Preparing for Autonomous Vehicles

Parking Reforms You Should Embrace Today

Presented by Patrick Siegman
Railvolution
September 19, 2017
Future 1: Hell

We all buy self-driving cars, which drive more and more, often with no one inside.
Future 2: Heaven

Fleets of Autonomous Vehicles that are Electric and Shared

Photo: courtesy of CityCarShare
Definition: *Minimum parking requirements* are government regulations that specify the *minimum* number of parking spaces that must be provided for every land use. They ensure that cities have more parking spaces than individuals would voluntarily supply.
What is the purpose of minimum parking requirements?

According to the zoning codes:

- **Palo Alto**: “to alleviate traffic congestion”
- **Dallas**: “essential to the reduction of congestion in the streets & to the encouragement of the most appropriate use of land.”
- **San Diego**: “to reduce traffic congestion & improve air quality”
- Generally, to prevent spillover parking problems
The pattern of “cruising for parking” was observed in Chicago by recording the license plate numbers of vehicles that repeatedly passed through a busy intersection during the morning rush hour.
An economically illiterate theory for addressing traffic congestion

1. Set minimum parking regulations to ensure that virtually all destinations have excess spaces, even when parking is given away free, even at isolated locations with no transit.

2. Prohibit or discourage charging for parking.

3. Prohibit curb parking.

4. Convert curb parking into more traffic lanes.

Result: no more cruising for parking, more auto capacity…but there were unintended consequences
Unintended consequences: less housing, more expensive housing & lower land values

1961: Oakland’s first parking requirement

- One space per unit for apartments
- Construction cost increased 18% per unit
- Units per acre decreased by 30%
- Land value fell 33%

Source: Shoup, Donald. The High Cost of Free Parking, 2005.
Minimum Parking Requirements - Source

Example: Office Parks
ITE Parking Generation Report
Peak Occupancy Rates, in spaces per 1000 sf of building area:

- Lowest: 0.94 spaces
- Average: 2.52 spaces
- Highest: 4.25 spaces

Typical requirement:
4.0 spaces/1000 sf

Photo: Alex MacLean
For more than half a century, cities have been requiring more parking than we need.
Now that ride-hailing services and autonomous vehicles are here, what will happen to parking demand?

<table>
<thead>
<tr>
<th>Source</th>
<th>Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic: Zhang et al</td>
<td>~90% reduction</td>
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<tr>
<td></td>
<td>50% of fleet shared</td>
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<tr>
<td>OECD International Transport Forum</td>
<td>80% reduction</td>
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<tr>
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<td>100% of fleet shared</td>
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<td>Academic: Kockelman</td>
<td>Each shared AV replaces 12 private vehicles</td>
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<tr>
<td>McKinsey</td>
<td>5.7 billion square meter reduction in parking</td>
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Three Reforms

1. Charge the right prices for curb parking

2. Return the parking revenue to the blocks where it is generated, to pay for public services

3. Remove minimum parking requirements
Berkeley - goBerkeley

Charge the lowest price needed to achieve 65-85% occupancy on each block

- Currently $1.50 - $2.75/hour

- Revenues fund public services for the blocks where the revenue is collected
  - Security
  - Cleaning
  - Help for the Homeless

Image credits: City of Berkeley
Performance-Based Pricing at Work

- Below 65%: Lower Rate
- Within Target Range: No Change
- Above 85%: Raise Rate

Image: City of Seattle
goBerkeley Results

- Most drivers surveyed say “finding parking is easy.”
- More drivers use formerly underused garages
- Less circling for underpriced curb parking
  - 693,000 fewer vehicle miles of travel/year
  - = 238 trips SF to NYC


Image credits: City of Berkeley, Google Maps
Residential Parking Benefit Districts

- Implement where needed
- Existing residents park free or cheaply
  - Limit permits issued to available curb space
- Non-Residents pay regular parking fees
  - Revenues fund neighborhood improvements
  - Payment options: pay by phone, pay stations, meters, or “scratcher” paper permits

Photo credits: Lady Demeter, Keith Kamisugi
Residential Parking Benefit District Examples

Laguna Beach, CA
- Regular parking fees: $1-$3 per hour
- Resident permit: $40/year

Oceanside, CA
- Regular parking fees: $2 / hour
- Resident permit: $100 / year

Other Examples
- Ventura, CA
- Washington DC
- Santa Cruz, CA
- West Hollywood, CA
- Austin, TX
- Boulder, CO

Photo credits: Lady Demeter, Keith Kamisugi
## Communities that have Eliminated Parking Requirements in some or all neighborhoods

- Buffalo, NY (citywide)
- Coral Gables, FL
- Eugene, OR
- Fort Myers, FL
- Fort Pierce, FL
- Great Britain (nationwide)
- Hayward, CA
- Los Angeles, CA
- Mexico City (citywide)
- Milwaukee, WI
- Nashville, TN
- Oakland, CA
- Olympia, WA
- Portland, OR
- Sacramento, CA
- San Francisco, CA
- Santa Clarita, CA
- Santa Monica, CA
- São Paulo, Brazil (citywide)
- Stuart, FL
- Seattle, WA
- Spokane, WA
## Curb parking management solutions

<table>
<thead>
<tr>
<th>Commercial Frontages</th>
<th>Residential Frontages</th>
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<tbody>
<tr>
<td><strong>Loading</strong></td>
<td><strong>Existing residents</strong></td>
</tr>
<tr>
<td>▪ Enough for Autonomous Vehicles</td>
<td>▪ Grandfather in w/ free or cheap parking permits</td>
</tr>
<tr>
<td>▪ Charge AV pick-up &amp; drop-off fees?</td>
<td></td>
</tr>
<tr>
<td><strong>Parking</strong></td>
<td><strong>Future residents</strong></td>
</tr>
<tr>
<td>▪ Charge the right prices for curb parking</td>
<td>▪ Limit # of parking permits issued to # of curb spaces</td>
</tr>
<tr>
<td>▪ Return the parking revenue to the district to fund public services</td>
<td>▪ Charge the right prices for curb parking</td>
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<td></td>
<td><strong>Non-residents</strong></td>
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<td>▪ Charge the right prices for curb parking</td>
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<td><strong>Use of revenues</strong></td>
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<td>▪ Return all parking revenues to the neighborhood to fund public services</td>
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**Loading:** Charge AV pick-up / drop-off fees?