



How Colorado Returns “Unconventional” Oil Revenue to Local Governments

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Introduction

This brief shows how Colorado’s local governments receive production tax revenue from unconventional oil extraction. Fiscal policy is important for local communities for several reasons. Mitigating the acute impacts associated with drilling activity and related population growth requires that revenue is available in the amount, time, and location necessary to build and maintain infrastructure and to provide services. In addition, managing volatility over time requires different fiscal strategies, including setting aside a portion of oil revenue in permanent funds.¹

The focus on unconventional oil is important because horizontal drilling and hydraulic fracturing technologies have led a resurgence in oil production in the U.S. Unconventional oil plays require more wells to be drilled on a continuous basis to maintain production than comparable conventional oil fields. This expands potential employment, income, and tax benefits, but also heightens and extends public costs.

This brief is part of a larger project by Headwaters Economics that includes detailed fiscal profiles of major oil-producing states—Colorado, Montana, New Mexico, North Dakota, Oklahoma, Texas, and Wyoming—along with a summary report describing differences between these states. These profiles will be updated regularly. The various approaches to taxing oil make comparisons between states difficult, although not impossible. We apply each state’s fiscal policy, including production taxes and revenue distributions, to a typical unconventional oil well. This allows for a comparison of how states tax oil extracted using unconventional technologies, and how this revenue is distributed to communities. Detailed state profiles and the larger report are available at <http://headwaterseconomics.org/energy/state-energy-policies>.

Colorado Summary

- Colorado levies a severance tax at the state level, and local governments collect property taxes on the value of oil production within their jurisdictions. Colorado’s effective tax rate of 6.8 percent ranks fifth of the seven states we compared (Figure 1).
- Colorado’s severance tax incentive greatly exacerbates severance tax revenue volatility² and makes property taxes the largest source of production tax income (72% of total production taxes from the typical unconventional oil well over ten years). The incentive creates an interaction between two taxes that are assessed on production that occurs at different times. In the first year, the incentive effectively is not available (the value of the incentive is zero). In subsequent years, the value of the incentive can exceed total severance tax liability (severance tax collections can be zero).³
- Local government reliance on property taxes is problematic as revenue accrues to the taxing jurisdictions where production occurs, and not to adjacent cities and counties experiencing impacts. Property taxes also delay revenue collections by more than two years after initial oil production begins.⁴ State severance tax distributions are progressive in that they consider impact related criteria in addition to production location, but low severance tax collections reduce their effectiveness.

Figure 1: Comparison of Production Tax Revenue Collected from a Typical Unconventional Oil Well

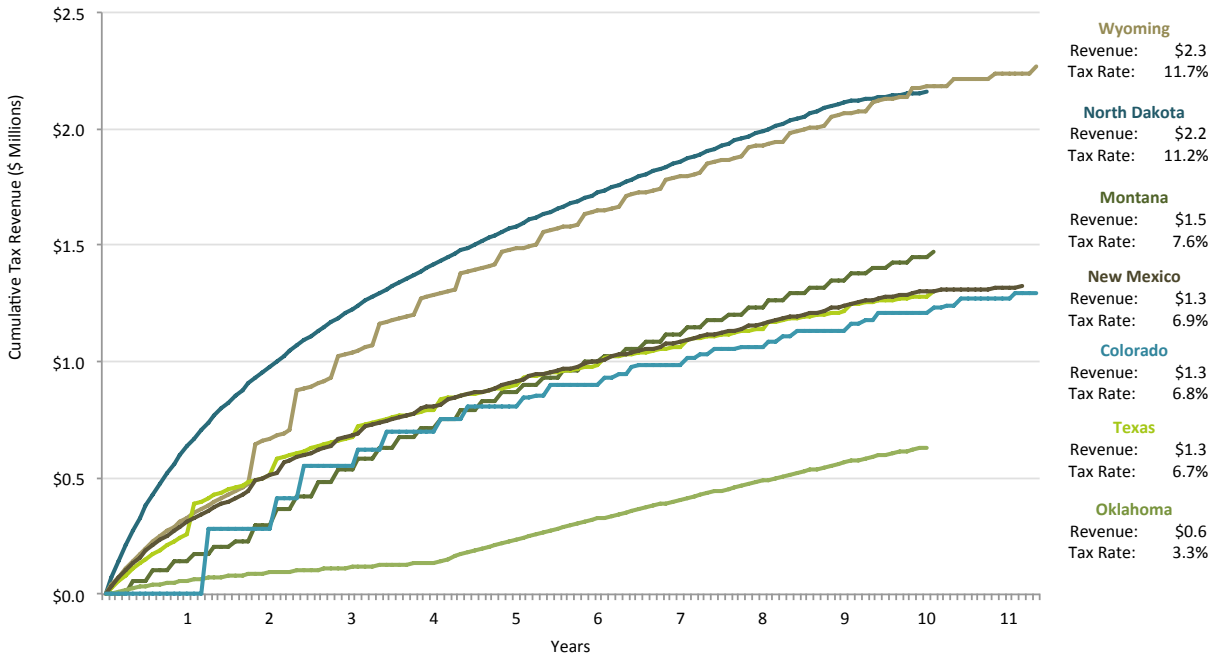
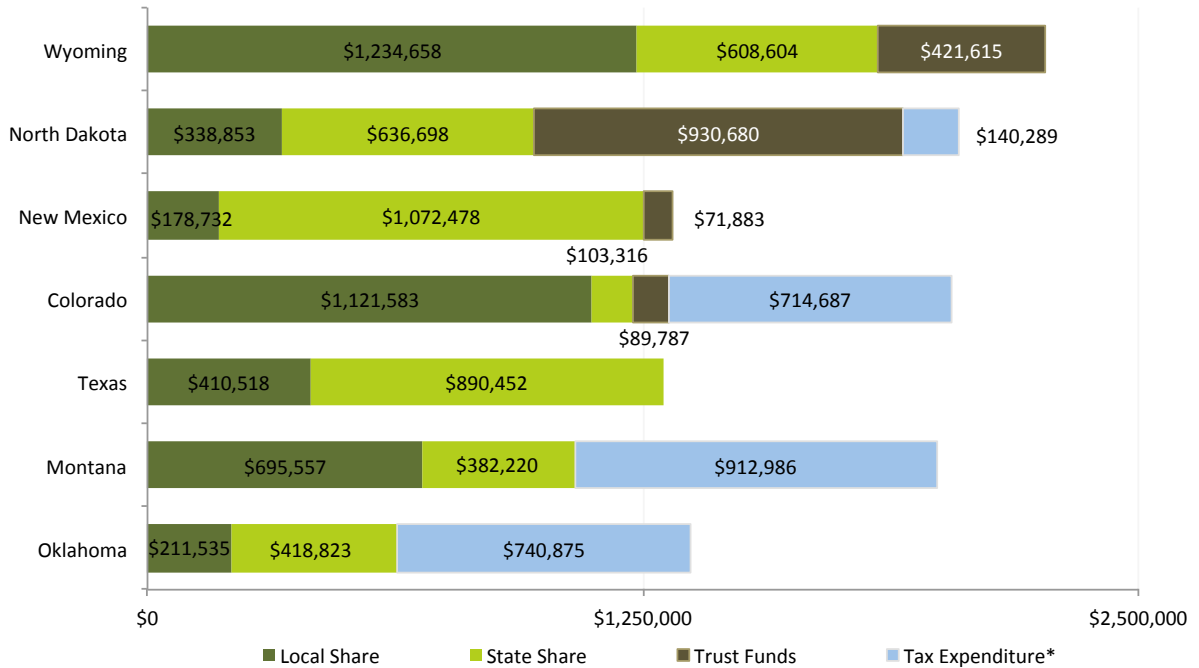


Figure 2: Comparison of Distribution of Production Tax Revenue from a Typical Unconventional Oil Well



*Tax Expenditure refers to the value of production tax incentives and tax relief funded with production tax revenue.

Unconventional Oil Well Performance

Unconventional oil is produced using horizontal drilling and hydraulic fracturing technologies. While no two wells are identical, unconventional wells all share a typical production profile, characterized by relatively high rates of initial production followed by steep production declines.⁵ This makes it possible to construct a typical well profile—in this case using data from Montana’s Elm Coulee field in the Bakken formation. We use this well profile to determine how a state’s taxation and distribution policies combine to deliver revenue to local governments over ten years in terms of amount, timing, location, and predictability.⁶

There were 789 horizontal oil wells drilled in the Elm Coulee between 2000 and 2012.⁷ Average oil production peaked at 246 barrels per day in the first month, declining to 122 barrels per day after one year—a 51 percent decline in the first year. Cumulatively, the average Elm Coulee well produces 227,374 barrels of oil over ten years (Figure 3). At a fixed price of \$85 per barrel, the typical well generates \$19.3 million in cumulative production value over ten years (Figure 4).

Figure 3: Production Profile from a Typical Unconventional Oil Well

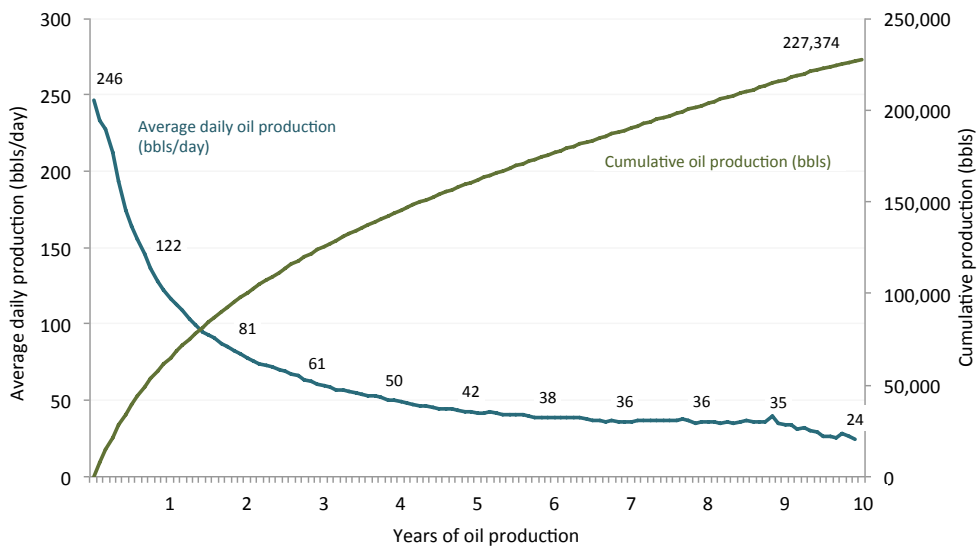
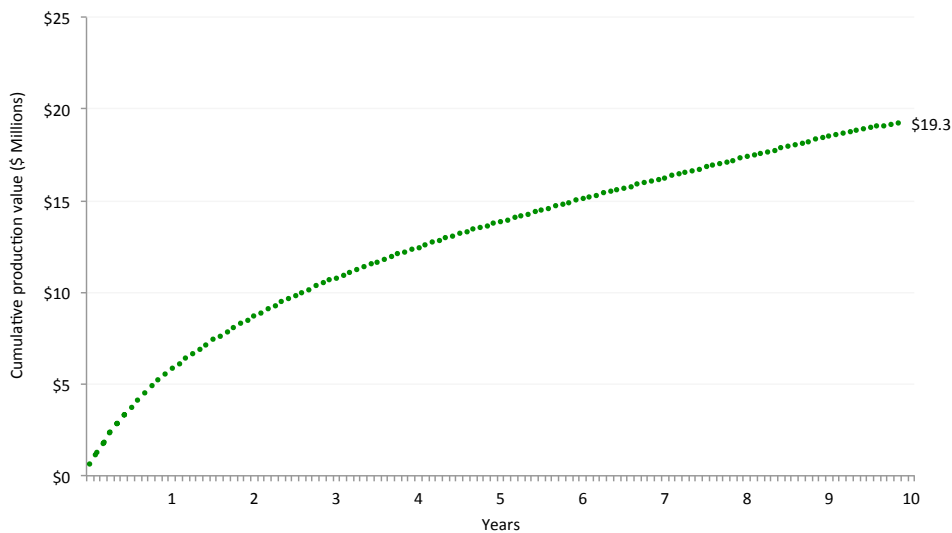


Figure 4: Cumulative Production Value from a Typical Unconventional Oil Well



Profile of Colorado Production Taxes

Colorado levies a severance tax at the state level, and local governments levy property taxes on the gross production value of oil produced. At the local level, the reliance on property taxes leads to both timing and distribution issues. Property taxes are levied annually on production assessed for the previous year, meaning property taxes are not collected in a timely manner in communities struggling with boomtown impacts. Property taxes also only accrue to jurisdictions that have production within their boundaries, meaning adjacent communities experiencing impacts related to population growth and industrial activity do not realize an increase in assessments and tax collections.

The state severance tax formula distributes a significant share of revenue to local governments through direct distributions and impact grants. The distributions are intended to help manage impacts and allocate revenue based on impact-related criteria (including oil and gas employment) to reconcile timing and jurisdictional challenges. However, the state severance tax structure fails in several respects. Colorado offers a unique incentive that allows producers to deduct property taxes paid to local governments from their state severance tax liability. Property taxes are assessed based on production that occurred in the previous tax year, and severance taxes are assessed on production that occurred in the current tax year. The difference between the two assessment periods creates volatility in the relative size of the incentive compared to current tax liabilities, creating significant volatility and uncertainty in state severance tax collections. For the typical well profiled in this study, the steep decline curve means that property taxes paid on the previous year's production can exceed the current year's severance tax liability, reducing severance tax collections to zero.

Finally, Colorado's Taxpayer Bill of Rights (TABOR) caps local revenue growth to the rate of inflation plus population growth, unless otherwise approved by a referendum. TABOR has often restricted the ability of local governments to realize new revenue from oil extraction. For example, during the natural gas boom on Colorado's West Slope, Mesa County had to give up severance tax distributions from the state because the revenue would have exceeded the county's revenue limit.⁸

Taken together, the tax structure has a variety of features intended to address local impacts and jurisdictional challenges with revenue distributions. However, local governments are still often uncertain about what revenue will be available due to the volatility and restrictions from the severance tax incentives, reliance on grants to address local impacts outside producing counties, and TABOR.

Severance Tax

Base Rate: Colorado levies a state severance tax on net production value of oil and natural gas. Net production value is gross production value less transportation and processing costs. The tax rate is graduated based on the gross income (production value) of the taxpayer:

- Two percent for gross income under \$25,000
- \$500 + three percent for gross income between \$25,000 and \$100,000
- \$2,750 + four percent for gross income between \$100,000 and \$300,000
- \$10,750 + five percent for gross income in excess of \$300,000.

A typical unconventional oil well generates sufficient value to pay the five percent tax rate (production value is \$897,000 in year 10). We assume transportation and processing costs of five percent.

Stripper Wells: Colorado exempts stripper wells that produce 15 barrels per day or less of oil, averaged over the entire taxable year. A typical unconventional oil well produces more than 15 barrels per day for the first 10 years and is not eligible for the stripper well exemption.

Production Incentives: Colorado offers a unique production incentive that allows producers to deduct 87.5 percent of property taxes paid to local governments in the prior year from their state severance tax liability. The effective severance tax rate on a typical unconventional oil well over ten years, after the incentive is considered, is 1.86 percent of gross production value. The value of the tax incentive is \$607,187, or 3.14 percent of gross production value.

Timing of Collections: The severance tax is collected annually. Payment is due on the 15th day of the fourth month after the close of the taxable year (April 15 following the tax year beginning January 1). We assume the typical oil well is completed in the first month of the tax year. The lag from initial production to tax payment is 16 months.

The formula to estimate the severance tax is:

$$\text{Severance Tax} = (((\text{Gross Prod. Value} * .95) * .05) + 300,000) - (\text{Prior Year Property Tax} * .875)$$

Property Tax

Base Rate: Colorado local governments levy property taxes directly against the assessed value of oil extracted in each taxing jurisdiction. Oil and natural gas is assessed at 87.5 percent of net production value, which is defined as gross production value less transportation and processing costs (assumed at five percent).

Local mill levies are applied to the assessed value. The average mill levy for counties, schools, cities, and special districts combined in 2012 was 77.685. The average county government and school district levy (excluding municipal and special district levies) was 58.636, or 5.86 percent of assessed value.⁹ We apply only the county and school district levy as most oil production occurs outside city or special district jurisdictions.

The effective property tax rate on oil produced from a typical unconventional well if drilled in Colorado in a typical county is 4.87 percent of gross production value.

Stripper Wells: There is no stripper well exemption from local property tax liability.

Production Incentives: No incentives from local tax levies are offered.

Timing of Collections: Taxes are assessed on production from the previous year, and are due in the year following the assessment year in full by April 15, or in two equal installments by February 28 and by June 15. The lag between initial production and when taxes are fully paid can extend 28 to 30 months.

The formula to estimate the property tax is:

$$\text{Property tax revenue} = ((\text{Prior Year Assessed Value} * .95) * .87) * (.058636)$$

Colorado Board of Oil and Gas Excise Tax

Base Rate: The Colorado Oil and Gas Conservation Commission levies an excise tax of 0.07 percent to fund their activities.

Stripper Wells: There is no stripper well exemption from the excise tax.

Production Incentives: No incentives from the excise tax are offered.

Timing of Collections: The excise tax is collected quarterly.

Figure 5: Colorado Tax Policy Applied to a Typical Unconventional Oil Well

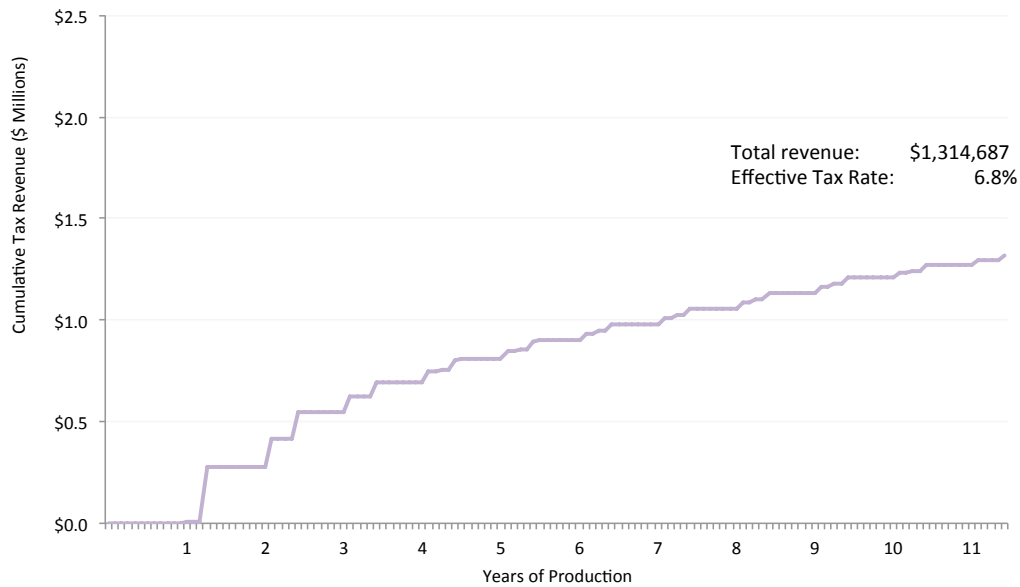


Table 1: Colorado Tax Policy Applied to a Typical Unconventional Oil Well

Production Year	Gross Production Value of Oil Production	Colorado Severance Tax Revenue	Colorado Ad Valorem Production Tax Revenue	Colorado COGCC Fee Revenue	Total Tax Revenue	Effective Tax Rate (based on tax year)	Value of Tax Expenditure (based on tax year)
1	\$5,530,321	\$0	\$0	\$3,871	\$3,871	9.89%	\$0
2	\$2,984,622	\$273,440	\$0	\$2,089	\$275,529	4.94%	\$152,520
3	\$2,146,014	\$0	\$269,554	\$1,502	\$271,057	4.94%	\$112,686
4	\$1,686,964	\$0	\$145,474	\$1,181	\$146,655	5.16%	\$87,307
5	\$1,412,756	\$3,574	\$104,599	\$989	\$109,162	5.61%	\$68,415
6	\$1,250,365	\$9,441	\$82,225	\$875	\$92,541	5.99%	\$57,126
7	\$1,160,428	\$13,016	\$68,859	\$812	\$82,688	6.28%	\$50,425
8	\$1,136,597	\$15,445	\$60,944	\$796	\$77,185	6.54%	\$46,649
9	\$1,121,166	\$18,089	\$56,561	\$785	\$75,435	6.58%	\$45,671
10	\$897,516	\$18,334	\$55,399	\$628	\$74,361	5.81%	\$45,572
11		\$7,810	\$54,647		\$62,457		
12			\$43,746		\$43,746		
Cumulative	\$19,326,749	\$359,150	\$942,008	\$13,529	\$1,314,687	6.80%	\$666,371

Table 1 shows the timing of tax collections comes a year (severance tax) or two (property tax) after a typical well begins producing. It also shows that because of the steep decline curve representative of unconventional wells, the value of the property tax incentive (based on property taxes paid the previous year) can exceed the current year’s severance tax liability, reducing severance taxes to zero for several years.

The effective tax rate is the rate paid on production generated in each year, even though those taxes may not be paid for several years after the production is complete. It shows that the effective tax rate on the first year’s production, before the severance tax incentive becomes available, is quite high compared to latter years.

Profile of Colorado Production Tax Distribution Policies

Colorado’s local governments receive revenue from two main sources: direct property taxes on oil and gas production, and distributions from state severance tax collections. Property taxes accrue only to jurisdictions that host production, creating uneven allocations of tax revenue relative to impacts in

adjacent communities and counties that don't host production, but experience related population growth and industrial activity. The state severance tax is intended to ameliorate some of these challenges by distributing half of severance taxes directly and via grants to local governments based on impact-related criteria in addition to the location of production.

The state severance tax is allocated to two funds: half is directed to the state severance tax trust fund, and half to the local government severance tax trust fund. The latter is split between direct distributions and impact grants. The state severance tax trust fund is allocated between a permanent revolving loan fund for state water projects, and annual funding distributed by the Department of Natural Resources for a variety of state purposes.

State Share: Half of severance taxes are distributed to the Department of Natural Resources Severance Tax Trust Fund. Half of DNR funds (25% of total severance taxes) go to operational spending for programs related to mineral extraction, clean energy development, low-income energy assistance, and species conservation. The Board of Oil and Gas Conservation Commission also levies a 0.07% tax to support their operations.

Local Share: Half of the severance tax is distributed to the local government severance tax trust fund. The fund is not a true trust fund, but the balance is distributed annually via the Department of Local Affairs (DOLA) to local governments. DOLA's distribution programs are notable both for the share of revenue Colorado distributes to local governments (local governments in Colorado retain the highest share of production revenues among peer oil and natural gas-producing states); and for the way distributions attempt to address impacts from industrial activity in largely rural county areas, and from related population growth in nearby cities. Thirty percent of the DOLA share (15% of total) is distributed directly back to local governments based on a formula that includes county of origin (where extraction occurs) and where oil and natural gas employees live.¹⁰ Seventy percent of the DOLA share is distributed to local governments via impact grants.

Local governments also levy property taxes directly on the value of oil production, and these taxes are retained by the jurisdictions where production occurs.

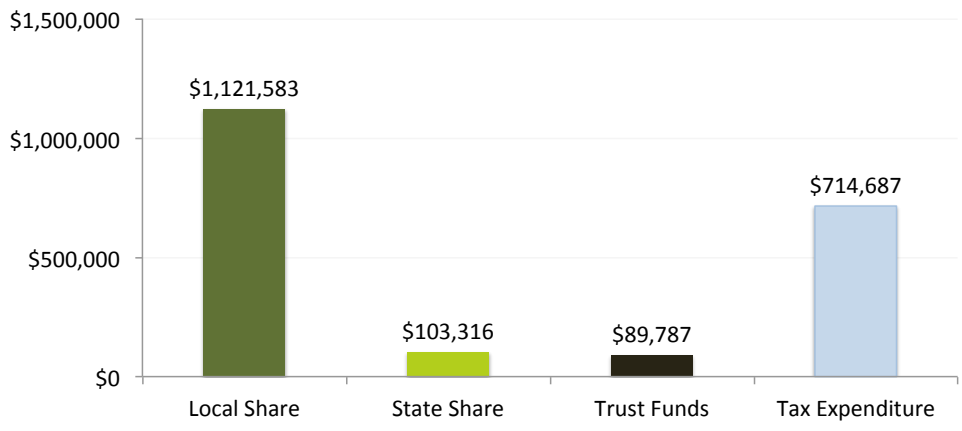
Permanent Savings: Colorado invests a portion of severance taxes into a perpetual base account used for loans for state water projects.

Tax Expenditures: The value of the severance tax incentive is significant. Based on the typical unconventional oil well profiled here, the incentive is worth \$714,687 per well, or about 67 percent of what would be collected from the severance tax if the incentive were not offered. (The state severance tax collection from the typical unconventional well drops from \$1,073,837 to \$359,150 after deducting 87.5 percent of property taxes paid in the previous year.)

Table 2: Colorado Tax Distribution Policy Applied to a Typical Unconventional Oil Well

Distribution	Description	Amount	Share of Total
State Share		\$103,316	5.1%
General Fund		\$0	0.0%
Infrastructure Spending		\$0	0.0%
Natural Resources Management	50% of severance tax is distributed to the Department of Natural Resources Severance Tax Trust Fund. Half of DNR funds (25% of total) go to operational spending for programs related to mineral extraction, clean energy development, low-income energy assistance, and species conservation.	\$103,316	5.1%
Other		\$0	0.0%
Local Government		\$1,121,583	55.3%
Local Production Taxes	Local governments levy property taxes directly against the gross production value of oil extracted in each taxing jurisdiction.	\$942,008	46.4%
Direct Distributions	50% of severance taxes are deposited into the Local Impact Fund managed by Department of Local Affairs (DOLA). 30% of these (15% of total) are distributed directly back to local governments based on a formula.	\$53,872	2.7%
Impact Grants	50% of severance taxes are deposited into the Local Impact Fund managed by Department of Local Affairs (DOLA). 70% these (25% of total) are distributed to local governments via impact grants.	\$125,702	6.2%
Trust Funds		\$89,787	4.4%
Natural Resources Permanent Fund		\$0	0.0%
Schools Trust Fund		\$0	0.0%
Other Trust Funds	50% of severance tax is distributed to the Department of Natural Resources Severance Tax Trust Fund. 50% of DNR funds (25% of total) go to the perpetual base account used for loans for state water projects.	\$89,787	4.4%
Tax Expenditures (Incentives)		\$714,687	35.2%
Production Tax Incentives	87.5% of property taxes paid to local governments are deductible from the state severance tax liability.	\$714,687	35.2%
Dedicated Tax Relief		\$0	0.0%
Total Distributions		\$2,029,375	100.0%

Figure 2: Colorado Tax Distribution Policy Applied to a Typical Unconventional Oil Well



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Headwaters Economics is an independent, nonprofit research group whose mission is to improve community development and land management decisions in the West.

Endnotes

¹ Headwaters Economics. *Oil and Natural Gas Fiscal Best Practices: Lessons for State and Local Governments*. November 2012. http://headwaterseconomics.org/wphw/wp-content/uploads/Energy_Fiscal_Best_Practices.pdf.

² “Why is the state severance tax revenue so variable?” Colorado Department of Local Affairs (DOLA), Division of Local Government: Energy and Mineral Impact Assistance (slide show, Background Papers on Public Revenue from Mineral Production in Colorado, March 14, 2008).

³ Colorado Oil and Gas Association. 2011. Colorado Oil and Gas Industry Tax Whitepaper. Denver, CO. <http://www.naro-us.org/Resources/Documents/COGA%20Whitepaper.pdf>.

⁴ Exhibit ES-13, “Public Investment Timing Issue” in BBC Research and Consulting, “Northwest Colorado Socioeconomic Analysis and Forecasts,” Report prepared for Associated Governments of Northwest Colorado. April, 2008: Executive Summary page 13.

⁵ See, for example: Energy Information Administration. 2013a. NEMS Model Documentation 2013: Oil and Gas Supply Module. Appendix 2.C: Decline Curve Analysis. U.S. Department of Energy. Washington, D.C.

⁶ This same approach is used by other analysts. See, for example, Ernst & Young LLP. 2012. Analysis of Ohio Severance Tax Provisions of H.B. 487. Prepared by Ernst & Young LLP for the Ohio Business Roundtable. <http://jobs-ohio.com/images/Ernst-Young-Severance-Tax-Analysis-Prepared-for-the-Ohio-Business-Roundtable-5-15-12.pdf>; See also Montana Department of Revenue. 2012. Oil and Gas Production Tax Comparison: Montana and North Dakota. Helena, MT. http://revenue.mt.gov/content/committees/legislative_interim_committee/oil_and_gas_prod_tax_comp_july_rtc.pdf.

⁷ Montana Board of Oil and Gas Conservation. Production data for Elm Coulee Horizontally Completed Wells. 2000 to 2013. Department of Natural Resources and Conservation. Analysis by Headwaters Economics.

⁸ Le Roy Standish, “Collection of state severance taxes exceeds county’s TABOR cap.” The Grand Junction Daily Sentinel. September 5, 2008.

⁹ Colorado Department of Local Affairs (DOLA). Property Tax Division. FY 2012 Annual Report – Section XI Revenue and Levy. <http://www.colorado.gov/cs/Satellite/DOLA-Main/CBON/1251590806884>.

¹⁰ State of Colorado Department of Local Affairs. Federal mineral lease and state severance tax direct distribution program guidelines, June 2011. <http://www.colorado.gov/cs/Satellite?blobcol=urldata&blobheadername1=Content-Disposition&blobheadername2=Content-Type&blobheadervalue1=inline%3B+filename%3D%22DD+Program+Guidelines.pdf%22&blobheade>

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