Infrastructure is Destiny
Levittown, NY 1947-1951

Eisenhower Interstate Highway System 1956

66% United States
37% Worldwide
29% Adults
14% Children
40 years of Cycle-friendly infrastructure building

<table>
<thead>
<tr>
<th></th>
<th>US</th>
<th>Netherlands</th>
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<tbody>
<tr>
<td>Km cycled/person/yr</td>
<td>47</td>
<td>864</td>
</tr>
<tr>
<td>% Obesity &gt;15 yrs old</td>
<td>36%</td>
<td>12%</td>
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HUMAN NATURE
(personal infrastructure)

We strongly favor convenience (EASY & CHEAP) economics
Over the last 100 years, we have specifically and proactively made personal cars easy and cheap.

TAX & REGULATORY (ECONOMIC) INFRASTRUCTURE

We have underpriced:

- Air pollution
- Congestion
- Curb access (in conditions of scarcity)
- User fees for transportation infrastructure investment (in some countries)

With market pricing misaligned with reality, we are overconsuming car travel.
Underpriced, Private vehicles as a solution have found their limits, clogging streets, arteries and the atmosphere.
Our planetary infrastructure
Scientists tell us we will be +5-6°C with BAU

Globally: is this year hotter or colder than 20th C average?

Scientists predict +5-6°C by 2100 under BAU
WHERE WE ARE TODAY

20,000 YEARS AGO

4.5°C

AVERAGE DURING MODERN TIMES

+4.5°C

MY NEIGHBORHOOD:

HALF A MILE OF ICE

THICKNESS OF THE ICE SHEETS

AT VARIOUS LOCATIONS

21,000 YEARS AGO

COMPARED WITH MODERN SKYLINES

TORONTO

CHICAGO

BOSTON

MONTREAL

Hi!

Credit: Randall Monroe
TECHNOLOGY

GPS, Internet, Wireless, Smart Phones, e-payment, Open Data, Electric Batteries

Car sharing
Ride sharing
Transit apps
On-demand consumption
Electric batteries
Connected and autonomous vehicles
Technology has made sharing easy

Car Sharing

Transit Apps

E-Hailing and Ride-Sharing
What would you do if e-hailing/ridesharing did not exist?

24% of people chose not to walk or bike 😞
It has also made on-demand consumption and delivery easy and convenient with consequences for city retail, and street and curb use.

E-Commerce as a Percent of Retail Shopping

Projections 2015-2021

Source: Statistica.com
Enter self-driving cars...making car trips even cheaper (no driver!)

Driverless Car Market Projections:

By 2020...
Honda (highway)
Hyundai (highway)
Toyota (highway)
Renault-Nissan (in cities)

By 2021...
Audi (fully)
BMW (fully)
Ford (fully)
Volvo (highway)

(Source: techemergence.com, autonew.com)
If we understand that people naturally choose easy & cheap, 
& INFRASTRUCTURE IS DESTINY 
& AVS ARE IMMINENT (AT LEAST IN CITIES)

Over next 5 years
We need to specifically & pro-actively rework our 
ECONOMIC, PHYSICAL & DATA INFRASTRUCTURE

active & shared transport
EASY & CHEAP
Today’s personal car trips:
75% of trips SPACE INEFFICIENT (single occupancy)
45% of trips BIKEABLE < 4 miles (6.5 kms)
15% of trips WALKABLE < 1.5 miles (2.5 kms)

MAKES SENSE!

active & shared transport
EASY & CHEAP.
& SAFER
Today’s personal car trips:
75% of trips SPACE INEFFICIENT (single occupancy)
45% of trips BIKEABLE < 4 miles (6.5 kms)
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MAKES SENSE!

active & shared transport
EASY & CHEAP.& SAFER
<table>
<thead>
<tr>
<th>Activity</th>
<th>Fatalities per Billion Passenger Miles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Riding a motorcycle</td>
<td>212.57</td>
</tr>
<tr>
<td>Driving or passenger in a car or light truck</td>
<td>7.28</td>
</tr>
</tbody>
</table>
We need to align siloed interests into a powerful global collaboration...

Around a common urban vision...

Sustainable, inclusive, prosperous, and resilient cities depend on transportation that facilitates the safe, efficient, and pollution-free flow of people and goods, while also providing affordable, healthy, and integrated mobility for all people.
The endorsers of the SHARED MOBILITY PRINCIPLES include:
Shared Mobility Principles for Livable Cities

1. Plan cities and mobility together
2. Focus on moving people, not cars
3. Encourage efficient use of space and assets
4. Engage stakeholders in decision making
5. Design for equitable access
6. Transition towards zero emissions
7. Seek fair user fees across all modes
8. Deliver public benefits via open data
9. Promote integration and seamless connectivity
10. Automated vehicles must be shared

SharedMobilityPrinciples.org
The endorsers of the SMPs include:
#2 Move people, not cars
#3 Encourage efficient use of space & assets
AV benefits are differentiated by population density. AVs are electric and shared. Fleets of AVs that are electric & shared offer safety benefits. Transformed land use (shared) & better air quality (electric) are key benefits.
space required to transport 60 people

car
Here are 200 people in 177 cars
#2 Move people, not cars
#3 Encourage efficient use of space & assets

60 people/lane/block
40 people/lane/block
12 people/lane/block
#7 Fair user fees across all modes

TODAY: Cities express ambivalence
In San Francisco
• $110 for a car parked illegally
• $500 for an electric scooter parked illegally

In New York City
• Personal cars will travel for free in Manhattan
• Shared vehicles will be taxed $2.75/trip
#8 Public benefits via open data

Interoperability between modes
Competition within modes

SharedStreets.io
No mapping standards for curb and lane use
#9 Work toward integration and seamless connectivity
Today we have a unique and irreplaceable window of opportunity

- provides a concrete and visible time horizon for action, with
- a built-in refreshment of our vehicle stock
- a host of focusing problems for all stakeholders

A chance to **DO-OVER** Cities
INFRASTRUCTURE IS DESTINY

We have to get this transition right.
POLICY QUESTIONS pertaining to USE of Avs:

- **Movement of people or goods?**
- **What is the population density?** (urban or rural)
- **What are goals?**
  - Safety
  - Air quality
  - Equity/access

How will we treat Data?
- Standards
- Reporting for govt planning
- Privacy of people & competitive secrets

Lower AV costs (today’s taxes) will result in induced demand for both trips and delivery

Reallocation of Rights of Way?
- Throughput of people not cars

Fair Pricing across modes
- Air pollution
- Congestion
- Curb access
- Road user fees

(Is there road capacity? Are alternatives poor?)
To summarize recommendations:

Start rationalizing policy to be consistent across all modes!

Reflecting real COSTS of
• tail pipe emissions
• Vehicle space efficiency (per square meter, with benefits for increased occupancy)
• Congestion charging or reallocation of public rights of way to get more throughput of people.

Standard DATA & reporting

EQUITY & ACCESS accommodations
A new collaborative initiative to channel tech-driven disruptions in mobility to (re)build cities that are sustainable, just and livable