Civil Society and Public Opinion Perspectives on Autonomous Vehicles in the U.S.

David J. Hess

Sociology Department

Vanderbilt University

Background

Social scientist

Field: “Science and Technology Studies”
--relationship between S&T and Society

Disciplines: sociology, anthropology, policy

Problem: Explaining Industrial-Technological Transitions

Definition: Transitions of technological systems

- Multi-decade
- Niche-regime dynamic
- Government support
- Contested (challenger-incumbent relationship)

Industrial Sectors:

- Electricity
- Transportation
- Natural gas
- Buildings & built env
- Agricultural production
- Water supply

Transition Success

- Animal power to internal combustion engine
- Gas light to electricity
- Computerization of the workplace
- Passenger transportation: Rail and steamship to air
- Autonomous family farm to industrial agriculture
- Coal to natural gas building heat

Transition Failure (or Niche Stasis)

- Expert systems in medicine (replace medical diagnostics)
- Renewable energy transition in electricity (in many countries)
- Individual vehicle to public transit in US cities
- Sustainable agriculture
- Segway

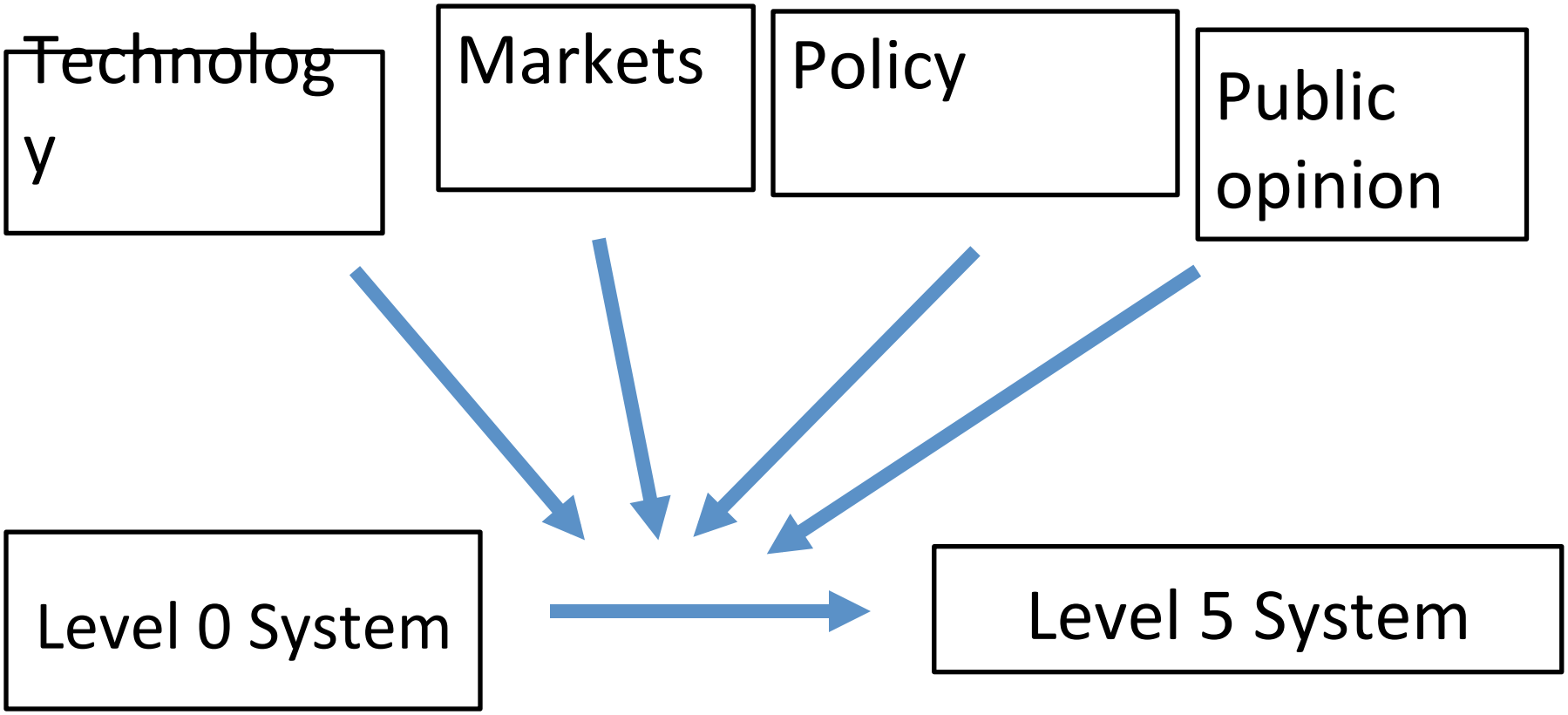
Theory of Transitions

Structuring condition factors:

- Technological (safety, security, etc.)
- Economic (cost)
- Government (R&D funding, regulatory openness, concern with global competition and national security)
- Civil society pressure: public acceptance or opposition

Agency-strategy factors:

- Strategies of challengers and incumbents in an industry
- Political coalitions for regulatory support or lack of it

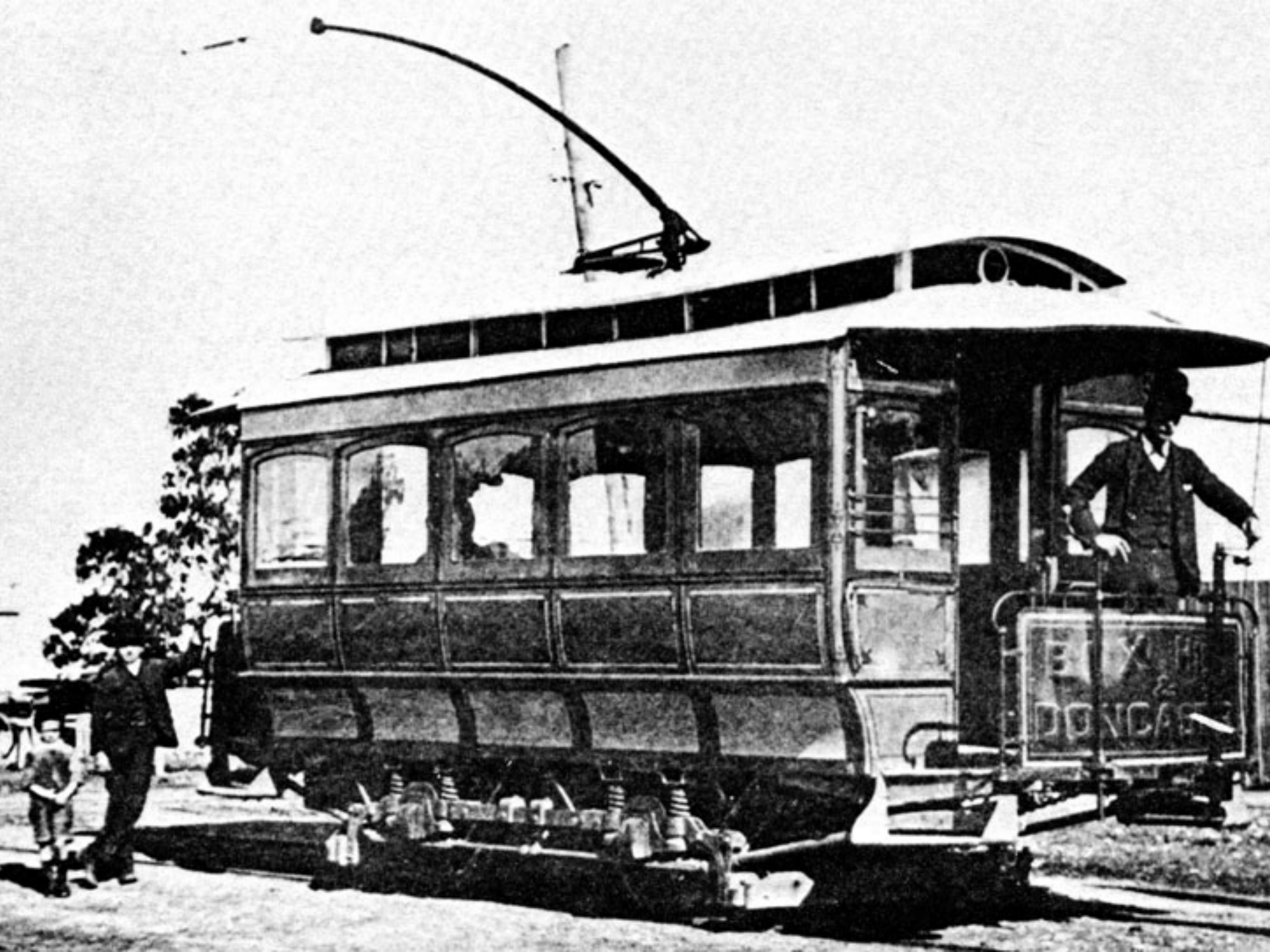

Technology
Markets
Policy
Public opinion
Level 0 System
Level 5 System

Twentieth-Century Transition of Transportation System

Early Twentieth-Century Transportation Regime

- Intercity: rail
- Intercontinental: ship
- Intracity:
  - Walking
  - Horse & Carriage
  - Bicycle
  - Streetcar
- Niche: automobile--racing

"THE CARS" ON LONDON RD.
OPENING DAY JULY 27TH 1904 DERBY ELECTRIC TRAMS.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Transportation Transition (Mid-Twentieth Century)

- Demise of Streetcars
  - 1936 – 1950
  - New deal reforms: utilities separated from streetcar companies
  - Declining investment
  - Rising role of automobiles
  - Controversy over role of General Motors
- Rise of Highways
  - Oil & auto lobby
  - Military
  - Construction
  - Railroads, too!

www.streetcar.org

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General Motors streetcar conspiracy

From Wikipedia, the free encyclopedia

The **General Motors streetcar conspiracy** (also known as the **Great American streetcar scandal**) refers to allegations and convictions in relation to a program by General Motors (GM) and other companies who purchased and then dismantled streetcar and electric train systems in many American cities.

Between 1936 and 1950, National City Lines and Pacific City Lines—with investment from GM, Firestone Tire, Standard Oil of California, Phillips Petroleum, Mack Trucks, and the Federal Engineering Corporation—bought over 100 electric surface-traction systems in 45 cities including Baltimore, Newark, Los Angeles, New York City, Oakland and San Diego and converted them into bus operation. Several of the companies involved were convicted in 1949 of conspiracy to monopolize interstate commerce but were acquitted of conspiring to monopolize the ownership of these companies.

Some suggest that this program played a key role in the decline

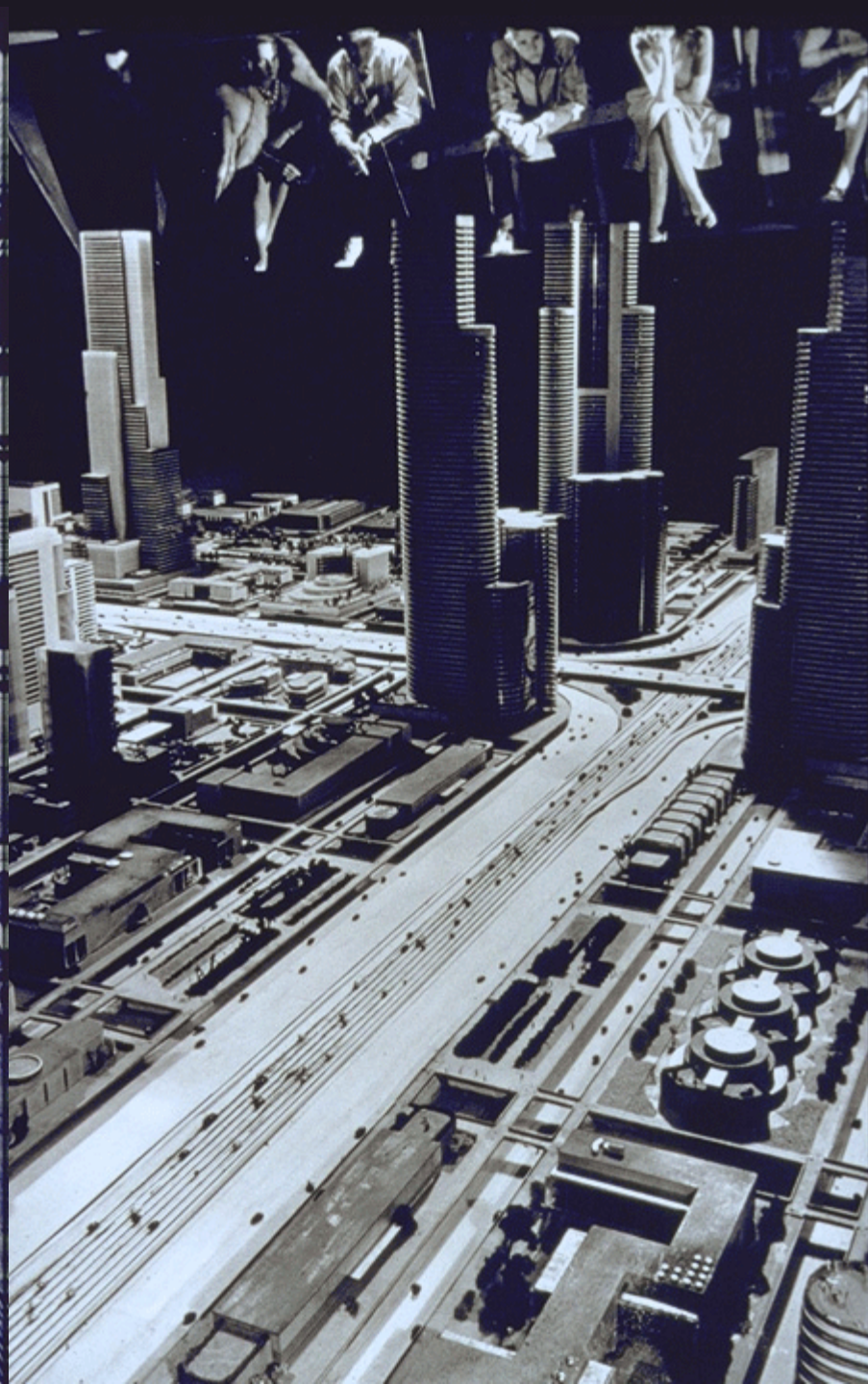
Pacific Electric Railway streetcars stac
Island, Los Angeles County, California,

Vision of the Future

Furturama 1939

World's Fair


http://morrischia.com/david/portfolio/boozy/research/futuram



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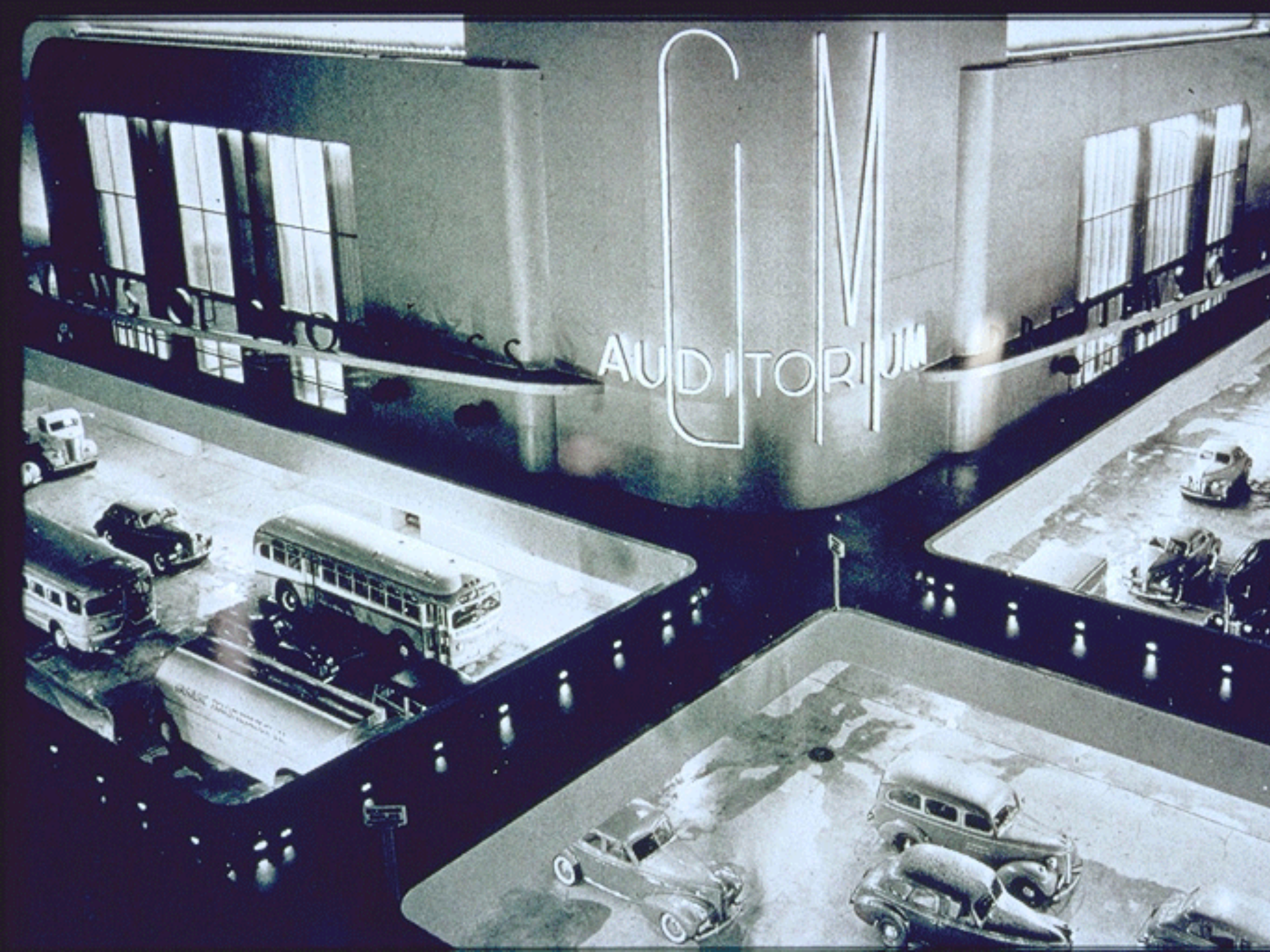
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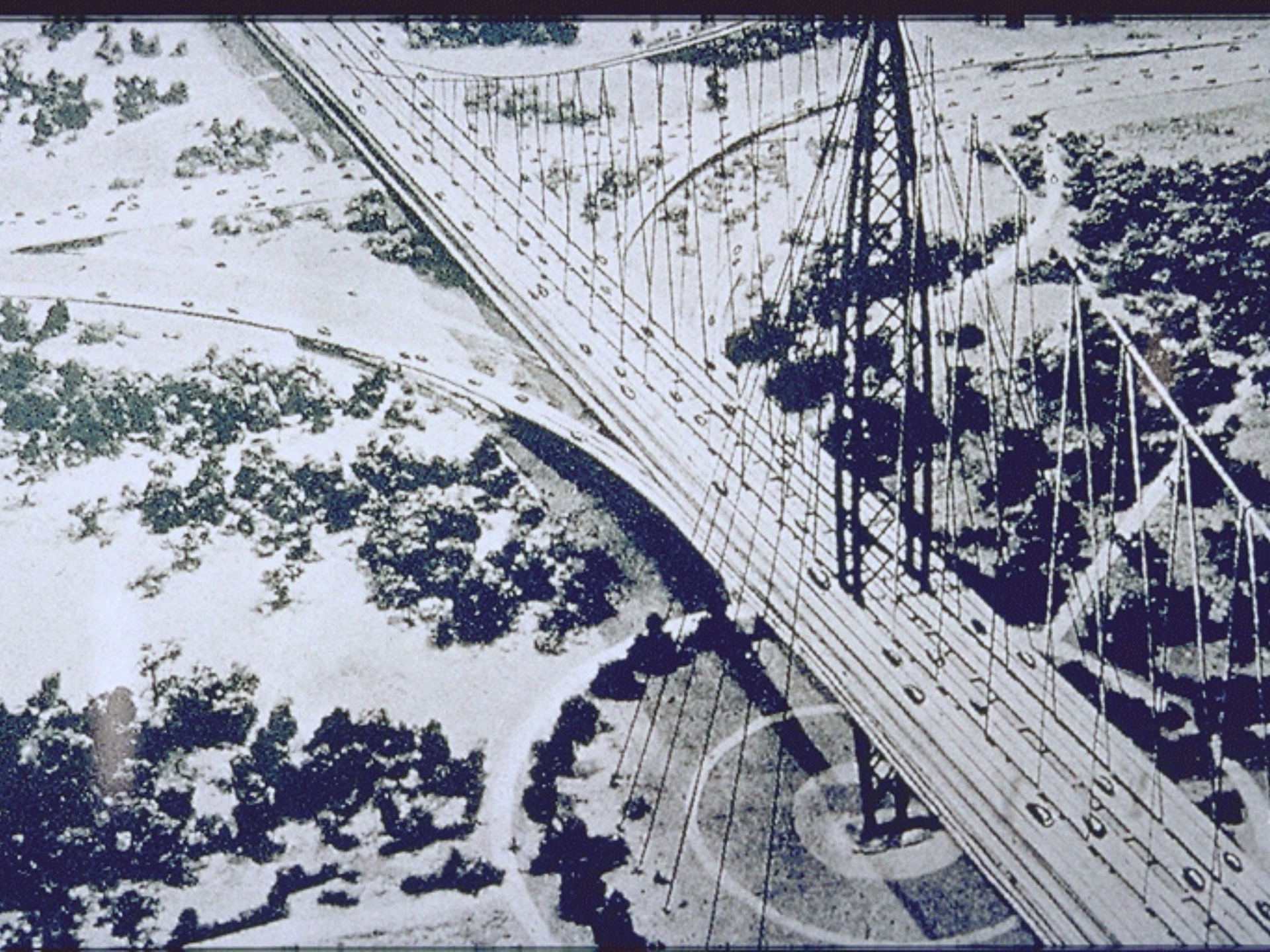
AUDITORIUM



Rise of Highways

Policy-Guided Transition

- Interstate Highway and Defense Act of 1956
  - Defense motivation
  - Economic efficiency motivation

- New regime
  - Automobile centered
  - Buses in cities
  - Air, Truck, highways for intercity

Effects of Interstate Highway System

- Decline of urban transit and railroads (at a peak at WWII)
- Suburbanization
- Geographical apartheid

http://commons.wikimedia.org/wiki/File:Cincinnati-suburbs-tract-housing.jpg

Effects of Interstate Highway System

- Often laid on black-white line (like a river)
- Often through low-income black neighborhoods
- Destroyed Overtown, Miami
  - https://www.youtube.com/watch?v=PLr-8QPbiAY
  - Divided Highways, 48:28

Twenty-First Century Transition: Sustainability

1. From petroleum-powered vehicles to electric
   (Some biofuels, hydrogen power)

2. From cars to public transit.

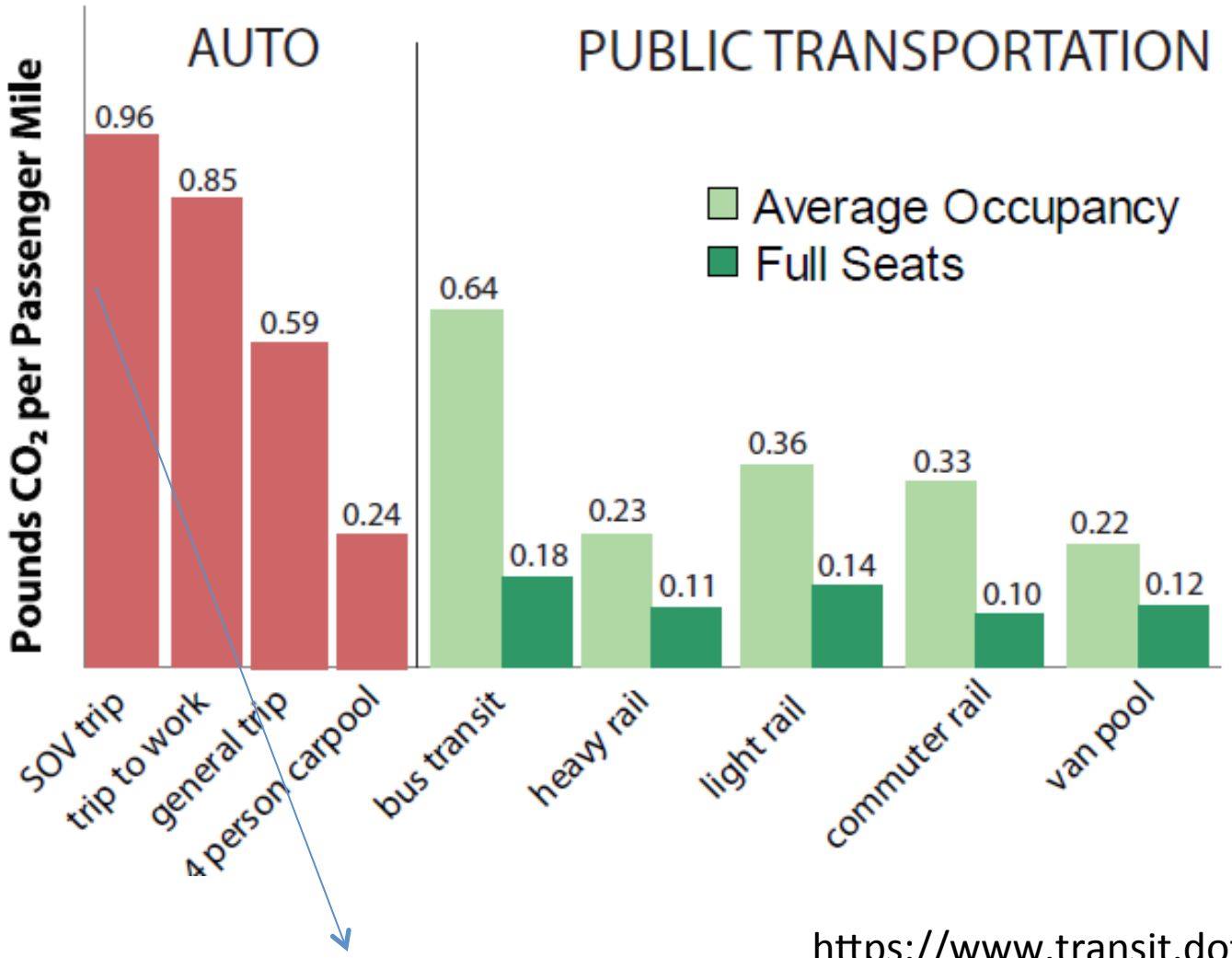


FIGURE 3
Estimated CO_2 Emissions per Passenger Mile for Average and Full Occupancy

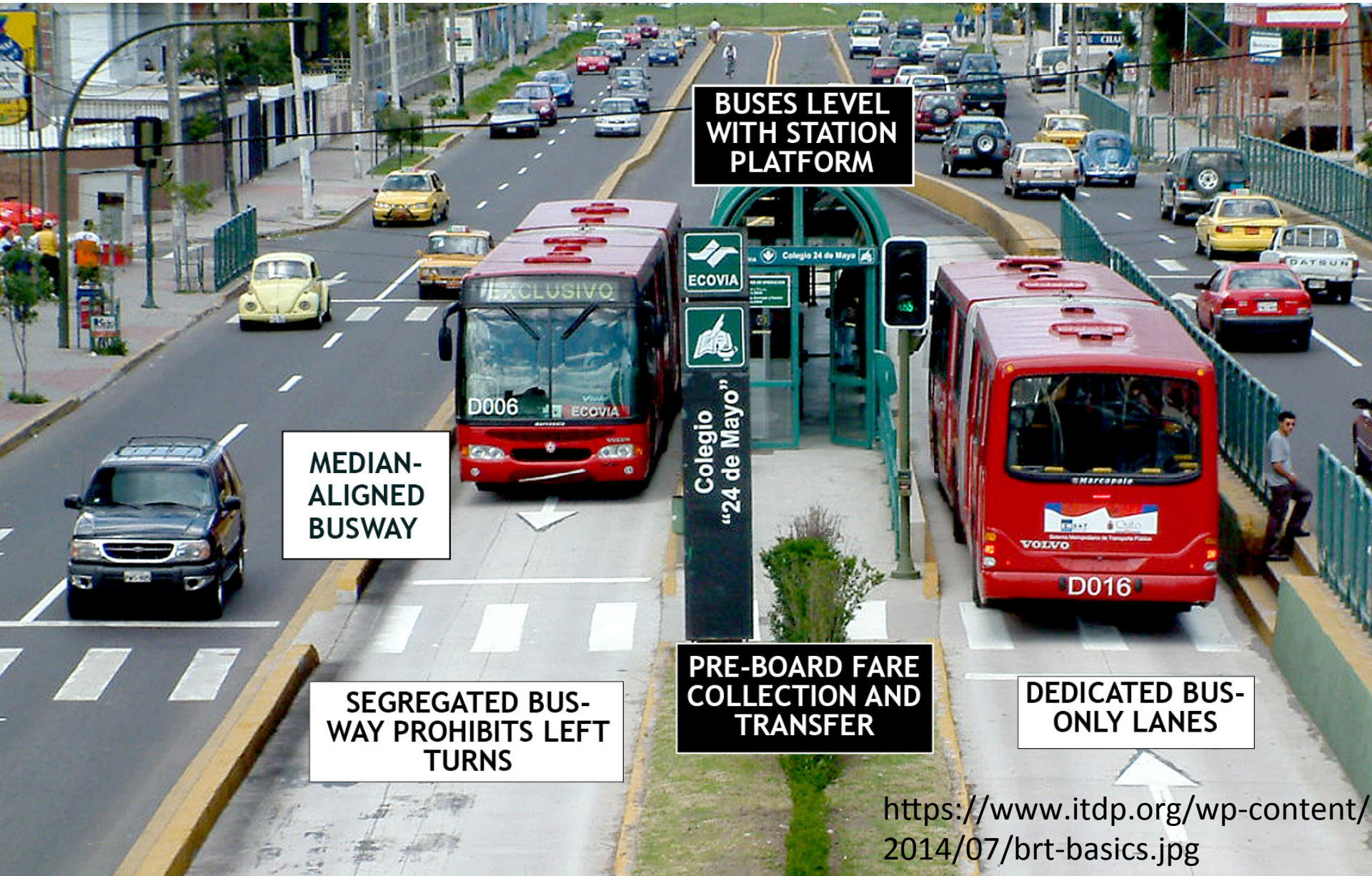
Sources:
See Appendix II for data sources and methodology.

Notes: The average number of passengers for private auto trips is 1.14 for work trips and 1.63 for general trips.

Electric car est. 4 times lower than standard gasoline car.

https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/PublicTransportationsRoleInRespondingToClimateChange2010.pdf

Bus rapid transit



https://www.itdp.org/wp-content/2014/07/brt-basics.jpg


West End | 28

Greening of Public Transit

- Cleaner diesel
- Hybrid-electric
- Natural gas buses (esp. LA)
- Use of biofuels
- Electric vehicles in limited cases
- Hydrogen pilot projects
- Human power (bicycling)

The CAV Transition

Benefits

- Health: reduce fatalities
- Environment: end parking lots, reduce need for ownership of vehicles
- Equity: access for non-drivers

Risks and Uncertainties

- How well will CAVs work when integrated with human drivers, bicyclists, and pedestrians?
- Privacy risks (tracking of trips, recognition of street activity)
- Security (hacking of vehicles)

Potential for Backlash

Sociological conditions for backlash:

1. Rapid, forced introduction
2. Significant public interest questions (e.g., fatalities)

Likely outcomes:

- Consumer groups raise concerns
- Public protest can begin

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https://www.phoenixnewtimes.com/news/arizona-city-reports-people-attacking-waymo-self-driving-cars-11185541

To avoid controversy, what should an ideal regulatory framework look like?

Views of the technology sector vs.

Views of consumer organizations

(idea of “civil society”)

What kinds of regulations should drive this potential transition?

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Civil Society's Actions in the U.S. Public Sphere on CAVs

1. Represents public opinion

2. Represents public interest
   a. Federal government policy
   b. State government policy
   c. Industry practices and technologies

General Consumer Organizations

Consumers Union

Consumer Watchdog

Consumer Federation of America

Transportation-Oriented Consumer Organizations

American Automobile Association

--58 million members

Advocates for Highway and Automotive Safety

Center for Auto Safety

The Truck Safety Coalition

Pedestrian organizations

Bicycling organizations

I. Public Opinion and Polling

Consumer Organizations

Goal: Conduct research to represent public opinion and formulate the public interest on the AV issue.

American Automobile Association

Basic policy message:

Public opinion is opposed to the rapid introduction of driverless vehicles.

American Automobile Association Polls

2016: 2/3 of Americans afraid to ride in AVs

BUT

61% want at least one autonomous feature:

- automatic emergency braking
- adaptive cruise control
- self-parking
- lane assistance

American Automobile Association

Policy statement of public interest:

"the gradual, safe introduction of these technologies to ensure that American drivers are informed, prepared and comfortable with this shift in mobility" (Stepp 2017)

Belmont principle: autonomy (respect for persons, informed consent)

Additional Poll: AAA

Two-thirds of the respondents: would feel less safe sharing the road with an autonomous vehicle if they were pedestrians or bicyclists.

- Expansion of the public interest to non-drivers and non-passengers.
- See coalition expansion later.
- Much more than 58 million members—everyone

Summary

Public opinion: polling results. Empirical research.

Public interest: Normative statements about desired policy. Statements of the consumer organizations about how to best serve the public interest

Desired Policy Outcomes

Continued development of driver-assisted technologies.

End to immediate introduction of driverless vehicles on the roads.

II. Federal Government Policy and Public Interest Organizations

Consumer Organizations

Goal: Call for changes in federal government regulatory policy for AVs

Attempt to modify existing federal guidance and legislation in the pipeline.

2017

2017: National Highway Traffic Safety Administration (NHTSA)

Automated Driving Systems (ADS): A Vision for Safety 2.0

Summary:
Automated Driving Systems (ADS): A Vision for Safety 2.0

Replace 2016 policy

- Voluntary guidance for levels 3 and above
- Voluntary disclosure of Voluntary Safety Self-Assessments
- State governments only responsible for human driver and vehicle operations (not safety design)
- Guidance to state legislatures

2017 Consumer Groups' Response

- Voluntary standards not adequate
- Need enforceable standards
- Implement the National Transportation Safety Board's recommendations for Level 2 and 3 vehicles
- Set minimum cybersecurity standards
- Set standards for over-the-air vehicle updates

National Transportation Safety Board's Level 2 Recommendations (2016 Tesla Semi-Truck Collision)

- Incorporate system safeguards that limit the use of automated vehicle control systems to those conditions for which they were designed.

- Develop applications to more effectively sense the driver's level of engagement and alert the driver when engagement is lacking while automated vehicle control systems are in use.

House of Representatives 2017: HR 3388

- Block states from banning self-driving vehicles
- Provides for safety exemptions for AVs
- Requires manufacturers to develop plans to block cyberattacks on Internet-connected vehicles

Senate: 2017-2018, S. 1885
AV Start Act

Consumer groups:

- Urge Senate to slow down and deliberate more.
- Suggest specific changes in the bill.

Consumer Groups: AV Start Bill

- Reduce the number of exemptions for AVs "to prevent public roads from being turned into corporate proving grounds"
- Remove section 7 of the bill, which allows automakers to turn off manual control of steering and brakes
- Establish minimum performance standards and consumer information
- Provide the NHTSA with the resources that it needs to fulfill its public mission
- Include level-2 vehicles in the safety provisions
- Address the needs of members of disability communities
- End preemptions to state and local governments
- Vision test for driverless vehicles

Senate: 2017-2018, S. 1885
AV Start Act

Summer 2018: 44 civil society organizations oppose the pending parliamentary maneuver to attach the Senate's AV Start Act to the Federal Aviation Administration Reauthorization Act (S. 1405).

Comparison with Aviation Safety

"The safety deregulation built into the AV START Act and the precise and thorough way aviation handles autonomous systems is a study in stark contrast. The FAA has rigorous protocols for ensuring the safety of automation in the air, and examples of the success of effective standards and oversight of automated systems fly over our heads every single day. Conversely, the AV START Act, in its current form, would shockingly allow potentially millions of vehicles on the market to be exempt from meeting existing safety standards" (Advocates for Highway and Auto Safety July 16 2018).

2018: Expansion of Civil Society Coalition (> 70 groups)

Representing:

Consumers
Drivers
Bicyclists
Pedestrians
City governments
Law enforcement
Other first responders (including medical)
Accident victim

Consumer Watchdog 2018 Poll

Specific poll re federal government policy:

"75% of voters say Congress should apply the brakes to driverless car technology until the technology is proven safe, compared to only 15% who think more driverless cars are needed on the roads" (Consumer Watchdog 2018).

2018: Additional Statements

After fatalities.
Consumers Union testimony before NHTSA:

- Implement the National Transportation Safety Board's recommendations for Level 2 and 3 vehicles
- Set minimum cybersecurity standards
- Set standards for over-the-air vehicle update

2018

Consumer Federation of America (Jack Gillis):

"Congress must mandate, and provide funding for, the National Highway Traffic Safety Administration to establish an AV oversight division within the agency staffed with the technical know-how needed to both understand and monitor this new technology."

III. State Governments & Regulatory Policy

Consumer Organizations

Goal: Call for stronger state government regulation.

Point out the effects of regulatory failure (Arizona case).

2016

“Uber moved a fleet of self-driving vehicles to Arizona on Friday after California insisted it comply with local rules — a move that highlights the regulatory discrepancies governing this new technology between states.

“The California Department of Motor Vehicles revoked the registration of 16 Uber cars Wednesday because Uber refused to apply for a permit for testing autonomous vehicles.”—LA Times, Etehad, 2016

State Governments and Polarized Politics

Arizona v. California

"Arizona welcomes Uber self-driving cars with open arms and wide open roads. While California puts the brakes on innovation and change with more bureaucracy and more regulation, Arizona is paving the way for new technology and new businesses....Arizona is proud to be open for business. California may not want you, but we do."

--Governor Ducy (Arizona, Republican, in LA Times, Etehad, 2016)

California Changes Law (Early 2018)

- No enforceable safety assessment from manufacturers (all voluntary)
- Liability shifts to consumers for failing to have an update

--Center for Auto Safety, Consumer Watchdog

Consumer Reports

Arizona (after the Uber accident)

It is “the wild west of robot car testing with virtually no regulations in place…With no sheriff in town, people get killed.”

--Consumers Union

Summary

Interstate competition leads to downward regulatory spiral.

Federal preemption could prevent “blue” states from having stronger regulations.

IV. Advocacy for Change in Private Governance (Corporate Policy)

Consumer Organizations

Goal: Call for changes in corporate practices, including communication of technology to consumers.

“Private governance” or “non-state regulation”

Tesla Autopilot

“Two messages—your vehicle can drive itself, but you may need to take over the controls at a moment’s notice—[that] create potential for driver confusion”—Consumer Reports

Needs to redesign it to keep driver hands on the wheels—Consumer Reports

Tesla Autopilot

Consumer groups compare with other products

GM: limited to specified highways

Subaru: facial recognition software for driver distraction

Tesla Autopilot

Consumer Watchdog and Center for Autosafety:

Change consumer advertising of the technology

Private Governance Recommendations

Need for clear consumer guidance on limitations of the system

Need for technology-based enforcement of the systems (e.g., infrared camera in the driver cockpit)

Conclusion

Summary

Competing definitions of the public interest.

AV industry—reduced congestion, improved access for non-drivers, fuel efficiency, repurposing of space

Consumer groups—protection from safety and security threats.

Privacy is also emerging

Policy Implications

Public opinion and public interest groups suggest:

1. Gradual introduction of driver-assisted technology with clear communication and compliance.
2. More off-road testing of more advanced systems with incremental introduction in highly controlled environments
3. Open discussion of where societal investments should be: e.g., toward more sustainable transportation vs. more autonomous transportation.

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