Why Transportation?
Hyperloop: 1867
What is Sustainable Mobility?
Personal Mobility: Most Inefficient Sector

- Cars used only 5% of useful life
- Only 25% of capacity used
Transportation Demand Management

- Making more efficient use of existing infrastructure
- Making sure mobility is always available, whenever needed
Traffic Economics

Waste

LOS F!

Capacity

Traffic Volume

Time:
- 2:00 AM
- 7:00 AM
- Noon
- 7:00 PM
- Midnight
Induced and Latent Demand

- Congestion
- More People Drive
- Widen Roadway
- Faster Driving
Congestion is an economic problem, not a technology or infrastructure problem.
Geometry
Not Ideology
Space required to transport 60 People

Car  Bus  Bike
PRIVATE MOTOR VEHICLES
600–1,600/HR

MIXED TRAFFIC WITH FREQUENT BUSES
1,000–2,800/HR

TWO-WAY PROTECTED BIKEWAY
7,500/HR

DEDICATED TRANSIT LANES
4,000–8,000/HR

SIDEWALK
9,000/HR

ON-STREET TRANSITWAY, BUS OR RAIL
10,000–25,000/HR

Image: NACTO
As cities grow, they have no choice but to reallocate space to more space efficient modes.

In order to make it possible to drive for those who need to, make it easy to not drive for those who don’t.
But

Autonomous Vehicles
Will save us, right?
Pop Quiz:

Who’s investing the most in autonomous vehicle technology?
Pop Quiz:

What’s Google/Alphabet/Waymo’s revenue model? Selling information, right?
~96% of Google’s revenue is Advertising

Source: Investopedia
FACTORS THAT MAY DETERMINE ADOPTION MODEL

- Cost per ride: $1 threshold vs. traditional autos
- Cost of AVs: Too costly for vast majority of people?

Minority Report
space required to transport 60 people

car  uber  autonomous car

Image: Jon Orcutt
So What Should Boulder be doing Now?
Manage the street

- Manage public right-of-way for public good
- Dedicate space for most efficient modes
- Price congestion
- Price wasted space
Price Wasted Space for Efficient and Equity
Manage the curb

- Design standards for curbside dropoff
- Fees for curbside access
- Promote shared use
- Eliminate dropoff/bike conflicts
Build more compact, walkable housing

- The only good transportation plan is a good housing plan
- Boulder’s lack of housing is the cause of its VMT and traffic problems

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Baseline</th>
<th>Progress</th>
<th>Trend</th>
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<tbody>
<tr>
<td>Reduce VMT in the Boulder Valley by 20% by 2035</td>
<td>1994 level of 2.44 million daily VMT for the Boulder Valley; target now 1.9 million daily VMT</td>
<td>VMT was last estimated at 2.49 million in 2016</td>
<td>1994</td>
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<td>Reduce SOV travel to 20% of all trips for residents and to 60% of work trips for nonresidents</td>
<td>1990: 44 percent SOV mode share for residents</td>
<td>Resident SOV mode share was 36% in 2015</td>
<td>1990</td>
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<td>1991: 81 percent non resident SOV commute mode share</td>
<td>Non resident SOV mode share was 78% in 2017</td>
<td>1991</td>
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<td>Achieve a 16 percent reduction in GHG emissions and continued reduction in mobile source emissions of other air pollutants</td>
<td>423,892 million metric tons of transportation related GHG in 2012</td>
<td>448,994 million metric tons of transportation related GHG in 2016</td>
<td>2013</td>
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Modernize parking regulations

- Price for availability
- Eliminate minimums
- Establish maximums
- Unbundle
- Share
- Promote adaptability
Establish data protocols for public good

- Data should inform transportation system
- Barriers to flow of data between public and private sector
- Disaggregate data by race, income, and other demographic categories.
- Explain the problem that data will solve.
Quantify and Promote Equity

• Focus on outcomes:
  – Health
  – Access to employment and services
  – Share of income and time spent on mobility

• Consider ethnicity, income, age, ability, gender

• Price least efficient modes to subsidize mobility for those with the fewest choices

• Private profit motive will ignore those with greatest need
Reorganize government around mobility

• Be decisive about public transit agency survival
• Realign taxation: replace gas and parking taxes with VMT and congestion fees
• Align public right of way ownership (state, county, local) with operations
• New regional mobility authorities?
Transit Must Lead

• Best contexts for AVs:
  – Long haul trucking
  – Bus Rapid Transit

• Cities must partner with transit operators:
  Dedicated right of way in exchange for AV BRT, 24/7 every 2 minutes

• Begin process now to minimize any job loss
Provide a quality future of work

- 4.4 million American workers are drivers
- Partner with labor leadership now
- Future jobs require tech or customer service skills
- Current trajectory jeopardizes public sector pensions
Tell Better Stories
It’s not sustainable if it’s not beautiful