



The Transportation Revolution: How Do Planners Grapple with an Uncertain Future?

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Uncertainty is Central to Planning

THOUGHT QUESTION

How confident have MPOs really been about their view of the 20 or 25-year planning horizon?

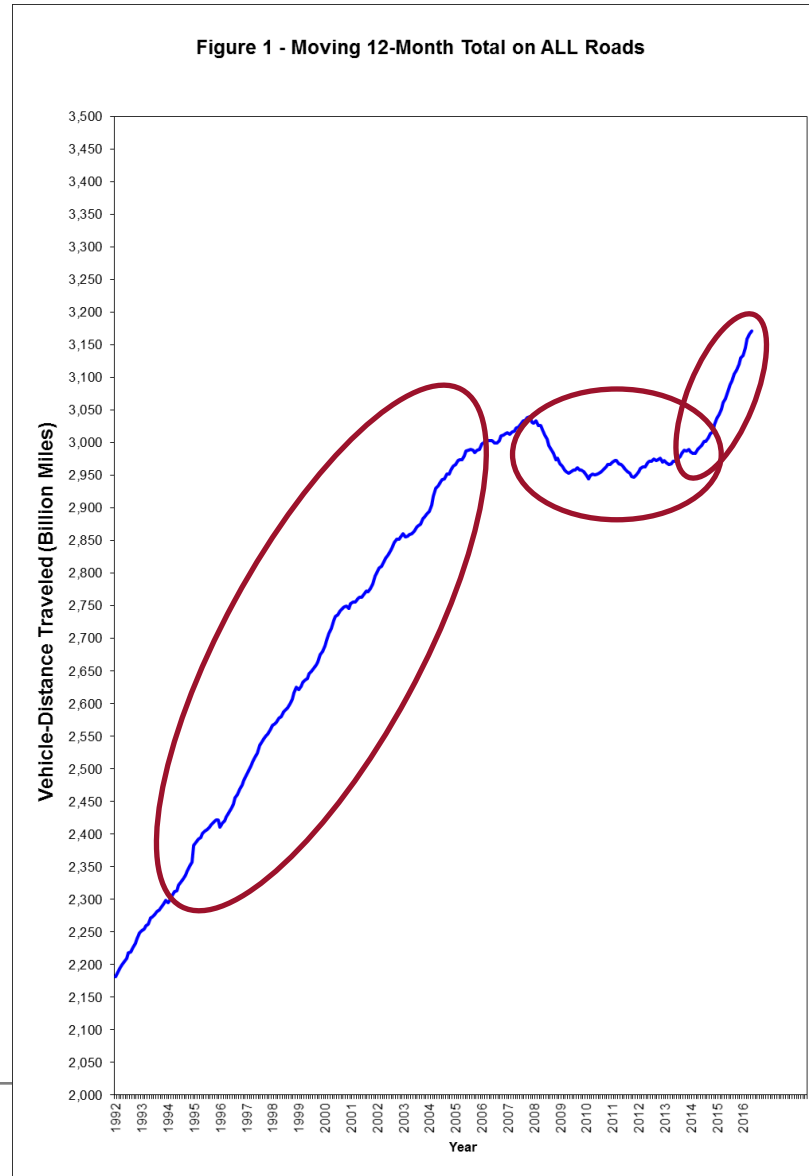


Central Concerns for Long-range Plans

- How will personal travel and goods movement be affected by disruptive and evolving technology/communication/social norms?
- Impacts on:
 - Travel demand
 - Infrastructure asset management
 - Safety
 - Operations
 - Sustainability



Forecasting Travel Demand



Source: FHWA Traffic Volume Trends



VMT Becomes More Uncertain

- Mobility as a Service (MAAS)
- An urban household may own no vehicles and have very unpredictable travel:
 - Monday: “Weather is nice. I’ll use a Bikeshare bike and ride to work.”
 - Tuesday: “Raining. I’ll use Uber.”
 - Wednesday: “I’m working at our downtown office today, which is on the light rail line. I’ll use transit.”
 - Thursday: “Working from home today.”
 - Friday: “I always go grocery shopping on the way home on Friday, and use CarShare.”



VMT and AV

- There is little agreement on the impact of autonomous vehicles (AV) on personal travel.
- VMT may increase because of:
 - Trips by young and old
 - Movement of empty vehicles
 - Ease of longer commute trips affects housing location
- VMT may decline because of:
 - Eliminating parking search
 - Potential for trip sharing



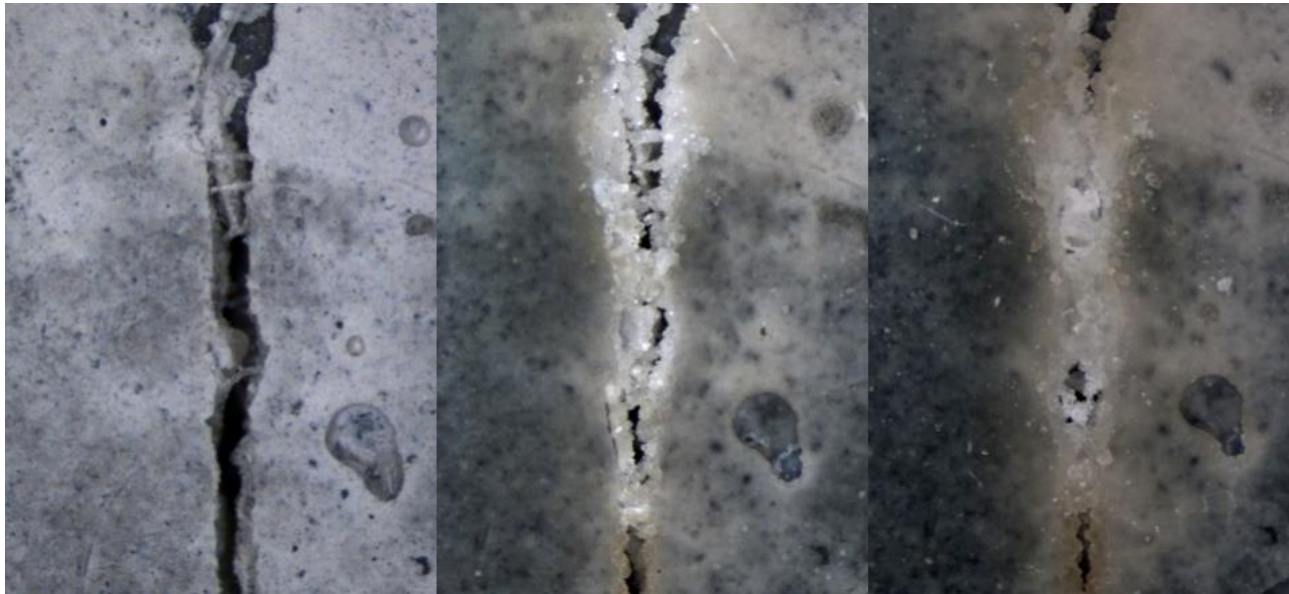
Other VMT Game Changers

- Web-based education – “Will anyone travel to our community college campus in 2040?”
- Urban goods movement
 - Autonomous trucks
 - Package delivery by drone
 - 3D printing in the home or neighborhood manufacturing



Asset Management Opportunities

- There are potential changes in construction and maintenance techniques that could impact MPO TIPs
- Roadways: Self- healing concrete



Asset Management Opportunities

- Roadways: Solar Road
 - Generates power (example: for EV charging stations)
 - Uses built-in LEDs for pavement markings



Asset Management Opportunities

- Carbon fiber bridge structures
 - “Bridge in a Backpack”
 - Suitable for lower volume roads
 - https://www.youtube.com/watch?v=bupAxrq1_Iw
- 3-D printed bridges



Safety Opportunities: CV

- Connected Vehicle technology has many potential safety benefits
 - *Red Light Violation Warning and Pedestrian in Signalized Crosswalk Warning* applications together have the potential to address more than 250,000 crashes and 2,000 fatalities/year
 - *Curve Speed Warning* application has the potential to address more than 169,000 crashes and 5,000 fatal crashes per year.
 - *Traffic management applications* on freeways can reduce the number of crash-related incidents by 25% during winter conditions

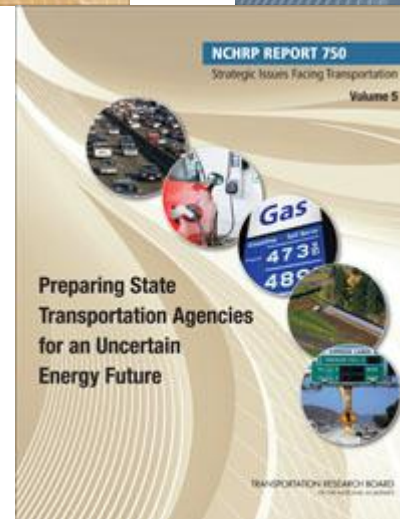
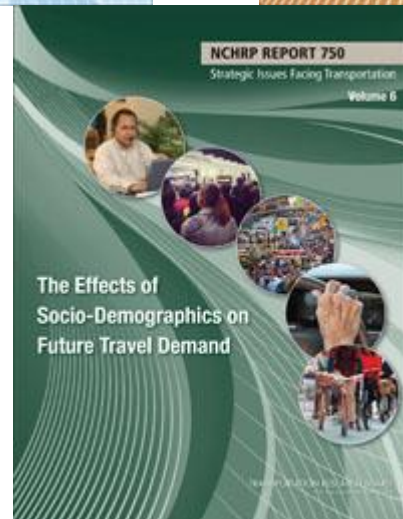
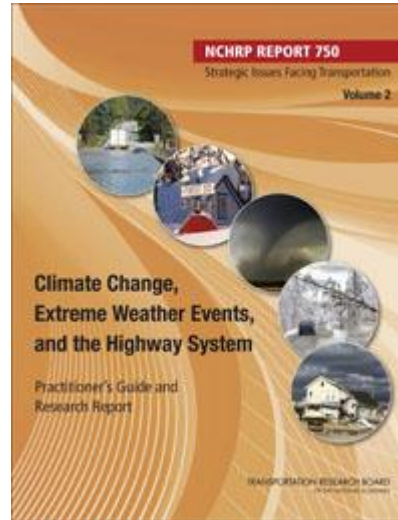
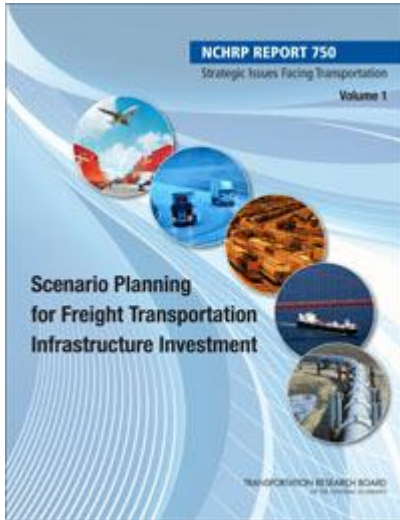


Safety Opportunities: AV

- NHTSA: driver behavior is cited as a causal factor in 94% of fatal crashes
- Range of human factors:
 - Impaired
 - Drowsy
 - Distracted
 - Reckless/speeding/road rage
 - Age related limitations
- Automated Vehicles could reduce crashes by 90%



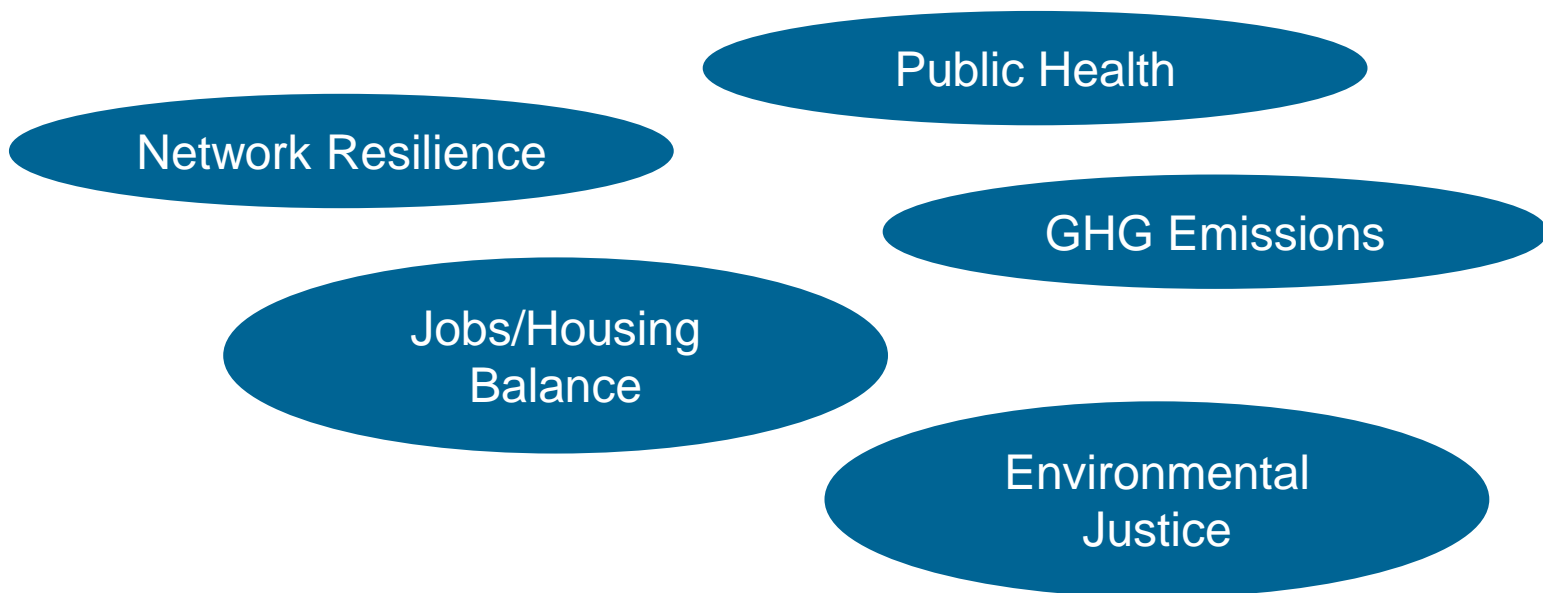
Sustainability



Sustainability

How do we sustain our community/region:

- 🌍 **Environmentally**
- 🌍 **Economically**
- 🌍 **Equitably**



Scenario Planning

- Scenario planning explicitly addresses uncertainty
- Originally applied to land use and growth
- Scenarios can also address external changes
 - Auto fleet is 50% autonomous by 2045
 - Need for safety projects decreases 75% by 2045 *if we invest in CV/AV by 2030*
 - Replace 20% of lane-miles of Interstate pavement with self-healing concrete between 2025 and 2045



Challenges

- Getting Policy Board buy-in
- Public input vs. public expectations
- Crafting a manageable set of scenarios
- Forging a link with performance-based planning



Conclusion

MPO Boards and staff should consider the importance of addressing future uncertainty in their Long Range Transportation Plans.



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