



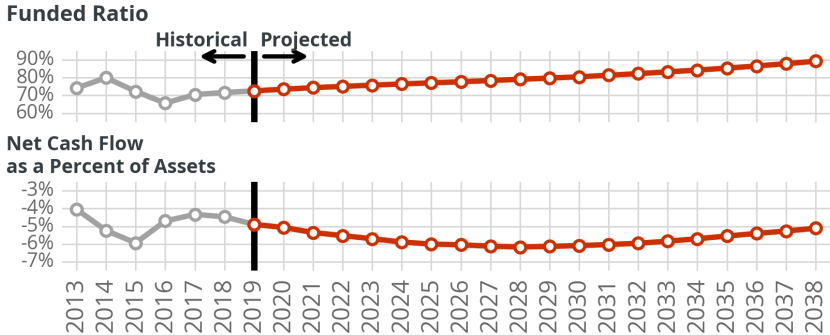
As a member of the Sinking Fund Commission, the City Controller has a responsibility to Philadelphia Gas Works’ pensioners to ensure the long-term viability and overall fiscal health of the Philadelphia Gas Works Pension Plan (Plan). Separate from Philadelphia’s Municipal Pension Fund, the Plan provides retirement benefits for approximately 3,700 current and former employees of Philadelphia Gas Works (PGW). To safeguard these benefits and ensure sustained, stable growth of the Plan, the Office of the City Controller conducted an analysis of the Plan’s liabilities and assets and its overall capacity to meet future obligations to pensioners. The following research evaluates the Plan’s current investment strategy, assesses areas of risks in its actuarial return assumptions, and offers several recommendations.

# 1 Cash Flow Analysis

An important indicator of the Plan’s health is its net cash flow, the measurement of benefit and expense payments as compared to employee and PGW contributions. When considered against the Plan’s market value of assets, it provides a measure of the Plan’s dependency on investment returns to fill the gap between contributions and disbursements. Once this gap has been filled, excess investment returns can be used to pay down any unfunded liabilities. A strongly negative cash flow can signal an overreliance on portfolio performance to meet annual obligations, which in turn, slows progress towards achieving full funding status. In the case of underperforming investment returns, it can lead to an increasing unfunded liability and require asset liquidation to meet obligations.

As of July 1, 2019, the Plan had a funded ratio of 73.2 percent and an unfunded liability of \$203M. This funded ratio represents a small improvement relative to a decade ago, when the Plan’s funded status was 68.4 percent.<sup>1</sup> Over the next twenty years, the funded ratio is projected to increase slowly but steadily to 89.3 percent, as seen in the top panel of Figure 1 below. Importantly, these projections assume the Plan’s portfolio achieves its assumed investment return of 7.3 percent annually. In the event that returns fall short of this goal, the Plan’s health depends upon its net cash flow. As seen in the bottom panel of Figure 1, the cash flow has been consistently net-negative since 2013, between 4 and 6 percent of the market value of assets. Under the Plan’s baseline assumptions, this trend is projected to continue, with the cash flow decreasing to a minimum of negative 6.2 percent in 2028 before stabilizing and improving to negative 5 percent by 2038.

**Figure 1**  
**Funded Ratio & Net Cash Flow Under the Plan's Baseline Assumptions**  
*Net cash flow equals total contributions minus benefit payments & expenses*



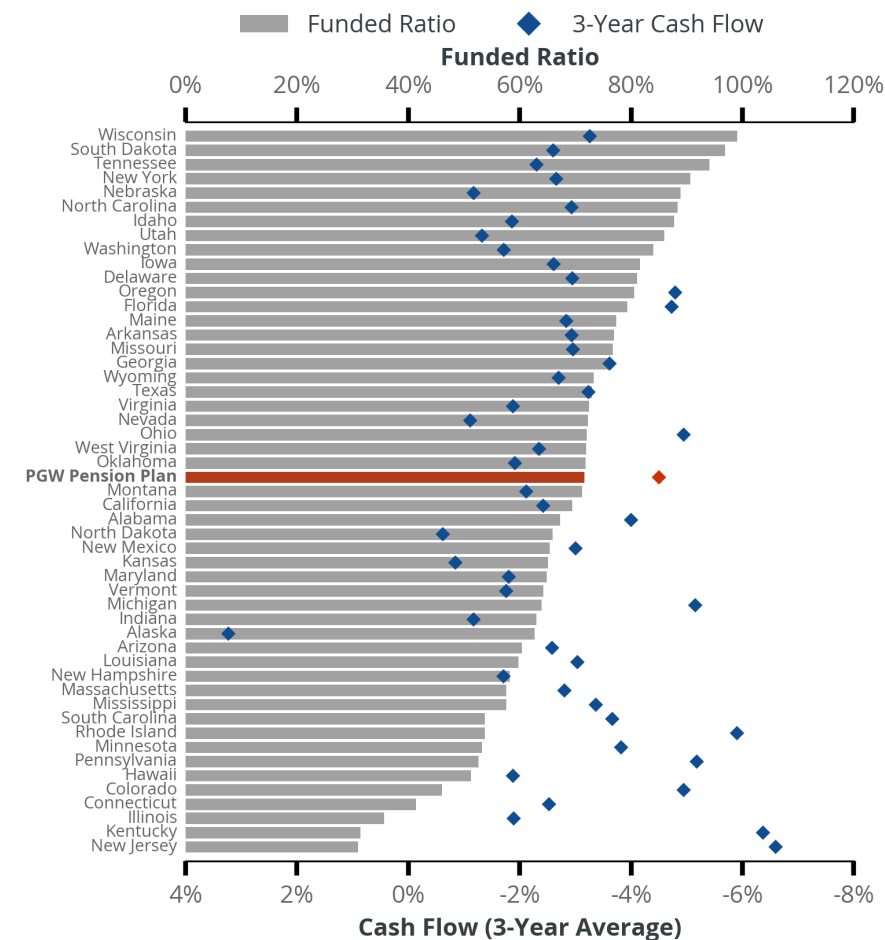
Source: PGW FY18 CAFR, Aon projections (July 2019)  
 Note: Baseline scenario assumes 7.3% investment return each year

<sup>1</sup>As of September 1, 2009.

The Plan's projected negative cash flow introduces significant investment risk. The projections show that a substantial percentage of future investment returns must first be used to meet annual obligations. The sluggish projected growth in funded ratio is due to the relatively small gap between the net cash flow, which is consistently between negative 5 to 6 percent, and the assumed investment return of 7.3 percent. If future investment returns were to fail to reach this assumed rate, the Plan's unfunded liability could grow if the negative cash flow outpaces portfolio returns. Such a scenario with sustained, lower-than-expected returns is discussed in greater detail later in this report.

A recent Harvard Kennedy School (HKS) analysis of state pension plans<sup>2</sup> used a cash flow value of negative 5 percent to identify plans at risk of fiscal distress. With an average cash flow of negative 4.5 percent in the last three years, the PGW Plan's cash flow approaches but does not surpass this limit. However, as seen in Figure 1 previously, the Plan's cash flow is projected to be below this limit for every year until 2038. According to the HKS study,<sup>3</sup> there are only nine state plans with a 3-year cash flow value more negative than the PGW Plan's. The majority of these plans, six out of nine, are not as well funded as the PGW Plan. This comparison is highlighted for all fifty states in Figure 2 below.

**Figure 2**  
**PGW Pension's Cash Flow and Funded Ratio vs. State Pension Plans**



**Note:** State data uses data from FY14 to FY16, while PGW data is from FY15 to FY17. Funded ratio values are from the most recent year available.  
**Source:** State data from "Assessing the Risk of Fiscal Distress for Public Pensions: State Stress Test Analysis", kindly provided by authors.

<sup>2</sup>Menis, G., Banta, S., and Draine, D. "Assessing the Risk of Fiscal Distress for Public Pensions: State Stress Test Analysis," Harvard Kennedy School, May 2018.

<sup>3</sup>Data provided by David Draine, as first presented in "Assessing the Risk of Fiscal Distress for Public Pensions: State Stress Test Analysis."

When compared to the wider universe of state and local public pension plans, the Plan's negative cash flow remains concerning. For the 187 state and local plans in the Public Plans Database<sup>4</sup> with cash flow data, the median 3-year cash flow is negative 2.9 percent, compared to negative 4.5 percent for the PGW Pension Plan. About 80 percent of the plans in the database have a 3-year cash flow that is more positive than the Plan's. While these public plans are typically much larger in size than the PGW Plan and employ a variety of funding policies and investment strategies, this cash flow comparison provides a useful metric for assessing the current and future fiscal health of the PGW Plan.

It is important to note two factors regarding the Plan's current cash flow situation. First, PGW employees made no contributions to the Plan prior to 2012, and a substantial fraction of the Plan's active participants still do not contribute to the Plan. This will improve over time, as more of the Plan's participants become active contributors. Second, a new contribution policy was implemented beginning in 2016. Since the change, PGW calculates an annual required contribution using both 20-year open and 30-year closed amortization periods and contributes the larger of the two values. A closed policy pays off any unfunded liability over a fixed number of years, while an open policy resets the amortization schedule each year. Under the Plan's baseline assumptions, the contribution method is projected to switch from a 20-year open to a 30-year closed amortization in 2025.

Typically, using both a shorter period and closed policy will result in paying off unfunded liabilities more rapidly. Plans with shorter periods and closed policies also tend to have better cash flows. Using data from the Public Plans Database, about 75 percent of plans amortized over a closed period in 2018. The median cash flow for these plans was negative 3.0 percent, which was 50 basis points better than the cash flow for plans with an open policy. Similarly, about two-thirds of plans used an amortization period of 25 years or less in 2018. These plans had a median cash flow of negative 2.5 percent, which was 100 basis points better than the cash flow for plans using a period greater than 25 years.

## 2 Investment Strategy

The Sinking Fund Commission has maintained its present investment strategy for more than ten years. This strategy targets a traditional 65-percent-to-35-percent asset split, with the larger allocation to equities and the smaller allocation to fixed income. As of August 31, 2019, the Plan invests \$366M in equities (68 percent of total fund assets), split between domestic and foreign/emerging markets, with \$262M allocated to domestic equities and the remainder to international equities. The Plan invests the portfolio's remaining \$173M in fixed income, spread across sovereign and corporate debt. Because the Plan has not invested in alternative assets, it maintains a daily liquidity of 99+ percent.

While the allocation strategy has not changed, the Sinking Fund Commission has shifted its approach to manager selection in the past several years to improve the Plan's returns. This includes a focus on lower management fees and a switch from active to passive management. By leveraging deals alongside the City of Philadelphia's larger Municipal Pension Fund, PGW has successfully negotiated lower-than-expected fees for a fund of its size. Such negotiations<sup>5</sup>

---

<sup>4</sup><https://publicplansdata.org/>, Center for Retirement Research at Boston College

<sup>5</sup>PGW has negotiated lower fees alongside the City's larger Municipal Pension Fund from the following managers: Rhumblin, Logan Circle, and Garcia Hamilton.

have helped to lower fees from 0.49 percent of assets under management in fiscal year 2014 to 0.37 percent in fiscal year 2018.<sup>6</sup> Additionally, the Plan's allocation to passive investment managers rose from 6.43 percent of total assets in 2012 to 41.6 percent in 2019.<sup>7</sup> These changes will continue to place downward pressure on fees and avoid unnecessary costs that diminish portfolio returns.

### 3 Evaluating Current Assumptions

The PGW Pension Plan assumes an annual portfolio return of 7.3 percent for actuarial calculations of contributions and liabilities. According to the Plan's investment consultant, the current portfolio has about a 45 percent chance of achieving this return assumption. However, the consultant has specified that the most likely return given the current target strategy is 7.0 percent, indicating that there is about a 50 percent chance that the portfolio's long-term return will be at least 7.0 percent.

For historical context, the Plan has returned 8.18 percent annually since its inception, net of fees.<sup>8</sup> From 2001 to 2016, the Plan's returns were lower but similar to the median return for all public pensions — the Plan returned 5.33 percent while the median return for public plans was 5.5 percent.<sup>9</sup> Over that same time period, Philadelphia's Municipal Pension Plan returned 4.77 percent.

The Plan's assumed rate of return has declined incrementally over the past decade, in-line with general expectations for capital markets. As recently as 2010, the assumption was an 8.25 percent return annually. The most significant consequences following a reduction in the return assumption are a drop in funded status and an increase in annual required contributions to compensate for reduced return expectations over the long term. Due in part to decreases in the return assumption, the Plan's funded ratio has improved only slightly in recent years, from 68 percent funded in 2009 to 73 percent funded in 2019.

The Controller's Office conducted its own analysis of the Plan's target strategy to gauge the reasonableness of the Sinking Fund Commission's actuarial assumptions. We simulated thousands of hypothetical returns for a 65/35 equities-to-fixed-income portfolio and calculated an expected average return and average volatility. To conduct this analysis, we relied on average 20-year capital market assumptions detailed in Horizon Actuarial Services' annual "Survey of Capital Market Assumptions" for 2018.<sup>10</sup> After inputting the expected returns and volatilities for domestic equities, foreign equities, and fixed income, correlating their returns with the market, and simulating according to the target allocations, we found an expected annual portfolio return of 7.0 percent and a volatility of 9.7 percent. These results mirror those of the Plan's independent investment consultant. They differ only in expected annual volatility, indicating that the capital market assumptions of the Horizon Survey likely match those employed by the consultant.

However, while our estimated return aligns with the investment consultant's figure, both differ from the Plan's actuarially assumed return by 30 basis points. Over time, an assumed return

---

<sup>6</sup>Figures via Philadelphia's Chief Investment Officer, Christopher DiFusco.

<sup>7</sup>As of October 2019. Figures via Christopher DiFusco. They include the Fund's uninvested holdings in cash.

<sup>8</sup>As of August 31, 2019.

<sup>9</sup>The median return for public pensions for 2001 to 2016 is from a Boston College Center for Retirement Research study. The comparable return for the PGW Plan is via the Plan's investment consultant.

<sup>10</sup>Capital market assumptions provide best-guess estimates for the expected returns and risks of each financial asset class based on historical data. To account for differences from firm-to-firm, Horizon's survey aggregates data from over 30 major financial firms and advisories to produce average return assumptions and volatilities by asset class.

that exceeds actual returns negatively impacts funded status and increases future contributions from PGW. As discussed previously, the Plan's projected cash flow is net-negative, increasing the likelihood that portfolio assets could be liquidated to meet obligations to pensioners. As assets are liquidated, the Plan cannot earn necessary investment income and instead operates as a pay-as-you-go system. Consequently, it is paramount for actuarial assumptions to match actual expectations for the market to ensure the Plan's long-term growth in assets.

Estimates from the Plan's investment consultant and the results of this analysis indicate that the current portfolio's most likely long-term return is 7.0 percent. In other words, there is still a 50 percent chance that the portfolio will underperform a return of 7.0 percent in the long run. As such, the Office of the Controller recommends lowering the assumed rate of return to better reflect market expectations for the future. If the assumed rate of return were lowered to 7.0 percent, the amount that PGW would be required to contribute annually, based on the Plan's current funding policy, would increase by about \$2.3M per year.<sup>11</sup> This increase represents about 8 percent of PGW's contribution during the July 1, 2018 to June 30, 2019 plan year.

## 4 Evaluating Future Risk: Stress Tests

Because future investment returns are unpredictable, the best practice for assessing a pension plan's ability to meet obligations is through stress testing. Given the relatively narrow gap between the Plan's projected cash flow (negative 6 percent) and expected investment return (7.3 percent) under the Plan's baseline assumptions, it is crucial to stress the Plan's ability to weather potential adverse investment scenarios. Such tests are becoming the norm for pension funds and provide information about potential cost increases and changes to expected cash flow in the event of a market downturn and/or sustained less-than-expected returns.

At the request of the Controller's Office, the Plan's actuary simulated 20 years of cash flows under two scenarios: fixed 5 percent portfolio returns and a single-year asset shock resulting in a negative 30 percent return followed by a moderate three-year recovery period.<sup>12</sup> Both of these tests provide realistic measures of the downside risk associated with unfavorable investment scenarios. The Plan's investment consultant estimates that there is about a 25 percent probability that the annual investment return will be 5 percent, while the asset shock scenario is consistent with the regulations established as part of the Dodd-Frank Act following the Great Recession. The Plan's funded ratio under these two stress test scenarios, as well as under the Plan's baseline assumptions, are shown in Figure 3 below.

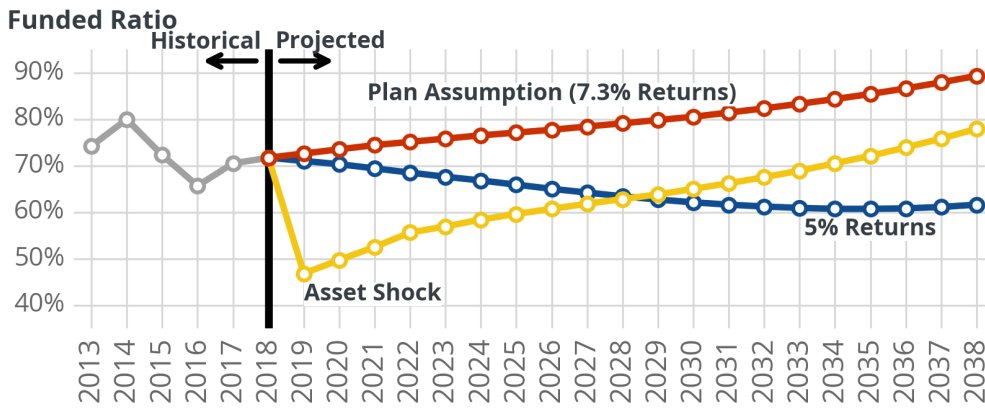
The drop in funded ratio in the 5 percent return scenario illustrates the substantial risk associated with a net-negative cash flow, particularly when investments underperform expectations. Under this scenario, the cash flow is less than negative 5 percent from 2020 through 2033. During this period, the Plan's unfunded liability grows, as investment returns are not sufficient to cover annual obligations and assets must be liquidated. The funded ratio stabilizes in 2034 and begins to improve slightly; it reaches 61.6 percent by 2038, as compared to 89.3 percent in the baseline scenario.

In the asset shock scenario, the Plan's funded ratio drops from 71.7 percent to 46.8 percent following the 2018 shock, and then recovers slowly, reaching 77.9 percent in 2038. The

<sup>11</sup>Per projections from the Plan's actuary in May 2019.

<sup>12</sup>The scenario assumes a single-year negative 30 percent return followed by 3 years of 12 percent returns and 7.3 percent returns for all years after.

**Figure 3**  
**Funded Ratio of the PGW Pension Plan Under 3 Scenarios**



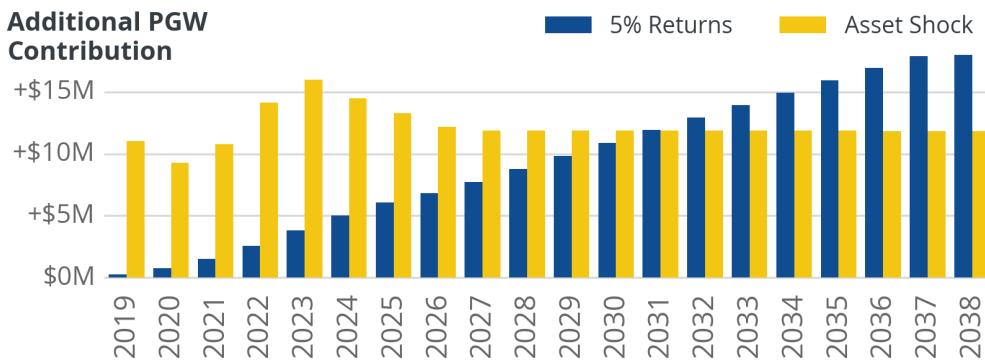
**Source:** Actuarial Valuation Reports, Aon projections, July 2019  
**Notes:** Asset shock assumes a negative 30% return in 2018 followed by 3 years of 12% returns and 7.3% for all later years; PGW's annual required contribution under current funding policy increases substantially in asset shock and 5% return scenarios.

funded ratio's recovery in this scenario is driven by the assumed 7.3 percent investment return beyond 2023. If portfolio returns underperformed this rate in the long run, recovery from the market shock could be substantially weaker, as illustrated by the 5 percent return scenario.

These stress test scenarios also illustrate the enhanced financial pressure incurred by PGW and therefore City rate payers. Figure 4 below shows the increase to PGW's required contribution amounts relative to the baseline projections. In the asset shock scenario, PGW's contribution would increase by \$11M in the year following the shock and reach a maximum increase of \$16M in 2023. Over the 20-year period simulated, the annual contribution would increase by \$12.2M on average, which represents a 42 percent increase relative to PGW's 2018 contribution level. In the 5 percent return scenario, PGW would contribute an additional \$9.4M per year on average. The extra required contribution grows steadily from \$0M in 2019 to \$19M in 2038, as larger and larger contributions are required to offset the sustained investment underperformance.

**Figure 4**  
**Increases to PGW's Annual Contribution Under 2 Scenarios, Relative to the Plan Assumption**

*Average annual increase: +\$9.4M for 5% returns and +\$12.2M for asset shock*



**Source:** Aon projections, July 2019  
**Note:** Asset shock assumes a negative 30% return in 2018 followed by 3 years of 12% returns and 7.3% for all later years

## 5 Other Considerations

The PGW Pension Plan maintains a split allocation strategy, a fact which shields it from some investment risks and exposes it to others. Historically, equity and debt markets have proven inversely correlated, allowing the portfolio's decline in one market to be offset by stability in the other. Additionally, because investments are allocated either to fixed income or equities, there are presently no significant liquidity concerns for the Plan in the event that market conditions suddenly worsen and liability needs suddenly increase. However, because investments are spread across only two asset classes, a lack of diversification could pose a risk to the Plan during adverse market conditions.

About 11.1 percent of the Plan's fixed income allocation, or about 3.6 percent of the Plan's total assets, falls below an investment-grade BBB creditor rating,<sup>13</sup> or what investors often call "junk bonds." In comparison, the Plan's fixed income benchmark, the Bloomberg Barclays U.S. Aggregate Bond Index, allocates no assets to fixed income sources below investment-grade. The Plan assumes this additional risk in order to increase its investment returns, as low-grade corporate bonds offer comparatively higher yields. The Controller's Office recommends modifying the Plan's composite fixed income benchmark to include a high-yield bond component. This will allow the Sinking Fund Commission to better evaluate the performance of these high-yield investments and ensure that the additional risk incurred by the Plan continues to be warranted.

The Sinking Fund Commission is currently considering investing in alternative asset classes, including real estate and/or private equity/debt. A recent analysis by the Plan's investment consultant indicated modest return gains from a small allocation to alternatives, ranging from 5 to 10 percent of total assets. Such an allocation would bring the portfolio's expected return in line with the Plan's current assumed rate of return while limiting downside risk through added portfolio diversification. However, an allocation to alternatives would also increase the Plan's costs through higher management fees, negatively impact the portfolio's liquidity, and require a thorough and careful manager selection process. The impact on the portfolio's liquidity, in particular, should be carefully reviewed, given the Plan's strongly negative cash flow.

Regardless of any allocation changes made to the Plan's portfolio, the Controller's Office considers it prudent to lower the Plan's return assumption to better reflect long-term capital market expectations. Aligning actuarial assumptions with market expectations gives the Plan the best chance to grow its funded status and minimize unforeseen risks. A small (less than 10 percent) allocation to alternative asset classes would also offer benefits to the Plan but would introduce additional risks that must be carefully monitored. However, the Controller's Office believes that the benefits of greater returns and enhanced diversification outweigh the risks for the modest allocations being considered by the Sinking Fund Commission.

## 6 Final Recommendations

As detailed in this report, the PGW Pension Plan's negative cash flow represents a considerable risk to the Plan's fiscal health, particularly if investment returns fail to achieve the current assumed rate of return. While important progress has been made towards reducing

---

<sup>13</sup>Per PFM, as of December 31, 2018.



management fees and increasing the Plan's passive investments, we recommend additional measures to mitigate these risks and ensure the Plan's long-term health. The Controller's Office recommends the following:

- Reducing the assumed rate of return to reflect current capital market assumptions and reevaluating on an annual basis;
- Evaluating options to improve the Plan's cash flow;
- Continuing to negotiate lower management fees and consider passive management opportunities;
- Requiring stress testing in the Investment Policy Statement, to be conducted as part of the Plan's annual actuarial valuation. The scenarios should include:
  - Tests that project sustained, less-than-expected asset returns, using portfolio returns that are both fixed and varying from year-to-year; and
  - Tests that measure the impact of market shocks on future cash flows;
- Using the data from the annual stress testing to inform decision-making; and
- Publicly disclosing annual management fees.

By adopting these recommendations, the Sinking Fund Commission can take concrete steps to alleviate future risks and ensure the Plan's ability to meet its responsibility to its pensioners.