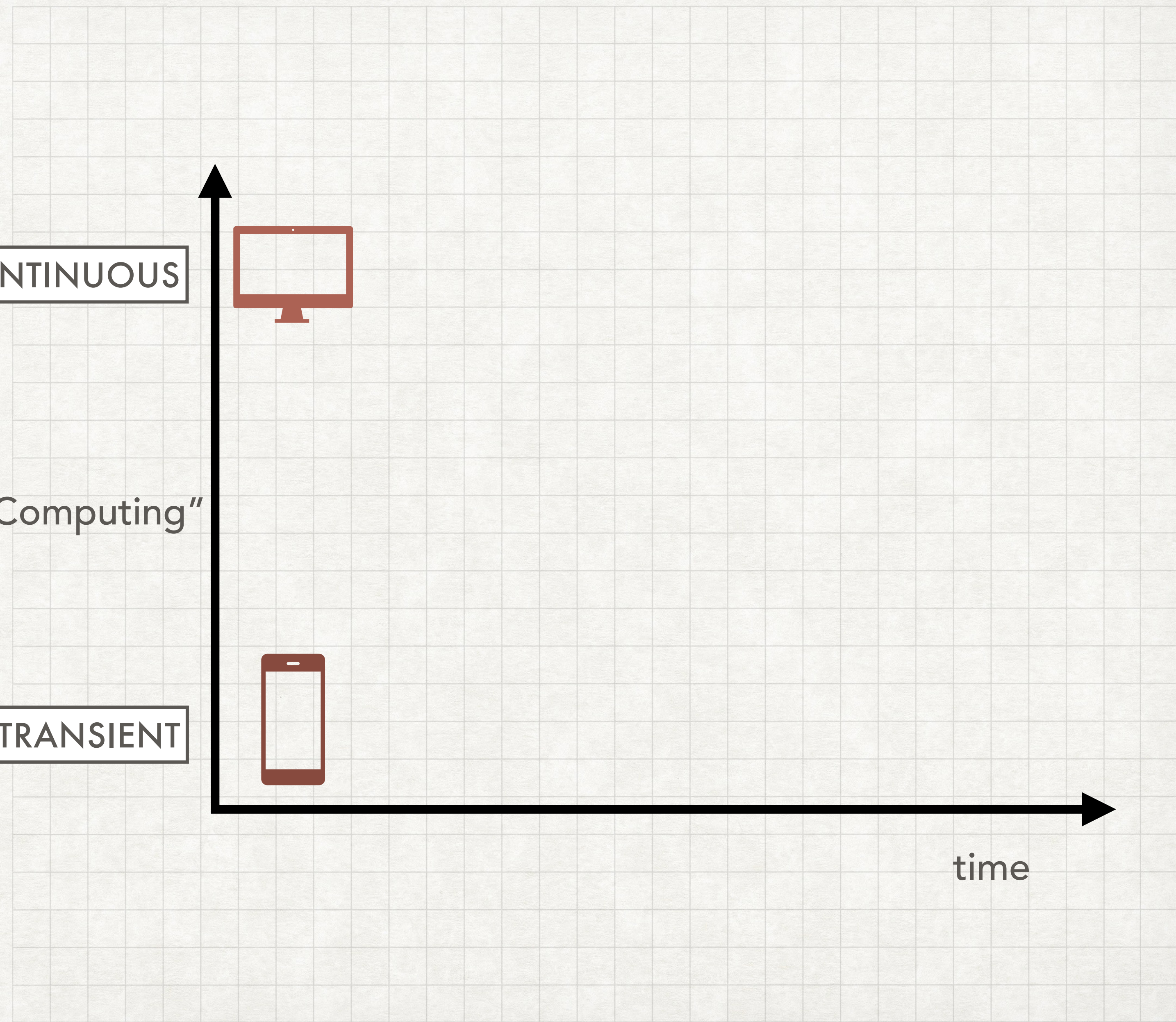


"Computing"

TRANSIENT



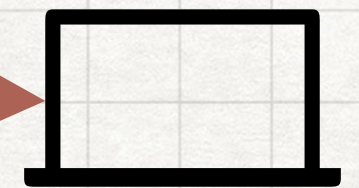
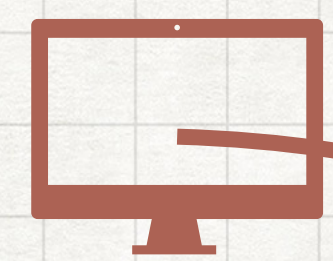
time



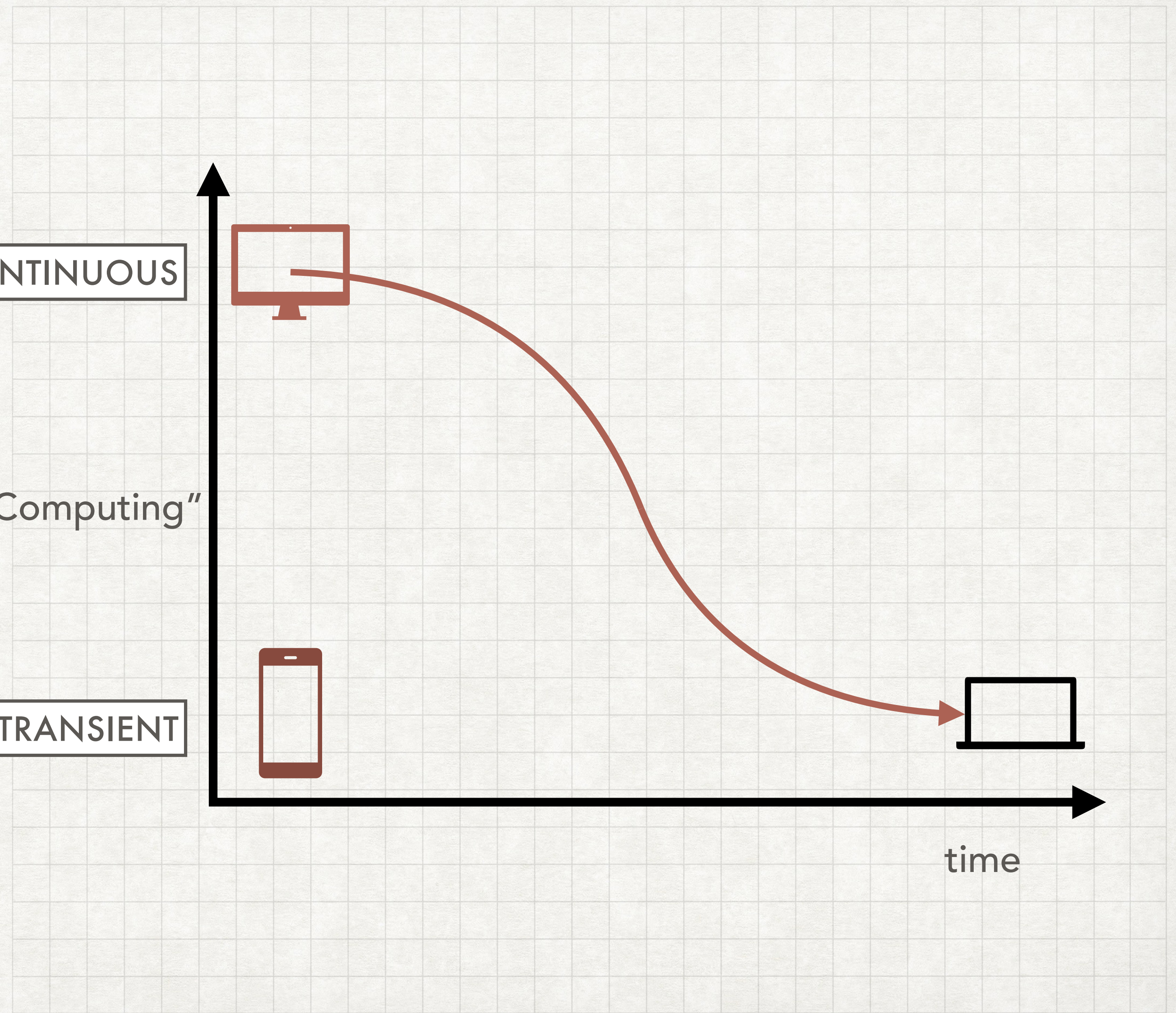
CONTINUOUS

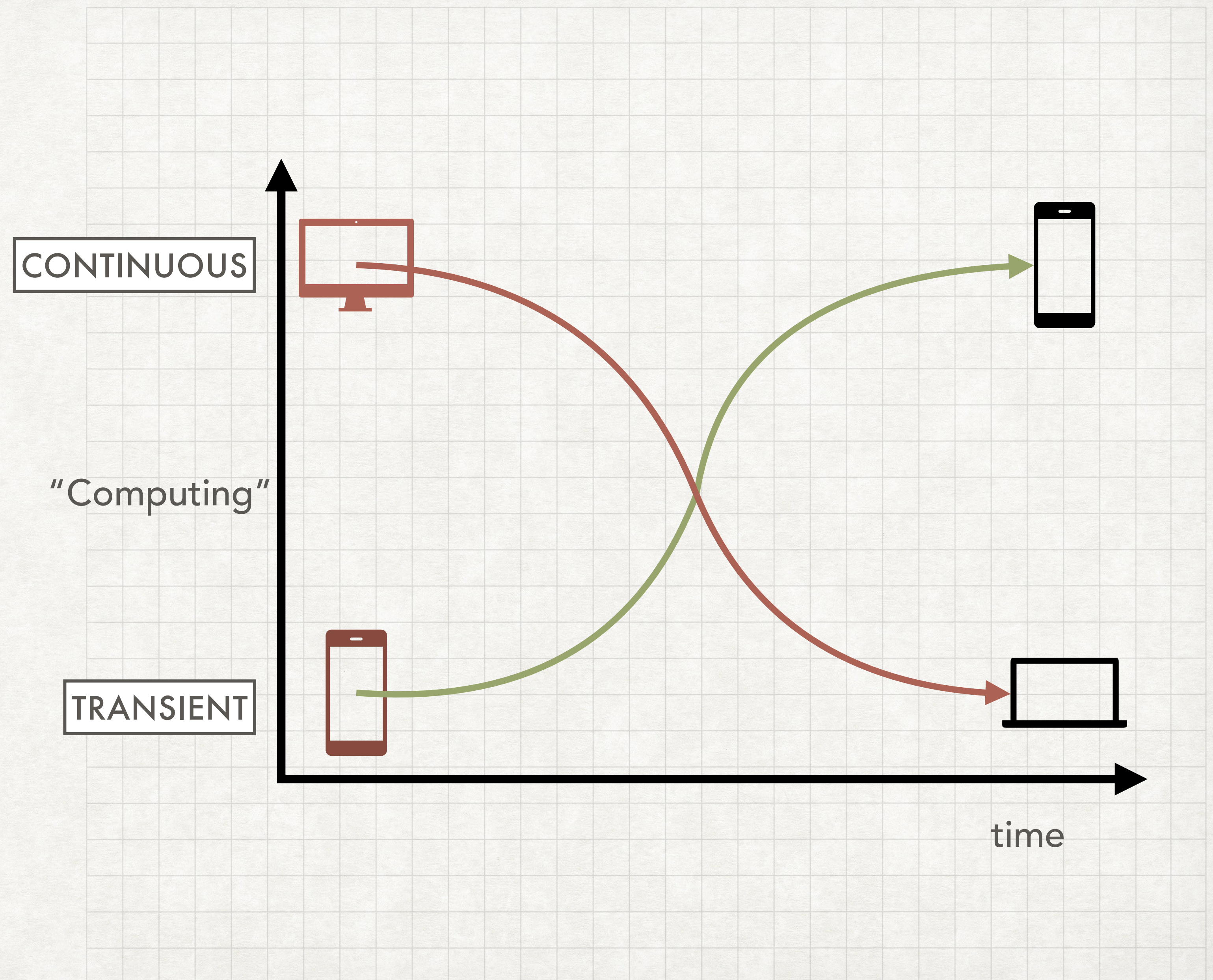
"Computing"

TRANSIENT

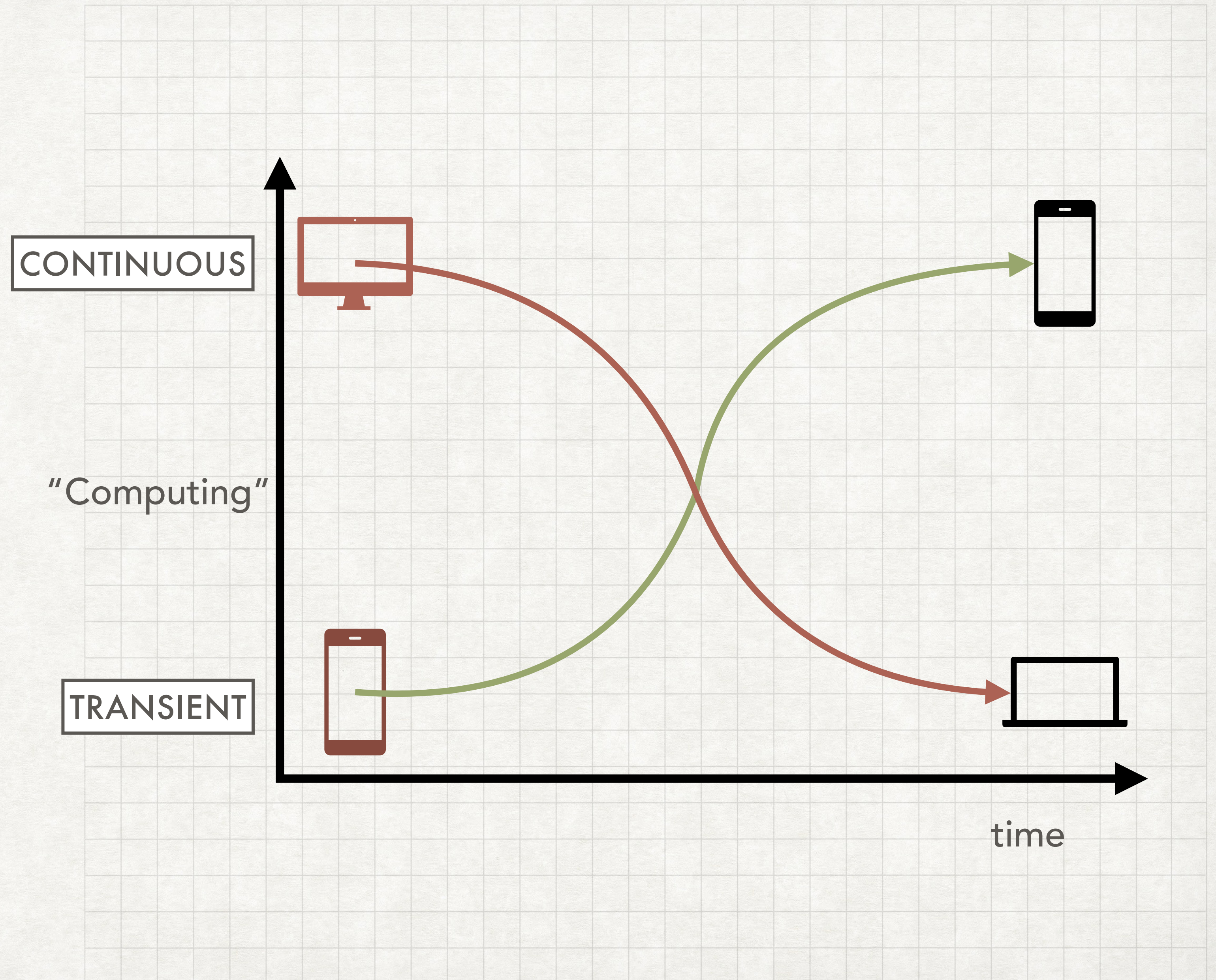


time



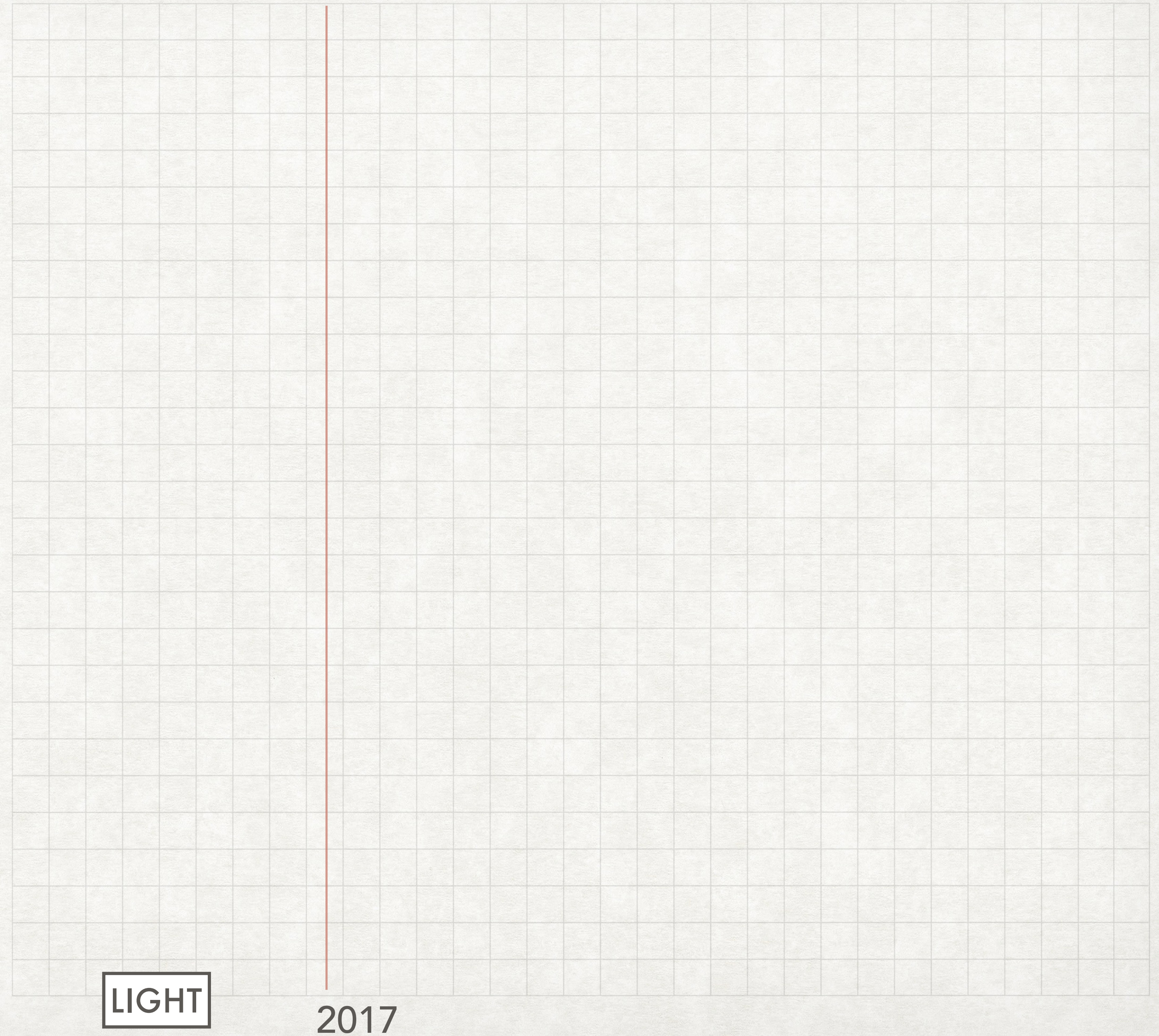


MOBILE SWITCH



HEAVY

RACE TO AUTONOMY



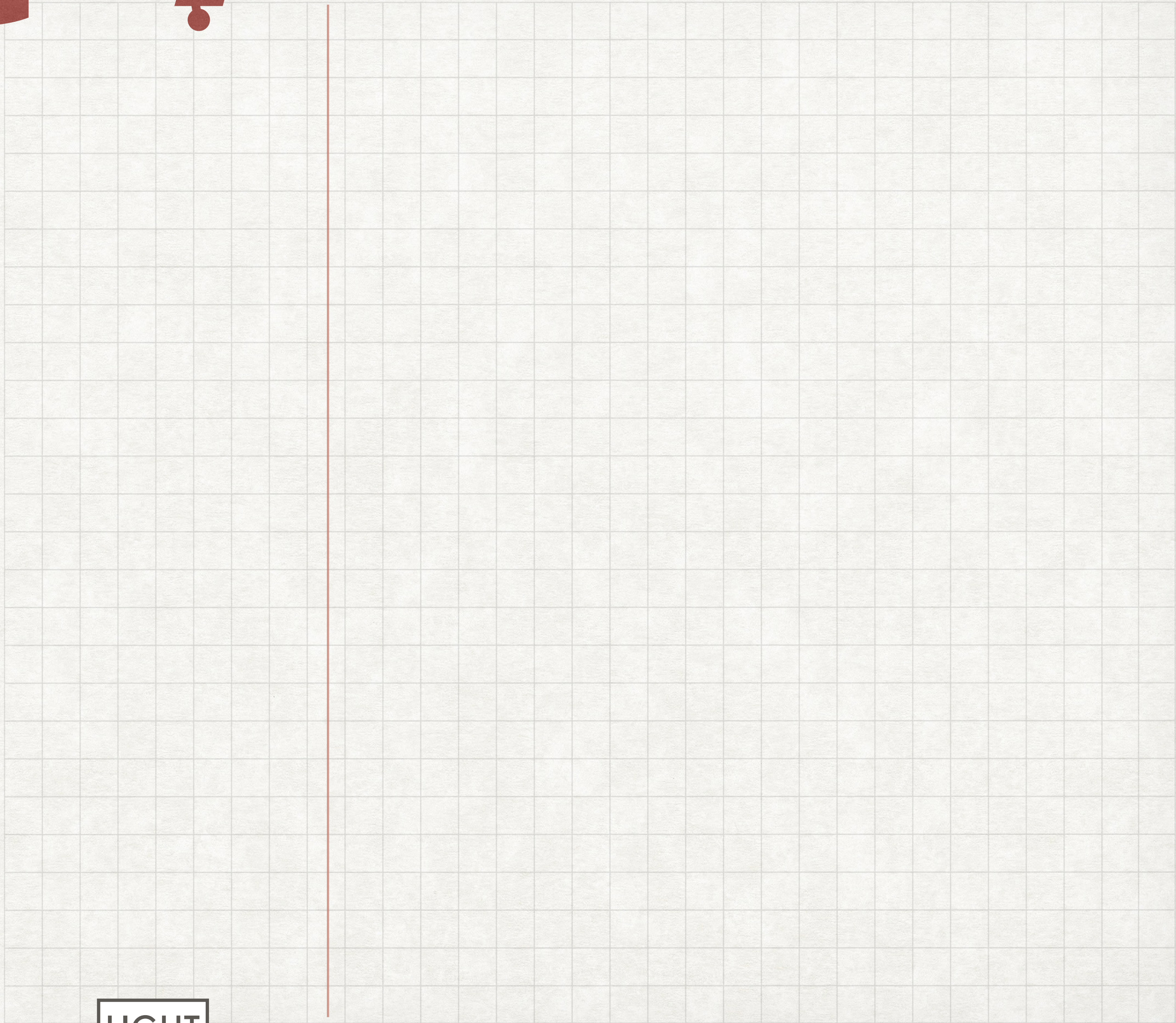
LIGHT

2017

HEAVY



RACE TO AUTONOMY



LIGHT

2017

HEAVY

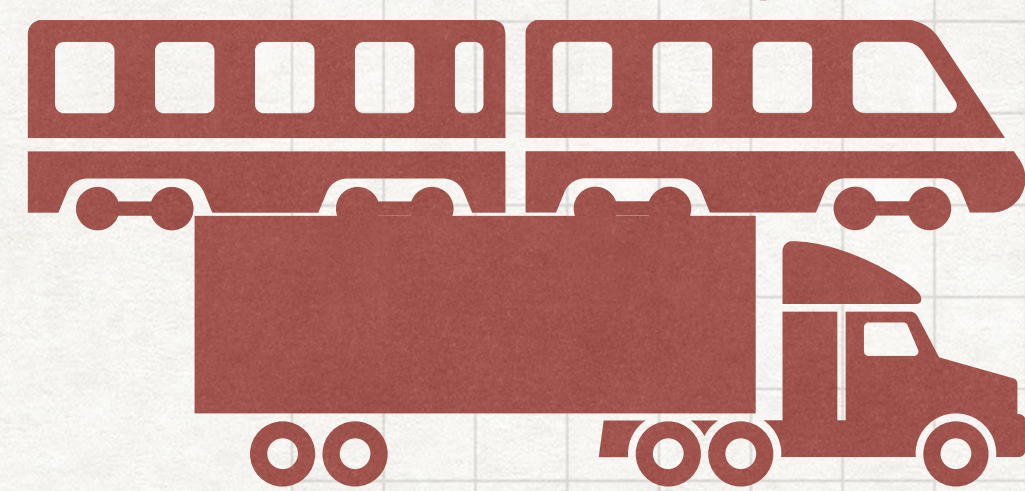


RACE TO AUTONOMY

LIGHT

2017

HEAVY

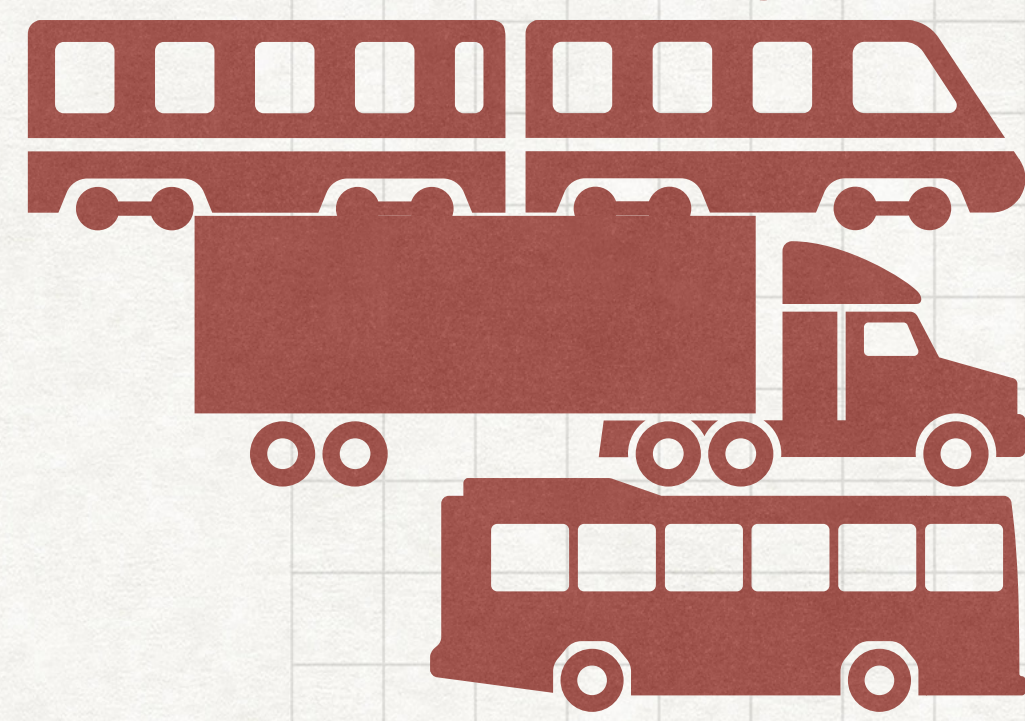


RACE TO AUTONOMY

LIGHT

2017

HEAVY



RACE TO AUTONOMY

LIGHT

2017

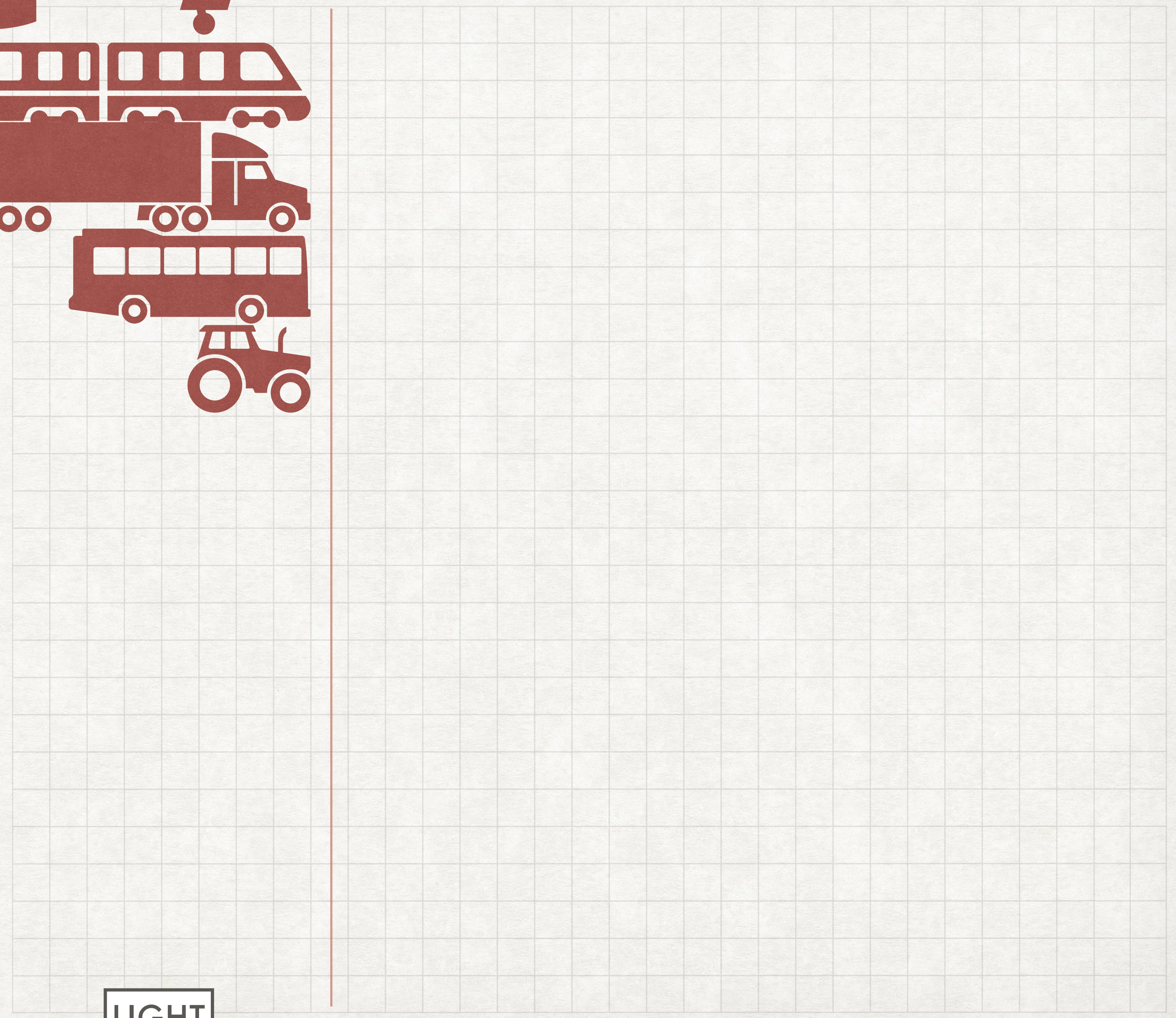
HEAVY



RACE TO AUTONOMY

LIGHT

2017



HEAVY

RACE TO AUTONOMY



LIGHT

2017

HEAVY

RACE TO AUTONOMY



LIGHT

2017

HEAVY

RACE TO AUTONOMY



LIGHT

2017

HEAVY

RACE TO AUTONOMY



LIGHT

2017

HEAVY

RACE TO AUTONOMY



LIGHT

2017

HEAVY

RACE TO AUTONOMY



LIGHT

2017

HEAVY

RACE TO AUTONOMY



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2017

HEAVY

RACE TO AUTONOMY



LIGHT

2017

HEAVY

RACE TO AUTONOMY



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2017

HEAVY

RACE TO AUTONOMY



LIGHT



2017

HEAVY

RACE TO AUTONOMY



LIGHT



2017



HEAVY

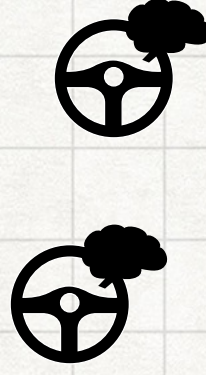
RACE TO AUTONOMY



LIGHT

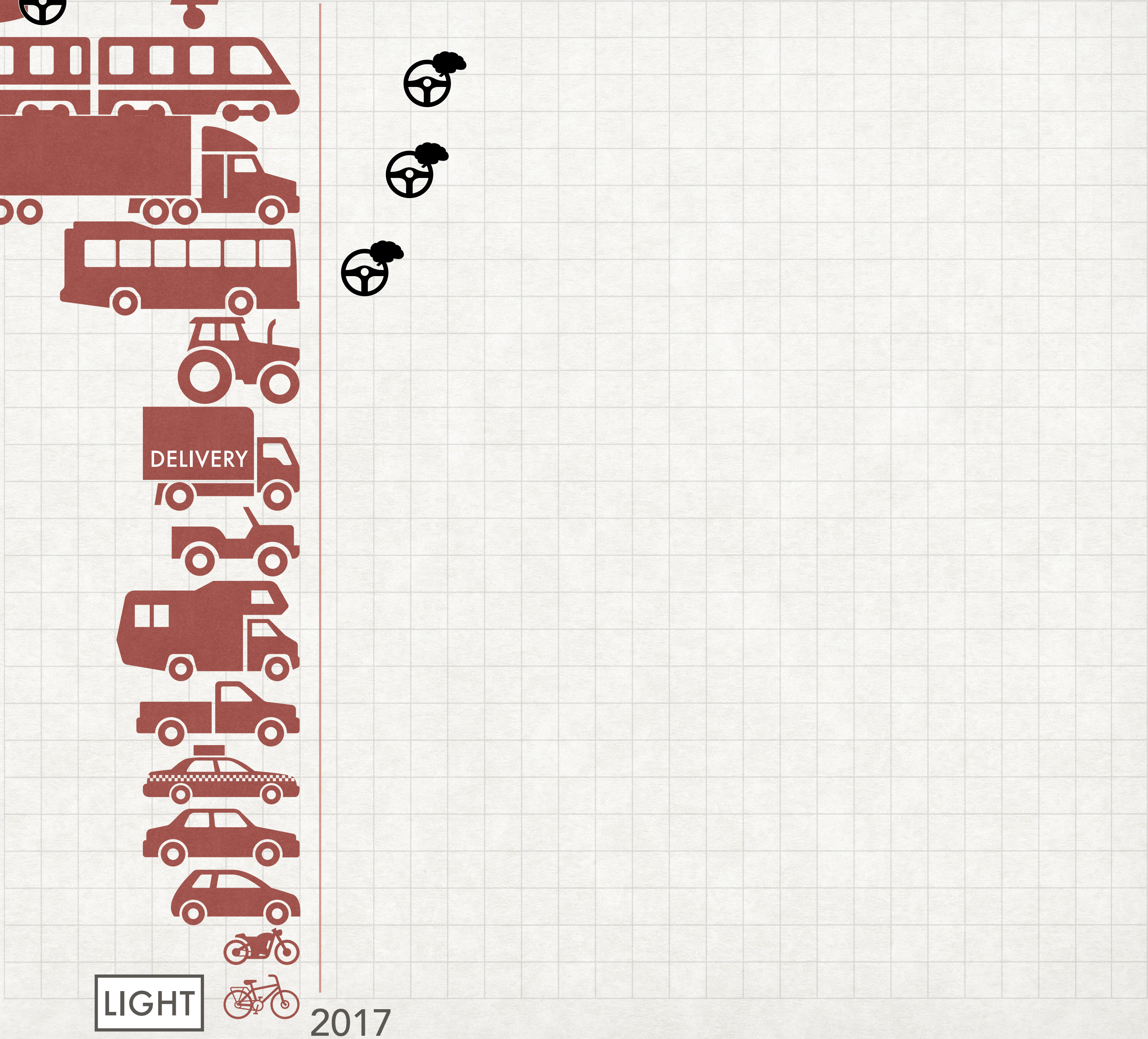


2017



HEAVY

RACE TO AUTONOMY



HEAVY

RACE TO AUTONOMY



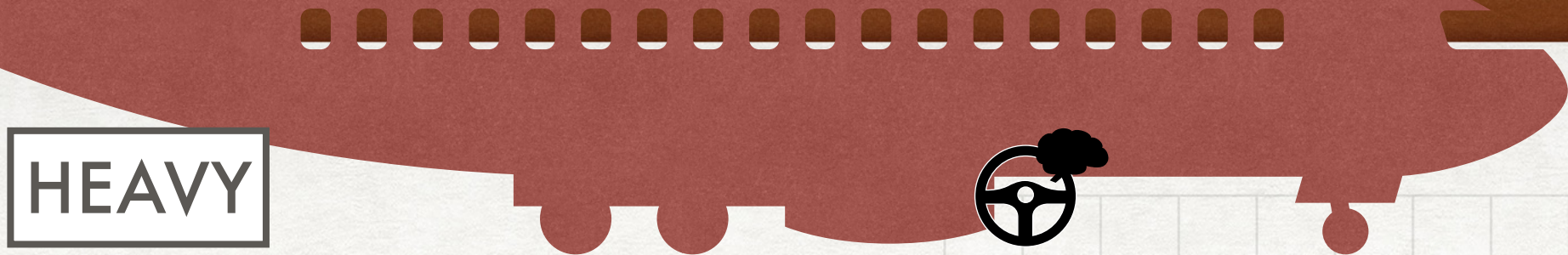
LIGHT

2017

HEAVY

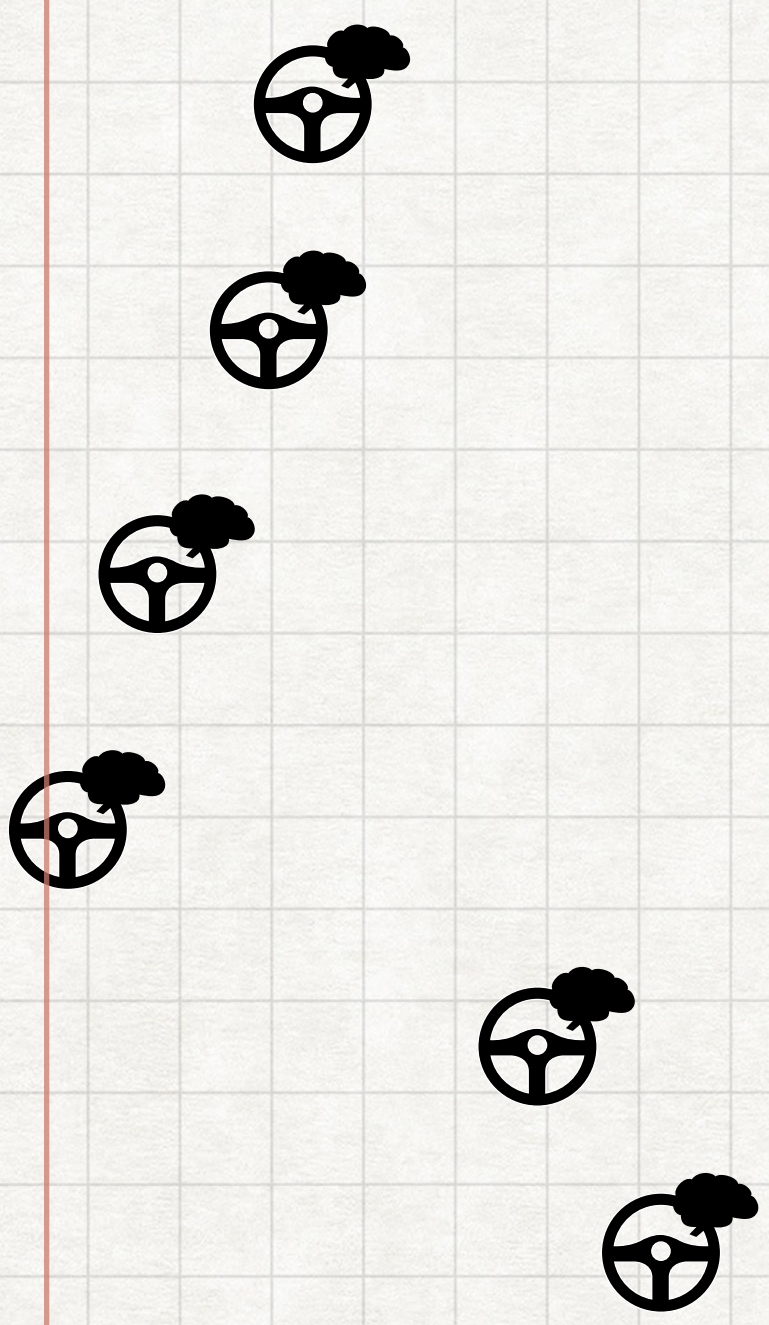
RACE TO AUTONOMY



A stylized illustration of a red airplane. On the left side of the fuselage, there is a white rectangular sign with the word "HEAVY" in black capital letters. On the right side, near the tail, there is a black steering wheel icon with a black cloud-like shape above it. The airplane has a series of small white rectangular windows along its top edge and landing gear visible at the bottom.

RACE TO AUTONOMY

LIGHT



A stylized illustration of a red airplane. On the left side of the fuselage, there is a white rectangular sign with the word "HEAVY" in black capital letters. On the right side, near the tail, there is a black steering wheel icon with a black cloud-like shape above it, suggesting a control or a warning. The airplane is shown from a side profile, flying towards the right. The background is a light gray grid pattern.

RACE TO AUTONOMY

LIGHT



HEAVY

RACE TO AUTONOMY



HEAVY

RACE TO AUTONOMY

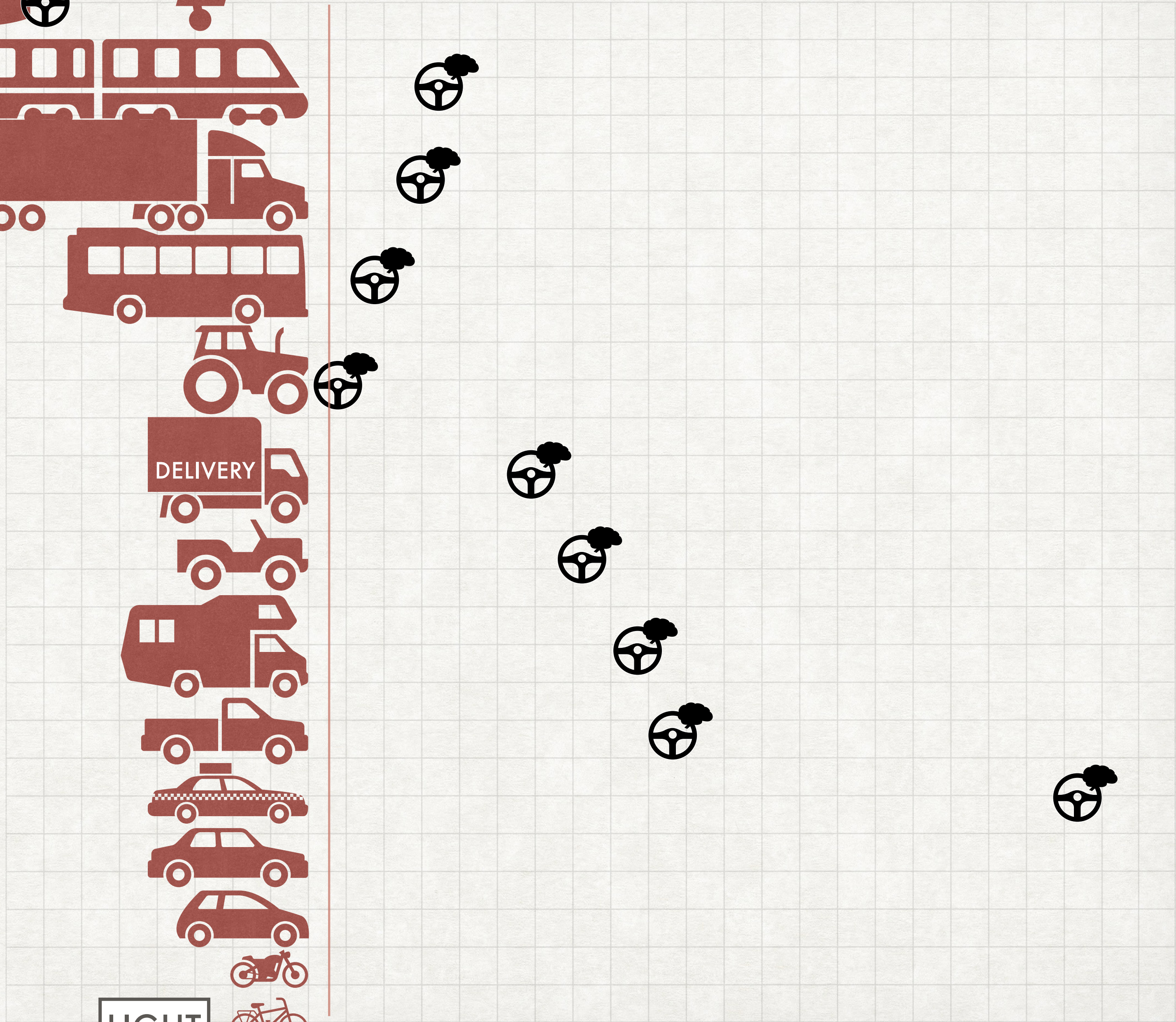


LIGHT

2017

HEAVY

RACE TO AUTONOMY



LIGHT

2017

HEAVY

RACE TO AUTONOMY RACE TO ELECTRIC

LIGHT

2017

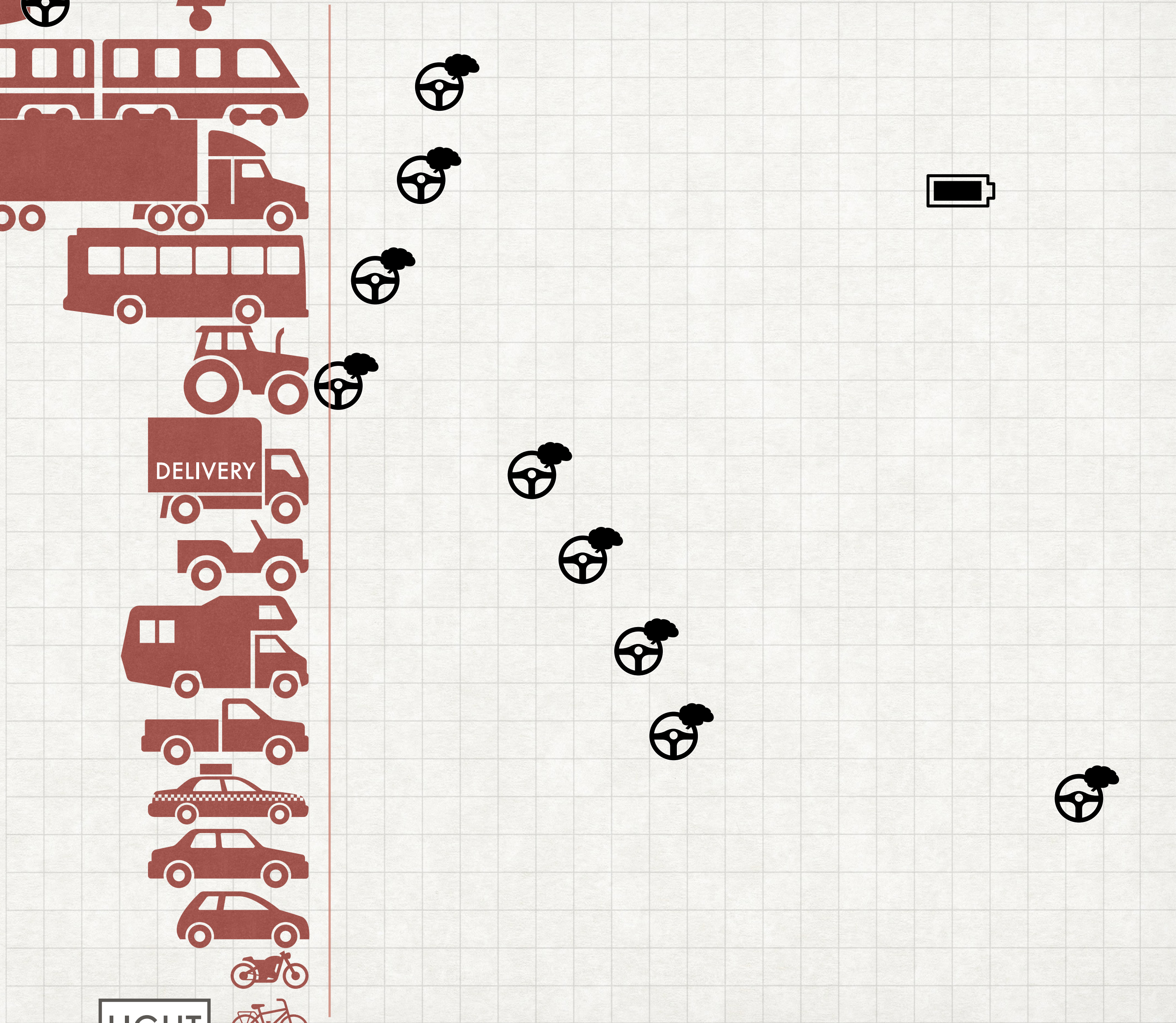


HEAVY

RACE TO AUTONOMY RACE TO ELECTRIC

LIGHT

2017

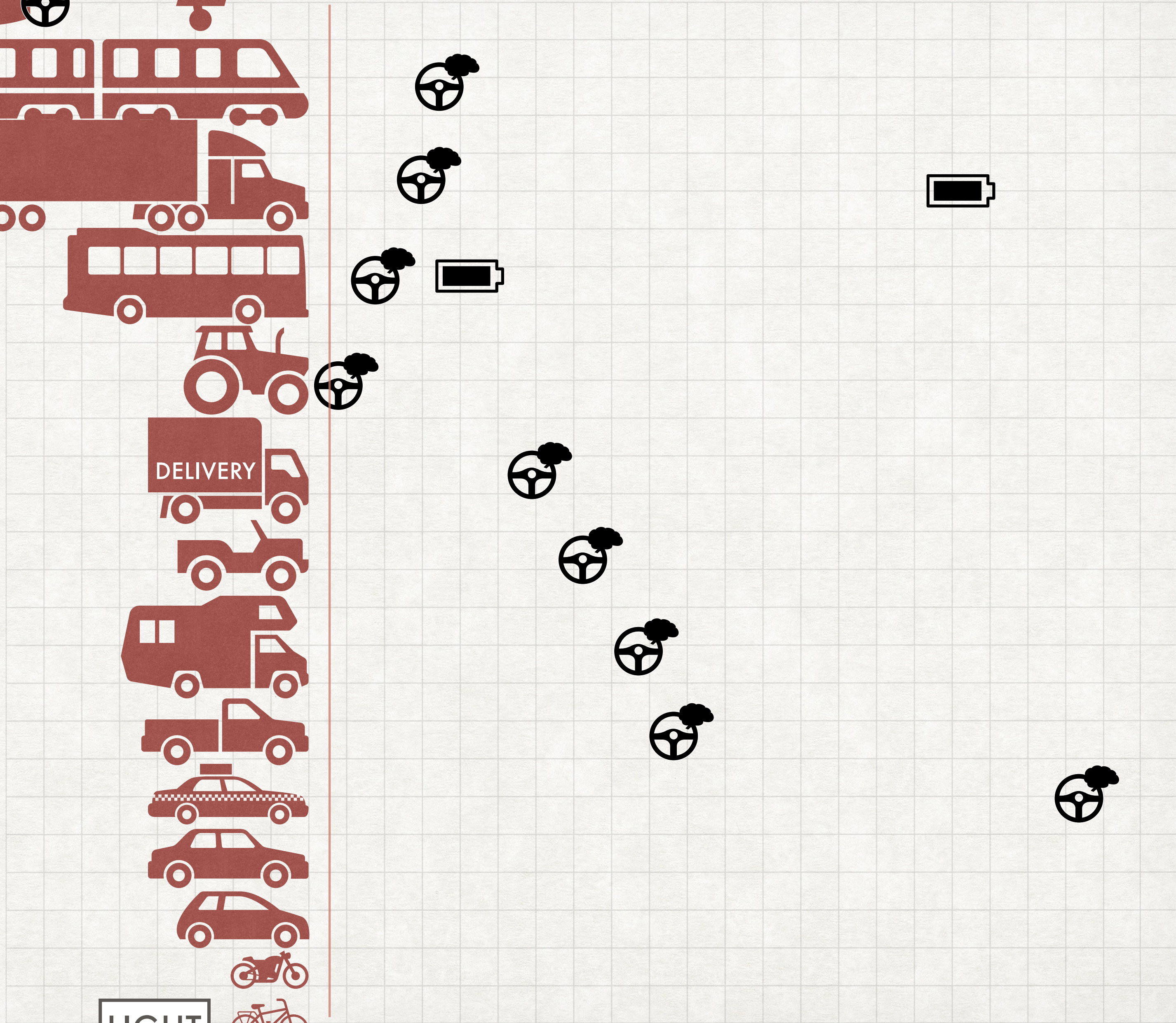


HEAVY

RACE TO AUTONOMY RACE TO ELECTRIC

LIGHT

2017



HEAVY

RACE TO AUTONOMY RACE TO ELECTRIC



LIGHT

2017

RACE TO AUTONOMY RACE TO ELECTRIC

HEAVY

LIGHT

2017

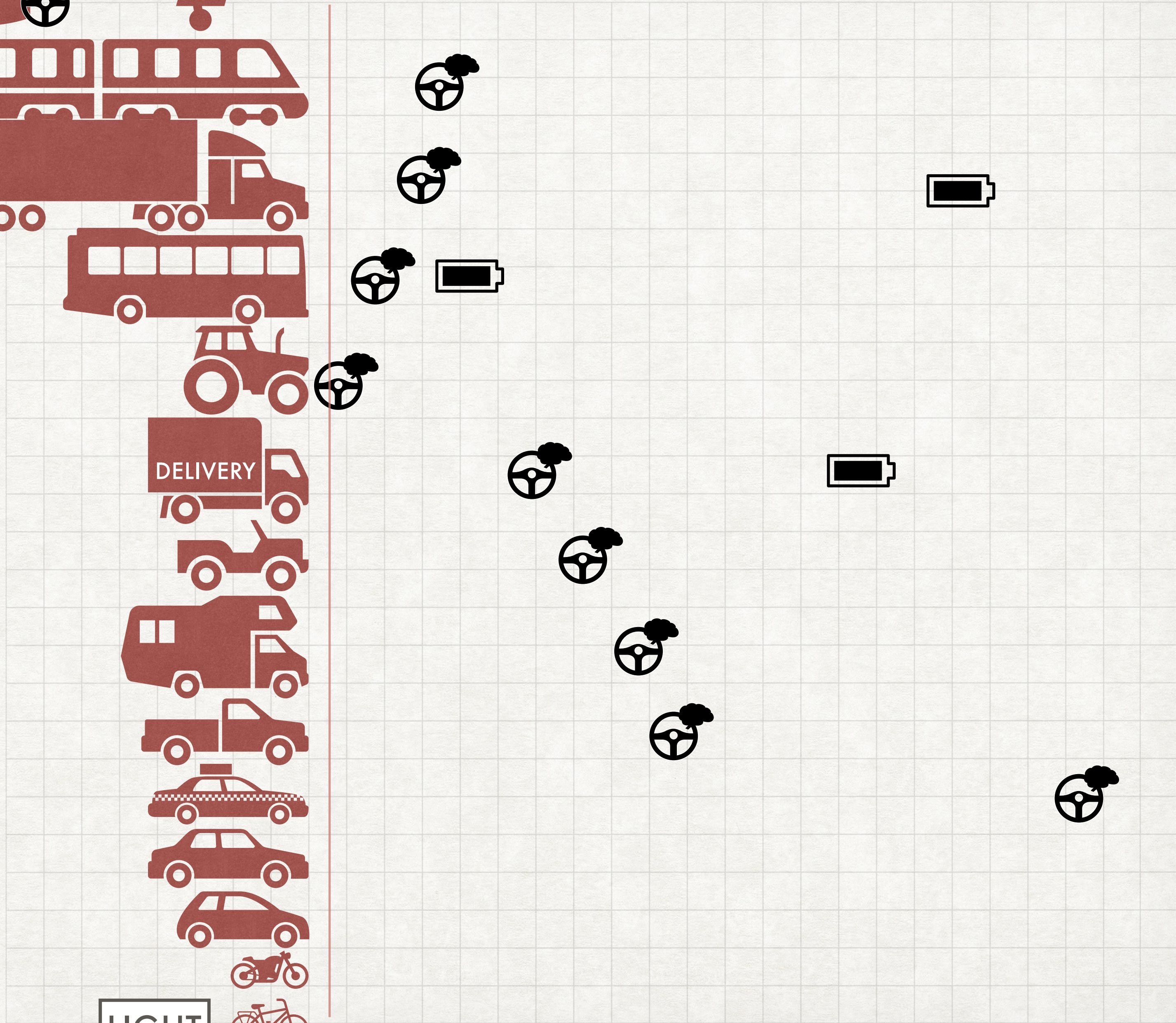


HEAVY

RACE TO AUTONOMY RACE TO ELECTRIC

LIGHT

2017

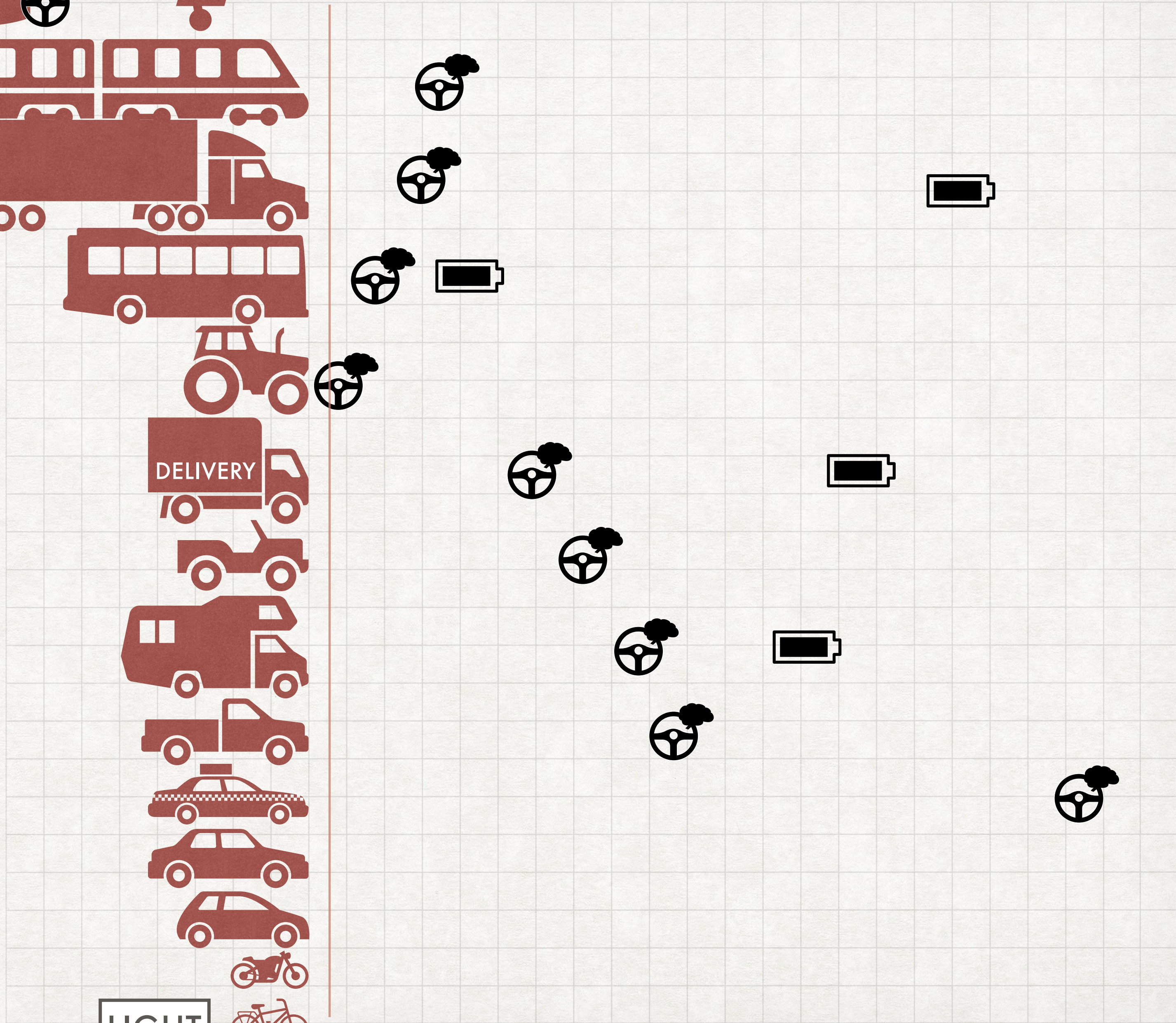


HEAVY

RACE TO AUTONOMY RACE TO ELECTRIC

LIGHT

2017

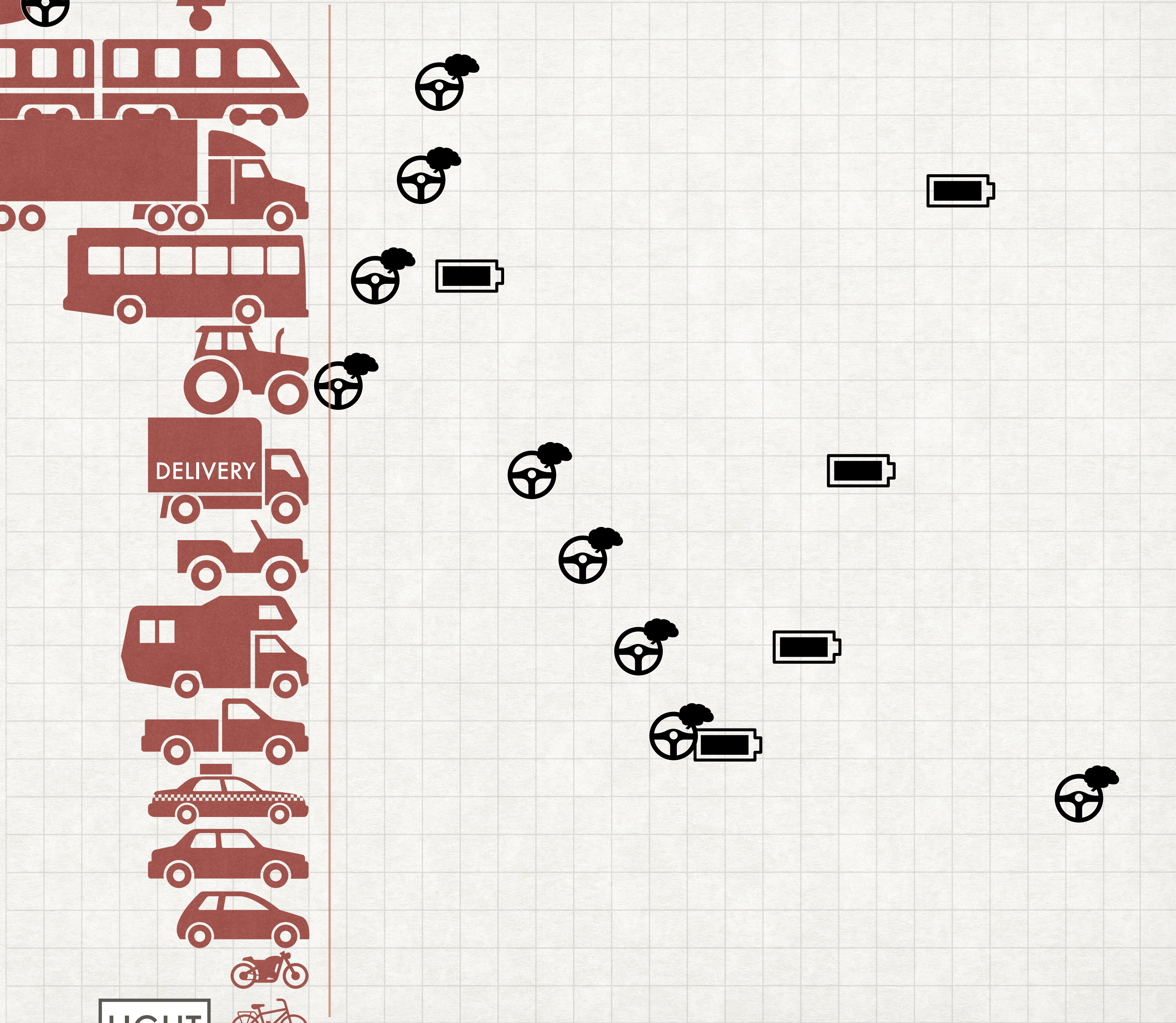


HEAVY

RACE TO AUTONOMY RACE TO ELECTRIC

LIGHT

2017

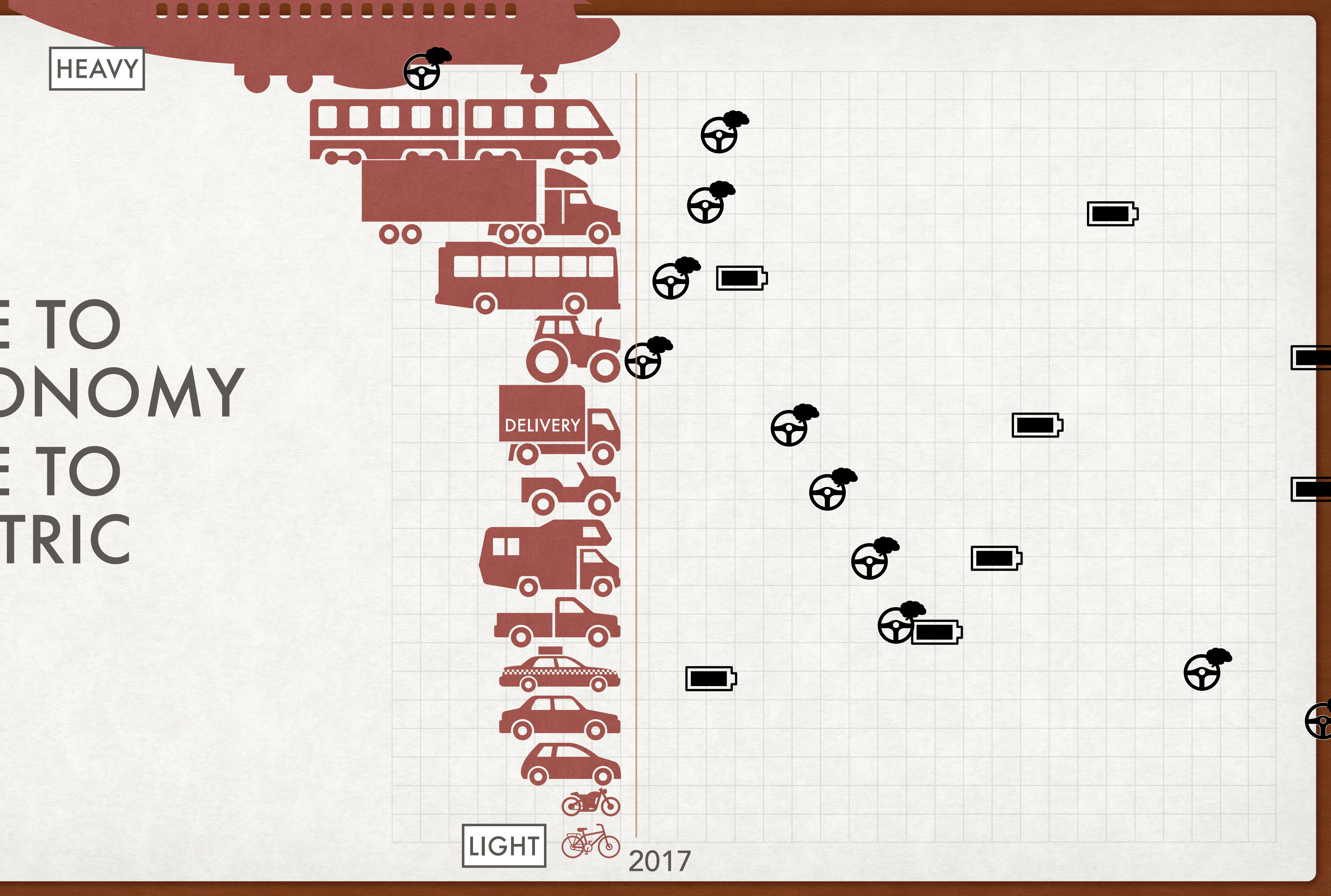


HEAVY

RACE TO AUTONOMY RACE TO ELECTRIC

LIGHT

2017

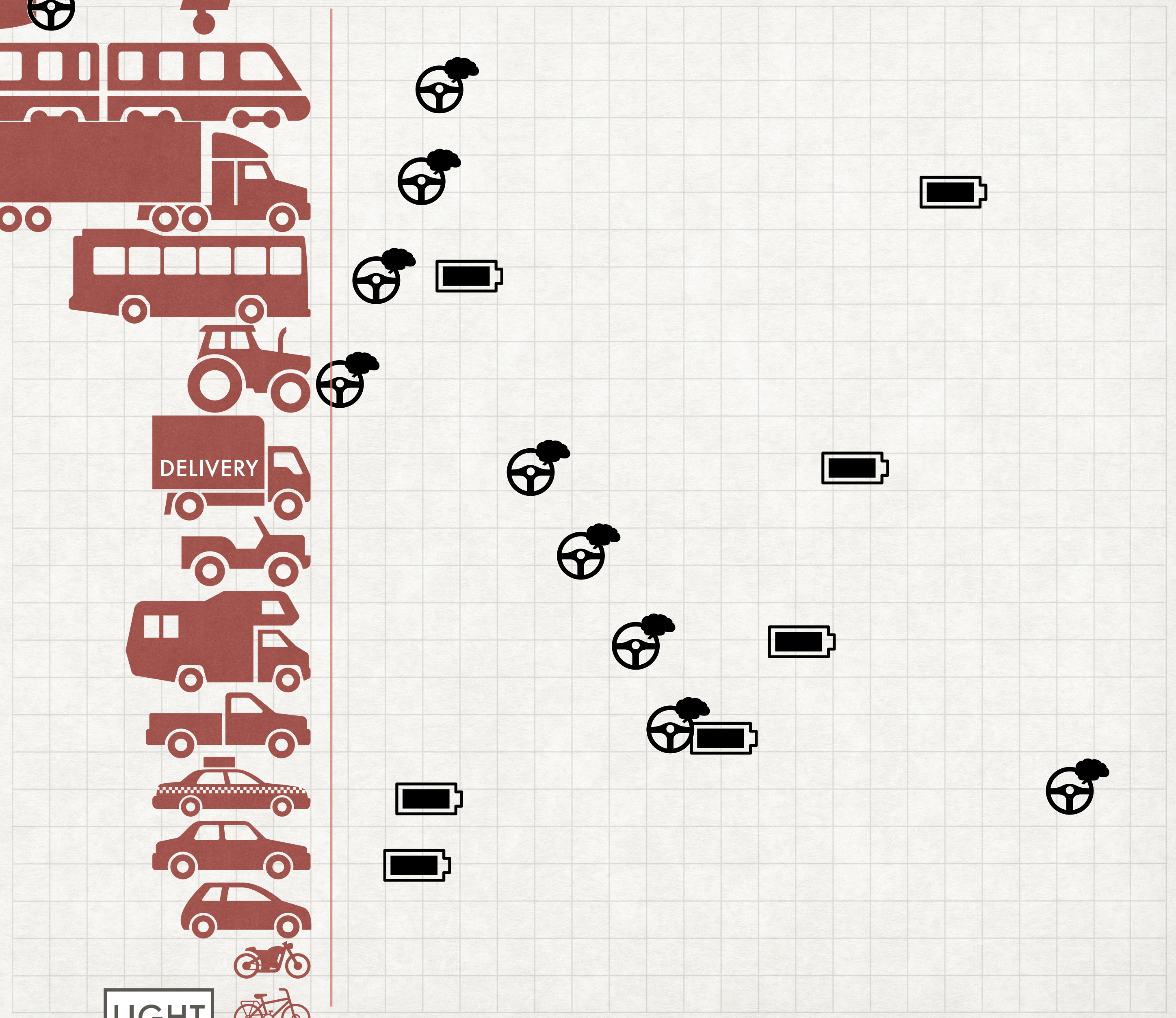


HEAVY

RACE TO AUTONOMY RACE TO ELECTRIC

LIGHT

2017

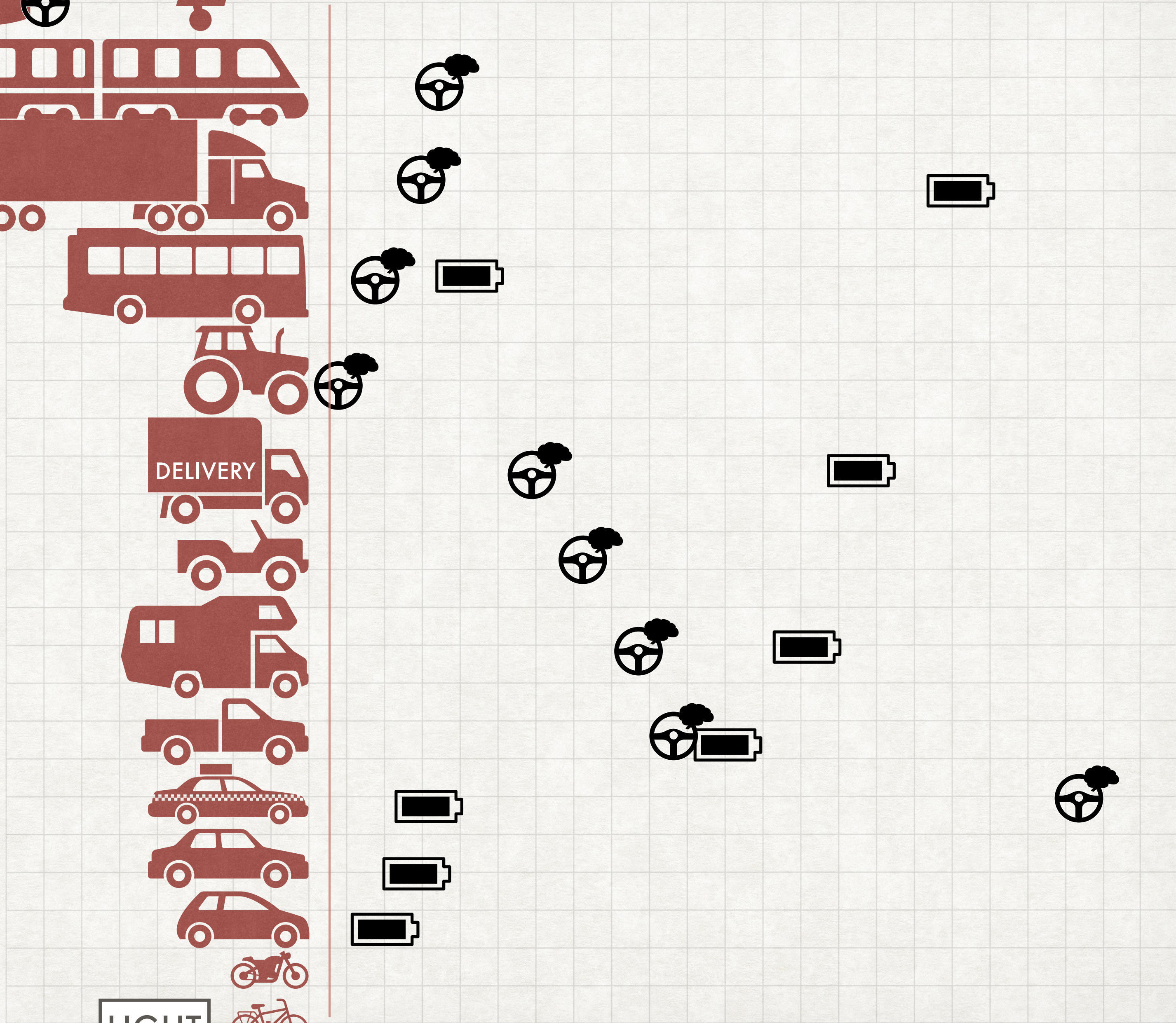


HEAVY

RACE TO AUTONOMY RACE TO ELECTRIC

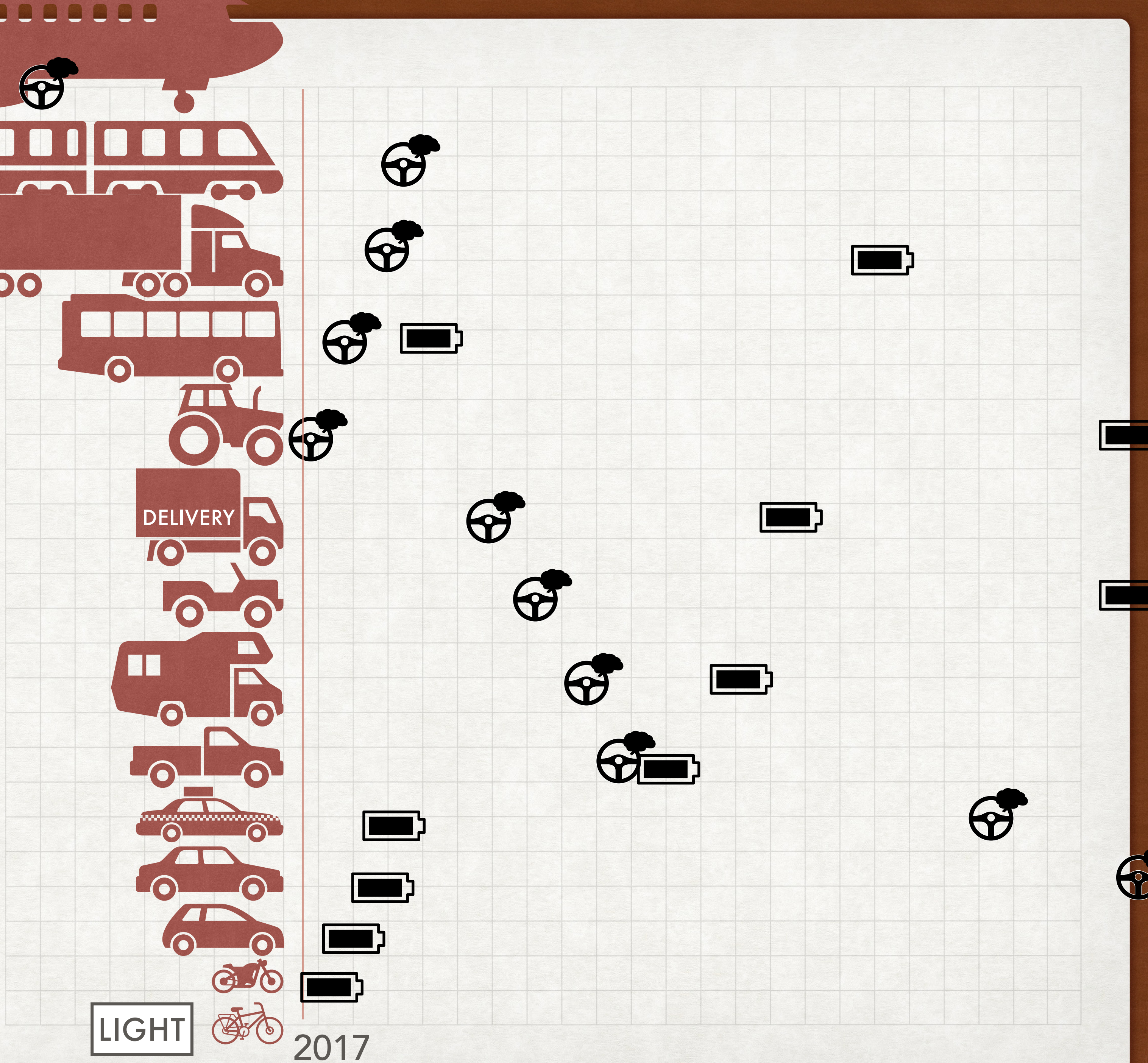
LIGHT

2017



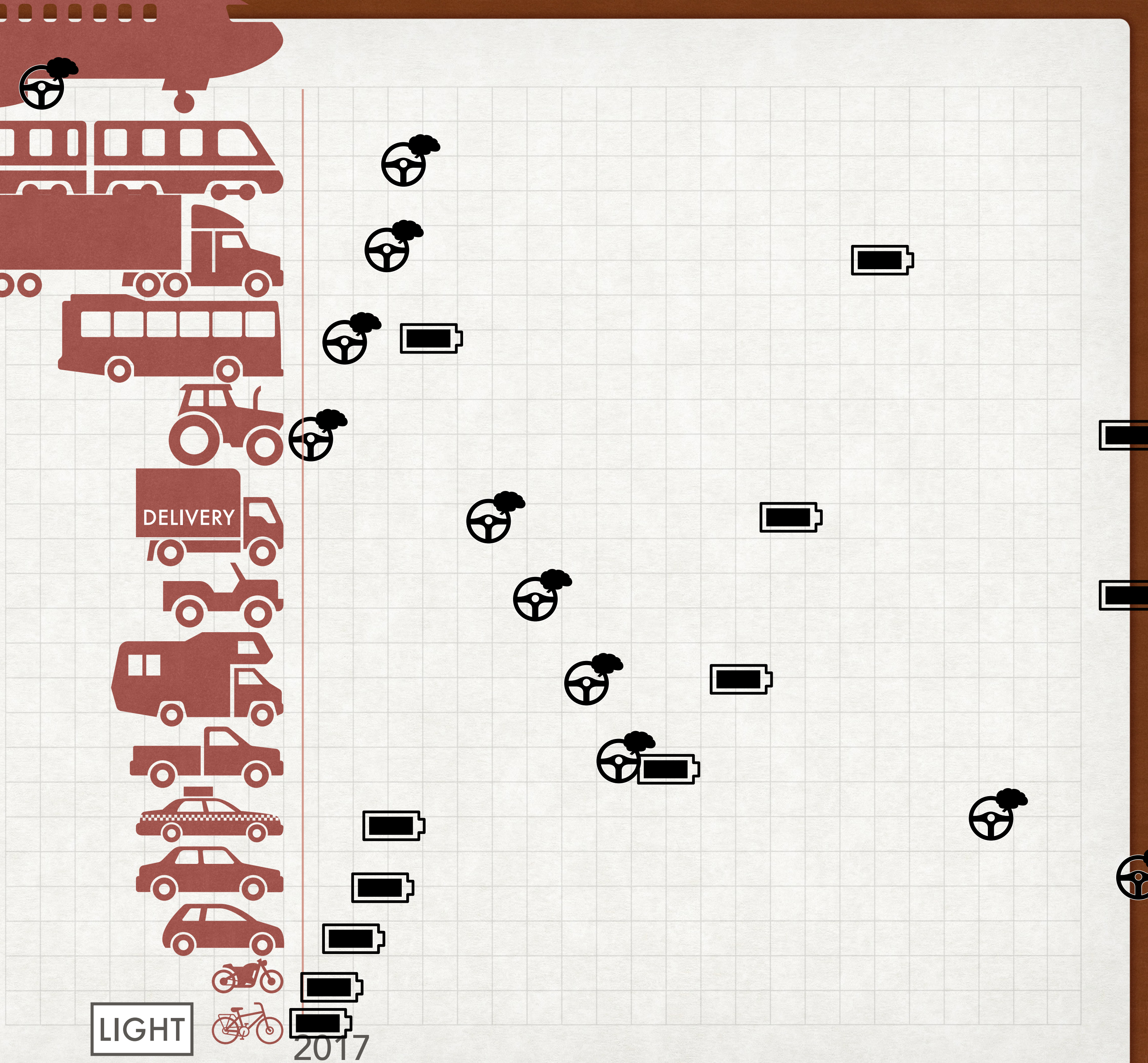
HEAVY

RACE TO AUTONOMY RACE TO ELECTRIC



HEAVY

RACE TO AUTONOMY RACE TO ELECTRIC

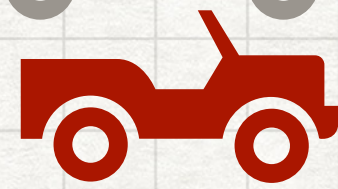


LIGHT

2017

HEAVY

HABITAT

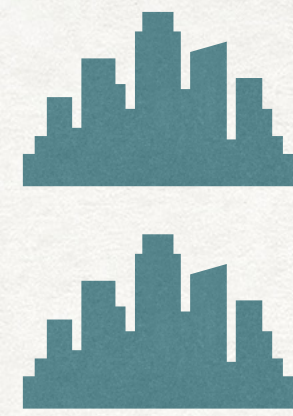


2017



URBAN

On-demand



Public



Owned



Personal



Capitalized

Commercial



Soon

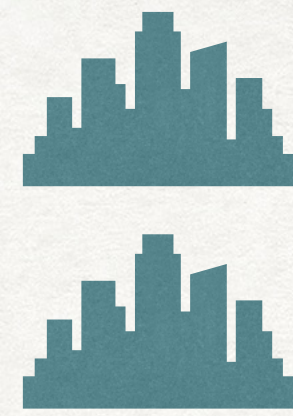
Much Later

RURAL

2017

URBAN

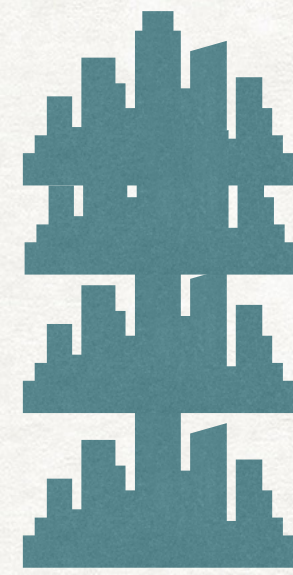
On-demand



Public



Owned



Personal



Capitalized

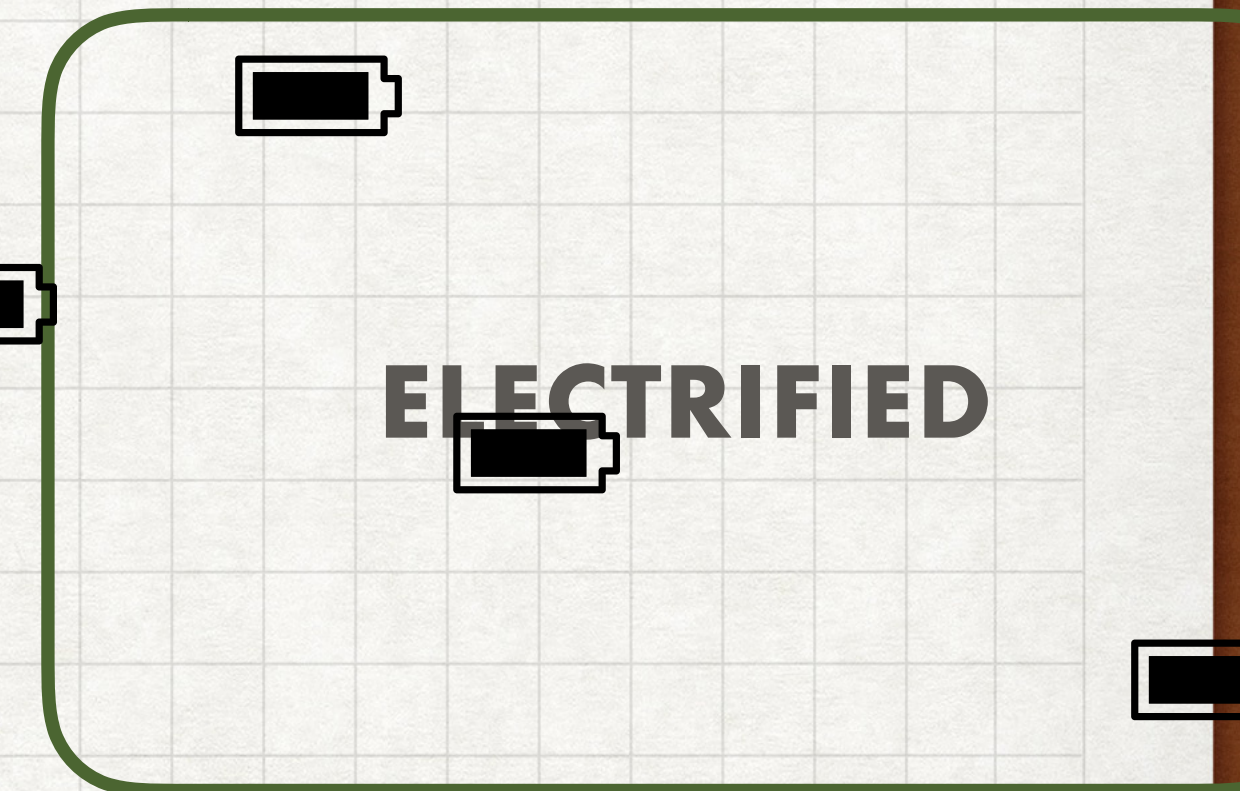
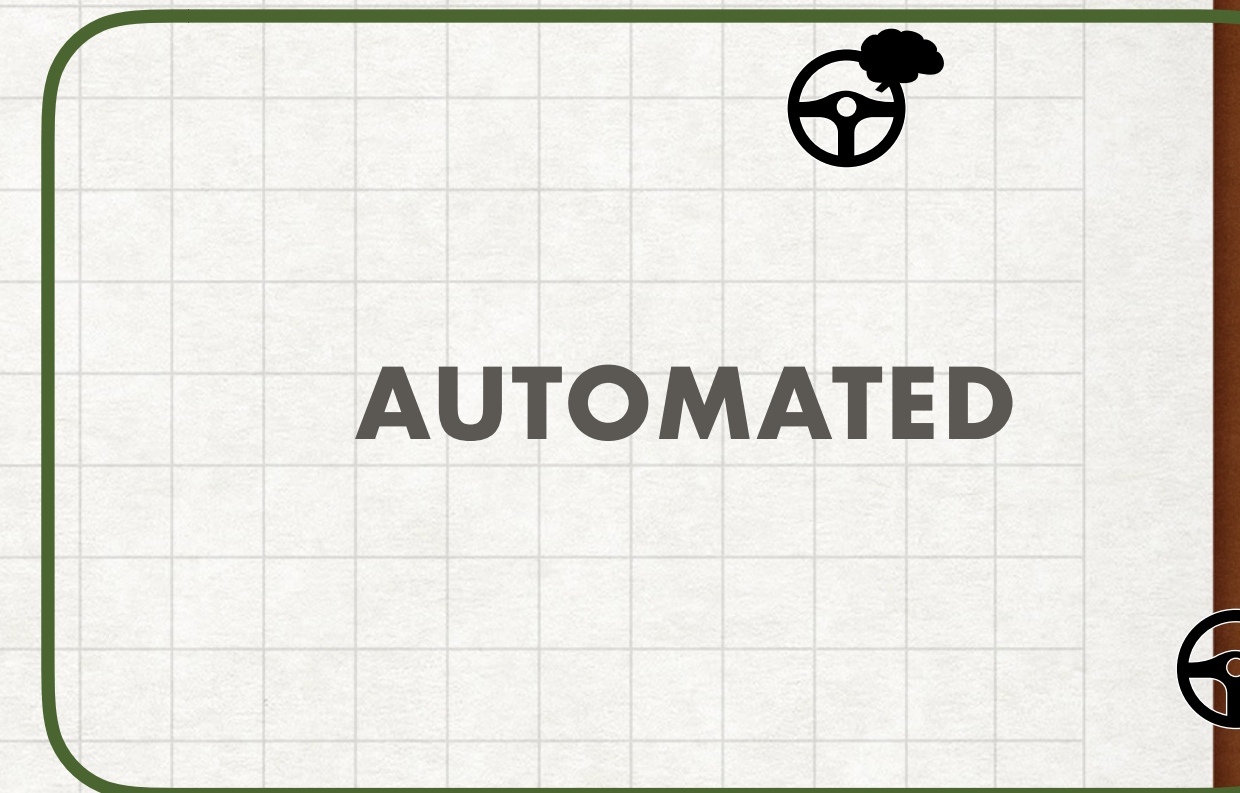
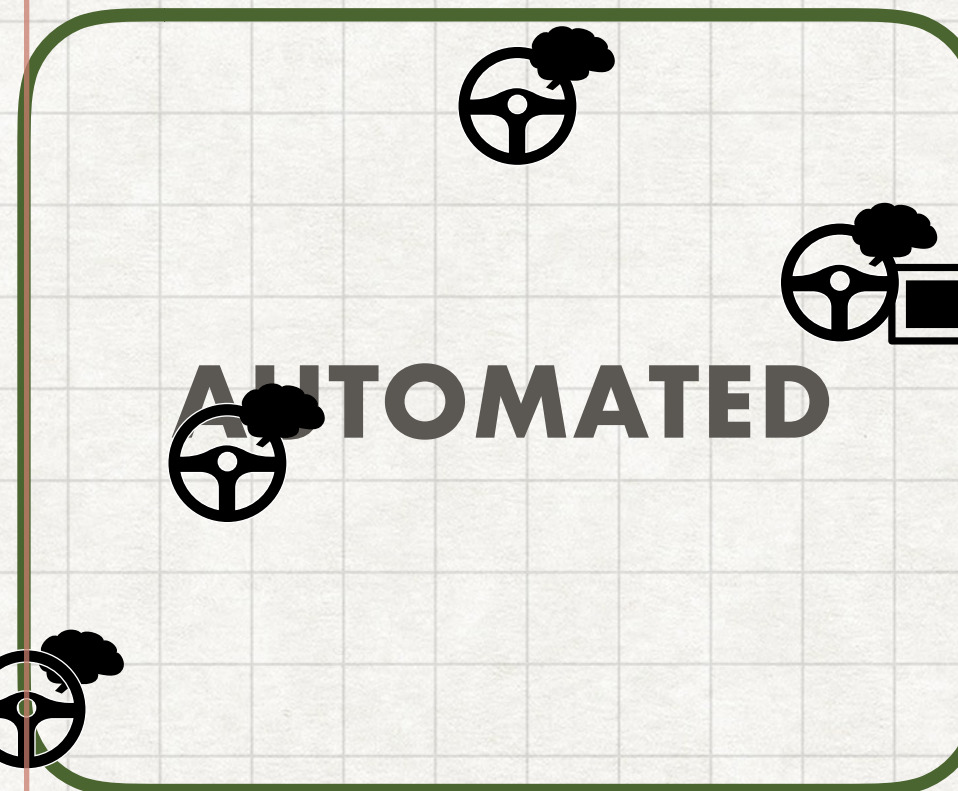
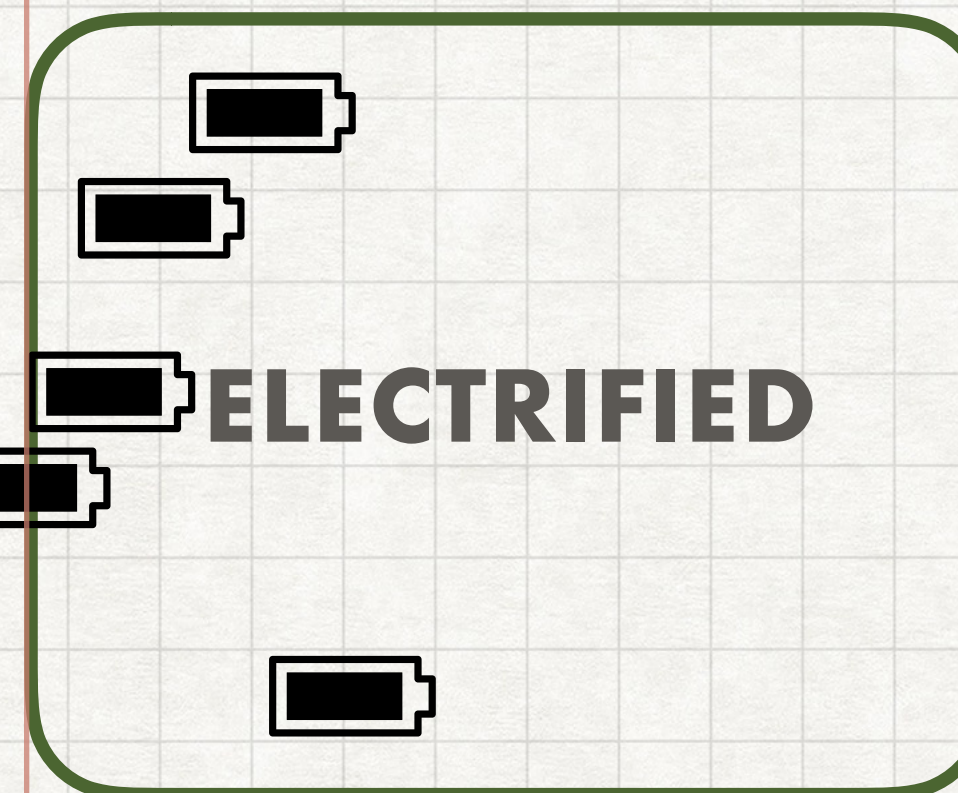


Commercial



RURAL

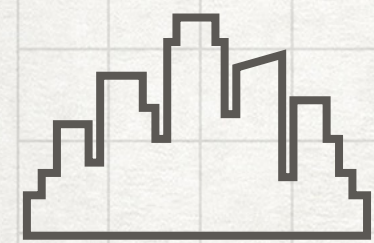
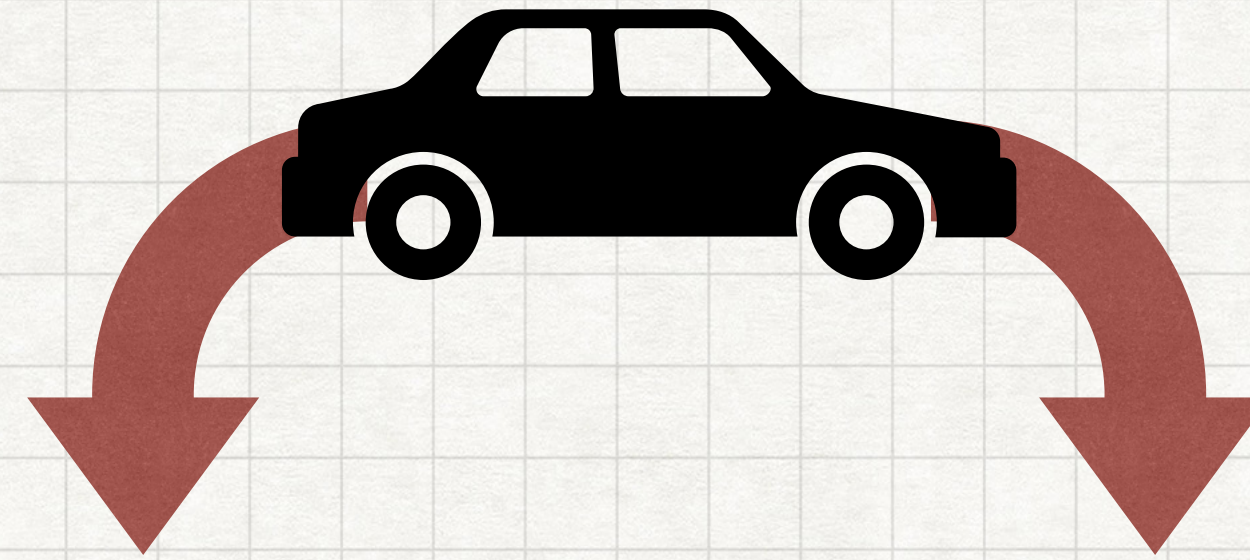
2017



Soon

Much Later

THE GREAT UNBUNDLING

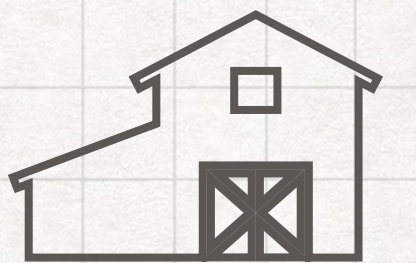


SMALL DISTANCES IN
SMALL VEHICLES



ELECTRIC EARLY
AUTONOMOUS LATE

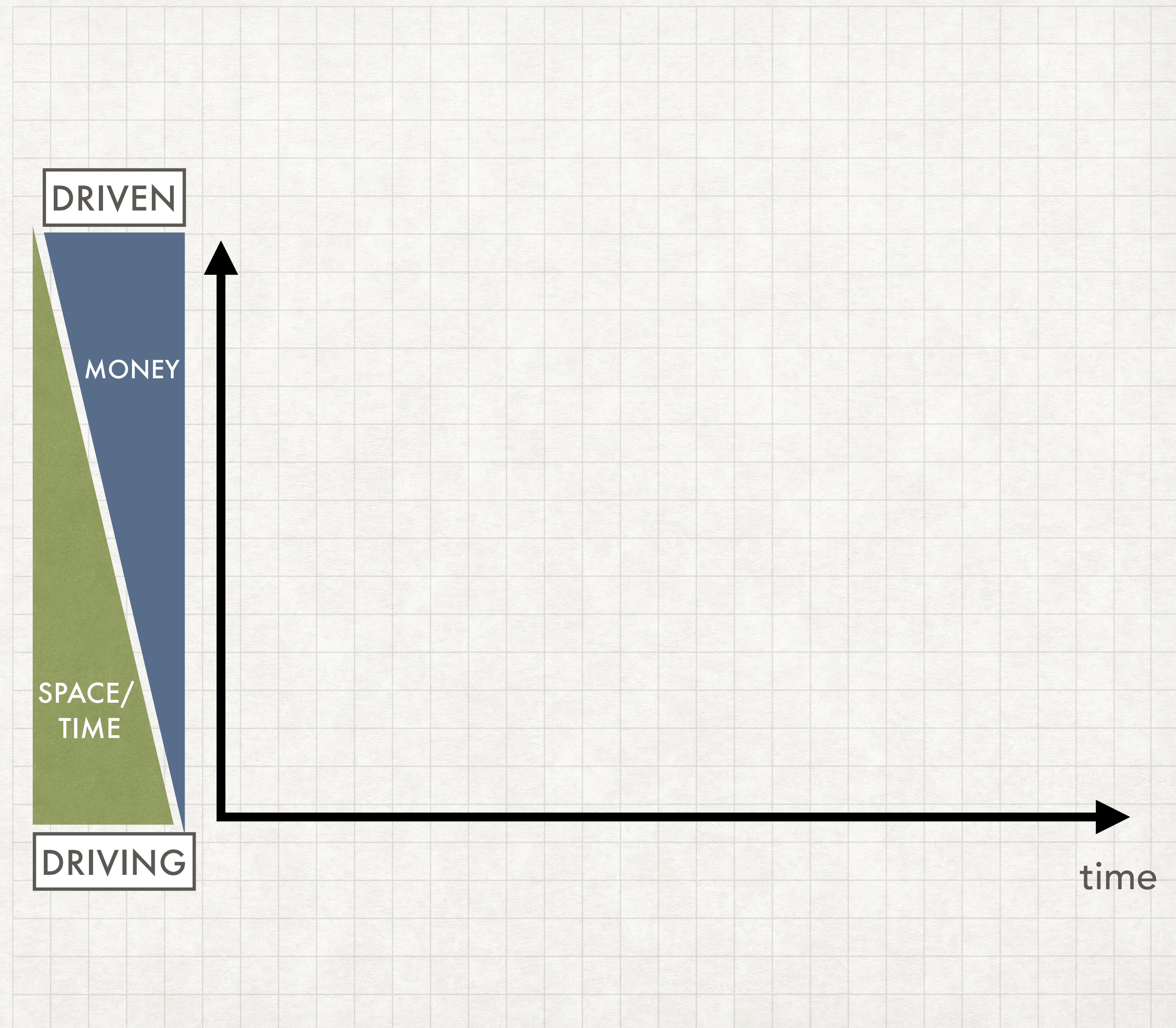
LARGE DISTANCES IN
LARGE VEHICLES

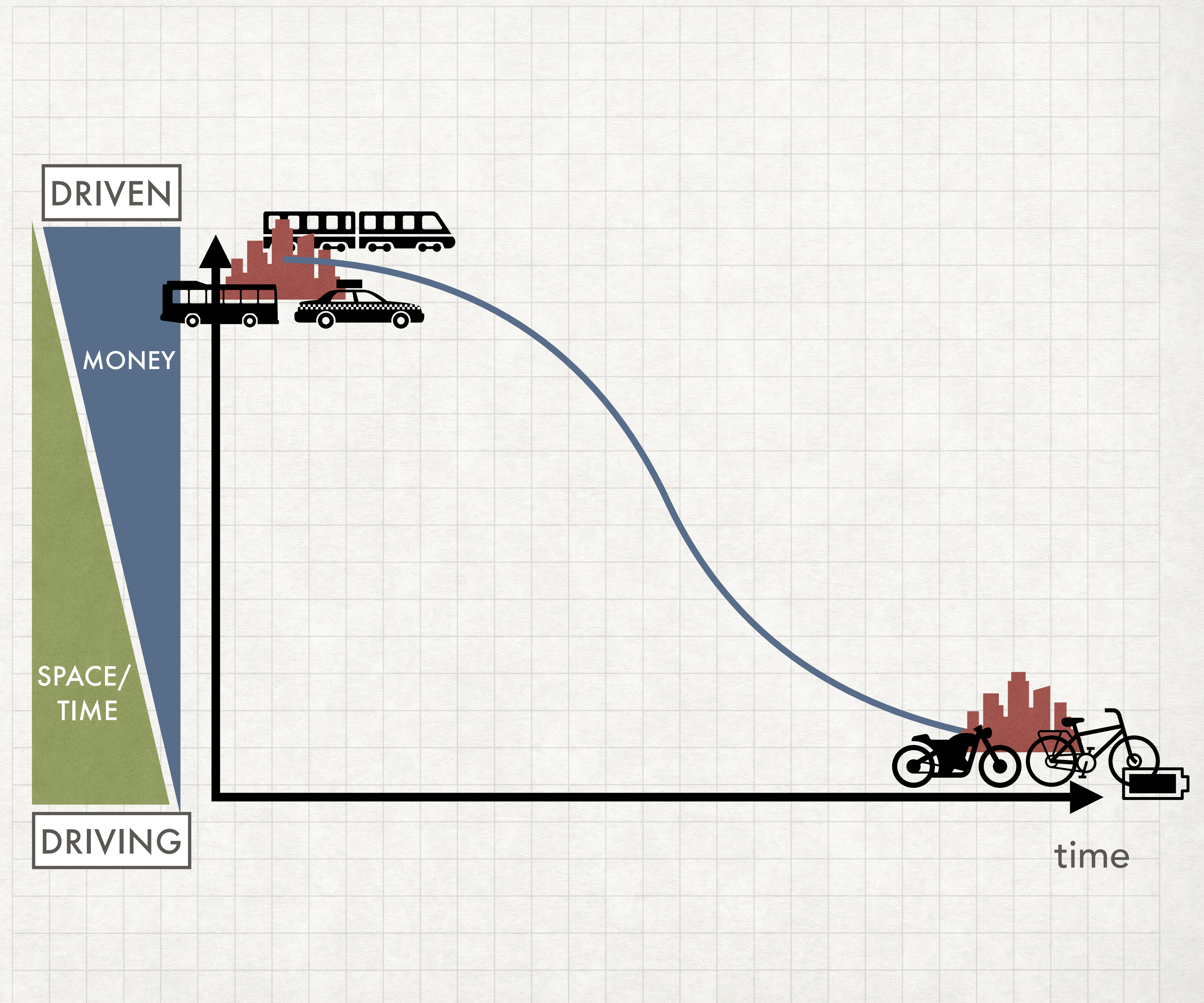


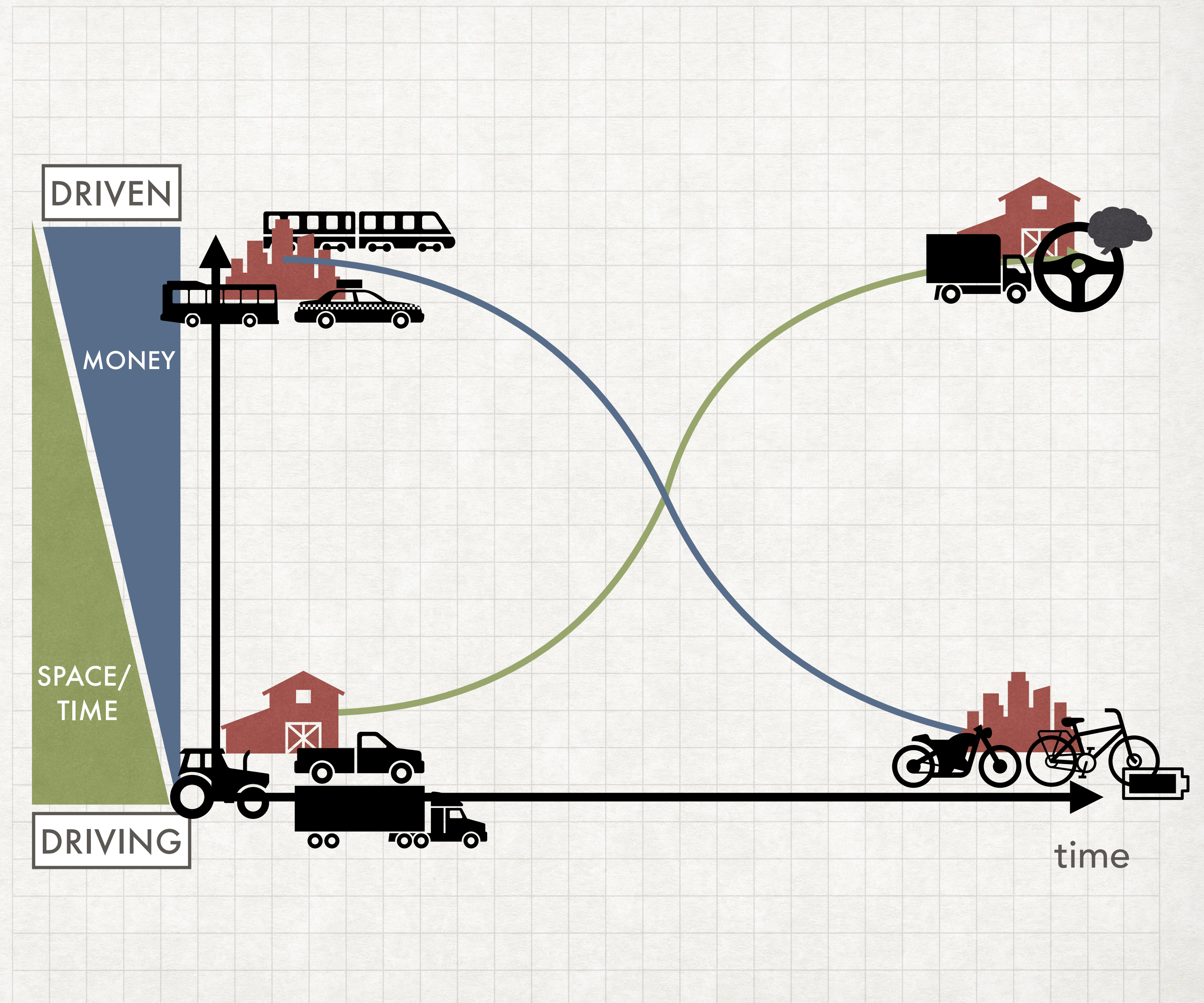
AUTONOMOUS EARLY
ELECTRIC LATE

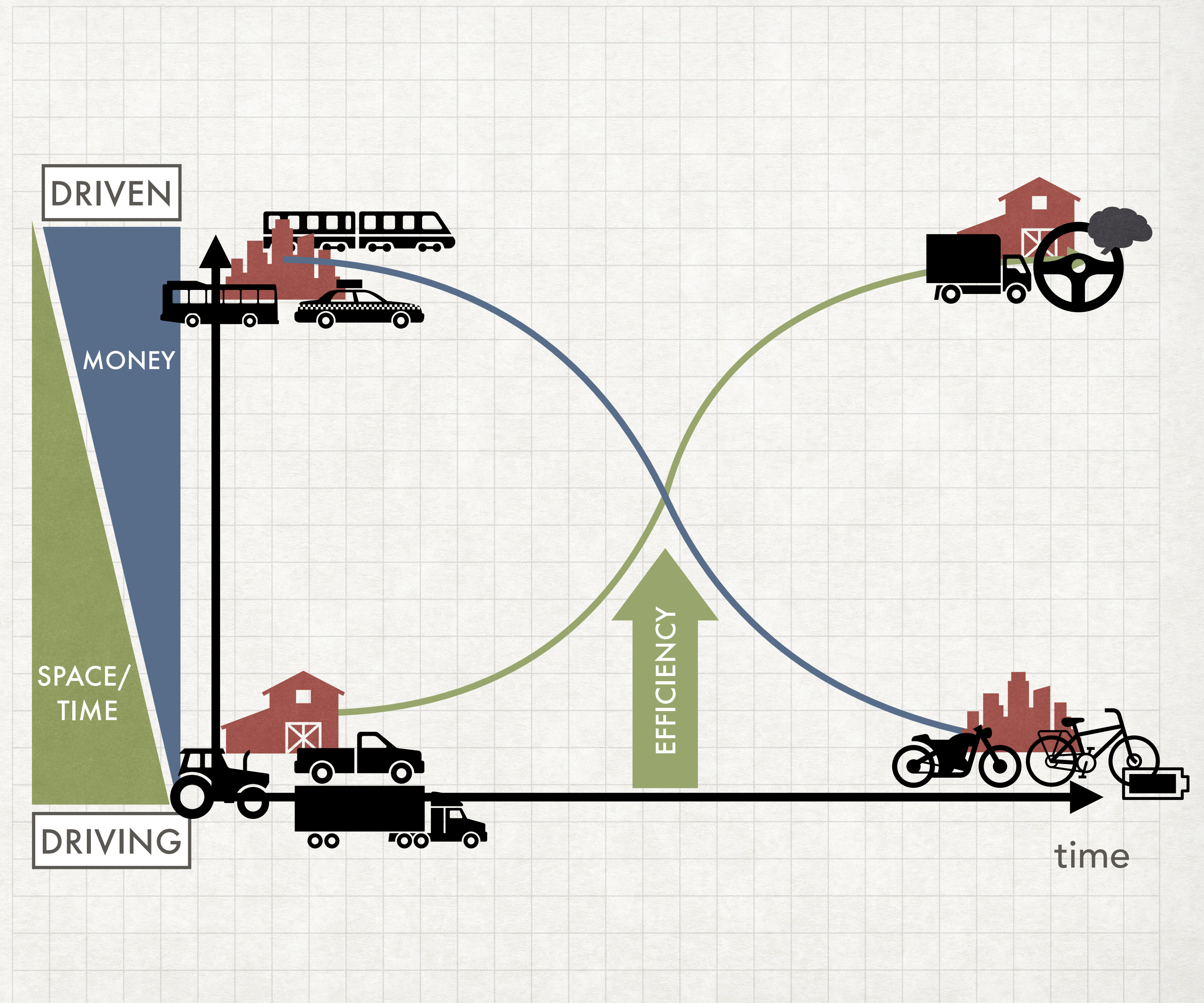


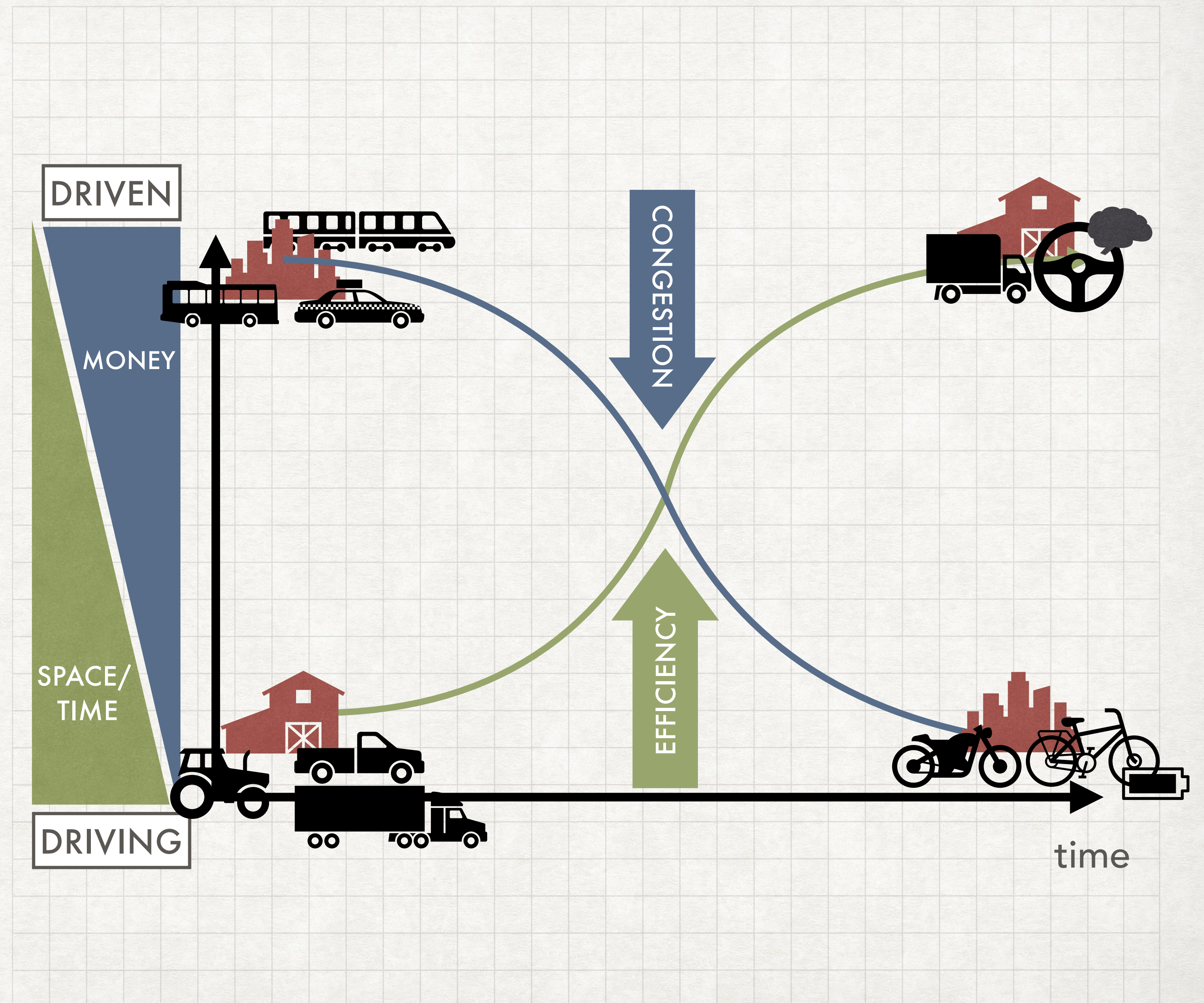
Micromobility market will grow fastest
2026: 40 million units/yr



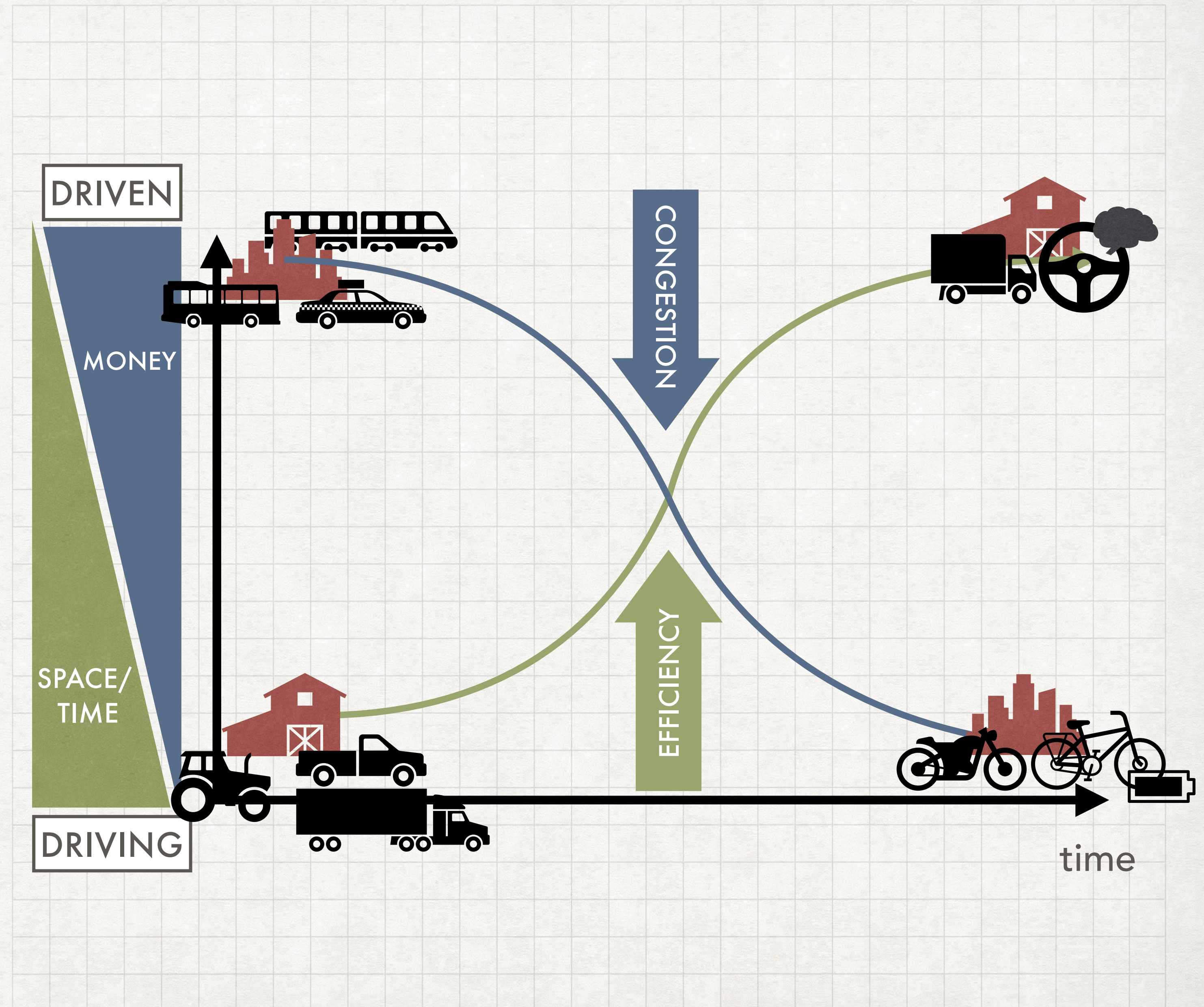


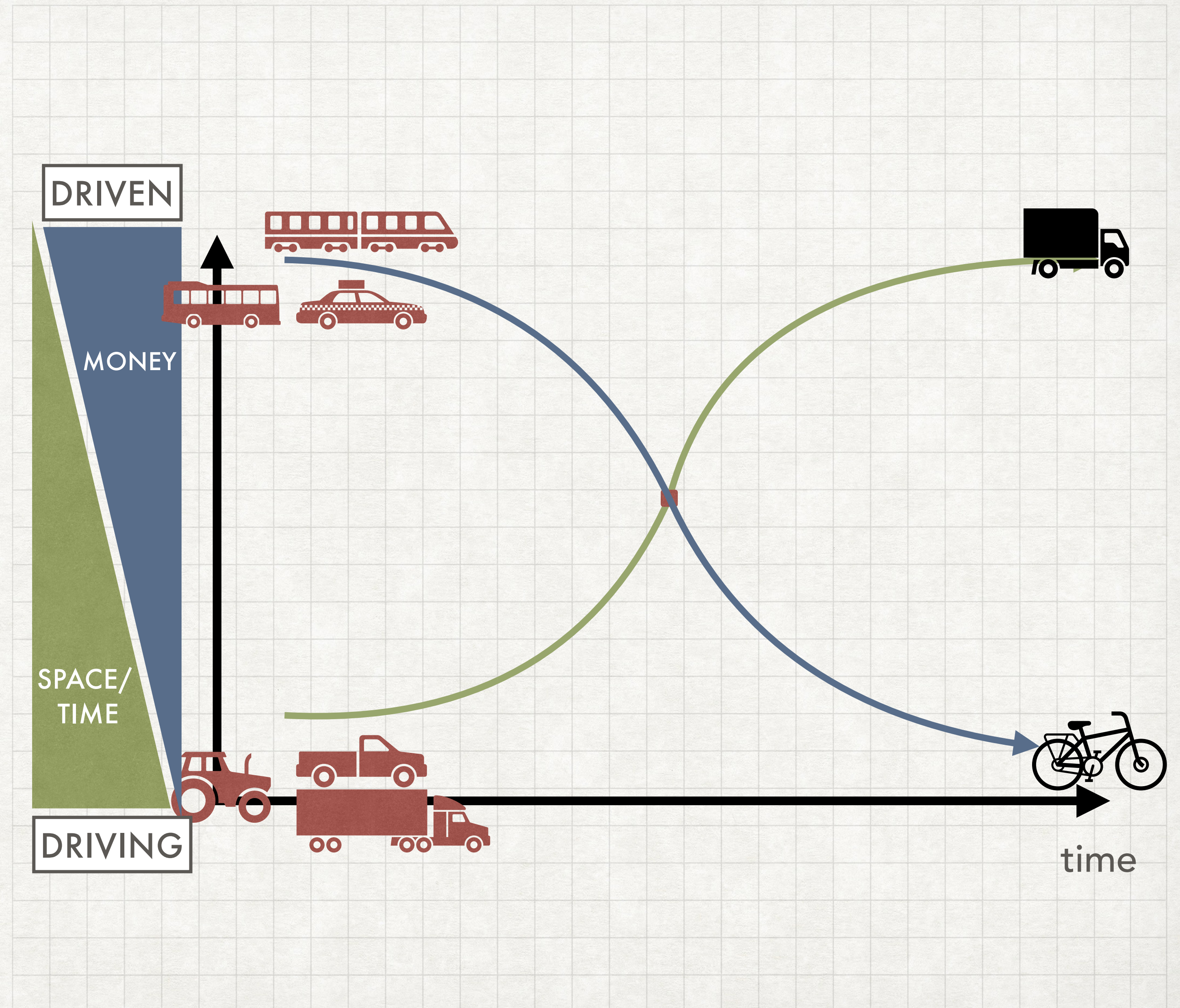




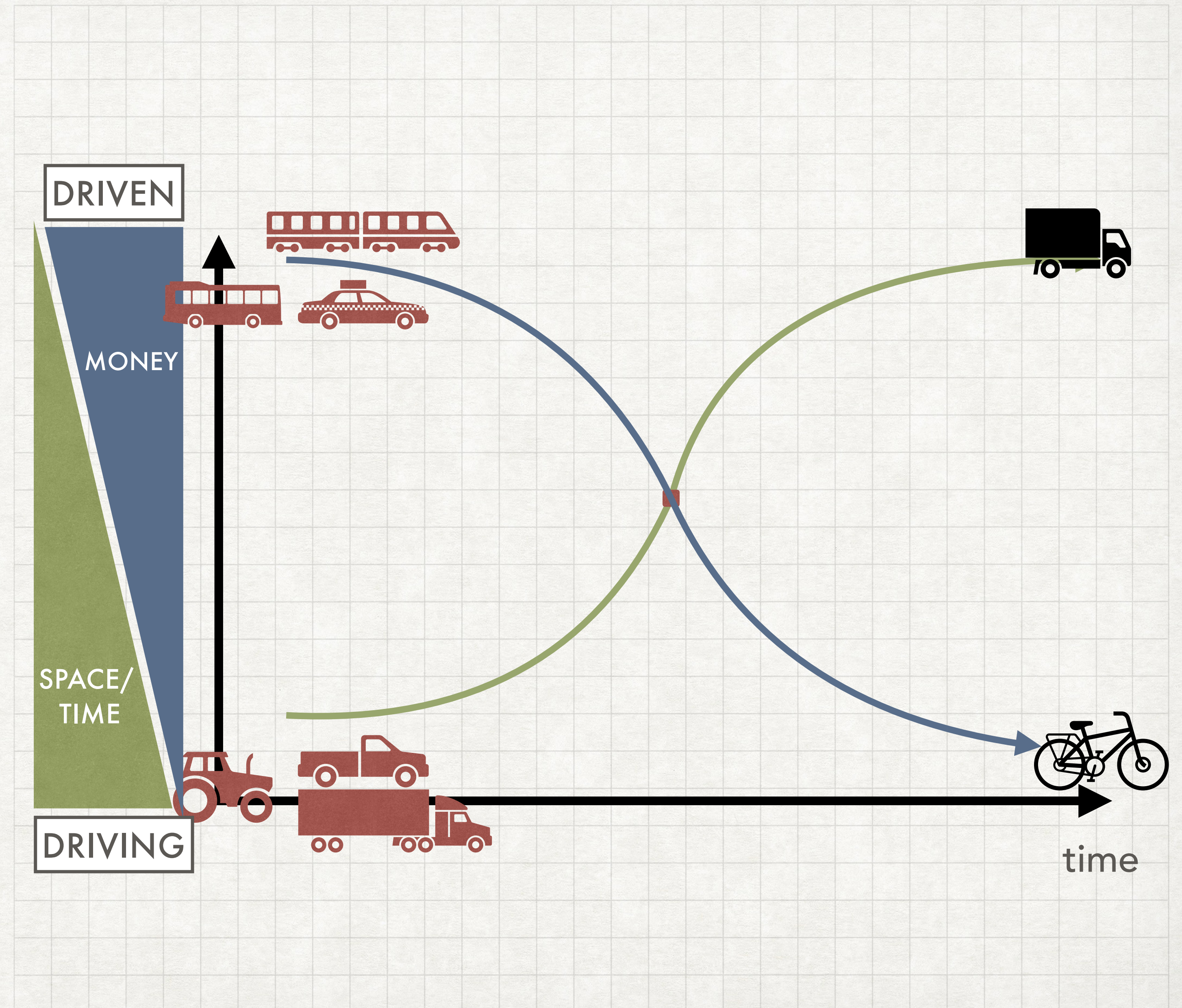


MICROMOBILITY SWITCH



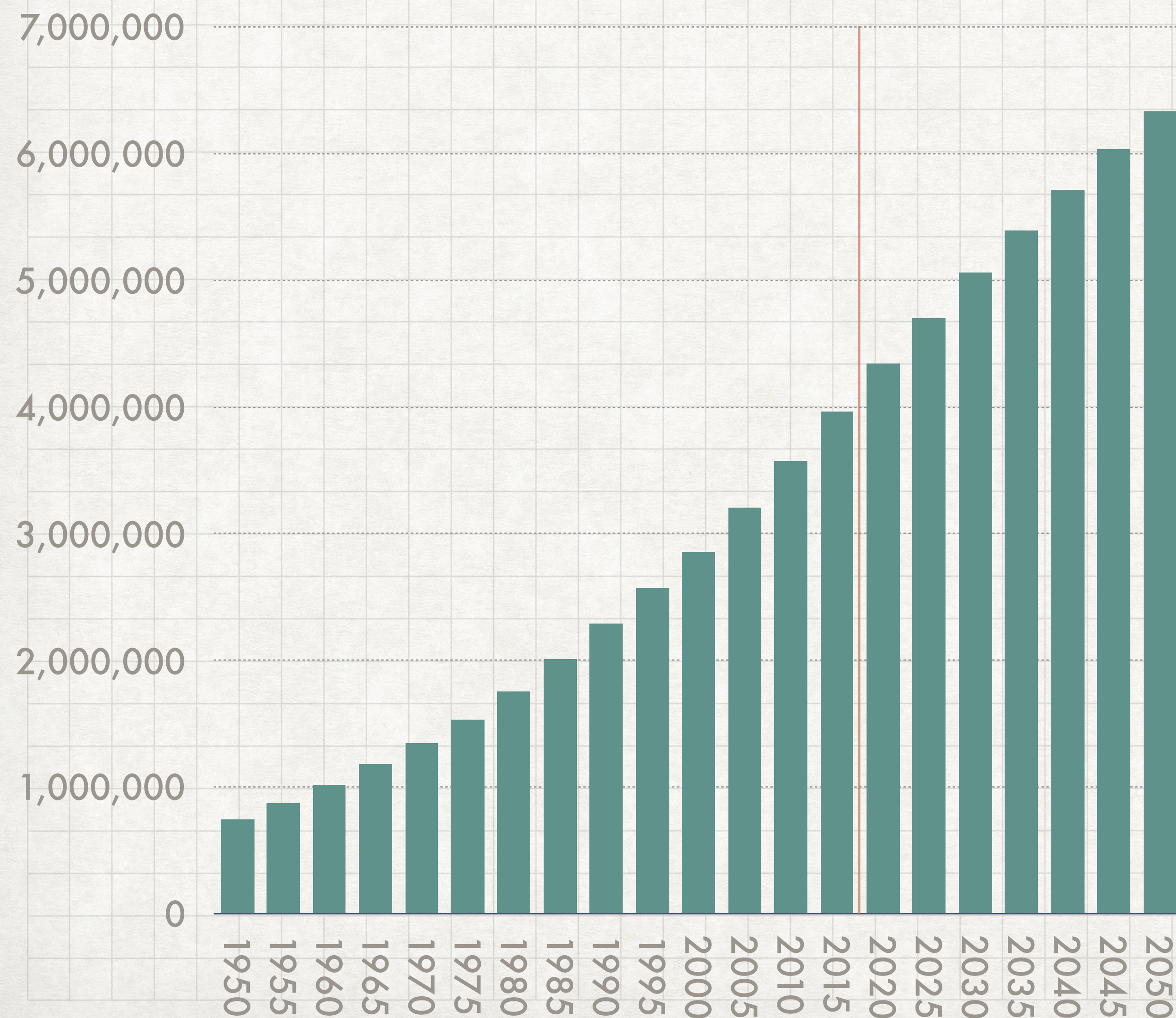


MICROMOBILITY SWITCH



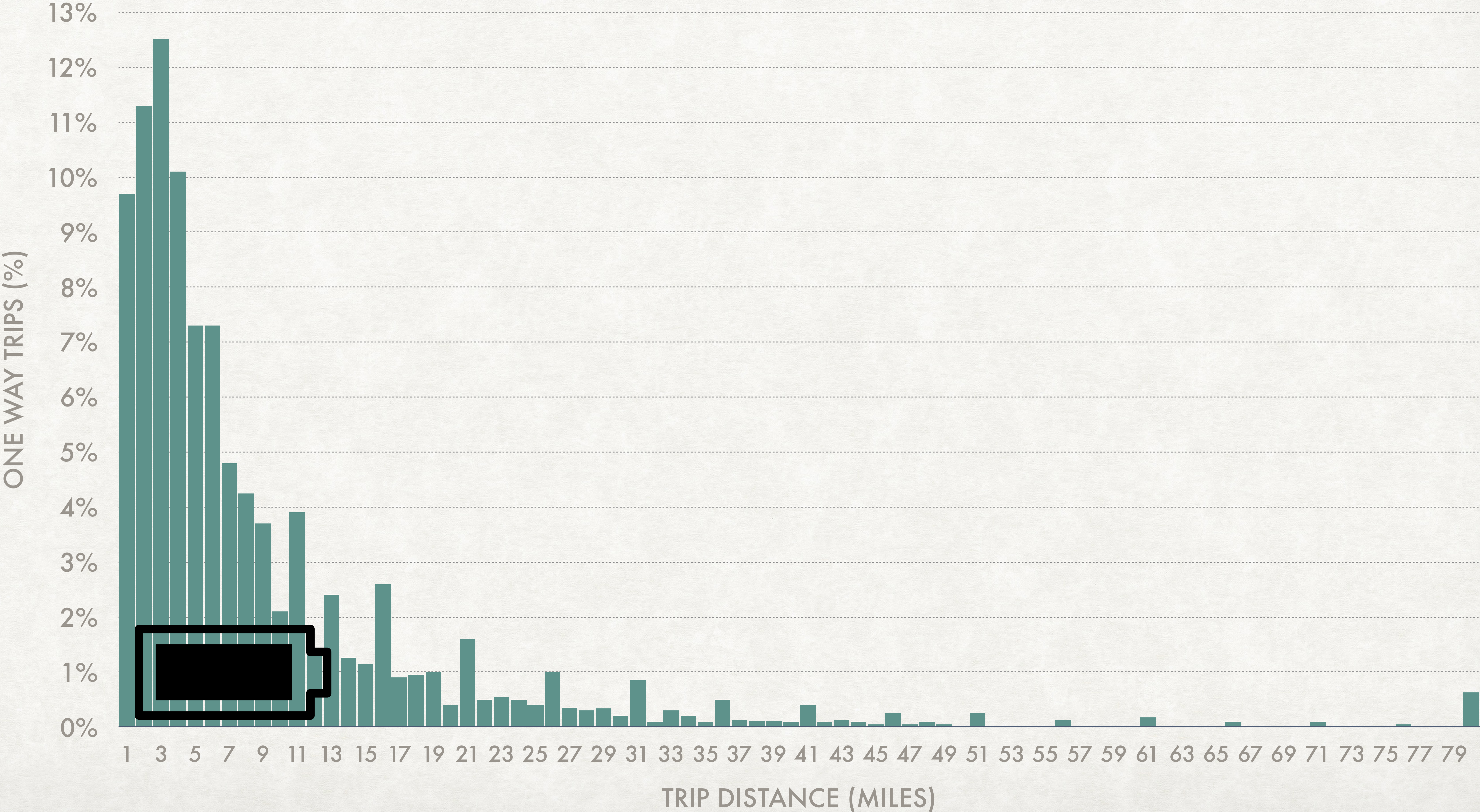
URBAN POPULATION AT MID-YEAR, 1950-2050 (THOUSANDS)

$\frac{2}{3}$ WILL LIVE IN CITIES

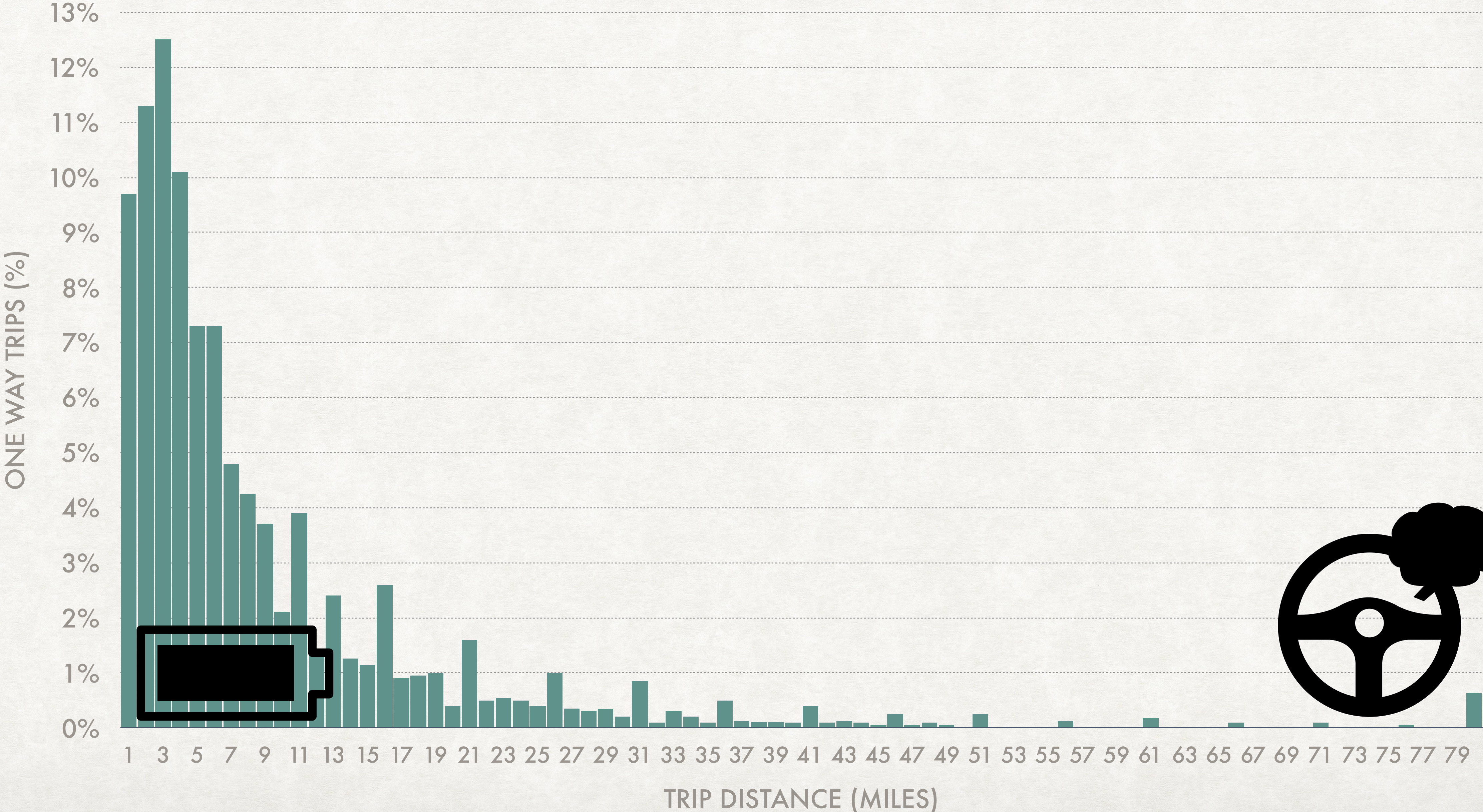


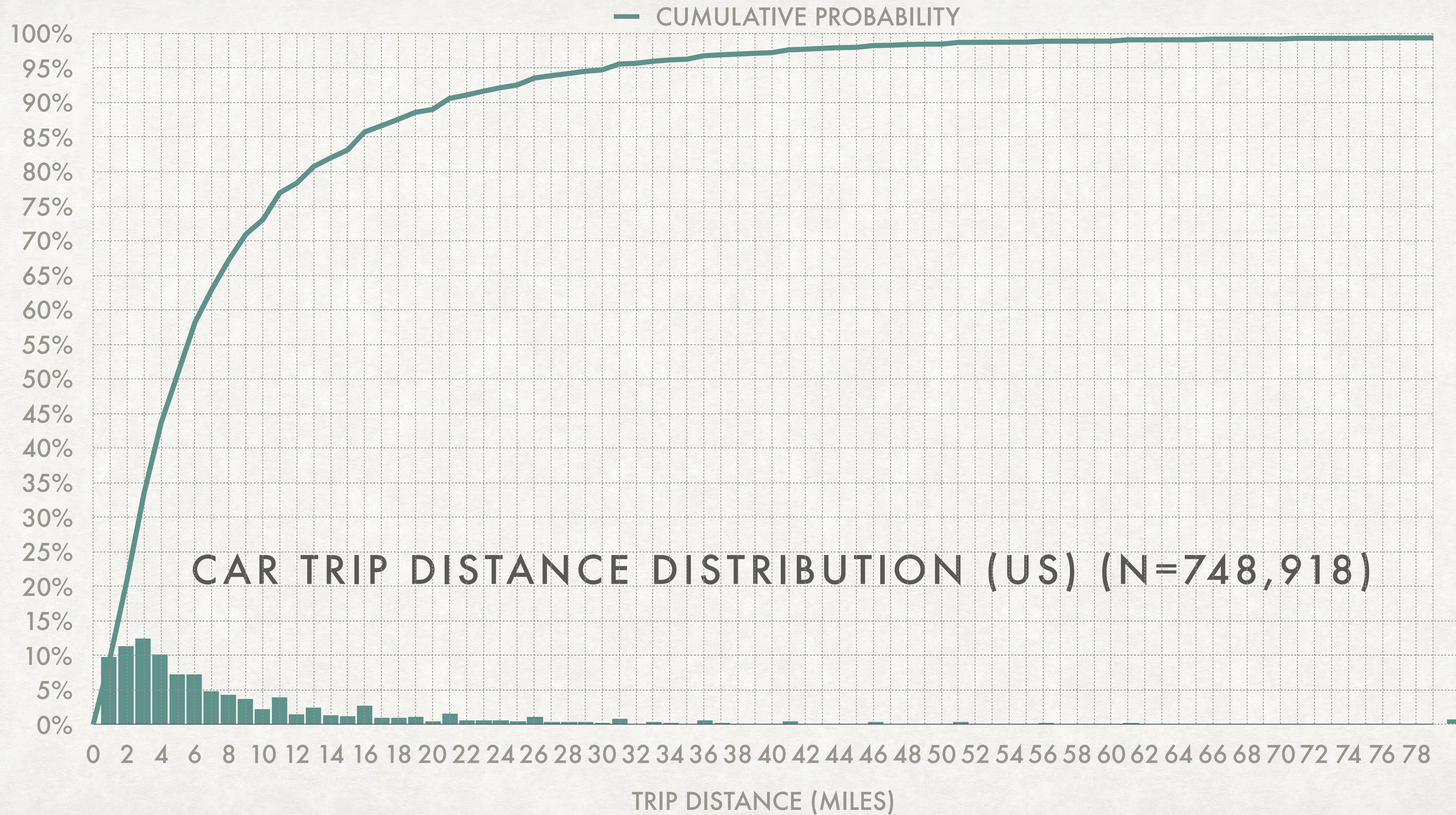
3.9 BILLION 2014 (54%)
6.4 BILLION 2050 (66%)

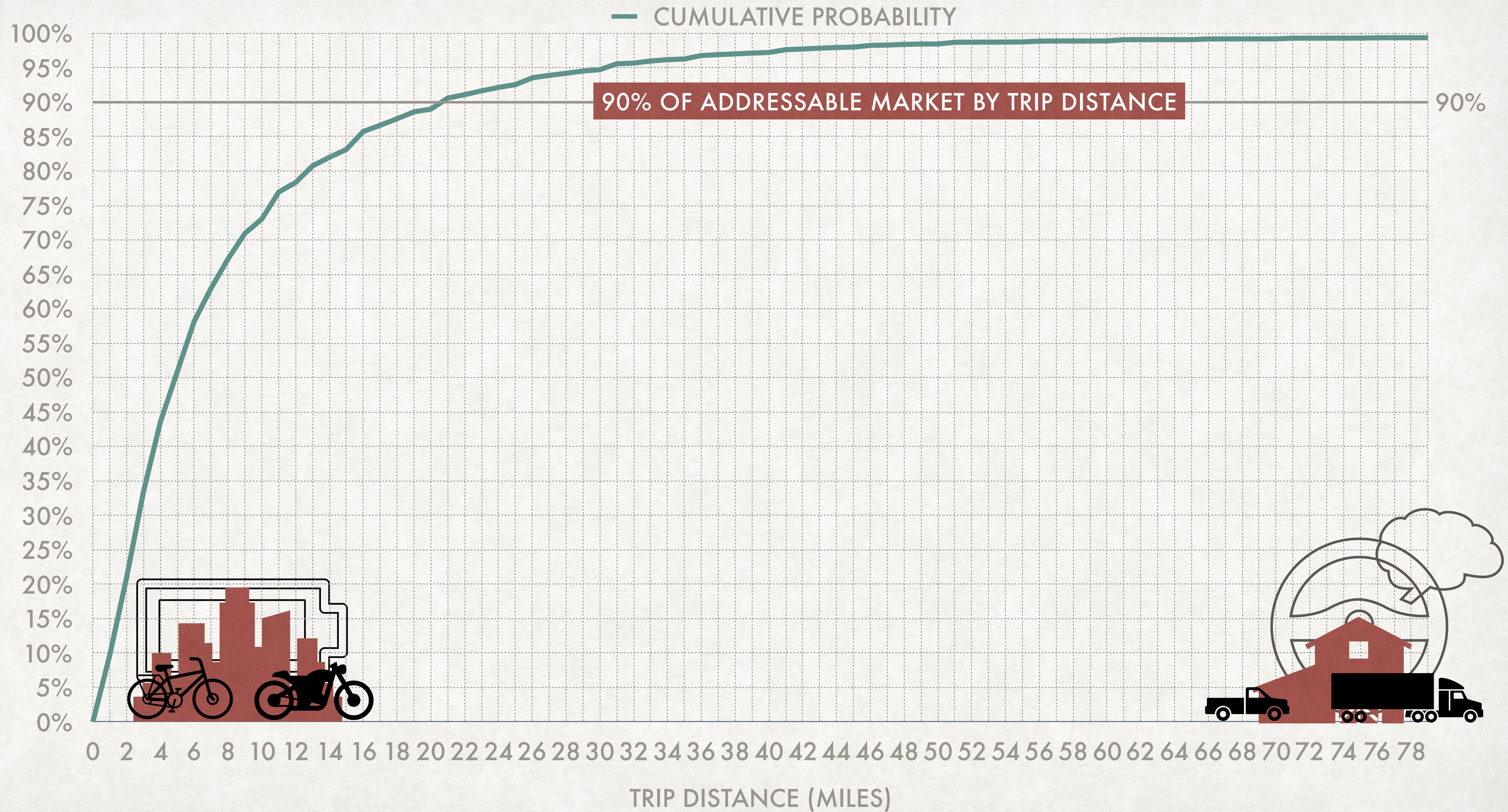
CAR TRIP DISTANCE DISTRIBUTION (US) (N=748,918)

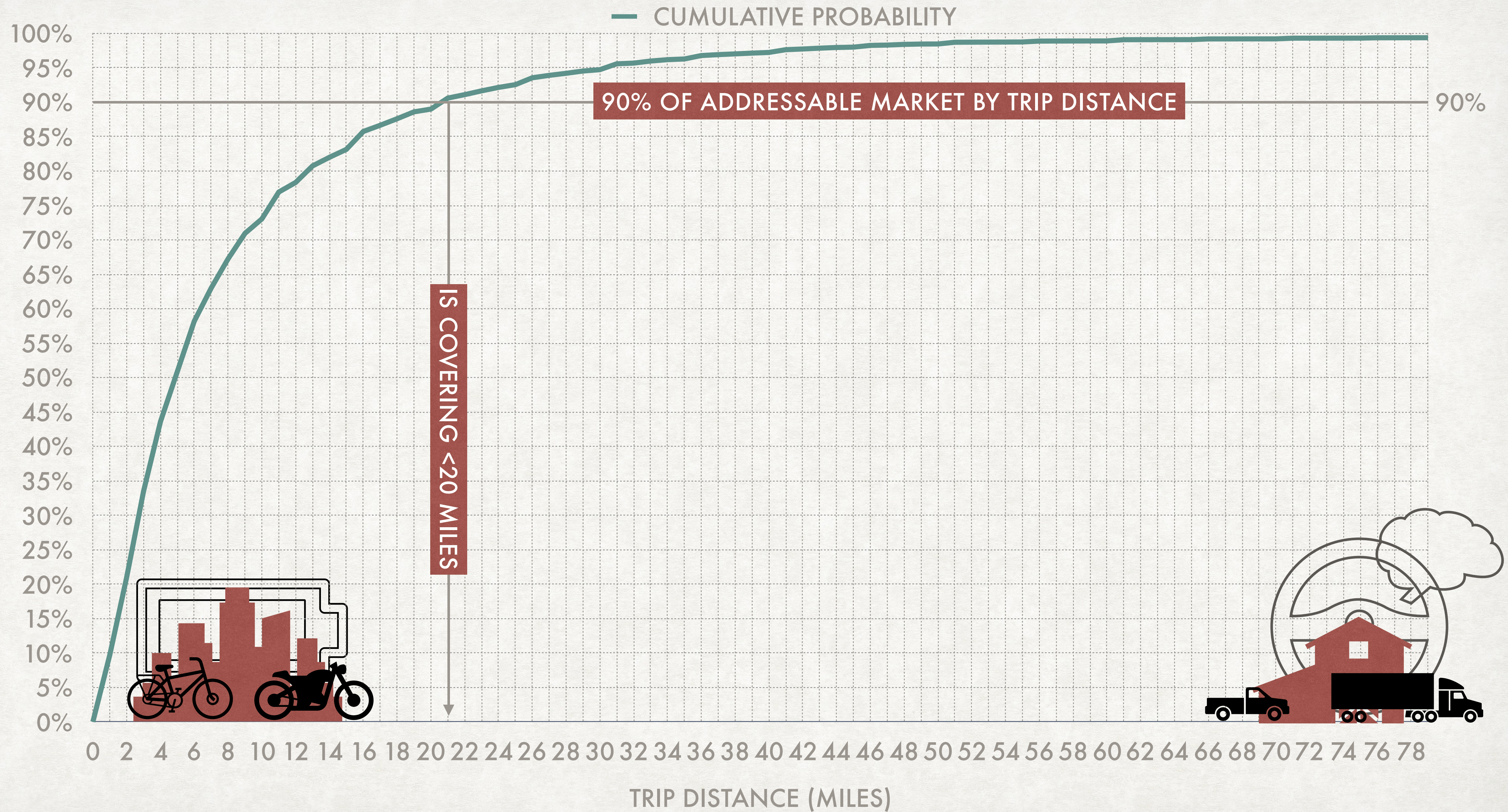


CAR TRIP DISTANCE DISTRIBUTION (US) (N=748,918)



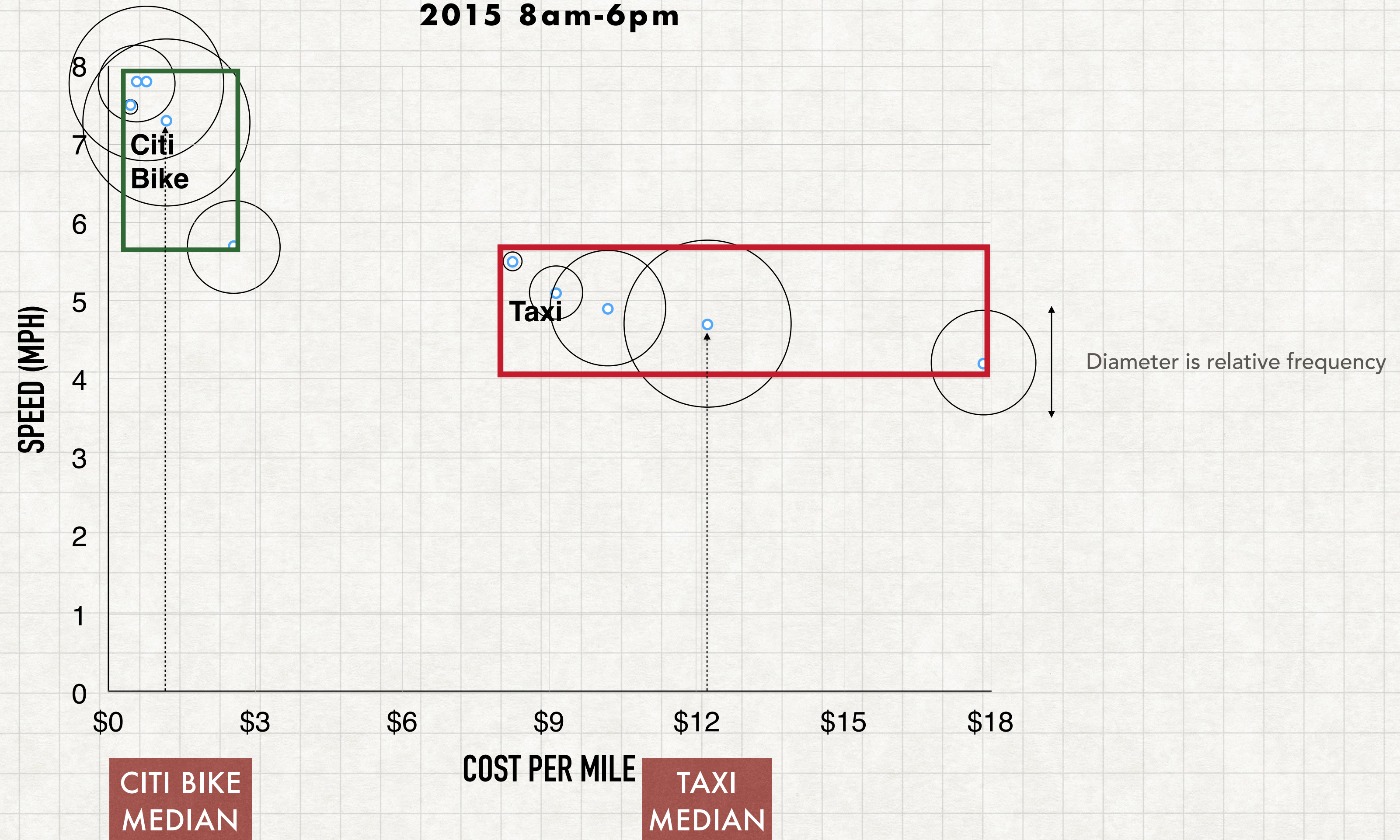




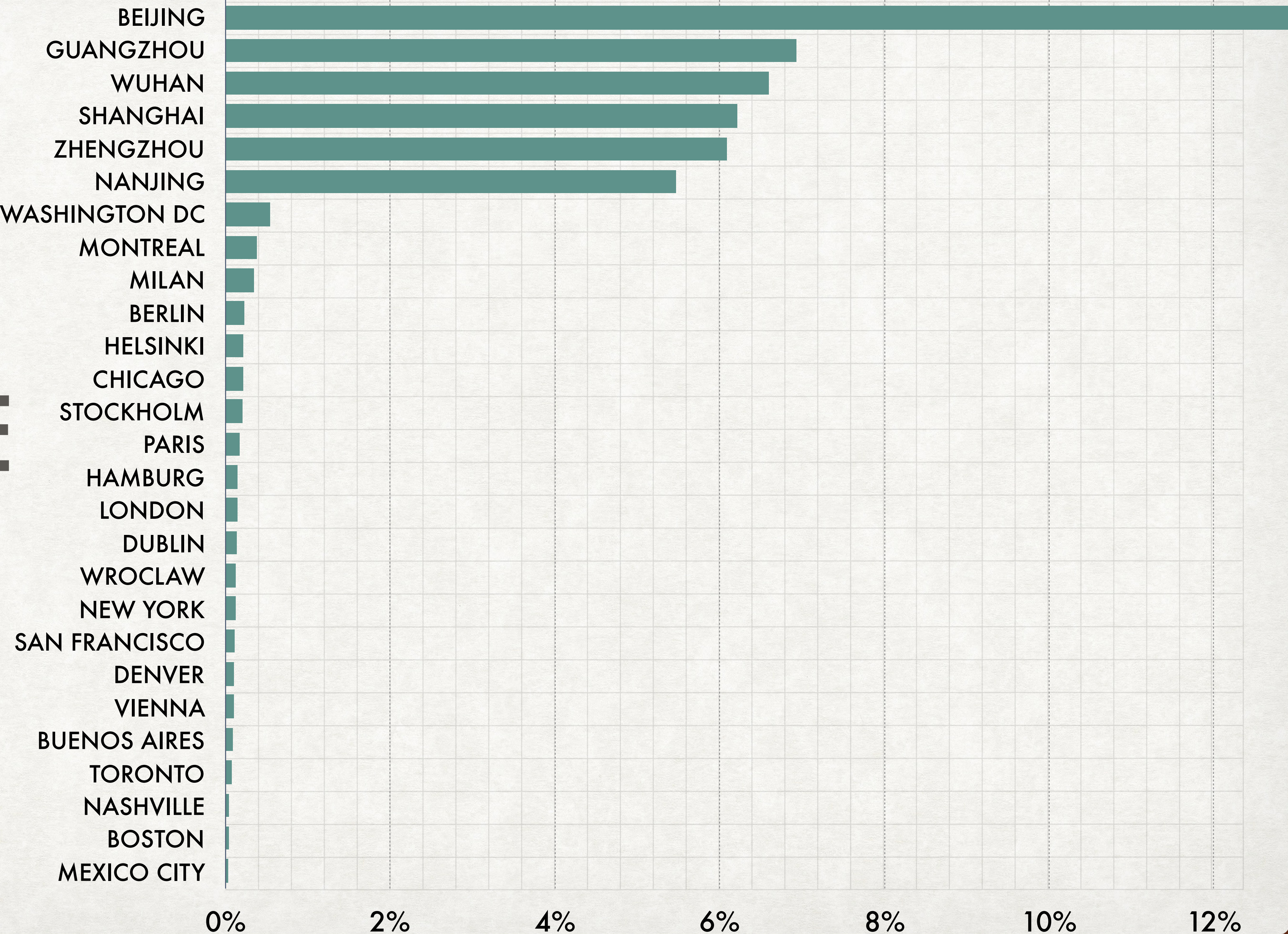


NYC MODEL

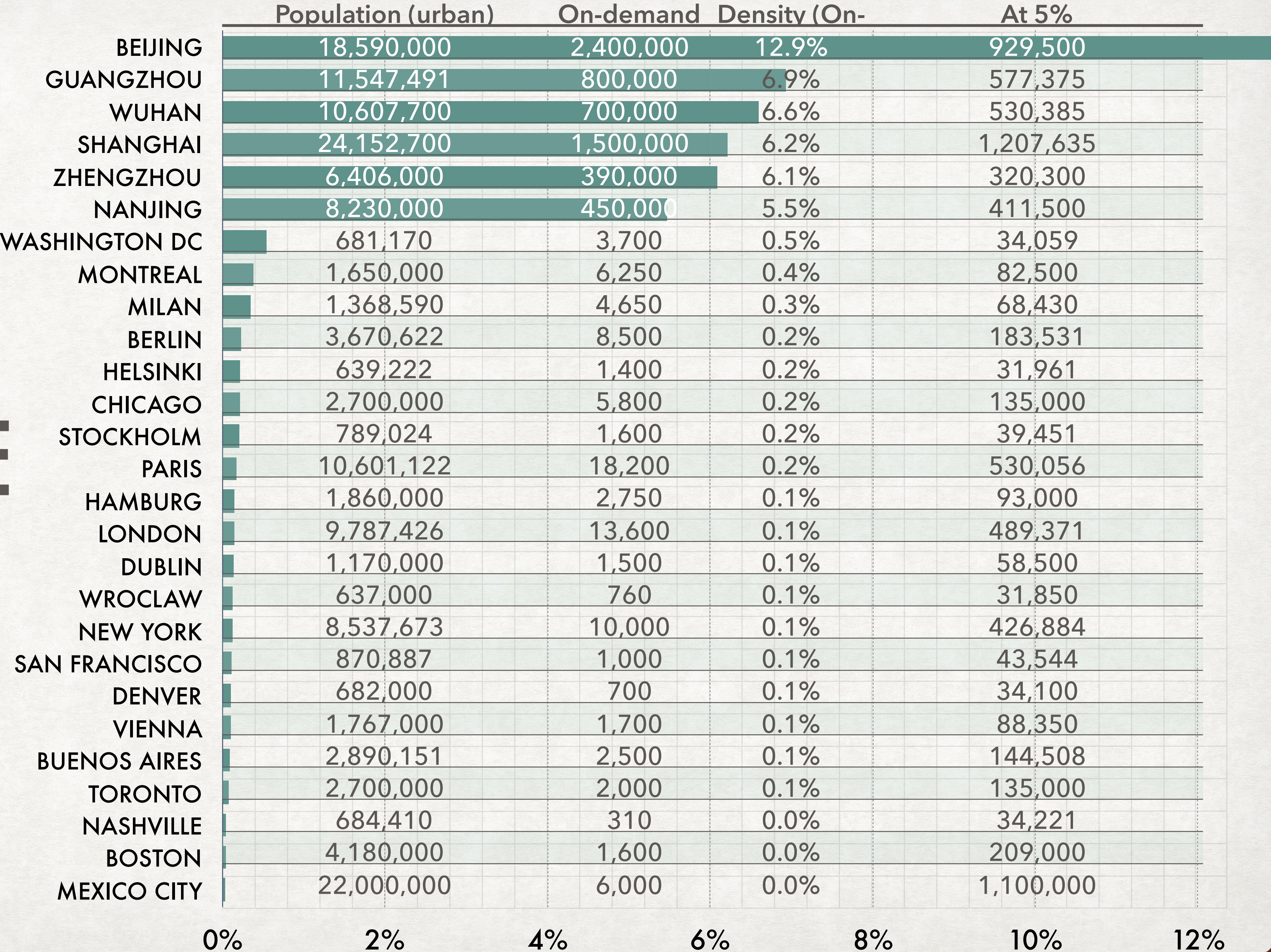
**Trips Starting and Ending in Midtown Core, Fall
2015 8am-6pm**



DENSITY AT
CHINESE
SCALE

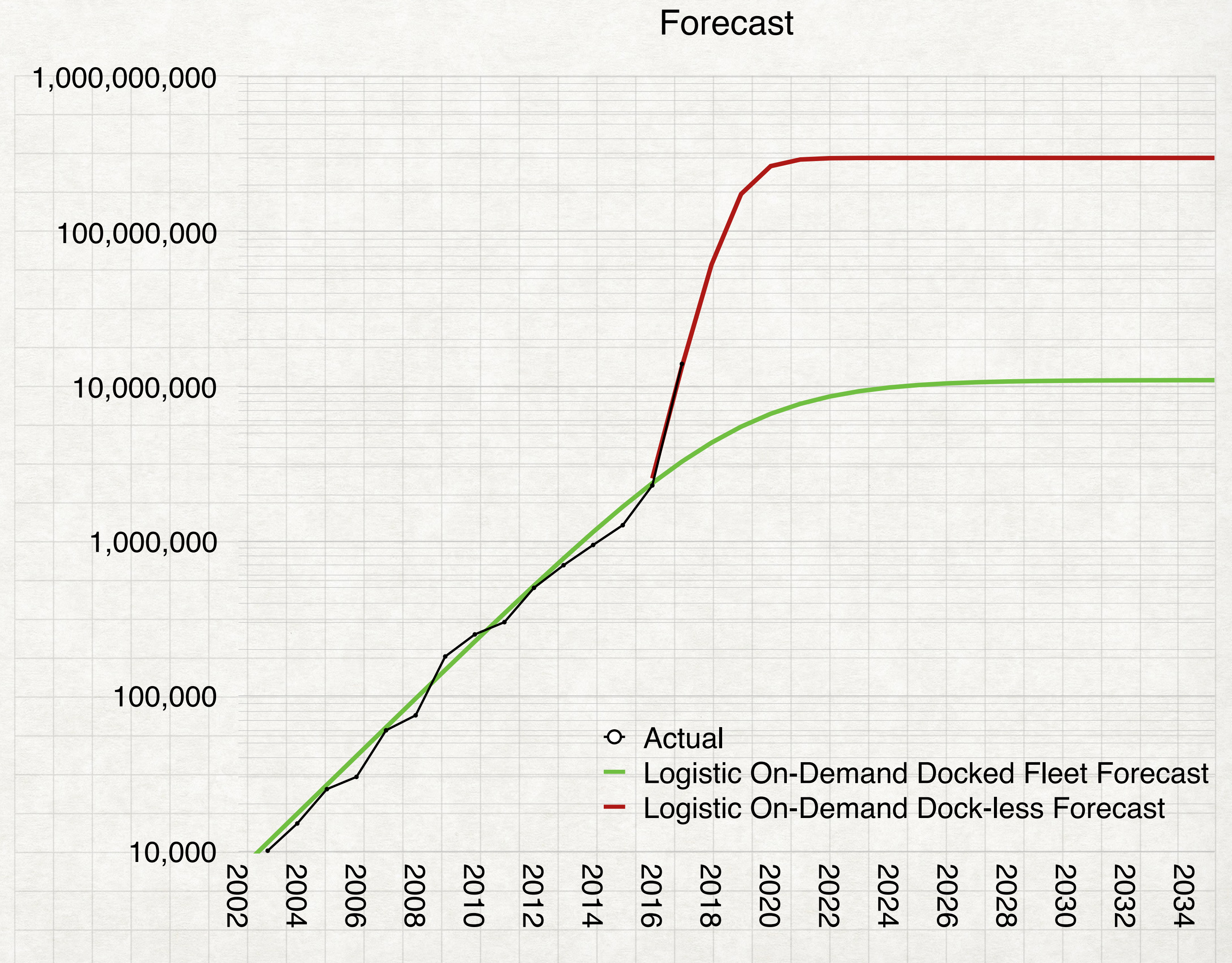


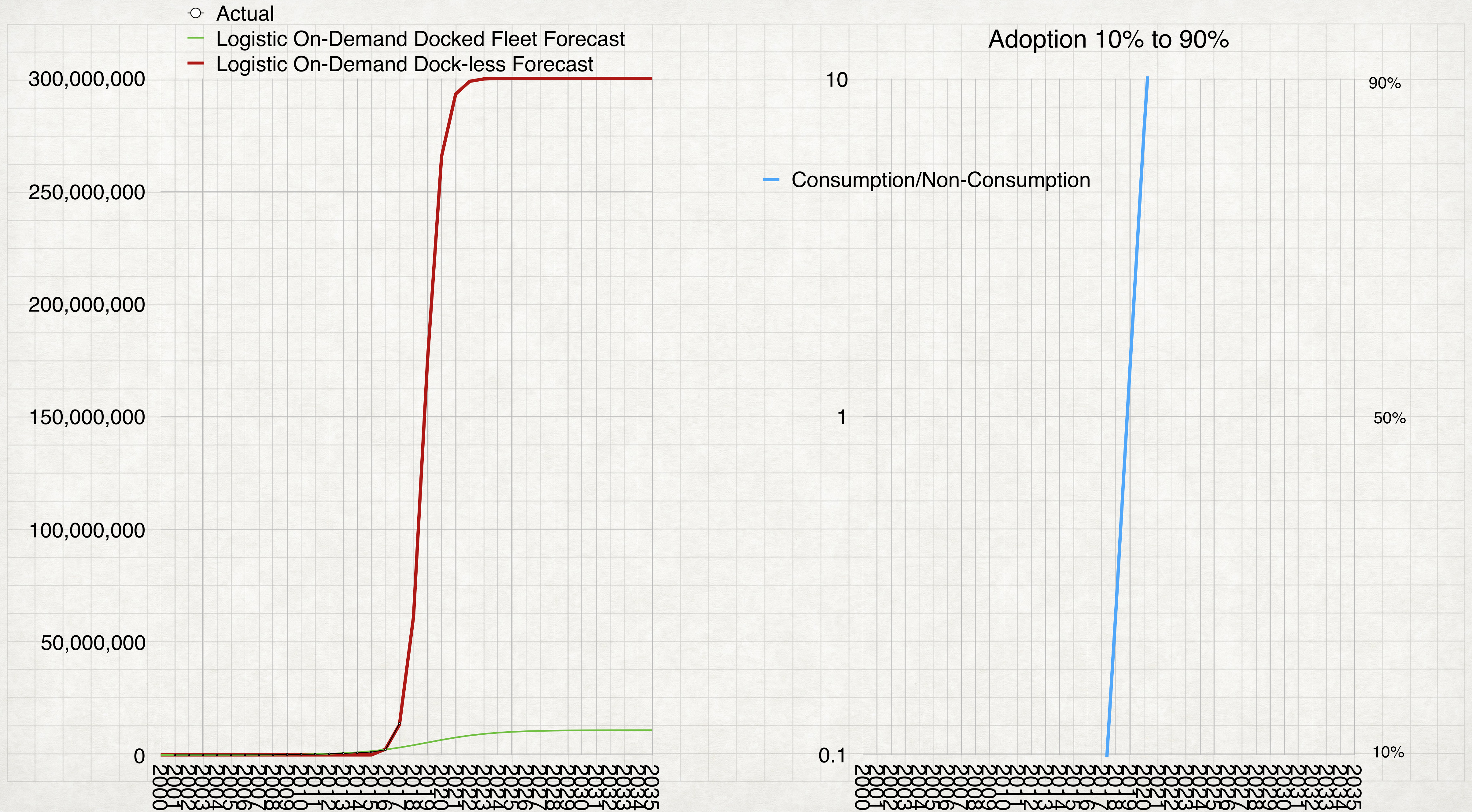
DENSITY AT
CHINESE
SCALE

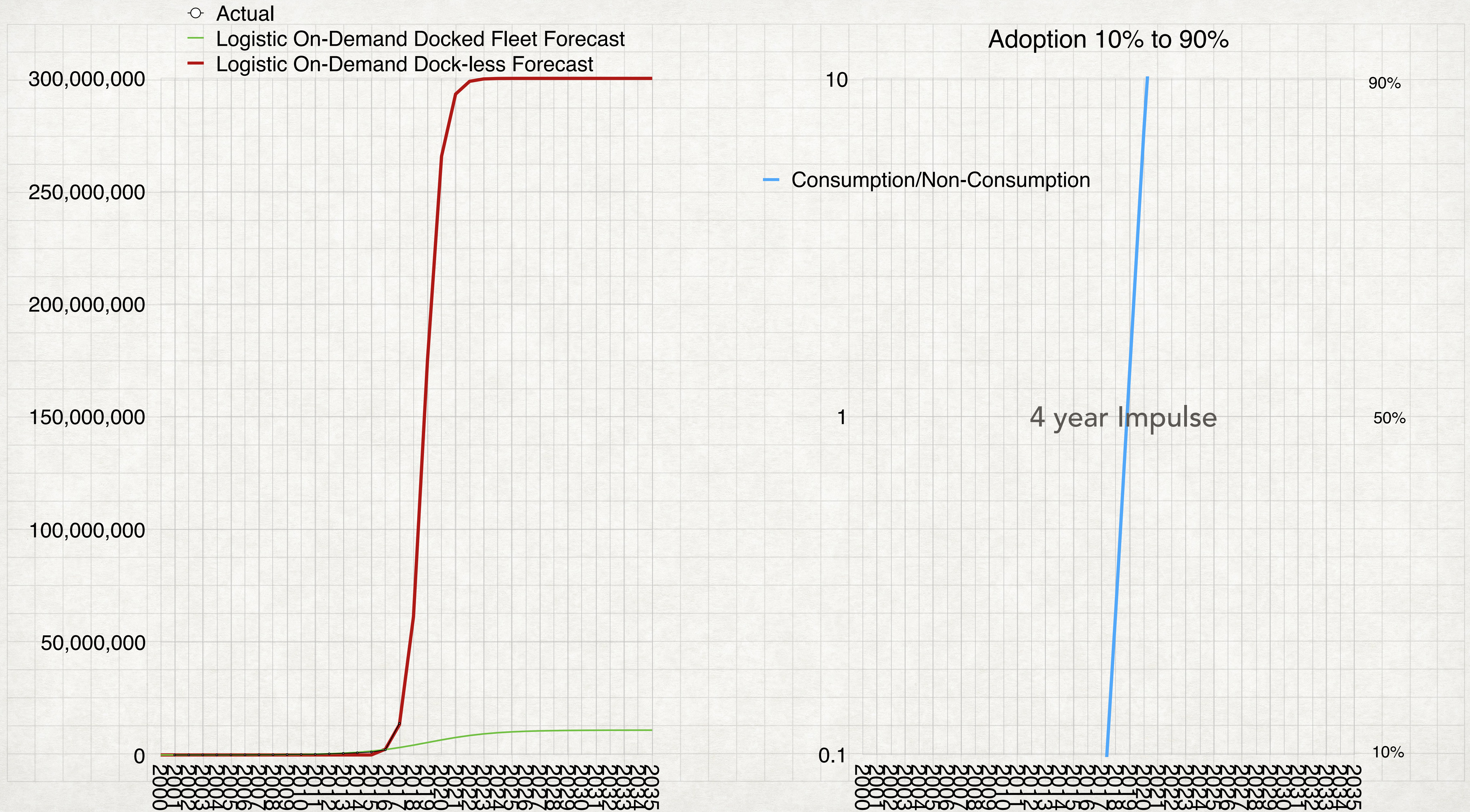


TOTAL ADDRESSABLE MARKET

- Institute for Transportation & Development Policy: Sharing guideline is 10 to 30 On-Demand station bikes per 1,000 residents (1-3% of population)
- China Tier 1 saturated at 6% to 7%
- Targeting 5% suggests a 300,000,000 bike fleet for the global urban market by 2030
- This constitutes a 1:5 ratio to global motor vehicle fleet







○ Actual
— Logistic On-Demand Docked Fleet Forecast
— Logistic On-Demand Dock-less Forecast

300,000,000

250,000,000

200,000,000

150,000,000

100,000,000

50,000,000

0

120

100

80

60

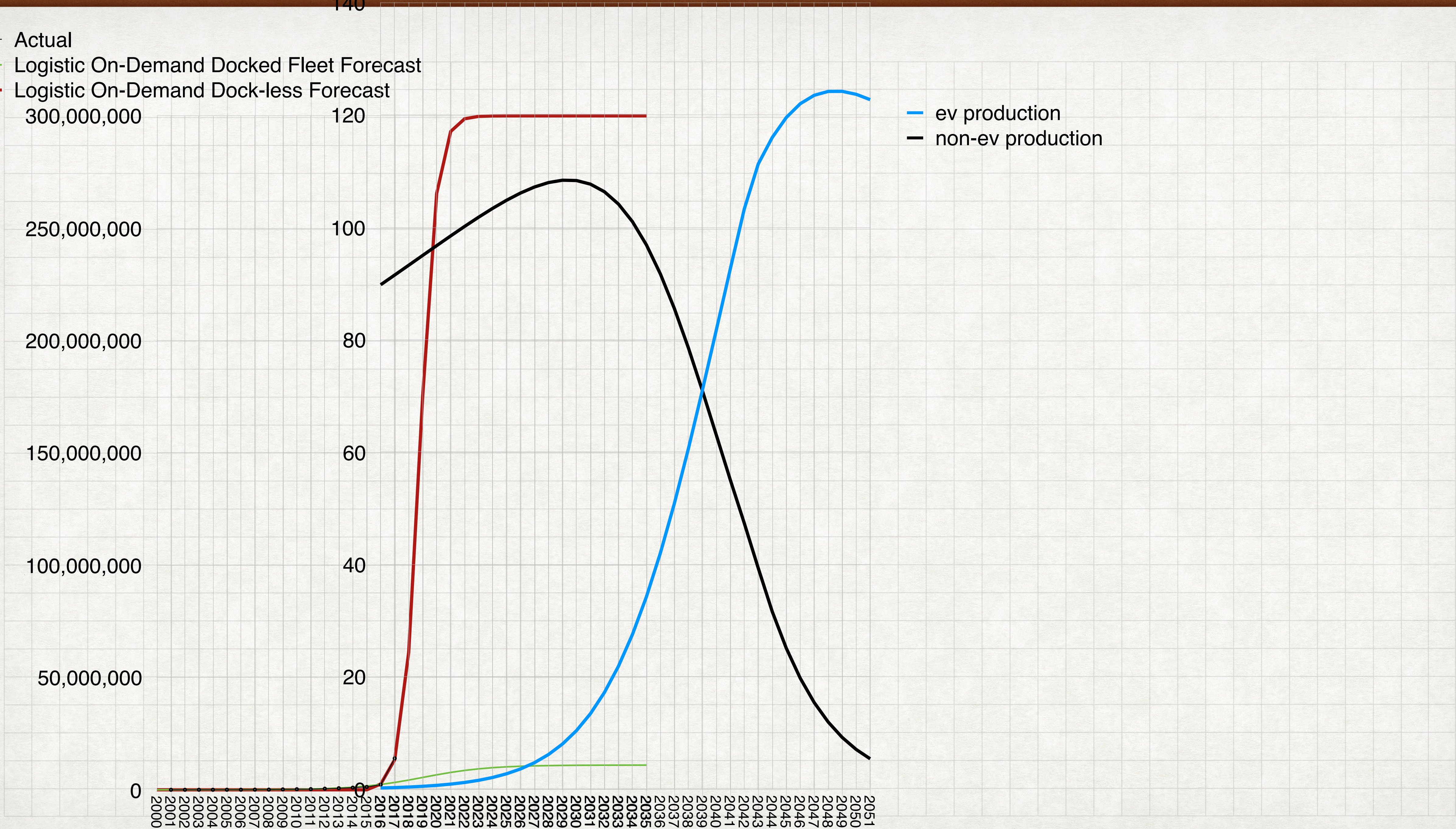
40

20

0

— ev production
— non-ev production

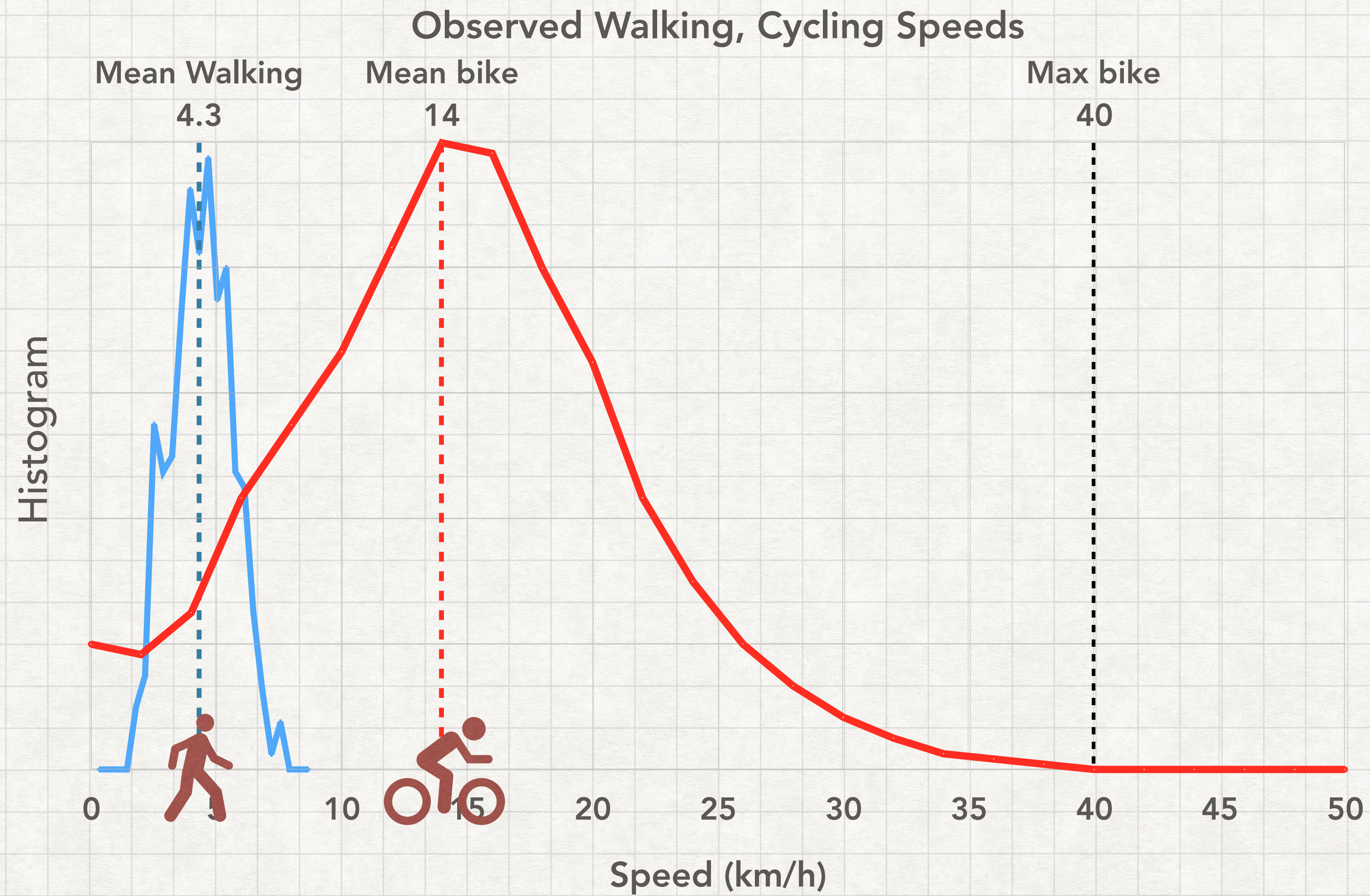
2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035 2036 2037 2038 2039 2040 2041 2042 2043 2044 2045 2046 2047 2048 2049 2050 2051



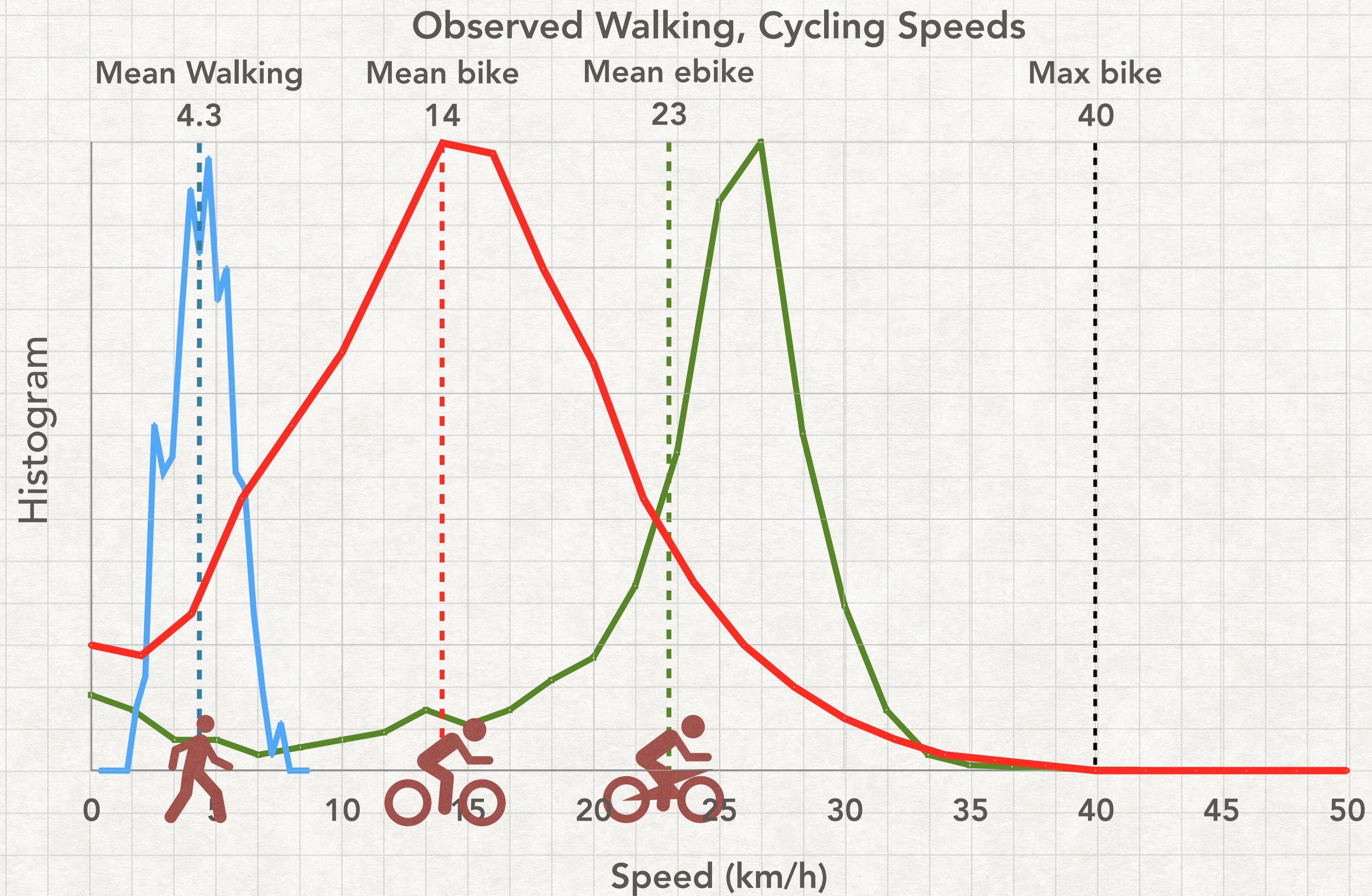
HOW MUCH FASTER IS AN E-BIKE?



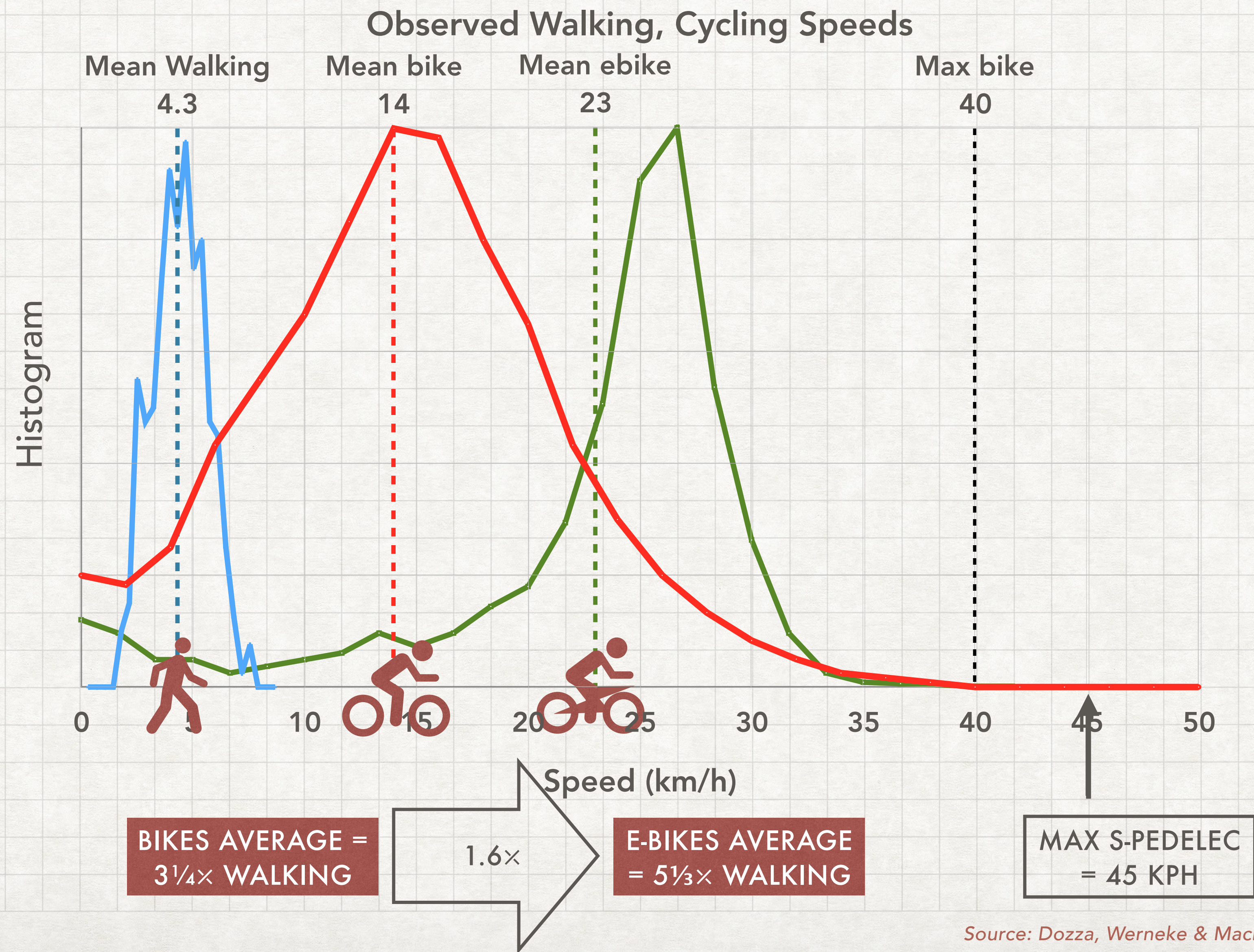
HOW MUCH FASTER IS AN E-BIKE?



HOW MUCH FASTER IS AN E-BIKE?



HOW MUCH FASTER IS AN E-BIKE?



Source: Dozza, Werneke & Mackenzie, 2013, Naturalistic cycling study

Estimated Costs for Automotive Lithium Batteries (Pack)

COST OF BATTERY PACK

