URBANISM NEXT: IMPACTS OF EMERGING TECHNOLOGIES ON LAND USE, TRANSPORTATION, URBAN DESIGN, AND REAL ESTATE
SUSTAINABLE CITIES INITIATIVE (SCI)

- Research: Urbanism Next
- Sustainable City Year Program: SCYP
- SCI-China
- Training
CONSUMPTION SPREADS FASTER TODAY

PERCENT OF U.S. HOUSEHOLDS

100%

80%

60%

40%

20%


SOURCE MICHAEL FELTON, THE NEW YORK TIMES

HBR.ORG
2017: 7,000 stores closed
Impacts on downtown and commercial corridors
Where do people want to go? Where they can be entertained and fed
- Viability of local retail
- Delivery trucks in residential zones
- Change in how people get goods
• Property values and taxes
• Income tax
• Sales tax
- Increase VMT
- Increase congestion
- Increase GHG emissions
- Competition with taxis
- Decreased registration fees

- Decrease demand for parking (airports)
- Competition for transit
- What happens to TOD?
- What are implications for urban design?
- AVs magnify the impacts of E-commerce and the sharing economy
- AVs are safer than human drivers
- Fleets vs. ownership
- Electric vs. gas
AVs will likely be cheaper than conventional cars
Transit vs. AVs

<table>
<thead>
<tr>
<th></th>
<th>Cost per mile</th>
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<tbody>
<tr>
<td><strong>Today's car</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>21¢</td>
</tr>
<tr>
<td></td>
<td>61¢</td>
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<tr>
<td><strong>Future mobility car</strong></td>
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<td>17¢</td>
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<td>26¢</td>
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</tbody>
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1. Despite high costs and fast depreciation, substantial utilization can make shared, high-tech "mobility vehicles" economically compelling.

The "mobility vehicle" is based on a small sedan that costs $25,000 and is completely replaced every three years with no residual value. It is shared and, therefore, driven 40,000 miles per year. The average NYC cab is driven an average of 70,000 miles per year.

- **Fixed Costs (per mile)**
  - Depreciation, insurance, finance, and registration-related costs

- **Operating Costs (per mile)**
  - Gas, maintenance, and tires

Sources: AAA, NYC Taxi and Limousine Commission, "NYC Taxi & Limousine".
VEHICLES
RANGE OF RESULTS

- AV model results

PRIVATE AV OWNERSHIP
50% SHARED AVs

- Vehicle Miles Traveled
- Vehicle Trips
- Average Vehicle Trip Length

Source: http://www.fehrandpeers.com/autonomous-vehicle-research/

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URBANISM NEXT

AUTONOMOUS VEHICLES
E-COMMERCE
SHARING ECONOMY

URBAN DESIGN
REAL ESTATE
TRANSPORTATION
LAND USE

EQUITY
ENVIRONMENT
ECONOMY
GOVERNANCE

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IMPACT ON LAND USE

• Parking
• Housing
• Employment: Retail and warehousing
• Parks and open space
IMPACT ON LAND USE

- Parking
- Housing
- Employment: Retail and warehousing
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IMPACT ON LAND USE


Small = 5-9.99 acres, large = 50-500 acres
Source: CoStar, CBRE Research • Created with Datawrapper


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IMPACT ON URBAN DESIGN

Preferred Communities – NAR National Study

- Metropolitan footprint
- Street design
- Transit-oriented development
- Resiliency
- Place/identity
IMPACT ON URBAN DESIGN

- Metropolitan footprint
- **Street design**
- Transit-oriented development
- Resiliency
- Place/identity
IMPACT ON TRANSPORTATION

- Walking
- Biking
- Vehicles
- Parking
- Transit
- Curb management

![Graph showing impact on transportation](image)
IMPACT ON TRANSPORTATION

- Walking
- Biking
- Vehicles
- Parking
- Transit
- Curb management
A Prospective Timeline in Four Phases

1. **2017-2022**
   Automated features continue to improve and become less expensive, while car ownership declines.

2. **2022-2027**
   Fully autonomous vehicles are on the market, but AV and legacy vehicle mix results in uneven traffic improvements.

3. **2027-2040**
   Autonomous conversion of light-duty vehicle fleets increases from 15 percent in 2030 to 75 percent in 2040.1

4. **2040 and beyond**
   Land use planning is permanently altered to make way for pedestrians, cyclists, and public spaces, in both urban and suburban streets.

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IMPACT ON REAL ESTATE

- Land value
- Project feasibility
- Buzz/vitality
- Quality of design

AUTONOMOUS VEHICLES & THE EVOLUTION OF THE PARKING GARAGE

PHASE 2: 2025 - 2035

As car ownership evolves to a subscription service with intelligent fleets, there will be less need for parking. Garages are transformed into other uses such as office, residential and hotels.

In 2035, the need for parking should decline by more than 5.7 billion square meters in the United States (This equates to half the size of Connecticut) Source: McKinsey & Co.
IMPLICATIONS FOR EQUITY

- Opportunities to improve access to transportation
- How will government ensure the private sector accommodates all transportation users?
- Potential loss of jobs (drivers/retail)
IMPLICATIONS FOR THE ECONOMY

The Most Common* Job In Each State 1978-2014

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IMPLICATIONS FOR THE ECONOMY

The jobs are going to large metro areas.

Small metro areas and rural counties account for about 23 percent of overall retail employment but just 13 percent of jobs attributed to electronic shopping firms.

IMPLICATIONS FOR THE ENVIRONMENT

U.S. GREENHOUSE GAS POLLUTION INCLUDES:

- **Carbon Dioxide (CO2)**
  - Enter the atmosphere through burning fossil fuels (coal, natural gas, and oil), solid waste, trees, and wood products; and also as a result of certain chemical reactions (e.g., manufacture of cement).
  - 84%

- **Fluorinated Gases**
  - Hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride are synthetic, powerful greenhouse gases that are emitted from a variety of industrial processes.
  - 2%

- **Nitrous Oxide (N2O)**
  - Emitted during agricultural and industrial activities, as well as during combustion of fossil fuels and solid waste.
  - 5%

- **Methane (CH4)**
  - Emitted during the production and transport of coal, natural gas, and oil as well as from landfills.
  - 9%

**Total U.S. Greenhouse Gas Emissions by Economic Sector in 2011**
- 28% Transportation
- 33% Electricity
- 11% Commercial & Residential
- 20% Industry
- 8% Agriculture

- Will GHG emissions decrease or increase?
- Opportunity to improve stormwater treatment

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IMPLICATIONS FOR GOVERNANCE

- How will regulations need to adapt to emerging technologies?
- How will government services need to change?
- How will revenue streams change and how should governments plan for and implement new revenue streams?
IMPLICATIONS FOR GOVERNANCE

Arena finance 101
How the City of Sacramento will pay for its share of the cost of building Golden 1 Center:

$255 MILLION
Amount the city contributed, mostly financed by selling a bond

$626 MILLION
Total principal and interest the city will pay over 35 years for that bond

Where will the $626 million come from?

- $354 million in lease payments and $25 million in property taxes from the Kings (57%)
- $6 million in hotel occupancy tax revenues (1%)
- $131 million in “liberated” cash from old, retired debits on city parking garages (4%)
- $62 million in new profit from city parking operations (21%)
- $48 million in bond proceeds, set aside for debt repayment (10%)

Source: City of Sacramento

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IMPLICATIONS FOR GOVERNANCE

- How will governments get the data they need to make informed decisions?

Data reciprocity is critical.
URBANISM NEXT

- Urbanism Next National Network
- PBOT / BPS / TriMet / Metro / ODOT Group
- Research
  - Responsive parking regulations
  - Price roads like a utility, instead of treating it like public space
  - State and local government budget and fiscal research
  - AVs and GHG emissions
  - Citywide analysis of impacts from emerging technologies
- Urbanism Next Blog / Clearinghouse
- Urbanism Next Conference, March 5-7, Portland
- www.urbanismnext.com

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NATIONAL URBANISM NEXT
CONFERENCE 2018

March 5-7, 2018
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