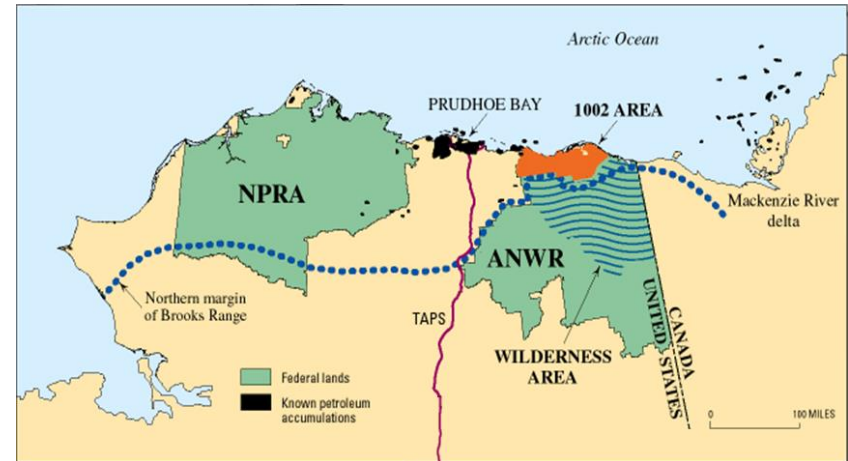




# Alaska Department of Revenue



## Revenue Potential of ANWR Development Presentation to the House Resources Committee February 23, 2015

Ken Alper, Director  
Dan Stickel, Assistant Chief Economist  
Alaska Department of Revenue, Tax Division



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## The 1002 Area of ANWR is the Most Promising Unexplored Area in Alaska

- Large amounts of estimated resources in a relatively small area
- Only 1.5 million acres or 2,300 square miles
  - 1/15 the size of NPRA
  - About the size of the City and Borough of Juneau, or the State of Delaware
- With the development of Pt. Thomson, ANWR becomes much closer to existing infrastructure

# Any Revenue Estimate for ANWR is Highly Speculative

- We worked together with DNR to identify consensus estimates from previously published federal reports
- We attempted to model a production scenario for an undiscovered, technically recoverable resource
- Although the known geology and resource estimates are extremely encouraging, the proven reserves in ANWR are zero
- It is necessary to understand our assumptions before we get to any numbers

# Source Documents



## Economics of 1998 U.S. Geological Survey's 1002 Area Regional Assessment: An Economic Update

By E. D. Attanasi



Open-File Report 2005-1359

U.S. Department of the Interior  
U.S. Geological Survey

This report is preliminary and has not been reviewed for conformity to U.S. Geological Survey  
editorial standards and stratigraphic nomenclature.

SR/OIAF/2008-03

## Analysis of Crude Oil Production in the Arctic National Wildlife Refuge

May 2008

Energy Information Administration  
Office of Integrated Analysis and Forecasting  
U.S. Department of Energy  
Washington, DC 20585

This report was prepared by the Energy Information Administration, the independent statistical and analytical agency within the Department of Energy. The information contained herein should be attributed to the Energy Information Administration and should not be construed as advocating or reflecting any policy position of the Department of Energy or any other organization. Service Reports are prepared by the Energy Information Administration upon special request and are based on assumptions specified by the requester.

# Assumptions: Total Volume

- We modeled three scenarios based on the low (95% probability), base (mean probability), and high (5% probability) total volumes from the 2005 USGS study

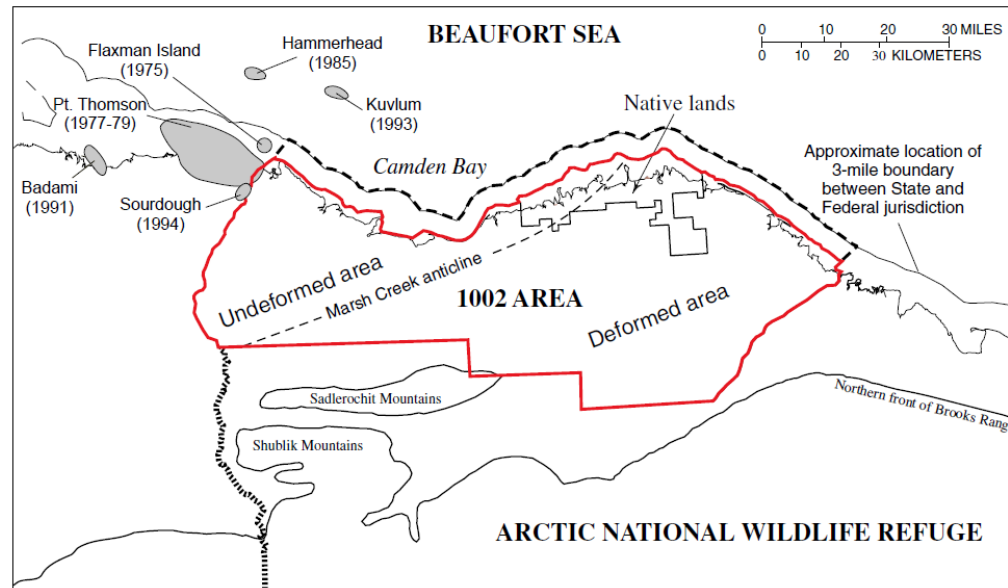
Volume of oil, in billions of barrels			
	<b>F<sub>95</sub></b>	<b>Mean</b>	<b>F<sub>05</sub></b>
Entire Study Area <sup>2</sup>	5.72	10.36	15.96
Federal part 1002 Area	4.25	7.69	11.80
Undeformed	3.40	6.42	10.22
Deformed	0	1.27	3.19

Source: USGS, *Economics of 1998 USGS's 1002 Area Regional Assessment: An Economic Update*, 2005

- Per the study, roughly 75% of the oil is presumed to be on federal land

# Assumptions: Distribution of Volume

- Presuming most of the resource is in the NW “undeformed” part of ANWR, from looking at the map



Source: USGS, 2005

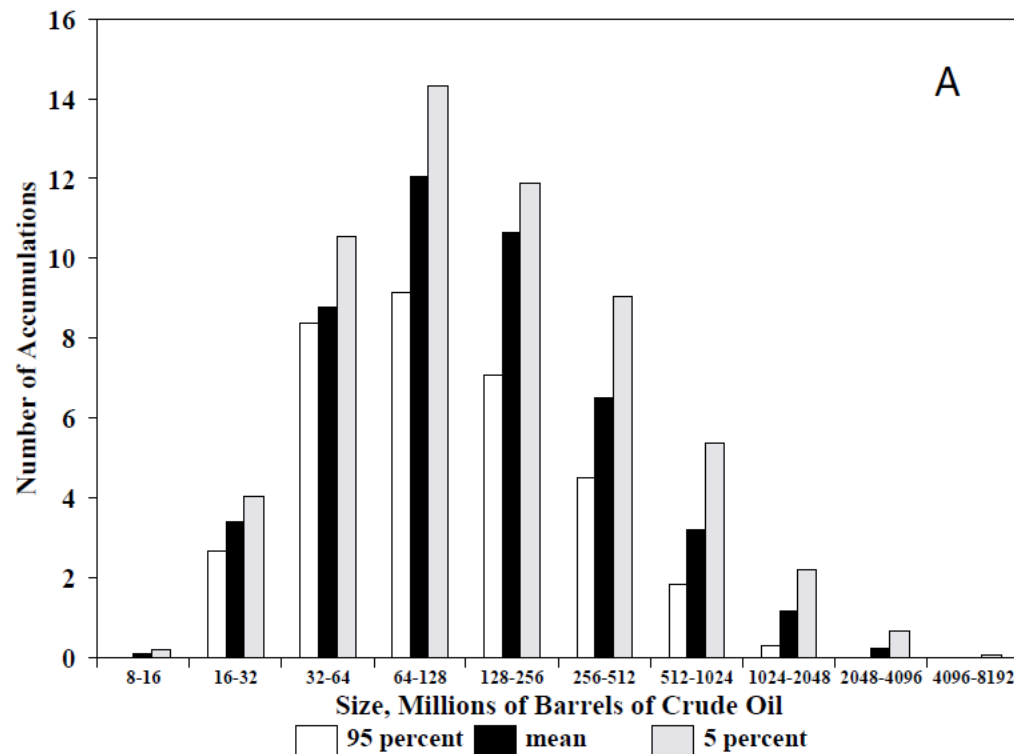
we assumed that the remaining oil would be 15% state (near offshore) and 10% private (Native lands near Kaktovik)

# Assumptions: Production Timeline

- Permission to explore in 2016
- Leases issued 2017-2019
- Exploration begins 2019
- First field is found and begins development in 2022
- First production in 2026
  - This is 10 years after authorization, consistent with EIA 2008 report timeline
- One new field comes on line every two years
- 25 total fields with last beginning in 2074
- Fields developed from largest to smallest
- 50 years of production through 2075

# Assumptions: Field Size Distribution

- Based on the USGS estimate of the number of accumulations (fields) of different sizes...



Source: USGS, 2005



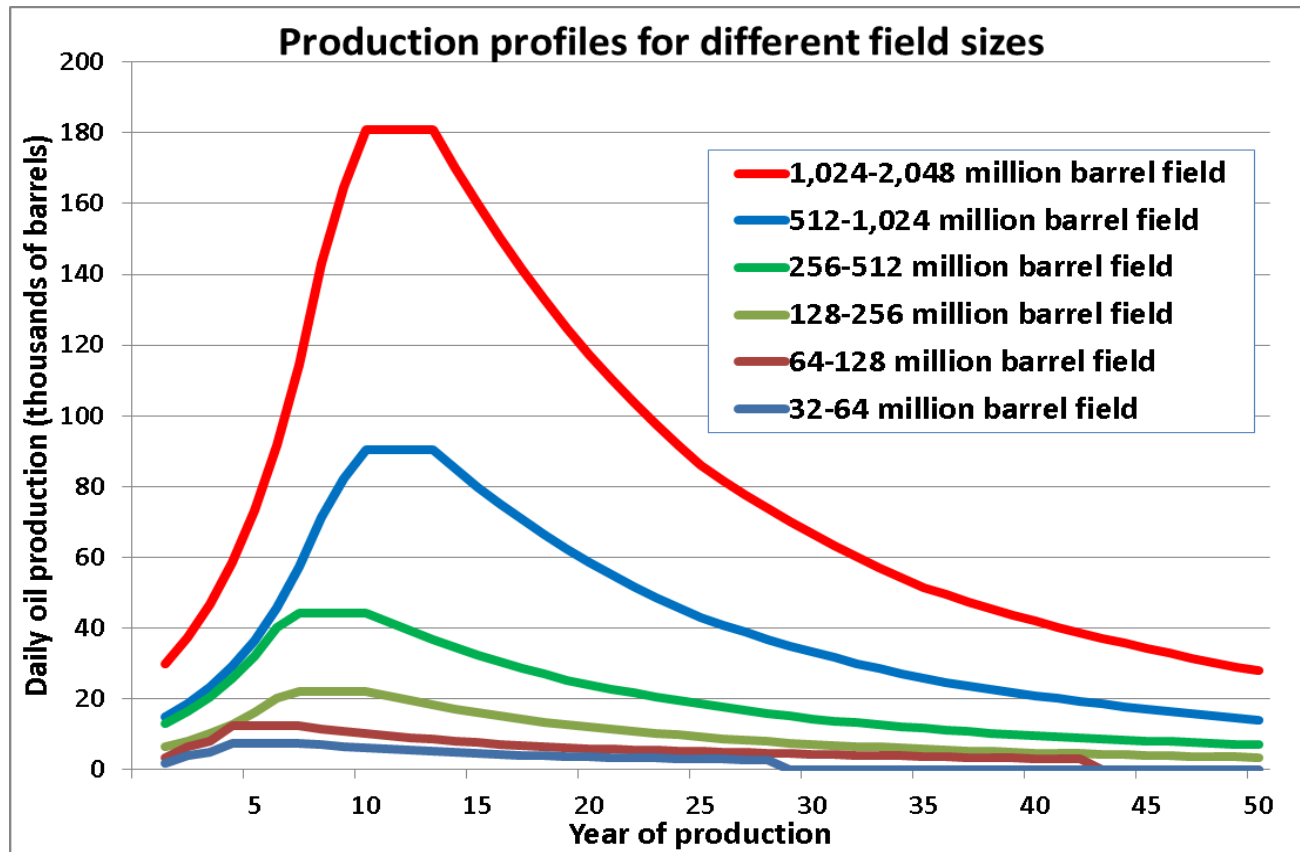
# Assumptions: Field Size Development

- ... we assumed the 25 developed fields to be of the following sizes:

Field Size in Millions of Barrels	Number of Fields		
	Low Case	Base Case	High Case
1024-2048	0	1	2
512-1024	2	3	5
256-512	4	6	9
128-256	7	11	9
64-128	9	4	0
32-64	3	0	0
Total Number of Fields	25	25	25
Total Barrels Produced through 2075 (mmbbls)	4,531	7,069	9,739

# Assumptions: Production Profile

- For each field size we assumed a typical ramp up – peak – decline production curve



# Assumptions: Price of Oil

- All prices and costs assume 2015 constant dollars
- Model assumes \$110 / barrel oil price
  - Revenue Sources Book projected 2024 price is \$134.39
  - Converted to 2015 dollars at an assumed inflation rate of 2.25% results in an oil price of \$110
- Constant dollars are important to keep the long-term numbers understandable.  
At 2.25% inflation by 2075 the price of oil could be about \$400 / bbl

## Assumptions: Gas

- Model assumes no gas production or cost of handling associated gas
- Gas resource information is less defined than for oil
- Introducing gas into the project would have raised too many issues to address in the time available
- Given proposed timing of the AKLNG line, gas from ANWR will be needed and will have space available in the pipeline system around 2045-50

## Assumptions: Costs

- Exploration costs \$500 million / year beginning in 2019
- Exploration costs \$250 million / year after 10 years
- Development capex \$10 / bbl over an 8-year development timeline for each field
- Maintenance capex \$5 per produced barrel each year
- Operating cost \$20 per produced barrel each year
- Netback cost of \$12.25 / bbl
  - ANWR feeder tariff to TAPS of \$1.00 / bbl
  - All other components set at Revenue Sources Book estimate for 2024, adjusted to real 2015 dollars
  - No adjustment to TAPS tariff of \$8.65 / bbl in real 2015 dollars

## Assumptions: Fiscal (Royalty)

- All fields have 12.5% royalty regardless of land ownership
- State would receive 90% of federal royalties per current law. We recognize that this could and would likely change before large-scale development was allowed
- Private royalty interests subject to 5% gross production tax per AS 43.55.011(i)

## Assumptions: Fiscal (Production Tax)

- Current tax regime per SB21 with all production qualifying for a 20% GVR
- Per-barrel credit of \$5 is decreased at 2.25% per year to convert to constant 2015 dollars
- Production assumed to be from a single, stand-alone company without impact on production or taxes from other North Slope producers or fields
- Any Net Operating Loss is shown as reimbursed as a 35% credit (negative cash flow to the state) in the year earned

## Assumptions: Fiscal (Other Taxes)

- State corporate income tax based on 6.5% of production tax value less production taxes paid, net of refunded credits
  - Corporate income tax can not be less than zero
- Property tax is valued at \$1.25 per produced barrel, comparable to current assets on the North Slope
  - Property tax will accrue only 7.5% to the State, with the rest going to the North Slope Borough

**So based on the last 12 slides of assumptions and caveats...**



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## Totals for Study Period (2016-2075)

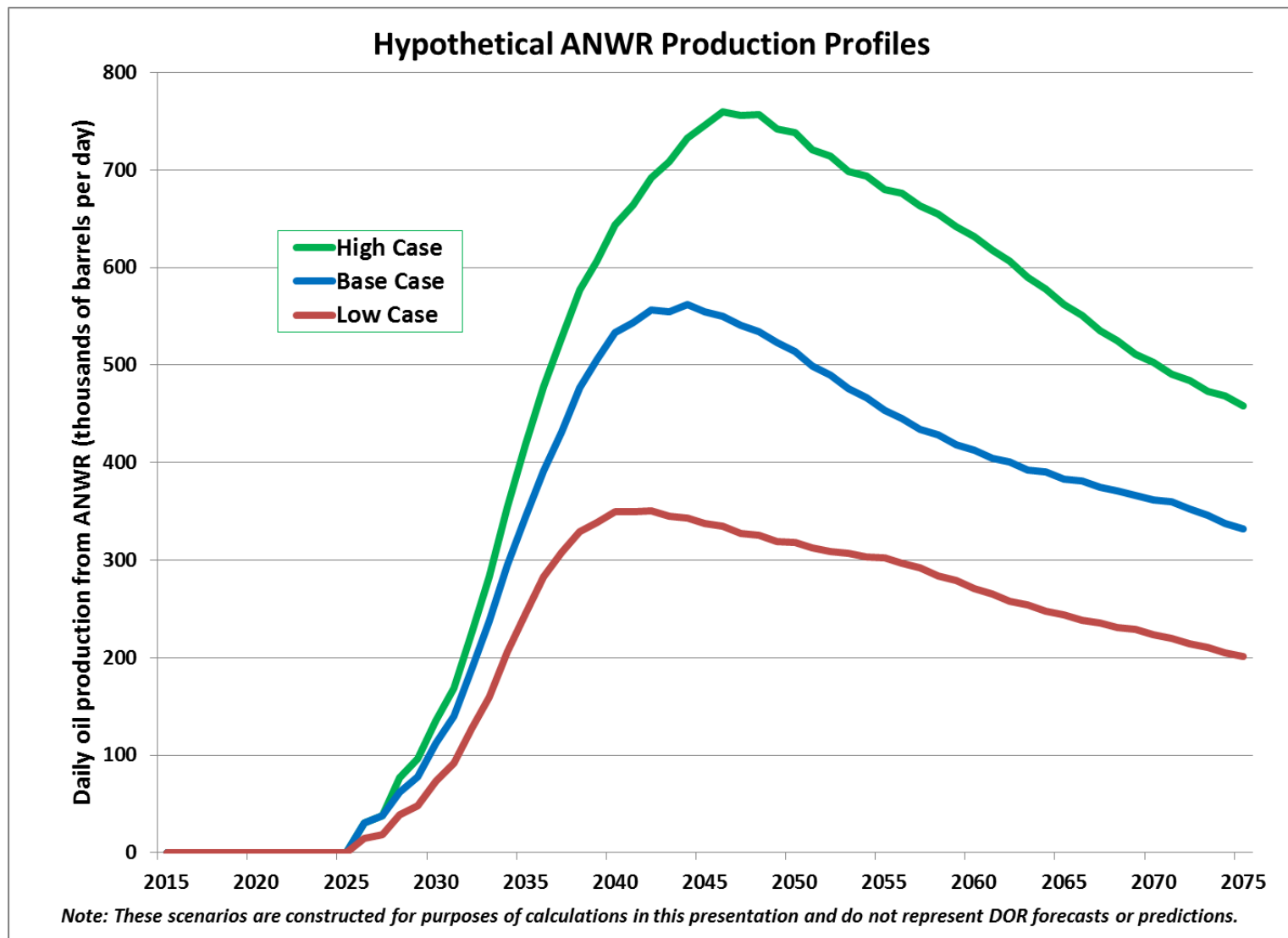
### ➤ Total Volume of Oil Produced

- High Case: 9.7 billion barrels
- Base Case: 7.1 billion barrels
- Low Case: 4.5 billion barrels

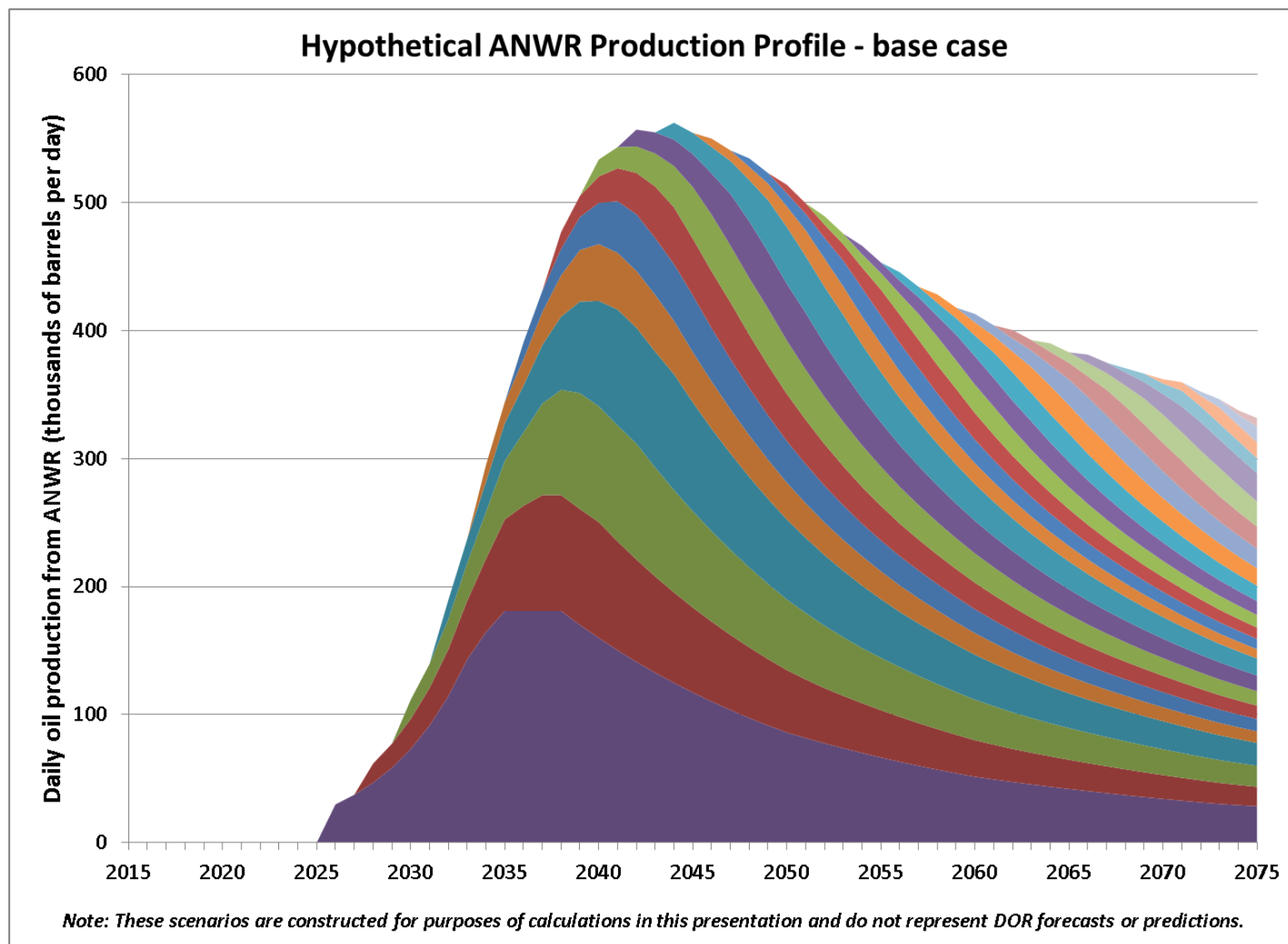
### ➤ Total Net Revenue to the State

- High Case: \$210.0 billion
- Base Case: \$150.9 billion
- Low Case: \$94.8 billion

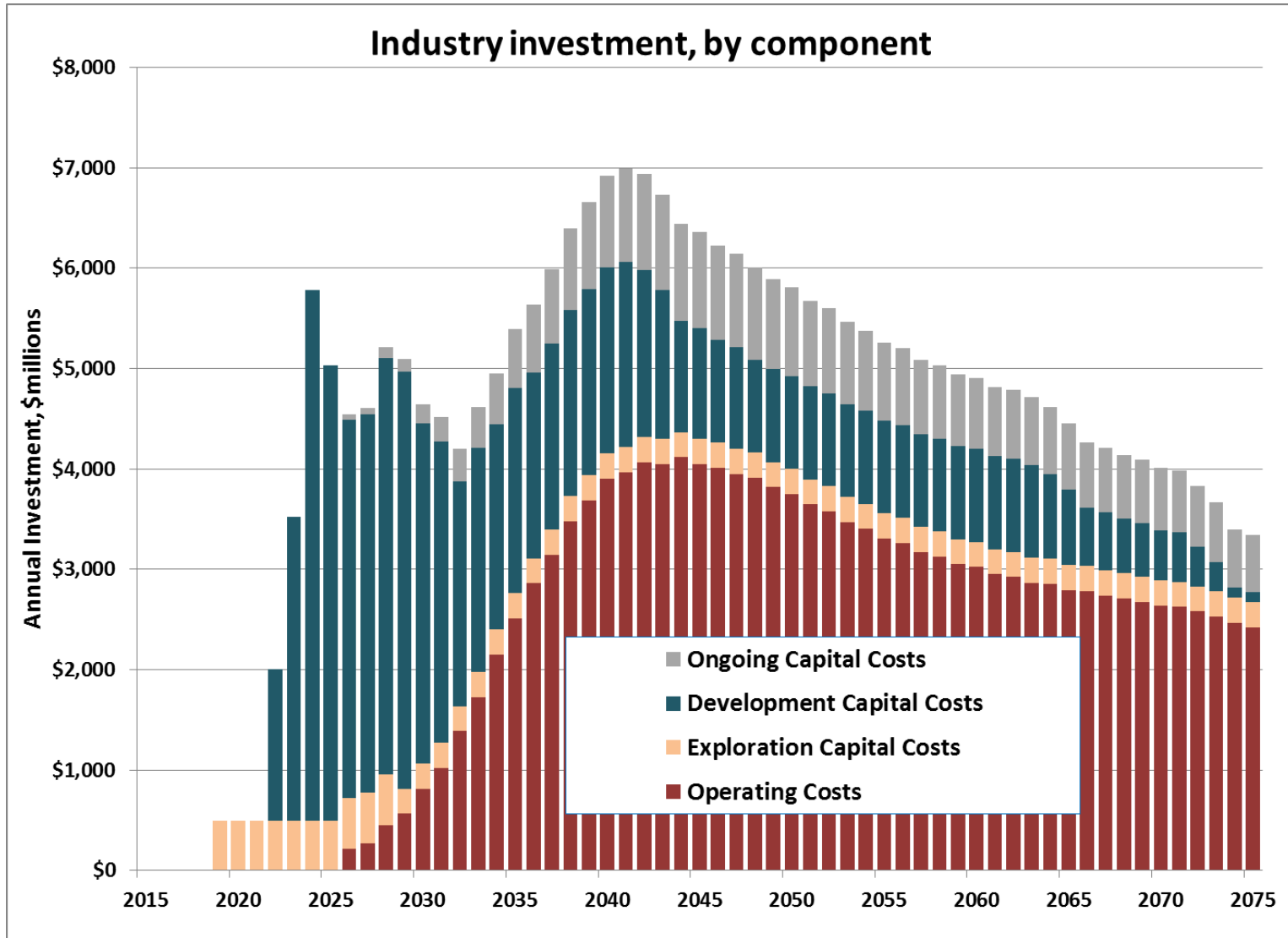
# Production Volume



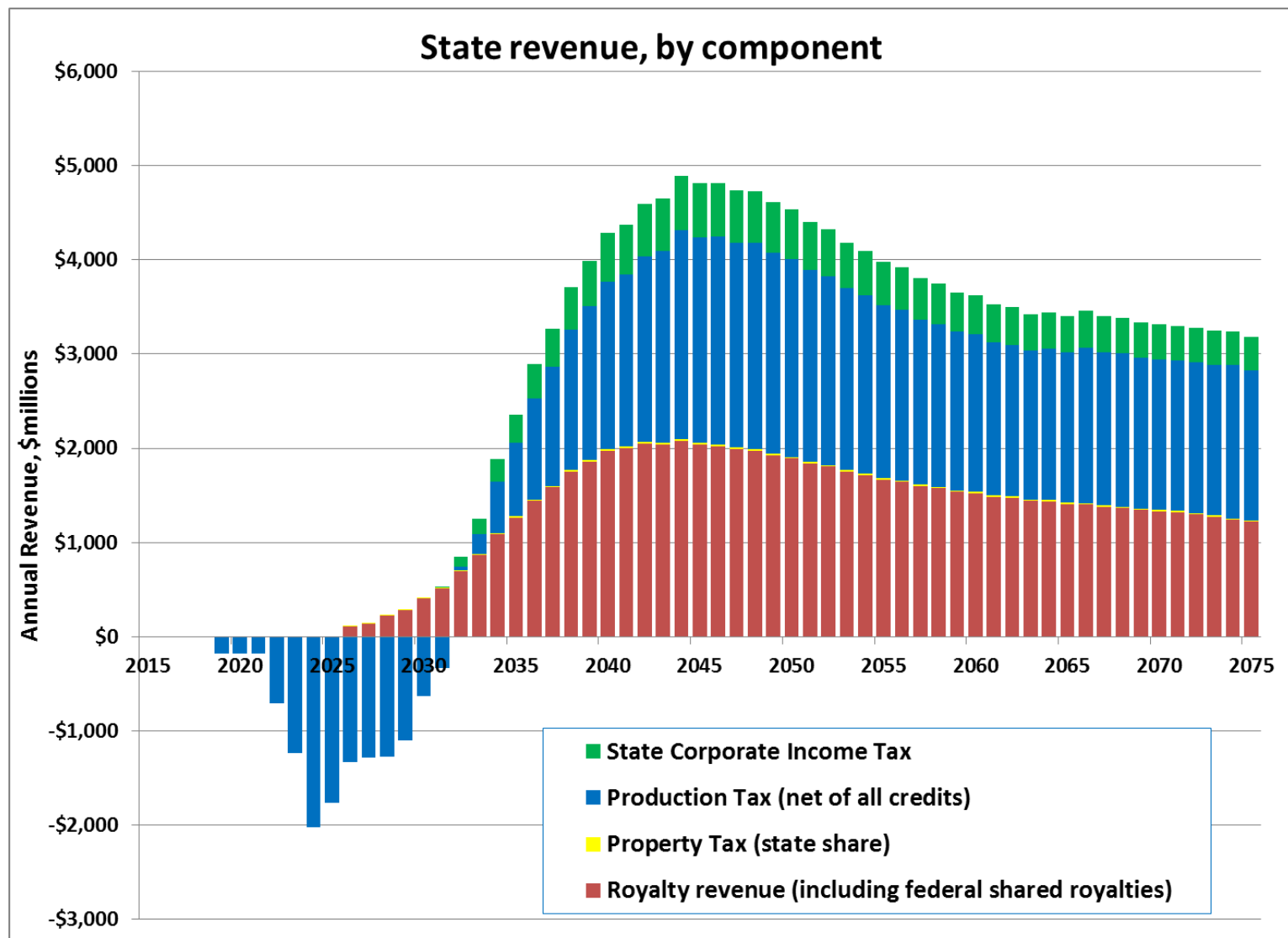
# Production Volume



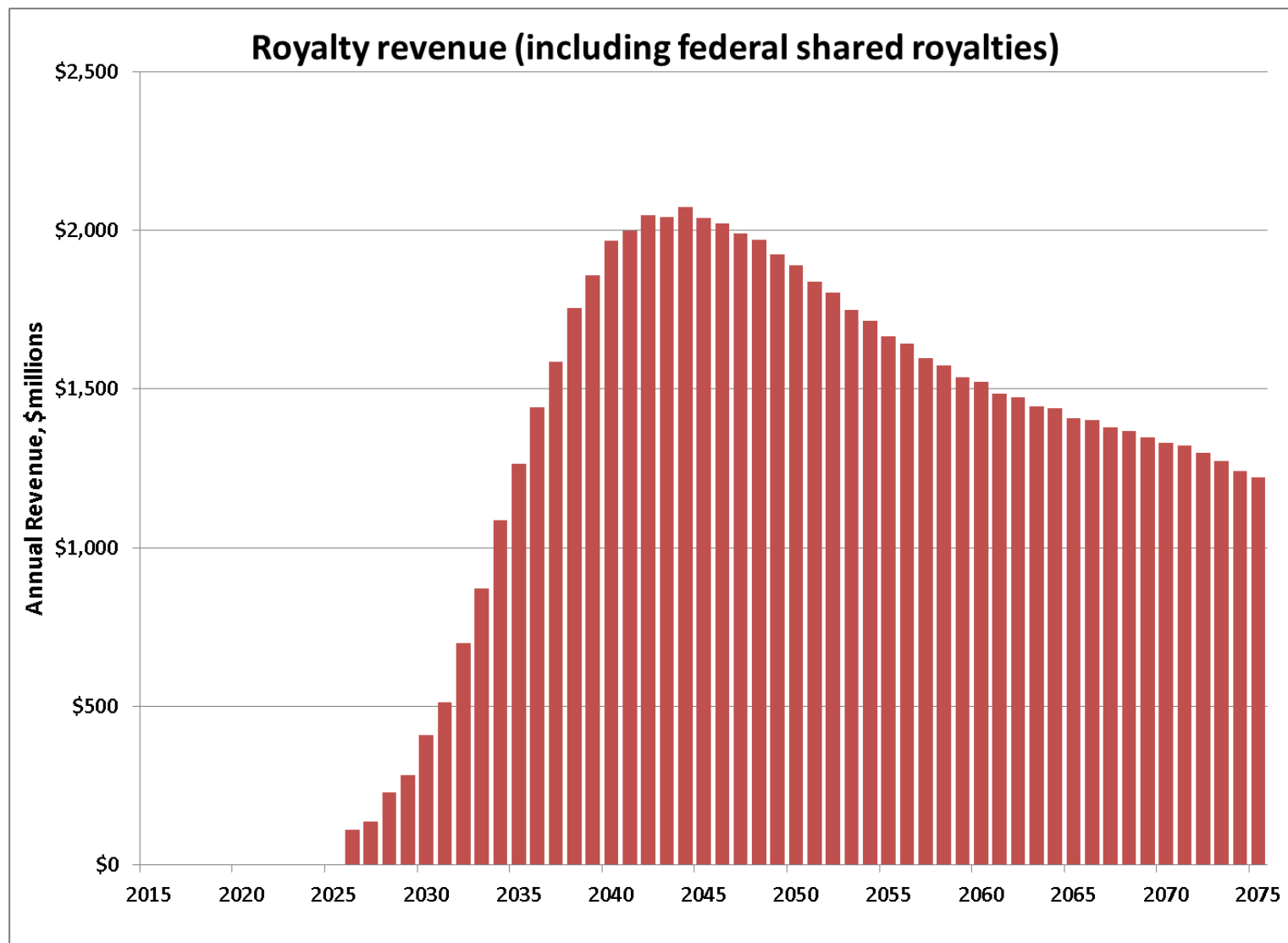
# Lease Expenditures



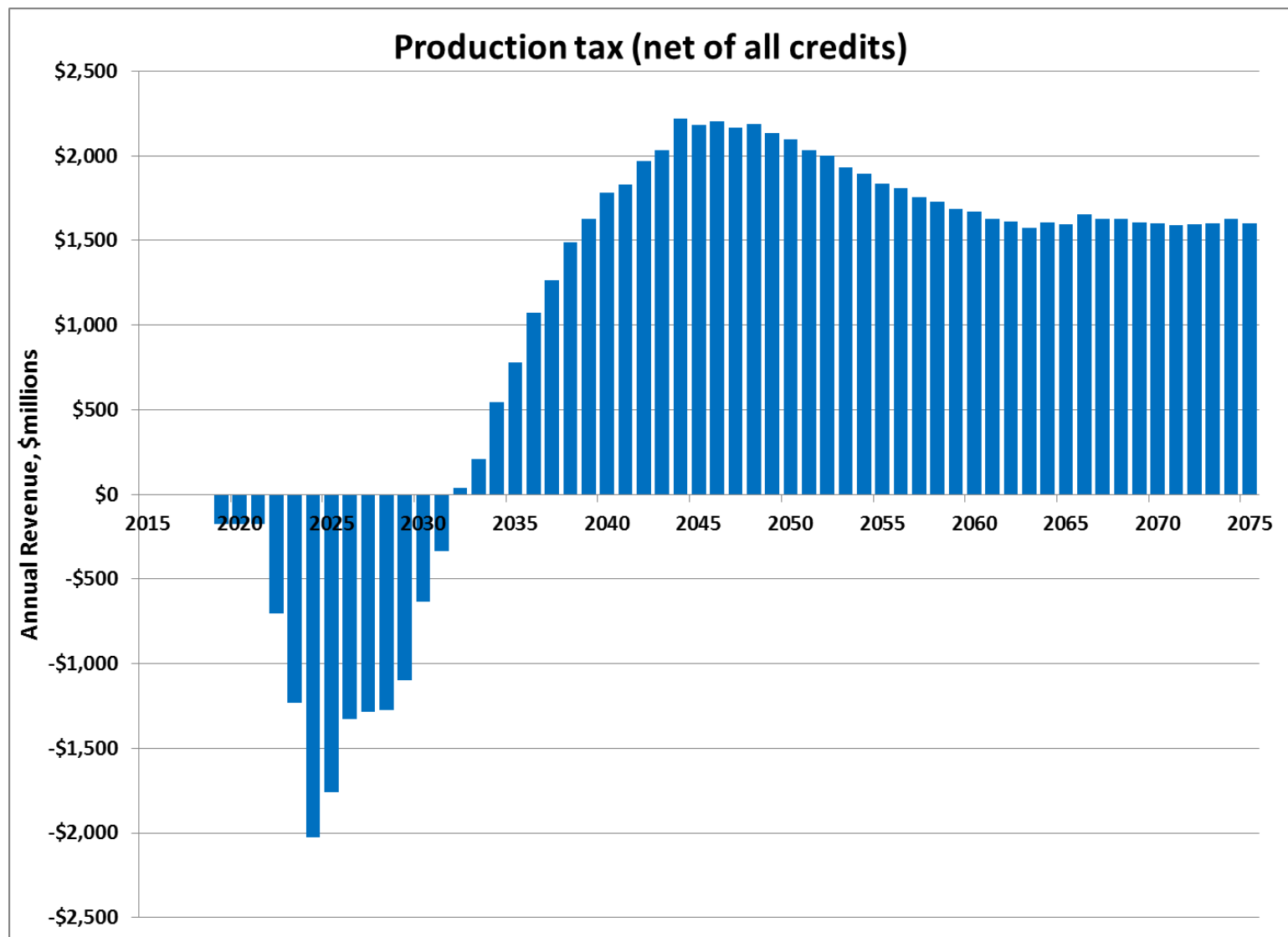
# Components of All Revenue- Base Case



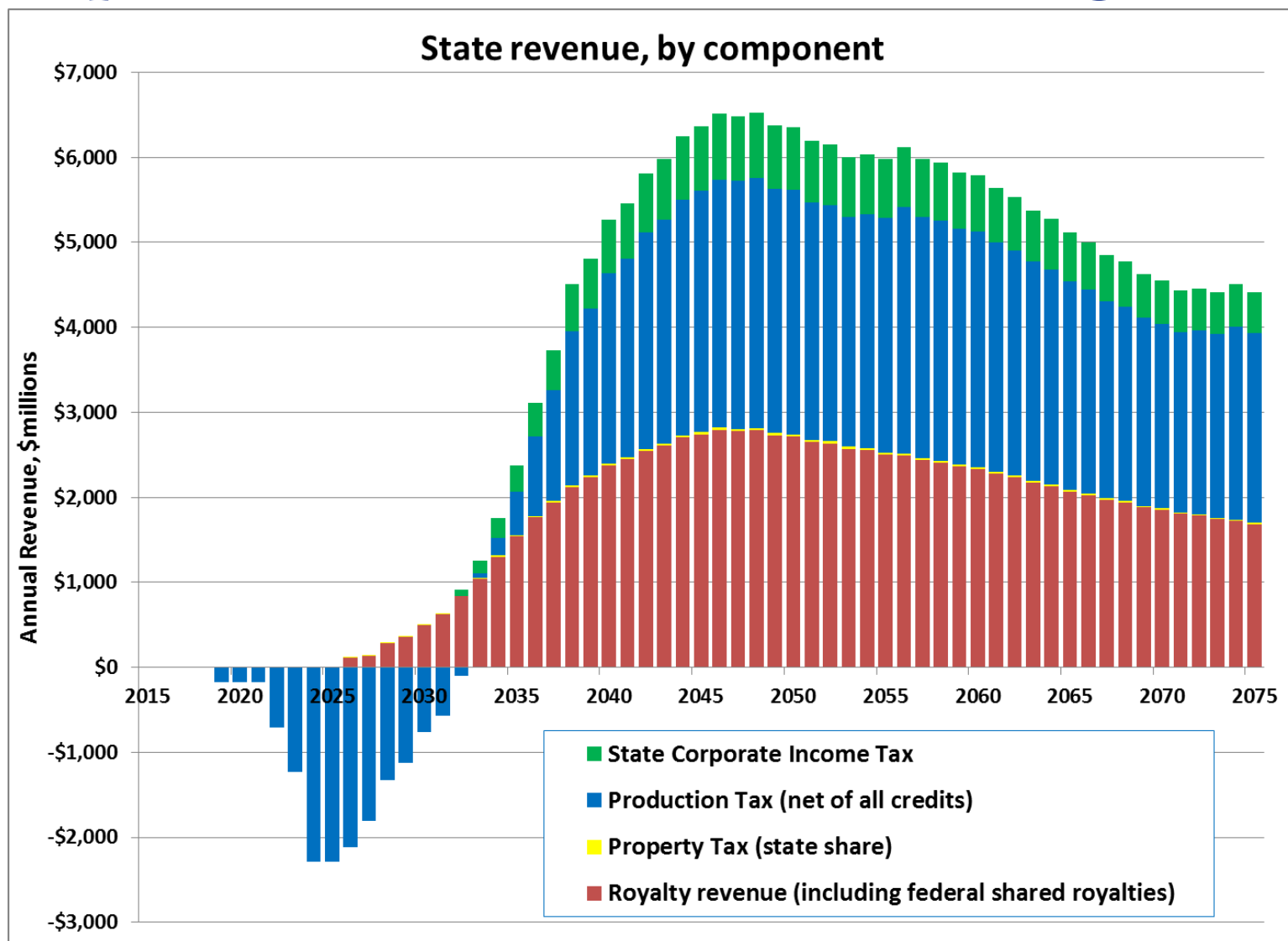
# Revenue, Royalty - Base Case



# Revenue, Production Tax - Base Case

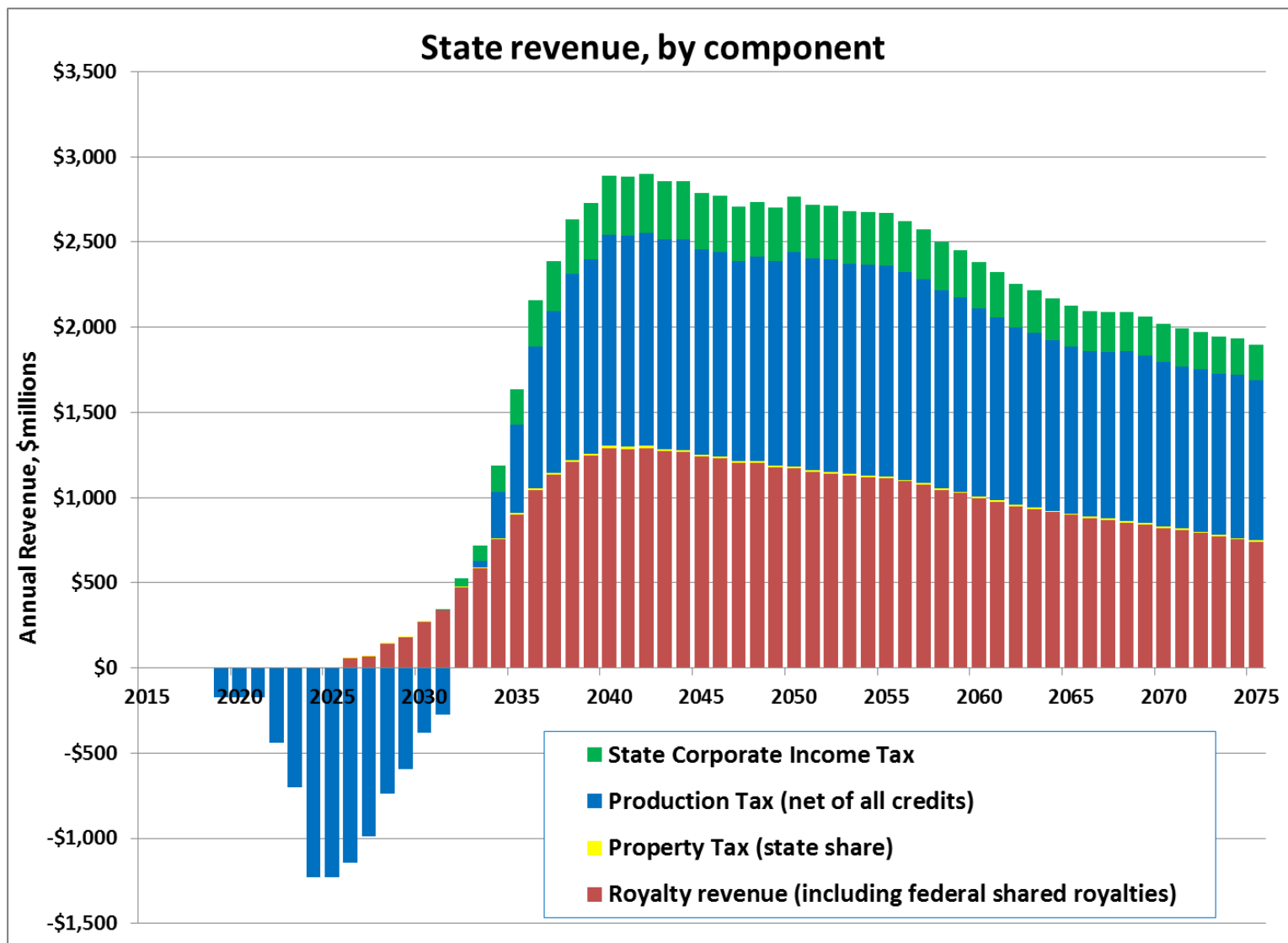


# Components of All State Revenue- High Case

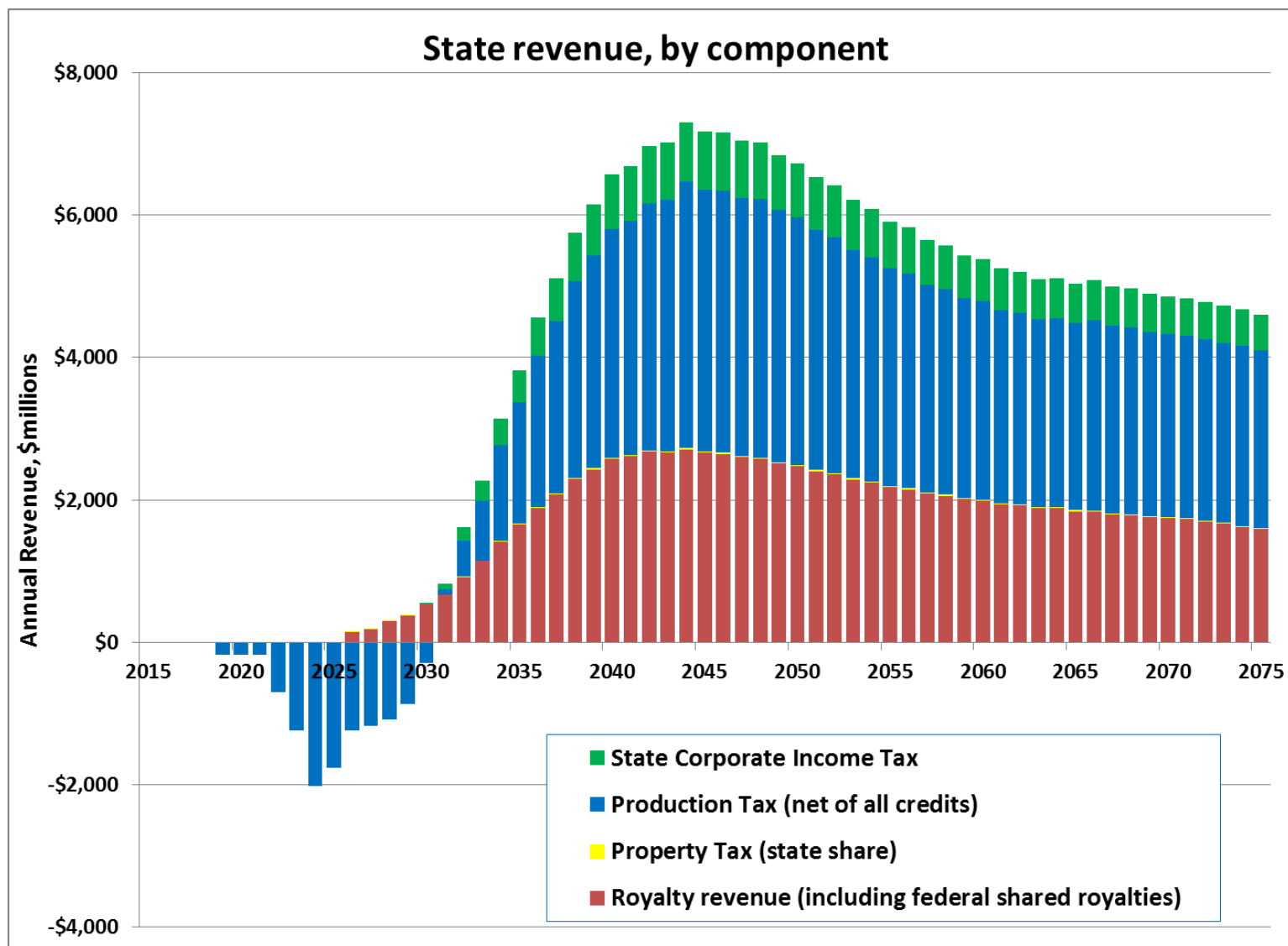




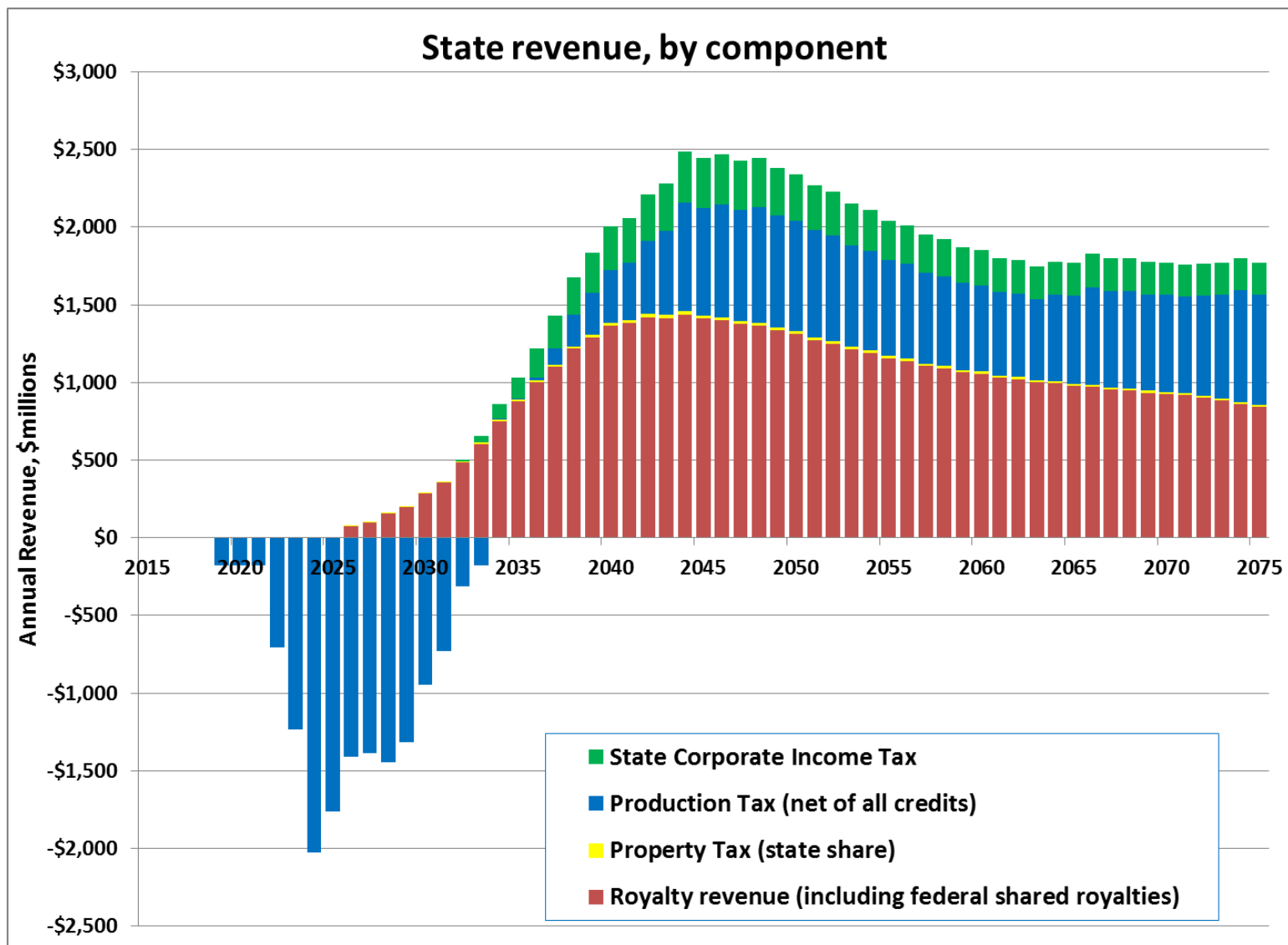
# Components of All State Revenue- Low Case



# All State Revenue at \$140 oil – Base Case



# All State Revenue at \$80 oil – Base Case



## Other State Benefits

- Gas: ANWR could provide additional billions in revenue as well as extended life for the AKLNG pipeline system
- Jobs & Investment: peak industry investment spending during the base case is almost \$7 billion / year
- TAPS life extension: these additional volumes could add potential decades to North Slope production
- Local benefits: property tax revenues to the North Slope Borough could be tremendous

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## Please keep in mind...

- We have presented one possible view of ANWR development. This is not a forecast or official estimate
- Our model is based on the premise that the majority of existing resources could be found and produced over a 60-year time period
  - Dependent on successful exploration
  - Actual development could happen faster or slower
- The Department of Revenue does not currently include any ANWR production in our official revenue forecasts

# THANK YOU

Please find our contact information below:

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