Center for Energy Regulation & Policy
SCHOOL OF ENERGY RESOURCES

DANIELS FUND
ETHICS INITIATIVE
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Power Wyoming Initial Simulation Results

Presentation to Wyoming Joint Revenue Committee

Cheyenne, WY

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UNIVERSITY OF WYOMING

Scenario Main Assumptions

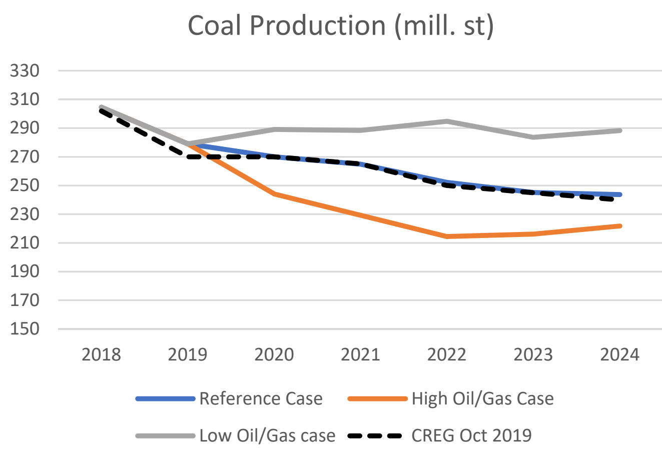
Reference case (AEO2019 - Jan)	Economic growth 1.9% annually, other variables at current trend values, current legislation stays in place.
Low oil/gas resource (AEO2019 - Jan)	Recovery rates of US oil/gas resources 50% lower than reference case, technological development is 50% lower than reference case.
High oil/gas resource (AEO2019 - Jan)	Recovery rates of US oil/gas resources 50% higher than reference case, technological development is 50% higher than reference case.
CREG (Oct 2019)	Assumptions based on current trends/information (to 2024 only)

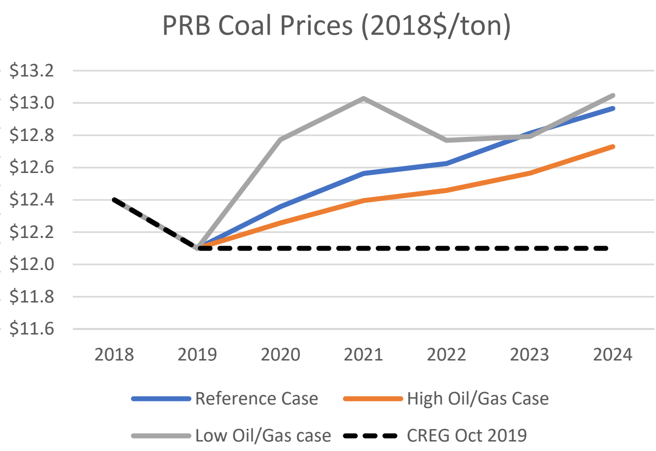
High Oil/Gas resource case and the CREG forecast best track current information and consensus future outlooks.

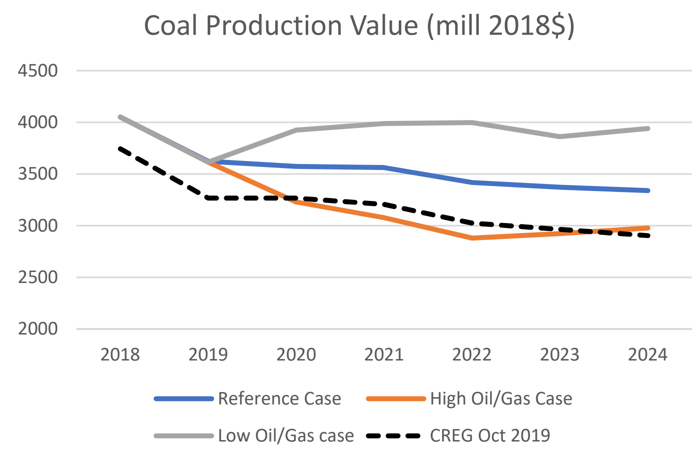
Scenario choice and probability

- EIA cases chosen for the range of assumptions and outcomes.
  - Higher or lower oil gas depletion rates
  - Higher or lower technological improvement in mineral production
  - National economic growth assumed constant at 1.9% (current rate of GDP growth)
- Each case is not currently perceived as equally likely.

Scenarios: Coal



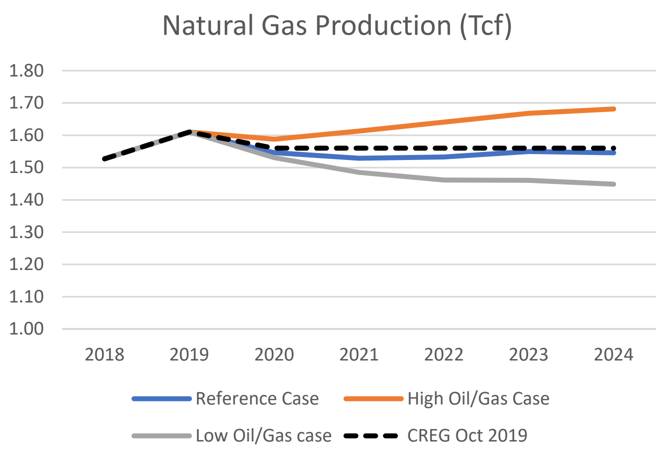


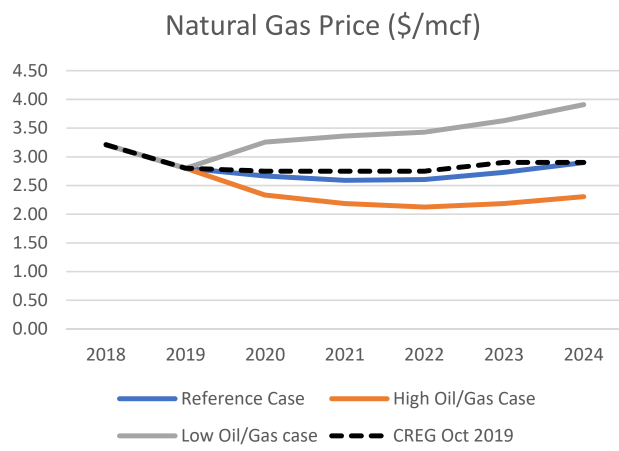


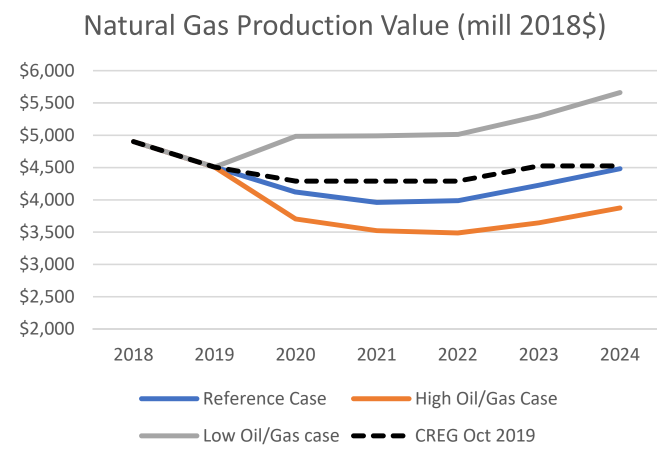
Consensus in all forecasts:

1) Coal production will not recover in next five years – question is how bad it gets.
2) Price of coal depends on
   - how overcapacity is resolved in PRB,
   - on demand for coal in the power sector, which is largely driven by natural gas prices.
3) Coal revenues flat (least likely) to 25% decline (most likely given current expectations) by 2022.

Scenarios: Natural Gas



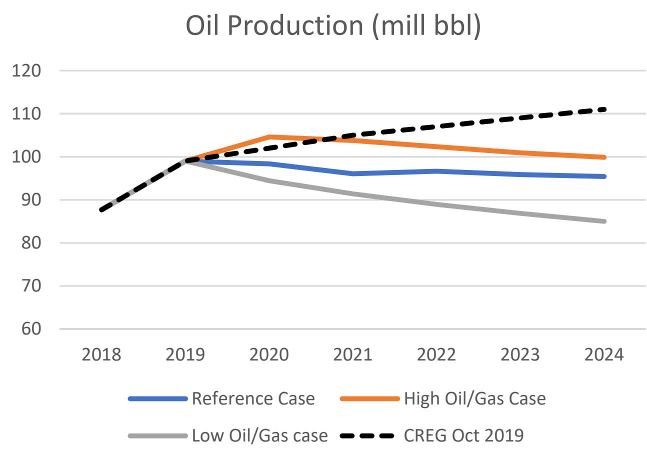


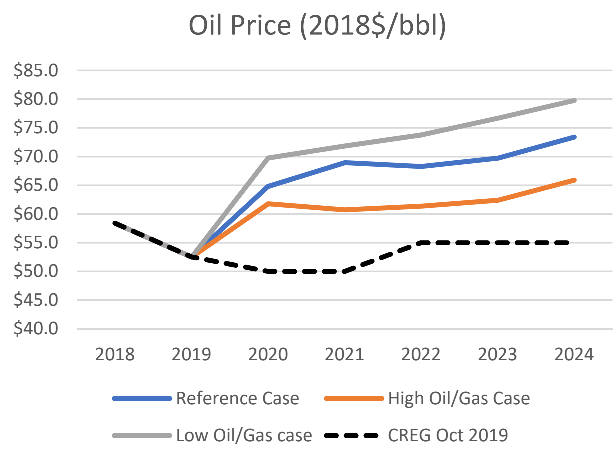


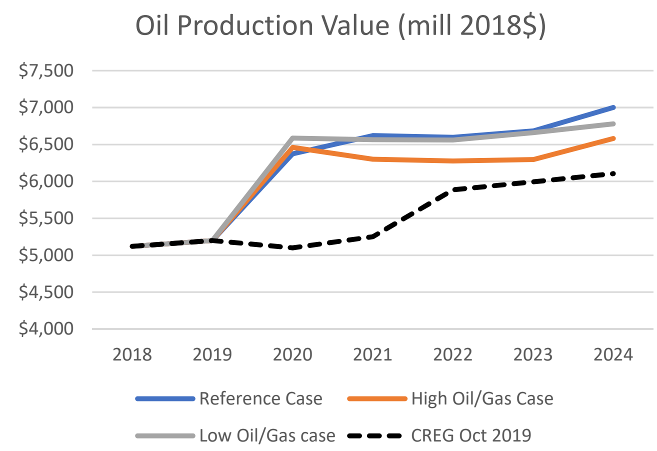
Consensus:

1) Natural gas production will be flat to declining in next 5 years.
2) Prices to continue to decrease – at best (least likely) they remain at historic lows.
3) Revenues flat to decreasing as much as 30%, with consensus decline around 14% by 2022.

Scenarios: Oil

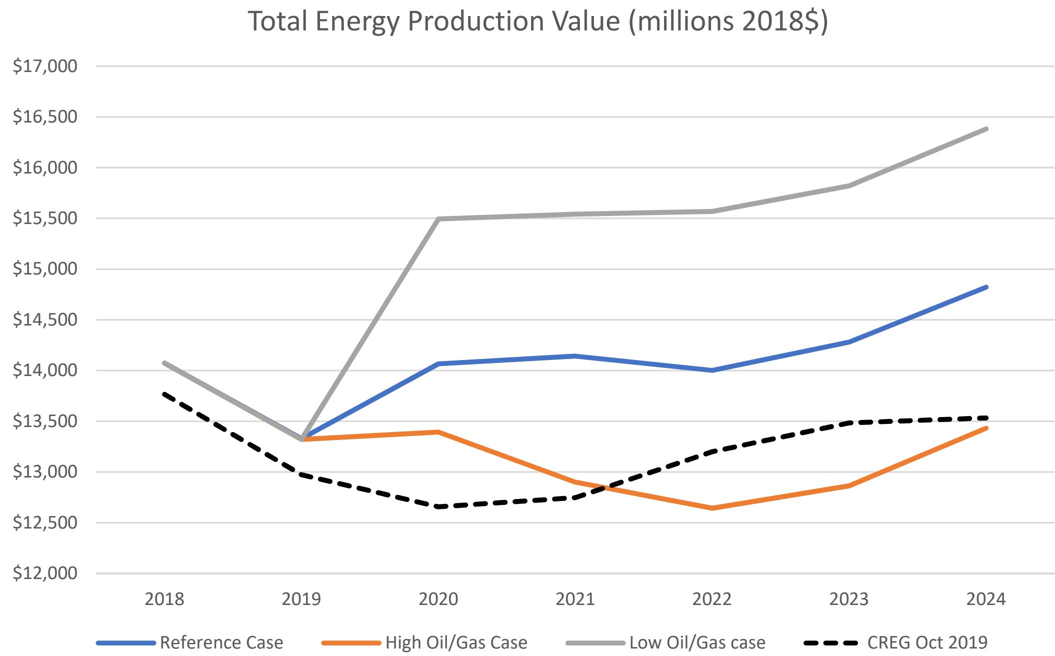






Consensus:
1) Oil production increases over near term – question of how much and how long?
2) Prices to remain low in most likely scenarios. Most recent forecasts support bearish CREG projection.
3) Revenues increasing by 15% to 30%, with 15% reflecting most current market expectations (CREG outcome).

Scenarios: Total Mineral Revenue Base



Overall:

- Total mineral revenue outlook forecasts a 10% decline occurring as early as 2020 to 2022 in most likely scenarios before a partial recovery (decline of 5% from today) by 2024.
    - Scenarios that show full recovery to expansion in revenues least likely cases given current market conditions and expectations.

Input Caveats

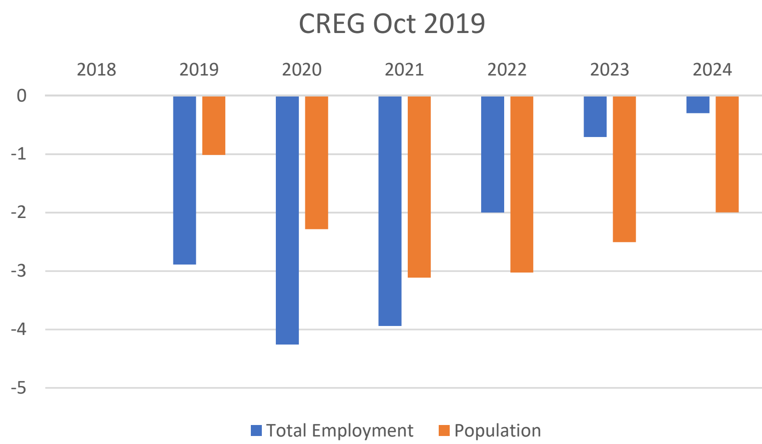
- Forecast uncertainty increases significantly with time.
  - Updated expectations to forecasts for all three commodities have been worsening.
- Projections do not consider any changes in national or state legislation (e.g. carbon regulations) and their impact on markets.
  - major regulatory changes could significantly reduce mineral (especially coal) projections.
- Projections do not consider business cycle changes (e.g. a recession) and such impacts on energy markets
  - Typically recessions dampen energy prices and output growth
  - Wyoming would be doubly hit by such a change (lower energy revenues + slowing economy in main markets)
- Information updates suggest increased pessimism in mineral forecasts of price and quantity.

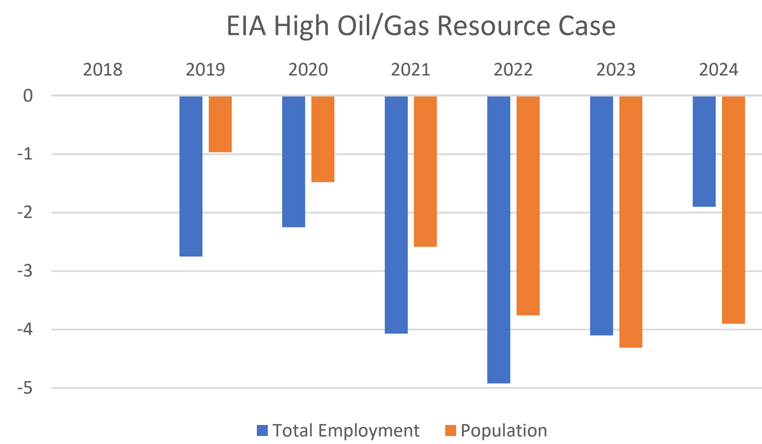
Economic Impacts

- All scenarios show decline in economic activity next year due to mineral production assumptions.
- More likely scenarios (CREG and High oil/gas resource) show economic contraction through 2024 due to mineral sector outcomes.
    - Reference case also shows near zero employment and output growth due to minerals sector through 2022.

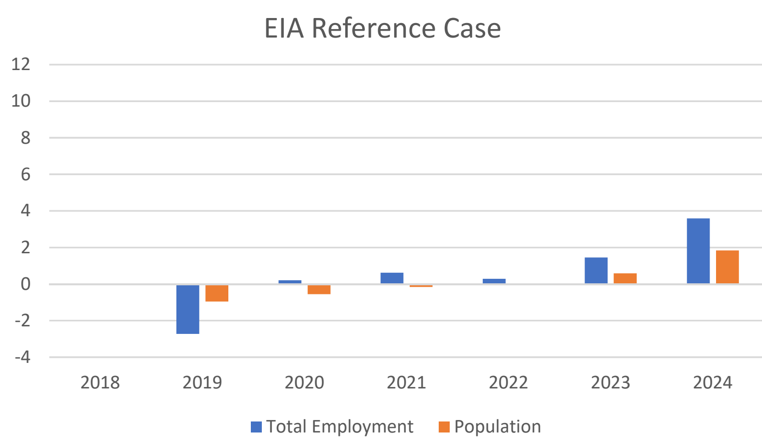
Employment/Population Impacts

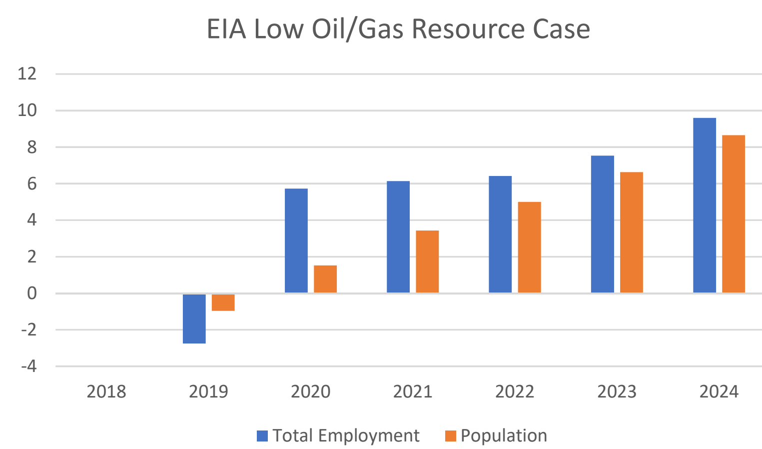
Thousands of People or Jobs



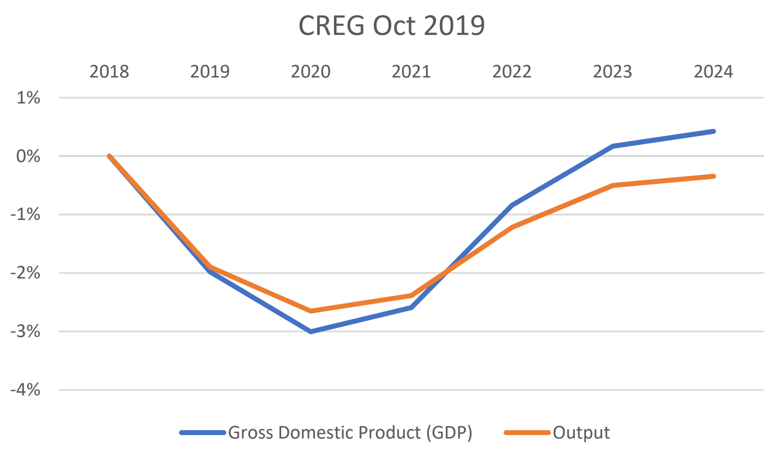


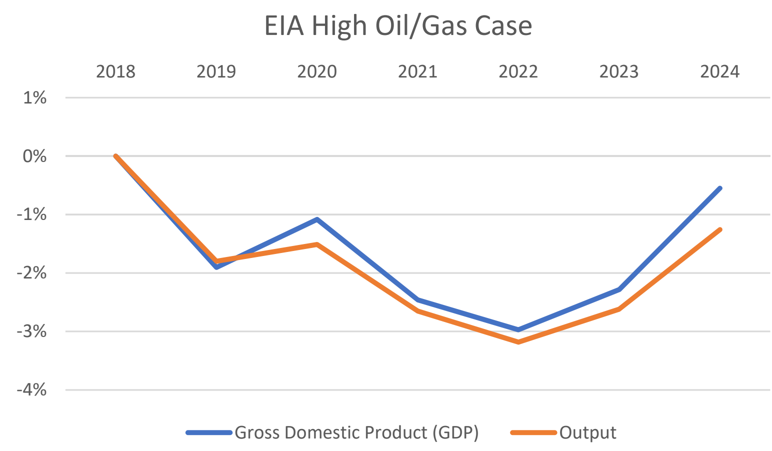
Thousands of People or Jobs

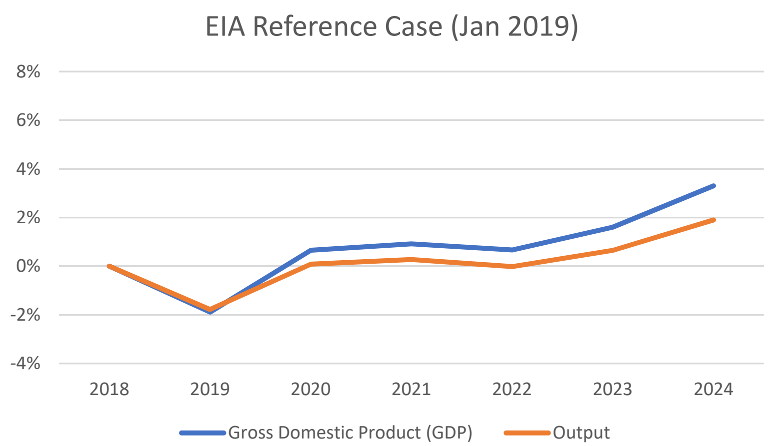


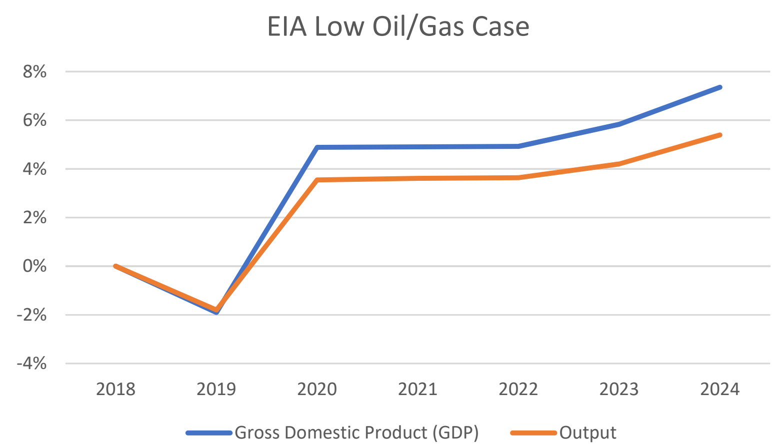


State Output Impacts (% chg from baseline)









Budget Impacts

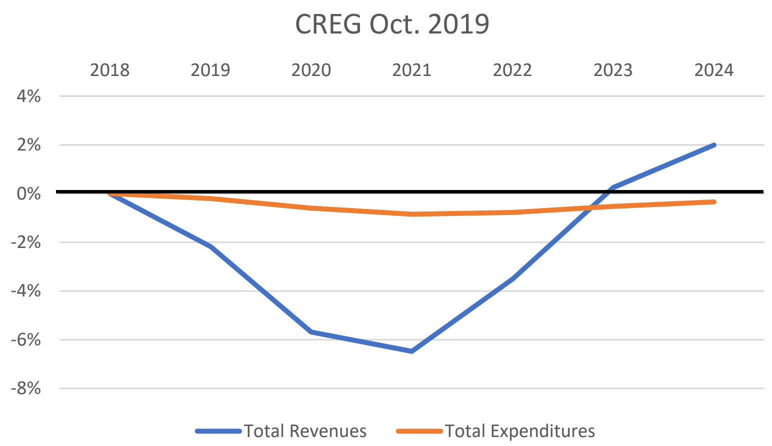
Expenditures:

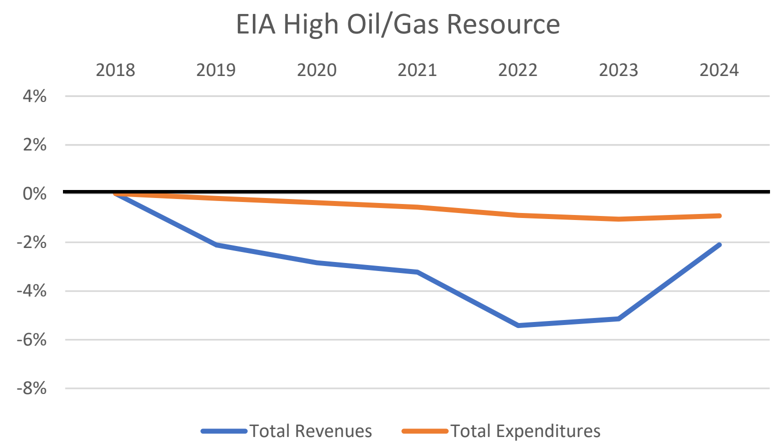
- Assume 2019 budget is unchanged in future
  - Future expenditure changes driven by changes in impacted populations (e.g. K-12 spending is driven by the population 5-19 years of age) and state of economy.
  - Estimates do not include any changes due to known trends in specific areas such as health care.

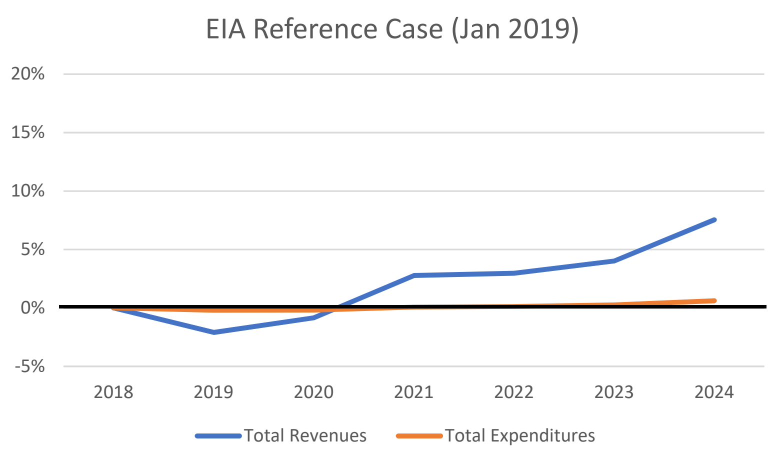
Revenue:

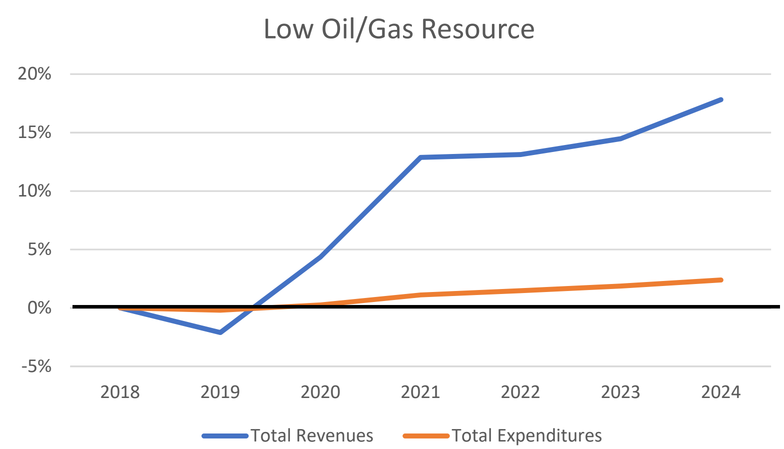
- Revenue estimates based on 2019 rates and estimated for General Fund and K-12 education
  - Driven only by mineral production assumptions and associated economic and demographic outcomes.
  - Excludes any changes in revenue due to investment income or other sources not related to the economy or mineral production.

Revenue and Expenditure (% chg from baseline)

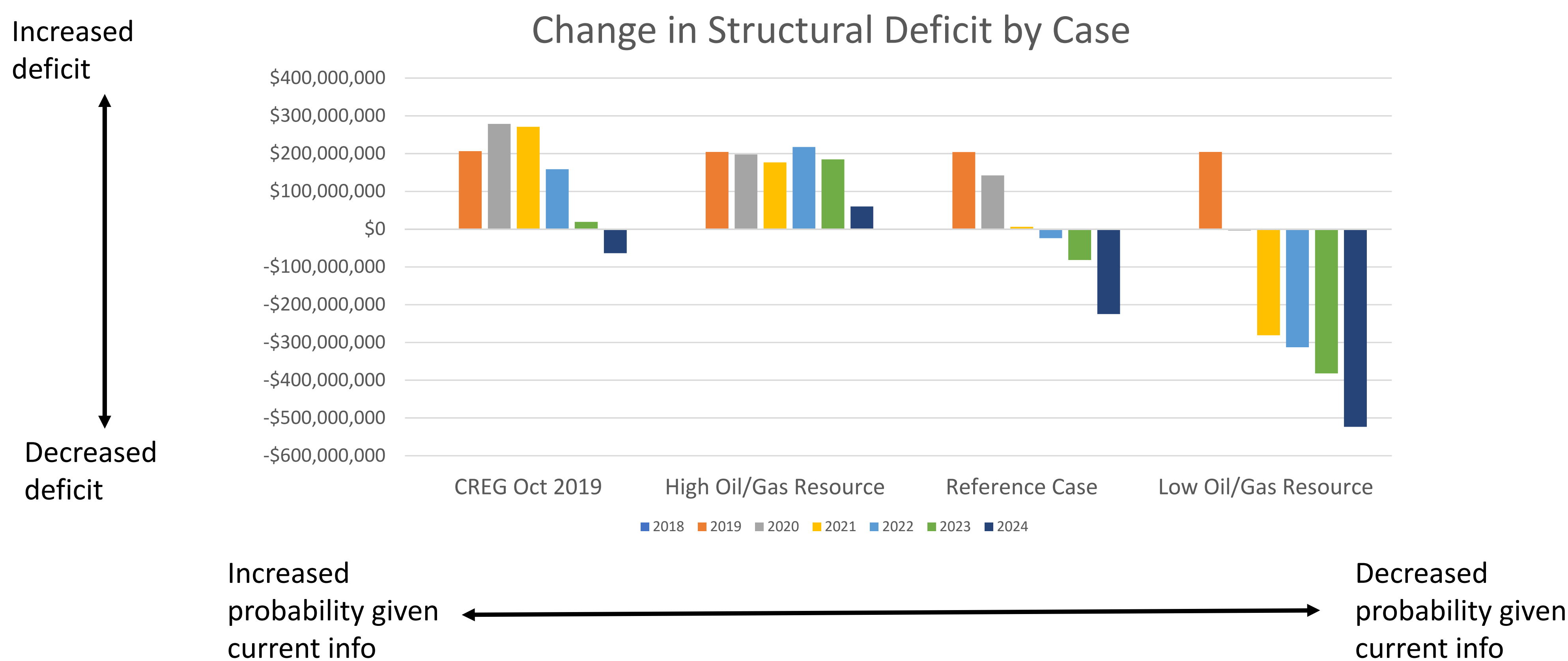








Change in Structural Deficit



Fiscal Takeaways/Thoughts

- All projections indicate a structural deficit in near term
  - Under the perceived most likely conditions, structural deficit persists four or more years.
  - Deficit increases by $200 million per year in those cases (CREG and High Oil/Gas Resource case).
- Real problem of coal decline is reduction in state energy production diversity.
  - Increased dependence on oil, the most volatile of the energy revenues as coal, natural gas production and value declines.
    - Increases the potential structural deficit should oil conditions decline (oil bust).
  - Any future oil boom may be tempered by eventual fossil-fuel regulations (is this the last oil boom?).