BlackRock

Investment and Fiduciary Analysis for Potential Fossil Fuel Divestment

Phase 3

Identification, Analysis and Evaluation of Prudent Strategies for Potential Divestment

Report DRAFT

Prepared for the Comptroller of the City of New York
As Custodian of the Funds of
The Teachers' Retirement System of the City of New York

By BlackRock Sustainable Investing

Executive Summary

- In this report, three potential divestment options are defined and evaluated. These options reflect a range of forward-looking investment hypotheses with respect to the speed and magnitude of the low-carbon transition, and are informed by the results of the Phase 2 transition risk assessment framework.

- These options span from a broad divestment approach, which seeks to divest of any fossil-fuel linked security exposed to current or forward-looking transition risk, to more concentrated options that maintain exposure to companies showing higher transition readiness.

- In providing a range of options, this analysis aims to illustrate considerations and trade-offs associated with potential fossil fuel divestment strategies.

- For each option, three key assessments are leveraged to evaluate the impact of divestment on the NYC TRS portfolio: historical performance, transaction costs, and tracking error (or active risk). Each metric has relative advantages and limitations in explaining the effects of a divestment strategy on the overall NYC TRS portfolio; to understand the overarching implications of each option, each assessment should be considered both individually and relative to other options.

- The historical performance assessment shows that each option would have generated outperformance on both a standalone and portfolio basis versus a broad market benchmark over the past five years. This should be evaluated however in the context of declining oil prices, in particular during the COVID-19 pandemic.

- The hypothetical divestment options reveal transaction cost impacts in the range of [redacted] bps (equity) and [redacted] bps (fixed income) for the broadest option to [redacted] bps (equity) and [redacted] bps (fixed income) for the most concentrated.

- Finally, the tracking error impacts fall in the range of [redacted] bps for the broadest option to [redacted] bps for the most concentrated. These ranges are relatively tight, given the historical performance and market comparisons of "climate-aware" benchmarks, which generally operate between [redacted] bps and [redacted] bps of predicted tracking error.

- These findings suggest that each of the three proposed divestment options could serve as a suitable divestment approach for the NYC TRS portfolio given the 1) historical validation of underperformance of fossil fuel linked securities, 2) historical outperformance of the representative divested portfolios on a risk-adjusted basis, and 3) minimal impact on costs and tracking error under each option.

- Ultimately, deciding between the approaches will depend on NYC TRS' forward-looking view on the low-carbon transition (including assessing the speed and "transition potential" of current fossil-fuel linked securities), the desired frequency for monitoring and updates (a dynamic process that allows for differentiation and improvement), and alignment with the organization's broader climate strategy (including its total climate-related active risk budget and investment strategy).

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I. Overview of Divestment Strategies

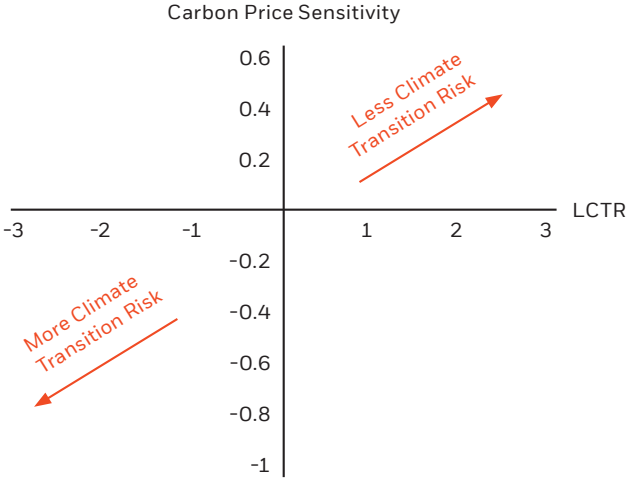
Key Findings

- The analysis conducted in Phase 2, which assessed both current and forward-looking risk of fossil fuel-linked issuers, revealed a distribution of potential transition risk within the NYC TRS' portfolio.
- This distribution, ranging from higher to lower transition risk, provides a starting point to assessing different approaches to mitigating transition risk and informing potential divestment options.
- Different investment views — from accelerated transition risks with low forward-looking potential upside for fossil fuel-linked securities, to more gradual transition risks with greater potential for company transformation — lead to different methodological choices in combining the current and forward-looking transition risk assessments, and ultimately different divestment options.
- In this report, three potential divestment options are defined and evaluated. These options reflect a range of forward-looking investment hypotheses with respect to the speed and magnitude of transition risk as well as the potential future upside for companies taking steps to transition their business practices today.
- Specifically, the options include a broad divestment approach, which seeks to divest of any fossil-fuel linked security exposed to current or forward-looking transition risk today, to a more concentrated option that leaves open the potential for improvement.
- In providing a range of options, this analysis aims to illustrate different considerations and trade-offs associated with potential fossil fuel divestment strategies.

In BlackRock's Phase 2 report "Identification, Analysis and Evaluation of Investment Risks Posed by Fossil Fuel Reserve Owners," two methodologies were introduced for measuring a company's climate transition risk. The first approach leveraged BlackRock's Carbon Price Sensitivity analysis to measure a company's current, point-in-time exposure to climate transition risk. The second approach used BlackRock's Low-Carbon Transition Readiness (LCTR) scores to estimate a company's forward-looking trajectory or preparedness for the low-carbon transition. For a comprehensive assessment of climate transition risk, both of these approaches were combined — current exposure and forward momentum — to generate a two-dimensional distribution of risk within the starting universe of fossil fuel reserve owners in NYC TRS' portfolio.

The Phase 2 analysis revealed a spectrum of transition risk exposure, with companies that ranged from high transition risk (both negative carbon price sensitivity and low forward-looking transition readiness) to relatively low transition risk (positive carbon price sensitivity and high forward-looking transition readiness).

Figure 1: Climate Transition Risk Spectrum



Companies in the bottom left of the matrix assessment are considered those with the greatest concentration of climate transition risk — in other words, the least prepared for the transition to a low-carbon economy. Conversely, those in the top right would be the fossil fuel reserve owners in NYC TRS' portfolio that are more prepared for the transition to a low-carbon economy.

The range of preparedness to both current and forward-looking transition risk presents opportunities to assess different approaches to minimize transition risks through divestment. These different approaches have been distilled down into three potential divestment options, ranging from the broadest material universe to a more concentrated divestment approach that weighs both current and forward-looking potential.

The first divestment option, Option 1: Broad, removes all fossil fuel reserve owners from NYC TRS' portfolio that have at least one negative transition risk assessment — either negative Carbon Price Sensitivity, LCTR, or both. This strategy would divest from [redacted] issuers, representing [redacted] of the portfolio's total market value. The rationale behind divesting from this universe would be the belief that there will be decisive, near-term climate policy action that will generate a low three to five-year investment outlook for a majority of companies owning fossil fuel reserves. Such a scenario would reduce transition prospects for all fossil fuel reserve owners.

The second option, Option 2: Transition Potential, identifies a slightly smaller universe that removes issuers with a negative carbon price sensitivity score as well as any issuer with an LCTR score less than -1.5. However, it would not remove any issuer with an LCTR score greater than 1.5, even if the carbon price sensitivity score is negative. This approach is aligned with a similar investment view as the first option, except with the greater belief that there will be some upside for fossil fuel reserve owners acting today to prepare for the low-carbon transition. This divestment strategy would exclude [redacted] issuers comprising [redacted] of the portfolio.

Lastly, the third option, Option 3: Combined Weighted, would be a divestment list that spatially comprises the riskier half of the two-dimensional Carbon Price Sensitivity-LCTR matrix shown in Figure 1. Relative to the first two options, this strategy would be consistent with the view that global policy action will be more gradual, leaving a more favorable outlook for companies taking the most transition action today. Hence, this approach balances between issuers current and forward-looking transition positioning. It would exclude [redacted] issuers equal to [redacted] of NYC TRS' portfolio.

Table 1: Overview of Divestment Strategies

	Option 1: Broad	Option 2: Transition Potential	Option 3: Combined Weighted
Investment View	Decisive near-term policy action, with low 3 to 5-year forward-looking prospects for current fossil fuel exposed companies.	Decisive policy action, but with transition upside for those preparing for the transition today.	Gradual global policy action, with forward prospects for more companies preparing for the transition today.
Method Description	Issuers with at least one negative transition risk assessment: negative LCTR score, negative carbon price sensitivity, or both.	Issuers with negative carbon price sensitivity and any issuer with an LCTR score below -1.5. Keep all issuers with LCTR above 1.5.	An equal combination of LCTR and carbon price sensitivity. Issuers falling below diagonal separating top half of the graph from the bottom.
Issuer Count	[redacted]		
% Market Value of Total Portfolio			
Weighted Average Carbon Sensitivity	-0.10	-0.14	-0.15
Weighted Average LCTR Score	0.08	-0.17	-0.48

Figure 2: Comparison of Divestment Strategy Coverage

Option 1: Broad

Option 2: Transition Potential

Option 3: Combined Weighted

These options reflect a range of potential forward-looking investment views, and result in options that span [redacted] issuers, or [redacted] of the TRS portfolio in the broadest option, to [redacted] issuers or [redacted] of the TRS portfolio in the more concentrated option. Apart from differences in the overarching investment rationale, the following section outlines BlackRock's approach for analyzing other key considerations of each divestment strategy.

II. Framework for Comparing and Evaluating Divestment Strategies

Key Findings

- Three key assessments are proposed to evaluate each divestment option on the NYC TRS portfolio: historical performance, transaction costs, and tracking error (or active risk).
- In assessing the historical performance of divestment strategies, each option is evaluated on both a standalone and portfolio basis.
- For standalone historical assessments, the divested securities are combined and treated as a separate portfolio. This analysis illustrates how the divested universe performs in isolation versus as part of a broad market portfolio.
- For portfolio historical assessments, divestment options are considered within a larger portfolio context by assessing the hypothetical performance of a portfolio with and without the divested securities. This provides a view into the potential portfolio experience of having made a particular divestment decision.
- Transaction cost analysis provides investors with a sense of the one-time costs of implementing any specific divestment strategy. These costs will vary depending on the size of the divestment universe and will offer insights into future trade execution strategies.
- Finally, tracking error analysis examines the impact to the historical and potential forward-looking deviation from the divested portfolio to its benchmark.
- To assess the potential impacts of divestment across these analytics, an illustrative portfolio based on the MSCI All Country World equity benchmark and Barclays Aggregate Fixed Income benchmark are examined with and without divestment options applied. These proxy exposures are weighted to reflect the composition of the TRS portfolio.
- Each metric has relative advantages and limitations in explaining the effects of a divestment strategy on the overall NYC TRS portfolio; to understand the overarching implications for the three divestment options, each assessment should be considered individually, in combination, and relative to other options.

Evaluating a prudent approach to divestment requires considerations across multiple dimensions: relative historical performance, transaction costs to implement, and projected tracking error to a policy or portfolio benchmark. This allows for a greater understanding of the past, present, and future implications of any divestment option in the context of the broader portfolio.

For the purposes of this analysis, the NYC TRS portfolio will be modeled by broader indices for which historical positions are available. A coverage analysis of the NYC TRS portfolio and its representative indices revealed sufficient overlap between the base portfolio and proxy indices to run diagnostics (90%+ coverage of implicated benchmarks within the proxy benchmarks). As such, representative indices, including a globally diversified public equity benchmark MSCI All Country World Index, and a diversified fixed income benchmark Bloomberg Barclays Aggregate Bond Index are the basis for this divestment analysis across three primary analytic approaches.

Table 2: Representative Indices for NYC TRS Portfolio

Strategy	Index	Weight
Equity	MSCI ACWI Index	60%
Fixed Income	Bloomberg Barclays Aggregate Bond Index	40%

The equity strategy has been collapsed from Russell 3000, MSCI World ex-US Net and MSCI Emerging Markets.

Historical Performance

Analyzing the historical performance of different divestment options allows investors to compare hypothetical portfolios under each divestment option and attribute any divergence in returns (in both the positive and negative direction) to differences in the divestment policy. That is, these analyses help to answer the counter-factual question — "What if we had implemented the divestment strategy?" — from a performance and risk perspective.

Two types of historical performance assessments are considered: first, a "standalone" assessment of the equity performance, consisting of the basket of divested securities by option in isolation, and second a "portfolio" assessment of return that removes each divestment option from the broader set of index securities. These tests simulate historical returns of the representative securities and indices under each divestment policy to allow for comparisons across options. These returns are further studied across different periods of market volatility to understand portfolio resilience and stability.

For both tests, historical performance is assessed across a five year back test, starting in January 2015, and ending in October 2020. This look-back period considers when organizations more widely began implementing fossil fuel divestments (see Phase 1 report), and captures different market and oil cycles to sufficiently gauge the potential impact of different divestment approaches. For the portfolio-level assessment, the representative portfolios are rebalanced monthly with the objective of minimizing ex-ante risk (tracking to the portfolio benchmark). This assumes that if a divestment strategy were pursued, indexed managers would rebalance the remaining constituents to as closely match the index returns as possible. The test is constructed to consider long-only strategies.

While investors can gain an understanding of historical performance of the representative portfolio under various divestment strategies through this test, the model is limited to five years of historical information. This time period constraint encompasses a broad range of market situations and is illustrative of periods of significant volatility (i.e., market selloffs in March – May 2020). However, these tests are backward-looking, and investors benefit from having full hindsight. Ultimately divestment decisions are based on forward-looking views. That said, while the back test is limited in scope, it is still a helpful tool in gauging the strengths of various divestment strategies on the relative implications at the portfolio level.

Transaction Cost

In order to implement a divestment policy, transaction costs are incurred when selling out of screened securities and purchasing new securities. A prudent divestment approach should consider the cost to liquidate positions from which the portfolio is divesting. The transaction cost analysis under each option prices the cost to portfolio to divest from the screened securities under normal market circumstances. This measure — scaled to basis of the portfolio net asset value — provides clarity on the instantaneous implication of each divestment option.

There are a variety of factors that can affect the transaction cost of a divestment option. The first is volume — trading out of a greater number of securities will likely lead to a greater transaction costs given that more transactions are occurring. For this reason, the broadest divestment options will likely be associated with higher transaction costs. Second, different attributors are considered when calculating transaction cost: fixed costs and market impacts. Fixed costs remain the same for a security irrespective of the trade amount, while market impact costs vary based on the size of the trade and the liquidation time horizon. Market impact is also a function of the position's market risk and forecasted trading volume (ADV), meaning riskier assets will have a larger market impact cost and assets with larger ADV estimates will have smaller market impact costs.

This analysis considers only the point-in-time costs associated with screening securities from the NYC TRS portfolio; costs are not calculated over a liquidation horizon. These assessments provide a view into the costs associated with executing any divestment option and are calculated as a percentage of the equity and fixed income portfolios separately.

Tracking Error

A divestment policy will impact the deviation of portfolio returns from its policy benchmarks. The policy benchmarks used for this analysis are the similar in composition as those used in the management of the NYC TRS portfolio. Hence, the tracking error compared to these references helps provide insight into how each divestment strategy would affect portfolio performance. In general, as the divestment universe growth larger, it becomes more difficult to match the risk profile of any particular benchmark. An assessment of projected tracking error of each divestment options to the representative indices provides insight into the future risk implications of divestment. To minimize tracking error, each evaluation assessment reinvests divested capital by re-optimizing to the benchmark. This approach is assumed to be pursued in an index-managed portfolio, for example.

Tracking error is derived from the active returns of the proxy portfolio under each divestment strategy and compared to the base portfolio. Specifically, the tracking error of each divestment strategy is the standard deviation of the active divested portfolio return versus the portfolio benchmark return on a monthly basis over the historical performance time period. While the active risk can change over time, the tracking error metric is meant to summarize the broad deviation of the two portfolios.

This metric has its limitations in describing the relative differences between a portfolio under a divestment strategy and its base portfolio. While tracking error can assess the high-level differences between the two, it does not address specific point-in-time deviations which may be helpful to assess (i.e., point-in-time deviation during times of significant market volatility, such as March 2020). That is, tracking error is meant to be a summary statistic. For example, if the tracking error of a divestment strategy to its base portfolio is 10 bps, that does not mean that at every point in a time series of returns the divested portfolio will be 10bps away from the base portfolio.

Table 3: Summary of Evaluation Assessments

	Historical Performance	Transaction Cost	Tracking Error
Assessment	Divested portfolio returns through time both on a standalone basis (looking at performance of only divested securities) as well as within portfolio context (removing securities within broader exposure).	Cost in portfolio basis points to implement divestment strategy. This considers the one-time offs of liquidating the divestment universe from the portfolio through both fixed costs and costs due to market impacts.	Difference in excess returns between divested portfolio and base portfolio. This can be done by using backward-looking assessments of returns of the hypothetical portfolio ("ex-post") and forward-looking return assessments and projected deviation of the hypothetical portfolio as compared to the benchmark ("ex-ante"). This provides a lens into the potential difference between divested option and the benchmark overtime.
Key Insights and Considerations	This assessment examines the counter-factual question of what would have happened if divestment policy was pursued in the past. It allows for a comparison of relative performance of divestment strategies versus proxy exposures. The results are presented starting in 2015, and benefit from hindsight.	Transaction costs provide point-in-time assessment of cost to trade of out divestment options. These can be considered as upper bound costs and can be reduced through targeted trade-execution strategies and consultation.	Tracking error providers insight into adherence to benchmark from a risk perspective. It is a broad summary statistic over a term period — using monthly returns for the past five years. Due to this, the tracking error may range from period to period, and deviate depending on the market conditions.

III. Comparison Analysis: Results and Considerations

Key Findings

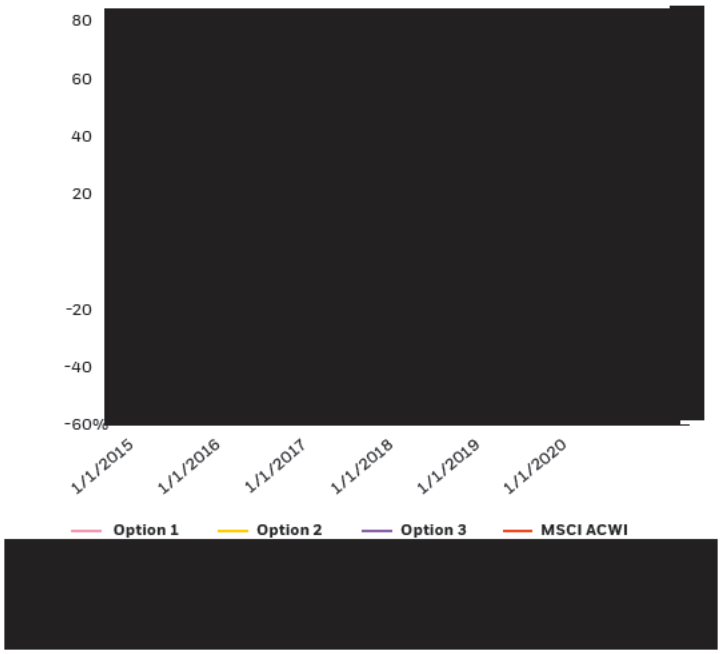
- For the historical performance assessment, each option shows outperformance on both a standalone and portfolio basis.
- The standalone performance analysis shows the universe of screened securities has consistently underperformed the broader market over the past five years, implying that divestment would have likely boosted portfolio performance. This is validated in the portfolio performance analysis, where each divestment option outperforms the proxy benchmark on an absolute and risk-adjusted basis.
- For any divestment approach, implementing each option would result in transaction costs incurred on the portfolio while trading out of the excluded security list and purchasing new securities; the transaction costs associated with each divestment option vary from [redacted] bps round trip (or the selling of divested securities and purchase of new securities) for equity and [redacted] round trip for fixed income.
- Under each divestment option, the risk implications are relatively muted. The tracking errors across options, on both an ex-post and ex-ante basis, show little deviation from the policy benchmark, given the relatively small size of the exclusion lists and the ability to "re-optimize" the portfolio to market exposures on a rolling basis.
- These findings suggest that each of the three proposed divestment options could serve as a suitable approach for the NYC TRS portfolio given the 1) historical validation of underperformance of fossil fuel linked securities, 2) historical outperformance of the representative divested portfolios, and 3) minimal impact on risks and costs under each option.
- That said, there are relative differences between approaches in both risk and cost implications.
- Choosing between the various approaches will depend on NYC TRS' forward-looking view on the low-carbon transition, the desired frequency for monitoring and updates, and alignment with the organization's broader climate strategy.

Assessment of Divestment Options

Leveraging the three-part assessment framework, each divestment option is compared against one another and to the policy benchmark. To begin, the standalone historical performance of the screened securities in each option is compared to that of a benchmark (MSCI ACWI) to provide greater clarity regarding the implications of implementing each divestment policy. This assessment reveals consistent underperformance in the past five years (beginning January 2015) of the baskets of screened securities as compared to MSCI ACWI. This trend is particularly exacerbated in March – June 2020, when Coronavirus-related market selloffs particularly affected the oil and gas and energy sectors (companies that are traditionally fossil fuel dependent, many of which have ties to fossil fuel reserves).

Over this time period, the MSCI ACWI index returned a cumulative 52.9%, whereas the baskets of screened securities returned between [redacted]. The basket of divested securities in Option 1 saw relatively better performance as compared to the other divested securities, but nonetheless still underperformed relative to the benchmark.

Figure 3: Cumulative "Standalone" Historical Equity Performance of Divestment Options vs Global Market



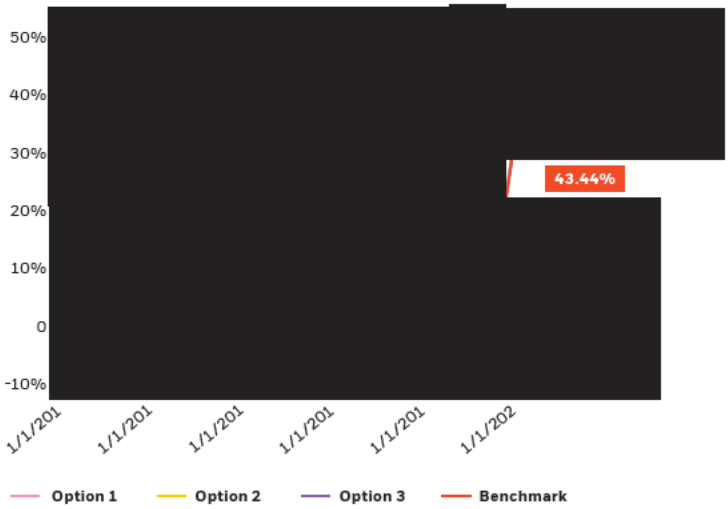
To understand the relative return of the divestment options, an illustrative portfolio (60% equity — MSCI ACWI, 40% fixed income — Bloomberg Barclays Fixed Income Aggregate) is constructed to serve as a proxy for the NYC TRS portfolio. The divested representative portfolios are then constructed by removing the screened securities under each option and reoptimizing the remaining constituents to closely match the risk characteristics of the benchmark portfolio.

Similar to the standalone analysis, the results of the back test show broad outperformance of the divested representative portfolios as compared to the base portfolio with minimal impact to tracking error. On both a cumulative and an annualized return basis, each divested portfolio consistently returns more than the benchmark. For cumulative return, the benchmark portfolio posts a 43.4% return at the end of the back test whereas the divested portfolios post between [redacted] over the same time horizon. Additionally, the divested portfolios post higher historical returns than the benchmark on a 1-, 3-, and 5-year annualized basis. The benchmark portfolio posts a 1-year annualized return of 12.9% as compared to the range of [redacted] for the divested portfolios; the 3-year benchmark portfolio return is 8.6% as compared to [redacted] for the divested portfolios; lastly, the 5-year annualized return of the benchmark portfolio is 9.4%, less than the range of [redacted]% for the divested portfolios.

Ultimately, to implement any divestment strategy a one-time cost will be incurred on the NYC TRS portfolio. The broadest investment option carries the largest transaction costs ([redacted] bps for equity and [redacted] bps for fixed income, round trip) and the narrowest option carries the smallest associated costs ([redacted] bps for equity and [redacted] bps for fixed income, round trip). This broadly falls in line with the trend that divesting from more securities (i.e., implementing the broadest option) will carry higher implementation costs given the volume of securities traded in the execution of such a strategy.

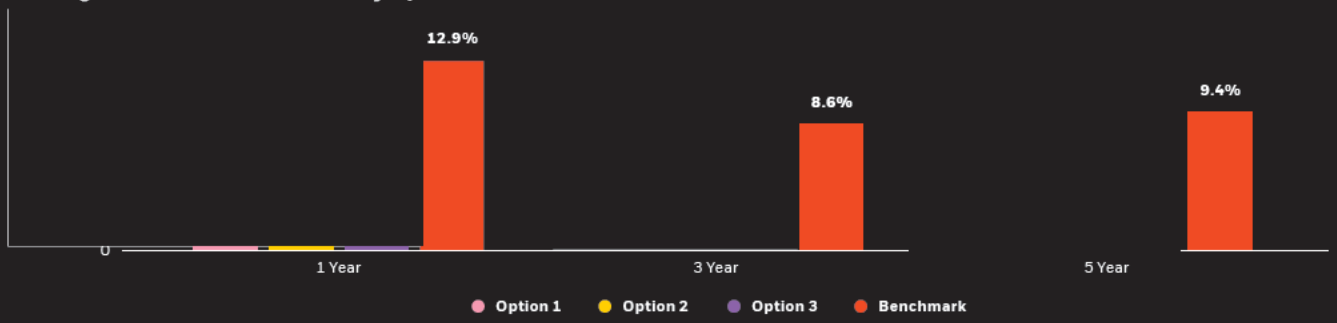
Divesting from securities in the base portfolio will have implications from a tracking error perspective. In general, divesting from more securities may lead to an increased tracking error because the characteristics of the adjusted portfolio are more different than those of the base. This trend is broadly followed in the NYC TRS analysis: the ex-post tracking error ranges from [redacted] bps (broadest option) to [redacted] bps (narrowest option), and the ex-ante tracking error ranges from [redacted] bps (broadest option) to [redacted] bps (narrowest option). Still, these tracking errors are largely muted across options and demonstrate that the divested portfolios could mirror closely the policy benchmarks of the NYC TRS portfolio.

Figure 4: Cumulative Returns by Option vs Combined Benchmark



The figure above represents the cumulative returns of hypothetical portfolios under a variety of divestment options and are not indicative of real returns. Hypothetical portfolios are constructed as 60% MSCI ACWI / 40% Bloomberg Barclays Fixed Income Aggregate before divested securities are screened out under each divestment option. Cumulative returns are expressed as a percentage of the portfolio at the start date of the analysis (1/1/2015) on a rolling basis.

Figure 5: Annualized Returns by Option



The figure above represents the annualized returns of hypothetical portfolios under a variety of divestment options as compared to a benchmark portfolio and are not indicative of real returns. Hypothetical portfolios are constructed as 60% MSCI ACWI / 40% Bloomberg Barclays Fixed Income Aggregate before divested securities are screened out under each divestment option. Annualized returns are expressed as of the end date of the analysis (9/30/2020).

Table 4: Summary Evaluation Results by Option

	Option 1: Broad	Option 2: Transition Potential	Option 3: Combined Weighted
Cumulative Performance Jan 2015 – Sep 2020, Bench: 43.4%			
1 Year Bench: 12.9%			
3 Year Annualized Bench: 8.6%			
5 Year Annualized Bench: 9.4%			
Risk Adjusted Return 5-year annualized excess return divided by ex-post tracking error			

Transaction Cost: Equity	*One Way* [redacted] bps	*Round Trip* [redacted] bps	*One Way* [redacted] bps	*Round Trip* [redacted] bps	*One Way* [redacted] bps	*Round Trip* [redacted] bps
Transition Cost: Fixed Income	*One Way* [redacted] bps	*Round Trip* [redacted] bps	*One Way* [redacted] bps	*Round Trip* [redacted] bps	*One Way* [redacted] bps	*Round Trip* [redacted] bps

Tracking Error: Ex-Post			
Tracking Error: Ex-Ante			

With overall ranges presented, each option is examined in more detail:

Option 1: Broad
Decisive near-term policy action, with low 3- to 5-year forward-looking prospects for current fossil fuel exposed companies

The broadest of all the options, Option 1 screens issuers with at least one (or both) negative transition risk assessment. While implementing such a divestment strategy would incur the largest transaction costs at [redacted] bps for equity and [redacted] bps for fixed income (largely driven by the volume of securities in the NYC TRS portfolio being screened), the illustrative divested portfolio outperforms all other options and the benchmark portfolio on both a standalone cumulative and a standalone annualized return basis. Given that Option 1 results in a portfolio most different from the base portfolio, the tracking error is also the largest in this approach at [redacted] bps ex-post and [redacted] bps ex-ante. Considering the larger tracking error, this illustrative portfolio would provide the lowest risk adjusted return across options ([redacted] versus [redacted]

This option would be suitable in the case that NYC TRS does not believe that there will be any upside associated with investing in securities well positioned for the transition to a lower carbon economy — particularly if NYC TRS has low conviction that such transformations are likely. Under this scenario it is likely that future updates to this analysis would be less frequent. Taking this broad divestment approach would imply that the bulk of the NYC TRS climate management strategy will be focused on managing downside protection as opposed to capturing upside potential.

Option 2: Transition Potential
Decisive policy action, with transition upside for those taking transition action today

The second proposed option for divestment screens out securities with low transition potential by divesting from issuers with negative carbon price sensitivity and any issuer with an LCTR score below -1.5. This approach leaves issuers in the NYC TRS portfolio that are projected to be relatively more prepared for the transition to a lower-carbon economy than relevant issuer peers within the same sector. The illustrative portfolio under this option posts positive active returns ([redacted] cumulative as opposed to 43.4% for the benchmark portfolio) while still adhering closely to the policy benchmark of the portfolio ([redacted] bps ex-post, [redacted] bps ex-ante). Notably, the 3- and 5-year annualized returns of the divested portfolio under Option 2 are similar to those of the divested portfolio under Option 1 — however lower active risk produce greater risk adjusted returns ([redacted] than that of the Option 1 illustrative portfolio.

This divestment approach would fit into a larger climate strategy to monitor issuers that show potential for upside under a transition to a lower carbon economy. As a result, the analysis would have to be updated as company commitments and the policy landscape continue to evolve.

Option 3: Combined Weighted
Gradual global policy action, with favorable forward prospects for companies acting today

Option 3 is the most concentrated of the divestment options, taking into consideration a combined assessment of LCTR and Carbon Price Sensitivity. The illustrative divested portfolio for Option 3 posts the smallest positive excess returns across divestment options (1-year annualized return [redacted] 3-year annualized return [redacted] 5-year annualized return [redacted] but still consistently outperforms the benchmark portfolio on a historical performance basis. Due to the lower volume of screened securities, the transaction cost to implement Option 3 as an investment strategy is the lowest of the divestment options ([redacted] bps for equity and [redacted] bps for fixed income, round trip). The tracking error for the Option 3 representative portfolio is the lowest of the three options ([redacted] bps ex-post and [redacted] bps ex-ante), which is in line with expectations. Hence, on a risk adjusted return basis, Option 3 illustrative portfolio matches the Option 2 illustrative portfolio ([redacted]

Option 3 is suitable with a forward-looking view that the transition to a lower carbon economy is imminent, and that there are significant investment opportunities associated with such a transition. This approach isolates the list of divested securities to only issuers that carry significant transition risk, leaving issuers in the NYC TRS portfolio that are linked to fossil fuel reserves but have strong point-in-time carbon price sensitivity or go-forward momentum in decarbonizing their business practices (or both). This divestment option would be the most dynamic of the three, leading to refreshes of this analysis as companies continue to change their carbon positioning and make net-zero commitments. That said, the greater turnover of the divestment list, the greater the likely transition costs of the strategy, relative to other approaches. Such a strategy may be part of a broader NYC TRS climate action plan focused on both mitigating climate risks and seeking climate opportunities.

Summary and Considerations

Leveraging the current and forward-looking transition risk analytics conducted in Phase 2, this report distills a set of three potential divestment options out of a wide range of available strategies. The three options reflect varying forward-looking investment hypotheses about the speed and magnitude of the low-carbon transition and span from a more wide-reaching exclusion list to one that is more concentrated.

To compare the portfolio impacts of each strategy, the report uses three key assessments: historical performance, transaction costs, and tracking error (or active risk). To assess historical performance, each divestment option is evaluated on a standalone basis as well as within a broader portfolio context. The first lens provides insight into how the divested companies have historically performed in isolation while the second reveals how divestment would have historically impacted an overall representative portfolio. Transaction cost analysis provides investors with a sense of the one-time costs of implementing any specific divestment strategy, which will vary depending on the size of the divestment universe. Finally, tracking error analysis is conducted to examine the impact of divestment on the portfolio's deviation from its benchmark.

Results from the historical assessment show that the fossil fuel linked securities of each divestment option have underperformed the broader investment market over the last five years. Furthermore, the three divested portfolios have each outperformed their benchmarks over the same time period. From a transaction costs perspective, the divestment strategies range from [redacted] basis points for equity trading in the concentrated option to [redacted] basis points for the broad approach. Lastly, the active risk implications are relatively muted for all three divestment options. Tracking errors, on both an ex-post and an ex-ante basis, show deviation from the policy benchmark in the range of [redacted] basis points, given the relatively small size of the exclusion lists and the ability to "re-optimize" the portfolio to market exposures on a rolling basis.

Overall, the relatively minimal impact on historical performance, transaction costs, and active risk in all three of the reviewed may serve as a suitable divestment strategy. In deciding between the strategies, NYC TRS may consider the following:

1. **Investment Thesis**: The first priority is to ensure the chosen divestment strategy is rooted in an ex-ante, forward-looking investment hypothesis about the future of the low-carbon transition. In particular, what will be the speed and magnitude of the low-carbon transition? Is a near-term scenario of decisive, far-reaching global climate policy action more probable than one where climate action is more gradual and limited? Will there be potential for some fossil fuel reserve owners to successfully transition their business models while avoiding financial harm? How are fossil fuel reserve owners positioned relative to other companies in the investment universe? Different transition pathways will have different investment implications, which will in turn depend heavily on an issuer's current transition risk exposure and forward-looking transition preparedness. Therefore, a strategy that is consistent with NYC TRS' investment outlook is a first priority, pending appropriate back-test validations like those that have been conducted for the three reviewed strategies.
2. **Dynamic Updates**: Second, and closely related, is the need to determine the dynamic nature of refreshing the exclusion list. Accurately predicting the future of the low-carbon transition is neither simple nor guaranteed. Therefore, in light of an ever-evolving macro outlook and climate policy landscape, there may be a need to revisit the underlying investment thesis and divestment policy over time. However, even without an updated hypothesis or policy, there will still be a need to refresh transition risk analytics, which could lead to companies moving on or off of the portfolio's exclusion list. For example, divestment strategies looking to capitalize on transition opportunities (i.e. Options 2 and 3) may need to refresh transition risk analytics more frequently to account for companies that change their climate positioning and transition efforts in real time.
3. **Overarching Climate Strategy**: Lastly, it is important to consider how the chosen divestment approach will fit within the organization's broader climate strategy and risk budget. Divestment is just one mechanism for managing the climate risks inherent in the transition to a low-carbon economy. As a result, a holistic climate strategy should also consider divestment in the context of active engagement efforts with corporates and climate-positive investment exposures. Can engagement achieve meaningful and timely change in certain companies with substantial climate risk? Is there an engagement plan for issuers with high carbon intensity and climate transition risk that don't own fossil fuel reserves? In addition to climate risk management, is the portfolio also targeting the investment opportunities of the low-carbon transition? Depending on the broader climate strategy, for example in one that allocates risk budget toward low-carbon solutions, may inform the level of acceptable active risk assumed by the divestment approach.

The three presented options each show historical resilience and low-relative impacts on the plan portfolio risk and diversification. Anchoring to the above considerations will enable NYC TRS to close in on the most suitable divestment strategy and path forward.