MODELING

FOR THE PERMANENT FUND PROTECTION ACT

Randall Hoffbeck, *Commissioner of Revenue*

Senate State Affairs Committee
Tuesday, February 7, 2017

Scenarios Modeled

1. **Status Quo**: ad hoc use of permanent fund earnings to fill budget deficit

2. **Permanent Fund Protection Act** (PFPA) **with** $2.4 billion transfer to the Constitutional Budget Reserve (CBR)
   - With Full Fiscal Solution
   - With No Fiscal Solution for remaining budget deficit.

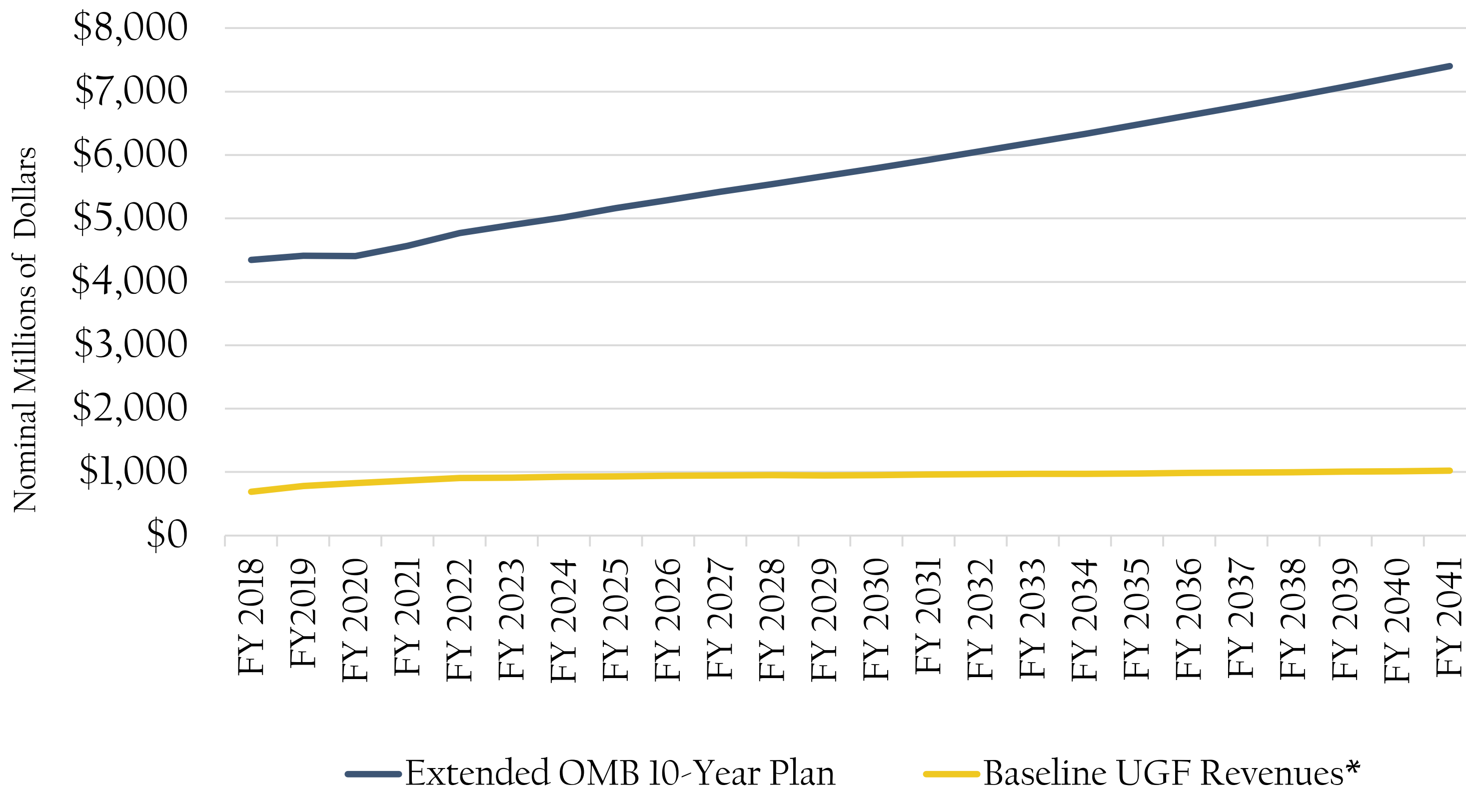
3. **PFPA without** transfer to the CBR
   - With Full Fiscal Solution
   - With No Fiscal Solution for remaining budget deficit.

Model Sophistication and Vetting

- Key aspects of the model
  - Probabilistic treatment of oil prices, oil production, investment returns
  - Focus on detail of how money flows between permanent fund, general fund, and dividends
  - Assumptions from objective sources
  - Monte Carlo simulations

- Vetted by McKinsey last year
  - Found no major mechanical errors, reasonable assumptions
  - Approved of Monte Carlo probabilistic method
  - Suggested improvements, some of which the Department of Revenue (DOR) has incorporated
    - Example: probabilistic oil production, autocorrelation

BUDGET ASSUMPTIONS



- Baseline UGF revenues are the DOR's Fall 2016 total UGF forecast less unrestricted royalties and production tax forecasts. Production and royalty UGF figures are estimated in the model.

Status Quo: Method, Inputs, and Assumptions

- **Permanent Fund Starting Value**: $54.9 billion
  - Realized portion of corpus: $40.7 billion
  - Realized portion of earnings reserve account (ERA): $7.9 billion
  - Unrealized earnings held by the fund: $6.3 billion
  - Starting value was estimated based on the following:
    - $54.9 billion estimated end of year (EOY) 2017 balance of permanent fund (PF) under status quo from Alaska Permanent Fund Corporation (APFC)

- **Investment Return**: Callan Associate's 10-year forecast
  - Total return: 6.95% geometric, 12.32% standard deviation
  - Statutory return: P10 = 3.70%, P50 = 6.24%, P90 = 8.14%
  - Inflation rate: 2.25%

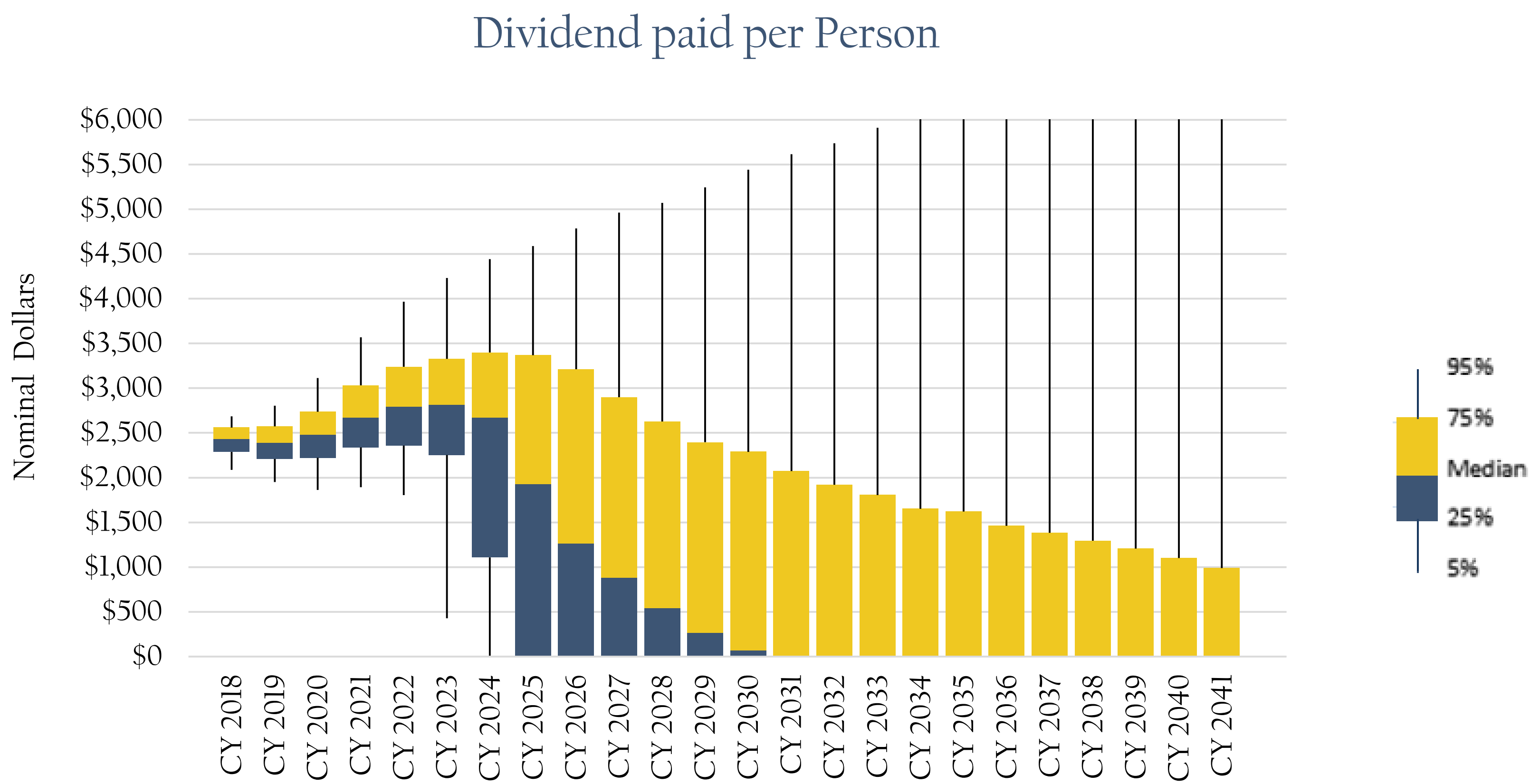
STATUS QUO: METHOD, INPUTS, AND ASSUMPTIONS

- **Petroleum Revenues:**
  - **Oil price**: Probabilistic analysis of ANS oil prices using a PERT distribution from the fall 2016 price forecasting session.
  - **Production**: Probabilistic analysis of ANS oil prices using a PERT distribution from the DNR provided Fall 2016 RSB
- **Deposits:** 31% of royalties deposited into the permanent fund.
- **Payout Calculation:** No planned payout to the general fund.
- **Unplanned Payouts:** After the constitutional budget reserve (CBR) is depleted, budget deficits are filled from the earnings reserve account (ERA)
- **CBR:** $4.4 billion beginning of year (BOY) 2018 balance with a 2.25% rate of return.

Status Quo: Method, Inputs, and Assumptions

- **Dividend Calculation:**
  - Total distributed is equal to half of the sum of the last 5 years' statutory net income multiplied by 0.21 or half of the ERA, whichever is less
- **Inflation Proofing:**
  - The fund's principal is inflation proofed at the predicted inflation rate.

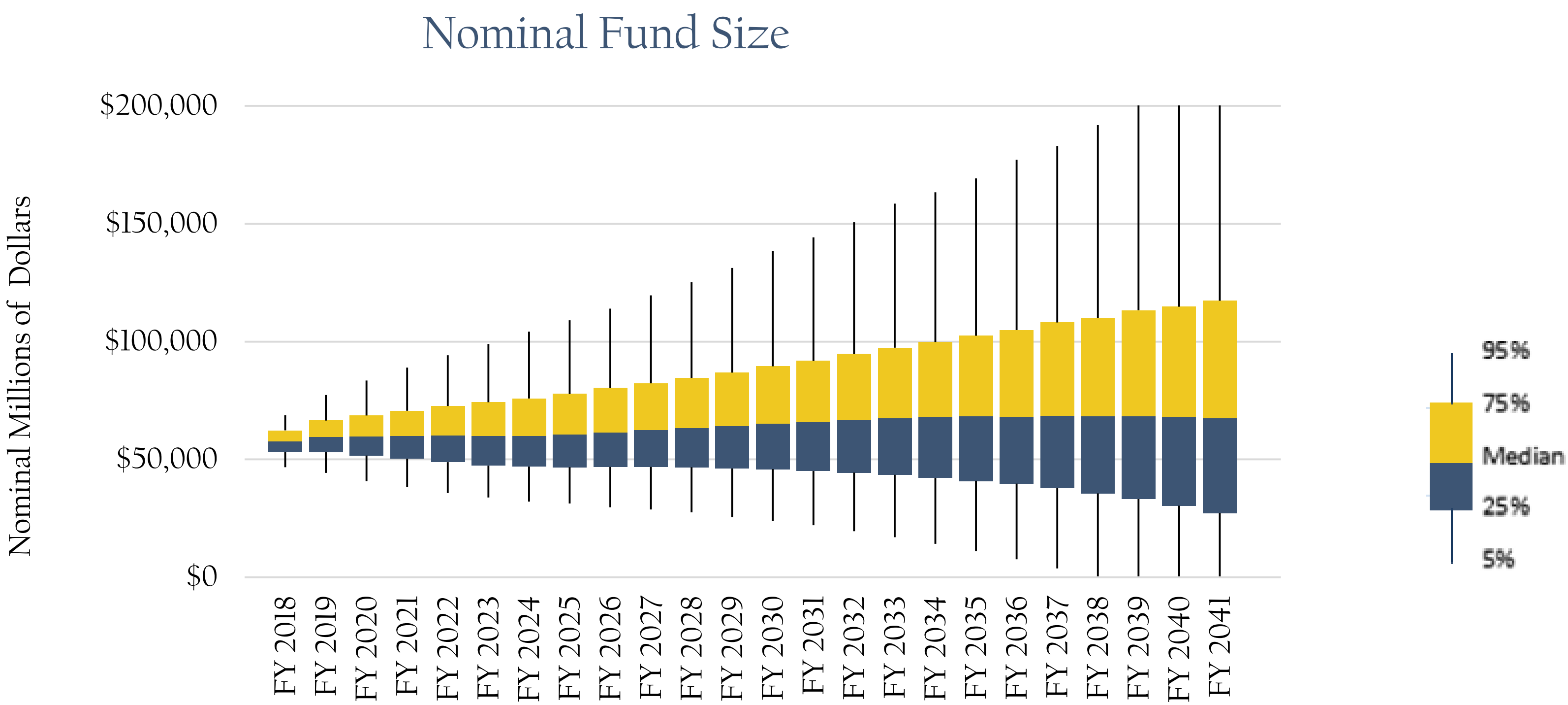
Status Quo, No Fiscal Plan



2018 median value: $2,432

2041 median value: $0

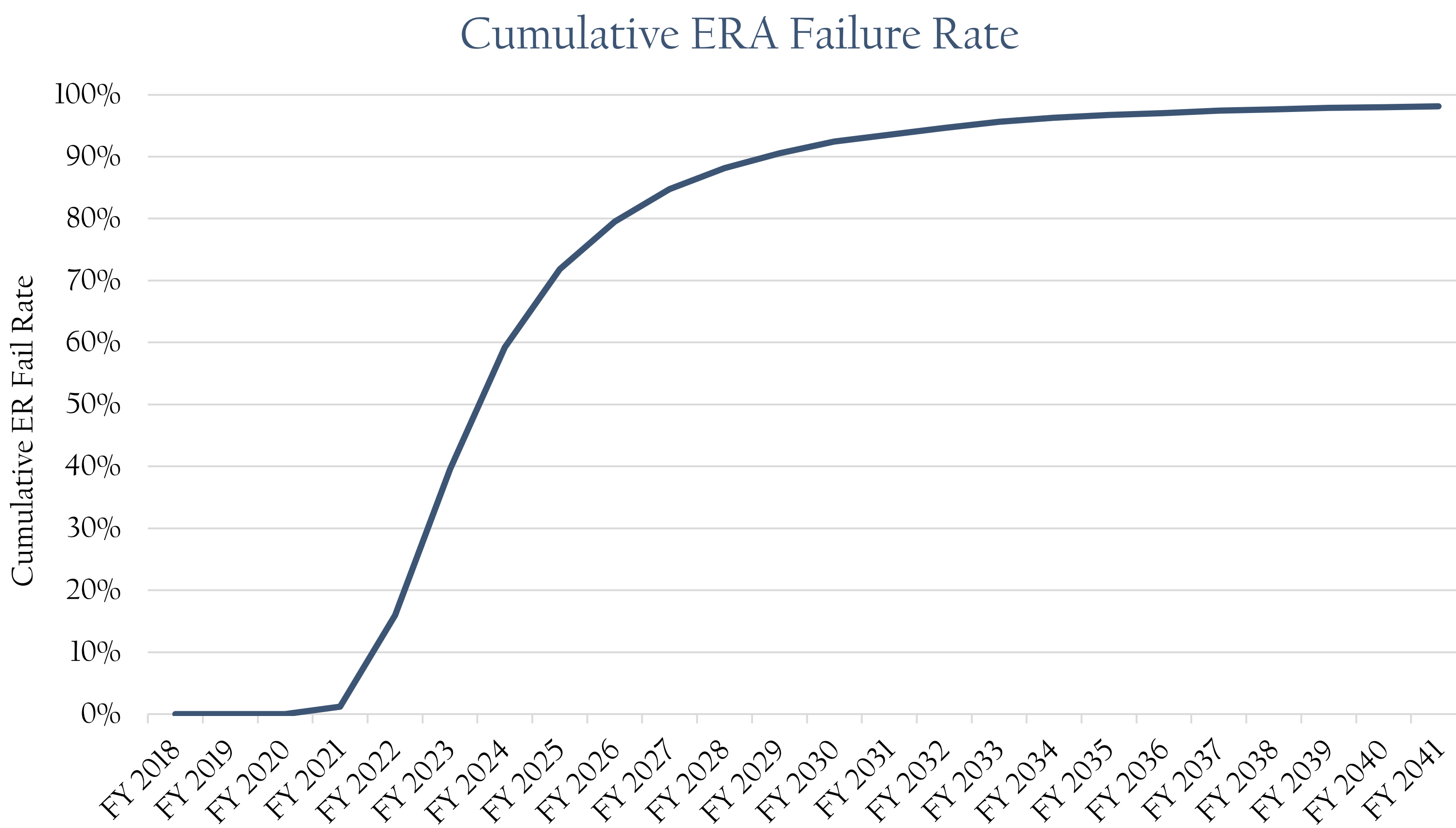
STATUS QUO, NO FISCAL PLAN



2041 median value: $67,484 nominal ($39,563 real) million

ER Fail Rate over 24 Years: 98.14%

Status Quo, No Fiscal Plan



APFPA with CBR transfer: Method, Inputs, and Assumptions

- **Permanent Fund Starting Value**: $53.4 billion
  - Realized portion of corpus: $40.7 billion
  - Realized portion of ERA: $6.3 billion
  - Unrealized earnings held by the fund: $6.3 billion
  - Starting value was estimated based on the following:
    - $54.9 billion estimated EOY 2017 balance of PF under status quo
    - Plus $0.8 billion from the difference in the calendar year (CY) 2017 dividend calculation
    - Less $2.4 billon transfer to CBR (repaying for last years withdrawal as if we started PFPA a year earlier)
- **Investment Return**: Callan Associate's 10-year forecast
  - Total return: 6.95% geometric, 12.32% standard deviation
  - Statutory return: P10 = 3.70%, P50 = 6.24%, P90 = 8.14%
  - Inflation rate: 2.25%

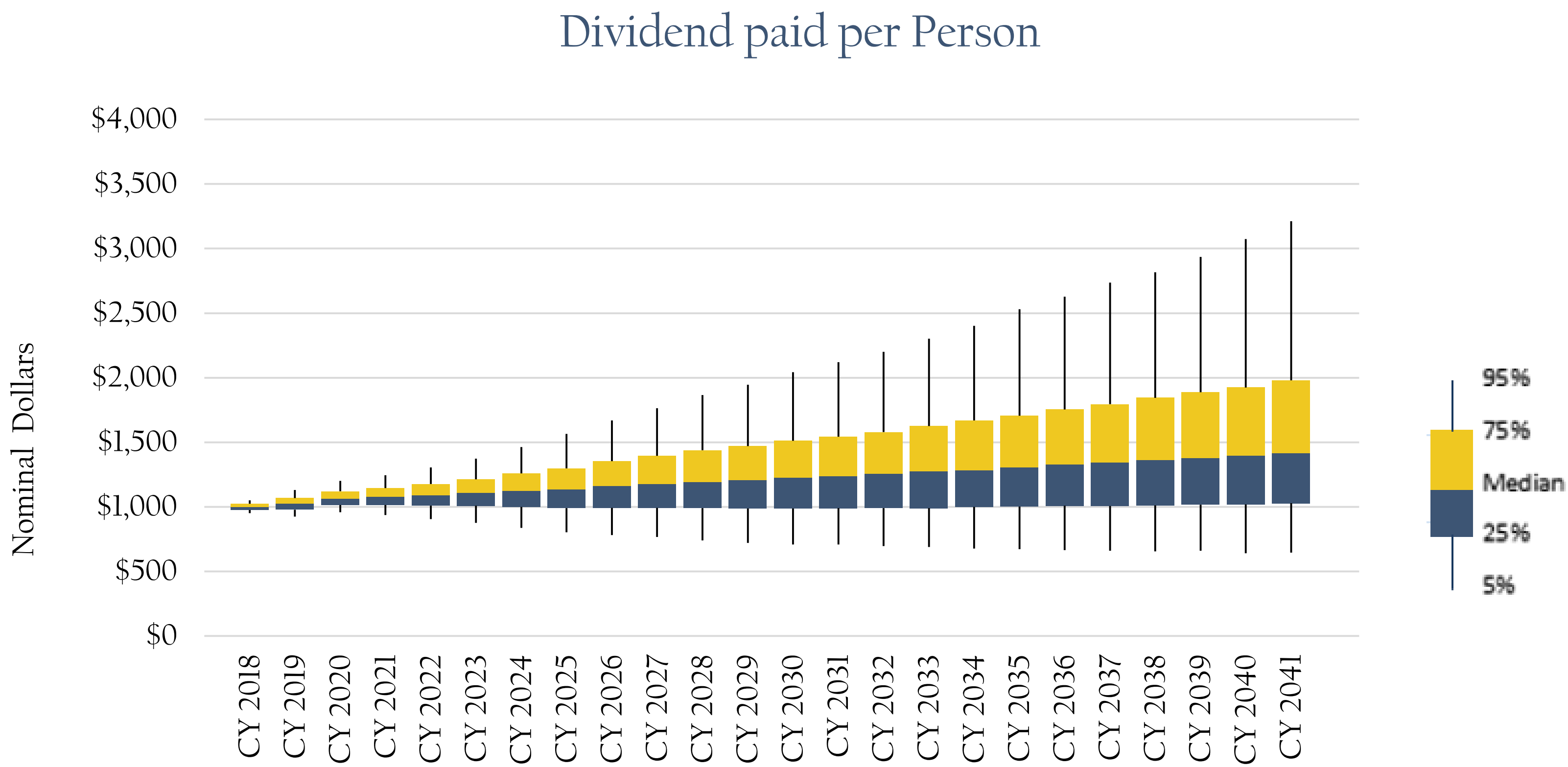
APFPA with CBRF transfer: Method, Inputs, and Assumptions

- **Petroleum Revenues:**
  - **Oil price**: Probabilistic analysis of ANS oil prices using a PERT distribution from the fall 2016 price forecasting session.
  - **Production**: Probabilistic analysis of ANS oil prices using a PERT distribution from the DNR provided Fall 2016 RSB
- **Deposits:** 25% of royalties deposited into the permanent fund.
- **Payout Calculation:** 5.25% of the average of first 5 of the last 6 years' total fund size. This value can then be decreased if the combined royalty and production tax revenues for the year are above $1.2 billion, by the amount over $1.2 billion. This can not reduce the payout amount by more then 80%.
- **Unplanned Payouts:** After depleting the CBR, budget deficits are filled from the ERA.
- **CBR:** $6.8 billion BOY 2018 balance with Rate of Return of 2.25%
  - Initial Balance of $6.8 billion is estimated based on a forecasted balance of $4.4 billion and a $2.4 billion transfer from the ERA

APFPA with CBRF transfer: Method, Inputs, and Assumptions

- **Dividend Calculation:**
  - The sum of:
    - 20% of the POMV payout before any reduction, and
    - 20% of the unrestricted royalties (about 15% of total royalties) from the most recent FY ended
    - Overwriting the above calculation there is a fixed dividend of $1,000 per person for CY 2018.
- **Inflation Proofing:**
  - If four times the 5.25% POMV payout (21% of the total fund value) remains in the ERA after the POMV transfer, the amount over the four times the POMV is transferred into the corpus.

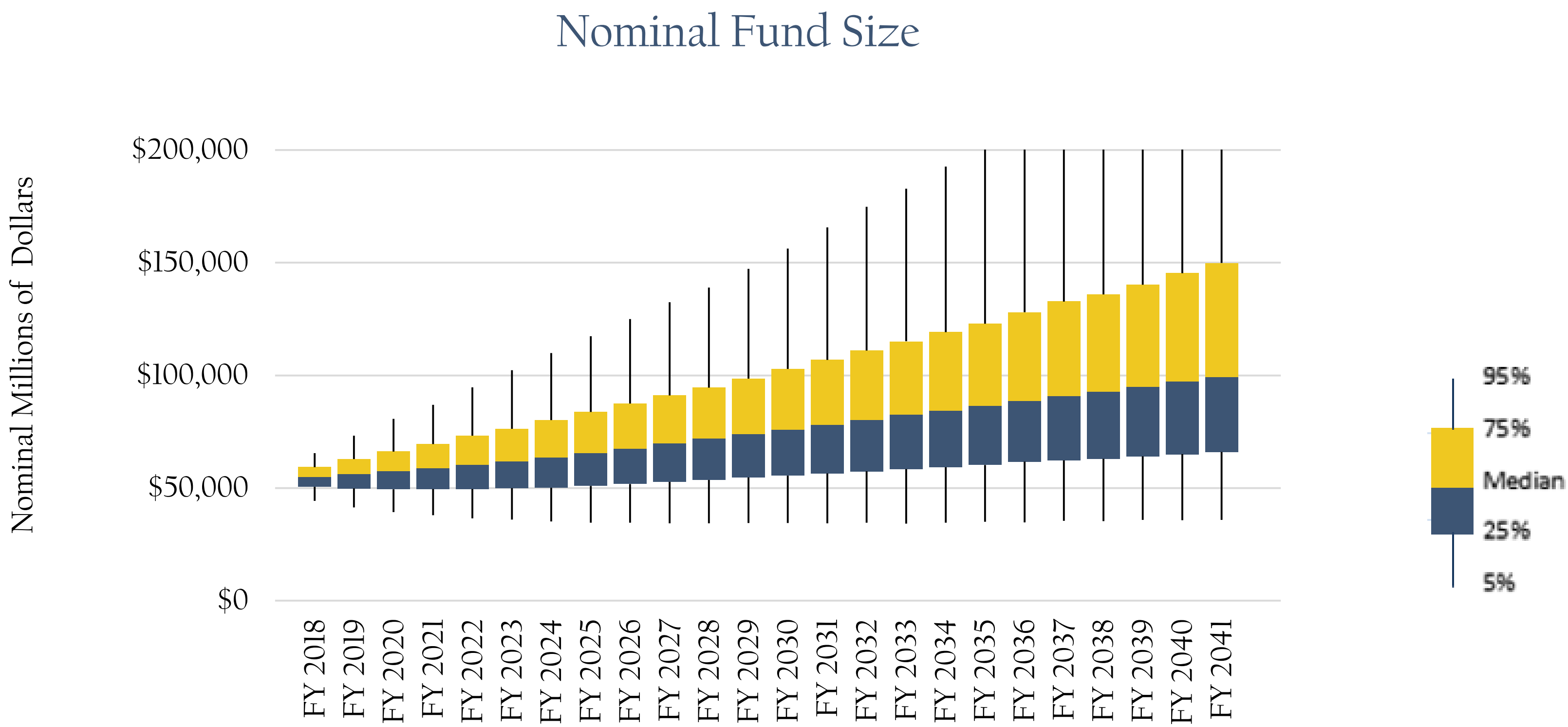
APFPA with transfer, Full Fiscal Plan



2018 median value: $1,000

2041 median value: $1,416 nominal ($830 real)

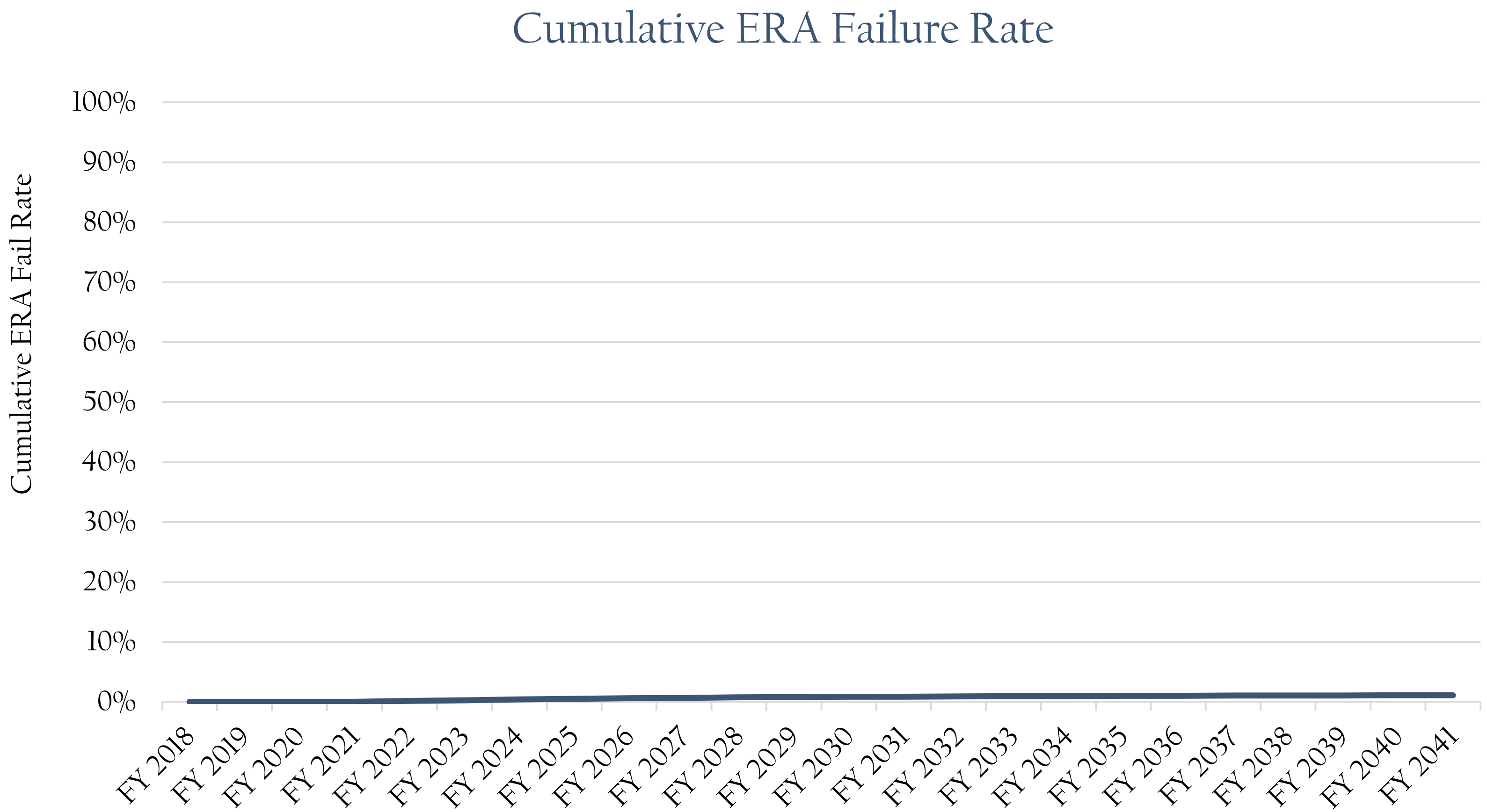
APFPA WITH TRANSFER, FULL FISCAL PLAN



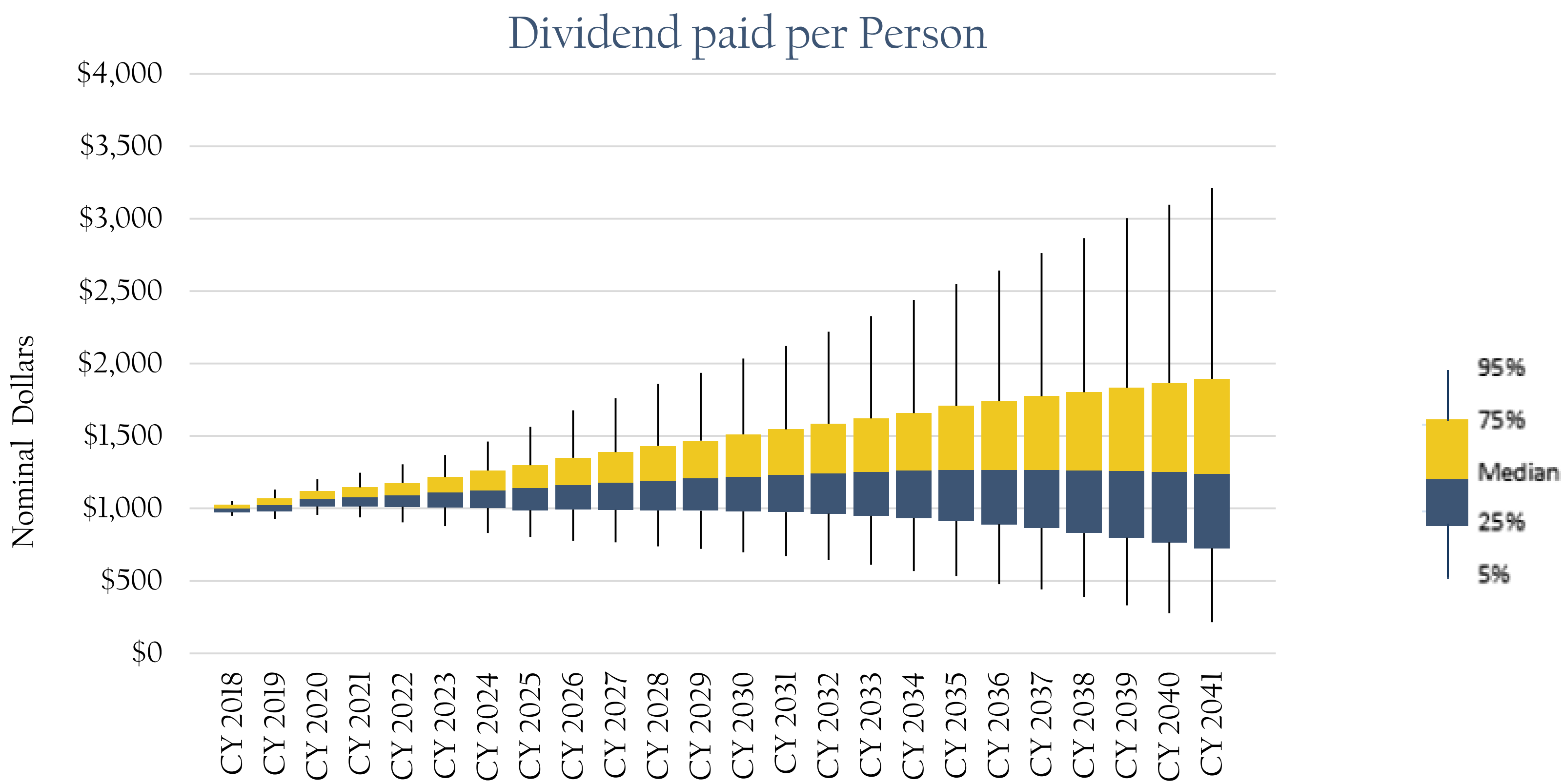
2041 median value: $99,254 nominal ($58,188 real) million

ER Fail Rate over 24 Years: 1.12%

APFPA WITH TRANSFER, FULL FISCAL PLAN



APFPA with transfer, No Fiscal Plan

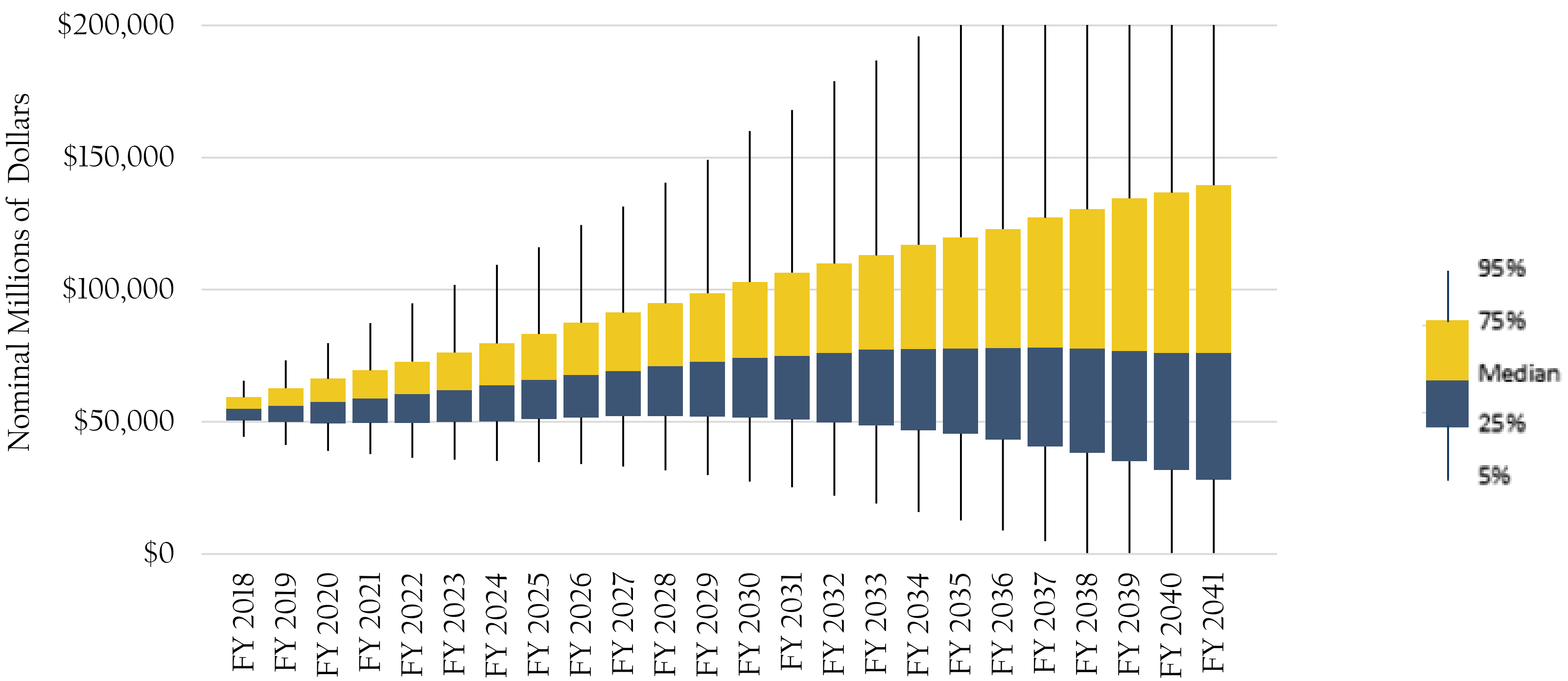


2018 median value: $1,000

2041 median value: $1,239 nominal ($727 real)

APFPA with transfer, No Fiscal Plan

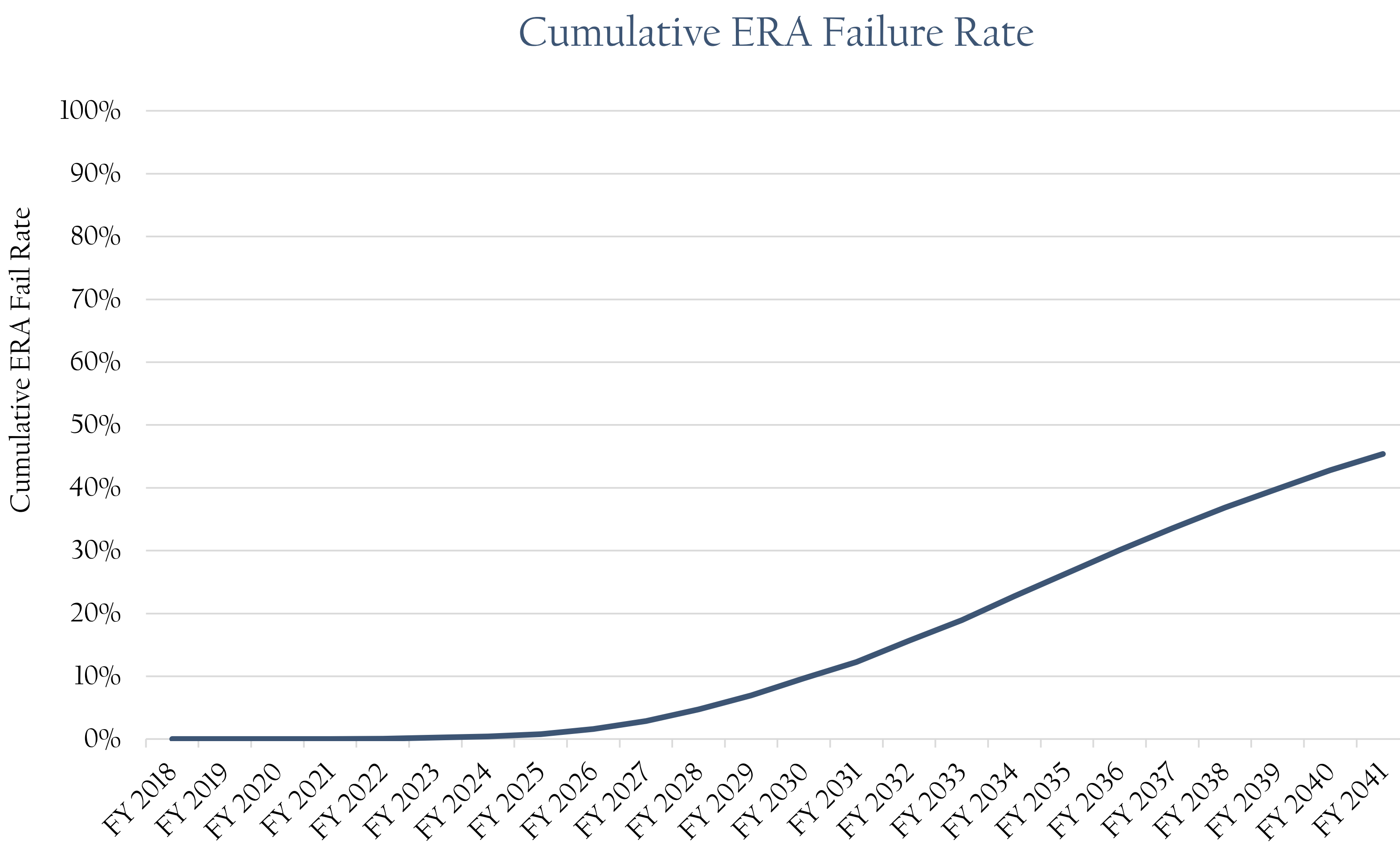
Nominal Fund Size



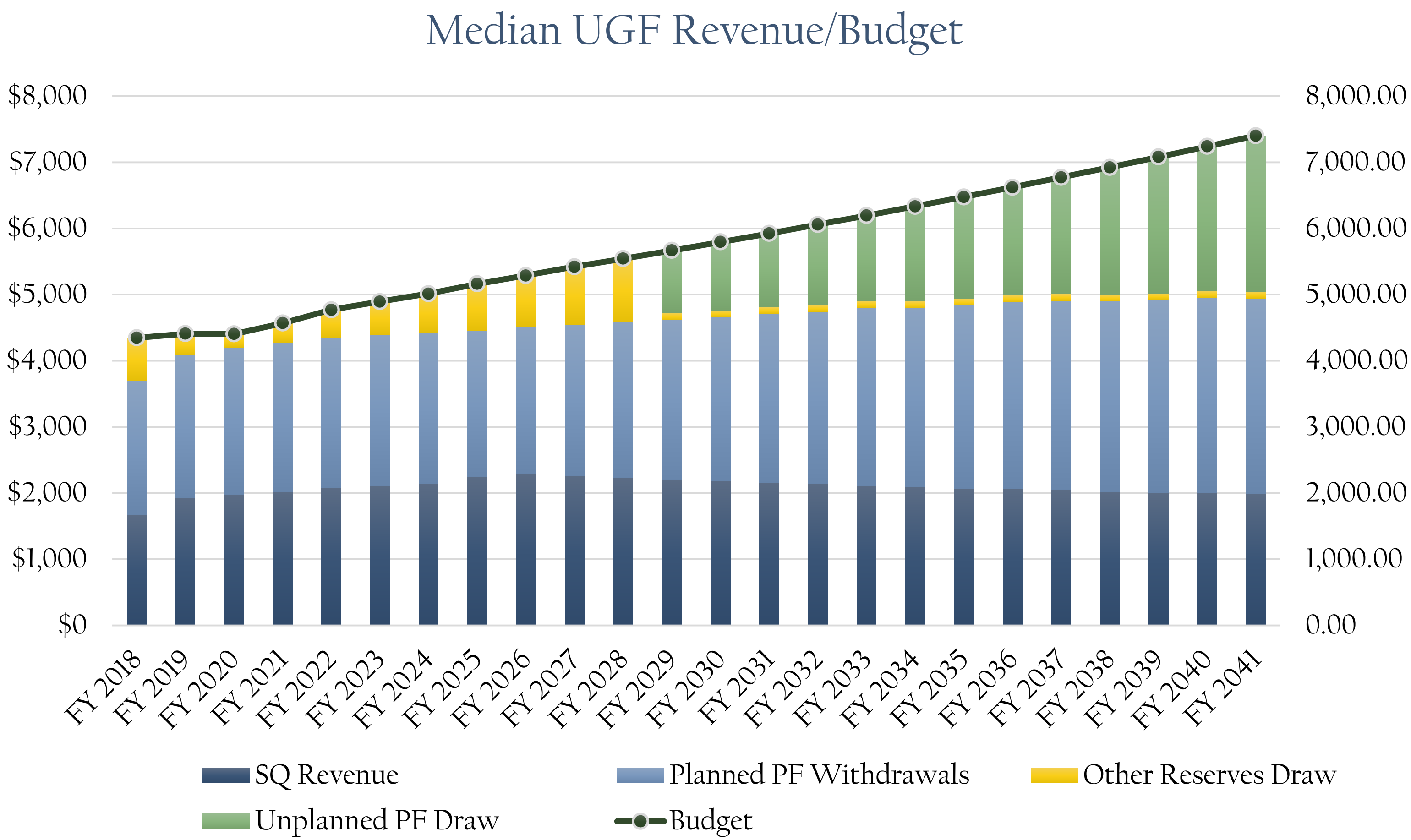
2041 median value: $76,047 nominal ($44,582 real) million

ER Fail Rate over 24 Years: 45.38%

APFPA with transfer, No Fiscal Plan



APFPA with transfer, No Fiscal Plan



APFPA WITHOUT CBRF TRANSFER: METHOD, INPUTS, AND ASSUMPTIONS

- **Permanent Fund Starting Value**: $55.8 billion (See estimate below)
  - Realized portion of corpus: $40.7 billion
  - Realized portion of ERA: $8.7 billion
  - Unrealized earnings held by the fund: $6.3 billion
  - Starting value was estimated based on the following:
    - $54.9 billion estimated EOY 2017 balance of PF under status quo
    - Plus $0.8 billion from the difference in the CY 2017 dividend calculation
- **Investment Return**: Callan Associate's 10-year forecast
  - Total return: 6.95% geometric, 12.32% standard deviation
  - Statutory return: P10 = 3.70%, P50 = 6.24%, P90 = 8.14%
  - Inflation rate: 2.25%

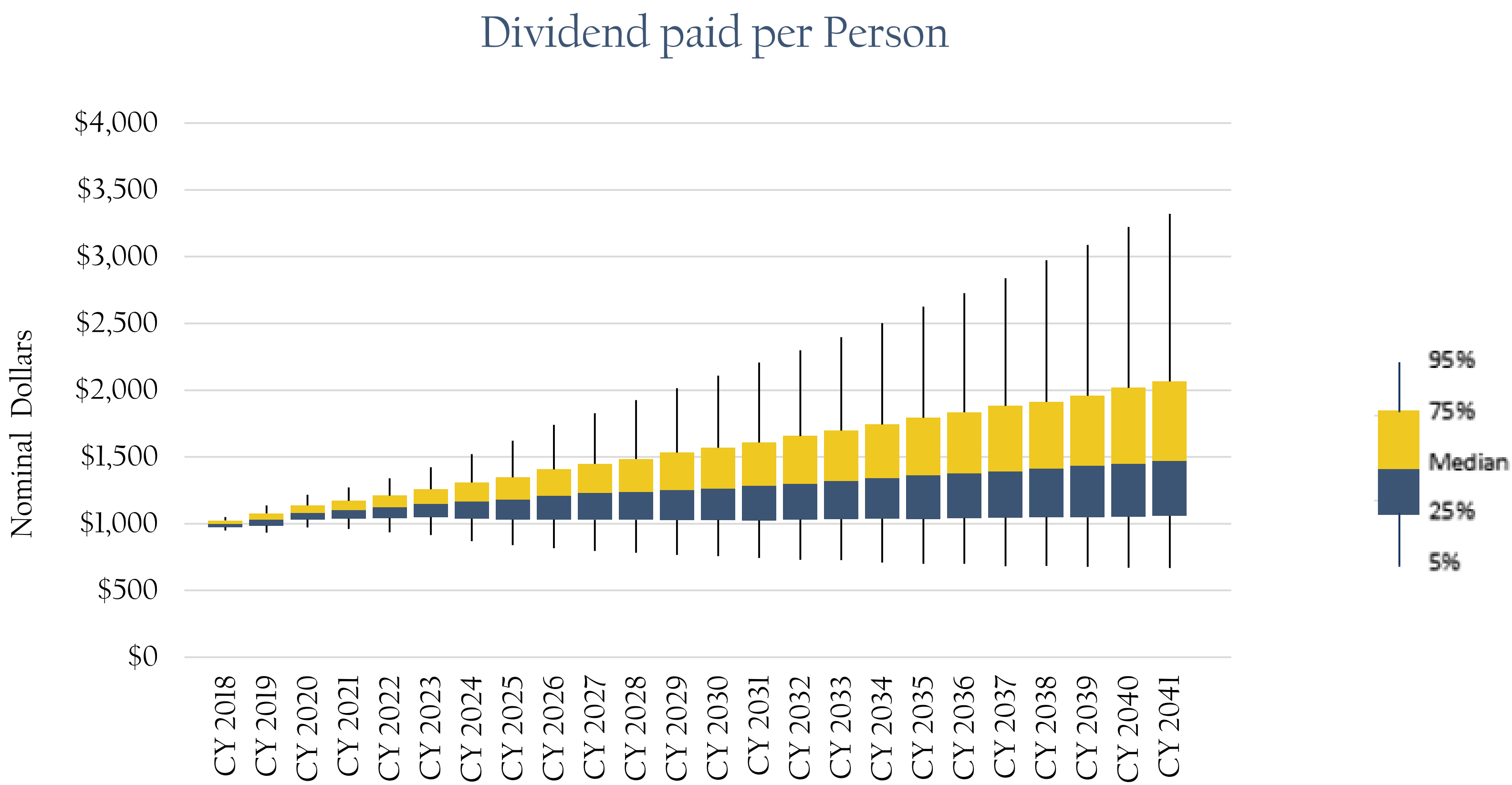
APFPA without CBRF transfer: Method, Inputs, and Assumptions

- **Petroleum Revenues:**
  - **Oil price**: Probabilistic analysis of ANS oil prices using a PERT distribution from the fall 2016 price forecasting session.
  - **Production**: Probabilistic analysis of ANS oil prices using a PERT distribution from the DNR provided Fall 2016 RSB
- **Deposits:** 25% of royalties deposited into the permanent fund.
- **Payout Calculation:** 5.25% of the average of first 5 of the last 6 years' total fund size. This value can then be decreased if the combined royalty and production tax revenues for the year are above $1.2 billion, by the amount over $1.2 billion. This can not reduce the payout amount by more then 80%.
- **Unplanned Payouts:** After the CBR is depleted, budget deficits are filled using the ERA.
- **CBR:** $4.4 billion BOY 2018 balance with Rate of Return of 2.25%

APFPA without CBRF transfer: Method, Inputs, and Assumptions

- **Dividend Calculation:**
  - The sum of:
    - 20% of the POMV payout before reductions, and
    - 20% of the unrestricted royalties (about 15% of total royalties) from the most recent FY ended
  - Overwriting the above calculation, the dividend for CY2018 is $1,000/person.
- **Inflation Proofing:**
  - If four times the 5.25% POMV payout remains in the ERA after the POMV transfer, the amount over the four times the POMV is transferred into the corpus.

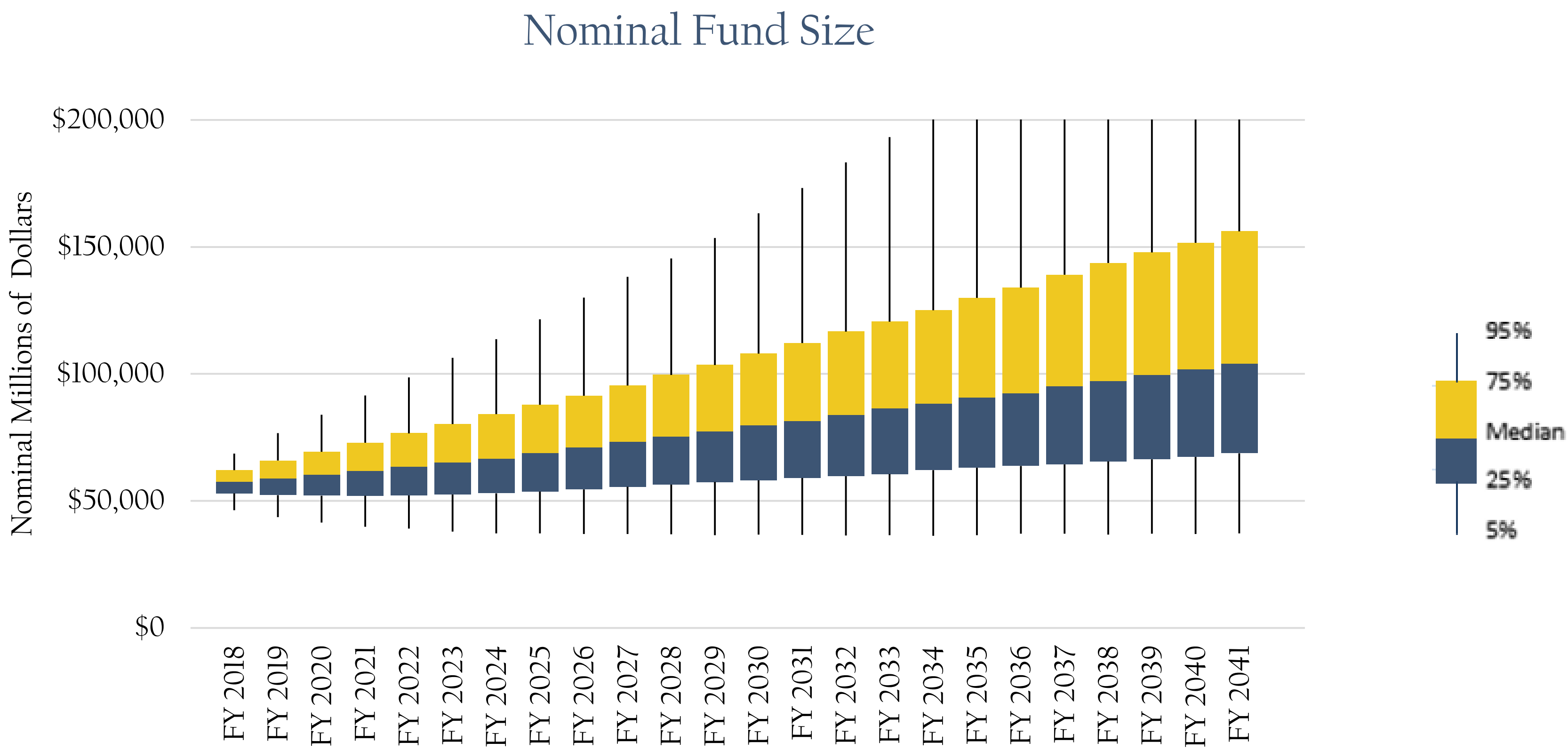
APFPA WITHOUT TRANSFER, FULL FISCAL PLAN



2018 median value: $1,000

2041 median value: $1,468 nominal ($861 real)

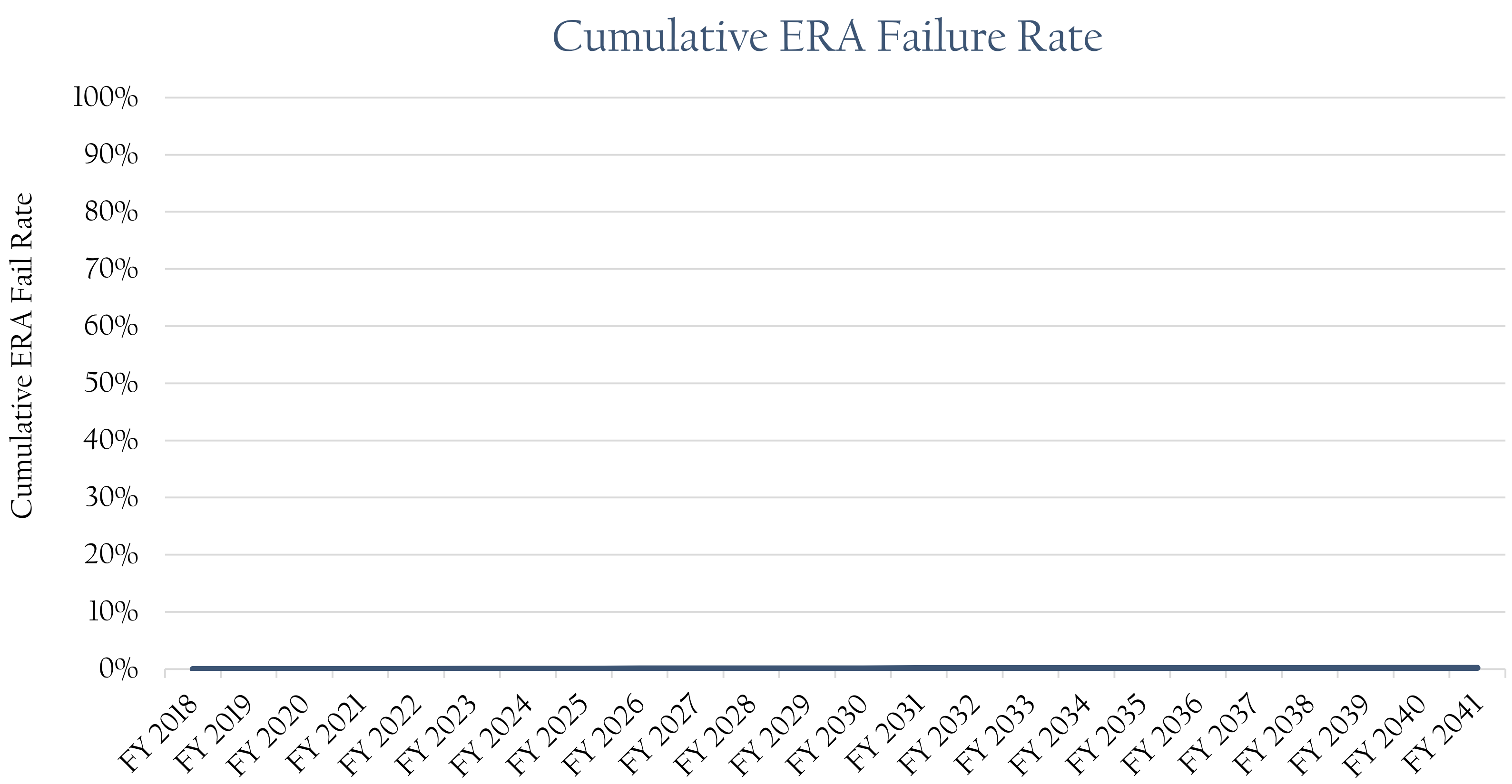
APFPA WITHOUT TRANSFER, FULL FISCAL PLAN



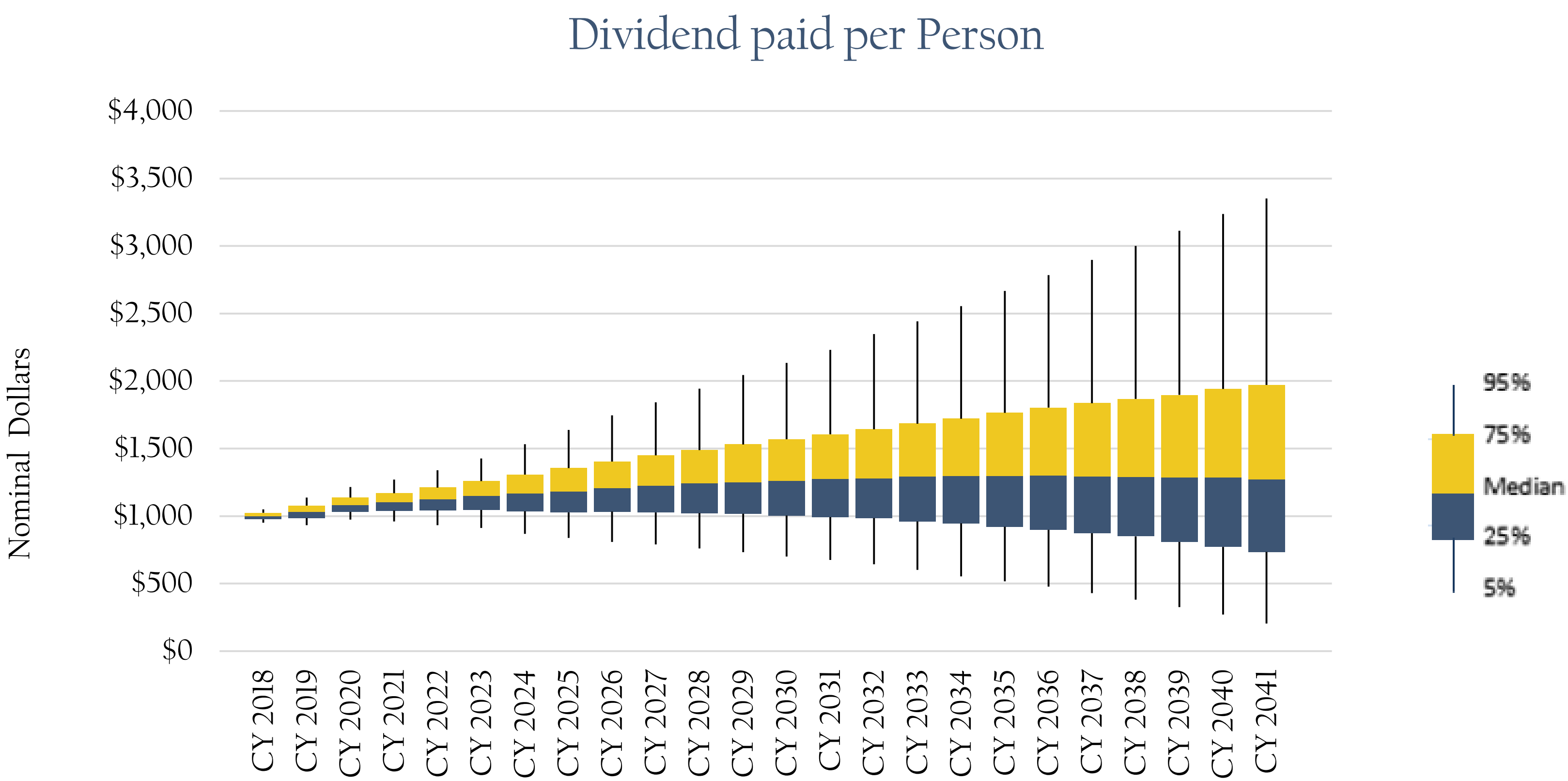
2041 median value: $104,079 nominal ($61,016 real) million

ER Fail Rate over 24 Years: 0.18%

APFPA without transfer, Full Fiscal Plan



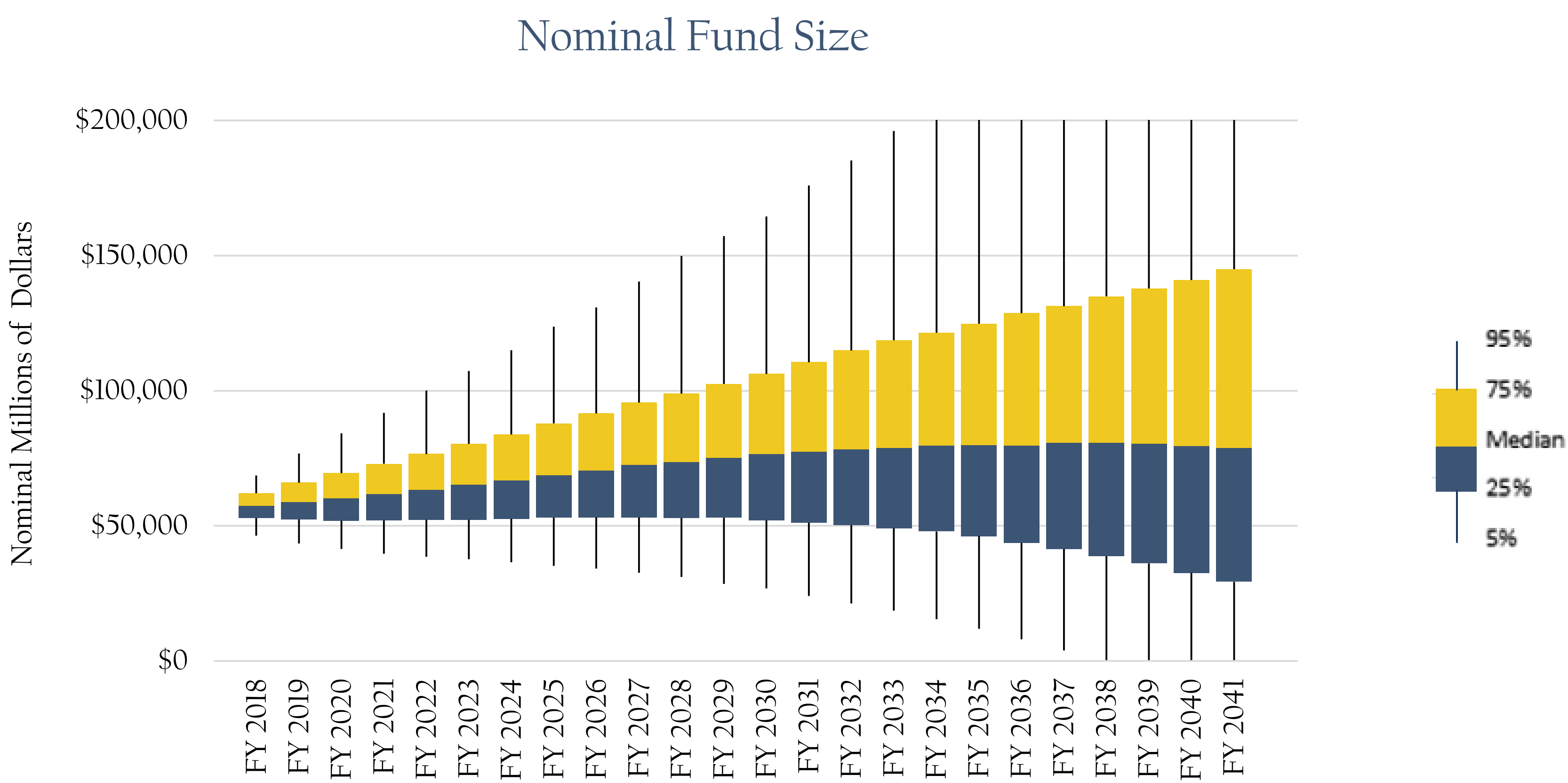
APFPA without transfer, No Fiscal Plan



2018 median value: $1,000

2041 median value: $1,271 nominal ($745 real)

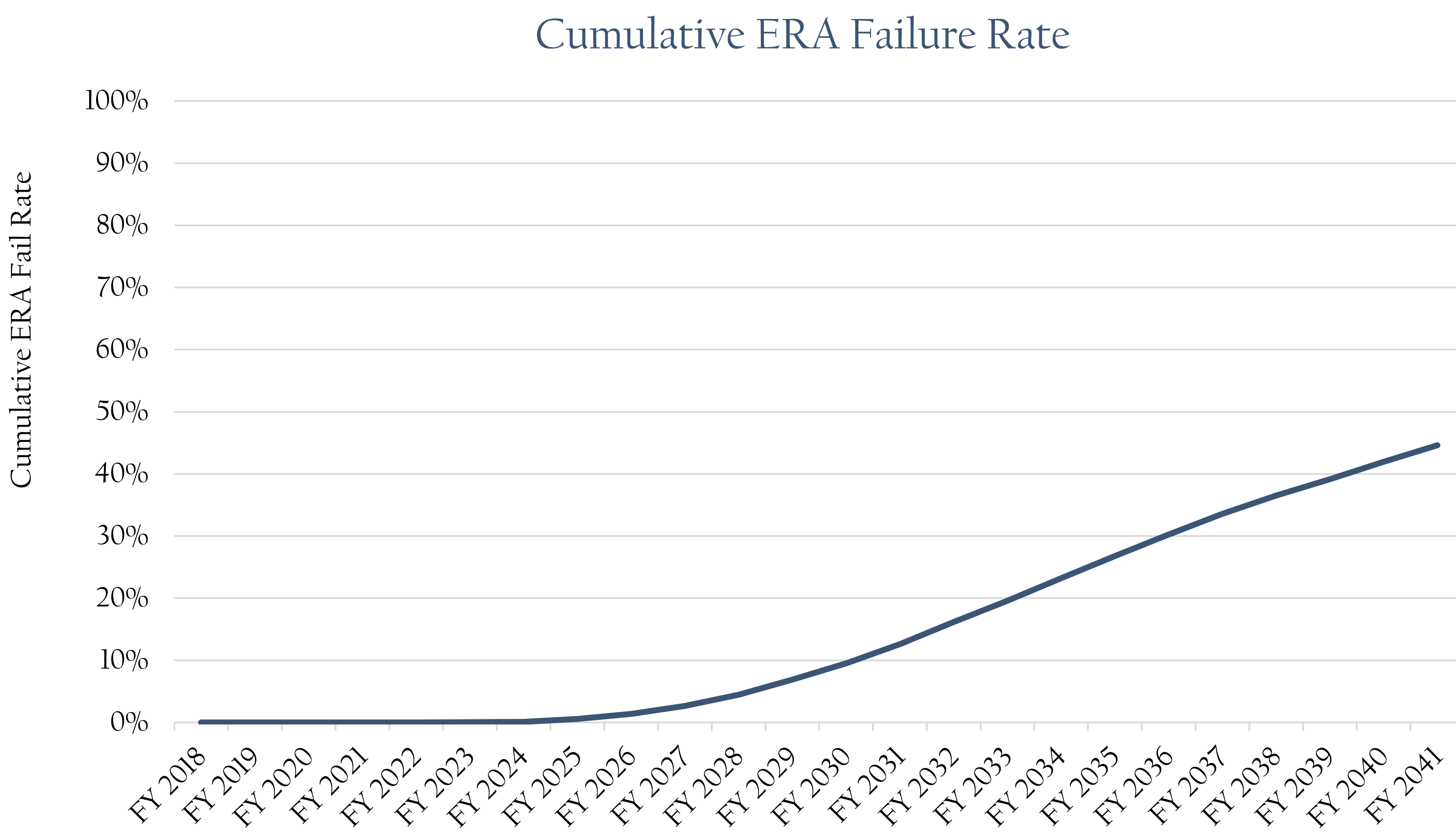
APFPA WITHOUT TRANSFER, NO FISCAL PLAN



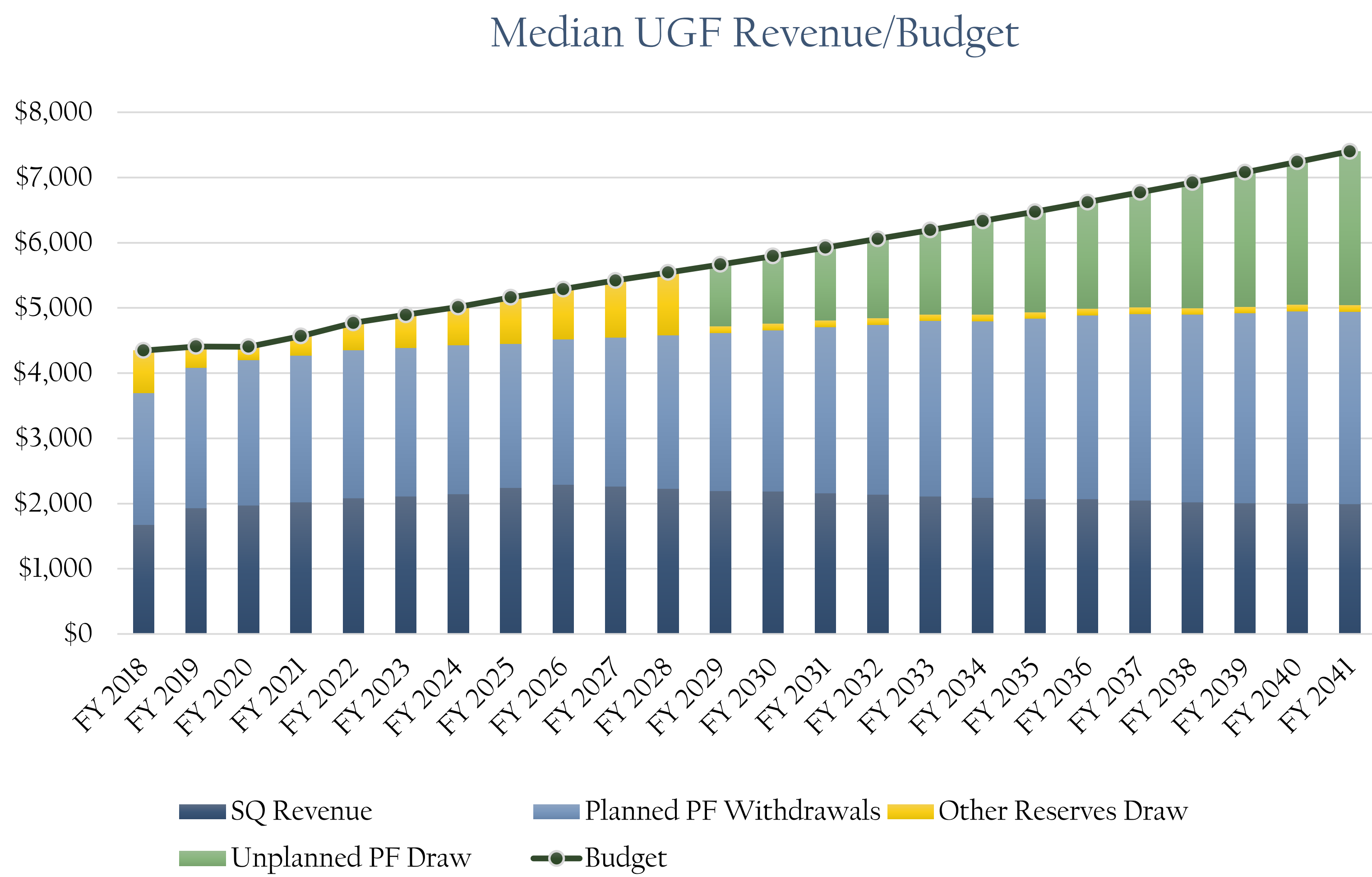
2041 median value: $78,926 nominal ($46,270 real) million

ER Fail Rate over 24 Years: 44.61%

APFPA without transfer, No Fiscal Plan



APFPA without transfer, No Fiscal Plan



CONCLUSIONS

- Status quo situation:
  - Dividend will collapse
  - Permanent Fund will be used to fill budget deficits, depleting value

- Permanent Fund Protection Act:
  - Stabilizes the dividend and budget with or without CBR transfer
  - However, additional revenue measures or budget cuts are required to protect the fund. Otherwise, the remaining budget gap will lead to unplanned withdrawals from the permanent fund that will degrade its value.