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EMPLOYMENT, GOVERNMENT REVENUE, AND ENERGY SECURITY IMPACTS OF CURRENT FEDERAL LANDS POLICY IN THE WESTERN U.S.

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Prepared for American Petroleum Institute by

EIS SOLUTIONS

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EMPLOYMENT, GOVERNMENT REVENUE, AND ENERGY SECURITY IMPACTS OF CURRENT FEDERAL LANDS POLICY IN THE WESTERN U.S.

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EXECUTIVE SUMMARY

The decline in oil and gas leasing, permitting, and new drilling on the nation's public lands since 2009 have come at a high cost to America – namely, a significant loss of domestically produced oil and natural gas, thousands of jobs in the energy-rich western United States, and the forfeit of hundreds of millions of dollars in state and federal tax revenues, royalties, and lease payments to western states and the U.S. Treasury.

These are the central findings of this Report: Employment, Government Revenue, and Energy Security Impacts of Current Federal Lands Policy in the Western U.S. The Report analyzes oil and natural gas leasing, permitting, and drilling trends on lands managed by the Bureau of Land Management (BLM) in the energy-producing western states of Colorado, Montana, New Mexico, North Dakota, Utah, and Wyoming. The balance of the evidence suggests a systematic decline of energy production activities on the nation's federal lands in the last two years.

Specifically, according to BLM data, the number of new federal oil and gas leases issued by the BLM is down 44% from an average of 1,874 leases in 2007/2008 to 1,053 in 2009/2010; the number of new permits to drill issued by the BLM is down 39%, from an average of 6,444 permits to an average of 3,962; and the number of new wells drilled on federal land have declined, 39%, from an average of 4,890 wells to 2,173 (Table E-1).

The BLM released new fiscal year 2011 oil and natural gas statistics on January 10, 2012. The trend in reduced leasing, permitting, and drilling on western lands appears to be continuing. Although the 2011 total of 1,461 federal leases issued for western states appears to be higher than the 2009/2010 average of 1,053, closer review of the BLM data shows that the majority of leases that the BLM characterizes as "issued" in 2011 were actually backlog leases that were sold in previous years but had been mired in challenges since. An estimated 860 of the 1,461 leases issued in 2011 were not new leases at all; they are leases secured in previous years that were stranded, in most cases, pending resolution of legal challenges in court. In 2011, only 601 new leases were actually sold, which is an all-time low (since 1984) when backlogged leases are accounted for. New drilling permits and wells drilled issued in 2011 were 3,851 and 2,783 respectively, both below the 2009/2010 averages and significantly below the 2007/2008 averages.

Table E-1:
Leasing and Permitting Activity on Federal Land

	Leases	Permits	Wells
2007-08 Average	1,874	6,444	4,890
2009-10 Average	1,053	3,962	2,173
Percent Change	-44%	-39%	-39%

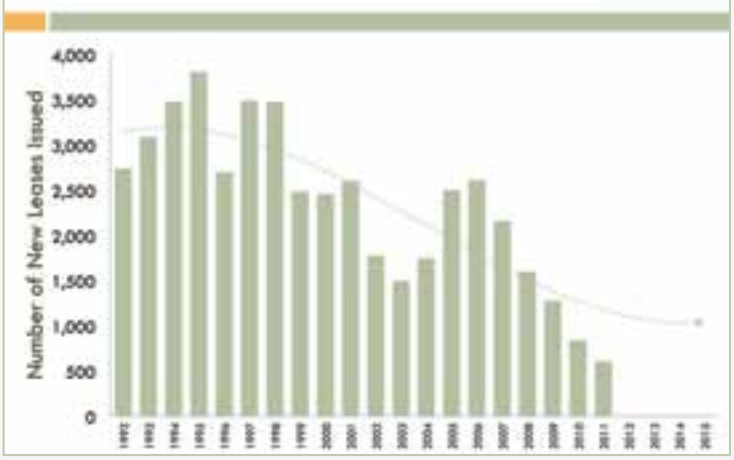
Source: BLM Oil & Gas Statistics (2010)
* Leases on federal land in FY 2011 – 601 Non-federal permits are down less than their federal counterparts over the last two years at 20%. Non-federal permits have rebounded in 2010, up 31%.

Clearly the economic downturn starting in 2007 is a factor contributing to these results. However, if market factors were the sole driver of the federal lands permitting slowdown, it would be reasonable to assume that non-federal drilling permits would generally track the trends occurring with their federal counterpart. But this is not the case.

Indeed, the number of new permits to drill on federal lands in the West is down by a significantly greater amount (-39%) than new permits to drill on non-federal lands (-20%) over the last 2 years. In 2010 alone, non-federal permits across the West actually increased by 31%, even as federal drilling permits dropped 13%. The Report shows that non-federal oil and gas production has increased in 2009/2010, even as federal oil production has plateaued and federal natural gas production has declined in the same time frame. The 2011 federal oil and natural gas production statistics recently released by the BLM had significant accounting adjustments and therefore current year production levels could not be determined. It is reported that the BLM may release 2011 production estimates in February 2012.

Even when viewed through a wider historical lens, including other recent recessionary periods, the downturn in federal energy activities is of a greater magnitude than any experienced in recent times. This is particularly the case when evaluating the number of new onshore federal oil and gas leases issued in the last two years. While federal leasing numbers have gone up and down due to a range of economic and regulatory considerations through the years, at no time in the last 25 years has the number of new onshore federal oil and gas leases been lower than the number of new leases issued in 2009 and 2010 (BLM Oil & Gas Statistics, 2010). As figure E-1 illustrates, new leases are significantly lower than at a period during the Clinton Administration, or during the George W. Bush Administration.

Figure E-1:
Number of New Leases Issued



*Western States (Includes Colorado, Montana, New Mexico, North Dakota, Utah and Wyoming)
Source: BLM Oil & Gas Statistics (2010)

These facts strongly suggest that the downturn in oil and natural gas activity on the nation's federal lands is due to something beyond the nation's difficult economic circumstances. A host of new rules, policies and administrative actions that are not conducive to oil and natural gas production on federal land are a culprit. The slowdown in new leases, permits and wells drilled on BLM lands is, in real part attributable to the direction of current federal land energy policy. The Report characterizes these new regulatory barriers.

Finally, in addition to quantifying the magnitude of the leasing, permitting, and drilling slowdown, and describing the regulatory barriers that have contributed to this slowdown, the Report also demonstrates the substantial opportunity cost of current BLM policies on America's energy supplies and the economy.

Using economic modeling, the Report shows that a simple return to permitting, leasing and drilling levels experienced in 2007 and 2008 would benefit the nation's economic and domestic energy future. Specifically, a return to 2007/2008 federal leasing and permitting levels would result in:

- A projected increase of 7 million to 13 million barrels per year of domestic oil production from federal lands in the western U.S. over the next four years.
- An annual average projected increase of 620 billion cubic feet of natural gas from federal lands in the western U.S. over the 2012 to 2015 time period. The increases range from 103 billion cubic feet to 818 billion cubic feet per year.
- Projected direct employment increases in the oil and gas industry in energy producing western states of 4,085 jobs in 2011, 6,914 jobs in 2012, 9,937 jobs in 2013, 9,713 in 2014, and 9,032 in 2015.
- A projected total increase in jobs supported throughout the economy of between 12,656 to 30,163 in energy producing western states over the next four years.
- Projected severance and ad valorem tax revenues increases between $59 million and $362 million per year over the 2011 to 2015 time period, totaling over $1.2 billion in five years.
- Projected federal royalty increases ranging from $106 million to $670 million per year through 2015, totaling over $2.1 billion in five years.

Table E-2:
Impact of Return to 2007/2008 Levels of Leases and Permits*
(Change from Baseline Case)

Year	Annual Oil Production (mmbbls)	Annual Gas Production (bcf)	Annual NGL Production (mmbbls)	New Wells	Direct Employment	Total Employment	Annual Severance & Ad Valorem Taxes ($millions)	Annual Federal Royalties ($millions)
2011	7.1	103	1.0	610	4,085	12,656	$59	$106
2012	8.5	447	4.3	880	6,914	21,315	$183	$337
2013	12.0	517	5.0	1,140	9,937	30,163	$236	$432
2014	13.2	696	6.7	1,070	9,713	29,715	$319	$585
2015	8.9	818	7.8	940	9,032	27,642	$362	$670

* Western States (Includes: Colorado, Montana, New Mexico, North Dakota, Utah and Wyoming)
Source: Economics International Corp., BLM Oil & Gas Statistics (2010)

In as much as a return to 2007/2008 leasing, permitting and drilling levels would boost the economic and domestic energy fortunes of America, the reverse is also unfortunately true - the loss of oil and gas production that will result from current BLM oil and gas permitting processes and practices will cost American jobs and increase our dependence on foreign sources of energy. For a nation enduring slow economic growth and increasing dependence on foreign sources of energy, the costs of this domestic drilling slowdown are profound indeed.

1 OIL AND NATURAL GAS IN THE WEST:
Understanding the Role of Federal Lands

For more than a hundred years, the West's oil and natural gas reserves have played a significant role in helping America meets its domestic energy needs. Recent advances in drilling technologies, which have made a significant amount of oil and gas resources buried deep below the earth's surface economically and technologically recoverable, will serve to greatly expand the influence of the West in America's domestic energy portfolio in the decades ahead.

According to a recent report from the Western Energy Alliance[1], the energy producing states in the western U.S. have the combined capacity to produce more energy from oil and natural gas than the total U.S. imports from Saudi Arabia, Iraq, Kuwait, Venezuela, Colombia, Algeria, Nigeria and Russia combined by 2020. Specifically, Western Energy Alliance found that the West has the capacity to generate 1.3 million barrels of domestic oil and condensate production a day by the year 2020, an amount that currently exceeds daily oil imports from Russia, Iraq and Kuwait combined. The West also has the potential to produce 6.2 trillion cubic feet of natural gas annually by 2020.

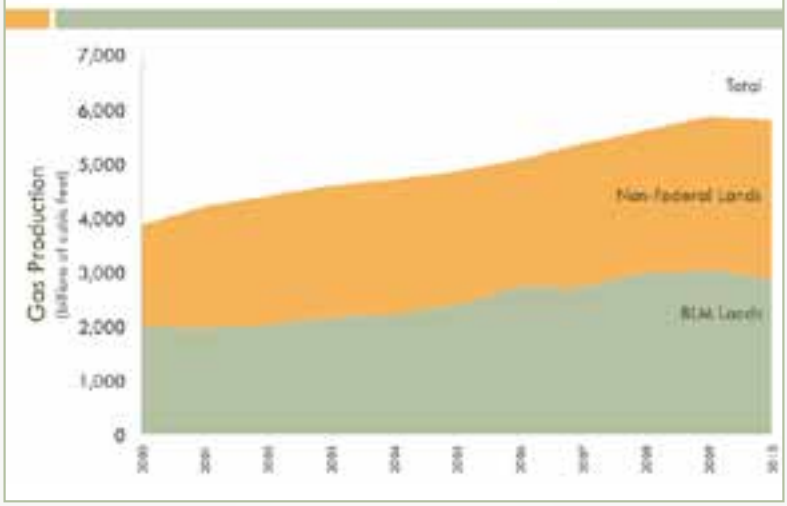
When it comes to America's energy security, the West is important.

Much of the oil and natural gas in the West is produced from public lands owned and managed by the federal government. While the vast preponderance of onshore oil and gas production in other regions takes place on private lands, many of the West's most vital energy plays are found on federal lands – usually, those managed by the Bureau of Land Management (BLM). Put simply, a robust and thriving domestic energy program in the energy-producing states of the American West is not possible without access to and production of the West's federal land resources.

Federal lands play a central role in driving overall natural gas production trends in the West. Approximately 40% of all natural gas production from western energy-producing states occurs on BLM lands.[2] This percentage has recently declined. In 2010, natural gas production on federal lands decreased while production growth from non-federal resources has experienced incremental growth. See Figure 1. In 2009, federal natural gas production decreased by 197 billion cubic feet compared to the 2008 level. See Table 1.

1. The Blueprint for Western Energy Prosperity, (2011). Western Energy Alliance.
2. As of 2009. Source: EIA Natural Gas Production Statistics (2010), BLM Oil and Gas Statistics (2011)

Figure 1:
Natural Gas Production, Total*



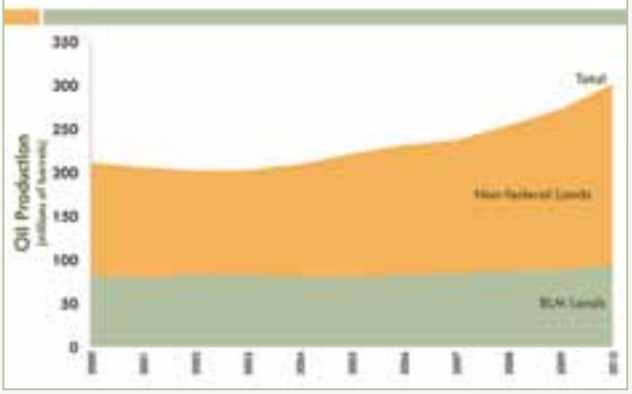
*Western States (Includes Colorado, Montana, New Mexico, North Dakota, Utah and Wyoming)
Source: BLM Oil & Gas Statistics (2010) Energy Information Administration (2011)

It is also important to note that a simple "federal vs. non-federal" comparison understates the impact of federal land production in the overall mix of western energy. Figure 2 demonstrates a sample ownership pattern, with federally owned lands in orange, and non-federal in white. Because federal lands are so commonly interspersed, adjacent or co-mingled with non-federal lands, many non-federal oil and gas plays in the West would be less desirable without the associated production of nearby federal lands. Therefore access to federal lands plays a more important role in energy production in the West than 40% of overall production number alone suggests. The loss of access to federal land can and will encumber access to some non-federal energy production opportunities as well.

Figure 2:
Example of Federal and Non-Federal Ownership Patterns

Source: BLM Ownership Maps, 2011.
BLM Public Lands and Administrative Jurisdictions

Figure 3:
Western States Oil Production, Total*



Western States (Includes Colorado, Montana, New Mexico, North Dakota, Utah and Wyoming) Source: BLM Oil & Gas Statistics (2010) Energy Information Administration (2011)

Table 1: Historical Oil and Natural Gas Production in Western States*

Natural Gas Production (billion cubic feet)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
CO Total	750.3	789.2	904.3	1,006.1	1,063.4	1,121.0	1,183.4	1,234.9	1,339.7	1,499.7	1,540.5
CO Federal	73.4	85.2	92.0	117.4	141.6	188.1	201.6	208.6	243.7	269.9	279.2
Non-federal	676.8	704.0	812.3	888.7	921.8	932.9	981.9	1,026.3	1,096.0	1,229.5	1,261.3
MT Total	67.4	78.4	84.9	85.8	93.3	105.3	112.4	116.2	114.9	102.6	89.3
MT Federal	15.8	17.8	19.1	20.6	24.1	28.7	31.8	32.2	33.5	70.9	46.3
Non-federal	52.0	60.6	65.8	65.2	69.2	76.5	80.6	84.0	8146	31.7	43.1
NM Total	1,647.2	1,689.6	1,646.9	1,611.5	1,620.9	1,647.4	1,616.8	1,547.3	1,456.5	1,409.0	1,303.6
NM Federal	1,105.7	1,030.5	1,002.0	938.0	936.7	926.3	989.4	867.0	843.4	780.1	673.7
Non-federal	541.6	659.1	644.9	673.58	684.3	721.1	627.4	680.3	613.1	628.9	629.9
ND Total	53.1	53.9	56.8	55.2	55.7	53.3	53.8	60.4	54.5	54.9	76.5
ND Federal	6.1	5.3	7.1	7.9	7.7	8.9	10.3	10.3	9.8	7.5	8.0
Non-federal	46.9	48.6	49.7	47.4	48.0	44.4	43.5	50.0	44.7	47.4	68.4
UT Total	262.7	283.3	276.3	270.9	271.6	294.4	335.3	378.9	410.7	450.8	430.9
UT Federal	80.6	86.4	107.8	123.4	134.9	170.8	193.4	223.9	250.9	285.9	271.0
Non-federal	182.1	196.9	168.5	147.5	136.7	123.6	141.9	155.0	159.8	164.9	160.0
WY Total	1,065.2	1,294.5	1,411.9	1,536.2	1,585.1	1,612.8	1,750.2	2,010.5	2,210.5	2,335.5	2,337.2
WY Federal	718.6	723.3	784.5	931.0	972.5	1,048.4	1,295.4	1,356.5	1,590.2	1,610.0	1,631.1
Non-federal	346.6	571.2	627.3	605.1	612.6	564.3	454.8	654.0	620.4	725.5	706.0
Total Federal	2,000.2	1,948.5	2,012.5	2,138.3	2,217.4	2,371.3	2,721.9	2,698.5	2,971.4	3,024.3	2,909.3
Total Non-federal	1,846.0	2,240.3	2,368.5	2,427.4	2,472.5	2,462.9	2,330.1	2,649.7	2,615.4	2,827.8	2,868.7

Oil Production (million barrels)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
CO Total	18.5	16.5	17.7	21.1	22.1	22.8	23.4	23.2	24.1	28.3	30.9
CO Federal	4.7	4.5	5.2	4.3	4.1	4.9	5.6	4.9	5.1	4.1	3.8
Non-federal	13.8	12.0	12.5	16.8	18.0	17.9	17.7	18.4	19.0	24.2	27.0
MT Total	15.4	15.9	16.9	19.3	24.7	32.9	36.3	34.8	31.5	27.7	25.3
MT Federal	2.9	2.9	3.2	3.5	3.8	3.7	3.9	3.8	3.8	3.5	3.8
Non-federal	12.5	13.1	13.6	15.8	20.9	29.1	32.4	31.0	27.7	24.2	21.5
NM Total	67.2	68.0	67.0	66.1	64.2	60.7	59.8	58.8	59.4	61.1	65.1
NM Federal	28.1	28.6	30.9	31.0	29.8	26.0	24.3	24.6	24.8	26.9	29.9
Non-federal	39.1	39.4	36.2	35.2	34.5	34.6	35.5	34.2	34.6	34.2	35.2
ND Total	32.7	31.7	31.0	29.4	31.2	35.7	39.9	45.1	62.8	79.7	113.0
ND Federal	6.0	5.9	5.8	5.8	5.6	6.2	7.0	7.6	8.4	7.6	8.2
Non-federal	26.7	25.8	25.2	23.6	25.5	29.4	32.9	37.5	54.3	72.1	104.8
UT Total	15.6	15.3	13.7	13.1	14.6	16.7	17.9	19.5	22.0	22.9	24.7
UT Federal	3.6	3.1	3.9	4.3	4.7	5.9	7.3	8.6	9.3	11.2	11.7
Non-federal	12.1	12.1	9.8	8.8	9.9	10.8	10.6	10.9	12.7	11.7	13.0
WY Total	60.7	57.4	54.7	52.4	51.6	51.6	52.9	54.1	52.9	51.3	53.1
WY Federal	35.8	32.9	33.6	32.4	32.1	32.4	33.2	34.4	34.7	33.9	34.9
Non-federal	24.9	24.5	21.1	20.0	19.2	19.2	19.7	19.7	18.3	17.4	18.2
Total Federal	81.1	77.8	82.7	81.2	80.0	79.1	81.4	83.9	86.1	87.3	92.3
Total Non-federal	129.1	127.0	118.4	120.2	128.4	141.1	148.8	151.7	166.6	183.9	219.8

BOTTOM LINE:

energy production in the West, home to more than 3 billion barrels of proved oil reserves (Western Energy Alliance, 2011), is vital to America's overall domestic energy portfolio, and federal lands are a key driver of energy production in the West. Recent oil and natural gas production on federal lands is lagging production growth on non-federal resources in the West.

*Western States (Includes Colorado, Montana, New Mexico, North Dakota, Utah and Wyoming) Source: BLM Oil & Gas Statistics (2010) U.S. Energy Information Administration Statistics (2011)

2009 Wyoming and 2010 Montana federal natural gas production numbers contained accounting errors and adjustments. The federal production above is based on an average of the State's previous and following year's production. Wyoming –average of 2008 and 2010. Montana- average of 2009 and 2011.

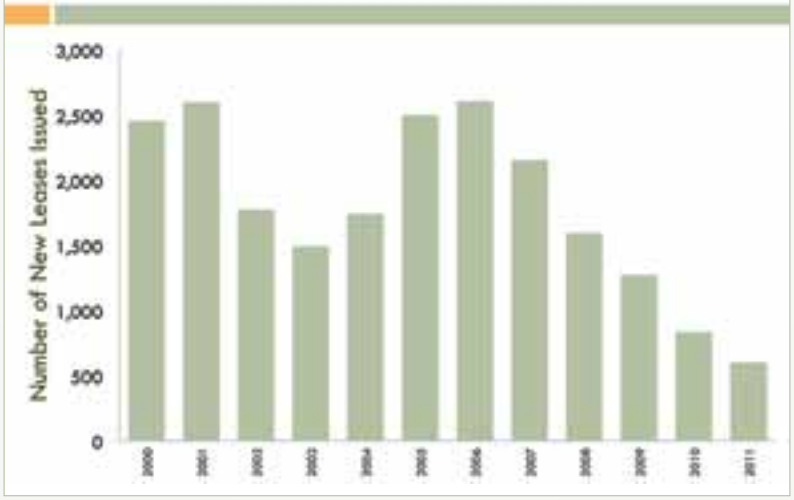
1.1 New Federal Drilling Leases Issued: Down 44%

Energy exploration and development on federally owned land is a multi-layered process, beginning first with a bid by an energy producer to obtain a lease from the relevant BLM state office. To obtain a federal lease, a company nominates a parcel it is interested in developing to the BLM state office, which then reviews the parcel for availability, lease stipulations, and conformance with a land use plan. Lease stipulations are determined and attached to the parcel prior to it being made available for bidding during the lease sale process. Once issued, these leases are "available" until they are produced, extended or expire.

A critical determinant of total available leases available for production is the number of new leases an Administration sells in a given year. New leases represent a real-time snap shot of how a given administration's policies translate into tangible action when it comes to domestic energy production on federal lands. What's more, the number of leases sold is also one of the key indicators of how private companies perceive the level of federal encouragement and commitment to oil and natural gas development.

Today new oil and natural gas leases issued for federal land are at their lowest level since 2000 (Figure 4). During 2009 and 2010, the number of new federal oil and gas leases issued has averaged 44% less compared to their 2007 and 2008 levels.[3] Indeed, while leasing numbers have gone up and down due to a range of economic and regulatory considerations through the years, at no time in the last 25 years has the number of new onshore federal oil and gas leases been lower than the number of new leases issued in 2009 and 2010 (BLM Oil & Gas Statistics, 2010).

Figure 4:
Number of Leases Sold on BLM Land*

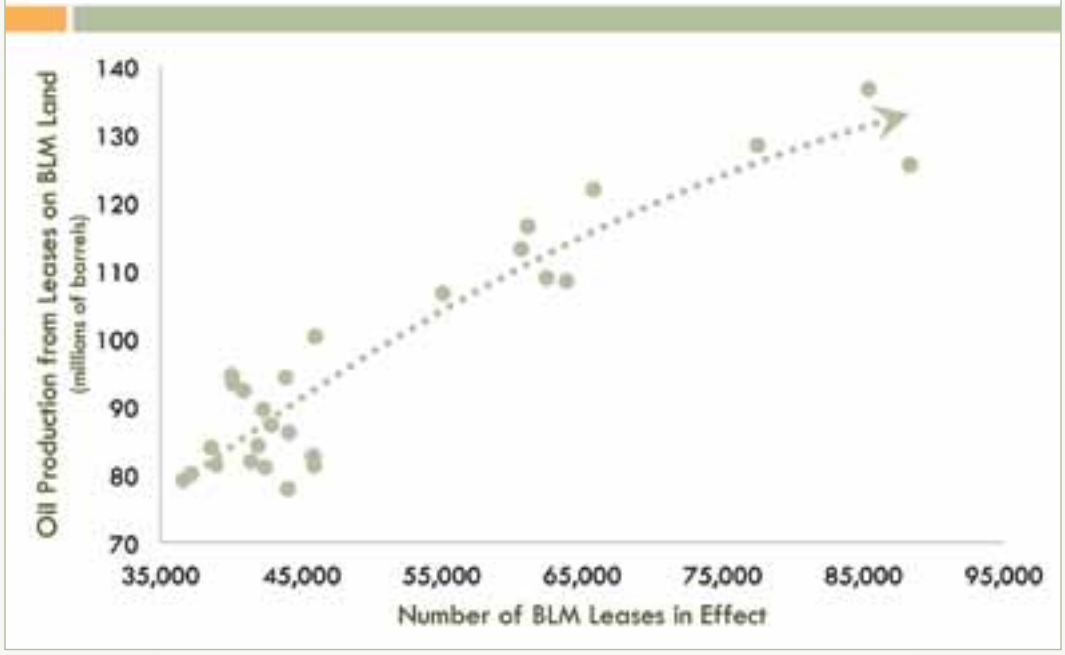


*Western States (Includes Colorado, Montana, New Mexico, North Dakota, Utah and Wyoming)
Source: BLM Oil & Gas Statistics (2010)

3. According to BLM lease sale data compiled by Western Energy Alliance, leases sold in 2011 decreased to 601. The reported number of leases issued by the BLM in 2011 was 1,461. However, an estimated 860 of the leases issued were backlog leases sold in previous years mostly in Wyoming and Utah and released in 2011 due to resolutions of challenges to these leases in the courts. Source: BLM FY 2005 - 2011 oil and gas leasing statistics.

Historically, the relationship between the number of leases in effect and future oil production in the western states shows a strong positive correlation: the more leases that are available, the greater the domestic oil production that occurs on federal lands. As Figure 5 shows, since 1984, oil production from federal lands has consistently been at its highest levels when the number of total drilling leases available was at its highest. The reverse has also been true through the years – fewer available leases have resulted in a curtailment of oil production from the nation's federal lands.

Figure 5:
Relationship Between Leases in Effect and Oil Production



*Western States (Includes Colorado, Montana, New Mexico, North Dakota, Utah and Wyoming)
Source: BLM Oil & Gas Statistics (2010)

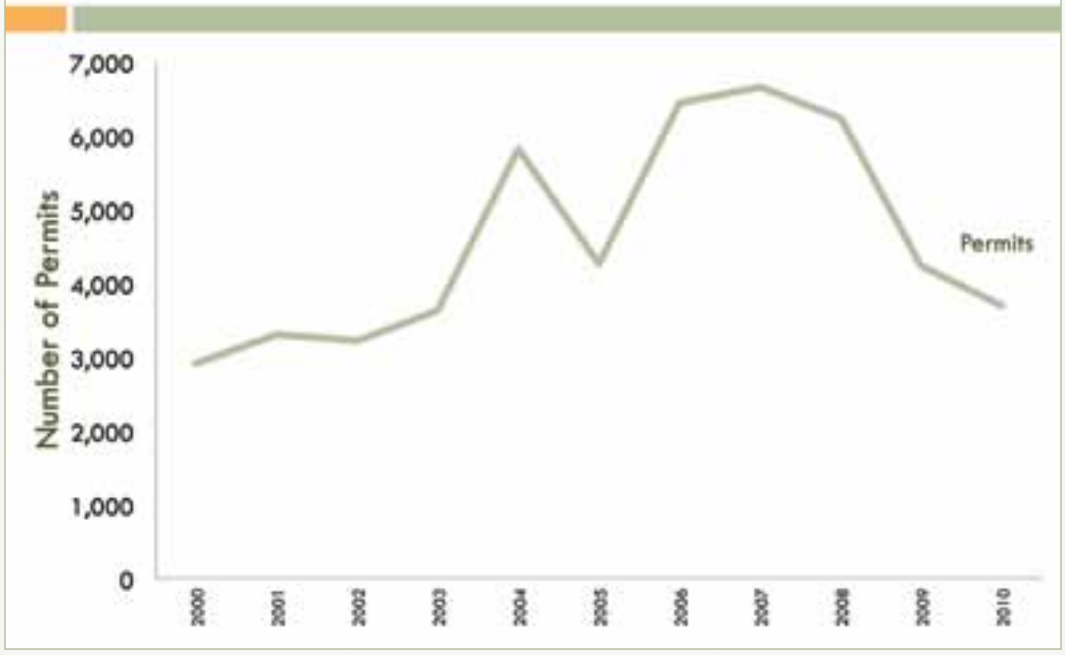
Recently released BLM figures for leases issued for 2011 were not available at the time this analysis was undertaken. However if used, they would most likely not have significantly impacted the model results of the relationship between leases and production.

1.2 Permits to Drill: Down 39%

Under federal law, once a federal lease has been issued, the next step in the administrative process for an energy producer is to obtain a permit to drill. The permit to drill is one of the administrative clearances necessary before an energy company can develop an oil and gas lease; thus, the number of permits issued in a given year is an illustrative metric of the relative priority an administration places on producing energy from public lands from one year to the next.

The most recent BLM data on drilling permits for federal leases indicates a relatively steep decline during the 2009/2010 time period. The number of permits issued from 2006 to 2008 increased significantly, but there has been a steep decline since then (Figure 6). Permits to drill are down by 39%, from an average of 6,444 in 2007/2008 to an average of 3,962 in 2009/2010. Reduced permitting trends appear to be continuing with 3,815 drilling permits recently reported for 2011.

Figure 6:
Number of Permits Issued During the Year on Federal Lands*

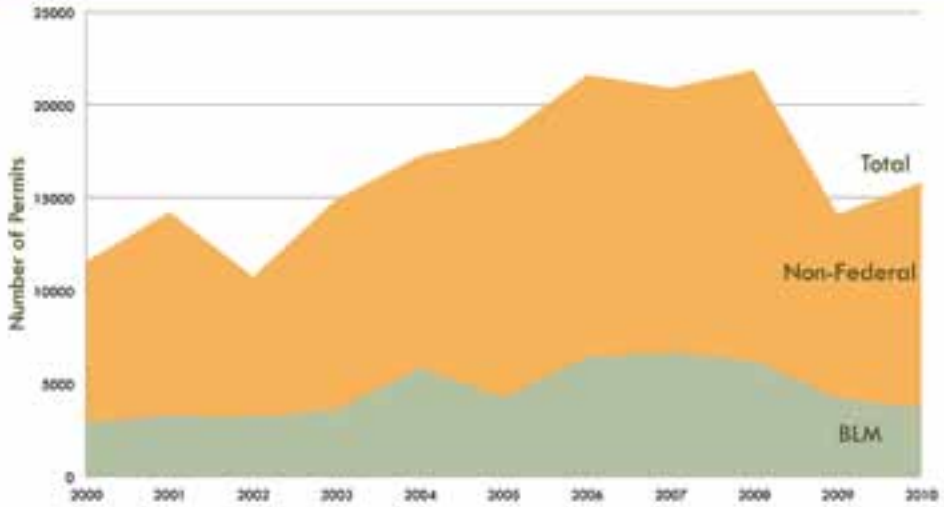


*Western States (Includes Colorado, Montana, New Mexico, North Dakota, Utah and Wyoming)
Source: BLM Oil & Gas Statistics (2010)

*In 2005, natural gas production in many parts of the Rockies began to have difficulty reaching markets due to limited availability of pipeline capacity. However, as sections of the Rockies Express and other pipelines began to be built and put into service, pipeline constraints out of the Rockies were alleviated. There are currently no significant consistent pipeline constraints out of the Rockies.

The slowdown in federal permits issued between 2007/2008 and 2009/2010 cannot be attributed solely to the recession and the reduction in demand for energy. If market factors were the principal driver of the federal lands permitting slowdown, it would be reasonable to assume that non-federal drilling permits would generally track the trends occurring with their federal counterpart. Although all permitting declined in 2009, permitting on nonfederal land rebounded somewhat in 2010. A similar permitting rebound did not occur on federal leases (Figure 7). The number of new permits to drill on federal lands is down by a significantly greater amount (-43%) than the decline in new permits on non-federal lands (-20%). In 2010, the difference in permitting between federal and non-federal lands is especially large. Non-federal permits across the West actually increased by 31%, even as federal drilling permits dropped 13%.

Figure 7:
Total Permits on Western Lands*

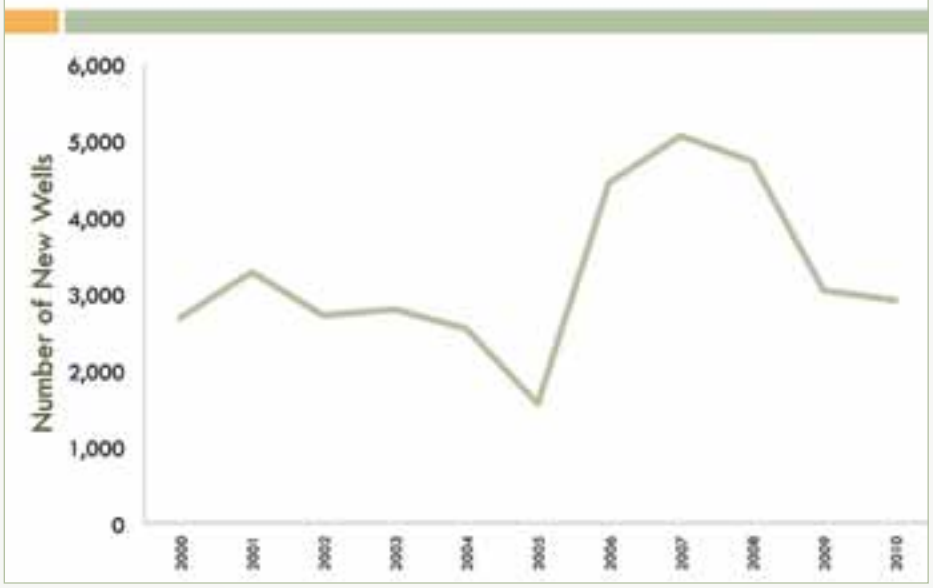


*Western States (Includes Colorado, Montana, New Mexico, North Dakota, Utah and Wyoming)
Source: BLM Oil & Gas Statistics (2010), State Oil and Gas Commissions

1.3 New Wells Drilled on Federal Land: Down 39%

The slowdown in federal leasing and permitting has led to a decline in the number of new oil and gas wells drilled on federal land between 2008 and 2010. Following a period of general growth in the number of wells started over the previous 8 years, new wells drilled on federal lands declined in 2009 and 2010. More permits are associated with more drilling activity (Figure 8). As the number of permits has declined in 2009 and 2010, the number of new wells drilled on federal lands has declined as well; down 39% from an average of 4,890 in 2007/2008 to 2,973 in 2009/2010. The reduced level drilling appears to be continuing. The BLM recently reported 2,783 wells were drilled in the western states in 2011.

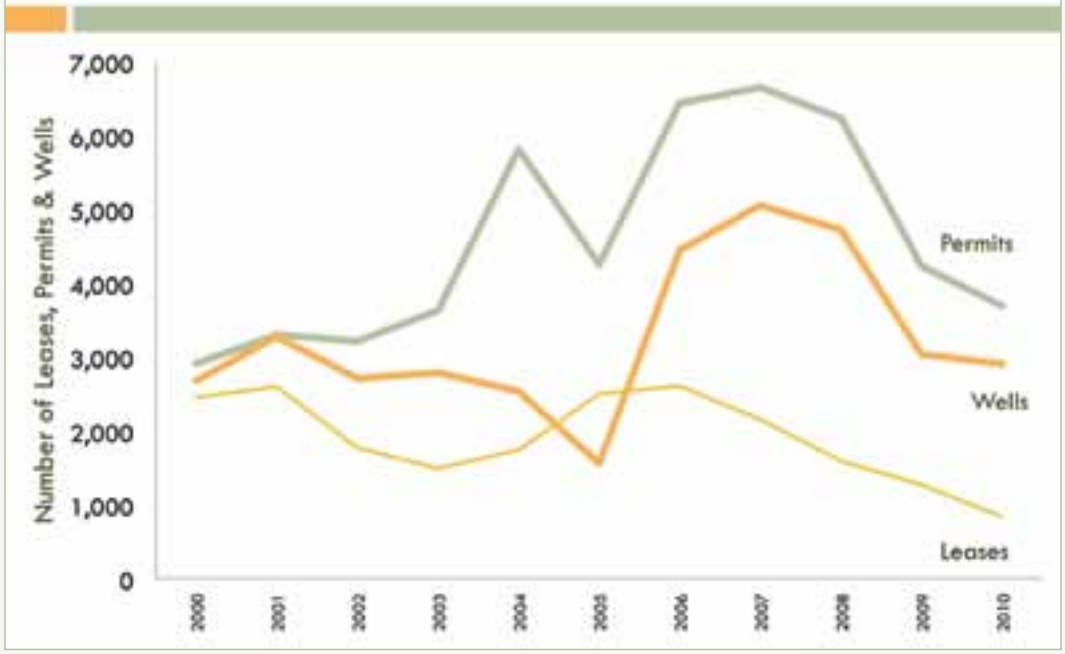
Figure 8:
Number Of New Wells Started During the Year on Federal Lands*



*Western States (Includes Colorado, Montana, New Mexico, North Dakota, Utah and Wyoming)
Source: BLM Oil & Gas Statistics (2010)

Figure 9 summarizes, in the cumulative, current trends of oil and gas development on federal lands. Comparing the two year period of 2007/2008 to 2009/2010, the number of new oil and gas leases issued by the BLM is down 44%, the number of new permits to drill issued by the BLM is down 39%, and the number new federal wells drilled on BLM lands is also down 39%.

Figure 9:
Number of Leases, Permits Issued and Wells Started During the Year on Federal Lands*



Western States (Includes Colorado, Montana, New Mexico, North Dakota, Utah and Wyoming)
Source: BLM Oil & Gas Statistics (2010)

2 ADVERSE FEDERAL LAND POLICY

The slowdown in new leases, permits and wells drilled on BLM lands is, in real part, attributable to the direction of current federal land energy policy. The Department of Interior (DOI) and the BLM have refused to follow the federal requirements that require timely action on important oil and gas decisions, and, what's more, DOI and BLM have established a host of new rules, policies and administrative actions that are adversarial to energy production on federal lands. Among those adversarial actions and decisions:

- From the very beginning, the current administration has failed to issue onshore oil and gas leases within the legally required 60-day timeline. Such unreasonable delays also have the effect of chasing away future investment from federal permitting, and the federal leases that are their pre-condition. Specifically, the GAO found that the administration failed to issue 91% of leases on federal land within the time frame required under federal law, without releasing or refunding more than a hundred million dollars in lease and bonus payments (U.S. GAO, 2010). In June of 2011 the BLM lost a lawsuit with independent energy producers for failure to meet this 60-day requirement, a judicial affirmation that the administration is causing unreasonable delay in federal oil and gas permitting.

- In 2009, the BLM rescinded 77 oil and gas leases issued in Utah, and in 2010, the BLM did the same, canceling 91,000 acres of oil and natural gas leases in Montana, North Dakota and South Dakota. This action, in addition to limiting energy production opportunities in these specific areas, also cast a pall of uncertainty around scores of other BLM oil and gas leases.

- In February 2009, BLM refused to issue oil-shale research and development leases in Colorado and Utah, a move that injected considerable uncertainty into the marketplace of energy producers investing significant resources into oil-shale R&D eforts. (Johnson, 2009).

- In January 2010, the DOI announced a slew of new administrative requirements to the onshore leasing process. While leasing regulations already involve land use planning and extensive reviews of parcel conformance with the land use plan and environmental and disturbance measures, new leasing regulations extend the analysis and lengthen the leasing process. The 2010 changes add entire environmental review documents for each revision or new stipulation, mandate public involvement from outside groups for comment and extend the interdisciplinary review of lease sale parcels. According to the Western Energy Alliance, "DOI created new policies in 2010 that will add three additional layers of regulation to the exploration and development of oil and natural gas on public lands. These regulations are in addition to the existing five levels of regulation and analysis that for decades have made development on federal lands more time-consuming and difficult than on private lands. All this redundant analysis has led to anemic lease sales-just a few parcels in many cases-cancelled lease sales, indeterminate deferrals, and indefinite delays from nomination to sale." (Western Energy Alliance, 2011). Here again, these new requirements cast an additional cloud of uncertainty around a leasing process that is already heavily regulated.

- In May 2010, BLM suspended 61 leases that were issued in Montana (U.S. DOI, 2010).

- In December 2010, the DOI announced a new "Wild Lands" policy, a new federal lands categorization that critics contend will force land managers to treat the lands as de facto wilderness (U.S. DOI, 2010). After Congress inserted a rider that prohibited the Wild Lands policy from proceeding in the current fiscal year, the DOI was forced to withdraw the plan, though the practical availability of these lands for energy production still remains uncertain.

- In March 2011, BLM placed new bureaucratic barriers in the way of commercial oil-shale development as part of a settlement with environmental groups (Proctor, 2011). This new rulemaking will make it difficult, if not impossible, to turn R&D oil shale leases into a commercial oil shale production program, at the point in time technological advancement allows.

- In June 2011, the head of the Environmental Protection Agency was reported saying that, at the end a 2-year study on hydraulic fracturing, EPA would promulgate new federal restrictions on hydraulic fracturing (Travers, 2011). Currently, hydraulic fracturing is regulated by the States, and many States have added new regulatory requirements to the practice in recent years. Still, new federal regulatory restrictions surrounding the practice of hydraulic fracturing, and the inevitable barrage of anti-development litigation such rules would invite, is of widespread concern, since hydraulic fracturing is the key to accessing billions of barrels of oil and trillions of cubic feet of natural gas in "unconventional" oil and gas plays across the western U.S. Various departments and agencies are considering new hydraulic rules and regulations.

- In May of 2010 the DOI issued a policy that would require redundant environmental reviews in drilling locations where a review had already recently been conducted. In years past, an expedited procedure would have minimized additional reviews for already analyzed drilling locations- ultimately allowing operators to move forward in a more timely fashion. In August of 2011, a judge ruled against the government's new policy, stating that western oil and gas companies had been harmed, and placed a nationwide injunction against the new redundant requirements promulgated by DOI earlier in 2011 (Western Energy Alliance vs. Ken Salazar et al.).

On a practical level, the current regulatory environment has not only resulted in fewer leases being issued by the BLM, but when leases are issued, these new restrictions make it more difficult, expensive and time-consuming to translate those leases into actual drilling permits, new drilling activity, and eventual production. Some have attempted to deflect blame for a decline in new federal production by attributing it to energy companies that have not developed existing federal oil and gas leases. But according to one industry survey, more than 50% of all federal lands that have been leased but not produced are hindered by post-leasing, pre-permitting, pre-drilling administrative processes (Western Energy Alliance, 2011).

Taken together, these recent policy decisions seem to have created an atmosphere which directly hinders future oil and natural gas production on federal land. Increased regulatory uncertainty - while harmful to business in general – is detrimental to an industry that depends on long-term investments for developing resources and technology necessary for energy production.

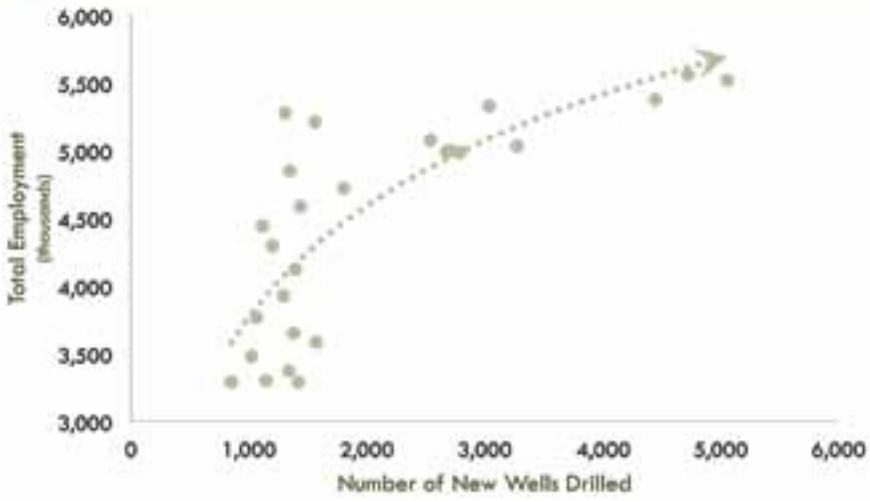
Beyond just the impact on domestic energy production, this regulatory environment has the potential to encourage energy producers to invest more of their resources in foreign nations and foreign energy reserves.

3 Economic Projections for Western U.S. Oil and Natural Gas Development

Oil and gas exploration and development is key to the economic vitality of the regional economy, and the number of new leases, permits and federal wells drilled will have economic and energy security impacts. Currently, the Western Energy Alliance estimates that oil and natural gas exploration and development supports 488,000 total jobs[4] in the western states; employment in the industry accounts for 8.1 percent of total regional employment; and oil and gas employees in the western states earn more than $27 billion in annual labor income, accounting for 10.3 percent of total regional labor income (Western Energy Alliance, 2010). For the purposes of this report, we will only narrowly focus on the direct "upstream" job implications of federal energy policy.

Figure 10 demonstrates the role that leasing and permitting plays in maintaining and expanding western states' employment. It shows that increased drilling activity is associated with increased employment in the western U.S.

Figure 10:
Relationship Between Drilling Activity and Employment, 1985–2010*



*Western States (Includes Colorado, Montana, New Mexico, North Dakota, Utah and Wyoming)
Source: BLM Oil & Gas Statistics (2010)

4. The Western Energy Alliance estimate includes all downstream employment impacts in the industry, ranging from pipeline transportation to gas station attendants; therefore this number reflects the total impact on the industry. Our analysis deals with upstream exploration and production related job categories, mapped to the following NAICS codes, and explained further in this Report. NAICS codes: 211- Oil and gas extraction, 213111- Drilling oil and gas wells, 213112- Support activities for oil and gas operations.

Energy production on federal lands also has the capacity to contribute large sums of severance and ad valorem taxes to state and local governments, and substantial revenues to the federal government in the form of federal royalties, bonuses and leasing payments. Therefore, policy decisions that impact oil and natural gas development on federal lands will also impact jobs and government revenues. For the purposes of this Report, future projections of oil and natural gas development and the associated economic impacts are framed by the following two cases: what would happen to domestic energy production, job growth and state and federal tax revenues if federal leasing and permitting levels returned to their 2007/2008 levels as compared to a continuation of 2009/2010 levels into the future?

We use regression analysis to measure the relationship between the number of energy leases and permits issued in a given year and the subsequent production of oil and natural gas from the leases on federal land in succeeding years. The results quantify the economic consequences of more leasing/permitting/drilling and less of the same. The estimated statistical relationship can be applied to various policy cases to evaluate how prospective policies would affect future production.

Two different cases are analyzed in the modeling exercise: a Baseline Case, which demonstrates the projected effects of continuing the levels of leasing, permitting and new drilling as seen in 2009/2010; and an Alternative Case, which shows the energy production, economic, and revenue impacts of returning to the level of leasing, permitting, and new federal drilling experienced in 2007/2008. The Baseline and Alternative Cases are useful in demonstrating the difference that policy changes can have on future energy production, employment and government tax revenues. The compelling feature of the model is in highlighting the difference, or delta, between a regulatory environment that encourages more leasing, permitting and new drilling versus the current regulatory climate which is more restrictive.

The relevant data in the regression analysis includes information from the BLM regarding the number of leases, permits, and production on federal lands. Functional form and statistics results are discussed further in the appendix.

Forecasts of production were developed under a “Baseline” and an “Alternative” Case using the following assumptions.

- **Baseline** Case represents the average annual number of leases and permits issued in 2009 and 2010, (1,060 leases a year and 3,970 permits a year).
- **Alternative** Case represents the average annual total number of leases and permits issued in 2007 and 2008, (1,880 leases a year and 6,450 permits a year).

Projections of future production were pivoted off of 2010 actual production. That is, actual values for dependent variables (oil production, natural gas production, and number of new wells drilled) for 2010 were used as the basis on which the projected percent changes were applied. This provided a Baseline and an Alternative estimate of production and drilling for each of the years 2011 through 2015. The Baseline value was subtracted from the Alternative value to provide the estimated impact, or delta, associated with increased leasing and permitting activity.

3.1 Overview of Baseline and Alternative Trends

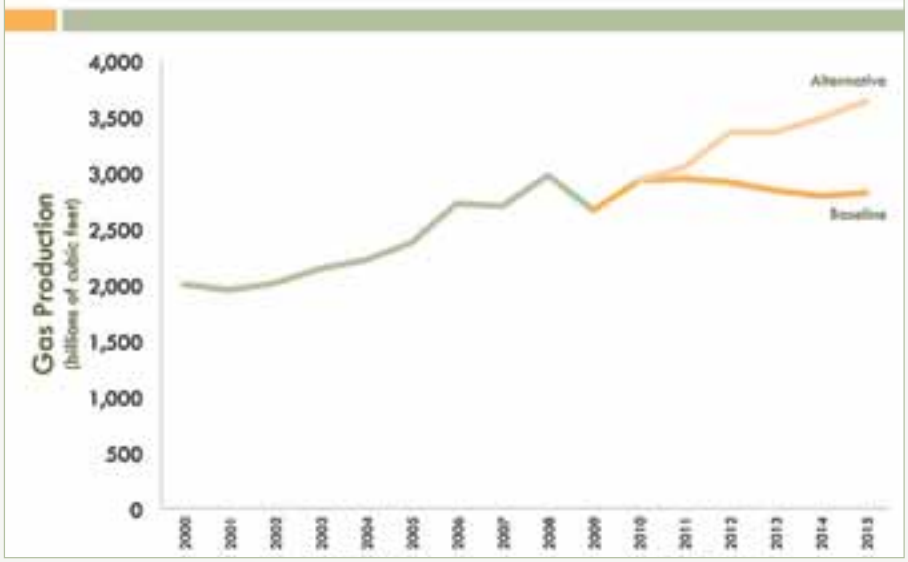
The models show that domestic oil and gas production, and the jobs and revenues that accompany such production, would experience a meaningful rebound under the Alternative Case, where a return to the 2007/2008 leasing, permitting, and drilling activities are assumed. Under the Baseline Case, where a continuation of the current slowdown is assumed going forward, natural gas production on federal lands stagnates, and oil production on federal lands would enter a period of year over year decline through the year 2015.

3.2 Increased Leasing and Permitting Would Lead to Increased Production

The models show that the effect of returning to 2007/2008 leasing and permitting levels is an increase of new domestic oil and natural gas supply for American consumers.

The impact of returning to 2007/2008 permitting and leasing levels is substantial when it comes to natural gas production, with a 516 billion cubic feet a year average increase in western states production over the next five years (Table 2). In natural gas production, the biggest winners would be Wyoming, New Mexico and Colorado, where natural gas production would increase on average by 262 billion cubic feet, 133 billion cubic feet, and 54 billion cubic feet, respectively, each year over the 2011-2015 time period.

Figure 11:
Natural Gas Production From Leases on BLM Lands*



*Western States (Includes Colorado, Montana, New Mexico, North Dakota, Utah and Wyoming)
Source: Economics International Corp. calculations based on information from BLM Oil & Gas Statistics (2010) and ICF International Rocky Mountain Forecasts (2011)

TABLE 2 – NET (Alternative Minus Baseline)
Natural Gas Production, billion cubic feet

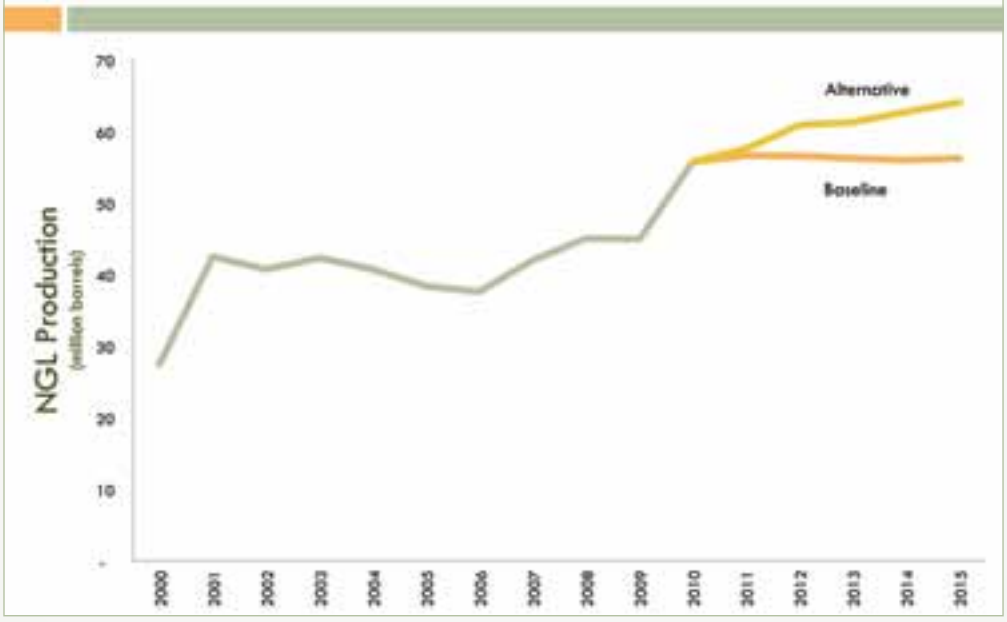
Increase in production relative to amount associated with baseline number of leases and permits issued

Year	Colorado	Montana	New Mexico	North Dakota	Utah	Wyoming	Total
2011	11	2	24	0	11	54	103
2012	45	8	110	1	50	232	447
2013	53	9	132	1	58	263	517
2014	72	12	183	2	76	351	696
2015	87	14	215	2	89	410	818
Average	**54**	**9**	**133**	**1**	**57**	**262**	**516**

Source: Economics International Corp. calculations based on information from BLM Oil & Gas Statistics (2010) and ICF International Rocky Mountain Forecasts (2011)

For natural gas liquids, returning to the 2007/2008 level of leases and permits issued would be associated with a 25 million barrel a year average increase in production between now and 2015 (Table 3). Given New Mexico and Wyoming's history of greater natural gas production on federal lands, those two states would also benefit from a return in this category as well. New Mexico would average an annual increase of 2.6 million barrels of natural gas liquids over the next five years, and Wyoming would average an annual 1.6 million barrel increase.

Figure 12:
Natural Gas Liquids Production From Leases on BLM Lands*



*Western States (Includes Colorado, Montana, New Mexico, North Dakota, Utah and Wyoming)
Source: Economics International Corp. calculations based on information from BLM Oil & Gas Statistics (2010) and ICF International Rocky Mountain Forecasts (2011)

TABLE 3 – NET (Alternative Minus Baseline)
Natural Gas Liquids Production, million barrels

Increase in production relative to amount associated with baseline number of leases and permits issued

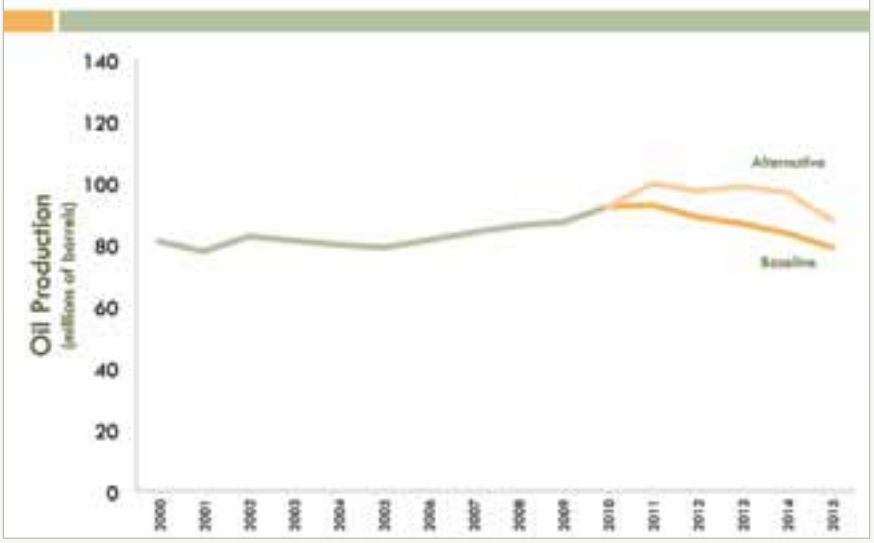
Year	Colorado	Montana	New Mexico	North Dakota	Utah	Wyoming	Total
2011	0.1	0.0	0.5	0.0	0.1	0.3	1.0
2012	0.3	0.0	2.2	0.0	0.4	1.4	4.3
2013	0.3	0.0	2.6	0.0	0.5	1.6	5.0
2014	0.4	0.0	3.5	0.0	0.6	2.1	6.7
2015	0.5	0.0	4.1	0.0	0.7	2.4	7.8
Average	**0.3**	**0.0**	**2.6**	**0.0**	**0.5**	**1.6**	**5.0**

Source: Economics International Corp. calculations based on information from BLM Oil & Gas Statistics (2010) and ICF International Rocky Mountain Forecasts (2011)

When it comes to oil production, (Table 4), returning to the 2007/2008 average level of leases and permits issued would result in a 9.9 million barrel a year average increase on federal lands in western states oil production over the 2011-2015 period relative to the production that would occur under 2009/2010 average leasing and permitting levels.

A return to 2007/2008 federal leasing, permitting and new drilling levels would generate a projected average of 3.6 million additional barrels of oil each year over the next 5 years from the state of Wyoming alone. In Utah, oil production would grow by an average of 1.4 million barrels each year over the next 5 years under a return to 2007/2008 federal land productivity measures. And North Dakota would experience an average 800,000 barrel per year jump each year over the projected horizon.

Figure 13:
Oil Production From Leases on BLM Lands*



*Western States (Includes Colorado, Montana, New Mexico, North Dakota, Utah and Wyoming)
Source: Economics International Corp. calculations based on information from BLM Oil & Gas Statistics (2010) and ICF International Rocky Mountain Forecasts (2011)

TABLE 4 – NET (Alternative Minus Baseline)

Oil Production, million barrels

Increase in production relative to amount associated with baseline number of leases and permits issued

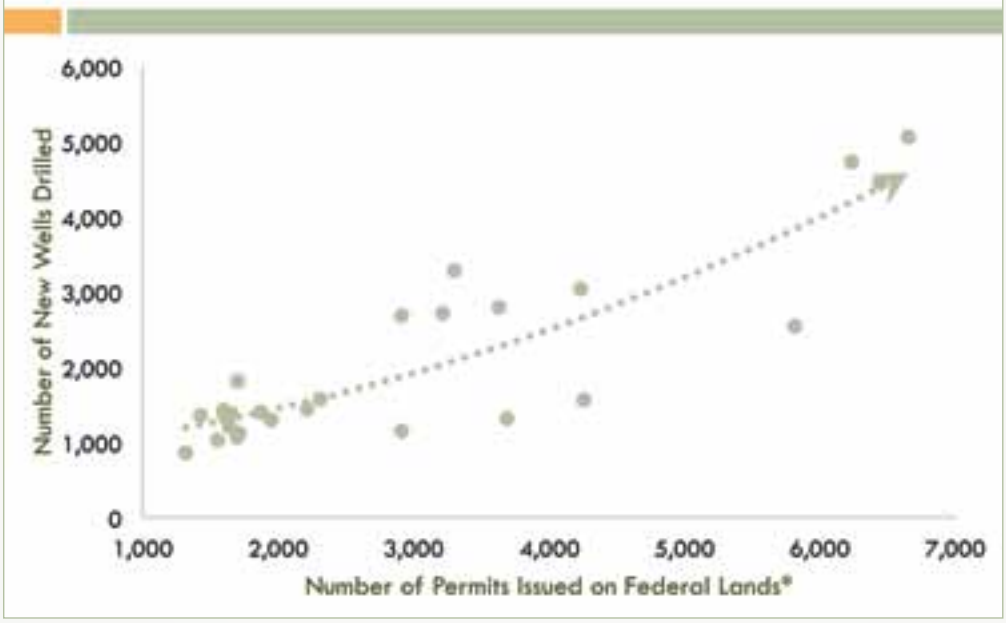
Year	Colorado	Montana	New Mexico	North Dakota	Utah	Wyoming	Total
2011	0.27	0.31	2.38	0.59	0.98	2.59	7.12
2012	0.34	0.36	2.81	0.69	1.25	3.02	8.47
2013	0.51	0.52	3.91	0.95	1.72	4.42	12.03
2014	0.52	0.56	4.32	1.07	1.92	4.80	13.2
2015	0.37	0.38	2.91	0.71	1.27	3.22	8.87
Average	**0.40**	**0.43**	**3.27**	**0.80**	**1.43**	**3.61**	**9.94**

Source: Economics International Corp. calculations based on information from BLM Oil & Gas Statistics (2010) and ICF International Rocky Mountain Forecasts (2011)

3.3 Increased Production Would Lead to Increased Employment

Oil and gas exploration and development is an important part of the regional economy. Freeing up federal lands for that purpose would be a boon to the western states by paving the way for job creation. Expanding the energy productivity of federal lands would drive increased drilling activity—which in turn would mean more jobs. There is a clear relationship between increased permitting and drilling activity, as seen in Figure 14.

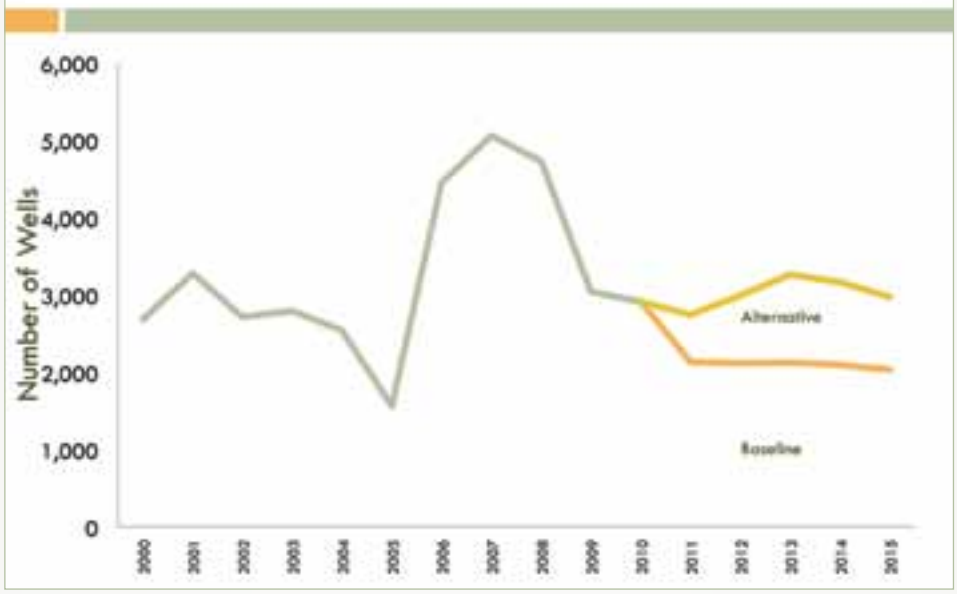
Figure 14:
Relationship Between Permitting and Drilling Activity, 1985–2010*



*Western States (Includes Colorado, Montana, New Mexico, North Dakota, Utah and Wyoming)
Source: BLM Oil & Gas Statistics (2010) and ICF International Rocky Mountain Forecasts (2011)

Based on this type of relationship, we can quantify the effect of the number of new permits issued on the number of new wells started. For instance, returning to the 2007/2008 levels of new permitting would be associated with an increase in drilling activity (Table 5). The western states stand to gain an average of 928 new wells drilled a year over the next five years. Colorado and Utah will gain on average over 100 new wells each year, relative to their 2000-2010 average (Table 6). New Mexico and Wyoming will also more than double that gain, averaging 236 and 378 new wells each year, respectively.

Figure 15:
Number of Wells Started During the Year on Federal Lands*



*Western States (Includes Colorado, Montana, New Mexico, North Dakota, Utah and Wyoming)
Source: Economics International Corp. calculations based on information from BLM Oil & Gas Statistics (2010) and ICF International Rocky Mountain Forecasts (2011)

2010 well numbers and the Alternative and Base scenarios were adjusted using the latest 2010 estimate from the BLM. See page 44 for more detail.

TABLE 5 – NET (Alternative Minus Baseline)
Number of Wells Started (Spud) on Federal Lands

Increase in wells relative to amount associated with baseline number of leases and permits issued

Year	Colorado	Montana	New Mexico	North Dakota	Utah	Wyoming	Total
2011	70	20	150	30	100	240	610
2012	120	20	220	30	130	360	880
2013	140	40	280	40	160	480	1,140
2014	120	30	280	50	160	430	1,070
2015	120	20	250	40	130	380	940
Average	**114**	**26**	**236**	**38**	**136**	**378**	**928**

Source: Economics International Corp. calculations based on information from BLM Oil & Gas Statistics (2010) and ICF International Rocky Mountain Forecasts (2011)

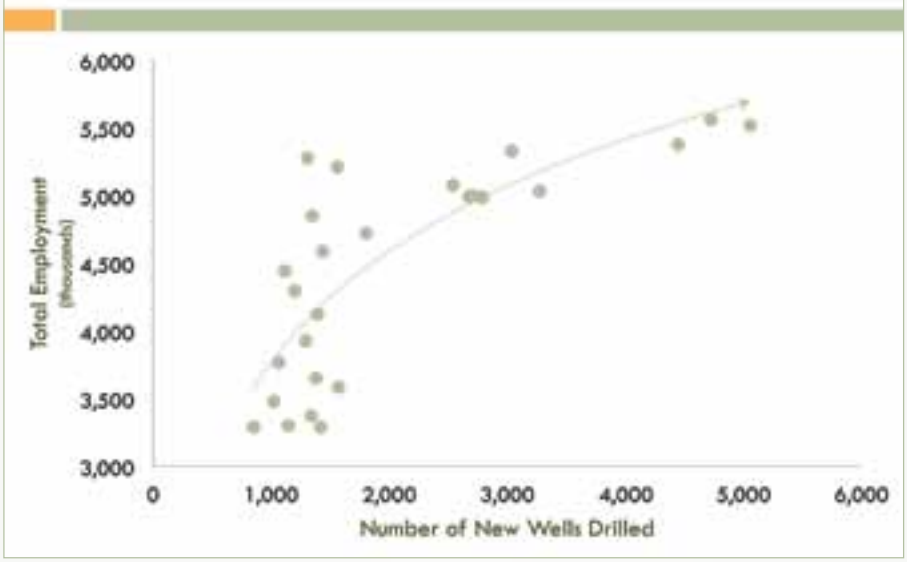
TABLE 6 – Average Actual Wells Started on Federal Lands 2000-2010

Colorado	Montana	New Mexico	North Dakota	Utah	Wyoming
282	103	841	66	330	1,640

Source: BLM Oil & Gas Statistics (2010)

The number of new wells is also an indicator of drilling activity, which in turn is a good indicator of increased employment in the industry, as shown in Figure 16.

Figure 16:
Relationship Between Drilling Activity and Employment



*Western States (Includes Colorado, Montana, New Mexico, North Dakota, Utah and Wyoming)
Source: Economics International Corp. calculations based on information from BLM Oil & Gas Statistics (2010) and ICF International Rocky Mountain Forecasts (2011)

Employment impacts were modeled using IMPLAN.[5] Drilling and completion expenditures were from forecasts provided by ICF.[6] Projections of the number of new wells drilled from the regression analysis (Table 5) were used in conjunction with drilling and completion expenditures to project total drilling and completion expenditures. The expenditures were mapped to IMPLAN sector 28 (drilling oil and gas wells) and sector 29 (support activities for oil and gas operations). The dollar value of production was mapped to IMPLAN sector 20 (oil and gas extraction). Dollar denominated results are not adjusted for inflation. For employment impacts, input expenditures were adjusted for inflation. Employment impacts are reported as the number of full- and part-time jobs. Impacts can be separated into: 1) direct impacts and 2) indirect and 3) induced impacts. Direct impacts are those immediately associated with a particular activity, such as employment directly associated with drilling and completion. Indirect employment includes the impact of local oil and gas companies buying goods and services from other local industries. Induced employment is created when spending increases due to additional household income from higher production in the direct and indirect industries.[7]

5. IMPLAN is an economic impact assessment modeling system that allows the construction of economic models which estimate the impacts of changes in the economies of states, counties and communities.
6. ICF International. (2011) Rocky Mountain Forecasts.
7. Indirect employment includes the impact of local industries buying goods and services from other local industries.

Table 7 outlines the number of direct oil and gas industry related jobs the western states stand to gain by returning to the 2007/2008 level of permitting. Employment in this sector would be expected to be more than five percent higher with the additional leases and permits. As spending on drilling activity works its way through the economy, the employment impacts for the state/regional economies grow too.

TABLE 7 – NET Employment – Direct Effect

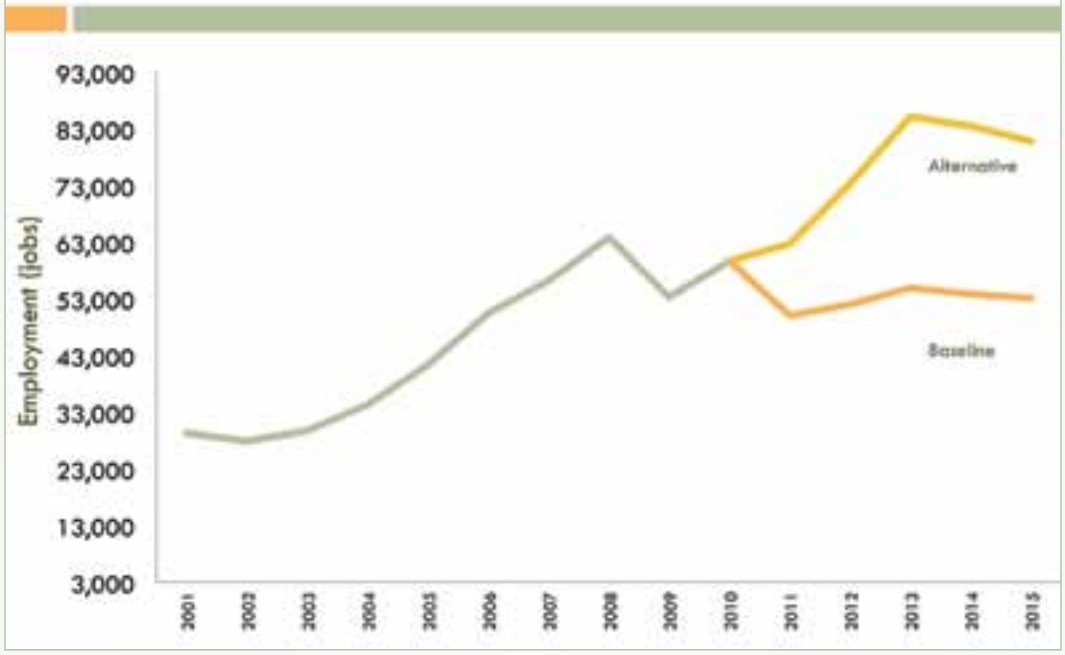
Year	Colorado	Montana	New Mexico	North Dakota	Utah	Wyoming	Total
2011	463	176	738	330	588	1,790	4,085
2012	931	208	1,352	349	855	3,219	6,914
2013	1,127	453	1,793	487	1,097	4,979	9,937
2014	1,085	347	1,958	597	1,154	4,572	9,713
2015	1,156	258	1,822	508	985	4,301	9,032

TABLE 8 – NET Employment – Total Effect

Year	Colorado	Montana	New Mexico	North Dakota	Utah	Wyoming	Total
2011	1,840	636	2,194	966	2,515	4,505	12,656
2012	3,748	751	4,014	1,021	3,653	8,129	21,315
2013	4,536	1,635	5,325	1,427	4,689	12,550	30,163
2014	4,419	1,253	5,806	1,749	4,934	11,553	29,715
2015	4,728	931	5,400	1,488	4,211	10,887	27,642

Source: Economics International Corp. calculations based on information from BLM Oil & Gas Statistics (2010) and ICF International Rocky Mountain Forecasts (2011)

Figure 17:
Total Employment Supported by Oil and Gas Development on Federal Land in Western States*



*Western States (Includes Colorado, Montana, New Mexico, North Dakota, Utah and Wyoming)
Source: Calculations based on information from BLM Oil & Gas Statistics (2010) and ICF International Rocky Mountain Forecasts (2011)

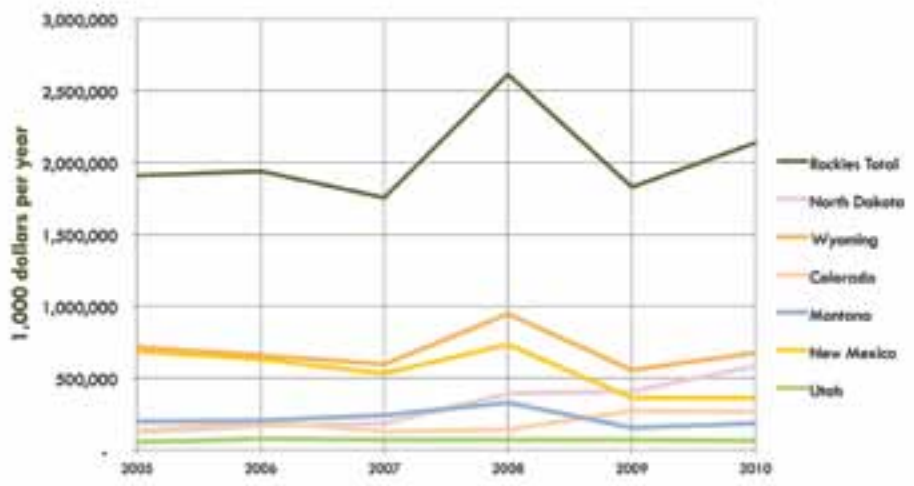
As Table 8 shows, a return to the 2007/2008 average level of leases and permits issued would be associated with an increase in employment of roughly 30,000 full- and part-time jobs by 2013, at a time when the economy is struggling to add jobs. In November 2011, the total number of unemployed residents in Utah was 85,783. The number of unemployed persons in New Mexico during that same period was 61,284. (U.S. Bureau of Labor Statistics, 2011).

Wyoming, Utah, New Mexico and Colorado – the Western States most dependent on federal lands for oil and gas production – would experience the sharpest jobs growth under a return to 2007/2008 levels. Each of these states would experience thousands of new direct jobs each and every year over the next 5 years if production levels increased to 2007/2008 levels. North Dakota would experience some jobs growth as well, although it would be less marked since the bulk of that state's new production is taking place on private lands.

3.4 Increased Production Would Lead to Increased Tax Revenues for Cash Strapped States

Increased domestic energy production brings benefits in the form of increased tax revenues. Western Energy Alliance calculates, for example, that every dollar appropriated for BLM's onshore oil and gas management program generates over $40 in royalty, rent, and bonus revenue for the federal government (Western Energy Alliance, 2010).[8] State governments too depend on revenues collected through severance and ad valorem taxes, which is assessed based on the value of the oil or natural gas produced. Figure 18 shows the degree to which the western states depend on oil and gas tax revenues—totaling billions every year.

Figure 18:
Oil and Gas Severance Taxes by State



Source: ICF International Rocky Mountain Forecasts (2011)

8. Western Energy Alliance's estimate compares the $69.3 million FY2010 Onshore BLM budget request and the $2.78 billion reported Department of Interior, Office of Natural Resources Revenue, Total Federal Onshore Federal Royalties Revenue in order to calculate the impact per dollar spent.

Table 9 shows what the western states stand to gain with increased leasing and permitting. An increase to the 2007/2008 average level of leases and permits issued would be associated with an average increase in severance and ad valorem taxes of $232 million per year for the time period 2011 to 2015. Importantly, this revenue boost to the western states would occur without the imposition of higher tax rates, and the negative implications associated with such a tax increase.

TABLE 9 – NET (Alternative Minus Baseline)
Severance and Ad Valorem Taxes, $ millions

Increase in revenues relative to amount associated with baseline number of leases and permits issued

Year	Colorado	Montana	New Mexico	North Dakota	Utah	Wyoming	Total
2011	$2	$3	$26	$3	$3	$22	$59
2012	$8	$7	$78	$5	$9	$75	$183
2013	$11	$9	$103	$7	$12	$95	$236
2014	$15	$11	$140	$8	$15	$130	$319
2015	$19	$11	$159	$6	$17	$151	$362
Total	**$54**	**$40**	**$506**	**$29**	**$56**	**$473**	**$1,158**

Source: Economics International Corp. calculations based on information from BLM Oil & Gas Statistics (2010) and ICF International Rocky Mountain Forecasts (2011)

Here again, the big winners under a return to 2007/2008 levels are those states that rely most heavily on federal lands for oil and natural gas production. New Mexico would, on average, see more than a $100 million increase in severance tax revenue each year over the next 5 under a return to 2007/2008 levels. Meanwhile, Wyoming would see an average increase of severance tax equaling $95 million over the next 5 years.

Figure 19:
State Severance Tax and Ad Valorem Revenues*

*Western States (Includes Colorado, Montana, New Mexico, North Dakota, Utah and Wyoming)
Source: Economics International Corp. calculations based on information from BLM Oil & Gas Statistics (2010) and ICF International Rocky Mountain Forecasts (2011)

3.5 Federal Royalties

Oil and natural gas production on federal lands is taxed at the local and state level, and also by the federal government. These levies are known as Federal Mineral Lease payments and, upon receipt, they are divided between the federal government and the states from which the royalties are derived on a near 50/50 basis.

A return to 2007/2008 oil and natural gas leasing, permitting and drilling levels would result in more than $2.1 billion to the federal treasury over the next 5 years in the form of increased Federal Mineral Royalties.[9] Wyoming would generate an additional $981 million dollars combined to the federal treasury over the next 5 years under a return to 2007/2008 levels.

Figure 20:
Federal Mineral Royalties in Western States*

*Western States (Includes Colorado, Montana, New Mexico, North Dakota, Utah and Wyoming)
Source: Economics International Corp. calculations based on information from BLM Oil & Gas Statistics (2010) and ICF International Rocky Mountain Forecasts (2011)

TABLE 10 – NET (Alternative Minus Baseline)

Federal Royalties Of Production Of Oil, Natural Gas And NGLs, $ million

Year	Colorado	Montana	New Mexico	North Dakota	Utah	Wyoming	Total
2011	7.3	3.2	31.9	4.6	12.8	45.6	105.5
2012	27.9	7.6	97.9	7.2	40.2	156.3	337.1
2013	36.4	9.9	127.9	9.6	51.4	197.4	432.6
2014	51.0	11.9	175.3	10.7	67.6	268.6	585.2
2015	63.4	12.3	198.6	7.7	74.5	313.0	669.6
Total	186.1	45.0	631.7	39.9	246.5	980.9	2,129.9

Source: Economics International Corp. calculations based on information from BLM Oil & Gas Statistics (2010) and ICF International Rocky Mountain Forecasts (2011)

9. Under current federal law, just less than half of all federal mineral lease royalties are directed back to the states, which means the states themselves will experience significant revenue gain as result of increasing federal mineral lease dollars.

4 CONCLUSION

The Western U.S. experienced a decline in oil and natural gas leasing, permitting, and new drilling on federal lands during 2009 and 2010 relative to previous years. Preliminary leasing data suggests that the downward trend has continued into 2011. This is expected to result in a reduction of domestically produced oil and natural gas, a loss of thousands of jobs in both energy and non-energy sectors of the economy, and the surrender of hundreds of millions of dollars in state and federal tax revenues, royalties, and lease payments to western states and the U.S. Treasury.

In sum, returning to permitting and leasing levels experienced in 2007 and 2008 would:

- Increase Western U.S. natural gas production by an average of 516 billion cubic feet per year 2012 to 2015.
- Increase Western U.S. oil production by an average of 9.9 million barrels per year 2012 to 2015.
- Direct employment increases in the oil and gas industry in energy producing western states of 4,085 jobs in 2011, 6,914 jobs in 2012, 9,937 jobs in 2013, 9,713 in 2014, and 9,032 in 2015.
- Increase total employment in energy producing western states over the next four years by an annual average increase of 24,298 total jobs.
- Severance and ad valorem taxes would increase by over $1.2 billion from 2011 to 2015.
- Federal royalty would increase ranging from $106 million to $670 million per year through 2015, totaling over $2.1 billion in five years.

For policymakers seeking to expand domestic energy production and stimulate economic growth, the public policy choice is clear. Federal lands energy policy needs to change in order to encourage development of oil and natural gas resources in a sensible, orderly and balanced way.

4.1 Sources

Davidson, P. (2011, March 10). USA Today. Retrieved 2011, from What's Libya's impact on oil?: http://www.usatoday.com/money/industries/energy/2011-03-10-libyaoil10_ST_N.htm

Goode, D. (2011, March 11). Bill Clinton: Drilling delays 'ridiculous'. Retrieved 2011, from Politico: http://www.politico.com/news/stories/0311/51150.html

Johnson, W. (2009, February 4). KSL Utah. BLM cancels 77 oil and gas leases in Utah. Retrieved 2011 from http://www.ksl.com/?nid=148&sid=5504421

Proctor, C. (2011, March 15). Denver Business Journal. Salazar: Feds to review oil-shale rules challenged by environmentalists. Retrieved 2011 from http://www.bizjournals.com/denver/news/2011/02/15/salazar-feds-to-review-oil-shale.html

Travers, A. (2011, June 29). Aspen Daily News. EPA chief promises action on air pollution from gas drilling. Retrieved 2011 from http://www.aspendailynews.com/section/home/147664

U.S. Bureau of Labor Statistics. (2011). Local Area Unemployment Statistics. Retrieved from http://www.bls.gov/lau/

U.S Department of the Interior. (2010). BLM Lifts Oil and Gas Lease Suspensions. Retrieved 2011 from http://www.blm.gov/mt/st/en/info/newsroom/2010/december/suspendedleases.html

U.S. Department of the Interior. (2010). Order No. 3310. Subject: Protecting Wilderness

Characteristics on Lands Managed by the Bureau of Land Management. Retrieved 2011 from U.S. Bureau of Land Management http://www.blm.gov/pgdata/etc/medialib/blm/wo/Communications_Directorate/public_affairs/news_release_attachments.Par.26564.File.dat/sec_order_3310.pdf

U.S Government Accountability Office. (2010, July 30). Report: Onshore Oil and Gas: BLM's Management of Public Protests to Its Lease Sales Needs Improvement. Retrieved 2011, from http://www.gao.gov/products/GAO-10-670

Western Energy Alliance. (2010, December 9). Western Energy Alliance Releases "Dashboard" Showing Trends in Western Oil and Natural Gas Development. Retrieved 2011, from Western Energy Alliance: http://westernenergyalliance.org/wp-content/uploads/2009/05/News-Release-%E2%80%9CDashboard%E2%80%9D-Showing-Trends-in-Western-Oil-and-Natural-Gas-Development.pdf

Western Energy Alliance. (2011, March 15). Western Energy Alliance: Non-producing Leases the Result of Bureaucratic Red Tape. Retrieved 2011, from Western Energy Alliance: http://westernenergyalliance.org/wp-content/uploads/2009/05/News-Release-Non-producing-Leases-the-Result-of-Bureaucratic-Red-Tape1.pdf

Western Energy Alliance vs. Ken Salazar, Secretary of the Interior, United States Bureau of Land Management, Roberts V. Abbey, Director of the Bureau of Land Management, United States Forest Service and Thomas Tidwell, Chief of the United States Forest Service, 2011 U.S. District Court for the District of Wyoming, (August 12, 2011)

5 APPENDIX: Data and Methodology

This study quantifies the relationship between the number of energy leases and drilling permits issued in a given year and the subsequent production of oil and natural gas from the leases on federal land in several western states. Projections of the impacts on production are used to forecast impacts on employment and severance and ad valorem taxes. Results from the econometric analysis were used to forecast future energy production under several scenarios.

This appendix describes the data and methodology employed in the empirical analysis. The analysis is focused on the states of Colorado, Montana, New Mexico, North Dakota, Utah, and Wyoming, which for convenience will be referred to as the "Western States." Unless stated otherwise, the analysis and findings pertain only to these Western States. The analysis is based on the information available at the time the analysis is conducted. As such, the approach and conclusions may change in future studies as new or additional information is obtained.

5.1 Data

This empirical analysis used the following data. BLM data used is from the FY2010 Oil and Gas Statistics.

- Number of new leases issued during the year, by state (BLM);
- Applications for Permit to Drill (APDs) on federal lands (BLM);
- Oil production on federal lands, barrels (BLM);
- Gas production on federal lands, mcf (BLM);
- NGL production associated with federal lands, gallons converted to barrels in this Report (BLM);
- Number of wells started (spud) during the year on federal lands (BLM);
- Well drilling and completion costs, current dollars (ICF);[10]
- Employment and output multipliers (IMPLAN);
- Oil price forecasts, current dollars per barrel, WTI (Economist Intelligence Unit);
- Natural gas price forecasts, current dollars per mcf (Economist Intelligence Unit);
- Severance and ad valorem taxes, current dollars (ICF);
- Royalties collected, current dollars (BLM).

10. Throughout this appendix, current dollars refers to dollar amounts that have not be adjusted for inflation.

5.2 Production and Drilling

Estimates of the impacts of leasing and permitting on oil, gas, and NGL production were produced using a log-log panel regression for oil and gas producing states over the period 1985 through 2010. Independent variables included a constant; cross-sectional fixed effects; a trend; dummy variables for regulatory changes (where appropriate) in 1997, 1992, 2000, and 2005; the number of new leases issued each year (including lags); and the number of permits issued each year (including lags). The analysis employs a lag structure of five lags to quantify the effects over time. Regressions were performed using the EViews econometric package for each of the following dependent variables:

- Oil production on BLM lands (14 states, 1985-2010, 149 observations),
- Gas production on BLM lands (14 states, 1985-2009, 137 observations),
- NGL production associated with BLM lands (12 states, 2000-2010, 76 observations), and
- Number of new wells begun (spud) on BLM lands (14 states, 1985-2010, 145 observations),

Dummy variables for regulatory changes include the following:

- 992: Energy Policy Act, competitive and noncompetitive leases are valid for a minimum of 10 years, and remain valid as long the lease is producing. Prior to the 1992 Act, competitive leases were valid for only five years if not producing.
- 2000: Prior to the year 2000, excess capacity meant that natural gas well production swung as wells were shut on and off to meet market conditions. Much of the excess capacity eroded by 2000 and well production did not swing with price.
- 2005: Energy Policy Act, Maguire (2010) indicates the Act has a small impact on leasing.

Forecasts of production were produced under a “Baseline” and an “Alternative” Case in EViews under the following assumptions. The Baseline represents the average annual number of leases and permits issued in 2009 and 2010 (1,060 leases a year and 3,970 permits a year). The Alternative represents the average annual total number of leases and permits issued in 2007 and 2008 (1,880 leases a year and 6,450 permits a year). The following table provides the assumed number of leases and permits issued under the Baseline and Alternative Case.

TABLE 11 – Baseline and Alternative Leasing and Permitting Scenarios

Leases Issued	Colorado	Montana	New Mexico	North Dakota	Utah	Wyoming
Baseline	120	130	200	140	120	350
Alternatives	210	230	360	250	210	620
Permits Issued						
Baseline	530	60	1,030	110	480	1,760
Alternatives	870	100	1,670	170	780	2,860

Under the assumption of ceteris paribus, all the other independent variables are assumed to remained fixed over the forecast period. Thus, the Baseline and Alternative projections should not be viewed as predictions of future production. Instead, this approach measures the difference between policy cases to evaluate the impact of policy differences.

VARIABLES USED:

OILPROD: total oil production (bbl)
GASPROD: total natural gas production (mcf)
NGLPROD: total natural gas liquids production (gallons)
LISSUED: number of new leases issued during the year
APD: number of APDs permitted during the year federal lands
SPUD: number of wells started (spud) during the year on federal lands

In the regression equations, the natural logarithms of the above variables are used.
1992: Dummy variable equal to 1 if year is 1992 or later and equal to 0 otherwise
2000: Dummy variable equal to 1 if year is 2000 or later and equal to 0 otherwise
2005: Dummy variable equal to 1 if year is 2005 or later and equal to 0 otherwise

REGRESSION EQUATIONS:

Oil production equation:

$$\begin{aligned} OILPROD = {} & b_0\ C + b_1\ TREND + b_2\ LISSUED + b_3\ LISSUED(-1) + b_4\ LISSUED(-2) \\ & + b_5\ LISSUED(-3) + b_6\ LISSUED(-4) + b_7\ LISSUED(-5) + b_8\ APD + b_9\ APD(-1) \\ & + b_{10}\ APD(-2) + b_{11}\ APD(-3) + b_{12}\ APD(-4) + b_{13}\ APD(-5) \end{aligned}$$

Gas production equation:

$$\begin{aligned} GASPROD = {} & b_0\ C + b_1\ TREND + b_2\ 1992 + b_3\ 2000 + b_4\ 2005 + b_5\ LISSUED + b_6\ LISSUED(-1) \\ & + b_7\ LISSUED(-2) + b_8\ LISSUED(-3) + b_9\ LISSUED(-4) + b_{10}\ LISSUED(-5) + b_{11}\ APD \\ & + b_{12}\ APD(-1) + b_{13}\ APD(-2) + b_{14}\ APD(-3) + b_{15}\ APD(-4) + b_{16}\ APD(-5) \end{aligned}$$

NGL production equation:

$$NGLPROD = b_0\ C + b_1\ GASPROD$$

New wells spud equation:

$$\begin{aligned} SPUD = {} & b_0\ C + b_1\ TREND + b_2\ LISSUED + b_3\ LISSUED(-1) + b_4\ LISSUED(-2) + b_5\ LISSUED(-3) + b_6\ LISSUED(-4) \\ & + b_7\ LISSUED(-5) + b_8\ APD + b_9\ APD(-1) + b_{10}\ APD(-2) + b_{11}\ APD(-3) + b_{12}\ APD(-4) + b_{13}\ APD(-5) \\ & + b_{10}\ APD(-2) + b_{11}\ APD(-3) + b_{12}\ APD(-4) + b_{13}\ APD(-5) \end{aligned}$$

As a log-log model, estimated coefficient results are interpreted as elasticities, or percent changes. For example, in the oil production coefficient, the coefficient on one-year lagged number of permits issued is 0.20. In other words, all other things held constant, a 10 percent increase in the number permits issued the year-before-last would be associated with a two percent increase in oil production this year.[11]

TABLE 12 – Regression Results

	Oil Production	Gas Production	NDL Production	Wells Spud
R-Squared	0.99	0.99	0.97	0.95
Coefficient	14.36	14.38	14.4	-1.90
Std. Error	0.063	0.69	1.14	.87

Projections of future projection were pivoted off of 2010 actual production. That is, actual values for dependent variables for 2010 were used as the basis on which the projected percent changes were applied. This provided a Baseline and an Alternative estimate of production and drilling for each of the years 2011 through 2015. The Baseline value was subtracted from the Alternative value to provide the estimated impact, or delta, associated with increased leasing and permitting activity. The analysis evaluates the differences between a "Baseline" level of permits and leases, and an "Alternative" level of permits and leases. The regression uses a panel data set and measures cross-sectional fixed effects.

The results are presented in Table 2, 3, 4 and 5 for gas production, NGL production, oil production and new wells respectively.

11. Natural gas liquids production is modeled as a function of natural gas production; regression results indicate an elasticity of 0.5.

5.3 Employment

Employment impacts were modeled using IMPLAN. Drilling and completion expenditures were projected from forecasts provided by ICF, and presented in the following table. Total projected drilling and completion expenditures are provided in the following table were mapped to IMPLAN sector 28 (drilling oil and gas wells) and sector 29 (support activities for oil and gas operations). The dollar value of production was mapped to IMPLAN sector 20 (oil and gas extraction). Dollar denominated results are not adjusted for inflation. For employment impacts, input expenditures were adjusted for inflation. Employment impacts are reported as the number of full- and part-time jobs.

TABLE 13 – Projected Drilling and Completion Cost

Per well, current dollars (not adjusted for inflation)

Year	Colorado	Montana	New Mexico	North Dakota	Utah	Wyoming
2011	3,319,000	4,226,000	1,832,000	5,515,000	2,669,000	3,574,000
2012	3,603,000	4,815,000	2,099,000	5,816,000	2,803,000	4,125,000
2013	3,727,000	5,445,000	2,230,000	6,101,000	2,944,000	4,900,000
2014	3,860,000	5,408,000	2,295,000	5,986,000	3,017,000	4,866,000
2015	4,017,000	5,881,000	2,285,000	6,379,000	3,071,000	5,099,000

The costs per well were applied to projections of the number of new wells drilled provided by the regression analysis (Table 5). Total projected drilling and completion expenditures are provided in the following table.

The costs per well were applied to projections of the number of new wells drilled provided by the regression analysis (Table 5). Total projected drilling and completion expenditures are provided in the following table.

TABLE 14 – Projected Drilling and Completion Cost

Total, current dollars (not adjusted for inflation)

Year	Colorado	Montana	New Mexico	North Dakota	Utah	Wyoming
2011	497,816,000	126,790,000	622,939,000	330,871,000	560,420,000	1,930,021,000
2012	648,520,000	144,452,000	692,564,000	290,785,000	532,608,000	2,186,026,000
2013	633,592,000	163,364,000	713,503,000	366,038,000	529,910,000	2,744,174,000
2014	540,381,000	162,244,000	780,422,000	359,188,000	603,412,000	2,530,224,000
2015	602,516,000	176,436,000	754,060,000	318,960,000	552,706,000	2,498,396,000
Alternative						
2011	730,131,000	211,317,000	897,765,000	496,306,000	827,287,000	2,787,808,000
2012	1,080,867,000	240,753,000	1,154,273,000	465,255,000	897,023,000	3,670,874,000
2013	1,155,374,000	381,184,000	1,337,818,000	610,064,000	1,000,941,000	5,096,323,000
2014	1,003,564,000	324,487,000	1,423,123,000	658,511,000	1,086,142,000	4,622,525,000
2015	1,084,530,000	294,059,000	1,325,317,000	574,128,000	951,883,000	4,435,928,000
Net = Alternative = Baseline						
2011	232,315,000	84,527,000	274,826,000	165,435,000	266,867,000	857,787,000
2012	432,347,000	96,301,000	461,709,000	174,470,000	364,415,000	1,484,848,000
2013	521,782,000	217,820,000	624,315,000	244,026,000	471,031,000	2,352,149,000
2014	463,183,000	162,243,000	642,701,000	299,323,000	482,730,000	2,092,301,000
2015	482,014,000	117,623,000	571,257,000	255,168,000	399,177,000	1,937,532,000

The resulting employment impacts are provided in the Tables 5 and 6.

5.4 State Severance and Ad Valorem Taxes

Oil and gas production values were calculated by applying price projections provided by the Economist Intelligence Unit to the production forecasts in Tables 1, 2, and 3.

Severance and Ad Valorem Rate (IFC)

	2011	2012	2013	2014	2015
Oil (US $ / bbl)	98.70	95.40	90.90	85.90	83.80
Natural Gas (US $ / mcf)	4.54	5.26	5.70	6.18	6.69

NGL price projections use 2010 propane prices as a baseline and are assumed to change from year to year at the same rate as natural gas prices.

Severance and ad valorem taxes are calculated by applying these values to the severance and ad valorem tax rates reported by ICF and shown below.

Severance and Ad Valorem Rate (IFC)

Colorado	Montana	New Mexico	North Dakota	Utah	Wyoming
2.85 %	8.61 %	7.89 %	7.07 %	2.20 %	4.70 %

The results are presented in Table 9.

5.5 Federal Royalties

Oil and gas production values were calculated in the same way as for state severance and ad valorem taxes . The following royalty rates were applied, based on the 2008/2009 royalty rate calculated from information provided by the Bureau of Land Management.

Oil	Gas	NGLs
11.7 %	12.4 %	9.7 %

5.6 Supplemental Tables

Oil Production, million barrels

Baseline

Production associated with same total number new leases and permits – Average 2009/2010

Year	Colorado	Montana	New Mexico	North Dakota	Utah	Wyoming	Total
2011	3.478	3.835	30.755	8.302	12.778	33.584	92.732
2012	3.495	3.562	29.359	7.928	13.082	31.533	88.959
2013	3.584	3.563	28.042	7.507	12.383	31.642	86.721
2014	3.241	3.363	27.243	7.494	12.129	30.231	83.701
2015	3.219	3.182	25.887	7.173	11.161	28.410	79.032
Average	**3.403**	**3.501**	**28.257**	**7.681**	**12.307**	**31.080**	**86.229**

Alternative

Production associated with same total number new leases and permits – Average 2007/2008

Year	Colorado	Montana	New Mexico	North Dakota	Utah	Wyoming	Total
2011	3.749	4.142	33.132	8.894	13.757	36.170	99.844
2012	3.836	3.920	32.169	8.615	14.333	34.555	97.428
2013	4.092	4.085	31.954	8.456	14.106	36.059	98.752
2014	3.765	3.924	31.564	8.567	14.051	35.033	96.904
2015	3.593	3.565	28.795	7.887	12.429	31.629	87.898
Average	**3.807**	**3.927**	**31.523**	**8.484**	**13.735**	**34.689**	**96.165**

Net (Alternative Minus Baseline)

Increase in production relative to amount associated with baseline number of leases and permits issued

Year	Colorado	Montana	New Mexico	North Dakota	Utah	Wyoming	Total
2011	0.271	0.307	2.377	0.592	0.979	2.586	7.112
2012	0.341	0.358	2.810	0.687	1.251	3.022	8.469
2013	0.508	0.522	3.912	0.949	1.723	4.417	12.031
2014	0.524	0.561	4.321	1.073	1.922	4.802	13.203
2015	0.374	0.383	2.908	0.714	1.268	3.219	8.866
Average	**0.404**	**0.426**	**3.266**	**0.803**	**1.429**	**3.609**	**9.936**

Natural Gas Production, billion cubic feet

Baseline

Production associated with same total number new leases and permits – Average 2009/2010

Year	Colorado	Montana	New Mexico	North Dakota	Utah	Wyoming	Total
2011	302	51	718	8	301	1,562	2,943
2012	286	50	725	8	325	1,515	2,909
2013	286	47	731	8	317	1,448	2,839
2014	283	44	737	8	306	1,409	2,789
2015	293	46	745	9	307	1,414	2,814
Average	**290**	**48**	**731**	**8**	**312**	**1,470**	**2,859**

Alternative

Production associated with same total number new leases and permits – Average 2007/2008

Year	Colorado	Montana	New Mexico	North Dakota	Utah	Wyoming	Total
2011	313	53	743	8	312	1,616	3,046
2012	331	58	836	9	375	1,747	3,356
2013	340	56	863	10	375	1,712	3,356
2014	356	56	920	10	383	1,760	3,485
2015	380	60	960	12	396	1,825	3,632
Average	**344**	**57**	**864**	**10**	**368**	**1,732**	**3,375**

Net (Alternative Minus Baseline)

Increase in production relative to amount associated with baseline number of leases and permits issued

Year	Colorado	Montana	New Mexico	North Dakota	Utah	Wyoming	Total
2011	11	2	24	0	11	54	103
2012	45	8	110	1	50	232	447
2013	53	9	132	1	58	263	517
2014	72	12	183	2	76	351	696
2015	87	14	215	2	89	410	818
Average	**54**	**9**	**133**	**1**	**57**	**262**	**516**

Natural Gas Liquids Production, million barrels

Baseline

Production associated with same total number new leases and permits – Average 2009/2010

Year	Colorado	Montana	New Mexico	North Dakota	Utah	Wyoming	Total
2011	3.5	0.1	29.0	0.2	5.2	18.7	56.6
2012	3.4	0.1	29.2	0.2	5.4	18.4	56.6
2013	3.4	0.1	29.3	0.2	5.3	18.0	56.3
2014	3.4	0.1	29.4	0.2	5.2	17.8	56.0
2015	3.4	0.1	29.5	0.2	5.3	17.8	56.3
Average	**3.4**	**0.1**	**29.3**	**0.2**	**5.3**	**18.2**	**56.4**

Alternative

Production associated with same total number new leases and permits – Average 2007/2008

Year	Colorado	Montana	New Mexico	North Dakota	Utah	Wyoming	Total
2011	3.5	0.1	29.5	0.2	5.3	19.0	57.6
2012	3.6	0.1	31.4	0.2	5.8	19.8	60.9
2013	3.7	0.1	31.9	0.2	5.8	19.6	61.3
2014	3.8	0.1	32.9	0.2	5.9	19.9	62.8
2015	3.9	0.1	33.6	0.2	6.0	20.2	64.1
Average	**3.7**	**0.1**	**31.9**	**0.2**	**5.8**	**19.7**	**61.3**

Net (Alternative Minus Baseline)

Increase in production relative to amount associated with baseline number of leases and permits issued

Year	Colorado	Montana	New Mexico	North Dakota	Utah	Wyoming	Total
2011	0.1	0.0	0.5	0.0	0.1	0.3	1.0
2012	0.3	0.0	2.2	0.0	0.4	1.4	4.3
2013	0.3	0.0	2.6	0.0	0.5	1.6	5.0
2014	0.4	0.0	3.5	0.0	0.6	2.1	6.7
2015	0.5	0.0	4.1	0.0	0.7	2.4	7.8
Average	**0.3**	**0.0**	**2.6**	**0.0**	**0.5**	**1.6**	**5.0**

Number of Wells Started (Spud) on Federal Lands

Baseline*

Production associated with same total number new leases and permits – Average 2009/2010

Year	Colorado	Montana	New Mexico	North Dakota	Utah	Wyoming	Total
2011	270	46	548	76	282	908	2,130
2012	300	46	538	66	262	898	2,110
2013	290	46	528	76	252	928	2,120
2014	260	46	548	76	272	888	2,090
2015	270	46	538	66	252	858	2,030
Average	**278**	**46**	**540**	**72**	**264**	**896**	**2,096**

Alternative*

Production associated with same total number new leases and permits – Average 2007/2008

Year	Colorado	Montana	New Mexico	North Dakota	Utah	Wyoming	Total
2011	340	66	698	106	382	1,148	2,740
2012	420	66	758	96	392	1,258	2,190
2013	430	86	808	116	412	1,408	2,460
2014	380	76	828	126	432	1,318	2,360
2015	390	66	788	106	382	1,238	2,170
Average	**392**	**72**	**776**	**110**	**400**	**1,274**	**3,024**

Net (Alternative Minus Baseline)

Increase in wells relative to amount associated with baseline number of leases and permits issued

Year	Colorado	Montana	New Mexico	North Dakota	Utah	Wyoming	Total
2011	70	20	150	30	100	240	610
2012	120	20	220	30	130	360	880
2013	140	40	280	40	160	480	1,140
2014	120	30	280	50	160	430	1,070
2015	120	20	250	40	130	380	940
Average	**114**	**26**	**236**	**38**	**136**	**378**	**928**

*The BLM reissued the estimated number of wells started in 2010 after the completion of this analysis. The new estimate was used to adjust the 2010 number of wells as well as the Baseline and Alternative forecasts. In both scenarios, the Net (Alternative minus Baseline) remained the same.

Net (Alternative Minus Baseline)

Employment – Direct Effect

Year	Colorado	Montana	New Mexico	North Dakota	Utah	Wyoming	Total
2011	463	176	738	330	588	1,790	4,085
2012	931	208	1,352	349	855	3,219	6,914
2013	1,127	453	1,793	487	1,097	4,979	9,937
2014	1,085	347	1,958	597	1,154	4,572	9,713
2015	1,156	258	1,822	508	985	4,301	9,032

Employment – Indirect Effect

Year	Colorado	Montana	New Mexico	North Dakota	Utah	Wyoming	Total
2011	612	219	679	308	910	1,375	4,103
2012	1,238	257	1,221	326	1,305	2,467	6,814
2013	1,499	4,143	1,626	455	1,678	3,823	13,224
2014	1,452	3,849	1,753	558	1,757	3,502	12,871
2015	1,550	4,102	1,617	475	1,490	3,291	12,526

Employment – Induced Effect

Year	Colorado	Montana	New Mexico	North Dakota	Utah	Wyoming	Total
2011	765	241	778	328	1,017	1,340	4,469
2012	1,578	286	1441	346	1,493	2,443	7,587
2013	1,911	620	1,906	484	1,914	3,748	10,583
2014	1,883	477	2,095	594	2,023	3,479	10,551
2015	2,021	356	1,960	505	1,735	3,291	9,868

Employment – Total Effect

Year	Colorado	Montana	New Mexico	North Dakota	Utah	Wyoming	Total
2011	1,840	636	2,194	966	2,515	4,505	12,656
2012	3,748	751	4,014	1,021	3,653	8,129	21,315
2013	4,536	1,635	5,325	1,427	4,689	12,550	30,163
2014	4,419	1,253	5,806	1,749	4,934	11,553	29,715
2015	4,728	931	5,400	1,488	4,211	10,884	27,642

Net (Alternative Minus Baseline)

Labor Income $ millions – Direct Effect

Year	Colorado	Montana	New Mexico	North Dakota	Utah	Wyoming	Total
2011	52.6	16.2	62.6	29.8	51.6	165.5	378.3
2012	118.4	19.9	127.6	31.6	81.2	315.1	693.8
2013	146.8	42.4	170.3	44.1	104.7	480.6	988.9
2014	157.4	33.3	197.5	54.0	114.3	462.0	1,018.5
2015	178.7	25.5	197.1	45.9	103.3	451.6	1,002.1

Labor Income $ millions – Indirect Effect

Year	Colorado	Montana	New Mexico	North Dakota	Utah	Wyoming	Total
2011	49.6	11.6	38.0	18.0	52.9	80.5	250.6
2012	103.2	13.7	70.6	19.1	77.0	147.2	430.8
2013	126.7	30.1	94.8	26.7	99.4	228.1	605.8
2014	126.9	23.0	104.3	32.7	105.0	212.3	604.2
2015	140.1	17.2	99.3	27.8	90.7	203.1	578.2

Labor Income $ millions – Induced Effect

Year	Colorado	Montana	New Mexico	North Dakota	Utah	Wyoming	Total
2011	36.9	8.9	29.0	12.3	39.6	50.6	177.3
2012	78.7	10.7	56.3	13.1	59.3	93.9	312.0
2013	96.9	23.2	75.4	18.3	76.5	144.6	434.9
2014	175.9	32.4	154.9	38.7	143.6	270.1	815.6
2015	110.3	13.6	82.9	19.0	72.1	131.5	429.4

Labor Income $ millions – Total Effect

Year	Colorado	Montana	New Mexico	North Dakota	Utah	Wyoming	Total
2011	139.1	36.7	129.6	60.1	144.1	296.6	806.2
2012	300.3	44.3	254.5	63.8	217.5	556.2	1,436.6
2013	370.4	95.7	340.5	89.1	280.6	853.3	2,029.6
2014	383.4	74.3	386.9	109.1	301.2	810.6	2,065.5
2015	429.1	56.3	379.3	92.7	266.1	786.2	2,009.7

Net (Alternative Minus Baseline)

Value Added $ millions – Direct Effect

Year	Colorado	Montana	New Mexico	North Dakota	Utah	Wyoming	Total
2011	153.8	47.6	185.9	87.4	153.5	491.1	1,119.3
2012	344.4	58.3	376.3	92.7	240.1	931.9	2,043.7
2013	426.8	124.2	502.4	129.5	309.5	1,423.2	2,915.6
2014	455.2	97.3	580.3	158.6	337.2	1,364.4	2,993.0
2015	515.9	74.4	577.3	134.9	303.6	1,331.4	2,937.5

Value Added $ millions – Indirect Effect

Year	Colorado	Montana	New Mexico	North Dakota	Utah	Wyoming	Total
2011	75.5	18.2	56.4	28.2	79.4	129.2	386.9
2012	160.7	21.8	105.2	29.9	116.4	236.5	670.5
2013	197.9	47.4	141.2	41.8	150.2	366.4	944.9
2014	202.3	36.5	155.7	51.2	159.2	341.3	946.2
2015	225.3	27.4	148.4	43.5	138.1	326.7	909.4

Value Added $ millions – Induced

Year	Colorado	Montana	New Mexico	North Dakota	Utah	Wyoming	Total
2011	65.1	16.1	52.5	21.4	69.1	99.9	324.1
2012	139.1	19.4	102.3	22.6	103.9	185.9	573.2
2013	171.4	41.8	136.9	31.6	134.0	286.0	801.7
2014	175.9	32.4	154.9	38.7	143.6	270.1	815.6
2015	196.1	24.5	151.2	33.0	126.5	261.0	792.3

Value Added $ millions – Total Effect

Year	Colorado	Montana	New Mexico	North Dakota	Utah	Wyoming	Total
2011	294.4	81.9	294.8	137.0	302.0	720.2	1,830.3
2012	644.2	99.5	583.8	145.2	460.4	1,354.3	3,287.4
2013	796.1	213.4	780.5	202.9	593.7	2,075.6	4,662.2
2014	833.4	166.2	890.9	248.5	640.0	1,975.8	4,754.8
2015	937.3	126.3	876.9	211.4	568.2	1,919.1	4,639.2

Net (Alternative Minus Baseline)

Output – Direct Effect

Year	Colorado	Montana	New Mexico	North Dakota	Utah	Wyoming	Total
2011	307.7	117.9	601.0	213.6	398.2	1,327.2	2,965.6
2012	718.7	174.6	1,456.5	248.7	777.2	3,089.6	6,465.3
2013	895.4	320.0	1,924.4	343.1	997.8	4,380.0	8,860.7
2014	986.8	285.6	2,421.9	409.9	1,175.9	4,850.3	10,130.4
2015	1,133.0	245.2	2,582.1	334.7	1,162.1	5,149.3	10,606.4

Output – Indirect Effect

Year	Colorado	Montana	New Mexico	North Dakota	Utah	Wyoming	Total
2011	132.7	36.1	99.8	57.0	159.9	243.0	728.5
2012	247.0	41.1	167.7	60.1	218.3	420.7	1,154.9
2013	298.1	93.1	226.8	84.1	282.2	666.4	1,650.7
2014	264.7	69.3	233.5	103.1	289.2	592.7	1,552.5
2015	275.4	50.3	207.5	87.9	239.2	548.9	1,409.2

Output – Induced Effect

Year	Colorado	Montana	New Mexico	North Dakota	Utah	Wyoming	Total
2011	100.9	27.4	76.0	39.0	118.9	160.0	522.2
2012	187.8	31.2	127.6	41.1	162.4	276.9	827.0
2013	226.7	70.6	172.6	57.5	209.9	438.7	1,176.0
2014	201.2	52.6	177.7	70.6	215.1	390.2	1,107.4
2015	209.4	38.1	157.9	60.1	177.9	361.3	1,004.7

Output – Total Effect

Year	Colorado	Montana	New Mexico	North Dakota	Utah	Wyoming	Total
2011	541.3	181.4	776.8	309.6	677.0	1,730.2	4,216.3
2012	1,153.5	246.9	1,751.8	349.9	1,157.9	3,787.2	8,447.2
2013	1,420.2	483.7	2,323.8	484.7	1,489.9	5,485.1	11,687.4
2014	1,452.7	407.5	2,833.1	583.6	1,680.2	5,833.2	12,790.3
2015	1,617.8	333.6	2,947.5	482.7	1,579.2	6,059.5	13,020.3

Severance and Ad Valorem Taxes, $ millions

Baseline

Production associated with same total number new leases and permits – Average 2009/2010

Year	Colorado	Montana	New Mexico	North Dakota	Utah	Wyoming	Total
2011	$52	$47	$572	$50	$59	$505	$1,284
2012	59	53	672	59	73	574	1,490
2013	63	53	694	55	74	586	1,525
2014	65	50	723	53	74	599	1,565
2015	71	50	751	49	75	625	1,623
Average	**$62**	**$51**	**$682**	**$53**	**$71**	**$578**	**$1,497**

Alternative

Production associated with same total number new leases and permits – Average 2007/2008

Year	Colorado	Montana	New Mexico	North Dakota	Utah	Wyoming	Total
2011	$54	$49	$598	$53	$61	$527	$1,344
2012	67	60	750	64	82	650	1,673
2013	73	62	797	62	85	682	1,761
2014	80	61	863	61	90	729	1,883
2015	90	61	910	55	92	776	1,984
Average	**$73**	**$59**	**$784**	**$59**	**$82**	**$673**	**$1,729**

Net (Alternative Minus Baseline)

Increase in production relative to amount associated with baseline number of leases and permits issued

Year	Colorado	Montana	New Mexico	North Dakota	Utah	Wyoming	Total
2011	$ 2	$ 3	$ 26	$ 3	$ 3	$ 22	$ 59
2012	$ 8	$ 7	$ 78	$ 5	$ 9	$ 75	$ 183
2013	$ 11	$ 9	$ 103	$ 7	$ 12	$ 95	$ 236
2014	$ 15	$ 11	$ 140	$ 8	$ 15	$ 130	$ 319
2015	$ 19	$ 11	$ 159	$ 6	$ 17	$ 151	$ 362
Average	**$ 11**	**$ 8**	**$ 101**	**$ 6**	**$ 11**	**$ 95**	**$ 232**

Federal royalties of production of oil, natural gas, and NGLs, $ millions

Baseline

Year	Colorado	Montana	New Mexico	North Dakota	Utah	Wyoming	Total
2011	179.6	52.4	720.6	68.2	260.7	1,052.6	2,334.1
2012	201.6	59.7	846.2	80.9	326.8	1,195.9	2,711.1
2013	215.6	59.3	876.1	75.2	328.1	1,222.0	2,776.4
2014	224.5	56.3	913.6	72.4	331.4	1,248.9	2,847.0
2015	245.6	56.6	950.5	67.3	336.6	1,304.0	2,960.6

Alternative

Year	Colorado	Montana	New Mexico	North Dakota	Utah	Wyoming	Total
2011	186.9	55.6	752.5	72.9	273.5	1,098.2	2,439.6
2012	229.5	67.3	944.1	88.1	367.1	1,352.1	3,048.2
2013	252.0	69.2	1,004.1	84.8	379.5	1,419.4	3,209.0
2014	275.5	68.3	1,088.9	83.1	399.0	1,517.5	3,432.3
2015	309.1	68.9	1,149.1	75.0	411.1	1,617.0	3,630.2

Net (Alternative Minus Baseline)

Year	Colorado	Montana	New Mexico	North Dakota	Utah	Wyoming	Total
2011	7.3	3.2	31.9	4.6	12.8	45.6	105.5
2012	27.9	7.6	97.9	7.2	40.2	156.3	337.1
2013	36.4	9.9	127.9	9.6	51.4	197.4	432.6
2014	51.0	11.9	175.3	10.7	67.6	268.6	585.2
2015	63.4	12.3	198.6	7.7	74.5	313.0	669.6

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