

# 2016 CCMTA ANNUAL MEETING

HALIFAX, NOVA SCOTIA

## CONCURRENT SESSIONS

TOPIC:

# DISRUPTIVE TECHNOLOGY

AUTOMATED VEHICLES, PLANNING FOR THE FUTURE

PRESENTER:

# KARLYN STANLEY

ADJUNCT SENIOR RESEARCHER AND LAWYER, RAND CORPORATION



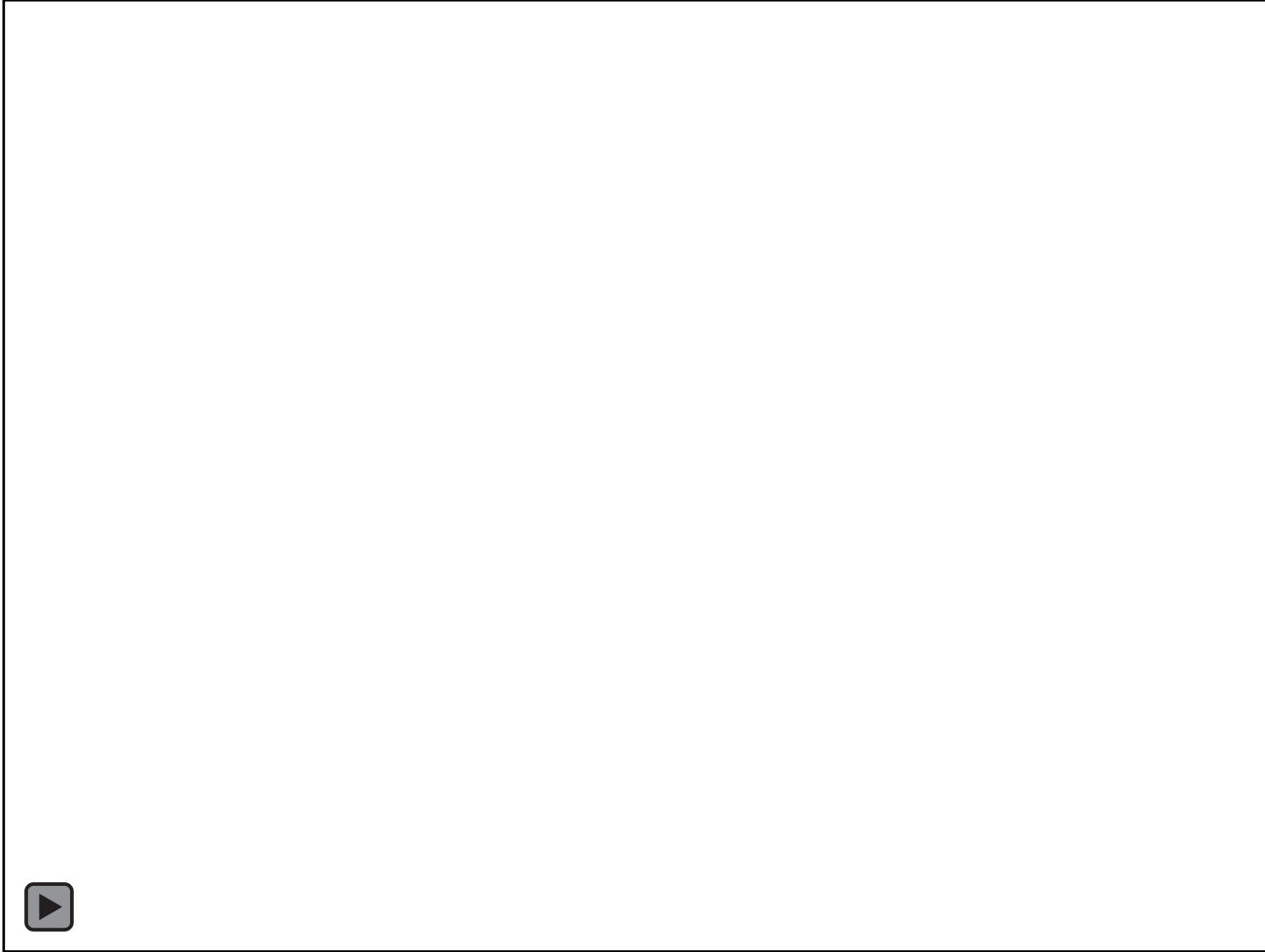
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## Road Vehicle Automation: The Legal and Policy Road Ahead

*Karlyn D. Stanley, RAND Corporation  
June 2016*

# Utopia?



Paleo-Future - Paleo-Future Blog  
Disney's Magic Highway, U.S.A. (1958).flv  
<https://www.youtube.com/watch?v=L3funFSRAbU>



Autonomous vehicle technology is developing quickly



# What's the holdup?





# NHTSA's 1971 Plan



Radar controlled automatic brakes



Low tire pressure warning



Warn other vehicles of high speeds



Alcohol interlocks

# Technology is necessary, but not sufficient to achieve benefits

- What happened?
  - Automaker opposition – concern about liability
  - Lack of consumer support
  - Legal underpinnings of regulatory strategy were overturned



# Considerations for policymakers

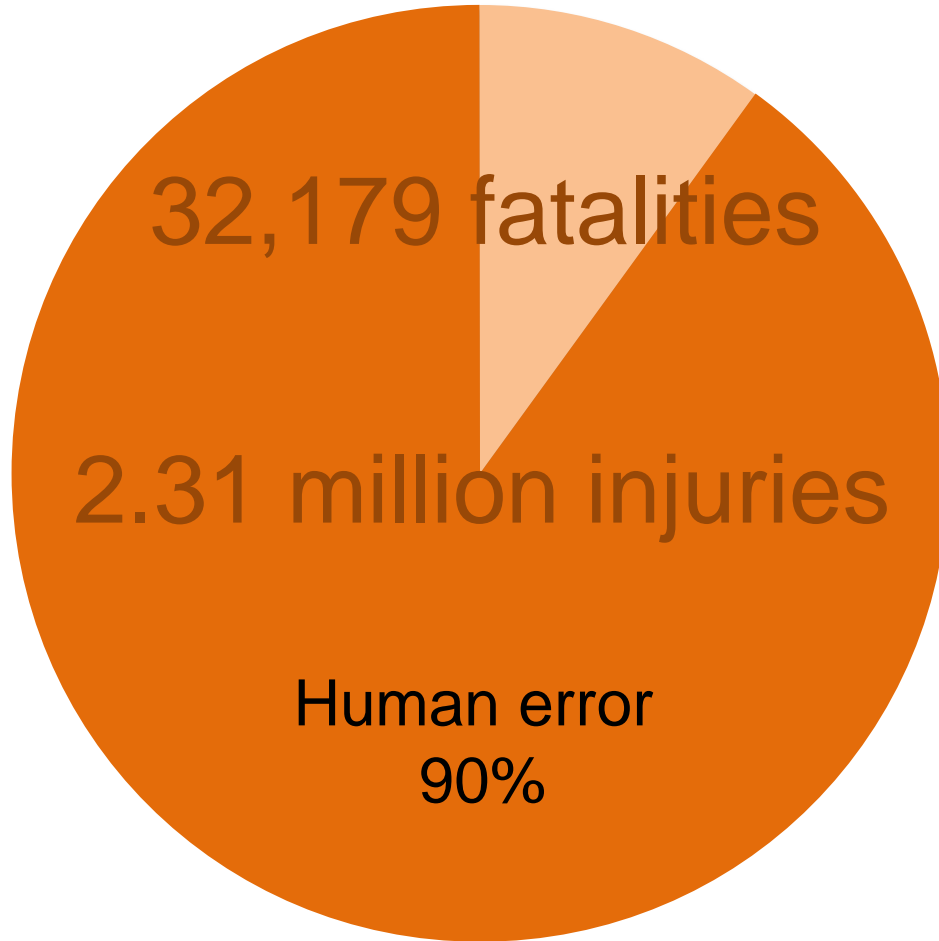
- What are the **advantages and disadvantages** of automated vehicle technology?
- What **obstacles** prevent us from realizing the benefits?
- What can policymakers **do**?

# Considerations for policymakers

- What are the **advantages and disadvantages** of automated vehicle technology?
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- What can policymakers do?

SAVE LIVES





## U.S. accident statistics



SAVE LIVES

IMPROVE  
MOBILITY



Film still from Google via YouTube.

SAVE LIVES

IMPROVE  
MOBILITY

FUEL  
CONSUMPTION





SAVE LIVES

IMPROVE  
MOBILITY

FUEL  
CONSUMPTION

LAND USE





SAVE LIVES

IMPROVE  
MOBILITY

FUEL  
CONSUMPTION

LAND USE

CONGESTION





CONGESTION





PUBLIC  
TRANSIT

CONGESTION





ECONOMIC  
DISRUPTION

PUBLIC  
TRANSIT

CONGESTION





ECONOMIC  
DISRUPTION

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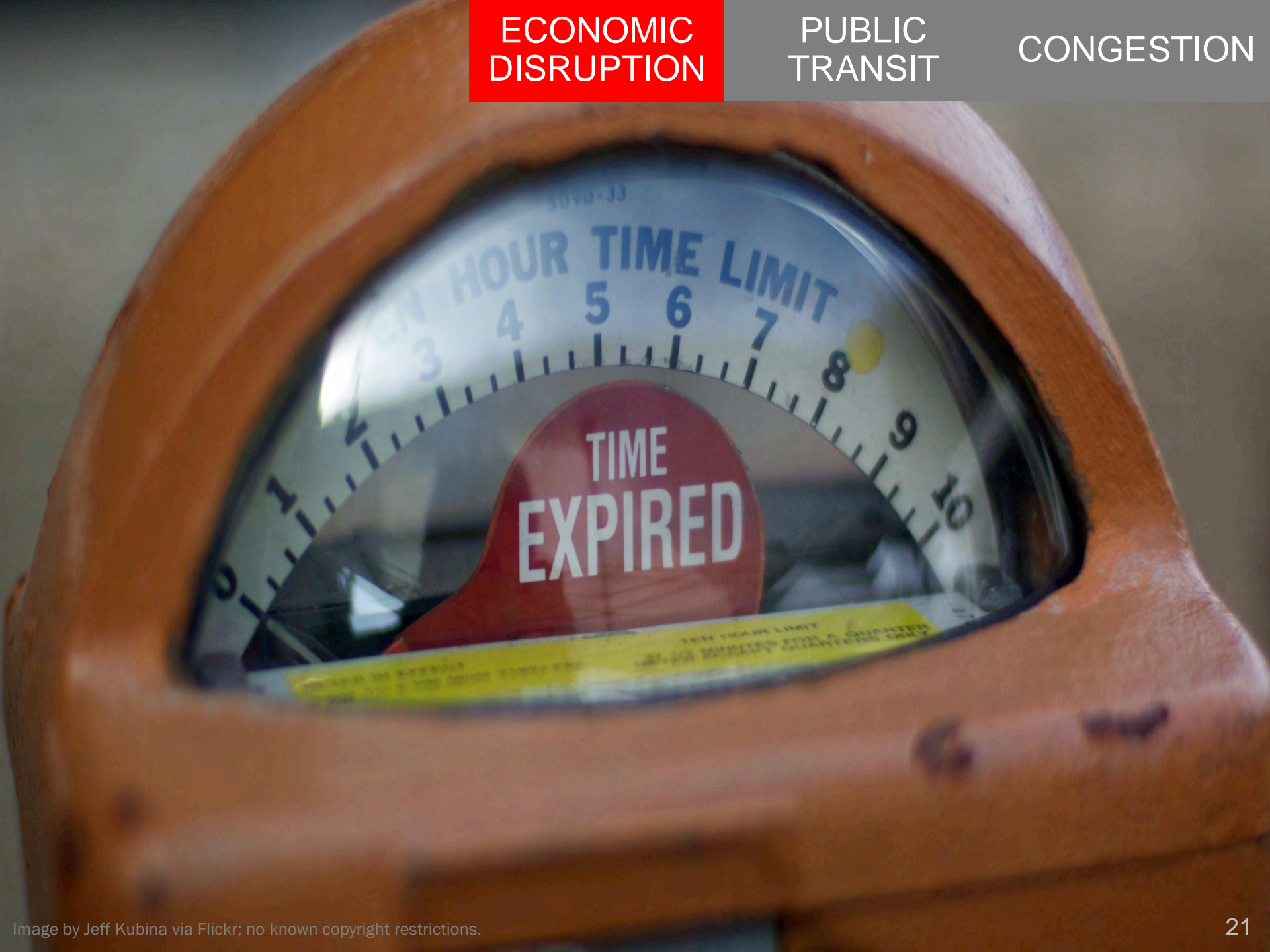
Image by Stan Wiechers via Flickr; no known copyright restrictions.



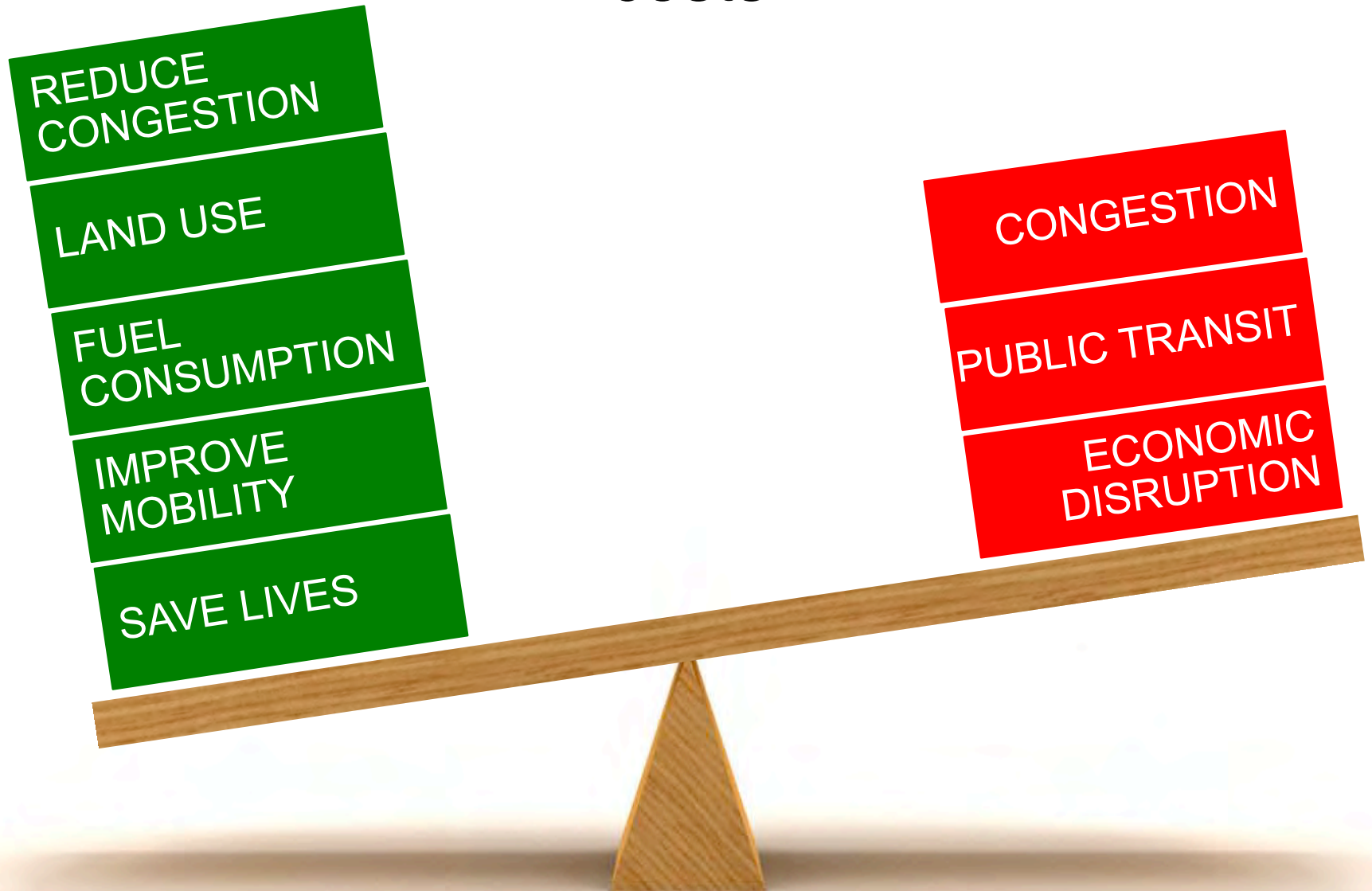
ECONOMIC  
DISRUPTION

PUBLIC  
TRANSIT

CONGESTION



# Overall societal benefits almost surely exceed costs



# Considerations for policymakers

- What are the advantages and disadvantages of automated vehicle technology?
- What **obstacles** prevent us from realizing the benefits?
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Driver overconfidence/safety undervalued

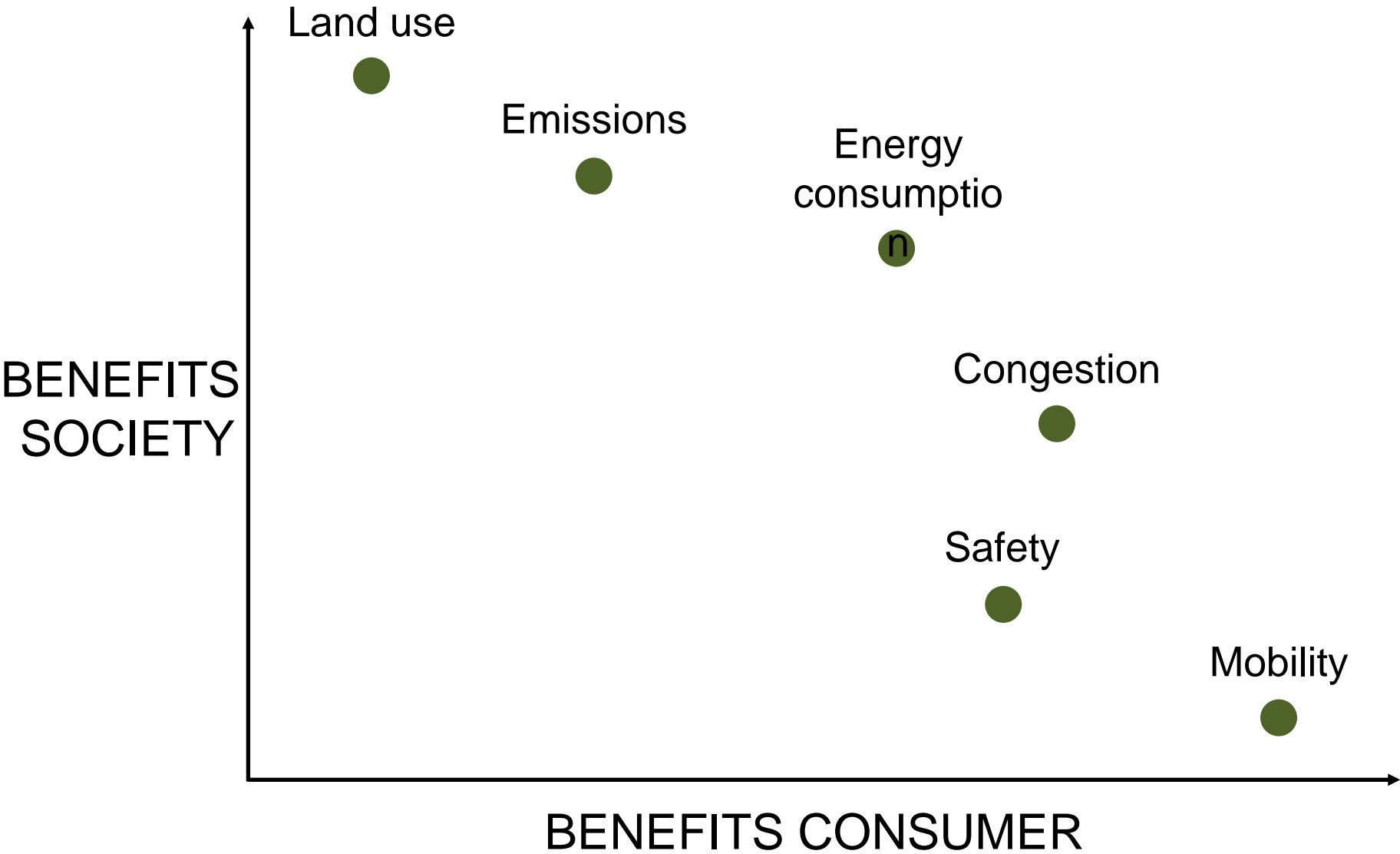


Automaker perception that safety does not sell



Early stages will require trained, alert drivers





OVER-  
CONFIDENCE

SAFETY

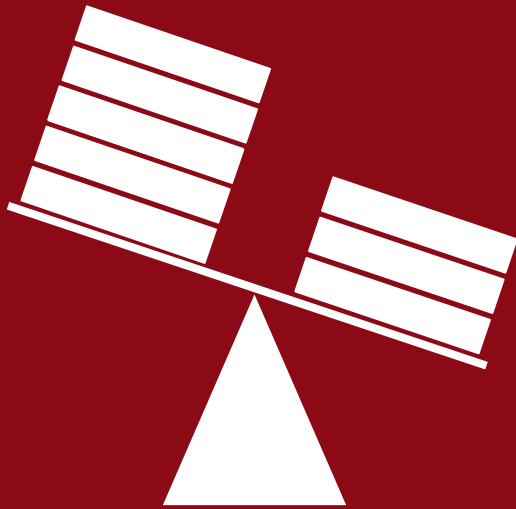
TRAINING

EXTERNALITY

AUTOMAKER  
LIABILITY



These factors together may result in market failure or slow adoption



Market failure



Slow adoption

# Considerations for policymakers

- What are the advantages and disadvantages of automated vehicle technology?
- What obstacles prevent us from realizing the benefits?
- What can policymakers **do**?



# Subsidies, privileges, mandates, user fees equalize public and private benefits



# Liability law changes might help

Vs.

Plaintiff,

Clarify liability standards

Federal vs. state law

Operator responsibility



# Collaboration is key



Technological concepts differ widely

States should coordinate regulations

Premature regulation can halt evolution



# Challenges for transportation planners



Models may change

Adaptive policy making

Information collection

# Key points

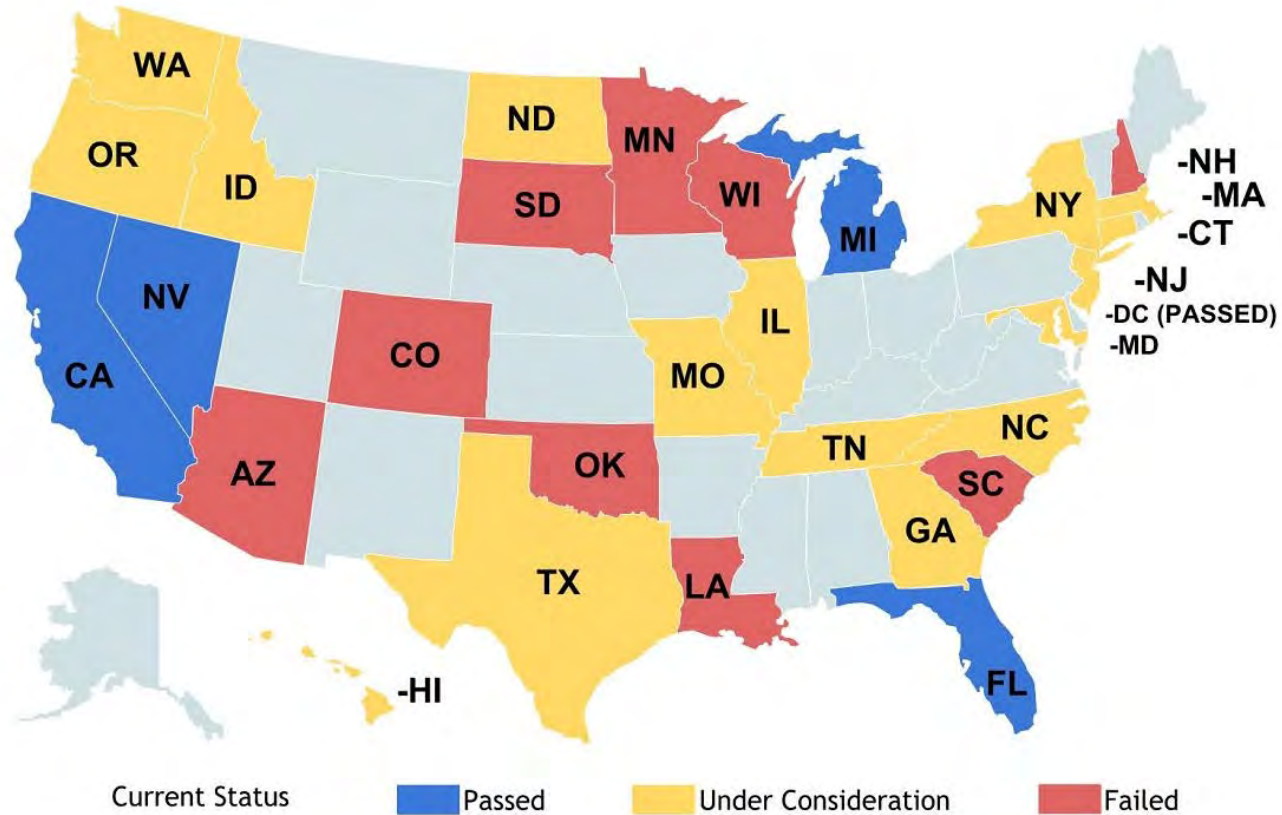
- **Benefits** outweigh disadvantages
- Purchaser does not get all benefits; may be **unwilling to pay**
- **Subsidies** could help
- **Adaptive policymaking** critical

# Focus on Three Important Areas

- State regulation of AVs
- Data privacy considerations for AVs and CVs
- Commercial and military truck platooning



# No. Yes. Maybe.



# California Leads the Way

- \$5 million in insurance, bond, or self-insurance
- Manufacturer has tested vehicle under controlled conditions that simulate, as closely as practicable, real world conditions and reasonably determined it is safe to operate the vehicle on public roads
- Test driver must be seated in driver seat during testing
- Test driver requirements:
- Report any accident within 10 days and unanticipated disengagements of autonomous technology annually
- Testing permit valid for one year

# AV Challenges for the State Regulatory Process

- New role for state Department of Motor Vehicles
- Federal Motor Vehicle Safety Standards or other industry standards have not been developed for autonomous vehicles
- Key topics that would inform the regulations are still in a research state
- How regulations will ultimately integrate with actions by other states, at the federal level, and internationally



# California Certifications for Autonomous Vehicles

- Maintain \$5 million in bond, insurance, or self-insurance
- Identify if vehicle is capable of operating without a driver
- Certify the autonomous technology meets and does not make inoperative any Federal Motor Vehicle Safety Standard
- Certify the autonomous vehicle has:
  - Mechanism to easily engage/disengage autonomous technology
  - Visual indicator that autonomous technology is engaged
  - System to alert the operator when a failure of the autonomous technology is detected
  - **Separate mechanism to record sensor data 30 seconds prior to collision**

# California Conditions for Operation of AVs

- Identify all areas where the vehicle can operate autonomously and certify it is incapable of operation outside those areas.
- Identify commonly occurring restrictions on operation (snow, fog, rain, construction zones)
- Identify what the vehicle will do if the autonomous technology fails
- Certify that the AV technology will obey traffic laws

# Considerations for Policymakers

- What are the applicable standards and certifications?
- Who sets the standards?
  - Federal government, province, manufacturer, third party
- How can regulatory and certification frameworks be harmonized across the U.S. and Canada?



# Collaboration is Key

- **Regulation** can delay the deployment of life-saving technologies
- What standards will be used to certify AV technologies?
- **Regulatory and certification frameworks need** to be harmonized across the U.S. and Canada, and across continents

# Focus on Three Important Areas

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# Data Privacy Issues Concerning Automated and Connected Vehicles

- Is there a need for new policies to manage vehicular and transportation data collected and used by the state as connected and automated vehicles are deployed?
- Should there be a state or federal approach to managing vehicular data issues from connected and automated vehicles?



# Report Explains How New Technologies May Challenge Existing Data Privacy Protections



- The debate about data de-identification
- The auto industry lacks consensus concerning how to protect drivers' data privacy

# Report Explains How New Technologies May Challenge Existing Data Privacy Protections



- Consumers are willing to trade their personal data to obtain a benefit
- Eighty-six percent of adults surveyed by AAA think there should be laws and policies to protect their vehicle data

# Privacy Protection is Segmented in U.S. Law and Regulation

- U.S. federal statutes cover different aspects of privacy protection—financial, medical, children’s use of the Internet—in contrast to the Canadian approach
- There is not a consistent statutory definition of “personal identifying information” (PII)



# Interviews of State DOTs, SMEs, Industry Stakeholders, and Privacy Experts Addressed Key Issues



- How are vehicular data being collected in Texas and other states?
- How are transportation data being used?
- Who owns or can access and use the data?
- What is the value of vehicular data?

# Who Owns or Can Use the Data?

- Drivers may think that they own or control their car's data, but this is not what we found in research
- There are telematic devices being installed in many new cars that transmit PII whether the driver likes it or not
- Calls for a “bill of rights” to control automakers' collection of data

# States and Private Entities are Planning to Use and Monetize AV/CV Data



- OEMs, telematics, and insurance companies, among other stakeholders, plan to monetize and use AV/CV data
- States plan to monetize and use data for traffic control and management



# States will Face a “Tsunami” of Data from AVs/CVs



- State agencies have made few preparations to deal with the extremely large volume of vehicular data that experts predict will be produced by automated and connected vehicle technologies

# States will Face a “Tsunami” of Data from AVs/CVs



- States may need third parties to handle the volume of AV/CV data and analyze it for state transportation purposes
- States will need to control use of AV/CV data by third parties, so need clear regulations or guidelines

# Data De-Identification is Not the Perfect Solution for Concerns About AV/CV Data Privacy

- Experts disagree about whether data de-identification works
- Recent MIT study puts current PII protection framework into question
- Currently, no standards for how AV/CV data should be de-identified



# There is No Consensus About a State or Federal Approach for U.S. AV/CV Regulation



- OEMs, insurance companies fear a patchwork of state legislation
- Advocates say states can take leadership role
- States may resist imposition of federal guidelines and delay deployment of AVs/CVs

# Focus on Three Important Areas

- State regulation of AVs
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# Commercial Truck Platooning



Source: <http://newsroom.scania.com/en-group/2012/04/04/scania-lines-up-for-platooning-trials/>

# How Does Platooning Work?

## Wireless Communications and Sensors



Fig. 2. A two-truck platoon with wireless communication and radar technology



# Commercial Benefits of Platooning: Fuel Savings, Reduce Driver Fatigue

- Estimates reflect 10% fuel savings for rear truck and 4.5% savings on front truck\*
- Fuel costs are a critical element of commercial trucking business model
- Platooning could also reduce driver fatigue, allow more efficient use of assets

*\*Source: Presentation by Josh Switkes, Peloton CEO, November 2015*

# States Determine Platooning Requirements

- Federal (USDOT, NHTSA, FMCSA)
  - Support development of best practices



# States Present Regulatory Challenges

- Some states have following distance restrictions: e.g., California
- Some states, like Utah, have created a legislative exception for connected vehicles
- Majority of states use “reasonable and prudent” standard
- Challenges to deployment may be greater from regulation than technology

# Licensed for Road Driving in Nevada 2015



Source: <http://www.freightlinerinspiration.com/newsroom/press/inspiration-truck-unveiled/> Freightliner Press Release, May 5, 2015



# European Truck Platooning Challenge 2016



Source: Gizmag, "Autonomous Trucks Platoon Successfully Across Europe," <http://www.gizmag.com/eu-truck-platooning-challenge-success/42714/>



# U.S. Army is Exploring Autonomous Convoys



# RAND's Autonomous Truck Study for the U.S. Army

Study Purpose: Provide analysis to inform Army strategy for implementing automated & autonomous technologies in combat logistics operations

# Factors Influencing Commercial Versus Tactical Autonomous Truck Development

## *Commercial Factors*

- Improved fuel efficiency
- Leverage established infrastructure
- U.S. regulatory environment

- Communications
- Human-machine interface (HMI)
- Cyber security
- Sustainment / maintenance

## *Tactical Factors*

- Reduce risk to personnel
- Limited / no infrastructure
- Rough terrain
- Austere conditions

Despite many similarities, not all tactical technology demands are being fully addressed by commercial AT development



# Key Points

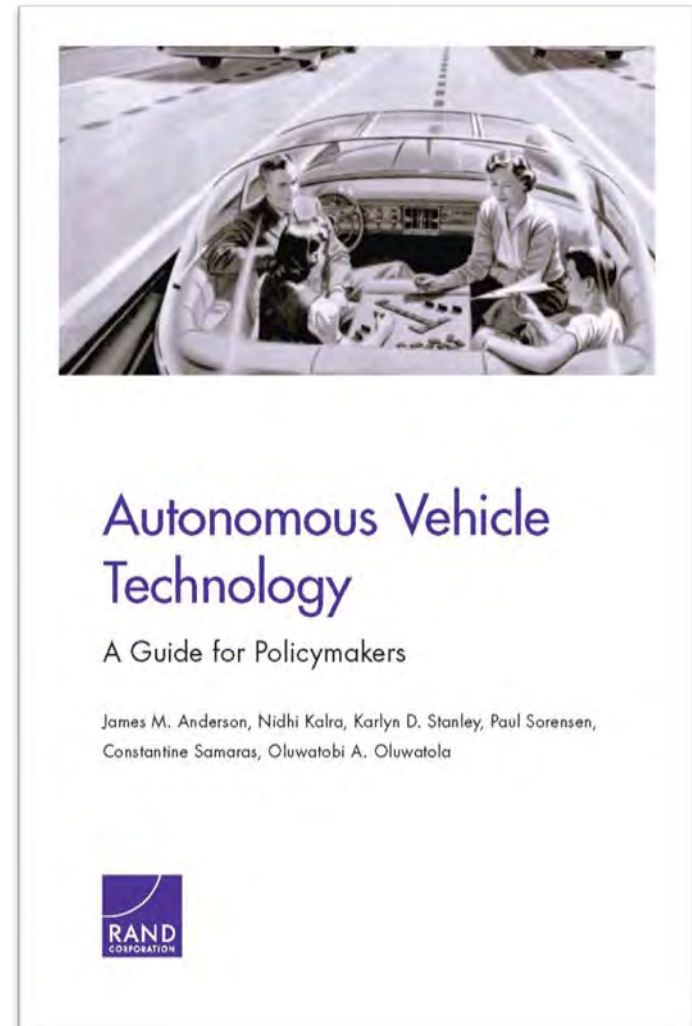
- Commercial platooning presents significant **economic incentives**
- Challenges to deployment may be greater from **regulation** than technology
- Military applications offer **force protection** in conflict environments
- Platooning illustrates the need for **harmonization** of regulatory and certification frameworks across borders



Image by H. Miller.

# You can review the entire RAND study at RAND.org

- State of technology
- Costs and benefits
- Communications
- Current state law
- Liability issues
- Recommendations for policymakers



Link to Texas Transportation Institute  
Policy Research Center  
“Data Privacy Considerations For Connected and  
Automated Vehicles”

- <http://tti.tamu.edu/documents/PRC-15-49-F.pdf>

Karlyn D. Stanley

[Kstanley@rand.org](mailto:Kstanley@rand.org)

202-746-0111