

*Moving Marin Forward*  
**Prospects, Possibilities, and  
Policy: Autonomous Vehicles**

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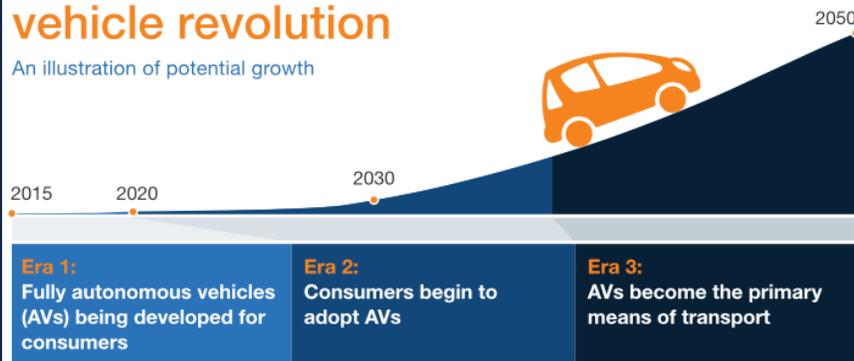
## Outline

- Where does the AV path lead?
- Transition
- Policy/Planning Issues

## Growth Path

### The self-driving vehicle revolution

An illustration of potential growth



McKinsey & Company

## What will that look like?

- Vehicle ownership will be very limited
  - Private ownership for those with specialized vehicle needs
  - Fleet ownership will serve everybody else
- Engines: electric
- Insurance: product liability
- Not clear when we will get there, but this is the likely model
  - 2030 for widespread adoption in the Bay Area

## This:



## Transition

- Short term: Tesla model of highway autonomy
  - Level 2, adaptive cruise control
- Medium term:
  - short period of personal vehicle ownership with level 3 capability
  - introduction of independent public fleets – Uber, Lyft, Google, nuTonomy, etc., with level 4 capability
- Long term:
  - Personal vehicle ownership is largely a thing of the past

## The Economics of the Transition

- Massive job displacement/relocation (**Millions!**):
  - Drivers of all varieties: truck, taxi, delivery
  - Gas station, vehicle repair and body shop
  - Police and fire
  - Health care workers
  - And so on...
- Municipal finances thrown for a loop:
  - Revenues up and down:
    - Parking revenue, tickets, traffic violation revenues
    - More commercial, retail and residential space
  - Less spending on road maintenance and development

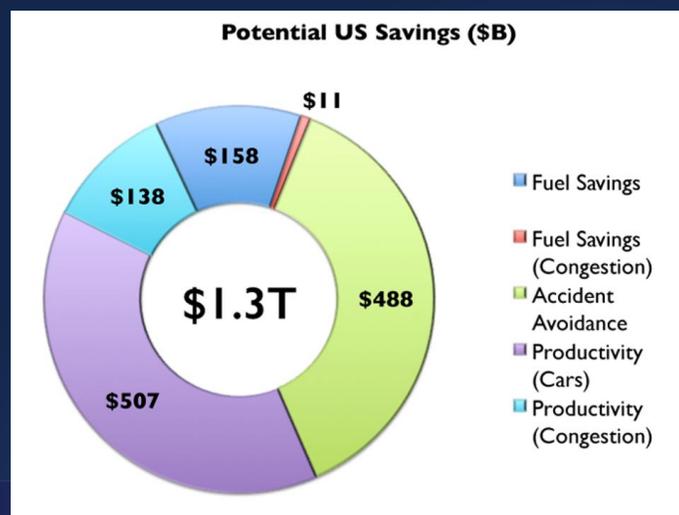
## Economics Drives Transition: Private

- Adoption dividend for private individuals
  - Eliminate car ownership
    - Ave annual cost of owning a car: \$8,698
    - Cost per mile will fall: \$0.59 to \$0.19
  - Repurpose your garage
    - \$50,000 from transition to bedroom
- Time recovery
  - 50% of Bay Area workforce has a commute in excess of 30 minutes
- It will become too annoying to drive around all of those autonomous vehicles!

## Economics Drives Transition: Public

- Economic and social costs associated with human drivers is enormous:
  - Estimated at \$0.8 to \$1.3 TRillion each year
  - Accidents drive 25% of congestion
  - 32,000 deaths from car accidents
  - 2 million injuries

## Potential Savings



## Public Policy/Planning Issues

- Government buy-in is:
  - Essential – gov't must encourage progress
  - Difficult – because of displacement issue
- Important transitional issues:
  - What infrastructure should be developed?
  - What to do about public transportation?
  - What to do with all of the parking spaces?

## Planning

- Respond to the coming changes
  - The planning horizon for any investment in transportation infrastructure based on today's predominant technology has changed
    - It has gotten MUCH shorter
- Encourage the changes to happen more quickly
  - Mobility, safety, productivity, and environmental concerns demand it!

## Responding to the coming changes:

- Transportation organizations must develop a forecast for adoption in their specific geography
  - San Francisco – faster than Marin
  - Marin – faster than Fresno
  - Fresno- faster than Kansas
- How does this affect the ROR calculation on projects?
  - Highway expansion? Public Transportation?

## Encourage Change

- **Mobility and equity** considerations
  - Elderly/disabled/impoverished
- **Safety:** Only way to reduce traffic fatalities is by coordinated effort
- **Productivity:** reduced congestion
- **Environment:** speed transition to electric vehicles

These are all societal benefits that come about too slowly if the private market is left to itself.

# Safety and Productivity



# Environment



## Incentives Through Policy and Planning

- Allow vehicles equipped with ACC into HOV lanes
  - Eventual conversion of HOV lanes to ACC/AV lanes
- Allow ACC equipped vehicles to travel faster in HOV lanes
- Subsidize ACC upgrades
  - Arguably more concrete benefits than electric vehicles

## Summary

- Transition is coming very quickly!
  - Most reports are extremely conservative
  - Apply generally, but Bay Area is different
- Very important to start incorporating AVs into planning now
  - No more highway lane-miles, please!

# Marin Economic Consulting

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