DRISI
Caltrans Division of Research, Innovation and System Information

Research Results

State Responses to Energy Sector Developments

Addressing impacts to state transportation infrastructure due to the expansion of energy production and development.

Planning, Policy and Programming

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Project Title:
Energy Development and Transportation Systems

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WHAT WAS THE NEED?

New and expanding energy sector developments – oil, natural gas, coal, wind, biofuels, and solar – are occurring in numerous states throughout the country. Hydraulic fracturing (fracking) for crude oil and natural gas is expanding in many states, including California.

Extracting the sand used in the fracking process is underway in states. Increased shipments of crude oil by rail and barges are occurring in these states, including California. Supply chains serving energy installations in one state often originate in another state, as is often the case with California.

While states, counties, and communities are realizing economic benefits from these activities, the impacts from energy development on transportation systems are immediate and extensive. Rural roads and bridges are especially vulnerable to the increased volumes of trucks, but additional demands are also being placed on the rail, port, and aviation networks. State departments of transportation and other agencies are responding in numerous ways to increased truck traffic, infrastructure deterioration, and safety concerns.

The influence of energy sector development on the transportation system is being examined by numerous states, the Transportation Research Board (TRB), and other organizations. Examples of TRB activities include workshops and sessions at Annual Meetings, a policy session at the 2013 Executive Committee Summer meeting, and a May 2014 Workshop in Arlington, Texas. In addition, a National Cooperative Highway Research Program (NCHRP) Synthesis on the topic is being finalized. Furthermore, the recent American Society of Civil Engineers (ASCE) Shale Energy Engineering Conference (SEEC) included numerous papers and presentations on topics related to the energy sector's impact on the transportation system.

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WHAT WAS OUR GOAL?

The main goal of this study was to survey and interview representatives from State Departments of Transportation for information sharing among member states about proactive and reactive responses to energy sector developments, including industry engagement, infrastructure management, funding and financing, safety, planning and forecasting tools, and other related topics. The tasks included developing, posting, and analyzing an online survey, conducting telephone interviews, and conducting state site visits (by the research team, including Katie Turnbull at the Texas Transportation Institute – TTI), to obtain information from state departments of transportation (DOT) and other transportation agencies on the methods, tools, and techniques being used to address energy sector development impacts on the transportation system.

Information on research projects underway in the various states was also obtained. The task expanded on the work conducted under NCHRP Synthesis 45-10, The Impacts of Energy Developments on U.S. Roads and Bridges, research conducted for Texas DOT, and research undertaken by TTI's Transportation Policy Research Center. Information was obtained on the type and extent of impacts. Information was also solicited on promising practices for responding to energy impacts, which included industry engagement, infrastructure management, safety, funding and financing, planning and forecasting tools, and other topics. The results are summarized in a PowerPoint presentation and a report.

Workshop and Member State Meeting

A workshop and meeting were held for member states to exchange information on the challenges and opportunities associated with energy sector developments and to hear from experts on the topic. The workshop and meeting was held on March 22-24, 2016 at TTI on the campus of Texas A&M University in College Station, and was organized with input from the member states.

Information obtained from the online survey and follow-up telephone calls were presented and member states shared additional information and discussed issues and approaches specific to their individual states. Funding for travel and expenses for two (2) representatives from member states was provided. The Caltrans customer for this project from the Division of Transportation Planning (Office of Freight Planning) and the Caltrans Division of Research, Information and System Information project manager attended.

Member state participants also had the opportunity to identify and discuss research needs and technology transfer activities, which could form the scope of work for additional years of the TPF or projects funded by other sponsors. A workshop and meeting summary were prepared documenting the key topics discussed, possible follow-up research, and other future activities.

State-of-the-Practice Synthesis and Initiate Identified Research

The final product from the interviews, workshop, and meeting is a state-of-the-practice synthesis. This synthesis includes best practice examples on the issues identified previously, including forecasting methods for new energy developments and impact areas, rapid response techniques for addressing infrastructure damage, funding and financing mechanisms, addressing safety concerns, and other topics.

In addition, problem statements were prepared on these and other topics for NCHRP, American Association of State Highway and Transportation Officials, and other funding sources. Through the interactions with workshop participants, new research topics might include:

- Driver behavior in rural areas;
- Oversize/overweight vehicles;
- Use of real-time and private sector data for analyzing truck traffic;
- Improved signage in high activity areas;
- Transportation infrastructure impacts of Inland Ports.

WHAT DID WE DO?

The goal of this study was to provide communication and information sharing among member states related to proactive and reactive responses to energy sector developments, including industry engagement, infrastructure management, funding and financing, safety, planning and forecasting tools, and other related topics.

WHAT WAS THE OUTCOME?

Through the work accomplished by the research team in their site visits and the pooled fund participant workshops, the following were conclusions/considerations from the study:

- The states differ considerably in their approach and effort to mitigate and pay for infrastructure damage from energy sector developments.
- The states vary on how they address/define impacts from extensive trucking activities upon disadvantaged communities.
- Proposed land use changes around energy developments are significant determinants regarding expansion of facilities, including access to and from state highway systems, local road signage and signal timing, at-grade rail crossings, etc.
- In some locations, oil and gas fracking is developed so rapidly that governments cannot act quickly enough to develop and implement appropriate mitigation strategies.
- Adequate and appropriate signage in high activity areas is critical for safety and accessibility.
- Some energy companies are willing to partner with local and state governments to finance infrastructure and safety related improvements.

WHAT IS THE BENEFIT?

While Caltrans participates in various freight studies and planning activities, specific information about energy sector development impacts to the State are not completely known. In California, there are more than 160,000 oil wells in production with more being planned. These oil wells often require truck services over rural and urban routes to drill and maintain them.

Materials such as sand, pipe, and chemicals are often trucked to oil well drill pads and facilities. After wells are initially drilled, it takes thousands of gallons of water to maintain for as long as one year. All water is trucked to these sites. This study will provide Caltrans an initial, in depth knowledge of energy sector logistics practices, specifically the oil industry, and create greater awareness of energy sector impacts to California's transportation infrastructure.

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https://static.tti.tamu.edu/tti.tamu.edu/documents/9-1530-P1.pdf