Autonomous Vehicle Technology: Moving us in the right direction?

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Self-Driving Cars May Get Here Before We’re Ready

Wired

The High-Stakes Race to Rid the World of Human Drivers

City Lab

The driverless, car-sharing road ahead

The Economist

UBER POWERFUL: THE CAR SERVICE'S BRAZEN PLAN TO BECOME A ROBOTIC SUPERPOWER

Popular Science

GM Invests $500 Million in Lyft, Plans System for Self-Driving Cars

Wall Street Journal

Semi-Autonomous Cars Compared!

Car and Driver

Google’s Autonomous Cars Will Now Be Considered ‘Real’ Drivers

Time
Why the attention?

An estimated **33,000** people in the US were killed in car crashes in 2015.

We will create the equivalent of one new city of **one million people every 5 days** between now and 2050.

Scientists say we need to reduce CO₂ emissions **80%** by 2050 to avoid the worst effects of global warming.
The car, on our estimates, is the world’s most underutilized asset. We believe it’s the most disruptable business on earth

$33,340 - Average new car price (KBB)
67 months - Average car loan (Experian)
> $1 Trillion - Outstanding car loans (Experian)
$9,000 per year - Annual cost to own a car (AAA)

96% - Amount of time a car is parked

“The car, on our estimates, is the world’s most underutilized asset. We believe it’s the most disruptable business on earth”

Adam Jonas
Lead Auto Analyst
Morgan Stanley Research
Most vehicles (Automatic transmission, Stability control, ABS)

Many vehicles (Adaptive cruise, automatic stopping, automated parking)

Tesla Autopilot, and others, available today

Test vehicles from many companies, on the road today

CAV = Connected and Autonomous Vehicles
The industry is further along than most people think!
Potential Benefits of CAVs

CAVs and the Environment

- Vehicle Efficiency
- Vehicle Connectivity
- Fuels and Electrification
- Built Environment
- Shared Mobility

Can Transportation Emission Reductions Be Achieved Autonomously?

Karl Simon, Jeff Alson, Lisa Snapp, and Aaron Hula
CAVs could be much more efficient

EPA is participating in research to quantify potential fuel economy improvements of CAVs.
What will be the Impact of Connected Vehicles?

Source: U.S. DOT
CAVs could lead to electrification

“We see the Bolt EV as more than just a car. It's an upgradeable platform for new technologies.”

Mary Barra
GM CEO
Introducing the Chevrolet Bolt EV at the Consumer Electronics Show
Parking Lots or Parks?

Houston, TX

Red = Surface parking
Yellow = Parking garage
Green = Parks
What is the Impact of Shared Mobility?

**CARSHARING IMPACTS**

- **25%** sold a vehicle
- **25%** postponed a vehicle purchase

1 carsharing vehicle replaces 9-13 vehicles

- **0.58 - 0.84** metric tons
  - Reduction of GHG emissions per year for one household (mean observed and full impact)

- **34% - 41%**
  - Reduction of GHG emissions per year for one household (mean observed and full impact)

- **27% - 43%**
  - Reduction of VMT per year, considering vehicles sold and purchases postponed

More carsharing users increased their overall public transit and non-motorized modal use (including bus, rail, walking, bicycling, and carpooling) than decreased it.
- For every 5 members that use rail less, 4 use it more.
- For every 10 members that ride the bus less, 9 ride more.

**$154 - $435**
- Monthly household savings per US member after joining carsharing

*Figure 2: Impacts of Roundtrip Carsharing (graphic excerpted from Shaheen and Chan (2015))*
Will Autonomous Vehicles Lead Us to a Decarbonized Transportation System?
CAV Environmental Impacts: Factors to Consider

- Platooning
- Eco-driving
- Congestion mitigation
- De-emphasized performance
- Improved crash avoidance
- Vehicle right-sizing
- Higher highway speeds
- Increased features
- Travel cost reduction
- New user groups
- Changed mobility services
- Infrastructure footprint*

CAVs Could Have a Large Impact – in Either Direction

Have our cake and eat it too

Stuck in the middle at Level 2

Strong Responses

Dystopian Nightmare

CAVs Could Impact Everything!

Delivery (Amazon, DHL)

Hauling (Komatsu)

HD trucks (Pelaton)

Shipping
What does this mean for us?