Energy Policy at a Crossroads: An Assessment of the Impacts of Increased Access versus Higher Taxes on U.S. Oil and Natural Gas Production, Government Revenue, and Employment

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Wood Mackenzie
energy consulting

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Project Background

API has requested Wood Mackenzie to undertake a study which examines the implications of increasing exploration and development access in 5 key US regions currently closed to development. The 5 key regions are the Eastern Gulf of Mexico, portions of the Rocky Mountains, ANWR, and the Atlantic and Pacific Outer Continental Shelf (OCS).

Additionally, Wood Mackenzie has contrasted this 'Access' study with an analysis of the potential threat to production and jobs associated with increasing taxation on the oil and gas industry at a rate of $5 billion per year, which was less than the amount that was considered by the US Congress and Administration in 2010. The taxes were applied on both an income and production basis so as to capture the impacts of the slate of proposed taxes put forward by the Administration in 2010.

Key Results

Wood Mackenzie's analysis found that increasing access leads to a direct increase in domestic production, jobs, and government revenue. Whereas increasing taxes reduces production and jobs. It is also detrimental to government revenues five years into the future.

ACCESS – Compared to Base Case

Total Potential Production Impact:
Gain of 1.4 mmboed* by 2020, and 4 mmboed by 2025**

Total Potential Government Revenue:
$20 billion by 2020 and $150 billion by 2025 assuming current regional fiscal regimes. In addition, we estimate leasing activity will raise a further $44 billion by 2020

- *mmboed = million barrels of oil equivalent per day*

** *2010 total US production is18.8 mmboed (8 mmb/d liquids and 61 billion cubic feet per day (bcfd) natural gas)*

TAXES – Compared to Base Case

Total Potential Production Impact:
Estimated loss of 0.7 mmboed by 2020 with an additional 1.7 mmboed put at increased risk***; and an estimated loss of 0.4 mmboed by 2025 with an additional 1.2 mmboed put at increased risk

Total Potential Government Revenue:
Averages a positive $3 billion per year the first five years, 2011-2015. An estimated $6 billion <u>less</u> in 2020 with an additional $8 billion put at increased risk; and an estimated $10 billion less in 2025 with an additional $8 billion put at increased risk

*** *Risk of not being developed due to unprofitable project economics*

Key Results

ACCESS – Compared to Base Case

Direct Employment Potential:

130,000 direct jobs are estimated to be created by 2020 and 150,000 by 2025

Indirect* Employment Potential:

330,000 indirect jobs are estimated to be created by 2020, growing to 380,000 by 2025

TAXES – Compared to Base Case

Direct Employment Potential:
An estimated 50,000 jobs lost in 2014, dropping to 15,000 in 2020 and 8,000 in 2025

Indirect Employment Potential:
An estimated decrease in employment of 120,000 in 2014, 35,000 in 2020 and 20,000 in 2025

** Indirect Employment includes both jobs that provide goods and services to the oil and natural gas industry as well as jobs resulting from spending of income earned either directly or indirectly from the oil and natural gas industry's spending*

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Scope of Study – Access Scenario

- The study considered the following federal areas currently off-limits:
  - Eastern Gulf of Mexico
  - Rocky Mountains*
  - Atlantic OCS
  - Pacific OCS
  - Alaska National Wildlife Refuge (ANWR) – 1002 Area
- To estimate the potential economic benefits of opening up new access, a development scenario was created for each region including field size distributions and schedules for leasing, exploration, and development. Leasing in all areas was assumed to start in 2012. See appendix for additional details
- Production and economic forecasts were created using Wood Mackenzie's proprietary economic modeling software (GEM)
- Production models were based on analog fields in the Gulf of Mexico and Alaska. Rocky Mountain models were based on existing Wood Mackenzie play models

* *The Rocky Mountains resource considered here was deemed effectively "no access" by the Department of Interior's updated "EPCA" assessment. For explanation of this assessment and treatment here, see the first two citations in References*

Resource Estimates of Areas Currently Off-limits

Estimated resource potential in bnboe = billions of barrels of oil equivalent

Methodology
Access Scenario - OCS/ANWR – Modeling Process

- Using existing field models as analogues, generic models were created in GEM for each field size: 75 mmboe, 400 mmboe, 700 mmboe, 1,500 mmboe
- Production streams were adjusted to account for varying gas-oil ratios across regions
- Capital and operating costs were adjusted to account for differences in operating environments. (e.g. drilling CAPEX was lowered in Pacific OCS fields to account for shallower water depth). See Appendix for details on cost assumptions
- Using these region-specific field files and development forecasts, aggregate drilling and production schedules were compiled for each region

Methodology

Access Scenario - Assumed Field Size Distributions (Commercial reserves*)

ANWR	mmboe** per field	# of fields	Total Resource (mmboe)
Small	75	20	1,500
Medium	400	12	4,800
Large	1500	3	4,500
TOTAL (mmboe)			10,800

Atlantic OCS	mmboe per field	# of fields	Total Resource (mmboe)
Small	75	40	3,000
Medium	400	15	6,000
Large	1500	3	4,500
TOTAL (mmboe)			13,500

East GoM	mmboe per field	# of fields	Total Resource (mmboe)
Small	75	40	3,000
Medium	400	20	8,000
Large	700	5	3,500
TOTAL (mmboe)			14,500

Pacific OCS	mmboe per field	# of fields	Total Resource (mmboe)
Small	75	30	2,250
Medium	400	15	6,000
Large	1500	2	3,000
TOTAL (mmboe)			11,250

* Commercial reserves are the resources which we have estimated will be developed successfully given today's technology and price forecasts. Given the nature of the areas we are modeling, we have assumed that a significant proportion of the discovered resources will remain undeveloped

** mmboe – millions of barrels of oil equivalent

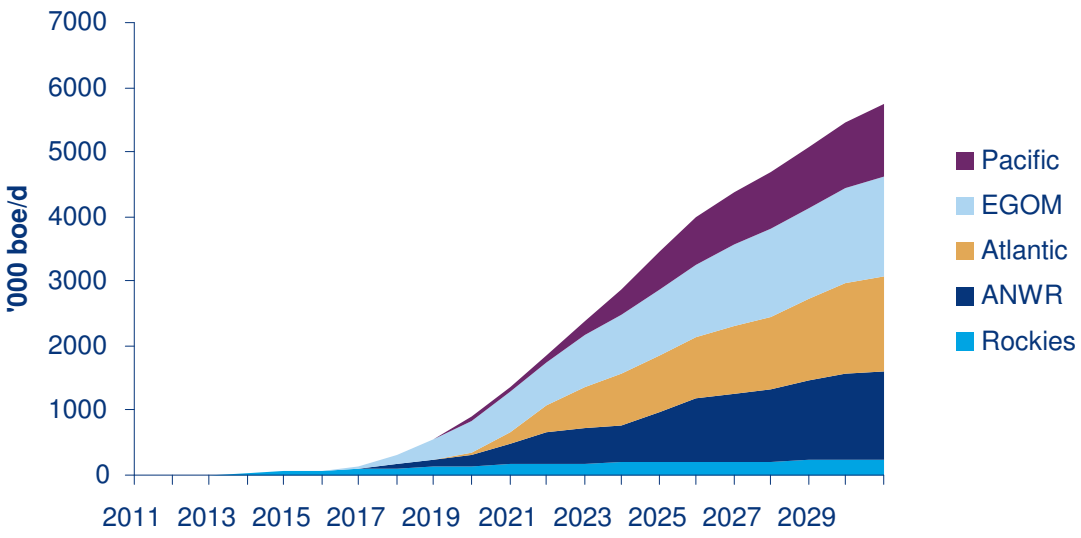
Methodology
Access Scenario - Rockies – Modeling Process

- The Rockies region was modelled at the play level
- Based on the USGS 2008 Resource Assessment, total Rockies reserves were split as follows:
  - 10% Uinta-Piceance Basin
  - 15% San Juan Basin
  - 13% Montana Thrust Belt
  - 12% Williston Basin
  - 50% Southwestern Wyoming (Greater Green River Basin)
- Representative play models were constructed for each of these basins including average per well costs, type curves, and appropriate tax regime
- Using Wood Mackenzie's estimates for average reserves per well, the number of wells necessary to develop the entire estimated resource was determined, and 20 year drilling forecasts were created for each basin
- Commercial reserves for the Rockies are estimated to be 2.0 bnboe based upon Wood Mackenzie internal assessments

Results
Access Scenario - Production Impacts

- Through increased access 1.4 mmboe/d could be brought on stream* by 2020 (850 mb/d liquids and 3 bcf/d natural gas)
- Potential production gains are estimated at 4.0 mmboe/d by 2025 (2.8 mmbl/d liquids and 6.6 bcf/d natural gas)
- For context, 2010 total US production is 8 mmb/d of liquids and 61 bcfd of natural gas. This equates to a total of 18.8 mmboed

Total Potential U.S. Production Impacts of Increased Access

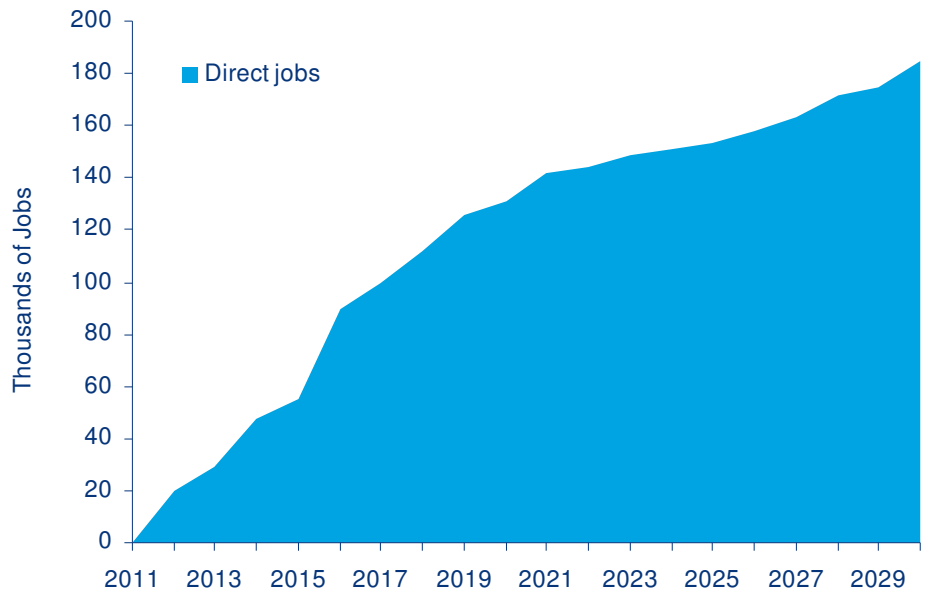


*See appendix for fields development plan

Access Scenario – Employment Impacts

- Job creation is projected to be approximately 50K direct jobs and 120K indirect jobs by 2014
- Approximately130K direct jobs and 330K indirect jobs by 2020.
- Approximately150K direct jobs and 380K indirect jobs* by 2025.
- Estimated Upstream jobs by sector:
  - Leasing & Seismic – 9,000 by 2020
  - Exploration Drilling – 42,000 by 2020
  - Appraisal Drilling – 5,000 by 2020
  - Construction – 64,000 by 2020
  - Operations – 12,000 by 2020
- **Indirect Jobs estimated at 2.5 per direct job based upon PWC and ICF Analysis (see references)**

Potential Employment Impacts of Increased Access

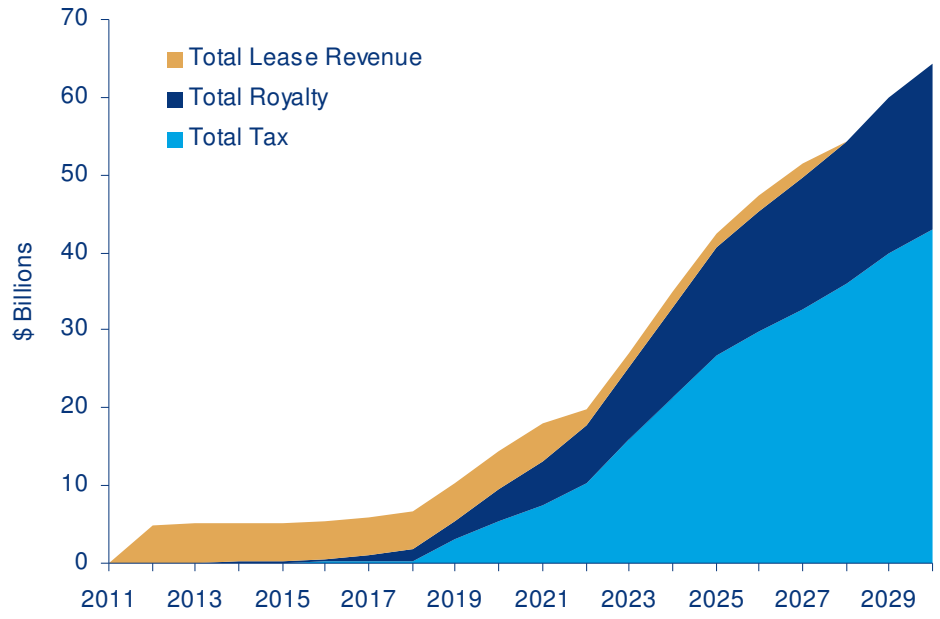


**Indirect jobs are those which are created in other industries to support the oil and gas sector as well as jobs resulting from spending of income earned either directly or indirectly from oil and natural gas industry spending*

Access Scenario– Government Revenues

- Total incremental government revenue (inclusive of state and local taxes) due to increased access is estimated to rise by a cumulative of $20 billion by 2020 and $150 billion by 2025.
- Further federal income will be generated as a result of by leasing activity. This will total $44 billion by 2020 and $61 billion by 2027

Estimated Government Revenue Impact of Increased Access



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Increased Tax Scenarios:
Scope, Methodology and Results

Scope of Study – Taxes Scenarios

- The study considered tax impacts on future production and jobs from the following areas:
  - Central and Western Gulf of Mexico
  - Onshore US excluding areas currently inaccessible (i.e. Rocky Mountains considered in the Access Scenario)
  - Alaska, areas which are currently open
  - Pacific OCS areas which are currently open
- To estimate the potential government revenue impacts of increasing taxes, we developed two scenarios:
  - The first considered the impact of increased income taxes
  - The second considered the impact of increased production taxes
- Production and economic forecasts were created using Wood Mackenzie's proprietary economic modeling software (GEM)
- Wood Mackenzie's analysis of tax impact does not include any potential impact which could result from future discoveries – a key difference to note when comparing the Access and Taxes scenarios

Methodology – Tax Scenarios

- The objective of this part of the study was to assess the impacts on U.S. oil and gas upstream operations of increased taxes by $5 billion per annum starting in 2011. U.S. production of oil and natural gas, employment, and government revenue impacts were ascertained
- The increased taxation scenario was based upon proposals considered by the Administration and Congress in 2010 ($7.3 billion per annum of tax proposals are catalogued on next slide) representing a combination of income and production taxes. Two tax scenarios were developed, one income based, the other production based, as proxies for taxes considered by policy makers in 2010
- Using these proposed fiscal regimes, Wood Mackenzie proprietary models and data were run to determine which "probable developments" would no longer be economic (i.e., Internal Rate of Return (IRR) falls below 15%)
- Marginal fields which are included in the base case development plan were considered to be "at risk" in the increased taxation scenario and no longer economic (these fields already had an IRR close to or below 15%)
- Production from these fields was then removed from the regional and national roll up, and the impacts on production, employment and government revenue were calculated

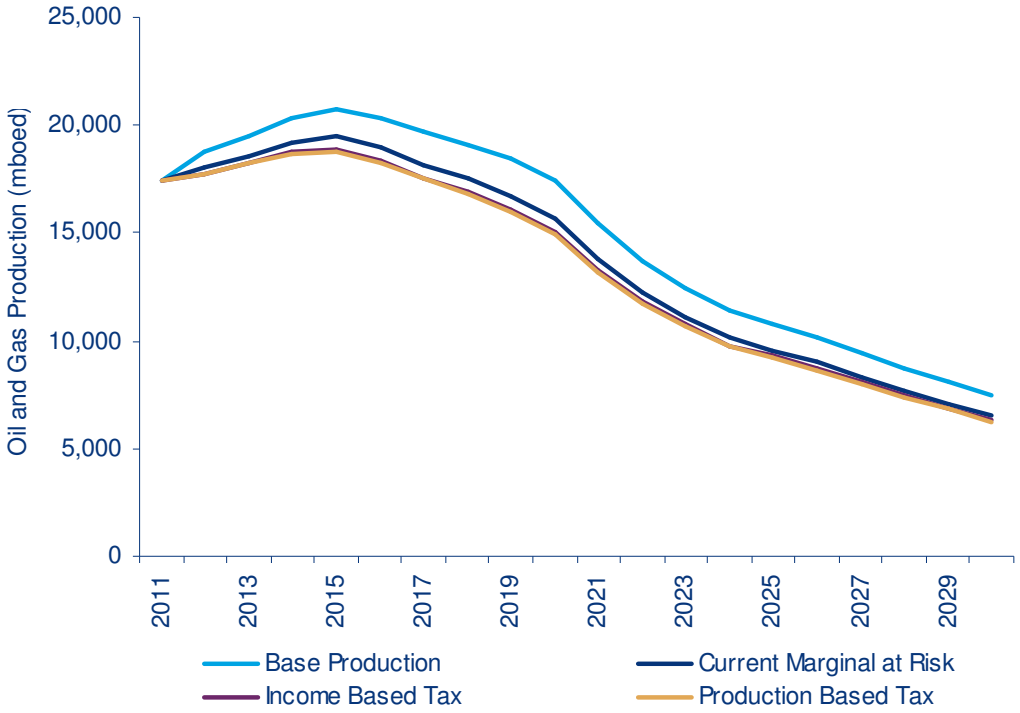
Proposed Tax Amendments Considered by Congress and the Administration in 2010

Amendment	FY 2011 Budget JCT Score – Industry Portion, 2011 – 2020 ($ millions)	Citation
Repeal EOR Credit	$0	Joint Committee on Taxation Report JCX-7-10R
Repeal Marginal Well Credit	$0	Joint Committee on Taxation Report JCX-7-10R
Repeal Expensing Intangible Drilling Costs	$10,924	Joint Committee on Taxation Report JCX-7-10R: VII.H.1.c
Repeal Deduction for Tertiary Injectants	$57	Joint Committee on Taxation Report JCX-7-10R: VII.H.1.d
Repeal Passive Loss Exemption	$217	Joint Committee on Taxation Report JCX-7-10R: VII.H.1.e
Repeal Percentage Depletion	$9,653	Joint Committee on Taxation Report JCX-7-10R: VII.H.1.f
Repeal Section 199 for Oil and Gas Activities	$14,789	Joint Committee on Taxation Report JCX-7-10R: VII.H.1.g
Increase G&G Amortization Period	$1,003	Joint Committee on Taxation Report JCX-7-10R: VII.H.1.h
GoM Excise Tax	$5,300	S. 3405 – 111th Congress (score from FY2010 budget)
Increase in Oil Spill Tax	$31,000	Senate Finance Committee estimate to S. 3793 – page 11
Potential Total Facing Industry	**$72,943**	

Results
Taxes Scenarios – Potential Production Impacts

- By increasing taxation on the industry, the modeling shows that several development opportunities are put at risk (IRR<15%)
- The production lost* from these sub-economic fields could reach 2.4 mmboed (1.7 mmboed due to increased risk**, while 0.7 mmboed could be lost under the Production Based Tax) in 2020 and drops to 1.6 mmboed in 2025
- The largest production impact is expected to be in the Lower 48, due to the larger proportion of marginal fields and the relative size of total Lower 48 production compared to the Gulf of Mexico and Alaska

Total Potential U.S. Production Impacts – Increased Taxes

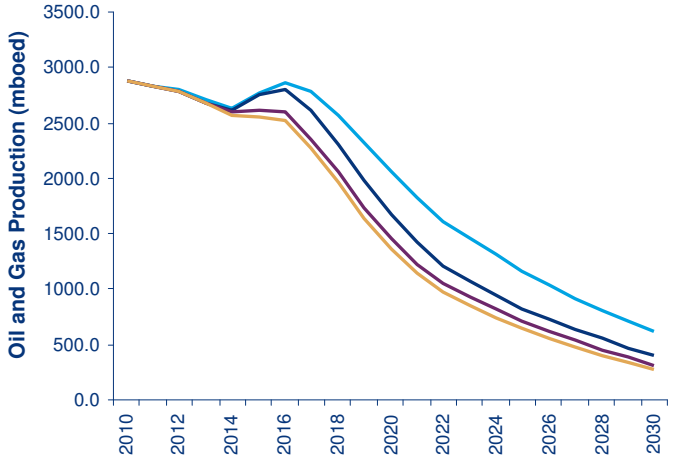


*Production loss estimates include: fields currently marginal and fields which become marginal under the high tax scenarios

**Risk of not being developed due to unprofitable project economics.

Tax Scenarios – Estimated Production Impacts by Region

Gulf of Mexico Deepwater & Shelf



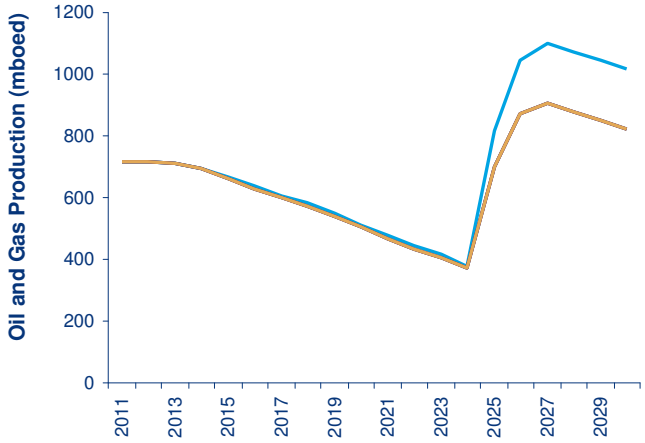
Base

Currently Marginal Production

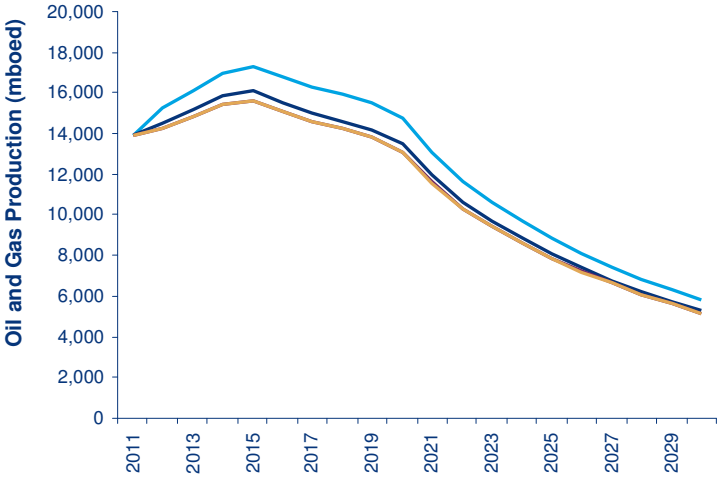
Income Based Tax Scenario

Production Based Tax Scenario

Alaska*



Lower 48



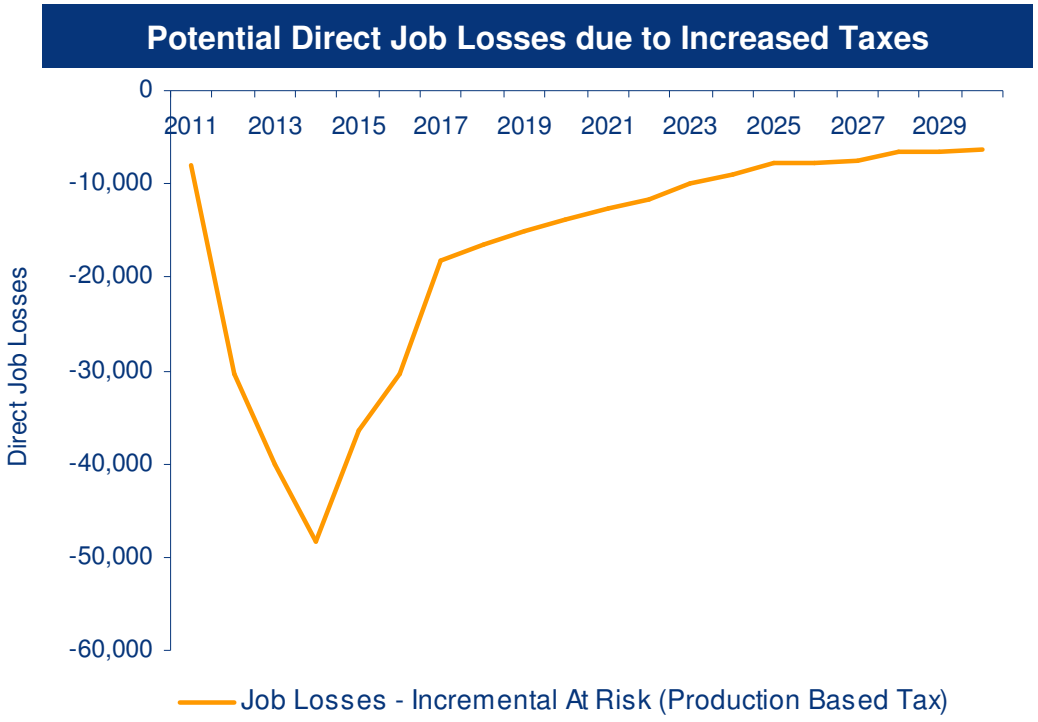
**Alaska's currently marginal, income based tax scenario, and production based tax scenario are all equal*

Tax Scenarios – Estimated Production Impacts by Region

Region	Year of Maximum Production Loss	Incremental Production Loss (mboed)	Total At Risk Production Loss (mboed)
Lower 48	2019	370	1,746
GoM	2020	313	701
Alaska	2027	191	191

Tax Scenarios – Projected Employment Impacts

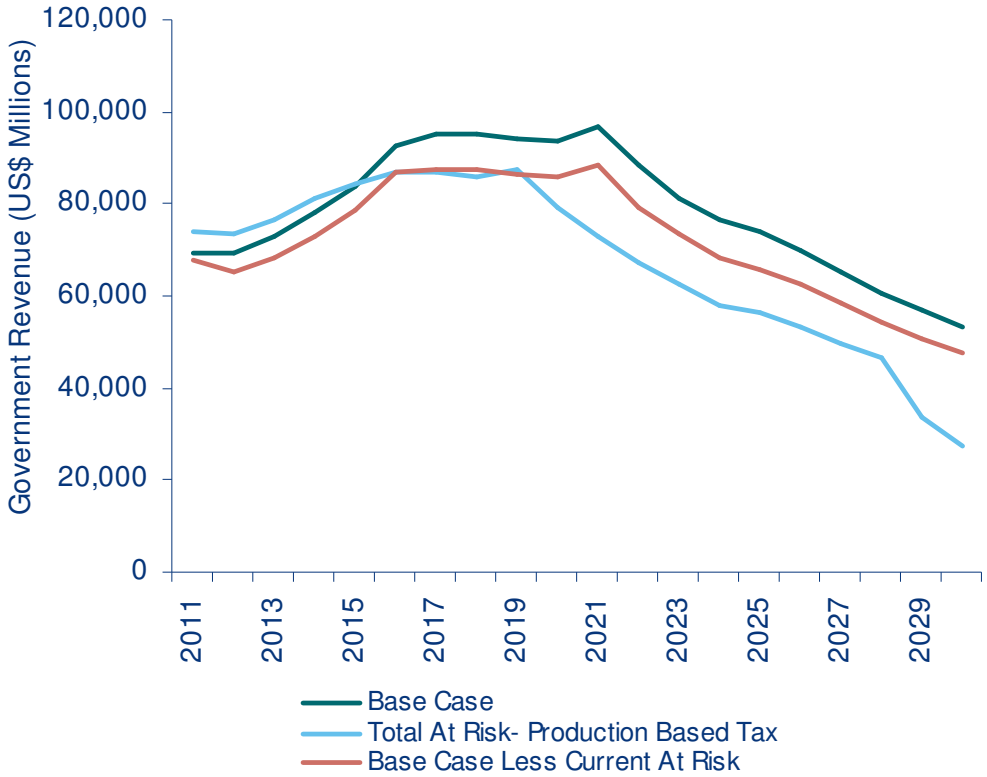
- Increased taxes will make a number of currently economic fields un-economic, resulting in additional direct job losses of nearly 50,000 in 2014
- Due to the labor intensity of onshore drilling, the L48 would see the largest adverse employment impact
- Based upon the potential forecast of direct job losses, the resultant indirect losses is 120,000 in 2014, 35,000 in 2020 and 20,000 in 2025



Tax Scenarios – Government Revenues

- Government tax increases* will result in a $16 billion increase in government revenue in the period 2011 to 2015.
- However, starting in 2016 government revenue will be reduced (compared to the base case) due to the lost tax income from potential opportunities not being developed
- We estimate a cumulative shortfall in government revenue* in the period 2016 to 2025 to potentially reach $144 billion if sub-economic fields do not get developed
- Considering only incremental sub-economic fields, results in a potential $65 billion cumulative shortfall in government revenue between 2016 and 2025

Estimated Government Revenue Impact due to Increased Taxes



** Government revenue estimates include fields currently marginal and fields which become marginal under the high tax scenarios*

3 Appendix

Access Scenario - Resource Assumptions

- Total resource estimates for all regions were based on the “alternative case” estimates generated by ICF International for their report “Strengthening our Economy: The Untapped U.S. Oil and Gas Resources”, December, 2008
- These alternative resource estimates were based on the history of USGS resource assessments that have continually increased over time. In particular, for the Eastern Gulf of Mexico and Atlantic OCS, the most recent (2006) USGS resource estimates were uplifted by a factor of 4.8 for oil and 2.4 for natural gas. In the Pacific case, both oil and gas were increased by a factor of 2.4
- The ANWR resource estimate was taken from the “high case” scenario in the 2005 USGS assessment
- ICF’s Rocky Mountain “alternative case” resource estimate was based on the Department of the Interior’s 2008 assessment of Federal land in the Rockies
- In Wood Mackenzie’s development scenario, only a portion of the overall resource base was assumed to be commercial. Across the five regions analyzed, 43% of the total resource was expected to be developed and produced

Access Scenario - Total Resource by Region

- Total undiscovered resource potential is 118 bnboe (ICF “Alternative case”)
- Total commercial reserve base is estimated at 52 bnboe

Resource Base	Rocky Mtns	Atlantic OCS	Pacific OCS	Eastern GoM	ANWR
Gas (tcf)	8.4	89	44	53	18
Oil (bnbbl)	0.5	18	26	19	17

Commercial Reserves	Rocky Mtns	Atlantic OCS	Pacific OCS	Eastern GoM	ANWR
Oil Equivalent (bnboe)	2.0	13.5	11.3	14.5	10.8

Access Scenario - Leasing Assumptions

- Leasing was assumed to begin for each region in 2012
- Combined income from lease sales in all regions is projected to total $61 billion

	Rocky Mtns	Atlantic OCS	Pacific OCS	Eastern GoM	ANWR
Total Region Acreage	10,137,000	269,130,000	248,450,000	64,556,650	1,500,000
Acreage to be leased	10,000,000	40,000,000	20,000,000	16,000,000	1,500,000
$/acre	$1,500	$200	$350	$1,000	$10,000
Lease revenue	$15,000 M	$8,000 M	$7,000 M	$16,000 M	$15,000 M

Access Scenario - Exploration Assumptions

- Discovery of large fields was distributed evenly over the first 20 years of each region's development
- Exploration expenses in the Rockies were considered negligible and were not modeled

	Atlantic OCS	Pacific OCS	Eastern GoM	ANWR
Exploration Start	2016	2016	2014	2014
Expl./Appraisal Well Cost	$80 million	$65 million	$90 million	$75 million
Expl. Success Rate	20%	30%	33%	50%
Seismic Cost per acre	$4,000	$4,000	$4,000	$4,000
Total Exploration Cost	$32 billion	$17 billion	$27 billion	$9 billion

Tax Scenario - Base Case Tax Rates

The 'Base Case' scenario was used to calculate the current tax revenues collected by the government, using the following assumptions:

Region	Federal Corporate Tax*	Royalty Rate
Alaska	35%	16.5% Oil / 12.5% Gas
Deepwater GoM	35%	12.5-18.75%
Shelf GoM	35%	16.67-18.75%
Gulf Coast	35%	12.5%
Mid-Continent	35%	12.5%
Northeast	35%	12.5%
Permian	35%	12.5%
Rockies	35%	12.5%
West Coast	35%	12.5%

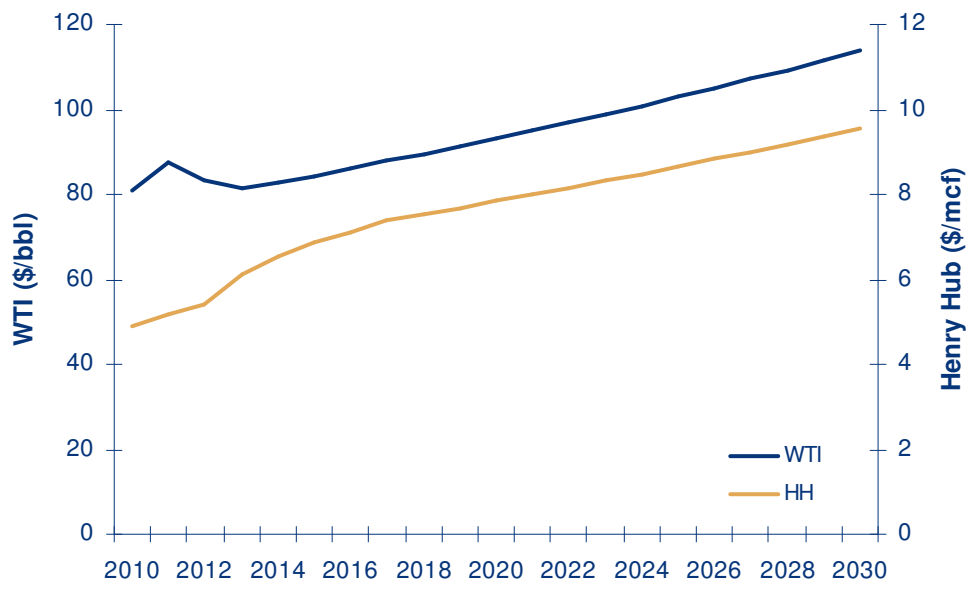
** State taxes were applied where applicable . To account for state taxes paid by corporations operating in the Gulf of Mexico, Wood Mackenzie used an effective state tax rate of 4%*

Access & Tax Scenarios - Model Assumptions

- All models included the following assumptions:
  - Federal royalty rates modelled at 12.5%
  - Federal Income Tax modelled at 35%

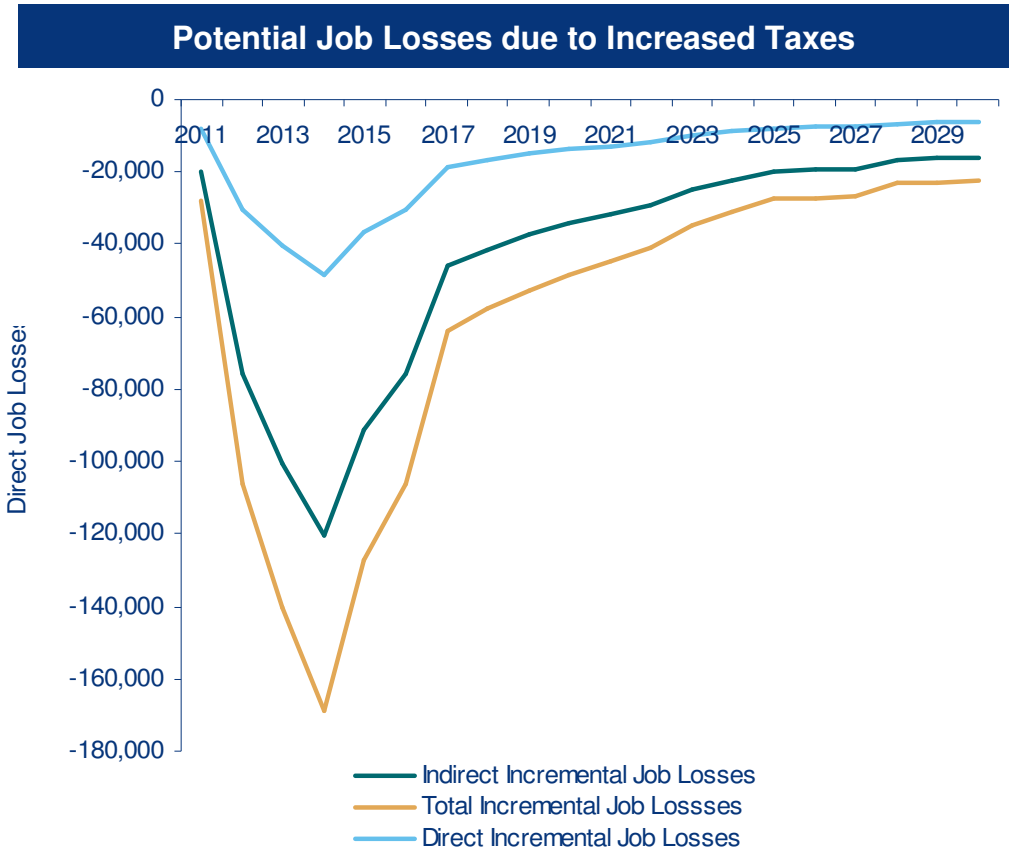
  i.e. current fiscal conditions
- Wood Mackenzie's commodity price forecast was used. All oil priced at WTI, gas priced at Henry Hub (HH)

Wood Mackenzie Oil & Gas Nominal Prices



Tax Scenarios – Projected Employment Impacts

- Increased taxes will make a number of currently economic fields un-economic, putting them at risk. At its peak in 2014, this could result in 50,000 direct job losses
- Using a multiplier of 2.5 indirect jobs per direct job based upon ICF and PWC studies implies that nearly 170 K total jobs put at risk in 2014



Access Scenario – Estimated Production Impacts (mboed)

Year	Rockies	ANWR	Atlantic	East GoM	Pacific	Total
2012	12	0	0	-	-	12.4
2013	38	0	0	-	-	38.4
2014	63	0	0	-	-	63.2
2015	84	0	0	-	-	84.1
2016	103	0	0	32.2	-	134.8
2017	119	57	0	156.4	-	332.3
2018	134	104	0	320.1	-	558.6
2019	148	160	57	492.4	56.6	914.1
2020	161	341	177	599.0	104.0	1,382.4
2021	173	503	403	683.9	103.4	1,866.3
2022	184	539	636	825.0	196.1	2,379.9
2023	194	579	790	928.6	364.1	2,856.2
2024	203	776	876	1,019.8	589.4	3,463.5
2025	211	976	936	1,131.1	724.5	3,978.7
2026	219	1,052	1,032	1,250.4	806.5	4,360.9
2027	226	1,120	1,121	1,351.9	875.2	4,694.3
2028	232	1,233	1,262	1,419.6	916.6	5,063.8
2029	238	1,325	1,404	1,469.5	1,006.9	5,443.1
2030	243	1,360	1,491	1,533.7	1,103.1	5,730.0

Access Scenario – Estimated Employment Impacts

Year	Total direct jobs	Total Indirect jobs	Total jobs
2012	19,669	49,173	68,842
2013	28,706	71,765	100,471
2014	47,418	118,544	165,962
2015	55,753	139,382	195,135
2016	90,717	226,792	317,509
2017	100,535	251,338	351,873
2018	113,311	283,279	396,590
2019	127,086	317,715	444,801
2020	132,603	331,507	464,110
2021	143,407	358,519	501,926
2022	145,794	364,486	510,280
2023	150,256	375,639	525,895
2024	151,513	378,783	530,296
2025	153,933	384,833	538,766
2026	158,085	395,211	553,296
2027	162,771	406,927	569,698
2028	171,222	428,055	599,277
2029	174,020	435,049	609,069
2030	184,228	460,569	644,797

Access Scenario – Estimated Impact on Government Revenue ($ billions)

Year	Total Tax	Total Royalty	Total Leases	Total Revenue
2012	0.0	0.0	4.9	5.0
2013	0.1	0.1	4.9	5.1
2014	0.1	0.1	4.9	5.2
2015	0.1	0.2	4.9	5.2
2016	0.2	0.3	4.9	5.4
2017	0.2	0.8	4.9	6.0
2018	0.3	1.5	4.9	6.8
2019	3.0	2.4	4.9	10.4
2020	5.5	4.1	4.9	14.5
2021	7.6	5.6	4.9	18.1
2022	10.4	7.4	1.9	19.8
2023	15.9	9.2	1.9	27.1
2024	21.5	11.5	1.9	34.9
2025	26.7	13.9	1.9	42.5
2026	30.0	15.4	1.9	47.3
2027	32.7	16.9	1.9	51.5
2028	36.2	18.2	0.0	54.3
2029	40.0	19.9	0.0	59.9
2030	42.9	21.4	0.0	64.3

Access Scenario – Value of Production and Government Revenue

*Life of Field Production (including 2030 and beyond)

	Rockies	ANWR	Atlantic	Eastern GoM	Pacific	Total
Production						
Natural Gas (Tcf)	8.2	9.4	37.1	26.9	13.5	**95.1**
Natural Gas (Bnboe)	1.5	1.7	6.6	4.8	2.4	**16.8**
Oil (Bnbbls)	0.5	8.7	6.8	9.7	8.1	**33.8**
Total Oil & Gas (Bnboe)	**1.9**	**10.4**	**13.4**	**14.5**	**10.4**	**50.7**
Total Value of Production ($BN)	**$126**	**$1,149**	**$1,163**	**$1,346**	**$1,061**	**$4,846**
Governemnt Revenue ($BN)						
Lease Bonus Bids	15	15	8	16	7	**61**
Taxes (State, Local, Federal)	29	285	283	332	282	**1,211**
Royalties	15	141	137	162	127	**581**
Total Government Revenue ($BN)	**$59**	**$440**	**$428**	**$510**	**$416**	**$1,853**

Tax Scenario – Estimated Total U.S. Production Impacts (mboed)

Year	Base Production	Less Current Marginal at Risk	Income Based Tax	Production Based Tax
2011	17,455	17,455	17,455	17,455
2012	18,753	18,046	17,786	17,768
2013	19,545	18,603	18,257	18,236
2014	20,332	19,211	18,753	18,704
2015	20,754	19,505	18,905	18,817
2016	20,304	18,939	18,334	18,238
2017	19,708	18,199	17,581	17,480
2018	19,119	17,480	16,875	16,773
2019	18,426	16,689	16,090	15,990
2020	17,386	15,687	15,067	14,966
2021	15,422	13,838	13,303	13,206
2022	13,707	12,251	11,811	11,722
2023	12,483	11,144	10,762	10,669
2024	11,366	10,140	9,797	9,711
2025	10,816	9,595	9,290	9,217
2026	10,169	8,992	8,711	8,646
2027	9,439	8,325	8,078	8,019
2028	8,714	7,672	7,434	7,383
2029	8,042	7,058	6,850	6,804
2030	7,431	6,549	6,310	6,269

Tax Scenario – Estimated Total L48 Production Impacts (mboed)

Year	Base Production	Less Current Marginal at Risk	Income Based Tax	Production Based Tax
2011	13,905	13,905	13,905	13,905
2012	15,232	14,534	14,274	14,257
2013	16,129	15,215	14,870	14,848
2014	16,998	15,905	15,461	15,437
2015	17,310	16,094	15,631	15,607
2016	16,795	15,510	15,109	15,087
2017	16,316	14,980	14,622	14,602
2018	15,967	14,591	14,248	14,229
2019	15,549	14,173	13,821	13,803
2020	14,808	13,506	13,114	13,098
2021	13,116	11,942	11,604	11,590
2022	11,651	10,601	10,320	10,307
2023	10,615	9,673	9,421	9,410
2024	9,673	8,826	8,602	8,592
2025	8,846	8,076	7,878	7,869
2026	8,094	7,392	7,216	7,209
2027	7,433	6,789	6,634	6,628
2028	6,832	6,239	6,101	6,096
2029	6,290	5,742	5,619	5,615
2030	5,788	5,329	5,171	5,168

Tax Scenario – Estimated Total Employment Impacts

Year	Direct Incremental Job Losses	Indirect Incremental Job Losses	Total Incremental Job Lossses
2011	8,000	20,000	28,000
2012	30,371	75,927	106,297
2013	40,157	100,393	140,550
2014	48,240	120,600	168,840
2015	36,378	90,945	127,323
2016	30,367	75,919	106,286
2017	18,335	45,838	64,174
2018	16,566	41,415	57,980
2019	15,012	37,531	52,543
2020	13,749	34,372	48,121
2021	12,725	31,813	44,539
2022	11,711	29,278	40,989
2023	9,865	24,664	34,529
2024	8,868	22,171	31,039
2025	7,879	19,697	27,576
2026	7,737	19,342	27,079
2027	7,602	19,005	26,607
2028	6,634	16,585	23,219
2029	6,512	16,281	22,793
2030	6,397	15,992	22,388

Tax Scenario – Estimated Impacts on Government Revenue ($ millions)

Year	Base Case Government Revenue $Million	Production Based Tax Scenario Government Revenue $Million	Differential $Million
2011	69,107	73,763	4,656
2012	69,559	73,275	3,716
2013	72,890	76,322	3,432
2014	78,049	81,464	3,415
2015	83,997	84,563	566
2016	92,709	86,990	(5,719)
2017	95,209	87,041	(8,168)
2018	95,194	85,750	(9,444)
2019	94,323	87,544	(6,779)
2020	93,738	79,282	(14,457)
2021	96,906	73,107	(23,799)
2022	88,197	67,324	(20,873)
2023	81,435	62,428	(19,008)
2024	76,557	58,172	(18,385)
2025	73,876	56,278	(17,598)
2026	69,573	53,360	(16,213)
2027	65,308	49,860	(15,448)
2028	60,726	46,394	(14,333)
2029	56,692	33,686	(23,006)
2030	53,181	27,286	(25,895)

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