Electrify America Perspective
Autonomous Mobility: Coming Soon?
Roadmap 2019
Although autonomy benefits already benefit driving today, level 4 (and, especially level 5) will not be common for another decade+

<table>
<thead>
<tr>
<th>Light Duty Critical mass</th>
<th>Adoption Factors</th>
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<tbody>
<tr>
<td>2030 – 2035+ miles travelled</td>
<td>• Consumer acceptance</td>
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<td>9% of total miles by 2030, 50% by 2040!</td>
<td>• Legal framework</td>
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<td>3M sales by 2035</td>
<td>• Liability</td>
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<td>Early 2020s but not at scale</td>
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Dramatically increased testing miles indicates significant progress with technology and reliability

<table>
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<tr>
<th>The Self-Driving Car Companies Going the Distance</th>
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<tr>
<td>Number of test miles and reportable miles per disengagement in California in 2018</td>
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- **Waymo**: 1,271,587 miles, 11,154.3 miles per disengagement
- **GM Cruise**: 447,621 miles, 5,204.9 miles per disengagement
- **Zoox**: 30,764 miles, 1,922.8 miles per disengagement
- **Nuro**: 24,680 miles, 1,028.3 miles per disengagement
- **Pony.ai**: 16,356 miles, 1,022.3 miles per disengagement
- **Nissan**: 5,473 miles, 210.5 miles per disengagement
- **Baidu**: 18,093 miles, 205.6 miles per disengagement
- **Aurora**: 32,858 miles, 99.9 miles per disengagement
- **Drive.ai**: 4,617 miles, 83.9 miles per disengagement
- **Nvidia**: 4,142 miles, 20.1 miles per disengagement
- **Mercedes-Benz**: 1,749 miles, 1.5 miles per disengagement
- **Apple**: 79,745 miles, 1.1 miles per disengagement
- **Uber**: 26,899 miles, 0.4 miles per disengagement

*Cases where a car's software detects a failure or a driver perceived a failure, resulting in control being seized.

Source: DMV via the lastdriverlicenseholder.com

**Highlights**
- California 2018 results reflect significant progress since 2017
  - ✓ Waymo reported 350k miles in 2017
  - ✓ Cruise reported 125k
Electrify America uses three site design layouts, two of which are brand new to improve convenience with conventional EVs.

Site location criteria:
- Visibility
- Retail access
- Restrooms
- 24/7
Key autonomous charging solutions

Evaluation criteria
- Standardization
- Cost
- Power
- Uses existing chargers

Inductive, Wireless
Mechanical Arm
Robotic Arm
Autonomous cars can reinvent parking/charging…. Need to rethink:
• Lot size
• Parking fees
• Proximity to passengers
• Depot or en route?
Other benefits of autonomous charging include poor weather charging and access for drivers with disabilities
Thank you!