The Effect of Alaska North Slope Oil and Gas Tax Credits on Petroleum Tax Revenue

Loren Crawford, Tim Harper, and John Tichotsky
Economic Research Group | Alaska Department of Revenue

Abstract

Alaska North Slope production tax credits are an incentive to entice a change in behavior for oil companies in Alaska. The economic concept of opportunity cost provides a counterfactual measure to compare an alternative use of resources. Using the performance of the Constitutional Budget Reserve Fund as the opportunity cost of North Slope production tax credits, we find that the change in behavior does not meet the benchmark compensation the State of Alaska for its investment.

Are North Slope oil and gas tax credits a good investment for Alaska?

Using an "opportunity cost" comparison between the estimated value of oil and gas tax credits or investing in the Constitutional Budget Reserve Fund (CBRF), we find oil and gas tax credits have a substantial negative effect on the State's finances. The opportunity cost of North Slope oil and gas credits over the last five years ranges from $0.9-$4.9 billion and in the next ten years the estimated opportunity cost is $0.6- $7.3 billion.

From 2009-2014, several oil and gas production tax credits were offered. There are two categories of credits that are considered in this study, those that are refunded, and those taken against tax liability. Refunded credits include qualified capital expenditure under AS 43.55.023(a), carry-forward annual loss under AS 43.55.023(b), and credits under AS 43.55.025. Credits taken against tax liability include qualified capital expenditure under AS 43.55.023(a), carry-forward annual loss under AS 43.55.023(b), transitional investment expenditure under AS 43.55.023(i), small producer credit under AS 43.55.024(a)(c) and credits under AS 43.55.025. Annual investment in credits are summarized in Table 1.

Table 1. Investment in credits and cumulative value in the CBRF (in millions)

2009 Investment	$ 590	$ 634	$ 648	$ 689	$ 742	$ 773
2010 Investment		$ 696	$ 711	$ 757	$ 814	$ 849
2011 Investment			$ 773	$ 822	$ 885	$ 922
2012 Investment				$ 710	$ 764	$ 796
2013 Investment					$ 857	$ 893
2014 Investment						$ 687
Total Value Invested in the CBRF	$ 590	$ 1,330	$ 2,133	$ 2,978	$ 4,061	$ 4,921

Per taxable barrel credits were not included in the analysis for two reasons: 1) There is not enough data to evaluate the impact of the tax or credit structure, 2) "The value of the credit changes depending on oil price received for each taxable barrel of oil produced" (Fall 2014 RSB). It better typifies a structural feature of the tax rate, than a traditional tax credit.

The next best alternative to offering tax credits is collecting the full tax revenue and investing in the CBRF. That is, investing a dollar in the CBRF, rather than granting a dollar of credit, is viewed as the opportunity cost. For the North Slope, from 2009-2014, $4.0 billion dollars were either issued or applied to tax liability, as credits. State wealth lost due to credits, is at least $0.9 billion or a maximum based on full payout of $4.0 billion, today. If all new production is attributed to tax credits, then the loss to the state is $0.9 billion. If none of the barrels can be attributed to the tax credits, then the loss to the State is $4.9 billion.

"Wealth destruction," is at least the opportunity cost, ($4.9 billion) less the calculated potential gains from the credit ($4.0 billion), costing the state $0.9 billion. Said differently, if those credit dollars had been invested in the CBRF instead, the state would have at a minimum an additional $0.9 billion in wealth in 2014.

Looking forward over the next ten years, we find similar results. The CBRF opportunity cost measurement would increase to $7.2 billion by 2024, using a 4% rate of return. In the same time period, revenue attributed to credits would sum to $6.6 billion. This suggests wealth destruction is at least $0.6 billion. Using petroleum revenue projections from the DOR fall 2014 forecast, the net present value (NPV) of credits (assuming all production is attributed to credits) is $2.3 billion in 2009 dollars. The CBRF NPV comes in at $2.9 billion, a difference of $0.6 billion. This difference assumes that all production is induced by credits. We do not speculate as to what percentage of the production would have occurred without credits. However, with these findings there is a simple conclusion. From an investment standpoint the state should not invest in credits because it has a lower expected value.

Traditionally in finance, the investor also examines risk exposure whereas tax code does not evaluate risk. The credits do not guarantee any oil production at all. They do provide funding to whatever end the company end the company qualifies for. It would be easy to conjecture that oil tax credits are more risky than the CBRF's probability of a negative return of 6.59% in the main account. Investment in oil tax credits provide a suboptimal return and a higher level of risk than the best alternative opportunity.

In per barrel terms, if every new barrel was induced by credits, each barrel is subsidized by $11. This figure is a very best case number. In wealth destruction terms, each barrel destroys state wealth by $22. In terms of price per barrel in the market, this is substantial, whether oil is at $50 or $120 per barrel.

Methodology

In order to evaluate the effectiveness of oil and gas tax credits as an investment, we contrast the comparative gains if the money had been invested in the Constitutional Budget Reserve Fund (CBRF). We analyzed data from 2009 to present. The credit payments for those years are illustrated in the table below with the return on investment in the CBRF.

Table 2. North Slope Oil and Gas Production Tax Credits 2009-2014 except per barrel taxable credit

	2009	2010	2011	2012	2013	2014	Total
Credit Payments North Slope Only (in millions)	$ 518	$ 648	$ 757	$ 667	$ 797	$ 659	$ 4,045

If these credit dollars had instead been invested in the CBRF, they would be worth $4.9 billion today as shown in Table 3.

Table 3. Investment in credits and cumulative value in the CBRF (in millions)

	2009	2010	2011	2012	2013	2014
Return of Return - CBRF	13.99%	7.50%	2.18%	6.37%	7.58%	4.25%
2009 Investment	$ 590	$ 634	$ 648	$ 689	$ 742	$ 773
2010 Investment		$ 696	$ 711	$ 757	$ 814	$ 849
2011 Investment			$ 773	$ 822	$ 885	$ 922
2012 Investment				$ 710	$ 764	$ 796
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Total Value Invested in the CBRF	$ 590	$ 1,330	$ 2,133	$ 2,978	$ 4,061	$ 4,921

In order to estimate the value of the credits, we assume all production above the 2009 technical forecast is caused by credits. We also leave out 2007-2008 years of credits paid out, but do include the production that would have come on as a result from those years. This biases the production upward. In other words, any effect on revenues from credits from 2007-2008 would be included in our results, but do not consider the payout implications from those credits. The 2009 technical forecast's currently producing category is the volume of ANS oil production if no other production came online. We attribute the difference between actual and the currently producing forecast as production induced by credits, regardless if this is actually true. In doing so, we create a maximum volume that credits can be attributed to. For years after 2014, we use the 2014 currently producing forecast and subtract the 2009 currently producing forecast. This attributes all barrels from new fields or new applied technologies that are created from 2009-2014 out into 2024.

Table 4. Technical Production Forecast (CP), Actual Production Forecast and Credit-Induced Production

	2009	2010	2011	2012	2013	2014
Production Actual	692,800	642,600	599,900	579,300	531,600	531,100
CP Forecast of 2009		646,303	562,304	503,749	451,984	419,794
CP Forecast of 2010			584,048	519,952	464,242	425,693
CP Forecast of 2011				548,034	484,538	451,192
CP Forecast of 2012					517,591	486,111
CP Forecast of 2013						488,436
CP Forecast of 2014						
Possible Credit-Induced Barrels		-	37,596	75,551	79,616	111,306

We applied the proportion of "credit induced production volumes" to actual production against actual production tax revenue. This provides the maximum investment yield credits can be attributed to.

Table 5. Method of calculating possible credit-induced revenue

	2009	2010	2011	2012	2013	2014	Total
Fraction of "Credit-Induced" to Total Production	$ -	$ -	$ 0.06	$ 0.13	$ 0.15	$ 0.21	
Actual Production Tax	$ 3,101	$ 2,861	$ 4,543	$ 6,137	$ 4,043	$ 2,589	
Possible "Credit-Induced" Production Tax	$ -	$ -	$ 285	$ 800	$ 605	$ 543	$ 2,233

This $2.1 billion dollar figure is an absolute maximum value credits have provided to the state in production tax revenue. The impact is actually smaller as many of the projects would have likely been completed anyway. This method gives complete benefit-of-the-doubt. Production tax is just one of four revenues generated from this "implied increased production." Royalty, corporate income taxes and property tax would also apply to these volumes. We do not include increased production's effect on tariff, which in turn would increase tax revenue. This may bias our estimate downward.

The bottom line is credits have cost the state in direct expenses a minimum of $3.9 billion in the five years.

Looking to the next ten years, below are the ANS currently producing schedules from the 2009 and 2014 production forecasts. The negative production in 2024 can be interpreted as production moved forward in time because of credits. We do not include speculative revenue values generated from gas in the ten-

year period, or the next ten years. From an NPV approach, the further out in time, the more discounted the value of the revenue flows of gas, so these values are likely to be negligible.

Table 6. Difference in Technical Forecasts from 2009-2014 as possible credit-induced barrels

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
CP Forecast of 2009	385,335	352,618	323,745	298,124	275,844	256,383	238,722	222,652	208,487	195,962
CP Forecast of 2014	472,345	411,712	370,646	331,015	298,840	272,046	248,860	228,465	210,822	195,443
Possible Credit-Induced Barrels	87,010	59,094	46,900	32,891	22,996	15,663	10,138	5,813	2,335	(519)

The revenues associated with the credit-induced production are simply the ratio of the production of total production multiplied by each revenue type. For example for 2015, the royalties are simply 18.4% x 1,593,700,000 =293,573,092.

Table 7. Possible "Credit Induced" Revenue ($)

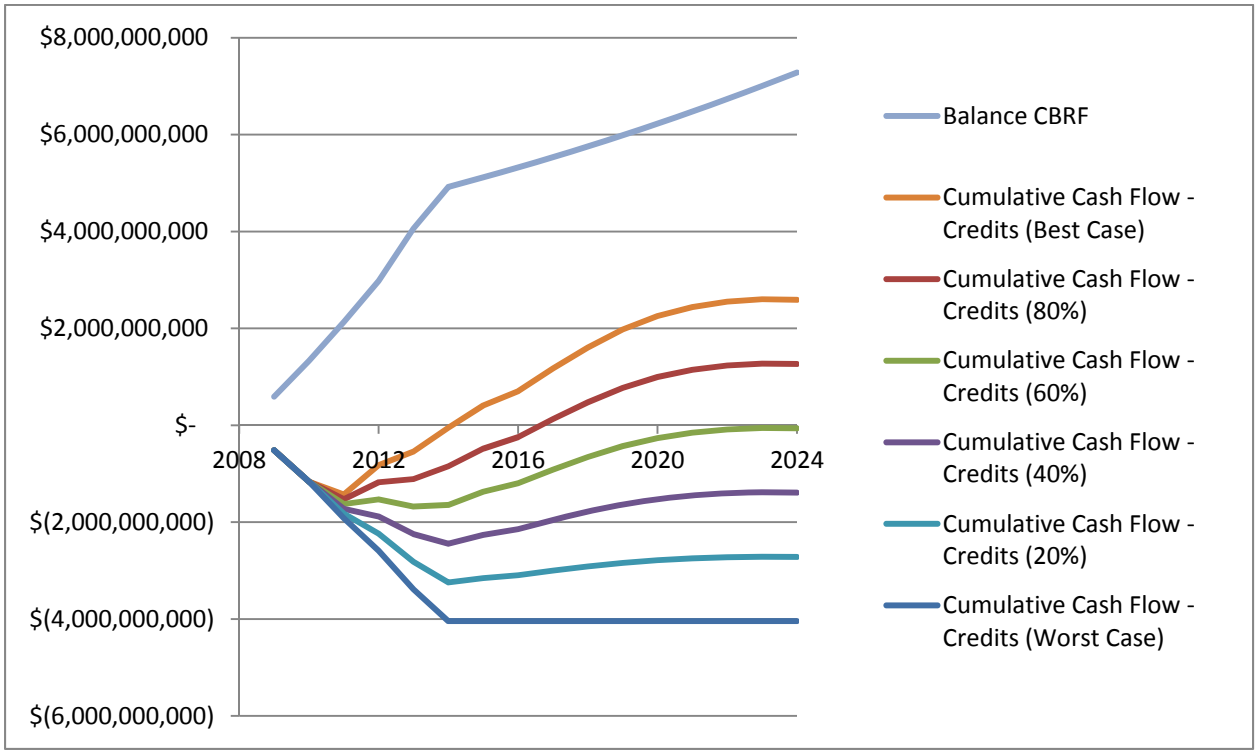
	2015	2016	2017	2018	2019
Fraction of "Credit-Induced" to Total Production	18.4%	14.4%	12.7%	9.9%	7.7%
Actual Production Tax	515,100,000	299,800,000	1,189,000,000	1,721,600,000	2,163,500,000
Possible "Credit-Induced" Production Tax	94,885,800	43,030,995	150,452,760	171,065,259	166,483,638
Actual Corporate Income Tax	249,200,000	195,400,000	276,700,000	282,900,000	289,300,000
Possible "Credit Induced" Corporate Income Tax	45,904,759	28,046,219	35,012,850	28,110,108	22,261,944
Actual Property Tax	128,900,000	125,200,000	124,600,000	123,800,000	122,700,000
Possible "Credit Induced" Property Tax	23,744,476	17,970,249	15,766,538	12,301,277	9,441,896
Actual Royalties	1,593,700,000	1,435,500,000	2,111,200,000	2,206,100,000	2,277,400,000
Possible "Credit Induced" Property Tax	293,573,092	206,040,671	267,145,388	219,207,172	175,248,365
Total Possible "Credit Induced" Revenue	458,108,127	295,088,133	468,377,536	430,683,817	373,435,844

	2020	2021	2022	2023	2024
Fraction of "Credit-Induced" to Total Production	5.8%	4.1%	2.5%	1.1%	-0.3%
Actual Production Tax	2,229,200,000	2,055,800,000	2,045,900,000	2,051,400,000	2,014,700,000
Possible "Credit-Induced" Production Tax	128,344,858	83,749,267	52,056,331	22,718,513	(5,351,526)
Actual Corporate Income Tax	295,800,000	302,500,000	309,300,000	316,300,000	323,400,000
Possible "Credit Induced" Corporate Income Tax	17,030,508	12,323,258	7,869,897	3,502,908	(859,028)
Actual Property Tax	121,100,000	119,200,000	117,300,000	115,200,000	112,900,000
Possible "Credit Induced" Property Tax	6,972,260	4,855,975	2,984,607	1,275,798	(299,889)
Actual Royalties	2,197,000,000	2,071,300,000	1,942,100,000	1,876,900,000	1,791,800,000
Possible "Credit Induced" Property Tax	126,490,963	84,380,707	49,415,221	20,785,989	(4,759,450)
Total Possible "Credit Induced" Revenue	278,838,589	185,309,207	112,326,057	48,283,209	(11,269,893)

For the NPV calculations, we used the revenue received from “credit caused production” with a 2.25% discount rate, DOR’s official inflation rate currently. Cumulative cash flows are shown in the table below. Even if all production was attributed to credits “or the best case”, its value falls far short of its opportunity cost of depositing the funds in the CBRF instead.

To illustrate the possible values North Slope credits have brought to the state, a cash flow diagram is provided. If all of the production is credit-induced, then that is labeled “Best Case.” “Worst case” is assuming no production was credit-induced. Several intermediate levels are provided in Figure 8.

Figure 8. Cash flow diagram for NS credits



Conclusion

The oil and gas production tax credits for the North Slope may at best be an inferior investment to the CBRF. It has a lower value overall in the foreseeable future, both without discounting over time and with discounting. It also has a higher risk of loss than the CBRF. From an investment perspective, oil and gas production tax credits for the North Slope do not beat the benchmark, and the risk to reward does not justify its inclusion in the State's portfolio.

References

Alaska Department of Revenue. *Revenue Sources Book Fall 2014.* Alaska Department of Revenue, pg. 28, 2014.