

Willow Project Fiscal Analysis – Spring 2023 Update

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Introduction

This paper provides an analysis of the potential revenue and related cash flows for the proposed Willow Project and how such resources might be shared between stakeholders.

This analysis is presented using the Department of Revenue’s (DOR’s) “Lifecycle Model” which allows for detailed financial analysis of an oil project over the full field life. The analysis utilizes publicly available information and includes all major applicable petroleum revenue sources. However, it is important to note the sources of uncertainty, which include oil price, project timing, oil production, lease expenditures, and company-specific details, both at Willow and elsewhere on the North Slope. Any of these variables could lead to significant changes to the revenues and related cash flows, including the conclusions of this analysis.

This version of the analysis is an update to the version dated March 23, 2023. This update corrects Table 3, Net Present Value of Cash Flow by Recipient, with all other contents of this paper and the underlying analysis remaining unchanged. This analysis supersedes the initial analysis that was released on February 28, 2023.

Summary

The Department of Revenue prepared a fiscal analysis of the impacts of the Willow project, including but not limited to the impacts on state revenues, local municipal property tax revenues, impacted community royalty revenues, and federal revenues. Key assumptions included:

- Oil Price – projected oil prices from DOR’s Spring 2023 revenue forecast. Beyond the time horizon of the forecast, prices assumed to increase with inflation.
- Transportation Costs – projected transportation costs from DOR’s Spring 2023 revenue forecast, using the long-term production outlook from Spring 2023 to extrapolate beyond the forecast. Transportation costs adjusted to incorporate the potential impact of additional Willow production on tariff costs for the Trans-Alaska Pipeline (TAPS) and feeder pipelines (Alpine and Kuparuk). Additional throughput from Willow

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reduces the expected TAPS tariff for all North Slope production. Additional throughput from Willow through the Alpine and Kuparuk reduces the expected feeder pipeline tariffs for those fields production.

- Production – production profile was obtained for the three-pad development from the Supplemental Environmental Impact Statement (SEIS). Production assumed to begin in Fiscal Year (FY) 2029 and total 613 million barrels over project life.
- Company Spending – capital expenditures of \$10.3 billion over the project life, informed by public statements from the operator. DOR developed a plausible scenario for how these costs will be realized over time, with operating costs based on the estimate found in the SEIS, increased with inflation.
- Taxation – modeled current law as of March 2023.

Key findings from this analysis include:

- State Revenue – Willow Project would become cash flow positive to the state by FY 2030, with \$4.4 billion of net cash flow through 2043 and \$6.3 billion through 2053.
- Municipal Revenue – \$1.3 billion to the North Slope Borough through 2053, becoming cash flow positive as soon as the first property tax revenue is received in this model in FY 2024.
- Impacted Communities Revenue share – \$3.4 billion passed through the State of Alaska to the impacted communities through 2053, already cash flow positive due to ongoing lease rental payments, with revenue increasing further once production royalty payments begin in FY 2029. This revenue stream is shown separately since it is disseminated directly to the impacted communities.
- Federal Revenue – the federal government benefits significantly from this project, through a combination of royalties and corporate income tax. This project would become cash flow positive to the federal government by FY 2031, with \$4.9 billion of net cash flow through 2043 and \$6.1 billion through 2053.
- Producer Revenue – The Willow project would become cash flow positive to the producer by FY 2033, with \$7.6 billion of net cash flow through 2043 and \$9.9 billion through 2053.

This analysis was based entirely on publicly available information and did not utilize any confidential, company-specific information available to DOR.

Willow Project Overview

The Willow project is a proposed oil development wholly owned and operated by ConocoPhillips. Willow is located within the federal National Petroleum Reserve in Alaska (NPR-A), and, if developed, would become the most western oil development on Alaska's North Slope.

The U.S. Bureau of Land Management (BLM) originally issued the Final Environmental Impact Statement (EIS) in August 2020, and the U.S. Department of the Interior (DOI) then issued a Record of Decision in October 2020, allowing the project to proceed. However, following legal action, the BLM was tasked with providing a Supplemental EIS (SEIS) that addressed the concerns raised in the legal challenges. This SEIS was released on February 1, 2023. On March 13, 2023, the Department of the Interior issued a new Record of Decision approving the three-pad development plan as recommended by the BLM. As of March 17, 2023, ConocoPhillips has begun building the ice road for the project, but agreed to delay gravel mining and road-building related activities while a federal judge considers a request from conservation groups to halt construction work.

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Modeling Assumptions

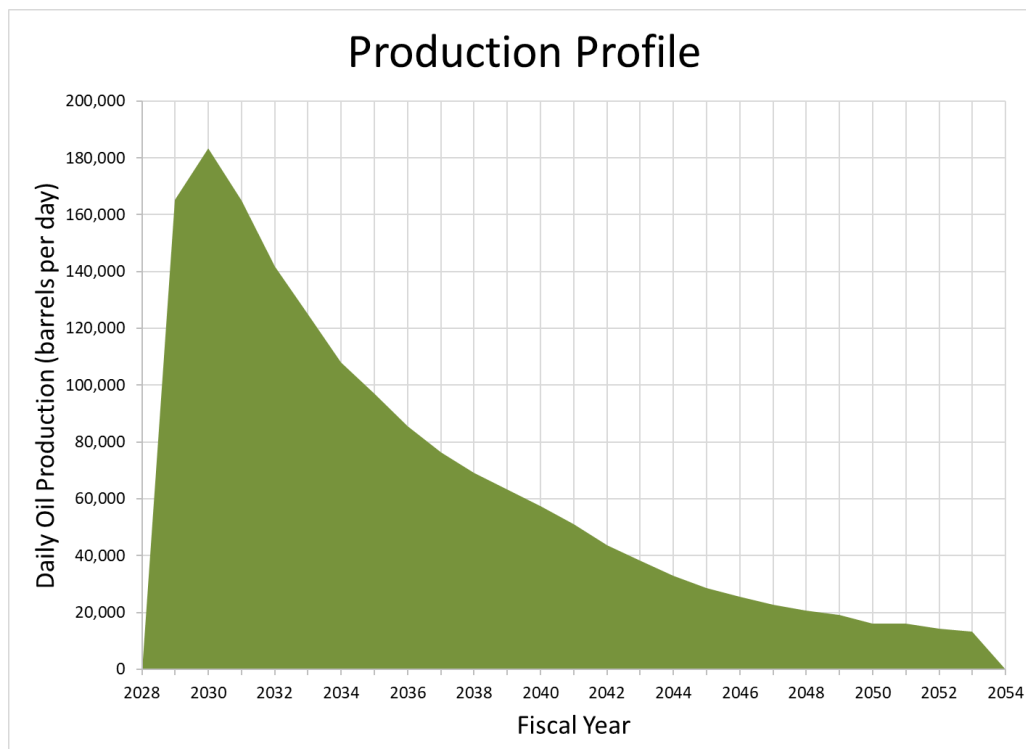
The analysis described in this paper is based on DOR’s “Lifecycle model” which estimates detailed cash flows over the life of an oil field. This is a deterministic model, not probabilistic, meaning that the model considers only a single set of assumptions within a range of possible assumptions. The model inputs and outputs are presented in nominal dollars unless otherwise stated.

Where possible, input data was obtained from public sources, especially Appendix E.15, Economics Technical Appendix, of the Willow SEIS, prepared by Northern Economics for the BLM in January 2023. Values from the SEIS are listed in real 2021 dollars. This analysis assumes that Willow is developed according to the DOI-approved three-pad development plan (“Alternative E” in the SEIS) and uses production and cost information associated with that plan. Development is assumed to start in Fiscal Year (FY) 2024 (July 1, 2023, to June 30, 2024), leading to first production in FY 2029 (July 1, 2028, to June 30, 2029).

In order to maintain taxpayer confidentiality, any input data not available publicly are based on North Slope average values from the Spring 2023 Revenue Sources Book published by DOR, or from knowledge of typical industry practice. Confidential company-specific details which could allow for a more accurate analysis were not used.

Production Profile

ConocoPhillips supplied the annual production profiles for the SEIS. This analysis uses the profile for the three-pad development plan approved by the DOI, with a total production of 613 million barrels, and production peaking at 183,000 barrels per day of oil in FY 2030 (Figure 1). This is produced over 25 years, from project year 6 (FY 2029) to project year 30 (FY 2053). While production may continue further, with or without future expansions, this analysis assumes only the production as laid out in the SEIS.



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Figure 1: Oil Production by Year, barrels of oil per day.

Cost Profile

Project costs are customarily divided between capital expenditures (CapEx) and operating expenditures (OpEx).

This analysis assumes capital expenditures of \$10.3 billion. The total costs and timing of those costs were developed by DOR, relying heavily on public information. The SEIS includes estimates by Northern Economics of total CapEx, divided into construction CapEx (\$4.8 billion) and drilling CapEx (\$3.9 billion), and these expenditures are assumed to equate to allowable lease expenditures for tax purposes. The SEIS also includes estimates of annual employment for construction and drilling, supplied by ConocoPhillips, which were used to estimate an annual CapEx profile, accounting for long-lead items by shifting a portion of costs into previous years. Construction costs are expected to be incurred in project years 1 to 8 (FY 2024 to FY 2031), and drilling costs are expected to be incurred in project years 4 to 11 (FY 2027 to FY 2034). Finally, the CapEx profile was scaled up by 6% to fit the statement made during the ConocoPhillips Q4 2022 earnings call, “...we’d anticipate the [total expenditures] to first production [FY 2029, in this model] to be in the \$7 billion to \$7.5 billion range.” The resulting CapEx profile is shown below.

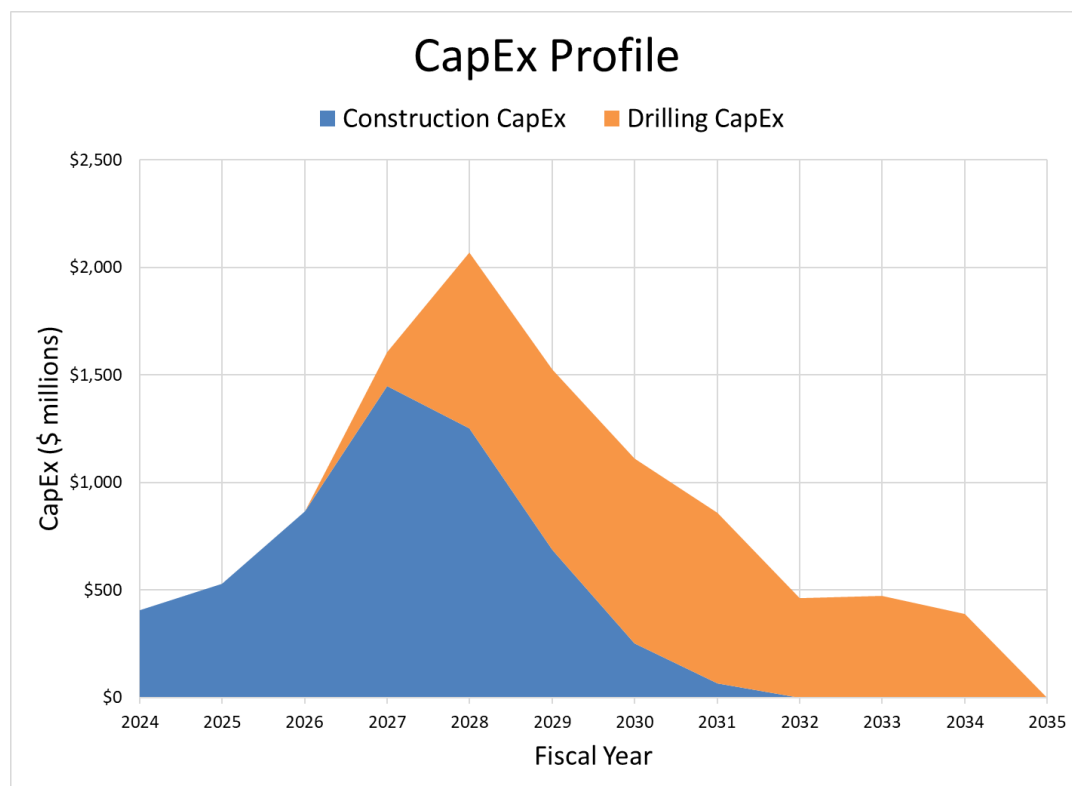


Figure 2: Capital Expenditures by Year, \$ millions.

This analysis assumes total OpEx of \$6.1 billion over life of field, or \$7.41 per barrel increasing with inflation, based on the estimate by Northern Economics in the SEIS. End-of-field-life costs and costs expended prior to FY 2024 are excluded from this analysis. The OpEx estimates used from the SEIS are assumed to equate to allowable lease expenditures for tax purposes.

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Prices and Transportation Costs

This analysis uses projected oil prices from DOR's Spring 2023 revenue forecast. Beyond the time horizon of the forecast, prices are assumed to increase with inflation, at a rate of 2.5% annually.

The analysis also uses projected transportation costs from DOR's Spring 2023 revenue forecast, modified to include the potential impact of Willow development on the TAPS tariff and on affected feeder pipelines (Alpine and Kuparuk). Additional throughput from Willow will reduce the expected pipeline tariffs for all North Slope production. The potential impacts of the development on marine transport costs were not modeled. Beyond the time horizon of the forecast, an unofficial extrapolation of the forecast was used, relying on the long-term production outlook from Spring 2023.

The list of projected oil prices and transportation costs for the model period are located in the Appendix.

Fiscal Assumptions

- No aspect of this analysis uses taxpayer confidential information.
- Current state and federal tax laws, as of March 2023, remain in place for the duration of the analysis.
- The rate of inflation is 2.5% throughout the analysis period.
- Production comes entirely from federal leases within the NPR-A, and royalty is paid at a rate of 16.67% of production. Federal royalty is shared at a rate of 50% for the benefit of the impacted communities. This revenue is listed separately in this analysis.
- Property Tax is modeled using the expected annual CapEx and assumes that 50% of CapEx represents taxable tangible property, with typical depreciation curves applied. Property tax revenue is assumed to be shared between North Slope Borough (NSB) and the state, with 89.95% to the NSB and the remainder to the state. In addition, the NSB property tax is modeled based on the existing mill rate of 17.99, with 2.01 mills for the state.
- For the Production Tax, the initial development is assumed to qualify for a 20% Gross Value Reduction (GVR) under AS 43.55.160(f)), with no producing area within the unit qualifying separately for GVR later in the field life.
- This analysis assumes that the producer can deduct lease expenditures incurred at Willow against production elsewhere on North Slope, but the benefit of those deductions is limited by the minimum tax floor, until entering a net operating loss. In order to estimate this benefit, the producer's North Slope production is assumed to be 228,000 barrels per day (or 200,000 taxable barrels per day after royalty), with the producer's average lease expenditures at \$24.50 dollars per barrel, increasing with inflation. These assumptions are not informed by confidential information; if confidential taxpayer information was utilized, it is possible that the producer's benefit from deducting lease expenditures would be different.
- This analysis includes the benefit of increased volumes entering TAPS and feeder pipelines, which would reduce transportation costs for all fields on the North Slope, and hence increase production tax and royalty revenue. This is referenced as "Pipeline Tariff Impact to the State" in this analysis and includes additional state production tax and royalty revenue from other North Slope production due to reduced pipeline tariffs. For this analysis, we only looked at the increased state revenue from production tax and royalty. We have not looked at potential changes to other state, municipal, or federal revenues. This benefit to state revenue is a simplified estimate and does not include the potential beneficial impact to marine transportation costs.

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- State Corporate Income Tax is incurred at a typical producer rate of 4.25% of production tax value less production tax. This assumption is lower than the 9.4% marginal tax rate and is a rule of thumb used for various DOR analyses, based on analysis of historical tax revenue, that is intended to reflect average corporate income tax paid by oil and gas companies subject to state's corporate income tax. Net impact on State Corporate Income Tax prior to the start of production is assumed to be zero.
- Federal Corporate Income Tax is incurred at a rate of 21.0%. This is the marginal federal tax rate, and the Willow development is assumed to be marginal income to the producer and taxed at the marginal rate.
- This analysis excludes the impact of increased state employment and other economic impacts outside of the direct fiscal impacts of the Willow development. While outside the scope of this analysis, the broader economic impacts would be significant and material for the state. Information about the potential employment and economic impacts is included in the SEIS, Appendix E.15, page 9. A reference to the SEIS is included at the end of this analysis.

Analysis

Model outputs are summarized below using charts presenting annual data, along with summary tables after 10, 20, and 30 years of field life (with project year 1 being the first year of development, FY 2024). All values are in nominal dollars, unless otherwise stated.

Revenues

Before production begins, the development leads to reduced state tax revenue, since capital expenditures can be deducted against production tax accrued elsewhere on the North Slope. This is displayed as negative revenue. Conversely, lease rental revenue and property tax revenue are modeled to begin in FY 2024, before production begins.

As soon as oil production begins in FY 2029, as modeled, production royalty payments begin, and annual impacts on corporate income tax are assumed to become positive.

Production tax revenue begins in FY 2030, remaining at low levels initially due to lease expenditure deductions, Gross Value Reduction (GVR), and tax credits under AS 43.55.24(i) (GVR). The interaction between these items, and with per-barrel tax credits under AS 43.55.024(j) (non-GVR), causes significant annual variation in production tax revenue. In addition, since much of the increase in annual state revenue from the reduction in pipeline tariffs comes as incremental increases in production tax, such revenue is similarly variable.

Cumulative To Year	Impacted Community Share of Royalty	Federal Share of Royalty	NSB Share of Property Tax	State Share of Property Tax	State Production Tax	Pipeline Tariff Impact to State	State Corporate Income Tax	Federal Corporate Income Tax	Total Government Revenue
2033	\$ 1,423.6	\$ 1,423.6	\$ 417.6	\$ 46.7	\$ 328.7	\$ 279.5	\$ 270.0	\$ 205.7	\$ 4,395.4
2043	\$ 2,878.4	\$ 2,878.4	\$ 969.9	\$ 108.4	\$ 2,512.0	\$ 1,119.1	\$ 657.1	\$ 2,037.1	\$ 13,160.4
2053	\$ 3,413.0	\$ 3,413.0	\$ 1,263.9	\$ 141.2	\$ 3,461.1	\$ 1,890.4	\$ 790.1	\$ 2,666.3	\$ 17,039.0

Table 1: Cumulative Revenues by Category after 10, 20, and 30 Years, \$ millions.

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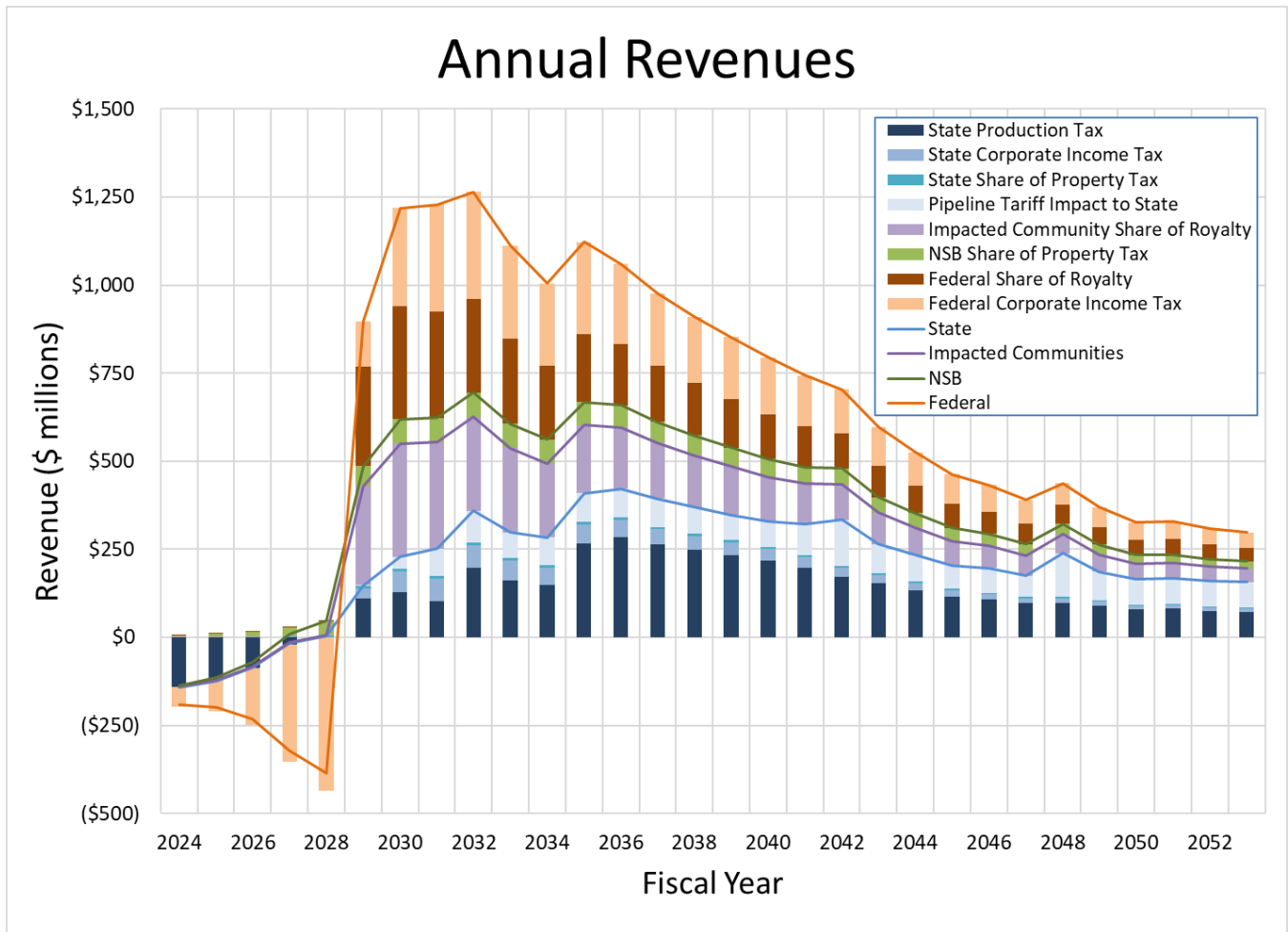


Figure 3: Annual Revenue by Category, \$ millions.

Cash Flow

Prior to production, reduced revenues from production tax and corporate income tax are displayed as negative cash flow for the state and federal government. The model shows that undiscounted cumulative cash flow becomes positive for combined state revenues in FY 2030, for impacted communities and North Slope Borough in FY 2024, for federal revenues in FY 2031 and for the producer in FY 2033. Total 30-year project undiscounted cash flow reaches \$6.3 billion for the state, \$3.4 billion for impacted communities, \$1.3 billion for the North Slope Borough, \$6.1 billion for the federal government, and \$9.9 billion for the producer.

Cumulative To Year	State	Impacted Communities	NSB	Federal	Producer
2033	\$ 924.9	\$ 1,423.6	\$ 417.6	\$ 1,629.3	\$ 723.9
2043	\$ 4,396.6	\$ 2,878.4	\$ 969.9	\$ 4,915.5	\$ 7,563.4
2053	\$ 6,282.8	\$ 3,413.0	\$ 1,263.9	\$ 6,079.3	\$ 9,880.5
Cash Flow Positive	FY 2030	FY 2024	FY 2024	FY 2031	FY 2033

Table 2: Cumulative Cash Flow by Recipient After 10, 20, and 30 Years, \$ millions.

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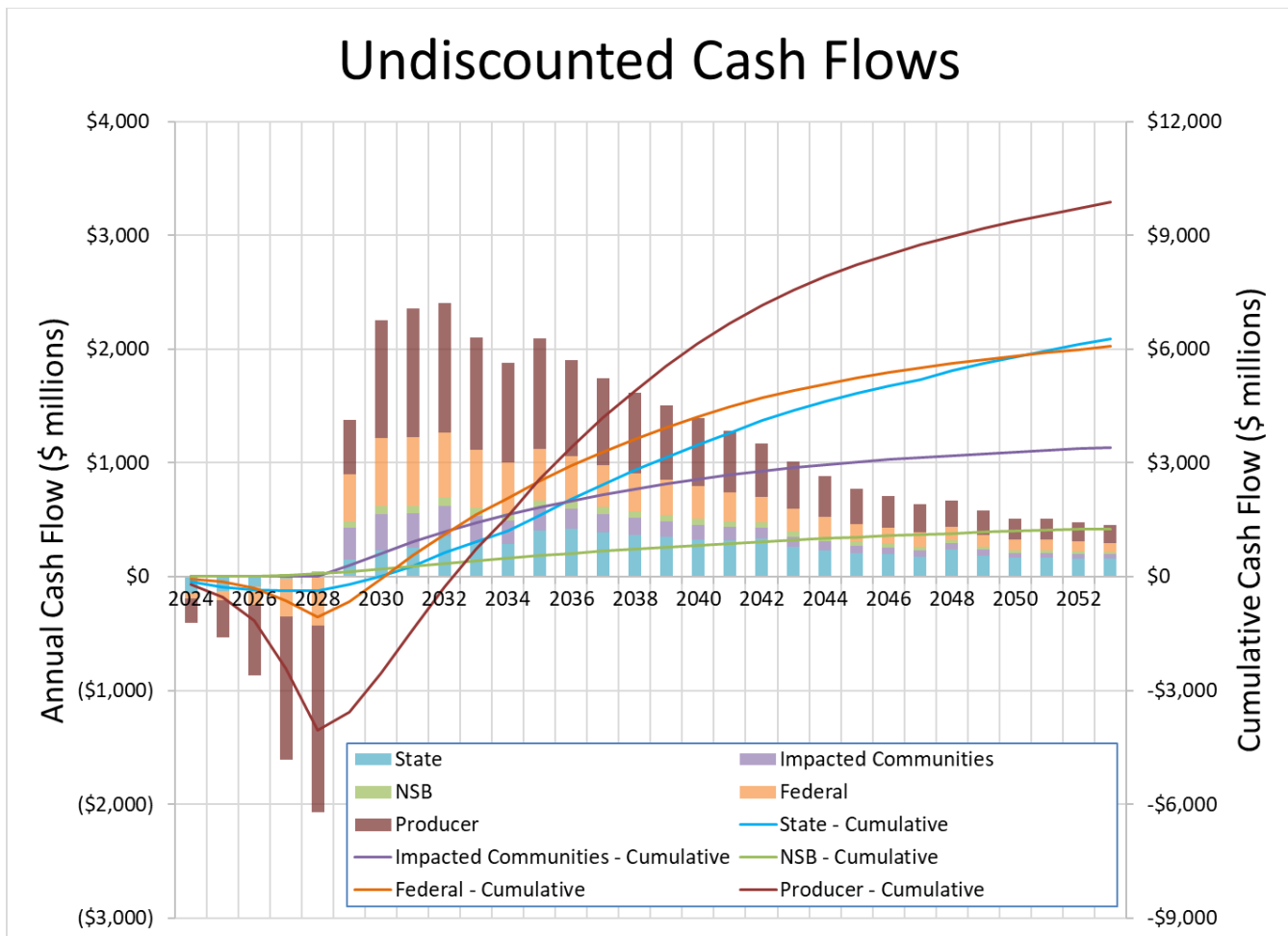


Figure 4: Annual Cash Flow (left axis) and Cumulative Cash Flow (right axis) by Recipient, \$ millions.

Local Impacts

In order to more clearly see the impacts during the construction phase of the project on the local entities, the cash flow figure was broken out to include only the North Slope Borough property tax and the impacted communities royalty share. These revenue streams, while smaller during the construction of the project, are still important revenue streams to the local entities. The significance of these two revenue streams increases during the production phase of the project.

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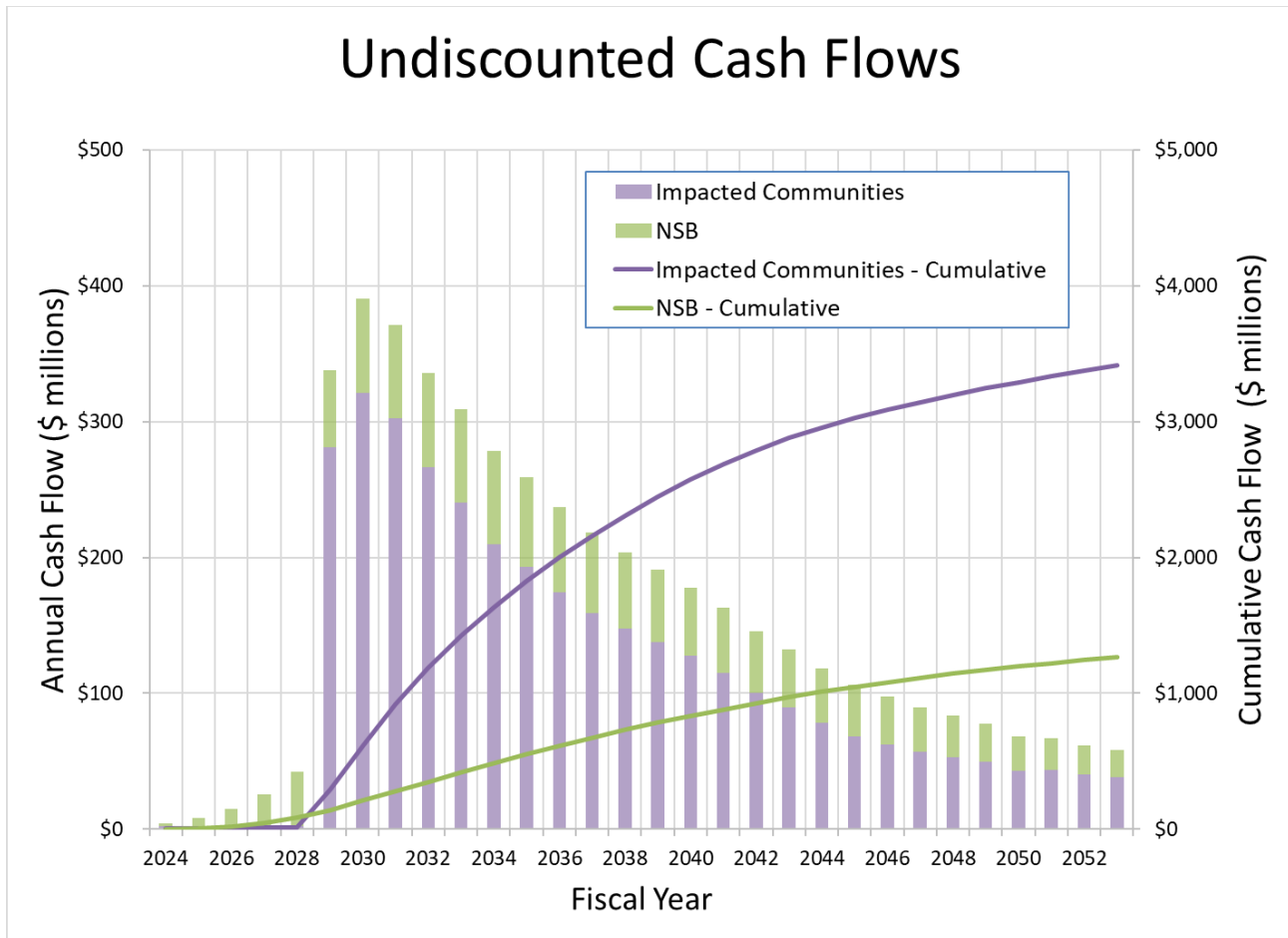


Figure 5: Annual Cash Flow (left axis) and Undiscounted Cumulative Cash Flow (right axis) for North Slope Borough and Impacted Communities Only, \$ millions.

Net Present Value

Net present value (NPV) is a measure used to discount future cash flows, and to better represent the time value of money. The analysis here is based on a NPV with a 10% discount rate for all stakeholders, which is an industry standard metric. Under current assumptions and standard metrics, NPV is positive for all recipients within 20 years, increasing further by 30 years.

Cumulative To Year	State	Impacted Communities	NSB	Federal	Producer
2033	\$ 283.5	\$ 679.5	\$ 212.8	\$ 525.8	\$ (609.1)
2043	\$ 1,119.4	\$ 1,048.1	\$ 349.0	\$ 1,357.0	\$ 1,119.3
2053	\$ 1,296.9	\$ 1,100.0	\$ 377.5	\$ 1,470.4	\$ 1,346.3
<i>NPV Positive</i>	<i>FY 2031</i>	<i>FY 2024</i>	<i>FY 2024</i>	<i>FY 2031</i>	<i>FY 2035</i>

Table 3: Net Present Value of Cash Flow by Recipient After 10, 20, and 30 Years, Using 10% Discount Rate, \$ millions.

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Discussion

Analysis Uncertainty

While this analysis incorporates all current major petroleum revenue sources, significant uncertainty remains. Much of this uncertainty derives from the simple difficulty in predicting the future; but, as partly noted in the Spring 2023 Revenue Forecast, uncertainty is currently above historic levels for many model inputs:

- Willow Project timing is dependent on ongoing lawsuits brought by conservation groups not leading to further delays.
- Oil and gas industry project costs are more uncertain, due to inflation, supply chain disruption, labor disruption, impacts of the Covid-19 pandemic in general, and increasing development activity in the oil and gas industry in particular.
- Oil price volatility is above normal levels following the Russian invasion of Ukraine, recent financial events, and the Covid-19 pandemic. Additionally, while Alaska's production taxes are progressive to price generally, the impact of oil prices is even more pronounced for a new project when oil prices are close to \$70 per barrel, which is the price threshold for determining whether a field receives GVR benefits for as many as seven years or as few as three years. Using the Spring 2023 DOR oil price forecast, the Willow project in this model would be eligible for GVR benefits for seven years.
- Production rates are naturally uncertain prior to development, with only a limited number of exploration and appraisal wells.

In addition, the benefit of lease expenditure deductions prior to production start-up depends on both oil price and on the producer's total North Slope production and lease expenditures, elements that are both uncertain and confidential.

Conclusions

Numerous uncertainties exist, so this analysis represents one possible scenario within a range of possible outcomes. That said, developing the proposed Willow project is expected to lead to significant state revenues, with positive total cash flow and net present value for the state. The project as modeled is worth billions of dollars to the state, the North Slope Borough, impacted communities, the producer, and the federal government. The benefits of the project include direct fiscal impacts as well as reduced costs and improved economics for all production due to increased volumes entering the Trans-Alaska Pipeline and feeder pipelines.

Additional benefits from the Willow Project that have not been included in this analysis include broader employment and economic impacts outside of the direct fiscal impacts of the Willow development. Like the direct fiscal impacts, the additional economic impacts would be significant and material for the state.

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Appendix: Oil Price and Transportation (Netback) Cost Forecast

Fiscal Year	ANS Oil Price	Transportation (Netback) Costs
2023	\$85.25	\$10.51
2024	\$73.00	\$10.51
2025	\$70.00	\$10.37
2026	\$69.00	\$10.33
2027	\$67.00	\$10.55
2028	\$66.00	\$10.60
2029	\$65.00	\$9.60
2030	\$66.00	\$8.80
2031	\$68.00	\$8.26
2032	\$70.00	\$8.81
2033	\$72.00	\$9.57
2034	\$73.00	\$9.94
2035	\$75.00	\$10.32
2036	\$77.00	\$10.85
2037	\$79.00	\$11.38
2038	\$81.00	\$11.94
2039	\$83.00	\$12.61
2040	\$85.00	\$13.43
2041	\$87.00	\$14.43
2042	\$89.00	\$15.58
2043	\$92.00	\$16.89
2044	\$94.00	\$18.37
2045	\$96.00	\$20.32
2046	\$99.00	\$21.38
2047	\$101.00	\$22.46
2048	\$104.00	\$23.58
2049	\$106.00	\$24.73
2050	\$109.00	\$25.96
2051	\$111.73	\$26.61
2052	\$114.52	\$27.28
2053	\$117.38	\$27.96

Notes:

- ANS Oil Prices are from the Spring 2023 Forecast.
- Netback costs are the Spring 2023 forecast adjusted by estimated impacts to the tariff for TAPS and the Alpine and Kuparuk pipelines from Willow production at different levels than incorporated into the official forecast.