

Shale Public Finance: Local government revenues and costs associated with oil and gas development

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Abstract

Oil and gas development associated with shale resources has increased substantially in the United States, with important implications for local governments. These governments tend to experience increased revenue from a variety of sources, such as severance taxes distributed by the state government, local property taxes and sales taxes, direct payments from oil and gas companies, and in-kind contributions from those companies. Local governments also tend to face increased demand for services such as road repairs due to heavy truck traffic and from population growth associated with the oil and gas sector. This paper describes the major oil- and gas related revenues and service demands (i.e., costs) that county and municipal governments have experienced in Arkansas, Colorado, Louisiana, Montana, North Dakota, Pennsylvania, Texas, and Wyoming. Based on extensive interviews with officials in the most heavily affected parts of these states, along with analysis of financial data, it appears that most county and municipal governments have experienced net financial benefits, though some in western North Dakota and eastern Montana appear to have experienced net negative fiscal impacts. Some municipalities in rural Colorado and Wyoming also struggled to manage fiscal impacts during recent oil and gas booms, though these challenges faded as drilling activity slowed.

Key Words: Shale gas, tight oil, local public finance, severance tax, property tax, property values, hydraulic fracturing

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1. Report Summary

Oil and gas development has increased substantially in the United States over the past decade, largely associated with shale resources. This increase has important implications for local government's ability to provide quality services to citizens. This report describes the major revenues and service demands (i.e., costs) for local governments associated with recent oil and gas development. These revenues and costs have varied substantially from state to state, and often within states.

Our research indicates that the net impact of recent oil and gas development has generally been positive for local public finances. While costs arising from new service demands have been large in many regions, increased revenues from a variety of sources have generally outweighed them or at least kept pace, allowing local governments to maintain and in some cases expand or improve the services they provide. Some local governments, notably in Arkansas, Pennsylvania, and parts of Colorado, have entered into agreements with oil and gas companies to repair damage to local roadways, which has played a major role in limiting public costs. However, most local governments in North Dakota and Montana's Bakken region have experienced net negative fiscal effects to this point, and some municipalities in very rural parts of Colorado and Wyoming struggled to manage rapid population growth during the most active phases of development, though these challenges subsided as drilling activity slowed (see Table 1).

We observed net positive fiscal outcomes across a variety of local factors. This includes local governments in regions where heavy drilling and hydraulic fracturing activity was ongoing or had slowed in recent years, as well as regions that experienced different scales of activity. This also includes local governments in urban, semi-urban, and rural regions, where population density and government capacity vary substantially. However, in rural regions where oil and gas booms have occurred rapidly and at a large scale, some local governments have experienced net negative fiscal effects to date (such as the Bakken region), or struggled to manage fiscal issues during heavy phases of development (such as parts of western Colorado and Wyoming).

For county governments that collect property taxes on oil and gas production, these taxes have provided the largest revenue source, while the largest revenue source for counties that do not collect property taxes typically has been from allocations of state-collected production (i.e., "severance") taxes or, in the case of Pennsylvania, an impact fee. Some county governments have also generated large new revenues from oil and gas leases on county-owned land.

The leading costs for most counties have been from road maintenance and repair due to oil- and gas-related truck traffic, and to a lesser extent staff costs due to growing service demands associated with population growth such as law enforcement, emergency services, or administrative staff. Most counties we examined have experienced net positive fiscal impacts related to oil and gas

development. However, county governments in western North Dakota have thus far struggled to keep up with increased demand for services, especially road maintenance.

For many municipal governments, the leading revenue source has been sales taxes, driven by a growing population and increased economic activity associated with the oil and gas sector. For other municipalities, allocation of state severance taxes has been the largest oil- and gas-related revenue source. For municipalities with substantial land holdings, a leading source has been leasing bonuses and royalty revenues from production on municipally-owned land.

For municipalities experiencing rapid population growth, the leading costs have been upgrades to sewer and water infrastructure, along with increased staff costs. Most municipal governments we examined have experienced a roughly neutral or net positive fiscal impact related to oil and gas development, though some in rural western states have experienced (or are experiencing) net negative fiscal effects during the most active phases of development.

Table 1. Net financial impact for local governments examined in the study

State	Counties	Municipalities
Arkansas	Medium to large net positive	Small to medium net positive
Colorado	Small negative to large net positive	Small to medium net positive
Louisiana*	Medium to large net positive	[insufficient data]
Montana	[insufficient data]	Roughly neutral to large net negative
North Dakota	Small to medium net negative	Medium to large net negative
Pennsylvania	Small to large net positive	Small to large net positive
Texas	Roughly neutral to large net positive	Roughly neutral to large net positive
Wyoming	Large net positive	Roughly neutral to small net positive

Note: Impact refers to the relative, not absolute, impact on a local government's financial position. For example, \$1 million may represent a large sum for one local government, but a small sum for another. The terms "small," "medium," "large," and "neutral" are our best assessment, based on interviews with local experts and analysis of local government financial documents. *For Louisiana, the "county" column refers to parish governments.

1.1 Local government revenues associated with oil and gas development

Oil and gas development has the potential to increase revenue for county and municipal governments from a variety of sources. These revenue sources vary substantially from state to state and sometimes within states. In Colorado, Montana, North Dakota, and Pennsylvania, the state government distributes to local governments a substantial amount of revenue from state taxes on oil and gas production (often referred to as severance taxes) and, in the case of Pennsylvania, from a fee based on the number of wells drilled. In Arkansas, Louisiana, Texas, and Wyoming, the state government allocates a relatively small or negligible share of revenue from severance taxes to county and municipal governments.

In states that do not allocate substantial revenue from severance taxes, many county governments raise large amounts of revenue from ad valorem property taxes on oil and gas property. In some cases, such as Montana and North Dakota, state severance taxes are designed to replace local property taxes on oil and gas production, and much of the revenue raised by the state is allocated back to local governments where oil and gas production occurs. Rules on what types of oil and gas property are taxable for local governments vary from state to state, but county governments have experienced large increases in revenue from ad-valorem taxes on oil and gas property in Arkansas, Colorado, Louisiana, Texas, and Wyoming. In Montana, North Dakota, and Pennsylvania, oil and gas production property is exempt from ad valorem property taxes, though counties in these states can generally collect property taxes from oil and gas industrial facilities, corporate headquarters and other non-production property.

For a majority of municipalities (and some counties) that do not receive substantial revenue from severance taxes, sales taxes are the key revenue source associated with oil and gas development. This revenue source tends to rise as population and economic activity increases during a surge in oil and gas activity. In all of the states we surveyed, sales taxes were a major source of new revenue for those local governments that levy a sales tax. Local governments have experienced large increases in revenue from sales taxes in Arkansas, Colorado, Louisiana, North Dakota, Texas, and Wyoming. Montana generally does not levy a sales tax, and Pennsylvania's local governments (except Philadelphia and Pittsburgh) do not levy a sales tax.

Local governments may collect revenues for leasing publicly-owned land for oil and gas production. They may also collect revenue from fees for services, such as selling unallocated water supplies to oil and gas operators, or from fees collected by the county clerk's office providing land records. Finally, local governments may receive in-kind donations from oil and gas operators who in some regions help repair roads damaged by their operations, or provide funds for local governments to make purchases such as emergency services equipment. Table 2 summarizes these key revenue sources.

Table 2. Major local government revenue sources associated with oil and gas development

Revenue instrument	Deployed by	Basis for revenue	Allocated to
Severance tax or PA impact fee	State	Value or volume of oil/gas production, number of wells drilled	Varies by state
Property tax	County	Value of oil/gas property (definitions vary by state)	County
Sales tax	State, muni, county	Value of sales (rates vary by state)	State, muni, county
Fee-for-service	Muni, county	Services rendered (e.g., county clerk fees, water sales)	Muni, county
Lease payments	State, muni, county	Negotiated lease terms	State, muni, county
In-kind	Muni, county	Negotiated agreements or donations	Muni, county

1.2 Local government costs associated with oil and gas development

Local governments often experience new demand for services when oil and gas activity increases. These service demands may increase more substantially for the oil and gas industry relative to some other industries due to the large volume of heavy trucks involved, as well as the potential for a rapid increase in local population, as many oil and gas jobs require specialized skills that may not exist in the local workforce. As demand for services increase, so too do costs for local governments. Some of these costs are observable on government financial documents, while others are not, such as service demands that go unmet (i.e., needed road repairs that are not made), or opportunity costs for government employees (i.e., time devoted to oil- and gas-related issues that takes away from other government priorities).

The largest new cost, especially for county governments, is often for road maintenance and repair. As new oil and gas wells are completed, thousands of heavy truck trips occur over a short period of time, in some cases on rural roads not originally designed to handle such traffic. In cold-weather regions such as Colorado, North Dakota, Montana, Wyoming, and parts of Pennsylvania, this damage is especially costly due to the higher expense of repairing or replacing roads designed to withstand an annual cycle of freezing and thawing. Costs for road repair have also been large in southern states such as Arkansas, Louisiana and Texas. Local governments with sturdier pre-existing road infrastructure tend to experience less substantial costs than those that maintain rural road networks originally designed for light traffic or farm equipment.

Another major potential cost, primarily for municipal governments, is increased demand for sewer and water infrastructure. Rapid population growth in parts of North Dakota, Montana, Colorado, Texas, and Wyoming has led cities to extend sewer and water lines or expand water and

wastewater treatment plants, projects that can cost tens of millions of dollars, even for small municipalities. When cities pass certain population thresholds in states such as Montana and Wyoming, regulations may require heightened standards for their sewer and water infrastructure, which can lead to an increase in costs disproportionate to population growth.

Other costs for local governments relate to staff and equipment needs associated with a growing population. These include increased staffing requirements for law enforcement and emergency services (EMS) to deal with increased traffic, accidents, or criminal activity, as well as increased staffing for administrative services such as the county clerk's office. Other costs are more specific to the oil and gas industry, such as training and equipment for first responders who may respond to emergencies at well sites. Workforce retention has also been a major issue for many local governments, as high-paying jobs in the oil and gas sector may attract government staff, which can lead governments to raise wages and other compensation, or perhaps allow some needs to go unmet.

Finally, some cases of rapid population growth can lead to quickly rising rents, forcing governments to pay housing stipends to attract or retain employees. In the case of North Dakota's Bakken region, several local governments have gone so far as to purchase real estate and construct housing to provide affordable living options for employees. Table 3 summarizes the major financial costs for local governments associated with recent oil and gas development.

Table 3. Major local government costs associated with oil and gas development

Service provided	Provided by	Connection to oil/gas industry
Road maintenance/repair	County, Muni	Increased heavy truck traffic
Sewer/water	Muni	Population growth
Police, EMS, administration	Muni, County	Population growth
EMS	Muni, County	Oil and gas response training
Staff costs/workforce retention	Muni, County	Economic growth leading to greater labor demand

There is a wide variety of benefits and costs that may be felt by communities experiencing significant oil and gas development. This report focuses on fiscal issues for local governments such as those described above. We do not focus on other costs, such as the social impact related to increased rental housing costs, the environmental impact of oil and gas development, or potential public health costs. Additionally, we do not focus on other benefits, such as increased employment opportunities or higher standards of living in the private sector.

Our main conclusions are that recent oil and gas development has mostly provided net benefits for local government finances. However, local factors play an important role. Local governments in very rural regions may face fiscal challenges associated with a rapidly-growing

population and heavy industry truck traffic. These challenges tend to be most acute at the height of drilling and hydraulic fracturing activities, rather than during the longer-lasting production phase. In-kind agreements with operators can play a large role in mitigating potential costs for local governments, especially regarding road maintenance and repair.

1.3 Summary of findings in eight states

1.3.1 Arkansas

In north-central Arkansas, where natural gas production has grown dramatically due to development of the Fayetteville shale, county governments have generally experienced substantial net financial benefits. The leading revenue source has been from property taxes, as newly valuable mineral properties came onto the tax rolls in the five counties we examined. These counties also experienced new costs associated with road maintenance and repair, but these costs were substantially limited by agreements made between county and various natural gas companies, who helped repair many of the roads that were damaged during their operations.

Municipal governments in the region experienced smaller new revenues along with smaller new costs, and reported smaller net financial benefits than county governments. The leading revenue source for these municipalities has been sales taxes, which peaked during the most active drilling years of 2007 and 2008, and remain higher than they were before Fayetteville shale activity began. One city also generated substantial revenue from natural gas production on city-owned land. These municipalities experienced modest staff costs, with workforce retention registering as a small challenge during the peak years of drilling activity.

1.3.2 Colorado

In two regions of Colorado, the Denver-Julesberg and Piceance basins, county governments generally experienced large net fiscal benefits, with one exception. New revenues were led by property taxes, and also included severance taxes allocated from the state, as well as increased sales tax revenues for some counties. Some counties also entered into in-kind agreements with oil and gas operators, which limited costs associated with road repair. Despite these agreements, road repair remained the most prominent issue, along with substantial staff costs, primarily from the addition of new staff and rising compensation to retain existing staff. One county (Rio Blanco) reported that road costs had increased faster than revenues. The county imposes an impact fee on new oil and gas wells. However, this fee has not covered associated road repair costs, and unlike other counties we examined, there is little in the way of in-kind agreements to repair roads.

The municipal governments we examined in Colorado generally experienced small net fiscal benefits. Some cities in the sparsely populated Piceance basin experienced large new revenues and large new costs, while others in more densely populated areas, or further from oil and gas development, experienced relatively little of either. For the heavily affected municipalities, primarily in the Piceance basin, sales taxes were the leading source of new revenue, along with leases on government-owned land. These governments saw rapid population growth during the peak years of drilling in 2007 and 2008, and faced large new expenditures to upgrade municipal sewer and water systems, along with local road networks. For modestly affected communities, allocations of the state's severance tax was the only major new revenue source associated with oil and gas development. Most of these municipalities experienced little to no increase in costs or service demands attributable to oil and gas development.

1.3.3 Louisiana

In the northwestern corner of Louisiana, parish governments (Louisiana does not have counties) have generally experienced substantial net financial benefits associated with natural gas development from the Haynesville shale. Parishes maintain roads and property records. Revenues and costs both increased rapidly for these local governments in 2007 and 2008, then declined almost as swiftly as drilling activity slowed in 2010 and 2011. The leading two revenue sources for these parish governments have been from sales taxes and leases of parish-owned land, which generated \$20 million to \$30 million each for two parish governments, nearly doubling overall revenues in certain years. These parishes also experienced substantial new costs to repair roads affected by heavy truck traffic, and experienced major challenges with workforce retention during the peak years of drilling, leading to an increase in compensation for staff.

We were not able to arrange sufficient meetings with municipal officials to report on the net fiscal impacts to municipalities.

1.3.4 Montana

Eastern Montana experienced a surge in oil activity from the Bakken shale in the mid-2000s. As much of this activity has shifted across the border to North Dakota, drilling in the region has slowed. However, population growth has been substantial, as many workers live in eastern Montana and commute to the North Dakota oil fields. We were not able to arrange sufficient interviews with county government officials to determine the net fiscal impact to counties, but did observe that counties in the region generally have experienced large new revenues, primarily from allocations from Montana's severance tax. Counties have also substantially increased their expenditures on roads and bridges, although it is unclear whether these expenditures represent a new cost brought on

by oil- and gas-related activity, an opportunity to upgrade existing infrastructure due to new revenues, or some combination.

Municipalities in eastern Montana have generally experienced net negative financial impacts. The state government allocates a very small share of severance tax revenue to municipalities and since the state does not have a sales tax, municipalities have not experienced any major new revenues associated with population growth. They have, however, experienced substantial new costs, primarily from upgrades and expansions of sewer and water infrastructure. Eastern Montana municipalities have also experienced new staff costs, as workforce retention challenges have led governments to substantially increase compensation.

1.3.5 North Dakota

Local governments in North Dakota's Bakken region have experienced mostly negative net financial effects, though some local officials expect the longer-term fiscal impacts to be positive. Bakken development has created major demands on rural roads and generated rapid population growth in this extremely rural region. While county governments have seen their budgets swell by as much as 10-fold since 2005 due to severance tax revenue (which the state imposes in lieu of allowing local governments to collect property taxes on oil and gas production) and sales taxes, they generally have not been able to keep pace with demand for services, led by road repair costs. Staff costs have also risen rapidly, with county governments in several cases doubling their overall number of employees.

Municipalities in North Dakota have experienced a similar dynamic, as severance tax proceeds coupled with sales and property tax receipts have rapidly increased government revenues. However, the scale and speed of population growth has led to even faster increases in costs, led by sewer and water infrastructure as well as municipal roads and bridges. Municipal governments have also doubled, tripled, or quadrupled their staff, along with increasing wages and other compensation to attract and retain a public workforce.

1.3.6 Pennsylvania

The local governments we examined in the northeast and southwest regions of Pennsylvania have experienced a range of net positive financial effects as a result of Marcellus shale development. The primary new revenue source for both county and township governments has been from the state's impact fee, which is paid for each unconventional natural gas well drilled in the state and allocated in large measure back to local governments where the drilling occurred. This revenue has in some cases doubled the operating budgets of townships, and provided substantial new revenue for county governments.

New costs for these local governments have been limited, and are primarily related to staff. In several counties we visited, new staff were added to manage increased service demands related to law enforcement, emergency services, and to a lesser extent social services such as assistance with affordable housing. For townships, which maintain the bulk of Pennsylvania's rural road network, costs were more limited and typically included the addition of a small number of employees to the road maintenance staff. Road repair costs have generally been small for townships, due to agreements with natural gas companies to repair township roads damaged by industry-related truck traffic.

1.3.7 Texas

Texas counties and municipalities have experienced a range of new revenues and costs, and the net financial effects of recent oil and gas development have ranged from roughly neutral to a large net positive. For counties with new oil and gas production, property tax revenues have grown significantly. For municipalities, sales taxes have been the leading new revenue source, and some have seen large new revenues from leasing municipal land for oil and gas production.

Local governments have also experienced a range of new costs. For most counties, road repair has been the leading cost, and in some cases they have roughly equaled the level of new revenue from property taxes. For municipalities experiencing rapid growth, such as those in the Eagle Ford region, sewer and water infrastructure has been a leading cost, while some larger municipalities such as Fort Worth and Midland have seen substantial road repair costs, as these cities maintain hundreds of miles of roads that are affected by heavy truck traffic. Municipalities and counties have both experienced new staff costs, primarily workforce retention challenges leading local governments to increase compensation.

1.3.8 Wyoming

Counties and municipalities in southwestern Wyoming have experienced differing financial effects related to natural gas development. The Sublette County government experienced a large net financial benefit due to rapid growth in property tax revenues in the late 2000s, along with smaller but substantial increases in revenue from sales taxes. Municipal governments in the region also experienced substantial new revenues from sales taxes associated with population growth. However, several struggled with fiscal issues during the peak of activity, and several years later describe a roughly neutral or a small net positive fiscal impact.

As in other western states, the leading cost for counties has been roads, while the leading cost for municipalities has been sewer and water infrastructure upgrades to serve a growing population. Staff costs have also been substantial for both levels of government, with workforce

retention creating major challenges during the peak years of drilling activity and local government compensation rising across the board.

1.3.9 Summary of major local government revenues and costs in eight states

Tables 4 and 5 present a summary of major oil- and gas-related revenues and costs for county and municipal governments in each state we examined. The presence of a dollar symbol indicates that the most or all governments we examined experienced either a major revenue (in Table 4) or major cost (Table 5) related to the given category.

Table 4. Major local government revenues associated with oil and gas development

		Severance tax or impact fee	Property taxes	Sales taxes	Fee-for-service or lease revenues	In-kind
AR	Counties		\$			\$
	Municipalities			\$	\$	
CO	Counties	\$	\$			\$
	Municipalities	\$		\$	\$	
LA	Parishes			\$	\$	
MT	Counties	\$				
	Municipalities					
ND	Counties	\$		\$		
	Municipalities	\$		\$		
PA	Counties	\$				
	Townships	\$				\$
TX	Counties		\$			
	Municipalities			\$	\$	
WY	Counties		\$	\$		
	Municipalities			\$		

Note: Based on interviews with local government officials and examination of state and local government financial records. A dollar sign indicates that most or all local governments experienced the relevant category as a major new revenue source attributable primarily to oil and gas development.

Table 5. Major local government costs associated with oil and gas development

		Roads	Sewer and water	Staff
AR	Counties	\$		
	Municipalities			
CO	Counties	\$		\$
	Municipalities		\$	\$
LA	Parishes	\$		\$
MT	Counties	\$		\$
	Municipalities		\$	\$
ND	Counties	\$		\$
	Municipalities	\$	\$	\$
PA	Counties			\$
	Townships			\$
TX	Counties	\$		\$
	Municipalities		\$	\$
WY	Counties	\$		\$
	Municipalities		\$	\$

Note: Based on interviews with local government officials and examination of state and local government financial records. A dollar sign indicates that most or all local governments experienced the relevant category as a major new cost attributable primarily to oil and gas development.

1.4 Summary of methodology

This report documents the fiscal impact to local governments related to recent oil and gas development from 10 oil and gas plays around the United States. While it is not a comprehensive survey of local governments in these regions, our methodology for selecting cases enables us to draw reasonably broad conclusions. Additionally, our methodology takes something of a “snapshot” regarding the net fiscal effects to date. For example, some local governments experienced fiscal challenges during the peak years of development, but now report net positive fiscal effects. An important question for additional research relates to the longer-term effects of recent oil and gas development for local governments and the communities they serve.

We selected local governments by identifying the counties that have been among the top 5 percent nationally in overall oil or gas production at any point between 2007 and 2012. We then traveled to as many of those counties as was practical, visiting county governments, municipalities within that county, and neighboring counties and municipalities. We conducted structured interviews with over 100 local government officials who were either leading elected officials (i.e., county judges, county commissioners, township supervisors, and municipal mayors), leading administrators (i.e., city managers and county administrators), or subject area experts (i.e., financial or oil and gas division administrators). We also reviewed government financial documents such as audited financial statements and annual budgets in each jurisdiction.

These local governments varied across four important dimensions: scale of oil and gas development (i.e., how much oil and gas activity has occurred or is occurring), phase of oil and gas development (i.e., is the region currently experiencing large amounts of activity and population growth, or has activity slowed), size of government (e.g., a small town or a large city), and rurality of region (e.g., population density and existing infrastructure). Examining local governments that varied across these dimensions allowed us to observe whether any or all of these variables weighed heavily on the net fiscal effect of recent oil and gas development for local governments.

In addition to these site visits and interviews, we conducted detailed analysis of state policies related to oil and gas revenue collection and allocation, collected state-level data on a variety of tax revenues, and interviewed experts from regional universities and private research firms, the oil and gas industry, and state government.