

Preparing State Transportation Agencies for an Uncertain Energy Future

Public Policy Implications



Transportation fuels and vehicle technologies are rapidly evolving. At a minimum, future petroleum-fueled vehicles will achieve much higher fuel economy. It is also possible that natural gas, biofuels, electricity, or hydrogen could increasingly displace petroleum in the coming decades. Such shifts will pose challenges for state departments of transportation. The goal of the study summarized here is to help state departments of transportation (DOTs) plan more effectively for an uncertain energy future.

Potential challenges for state DOTs.

Through extensive research and expert interviews, the team identified a range of plausible futures for the 2050 timeframe encompassing fuels and vehicle technologies, travel demand, and possible shifts in relevant federal policies. Interviews conducted with senior DOT staff considered how the plausible futures could impact state DOTs, as well as the types of strategies that states might consider in response. Seven potential challenges were identified:



- **Declining fuel-tax revenue** if conventional vehicles achieve much higher fuel economy or if alternative fuels achieve significant market share.
- **Higher highway construction and maintenance costs** if the price of oil rises significantly.
- **Worsening traffic congestion** if there is significant growth in total vehicle miles of travel.
- **More crashes and fatalities** if there is significant growth in total vehicle miles of travel.
- **Greater difficulty meeting air quality standards** if total travel increases and if less polluting fuels and vehicle technologies fail to emerge.
- **More pressure to mitigate greenhouse gases** if greater public consensus emerges and if petroleum remains the dominant transportation energy source.
- **More demand for alternative travel modes** if driving becomes much more expensive or if urban traffic congestion becomes much worse.

Robust policy responses.

The analysis assessed an array of strategies (broad policy approaches) that states might employ to address these challenges. With the aim of preserving flexibility for future planners, the analysis also sought to differentiate strategies that should ideally be pursued in the near term and strategies that can be safely deferred until more information about how the future is unfolding becomes available.

Public policy implications.

The good news is that there are highly effective strategies for mitigating any of the potential impacts. Many, however, fall beyond the existing authority of most state DOTs and thus are likely to require enabling state or even federal legislation. To underscore this point, the table below lists strategies rated as “most promising” for mitigating one or more of the impacts enumerated above. All but two of these include elements that may require enabling legislation.

Most Promising Strategies for One or More Objectives	Possible Need for Enabling Legislation?
Broad application of tolling or mileage-based user fees	Federal / State
Increased fuel taxes	State
Higher registration fees	State
Broad application of beneficiary fees	State
DOT efficiency improvements	State
Goods movement investments	
Congestion pricing on all congested highways	Federal / State
Intelligent transportation system investments	Federal / State
Transportation system management and operations investments	State
Traffic safety investments	
Transportation demand management investments	State
Public transportation investments	State
Tighter integration of transportation and land use planning	State
Vehicle feebates to promote more efficient vehicles	State
Carbon pricing to promote shift to lower-carbon fuels	State

Note: details about the elements of the strategies that could require enabling legislation are available in the full report.

The strategies identified in this table, if pursued, promise to be very effective in addressing the possible challenges that DOTs could face under plausible transportation-energy futures. As indicated in the table, however, many of these may not be possible without enabling legislation.

This document summarizes material from
NCHRP Report 750 Volume 5:
Preparing State Transportation Agencies for an Uncertain Energy Future
2013

Report authors:
Paul Sorensen, Tom Light, Constantine Samaras,
Endy M. Daehner, Liisa Ecola, David S. Ortiz, and
Martin Wachs, RAND Corporation

Evan Enarson-Hering and Steven Pickrell, Cambridge
Systematics, Inc.

Graphic design by Sharp & Company

ACKNOWLEDGEMENT

This research report was performed under NCHRP Project 20-83(04) by RAND Corp. as the primary contractor, and Cambridge Systematics, Sharp & Company, and University of California Davis Institute of Transportation Studies as subcontractors. The research was sponsored by the American Association of State Highway and Transportation Officials, in cooperation with the Federal Highway Administration, and was conducted in the National Cooperative Highway Research Program, which is administered by the Transportation Research Board of the National Academies. The opinions and conclusions expressed or implied in reports are those of the research agencies. They are not necessarily those of the Transportation Research Board, the National Research Council, or the program sponsors.