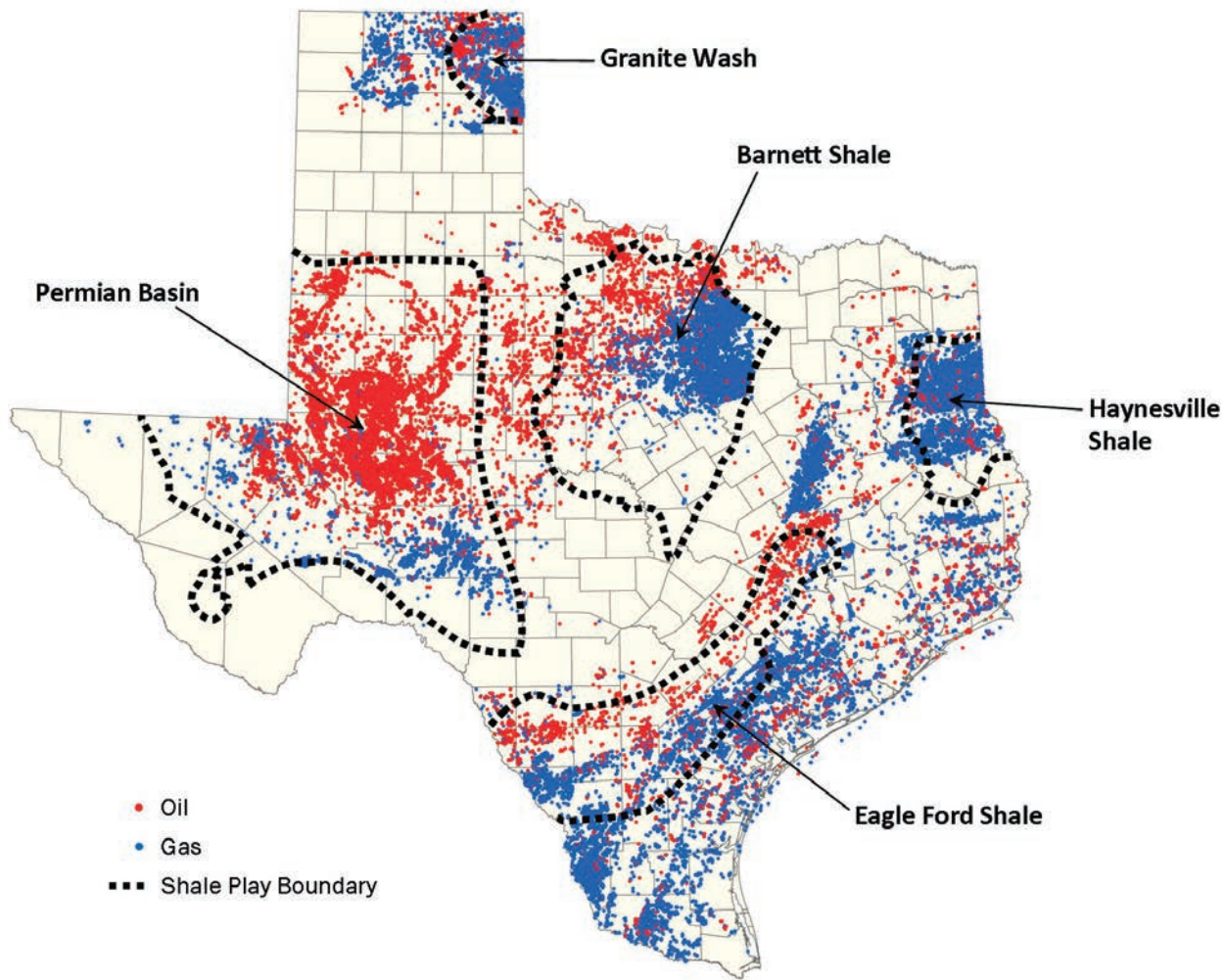


ENERGY SECTOR



TRANSPORTATION IN THE ENERGY SECTOR

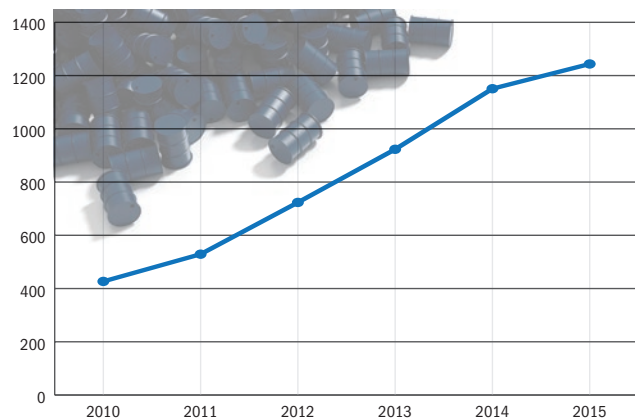
Texas Oil & Gas Well Permits (2010-2015)
and Major Shale Plays



OVERVIEW

The development of energy resources significantly contributes to the economies of individual communities and the state as a whole. It provides employment for thousands of Texans and is a vital source of often scarce jobs in economically disadvantaged areas. It helps to generate sales and hotel tax revenue for many local governments and provides severance taxes and other revenue for the state. Although the energy sector provides a positive economic impact, the development of energy resources significantly affects our transportation infrastructure and challenges the efforts of the Texas Department of Transportation (TxDOT) and local governments to ensure the safety of the traveling public and to protect the taxpayers' investment in our state's roads and bridges.

Barrels of Oil Produced in Texas, 2010-2015



Source: Texas Railroad Commission

ENERGY DEVELOPMENT ACTIVITIES STATEWIDE

Energy development activities have been underway for decades in Texas. The map below shows the extent of oil and gas drilling activities around the state and provides some sense of the corresponding challenge to TxDOT and local governments responsible for maintaining transportation infrastructure.

CHALLENGES FOR TxDOT AND LOCAL GOVERNMENTS

Although Texas' energy resources include oil, natural gas, coal, wind, solar, biofuels and nuclear, the production of energy from oil, natural gas and wind has caused the greatest impact on our transportation infrastructure. A great deal of the exploration and production associated with the latter forms of energy occurs in rural areas where most of the roads and bridges were designed for lighter loads and lower volumes of traffic. Production of oil, gas and wind energy, however, requires large numbers of heavy trucks, including many classified as oversize and overweight vehicles. Over time, high volumes of heavy truck traffic can damage roads and bridges and significantly reduce their service life. The problem

is particularly acute on highways, roads and bridges that are not designed or constructed to accommodate heavy loads or oversized vehicles.

Damaged roads and bridges are more than a major inconvenience for energy companies and a logistical and financial burden for state and local governments. More importantly, they are also a safety hazard for motorists. In some cases, severely damaged roads can impede or prevent access by school buses and emergency vehicles. Rougher roads also impact trucking industries through increased vehicle maintenance. Given the extent of energy development activities around the state, damage to transportation infrastructure is not limited to one route or area. Certain areas experienced a sudden spike in drilling activity, which forced TxDOT and local governments to ramp up their maintenance and repair efforts.

In addition, many counties were hard pressed to address damaged county roads with their available tax revenues. At a time when rebuilding a paved road can cost more than \$1 million per mile, the annual maintenance and construction budget for many rural county road and bridge departments is likely to be no more than \$1 million to \$2 million in total. Despite the recent decline in drilling activity, roadways across the state are still in need of repair and reinforcement so that they are adequate when activity returns.



Energy-Related Impacts on Highways and Roads

Energy development activities have a very significant impact on our state's transportation infrastructure. Much of the impact stems from the large numbers of heavy truck trips required to bring an oil or gas well into production or to erect a wind turbine.

The volume of truck traffic required to bring a single gas well into production is equivalent to the impact of approximately eight million cars. Truck traffic required to maintain a single gas well's production is equivalent to up to an additional two million cars per year.

The transportation of water used in the hydraulic fracturing process also has an impact on our infrastructure. In addition to its inherent weight, water transported by truck sloshes back and forth in the truck tank, which constantly shifts the weight borne by each axle and causes far greater road damage than a load of the same weight that consists of a static material. Moreover, much of the water used in hydraulic fracturing must be transported twice: the first time to the well site prior to its use and a second time to a disposal well.

Increasing Use of the Rural State Highway System

The state's Farm-to-Market (FM) and Ranch-to-Market (RM) road network represents about 43 percent of the state highway system and has traditionally been used for local rural needs. However, the bulk of new energy activity has occurred in areas accessed by these roads. Since the FM and RM system was not designed to accommodate the amount, size and weight of traffic associated with oilfield operations, the vehicles accessing these regions have degraded the rural infrastructure.

From 2009 to 2014, truck traffic on the rural FM and RM network increased substantially. Measured in daily vehicle miles travelled (DVMT), truck traffic volume increased by 23 percent during this period. This compares to a smaller 16.7 percent increase on the state's other on-system rural highways and a 17.5 percent increase on the overall state highway system.

Overall Cost of Energy Sector Activity

Under a contract with TxDOT, the Texas A&M Transportation Institute (TTI) studied, in a 2012 report, the financial impact of the latest oil and gas production boom on the state's highways and local road networks. TTI concluded that the statewide annual needs for maintenance and repair of the state highway system associated with energy sector activity would be a minimum of \$1 billion each year or \$2 billion per biennium.

TTI's research quantified the cost for rebuilding infrastructure being damaged by increased energy-related activities at a minimum of approximately \$1 billion annually for roadways under TxDOT's jurisdiction and approximately \$1 billion annually for roadways under the jurisdiction of local governments. TTI's research also determined that reinforcing or strengthening roadways and bridges in advance of the energy-related traffic increases would substantially reduce costs.

Funding increases for state roads impacted by energy sector activities has occurred because TxDOT funding formulas account for accelerated pavement and bridge deterioration.

In addition to these formula funds, the Texas Legislature designated funds by targeted for energy sector projects (HB 1025, 83R, 2015 - \$225 million; SB 1747, 83R, 2015 - \$225 million), \$402 million in safety and maintenance needs (as approved by the Legislative Budget Board in Fiscal Year 2015), and \$500 million to non-metropolitan planning organization (MPO) areas for safety and maintenance needs (see chart titled Energy Sector Implemented Investments). HB 1025 and SB 1747 are summarized in the legislative action segment.

Energy Sector Corridor Improvement Program

In March, 2016, TxDOT created the Energy Sector Corridor Improvement program to strengthen pavements and provide safety enhancements on key roadways in energy sector regions. As part of the corridor improvement program TxDOT has hosted workshops with oil and gas industry representatives to collect feedback on current issues. ProposedCurrently, planned program improvements include:

- Strengthening/reinforcing 1,125 miles of pavement structures
- Adding 50 miles of shoulders to protect pavement edges
- Adding/widening 20 miles of lanes for safety
- Adding turn lanes at key intersections
- Constructing 521 miles of passing lanes on Super 2 corridors

TxDOT districts affected by energy sector activities have identified road projects by prioritizing corridor segments that cross multiple districts, that directly connect energy sector activity nodes or that have high frequencies of injury or fatal crashes. Thirty percent of program improvements deliver safety to area roadways. TxDOT categorized these identified corridors into Priority 1 and Priority 2 groups based on the improvements needed. In early 2017, the Texas Transportation Commission could approve these proposed projects during the adoption of the 2017 Unified Transportation Program (TxDOT's 10 year planning document).

RECENT LEGISLATIVE ACTION

With the passage of Proposition 1 (2014) and Proposition 7 (2015) by Texas voters and the Legislature, new funding has been directed towards energy sector roadway repair. An additional approximately \$2.1 billion will be available for energy sector roadway repair, under current projections, over the next ten years because of these new sources of revenue.

Supplemental Appropriations House Bill 1025 (State Highways)

House Bill 1025 from the 83rd Session specifically appropriated \$225 million to TxDOT to repair or rehabilitate parts of the state highway system located in counties where there had been increased energy-related activity. The bill also appropriated \$225 million to TxDOT to distribute as grants to counties around the state to repair and rehabilitate county roads damaged by energy-related activities.

HB 1025 required TxDOT to allocate its \$225 million appropriation for state highways based on four criteria: safety, roadway condition, roadway width and traffic volumes. Using these criteria, TxDOT ranked proposed projects and selected 41 projects for development and funding. In July 2013, the Commission approved a minute order of the maintenance projects list of \$225 million to fund 37 of the 41 projects with the \$225 million. It funded the remaining four projects through regular appropriations.



Senate Bill 1747 (County Roads)

Senate Bill 1747 from the 83rd Session established TxDOT's County Transportation Infrastructure Fund Grant Program and authorized TxDOT to distribute \$224.5 million among eligible counties that applied for funding. (The bill also provided that TxDOT could be reimbursed up to \$500,000 for documented administrative costs associated with implementing the program.) The bill included an allocation formula based on energy-related activities in individual counties.

TxDOT began the implementation process shortly after the bill was enacted by creating both internal and external stakeholder groups. The internal group met frequently to ensure an all-inclusive, big-picture approach.

Of the 254 counties in Texas, all of which were eligible to receive funds, TxDOT received applications from 191. The Commission awarded grants to those counties in April 2014. More information on the grant program is available at <http://www.roadfortexasenergy.com/legislation.htm>.

TEXAS DEPARTMENT OF TRANSPORTATION

VALUES:

People

People are the Department's most important customer, asset, and resource. The well-being, safety, and quality of life for Texans and the traveling public are of the utmost concern to the Department. We focus on relationship building, customer service, and partnerships.

Accountability

We accept responsibility for our actions and promote open communication and transparency at all times.

Trust

We strive to earn and maintain confidence through reliable and ethical decision-making.

Honesty

We conduct ourselves with the highest degree of integrity, respect, and truthfulness.

VISION:

A forward-thinking leader delivering mobility, enabling economic opportunity, and enhancing quality of life for all Texans.

MISSION:

Through collaboration and leadership, we deliver a safe, reliable, and integrated transportation system that enables the movement of people and goods.

GOALS AND OBJECTIVES:

- **Deliver the Right Projects** – Implement effective planning and forecasting processes that deliver the right projects on-time and on-budget.
- **Focus on the Customer** – People are at the center of everything we do.
- **Foster Stewardship** – Ensure efficient use of state resources.
- **Optimize System Performance** – Develop and operate an integrated transportation system that provides reliable and accessible mobility, and enables economic growth.
- **Preserve our Assets** – Deliver preventive maintenance for TxDOT's system and capital assets to protect our investments.
- **Promote Safety** – Champion a culture of safety.
- **Value our Employees** – Respect and care for the well-being and development of our employees.