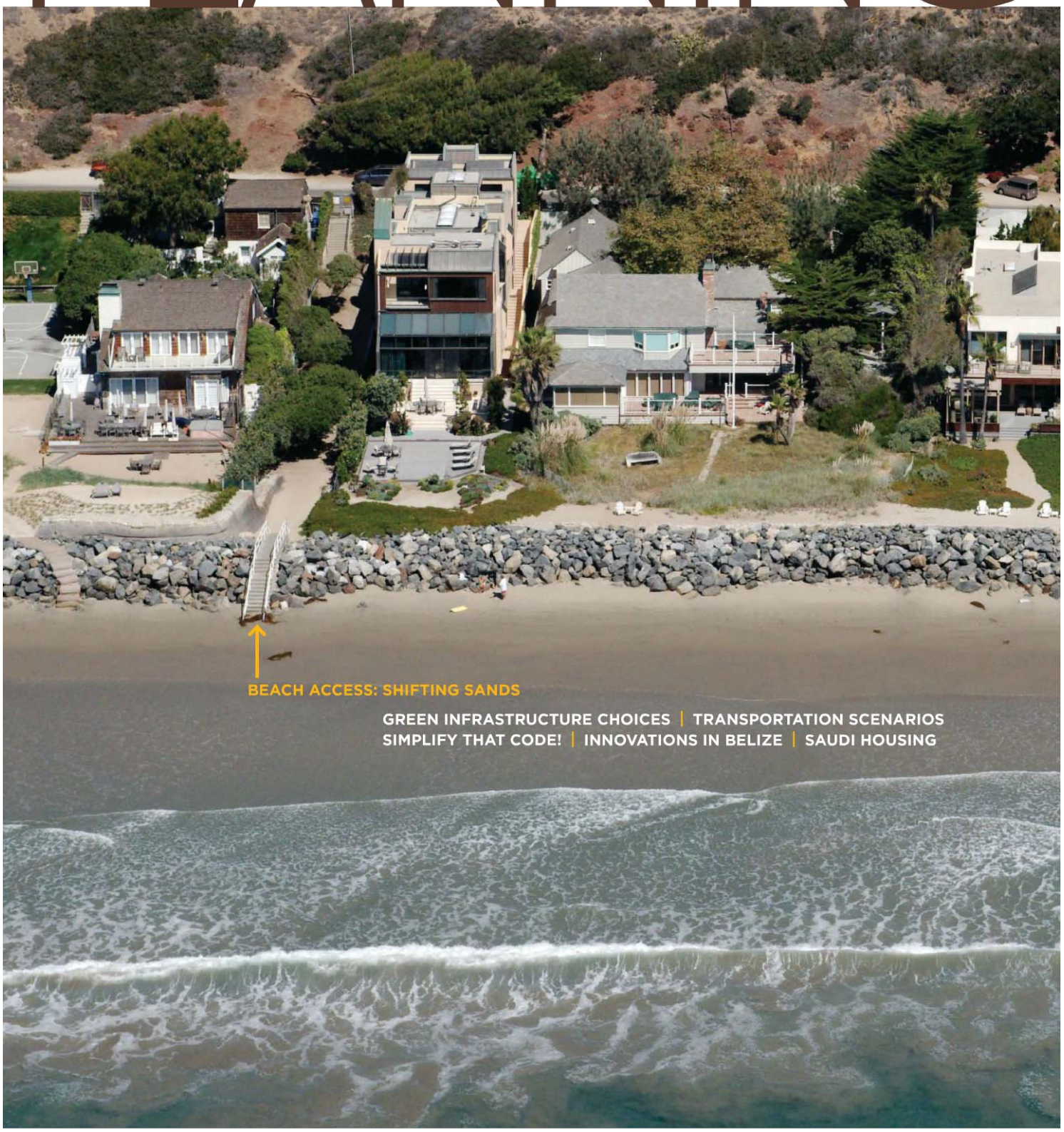
THE MAGAZINE OF THE AMERICAN PLANNING ASSOCIATION

JUNE 2015

PLANNING



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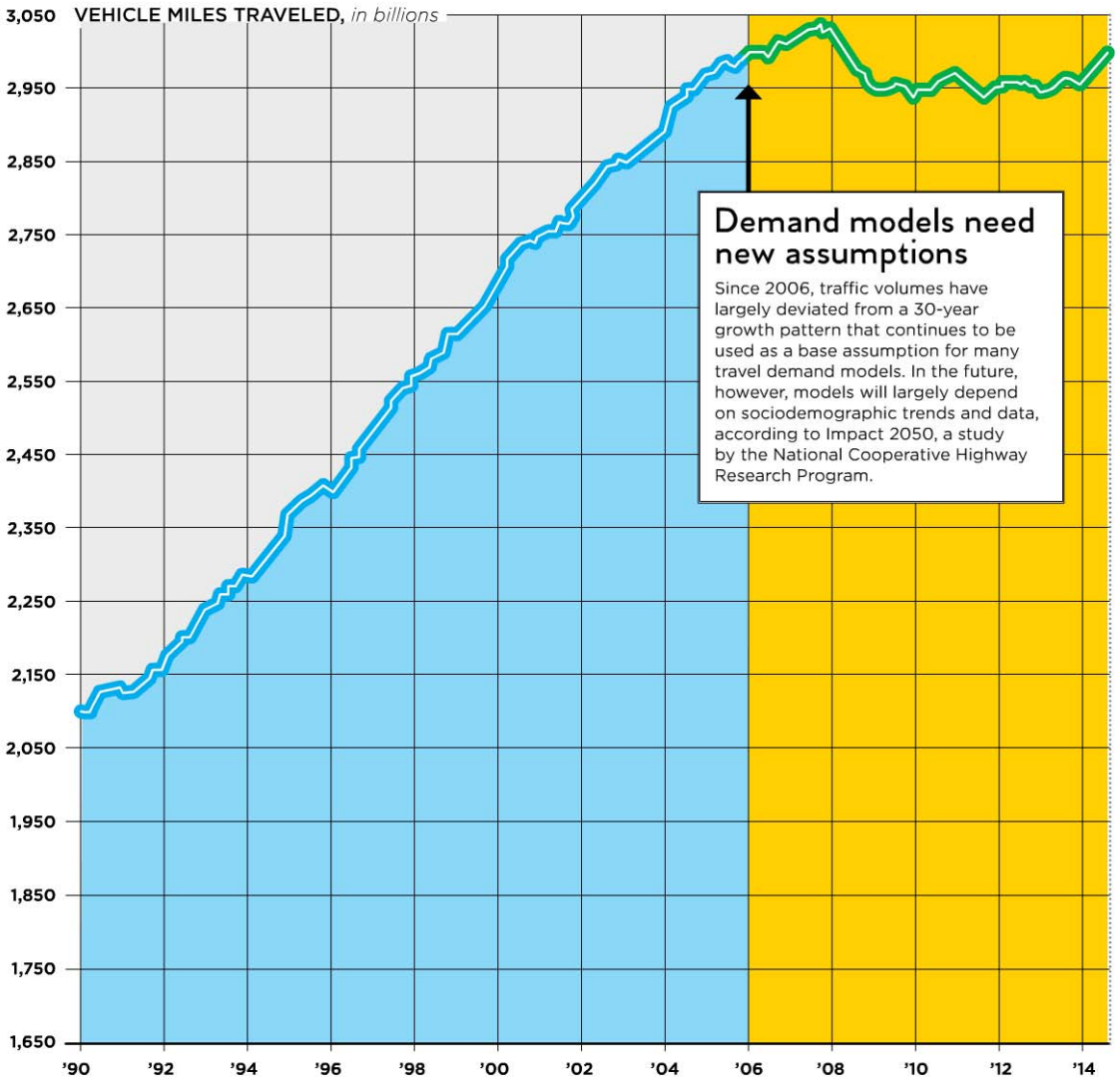
Out of the Box, Into the Scenario

Enlisting a powerful tool to address the future of freight.

By DANIEL HAAKE, AICP

TRANSPORTATION PLANNERS are increasingly turning to scenario planning to supplement their traditional projections based on population and job growth estimates. There are two main reasons: As the urban landscape and global stability continue to shift rapidly, linear projections have become less useful; more importantly, scenario planning allows planners to embrace a future that the community desires, not a predestined one.



SOURCE: U.S. FEDERAL HIGHWAY ADMINISTRATION

Paradox of traffic forecasting

Impact 2050, a recent National Cooperative Highway Research Program project, looked at long-range strategic issues facing transportation, among them the decreasing ability of traditional modeling techniques to forecast future traffic accurately. The study notes that total vehicle miles traveled peaked in 2006, and it found that future transportation demand will largely depend on sociodemographic trends. The study established a tool and process for integrating the evaluation of various scenarios into the transportation decision-making process.

Further, the study examined future VMT growth based on eight actual sociodemographic trends and explored what the interrelationships between the trends could mean for the future. Results varied from a small decrease in VMT to a decrease of more than 50 percent. The project recommended the future use of scenario planning to help deal with the increasing uncertainties in long-range transportation planning.

Freight planning

In particular, freight planners at metropolitan planning organizations, state transportation departments, and the U.S. Department of Transportation have embraced scenario planning as a tool to make more informed decisions in an increasingly complex global marketplace.

Freight growth is largely a function of global trends, which are much more volatile and unpredictable than traditional planning measurements. A decision made halfway around the world can have a dramatic effect on roadway volumes in rural America.

Scenario planning has been used to help account for these global trends at the regional and state levels, and recently for multinational planning. The process promotes an open dialogue that can result in more informed decision making. Namely, it allows planners and stakeholders such as private-sector freight operators and public officials to discuss trade-offs, nuances, and cause-and-effect relationships that the traditional methods could not identify.

By working through the alternate futures described in each scenario, stakeholders can extract common needs that may be relevant no matter what the future may hold. Stakeholders also learn from each other's perspectives; scenario planning provides a unique opportunity for stakeholders to learn about complex subjects like freight planning with relative ease.

Developing freight scenarios

The use of scenario planning with freight can be credited to Chris Caplice and his team at the Massachusetts Institute of Technology Center for Transportation and Logistics. Their work on *National Cooperative Freight Research Program Report 750* and subsequent work helped several transportation agencies adopt scenario planning as part of their freight planning process.

After a deliberate and lengthy process between 2009 and 2013, the MIT team defined four future freight-flow scenarios. Once the scenarios were established, the team held six scenario-planning workshops with public- and private-sector freight stakeholders to test their proposed process and elicit feedback on future freight needs. The identified future freight needs fell into four categories.

NO-BRAINER PROJECT: Invest in all scenarios.

NO-REGRET PROJECT: Invest in some but positively impact all scenarios.

NO-GAINER: Do not invest in any scenario.

CONTINGENT: Invest in some but not all scenarios.

Within these categories, a key differentiator over traditional planning techniques was developed. No matter how different the scenarios, there are a series of needs and projects that must be fulfilled. The MIT team called these "no-brainers." These are projects that need to happen no matter what the future holds.

Finally, the report offered a series of recommendations on how freight planners could integrate the scenarios and process after the project ended. The MIT team's subsequent work helping U.S. DOT, Washington DOT, and the Delaware Valley Regional Planning Commission has shown the processes' utility in different contexts.

Using the four scenarios, the Federal Highway Administration's National Corridor and Gateways project identified and documented multimodal corridor and gateway needs to support trade and overall competitiveness. This project was created to support the agency's work in implementing MAP-21 (Moving Ahead for Progress in the 21st Century Act), in particular the National Freight Plan that is under way.

Currently, FHWA is undertaking a scenario planning effort with its peer North American agencies, Transport Canada and Secretaría de Comunicaciones y Transportes México, to identify freight and passenger needs and future flows that will be used for multinational planning efforts. Lessons learned from *NCFRP 750* and the National Corridor and Gateway Concept projects have been taken into account; the plan uses the four scenarios and workshop methodology created in *NCFRP 750*.

This project is scheduled to be completed in 2016. It is the first effort to forecast North American transportation flows and will be used to inform future border crossing and international policy decisions.

To support the development of the *Washington State Freight Mobility Plan*, WSDOT held a series of scenario workshops focused on the effect of the four MIT scenarios on 16 multimodal segments. What resulted was a prioritized list of segments that could account for changes under each of the four scenarios. As with the results from *NCFRP 750*, several segments became "no-brainers" that need to happen no matter the future scenario.

DVRPC used the same four *NCFRP 750* scenarios. Unlike WSDOT, DVRPC chose to evaluate eight investment bundles instead of transportation segments. Each bundle includes a series of illustrative projects. The result was a series of themes to help guide further freight investment. Each bundle represented different improvement strategies that included land use, policy and regulation, capacity, and operational improvements.

Missouri's Freight on the Move

Missouri has always served as a gateway to the West. Today its role is more important than ever because it is a major junction point for North American freight movement. Not only do the East and West Coast railroads meet there, but so do railroads that serve Canada and Mexico.

Missouri's interstates (I-70, 55, 44, 35) are among the most heavily used freight corridors in the nation. While less visible than the other modes, the inland waterways serve a critical role in the overall economic success (particularly for the agriculture and energy sectors) of the Mississippi Valley. The state of Missouri is

where the Missouri and Ohio rivers join the Mississippi River.

In 2013, MoDOT conducted an outreach effort to support its update to the state's *Long Range Transportation Plan*. The On the Move initiative led to a grassroots-driven and widely accepted LRTP update. Capitalizing on this momentum, MoDOT developed a *State Freight Plan in 2014,* which kicked off with a smaller, more strategic outreach approach called Freight on the Move. This effort focused exclusively on freight stakeholders, but more importantly sought to identify trends that will drive future needs on Missouri's multimodal freight system.

To account for the complexities involved, MoDOT embraced the lessons of *NCFRP 750* but followed a more streamlined approach that is easily adaptable by other freight planners. However, to start the scenario-planning process, MoDOT's outreach effort identified 15 trends that will shape how Missouri's freight system will evolve over the next decade. These trends are somewhat diverse, covering issues from sociodemographic changes to major supply chain shifts. The trends were considered in concert with the *NCFRP 750* scenarios and corresponding driving forces. What resulted were three future extreme—but still plausible—scenarios for MoDOT to use for planning:

HUNGRY WORLD. Missouri is a major agricultural state. In this scenario, rapid world population growth expands the market for the state's food, resulting in major changes to how freight moves in Missouri.

GLOBAL MARKET. The current global trend of near-shoring or reshoring (bringing manufacturing facilities back to North America) will continue. Under this scenario, Missouri capitalizes on its long history as a manufacturing center to increase its role in the global marketplace.

CONVENIENT LIVING. This scenario captures three major trends facing transportation planners today: the rise of e-commerce, urbanization, and decreasing VMT. People will drive dramatically less. Work often takes place at home and most people live in communities where they can walk to work, school, and neighborhood markets. With the increase of online retail purchases, residential deliveries increase, while trips to traditional shopping malls decrease.

Scenario-planning exercise

Before undertaking the actual exercise, MoDOT distributed a stakeholder survey to gauge what challenges and opportunities each scenario offered. The survey was designed both to gather results and to introduce scenario planning to key stakeholders. For each scenario, the respondents were asked what two things would be impacted the most. In addition, the survey inquired how each scenario would affect the distribution network.

Using these results, the project team in March 2014 conducted a scenario-planning exercise with the project's steering committee, comprised of public- and private-sector decision makers. To kick off the discussion, the project team introduced the scenario-planning process and used the survey results to explain how the three scenarios may affect freight movement in the future.

1. How does this impact freight planning in Missouri?
2. Will a more multimodal transportation system be needed?
3. What kind of risk does this pose to Missouri's transportation?
4. Does this future require more emphasis on preservation, modernization, or expansion-type projects?
5. Are current funding trends adequate or do they require higher or less funding?
6. Are policy, procedure, or regulation changes necessary?
7. What partnerships would help lead to success?
8. Is there something that we need to include in this future that may present an impact?

The three scenarios produced very different results. In the end, six "no-brainers" were identified as being crucial to Missouri's continued success no matter what the future holds. These six recommendations provided the framework for the development of the plan's policy and implementation strategies: proactive partnership, state of good repair, strategic investment, multimodalism and connectivity, flexibility, and funding.

Missouri's lessons can be applied to freight plans elsewhere. This largely qualitative exercise identified Missouri's future freight investments. It also served as an educational process and built a coalition among varied and often opposing stakeholders. The results will ultimately help MoDOT work with stakeholders to implement their freight plan.

Scenario planning has proven to be a practical, useful tool to supplement traditional planning methods. This is especially true of freight planning, where global trends can have an effect on local roadways anywhere in the country.

Scenario-planning methods are scalable and effective at capturing the subjective trade-offs involved in transportation decision making. After all, planning is about the process and not a formula. While this process provides planners valuable info, it also builds stakeholder consensus. Numbers do not sell projects by themselves, stories do. ■

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MODOT'S IDENTIFIED TRENDS

- Future of global trade
- Alternative fuels
- Transportation system conditions
- Expansion of the Panama Canal
- Science and technology advances
- Aging
- Population increase
- High and volatile fuel prices
- Increase in climate regulations
- Low-cost batch manufacturing
- Online retail
- Nearshoring
- Security threats
- Funding
- Supply chain visibility