



RETIREMENT BOARD CALENDAR SHEET
Retirement Board Meeting of October 14, 2020

To: Retirement Board

Through: Jay Huish 
Executive Director

William J. Coaker Jr., CFA, MBA
Chief Investment Officer

Kurt Braitberg, CFA, CAIA
Managing Director, Public Markets

From: Andrew Collins
Director of ESG Investing

Adrienne von Schulthess
Security Analyst, ESG Investing

Date: October 14, 2020

Agenda Item:

Annual ESG Update

Background:

At the June 20, 2018 Investment Committee meeting Staff presented a strategic plan for the ESG program.

Staff presents an annual update on the ESG program, including an update on all three pillars of the SFERS ESG Platform, which covers engagement, ESG in investment management, and communication & collaboration. As part of this update, Staff presents a report on the performance impact of historical investment exclusions and an analysis of the carbon footprint of the SFERS portfolio.

Recommendation:

This item is for discussion only.

Attachment:

- Staff Presentation – 2020 SFERS ESG Platform Update
- Staff Memorandum – Fund Performance Impact of SFERS Investment Restrictions
- Staff Memorandum – Analysis of Carbon Footprint of SFERS Portfolio



SFERS

San Francisco Employees' Retirement System

San Francisco Employees' Retirement System
Environmental, Social, and Governance (ESG)
Platform & Strategic Plan – 2020 Update

Andrew Collins, Director of ESG Investing
October 14, 2020

SFERS ESG Platform | 2020 Update

Beliefs

Fundamentally SFERS believes that ESG factors can have a material impact on the value of companies and securities, as well as affect the macroeconomic environment more broadly. The consideration of these factors alongside traditional financial factors should, therefore, provide a better understanding of the risk and return characteristics of investments. SFERS acknowledges that the relevance of particular ESG issues may differ and vary in degree across companies, sectors, regions, asset classes and over time. Therefore, SFERS takes a differentiated and materiality-based approach to integrating ESG considerations into its investment process.

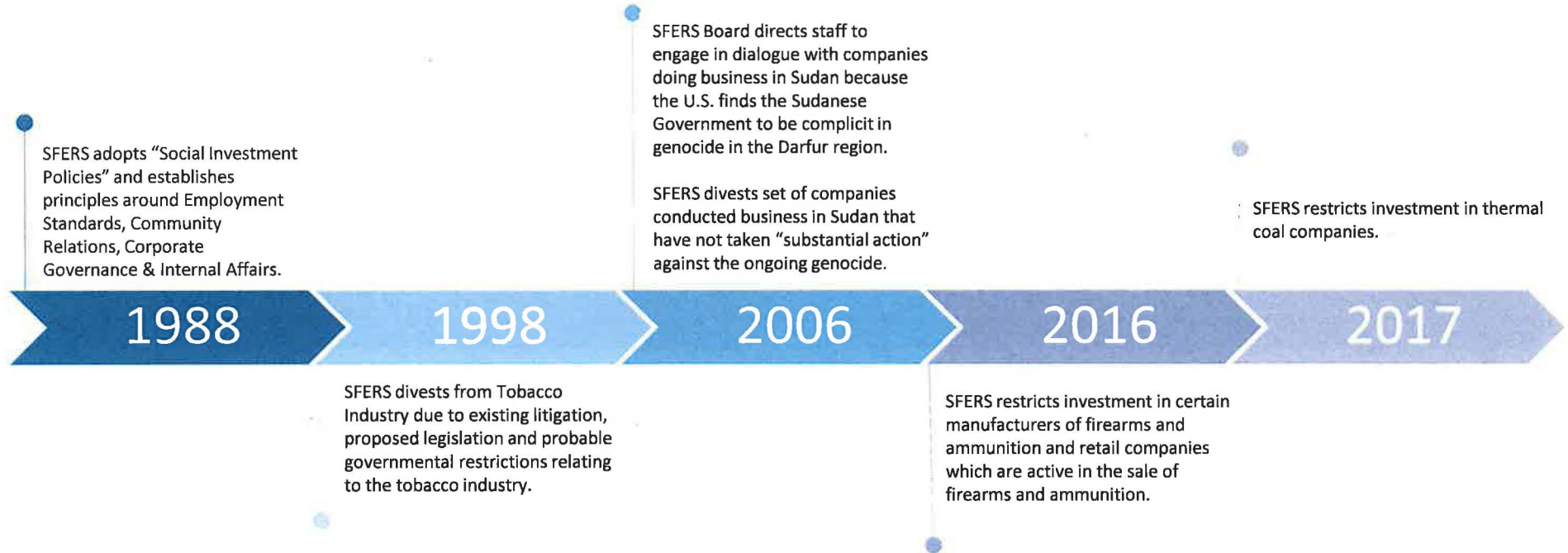
SFERS is committed to incorporating ESG factors into its management of the Plan in a manner that is consistent with the Retirement Board and Staff's fiduciary responsibilities to act in the best interests of the members, retirees, and beneficiaries of the Retirement System and consistent with SFERS' role as a prudent, long-term investor.

History

SFERS' ESG journey began in 1988 when SFERS first adopted "Social Investment Policies" which eventually evolved into our current ESG Policy. Over the years SFERS has taken steps to divest from tobacco, Sudan, firearms, and thermal coal. Beginning in 2017, SFERS began a more integrated and formalized approach to ESG investing. SFERS became a signatory to the Principles for Responsible Investing (PRI) and joined the Ceres Investor Network. The next year SFERS hired its first Director of ESG Investing, dedicated \$1 billion to low carbon investing, introduced a Climate Transition Risk Framework, and began a partnership with the 30 Percent Coalition to advocate for greater board representation from women and people of color. Most recently, in March 2020, to address the mounting investment risks related to climate change, SFERS announced the ambition that its investment portfolio be net zero emissions by 2050.



SFERS ESG Platform | 2020 Update



SFERS ESG Platform | 2020 Update

SFERS establishes dedicated ESG department and adopts Three-Pillar ESG Platform.

SFERS adopts Six Strategies to Mitigate Climate Risk and launches Climate Transition Risk Framework, resulting in a multi-year engagement with 24 oil & gas companies and directs to its managers to divest and restrict future investment in seven other “high-risk” oil & gas companies.

SFERS joins 30 Percent Coalition, Climate Action 100+, CERES Carbon Asset Risk Working Group, Principles for a Responsible Civilian Firearms Industry, and Task Force on Climate-related Financial Disclosure (TCFD).

SFERS begins integration of ESG considerations into manager due diligence, selection, and monitoring process in Public Markets, Real Assets, and select Private Equity investments.

2018

2019

SFERS completes inaugural PRI Reporting.

SFERS integrates ESG considerations into manager selection and due diligence processes across asset classes.

SFERS begins engagement efforts with Oil & Gas Watch List companies, co-files shareholder resolution at BP annual meeting that receives 99% support, and urges companies receiving 10-50% of revenues from thermal coal to communicate plans for exiting the sector.

SFERS “adopts” three companies as part of 30 Percent Coalition and engages around board gender diversity.

SFERS begins engagement with utilities companies identified through a Utilities Climate Transition Risk Framework.

SFERS updates its Environmental, Social, and Governance (ESG) Procedures and Investment Policy Statement to reflect evolution of ESG practices.

SFERS ESG Platform | 2020 Update

SFERS announces ambition that the Trust be Net Zero Emissions by 2050 in line with the objectives of the 2015 Paris Agreement in limiting global temperature increase to 1.5°C. Staff begins development of a Climate Action Plan.

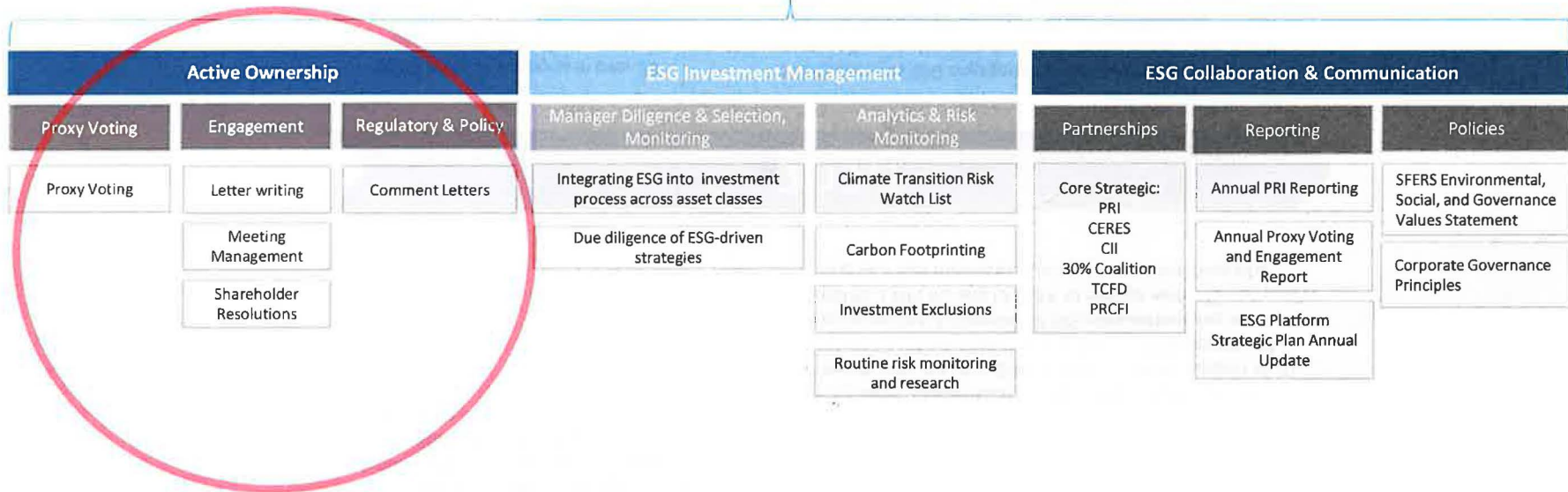
SFERS votes against 130 Directors where Board gender diversity was less than 20%. SFERS continues support of 30 Percent Coalition, engaging with four companies around improving board diversity. SFERS joins partnership with CalSTRS, CalPERS, and LACERA to engage with ~75 companies in the S&P 500 that lack racial or ethnic board diversity.

2020

SFERS leads or supports in over 20 engagements with public oil & gas companies and utilities companies around climate transition risk, making progress on target setting, disclosure, along with political spending and lobbying activities.

SFERS deepens ESG engagement with external managers across all asset classes including in depth conversations with key relationships within Private Equity and Absolute Return programs. SFERS begins deep dive engagement with external managers around climate transition risk through due diligence questionnaire and dialogue with Public Equity and Fixed Income managers.

SFERS ESG Platform



SFERS

San Francisco Employees' Retirement System

Active Ownership

Proxy Voting	Engagement	Regulatory & Policy
<p>2019-2020 Progress</p> <ul style="list-style-type: none"> Updated SFERS Proxy Voting Guidelines in February to further strengthen voting on Board diversity, generally support additional human capital and pay gap proposals, tighten compensation analysis in equity compensation plans, and several other updates. SFERS supported key shareholder proposals on climate risk at JP Morgan Chase, UPS, Phillips 66, Ovintiv (formerly EnCana), Exxon, and Chevron. Based on SFERS updated Proxy Voting Guidelines, SFERS voted against 130 Directors due to lack of gender diversity on the Board and supported shareholder proposals for additional disclosures on diversity and gender pay gaps at 6 companies. Approximately 32% of shareholder proposals that went to vote were on E&S topics (as opposed to governance) compared to >40% during 2019; while there was a decline in proposals going to vote (as well as those submitted) there continued to be significant withdrawals of E&S shareholder proposals showing willingness for companies to constructively engage with shareholders SFERS voted against three Exxon directors, including CEO Darren Woods for failure to adequately address E&S risks, including climate change risks. SFERS voted in favor of an independent board chair and in support of a political spending and lobbying proposal. SFERS voted against 22% of say-on-pay proposals (compared to ~17% in 2019 and ~14% during 2018) indicating more scrutiny of executive compensation. Staff continued to be involved in tracking key votes and conducting independent research. 	<p>2019-2020 Engagement Campaigns</p> <p>Oil & Gas, Climate Risk</p> <ul style="list-style-type: none"> Strengthened participation in Climate Action 100+ and Ceres Carbon Asset Risk (CAR) Working Group, joining, leading, or supporting over 15 collaborative engagements for Oil & Gas companies. Engaged with all 12 companies of SFERS Climate Transition Risk Priority Watch List via letter writing. <p>Utilities, Climate Risk</p> <ul style="list-style-type: none"> Engaged with five Utilities on their climate transition risk plans coordinating with Ceres CAR and Climate Action 100+ on engagements. <p>Gender Diversity</p> <ul style="list-style-type: none"> Member of 30% Coalition and participant in engagements with companies with low board gender diversity; engaged with four (4) companies, three of which appointed additional women to their Board. <p>Firearms Retail Practices</p> <ul style="list-style-type: none"> Signatory to Principles for a Responsible Civilian Firearms Industry and engaged with domestic retailers around firearm retail practices <p>Other Engagement</p> <ul style="list-style-type: none"> Engaged opportunistically with companies around topics such as political spending and lobbying, response to the Covid-19 crisis, and vehicle fuel economy standards. 	<p>2019-2020 Policy Advocacy</p> <ul style="list-style-type: none"> Signatory to Global Investor Statement to Governments on Climate Change, advocating climate action from G7 leadership. Supporter of Taskforce on Climate-Related Finance Disclosures (TCFD) framework for corporate, asset manager, and asset owner disclosure of climate risks. Signatory to the Investor Expectations on Corporate Climate Lobbying Submitted public comment to the Department of Labor's "investment duties" rule under ERISA which contained rulemaking around consideration of ESG factors.

SFERS ESG Platform | 2020 Update

SFERS ESG Platform



ESG Investment Management

Manager Diligence & Selection, Monitoring

2020 Manager Due Diligence

- Continued ESG monitoring of public equity and fixed income managers' ESG practices through biannual due diligence questionnaire process; analyzed and evaluated responses to identify opportunities for engagement with managers and identify and benchmark best practices.
- Initiated ESG engagement effort with core managers in the Private Markets and Absolute Return portfolios to better understanding how ESG factors are integrated into investment management practices and firm operations.
- As part of the Net Zero by 2050 Climate Action Plan sent due diligence questionnaires on climate risk to all public equity and fixed income managers to initiate a dialogue on how climate risk considerations are integrated into SFERS' portfolios.
- Continued to embed ESG considerations in the due diligence process for the selection of SFERS' managers across, and unique to, each asset class; considering ESG impacts at (1) asset manager firm level, (2) investment strategy level.
- Incorporated ESG considerations into all outgoing RFPs.
- Continued to help investment teams to seek out ESG-specific strategies that meet SFERS risk/return profile, bringing these opportunities to SFERS and supporting underwriting process when moving forward to an investment recommendation.

Analytics & Risk Monitoring

2020 ESG Analytics & Risk Projects

- Refreshed public markets exposure to upstream oil & gas with SFERS Climate Transition Risk Framework
- Developed quantitative framework for assessing climate risk in utilities sector to prioritize companies for engagement.
- Conducted performance monitoring of portfolio with respect to SFERS' investment exclusions on tobacco, thermal coal, Sudan, firearms, and certain oil & gas companies; results continue to imply a small but negative cumulative impact to the performance of the total fund since 1998.
- Continued to utilize MSCI ESG Research to enable portfolio-wide ESG scoring, carbon footprinting, and ESG risk measurement.
 - Overall weighted average carbon intensity of the public equity portfolio is 36% less than its benchmark and has declined 55% over the past 10 years.
- Continuing to explore next generation ESG analytics including NLP, machine learning solutions to monitor portfolios for ESG-related incidents, risks, and opportunities on a real-time basis.
- Investigating tools for portfolio-wide scenario modeling and stress testing for different climate scenarios to assess risk and resilience of the portfolio over near, medium, and long-terms.
- Investigating tools to assess the physical climate risk exposure for key investments across the plan.

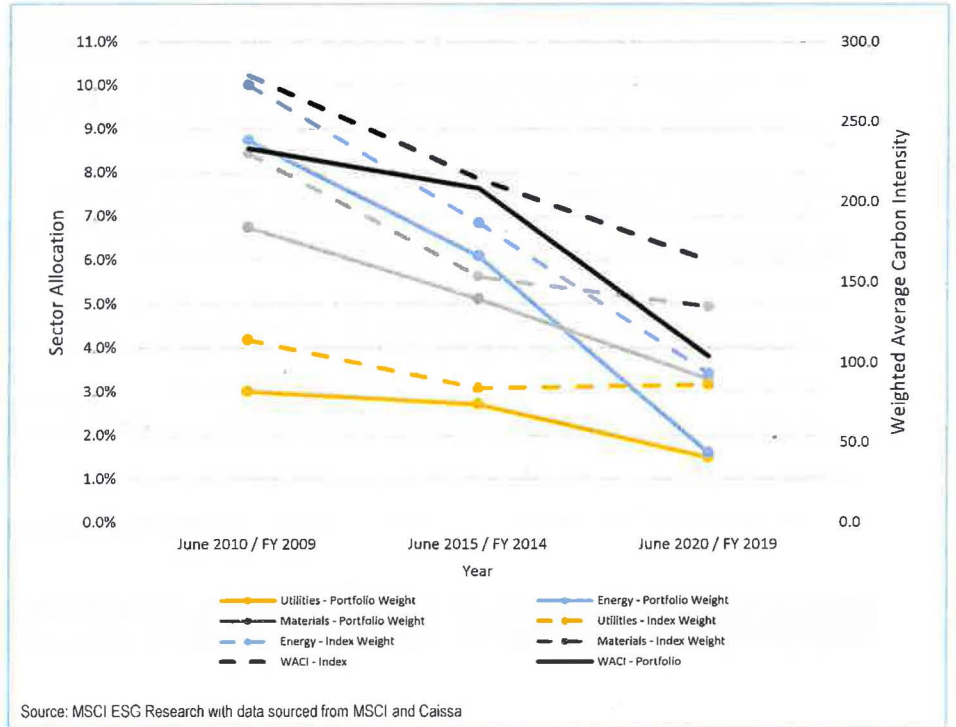
SFERS ESG Platform | 2020 Update

SFERS Weighted Average Carbon Intensity, Public Equity, as of June 30, 2020

SFERS Public Equity vs MSCI ACWI IMI	Portfolio Weight	Active Weight*	t CO2e / \$M Sales		Percentage Attribution			Total
			Portfolio Wtd Ave Intensity	Benchmark Wtd Ave Intensity	Sector Allocation	Stock Selection	Interaction	
Financials	9.7%	-3.5%	11.9	15.3	3.2%	-0.3%	0.1%	3.0%
Consumer Staples	6.0%	-1.7%	58.0	60.1	1.1%	-0.1%	0.0%	1.0%
Consumer Discretionary	11.2%	-0.7%	39.8	36.8	0.5%	0.2%	0.0%	0.7%
Real Estate	2.5%	-1.3%	91.9	114.8	0.4%	-0.5%	0.2%	0.0%
Industrials	9.8%	-0.5%	117.9	122.8	0.1%	-0.3%	0.0%	-0.2%
Communication Services	9.9%	1.3%	17.8	22.1	-1.1%	-0.2%	0.0%	-1.4%
Health Care	16.4%	3.5%	24.5	25.1	-2.9%	-0.1%	0.0%	-3.0%
Energy	1.6%	-1.9%	547.9	506.8	-3.9%	0.9%	-0.5%	-3.5%
Materials	3.3%	-1.7%	892.4	770.7	-6.2%	3.7%	-1.2%	-3.8%
Information Technology	28.2%	8.1%	34.4	33.7	-6.4%	0.1%	0.0%	-6.3%
Utilities	1.5%	-1.7%	1,857.0	2,129.0	-20.4%	-5.3%	2.8%	-22.8%
Total	100%		103.9	163.2	-35.7%	-1.9%	1.4%	-36.2%

Source: MSCI ESG Research

SFERS Weight Average Carbon Intensity, Public Equity vs. Benchmark, 2010-2020

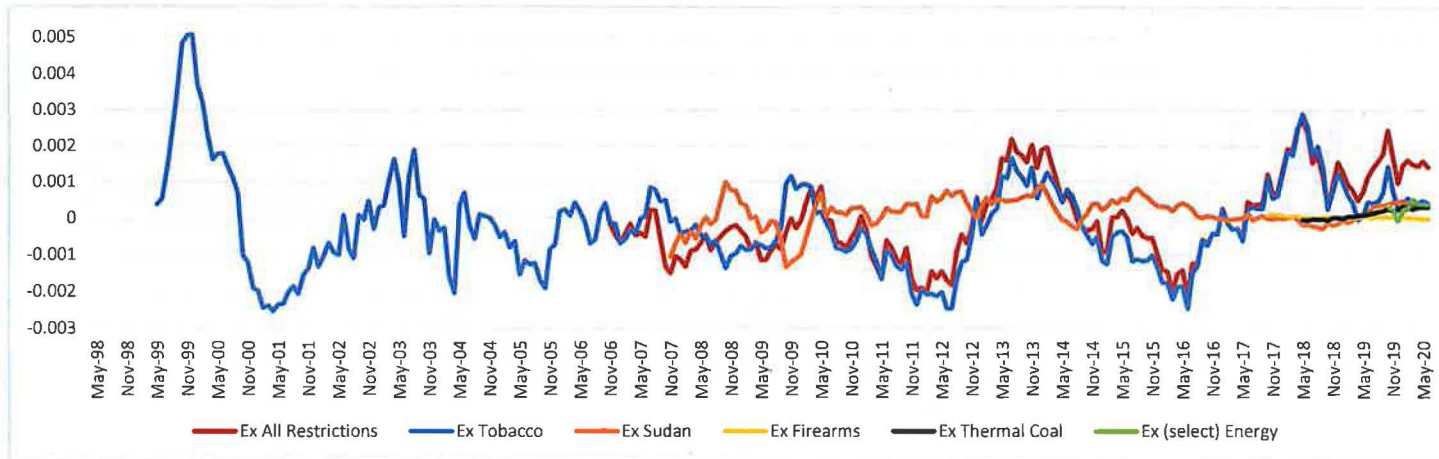


SFERS ESG Platform | 2020 Update

Custom Index Relative Returns and Volatility – Since Inceptions

Index Name	Relative Restriction Wt.*	Relative Cumulative Return**	Relative Annualized Return**	Relative Annualized Volatility**	Impact through 6/30/20	YoY Impact FY19 - FY20
ACWI IMI ex Tobacco	0.35%	-1.65%	-0.02%	+0.04%	-\$88.0m	+\$0.9m
ACWI IMI ex Sudan	0.07%	+0.42%	+0.02%	-0.01%	+\$29.2m	+\$3.9m
ACWI IMI ex Firearms	0.01%	+0.02%	+0.00%	0.00%	+\$1.5m	+\$0.0m
ACWI IMI ex Thermal Coal	0.06%	+0.04%	+0.01%	0.00%	+\$3.1m	+\$2.6m
ACWI IMI ex (select) Energy	0.06%	+0.06%	+0.04%	-0.03%	+\$5.0m	+\$3.1m
ACWI IMI ex Tobacco ex Sudan ex Thermal Coal ex Firearms ex (select) Energy	0.54%	-0.65%	-0.01%	+0.03%	-\$53.4m	+\$10.5m

Custom Indices Rolling 12 Month Relative Returns – Since Inceptions



SFERS ESG Platform




ESG Collaboration & Communication

Partnerships	Reporting	Policies
<p>2020 Core ESG Partnerships</p> <ul style="list-style-type: none">• UN-supported Principles for Responsible Investment (PRI); – participated in Western Network Advisory Committee• CERES – continued to be engaged in CA 100+, CAR• Thirty Percent Coalition• Council of Institutional Investors (CII)• Principles for a Responsible Civilian Firearms Industry	<p>2020 ESG Reporting</p> <ul style="list-style-type: none">• Completed PRI Transparency Report; began process to implement strategic improvements based on results.• Continued to report on Proxy Voting Activities in February for prior calendar year's meetings.	<p>2020 Policy Updates</p> <ul style="list-style-type: none">• Updated SFERS Environmental, Social and Governance Investment Policies and Procedures and SFERS Environmental, Social and Governance Values Statement.• Completed updates to SFER Proxy Voting Guidelines and Governance Principles.



To: Retirement Board

Through: Jay Huish 
Executive Director

William J. Coaker Jr., CFA, MBA
Chief Investment Officer

Kurt Braitberg, CFA, CAIA
Managing Director, Public Markets

From: Andrew Collins
Director of ESG Investing

Adrienne von Schulthess
Security Analyst, ESG Investing

Date: October 14, 2020

Agenda Item:

Fund Performance Impact of SFERS Investment Restrictions

Background:

At the September 12, 2018 San Francisco Employees' Retirement System (SFERS) Retirement Board meeting the Board requested Staff investigate the performance impact of the investment restrictions that SFERS applies to its public markets portfolios.

SFERS restricts its external managers from directly investing SFERS' capital in securities issued by SFERS-specified companies with business operations in five areas:

- US tobacco manufacturers and wholesale distributors
- Companies operating in Sudan
- Firearms and Ammunition Manufacturing Companies and Retailers
- Thermal Coal Companies
- Select Oil & Gas Companies

SFERS determines each list of companies utilizing publicly available data, research, and information as well as datasets licensed for use by SFERS. Annually, Staff conducts research to contemplate updates (additions and removals) to each list of restricted companies and provides recommendations to the Board.

SFERS communicates the lists of restricted companies to its external managers of public equity and fixed income accounts held in separately managed account structures (SMAs). SFERS investment restrictions do not apply to public markets investments when SFERS invests through a commingled

account structure (i.e., where SFERS' funds are pooled collectively with those of other investors) because SFERS does not have the ability to dictate such terms of the account.

Staff monitors managers' compliance with the SFERS investment restrictions on a daily basis.

Restricting SFERS' managers ability to invest in specific securities reduces the overall investment universe. Financial theory suggests that such a constraint may reduce opportunities for diversification and thus have negative impacts on risk adjusted return. However, it is also possible that standard asset pricing models may not be efficiently pricing long-term environmental, social, and governance (ESG) risks associated with companies operating in the areas in which SFERS has investment restrictions.

At the Board's request, Staff has developed a process to measure the impacts of SFERS' investment restrictions over time. With this report, Staff will begin reporting annually what this impact has been.

To measure performance impacts of SFERS' investment restrictions, SFERS has developed a methodology that compares the risk and return of a portfolio subject to investment restrictions with one that is not. In order to do so, SFERS has worked with MSCI to develop customized indices based on SFERS' equity policy benchmark, the MSCI All Country World Investible Market Index ("MSCI ACWI IMI" or "ACWI IMI").

In order to measure the overall impact of SFERS' investment restrictions, SFERS has licensed an index that reflects the ACWI IMI after excluding all of the stocks subject to restriction. This index reflects historical changes to the restrictions over time as they occurred and specifically at the end of each month that the Board decision was made to add another category of restriction and/or change the lists of restricted companies.

To measure the cumulative impacts of the restrictions, SFERS has compared relative return and volatility of the excluded ACWI IMI index to the parent ACWI IMI index.

In addition, in order to measure the impacts of each restriction separately, SFERS has licensed five additional custom indices that reflect each restriction on a standalone basis. The methodology for constructing each standalone exclusion index is the same as the cumulative exclusion index, in that they each reflect historical changes to SFERS' restricted lists over time.

Table 1: Custom Index Names and Inceptions

Restriction Theme	Inception	Index Name
Tobacco	May 31, 1998	ACWI IMI ex Tobacco
Sudan	November 30, 2006	ACWI IMI ex Sudan
Civilian Firearms	October 31, 2016	ACWI IMI ex Firearms
Thermal Coal	May 31, 2017	ACWI IMI ex Thermal Coal
Select Oil and Gas Companies	October 31, 2018	ACWI IMI ex (select) Energy
All Restrictions	May 31, 1998	ACWI IMI ex Tobacco ex Sudan ex Thermal Coal ex Firearms ex (select) Energy*

* Each individual restriction theme is added to this index according to the above inception dates.

Staff believes that use of these custom indices to approximate the performance impact of the investment restrictions is the best available methodology for doing so. However, Staff notes that this methodology has several limitations:

- The analysis is limited to Public Equities and does not include any effects on Public Fixed Income exposures (though it is worth noting the performance impact of this would likely be less significant).
- The impact of active positions (both overweight and underweight) that managers would have otherwise held are not reflected, including positions in stocks that are outside the MSCI ACWI IMI constituents.
- Staff has modelled the effects as if the restrictions applied to the entire Public Equity asset class. In practice, the investment restrictions do not apply to pooled investment structures.

Total returns (net dividends) in USD are used throughout this report.

A summary of the relative returns of the custom indices is shown below. Overall, the investment restrictions have detracted from returns marginally and increased risk slightly. These effects have been almost entirely due to the tobacco restrictions which have been in place since 1998.

Table 2: Custom Index Relative Returns and Volatility Since Inceptions

Index Name	Relative Restriction Wt.*	Relative Cumulative Return**	Relative Annualized Return**	Relative Annualized Volatility**	Impact through 6/30/19	Impact through 6/30/20	Diff Impact FY19 to FY20
ACWI IMI ex Tobacco	0.35%	-1.65%	-0.02%	+0.04%	-\$88.9m	-\$88.0m	+\$0.9m
ACWI IMI ex Sudan	0.07%	+0.42%	+0.02%	-0.01%	+\$25.3m	+\$29.2m	+\$3.9m
ACWI IMI ex Firearms	0.01%	+0.02%	+0.00%	0.00%	+\$1.5m	+\$1.5m	+\$0.0m
ACWI IMI ex Thermal Coal	0.06%	+0.04%	+0.01%	0.00%	+\$0.5m	+\$3.1m	+\$2.6m
ACWI IMI ex (select) Energy	0.06%	+0.06%	+0.04%	-0.03%	+\$1.9m	\$5.0m	+\$3.1m
ACWI IMI ex Tobacco ex Sudan ex Thermal Coal ex Firearms ex (select) Energy	0.54%	-0.65%	-0.01%	+0.03%	-\$63.9m	-\$53.4m	+\$10.5m

* Weightings of restricted stocks in the generic MSCI ACWI IMI Index at June 30, 2020.

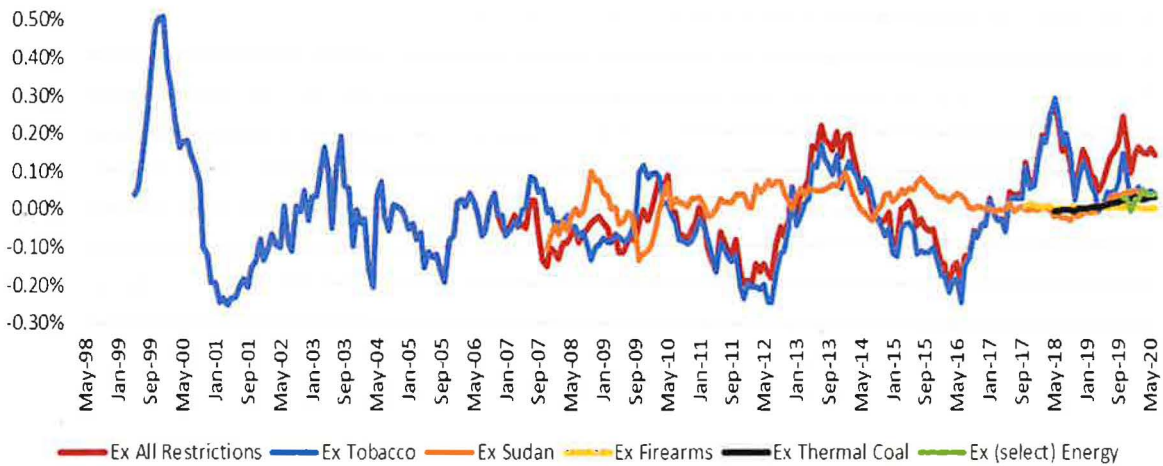
** Relative returns and volatility are against the MSCI ACWI IMI Index through to June 30, 2020.

Source: MSCI. The MSCI data is comprised of a custom index calculated by MSCI for, and as requested by, SFERS. The MSCI data is for internal use only and may not be redistributed or used in connection with creating or offering any securities, financial products or indices. Neither MSCI nor any other third party involved in or related to compiling, computing or creating the MSCI data (the "MSCI Parties") makes any express or implied warranties or representations with respect to such data (or the results to be obtained by the use thereof), and the MSCI Parties hereby expressly disclaim all warranties of originality, accuracy, completeness, merchantability or fitness for a particular purpose with respect to such data. Without limiting any of the foregoing, in no event shall any of the MSCI Parties have any liability for any direct, indirect, special, punitive, consequential or any other damages (including lost profits) even if notified of the possibility of such damages.

The above results are significantly impacted by compounding, especially with the ex-tobacco and ex-all restrictions indices going back to 1998. On a simple arithmetic basis, the cumulative monthly relative performance of the ex-all restrictions index was more modest at -0.09%, but this is compounded by gains of ~227% on both the generic and custom indices since 1998.

In estimating the dollar impact of the investment restrictions, gains and losses are calculated each month as the difference between the custom and generic index monthly returns (net total returns in USD) multiplied by the prior month's closing allocation to Public Equities. This monthly gain or loss is then reinvested at the plan's overall returns from the end of the month through to June 30, 2020. The present values of monthly gains and losses are then summed.

Chart 1: Custom Indices Rolling 12 Month Relative Returns – Since Inception

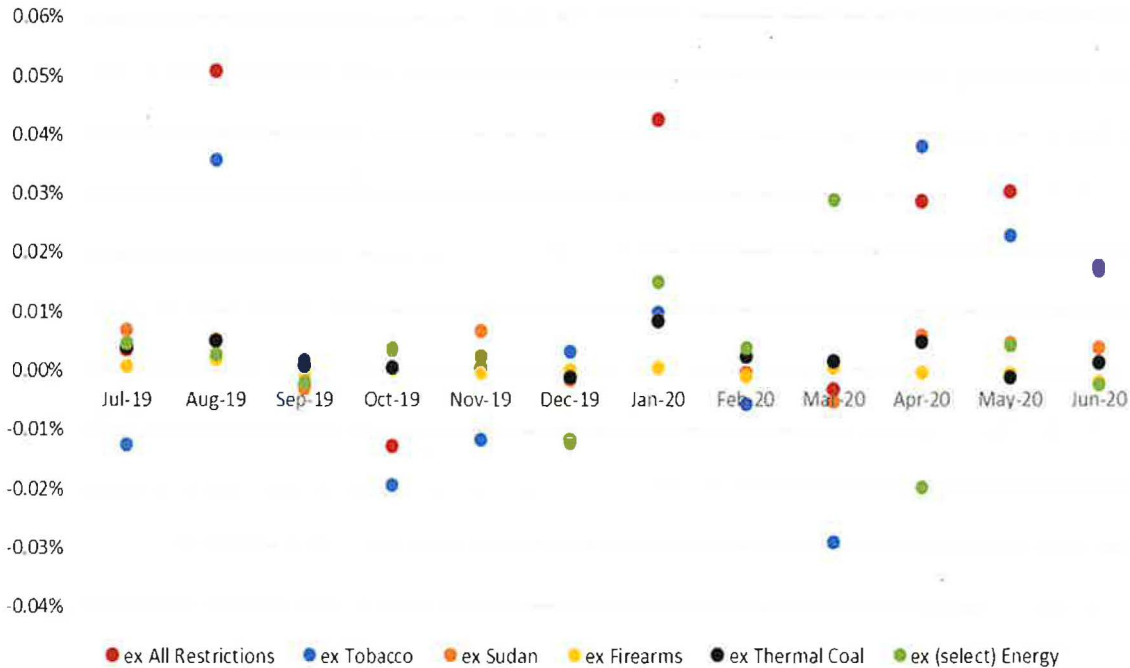


Source: MSCI. Refer to disclaimer on prior page.

The above chart shows that the annualized returns hide material divergence in performance at times.

Though the overall impact on returns since inception is de minimis at only -0.01% p.a., the impact on individual months and rolling 12-month periods has been material. Tobacco and Sudan restrictions in particular have had material impacts at times. The tobacco restrictions initially boosted performance due to the effect of reallocation to booming sectors including technology at the end of the 1990's. However, as the market turned in 2001, the reverse occurred. The Sudan restrictions initially included several large global industrials, telecommunications, energy and utility companies, which have since been removed from the Sudan restrictions list. Therefore, the relative return impact of the Sudan restrictions has moderated from 2016.

Chart 2: Custom Indices Monthly Relative Returns – Last Year



Source: MSCI. Refer to disclaimer on prior page.

Focusing on the most recent 12 months, tobacco restrictions have continued to generally have the largest influence on relative returns followed by the select energy (oil & gas) restrictions. Firearms, Sudan, and thermal coal had more modest impact on returns, which is to be expected given the low weighting of these companies in the generic index.

Summary:

Staff has implemented a process to monitor the performance impacts on the total fund due to SFERS' investment restrictions.

Since inception, investment restrictions are estimated to have had a small, but negative impact on risk and return. Over the past fiscal year the impact has been small but positive.

Staff will continue to monitor performance impacts over time and report findings annually to the Board.



SFERS

San Francisco Employees' Retirement System

City and County of San Francisco Employees' Retirement System

To: Retirement Board

Through: Jay Huish *JH*
Executive Director

William J. Coaker Jr., CFA, MBA
Chief Investment Officer

Kurt Braitberg, CFA, CAIA
Managing Director, Public Markets

From: Andrew Collins
Director of ESG Investing

Adrienne von Schulthess
ESG Investment Analyst

Date: October 14, 2020

Agenda Item:

Analysis of Carbon Footprint of SFERS Portfolio.

Introduction:

There is increasing evidence that climate change is already occurring, and the impacts are starting to be observed in financial markets.¹ Therefore, there is a fiduciary duty to assess the risks of the portfolio in relation to climate change.

While not a comprehensive measure of vulnerability to climate risk, one method of assessing an investment portfolio's exposure to such risks is its carbon footprint. Simply put, a portfolio's carbon footprint measures the amount of greenhouse gas emissions associated with the companies in the portfolio, measured as carbon dioxide equivalents (CO₂-e).

CO₂-e is an aggregate measure of greenhouse gases, including carbon dioxide, methane and nitrous oxide (amongst others) converted to an amount of carbon dioxide based on factors that represent their relative global warming impact per unit of mass.

Companies generate carbon dioxide directly in their operations as well as indirectly from upstream and downstream activities in supply and distribution chains. In the measurement of CO₂-e, emissions are classified according to three different "Scopes" depending on where those emissions occur:

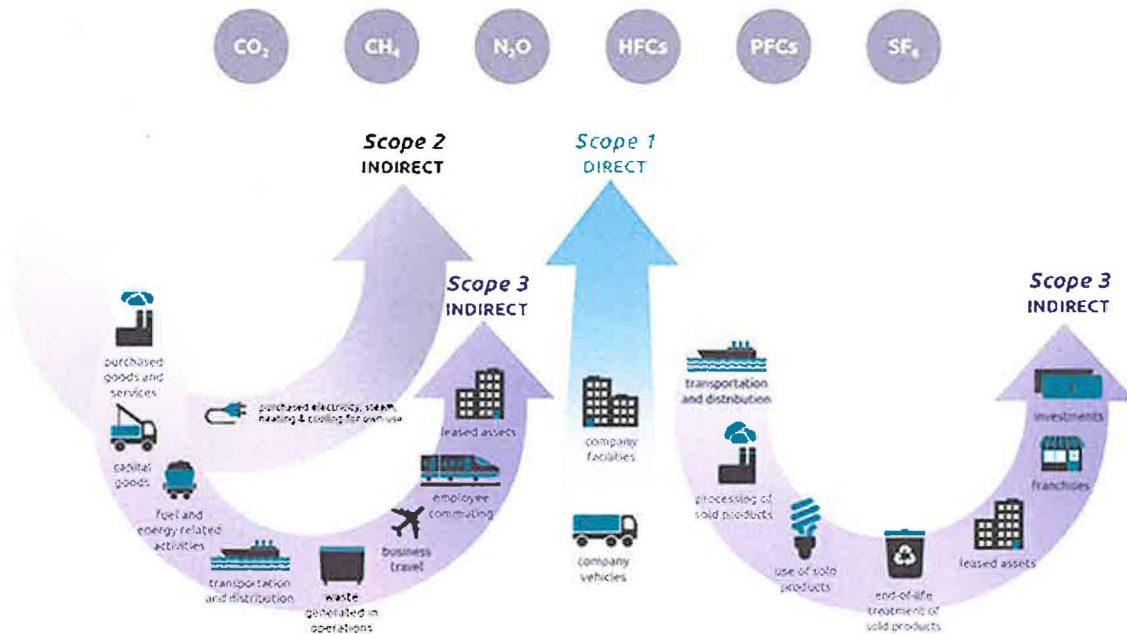
Scope 1 – Direct emissions from owned or controlled sources, typically resulting from the combustion of hydrocarbons or emissions from chemical processes.

¹ For example, several coal miners are in financial distress in the US, coal-heavy independent power producers trade at a discount, and valuations of oil and gas companies have lagged the broader market.

Scope 2 – Indirect emissions from the generation of purchased electricity, heat or steam, whose emission physically occur at the facility where the electricity is generated (e.g., a utility-owned power plant).

Scope 3 – Other indirect emissions that are a consequence of an entity's activities but occur from sources not owned or controlled by the entity. Examples include extraction and production of purchased materials; transportation of purchased fuels; and use of sold products and services.

Chart 1. Greenhouse Gas Emission Scopes



Source: Greenhouse Gas Protocol

In this report, Staff has focused on assessing Scope 1 & 2 emissions only due to significant definitional, data quality, and data availability issues associated with Scope 3 emissions.

There are a variety of ways that an investor can measure the carbon footprint of its portfolio. The Task Force on Climate-related Financial Disclosures (TCFD), the market-driven initiative that publishes recommendations for voluntary and consistent climate-related financial risk disclosures, highlights five different carbon footprinting metrics that may be relevant to investors.

Table 1. Carbon Footprint Metrics Identified by Task Force on Climate-related Financial Disclosures

Metric	Description	Formula
Weighted Average Carbon Intensity	<i>Portfolio's exposure to carbon-intensive companies, expressed in tons CO₂e / \$M revenue.</i>	$\sum_n \left(\frac{\text{current value of investment}_n}{\text{current portfolio value}} * \frac{\text{issuer's Scope 1 and Scope 2 GHG emissions}_n}{\text{issuer's \$M revenue}_n} \right)$
Total Carbon Emissions	The absolute greenhouse gas emissions associated with a portfolio,	$\sum_n \left(\frac{\text{current value of investment}_n}{\text{issuer's market capitalization}_n} * \text{issuer's Scope 1 and Scope 2 GHG emissions}_n \right)$

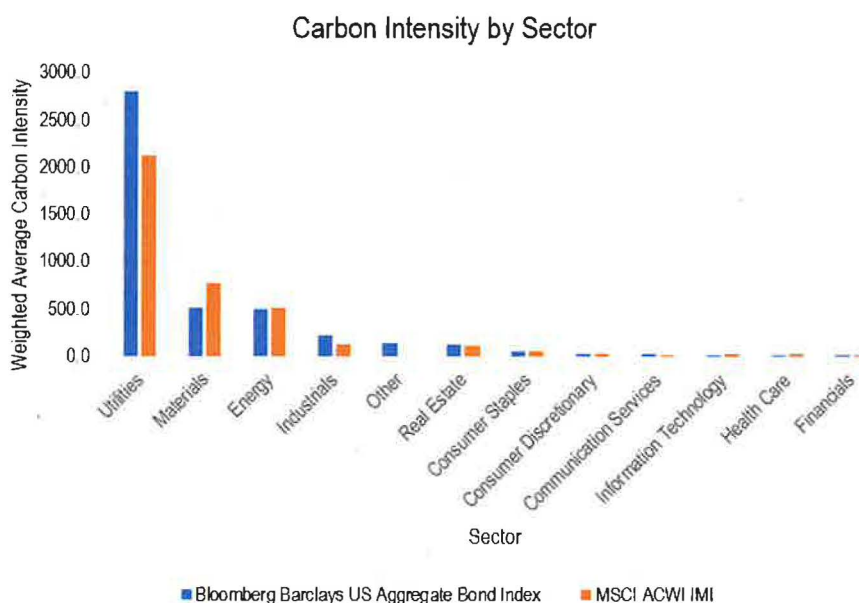
	expressed in tons CO ₂ e.	
Carbon Footprint	Total carbon emissions for a portfolio normalized by the market value of the portfolio, expressed in tons CO ₂ e / \$M invested.	$\frac{\sum_n \left(\frac{\text{current value of investment}_i}{\text{issuer's market capitalization}_i} * \text{issuer's Scope 1 and Scope 2 GHG emissions}_i \right)}{\text{current portfolio value (\$M)}}$
Carbon Intensity	Volume of carbon emissions per million dollars of revenue (carbon efficiency of a portfolio), expressed in tons CO ₂ e / \$M revenue.	$\frac{\sum_n \left(\frac{\text{current value of investment}_i}{\text{issuer's market capitalization}_i} * \text{issuer's Scope 1 and Scope 2 GHG emissions}_i \right)}{\sum_n \left(\frac{\text{current value of investment}_i}{\text{issuer's market capitalization}_i} * \text{issuer's \$M revenue}_i \right)}$
Exposure to Carbon-Related Assets	The amount or percentage of carbon-related assets in the portfolio, expressed in \$M or percentage of the current portfolio value.	$\frac{\sum \text{current value of investments in carbon-related assets}}{\text{current portfolio value}} * 100$

Source: TCFD, Implementing the Recommendations of the Task Force on Climate-related Financial Disclosures, June 2017

The TCFD recommends that asset owners use weighted average carbon intensity as a measure of portfolio carbon exposure. As shown in the table above, carbon intensity is defined as the ratio of metric tonnes of CO₂ equivalent (CO₂-e) emitted per million dollars of sales.

Staff agrees that assessing weighted average carbon intensity is a good starting point for the measurement of exposure to climate risk. It partly reflects companies' energy efficiency and risk exposure to potential carbon pricing regimes or other policy changes. Carbon intensity does not measure transition risk, technology risk, physical risks or even the full scope of regulatory risks. Nevertheless, it is a useful indicator of the challenges that companies and portfolios face as decarbonization needs and policies accelerate.

Chart 2. Carbon Intensity by Sector²



Source: MSCI ESG Research with data sourced from MSCI and Caissa.

² Staff used holdings (as of 6/30/20) and associated carbon intensity of the Blackrock US Debt Index, which tracks the Bloomberg Barclays US Aggregate Bond Index ("US Agg"), as a proxy for the benchmark carbon intensity.

Staff notes that the most important factor impacting the carbon intensity of a portfolio of publicly traded securities is sector allocation. This is due to the fact that three sectors – utilities, materials and energy – contribute over 70% of MSCI ACWI IMI's Scope 1 & 2 weighted average emissions intensity. Though these sectors have modest index weightings, at 3.2% of utilities, 4.9% for materials, and 3.4% for energy, the carbon intensity within the sectors result in dominant contributions at 41.8%, 23.2% and 10.6% respectively.

To comprehensively measure the SFERS portfolio's carbon footprint, SFERS has subscribed to carbon data provided by MSCI ESG Research. MSCI's data coverage is largely dependent on disclosures from companies and is thus mainly related to companies that have debt or equity outstanding in public markets. Therefore, Staff has focused its analysis of the portfolio's carbon footprint on the Public Equity and Public Fixed Income portfolios.

Public Equity:

As of June 30, 2020, the SFERS Public Equity portfolio had a weighted average carbon intensity of 103.9 tonnes CO₂-e/ \$ million sales which was 36% lower than the MSCI ACWI IMI benchmark which stood at 163.2 tonnes CO₂-e/ \$ million sales.

Underweights to the utilities, materials and energy sectors – the three highest emitting sectors within the public company universe – and overweights to the carbon-light information technology, communication services, and healthcare sectors are the main drivers of the lower weighted average carbon intensity. In addition, within the utilities sector – the highest emitting sector – the SFERS public equity portfolio is underweight in highly carbon intensive companies. However, stock selection for materials and energy are contributing to an overweight in highly carbon intensive companies.

The top ten largest contributors to the portfolio make up 19.7% of the portfolio's weighted average carbon intensity, but only 1.4% of the portfolio weight. Of those ten companies, SFERS has an active weight relative to the ACWI IMI in the following:

Table 2: Top Contributors to SFERS' WACI where SFERS has active weight relative to ACWI IMI

Company Description	Sector	Contribution to WACI	Active Weight
Chinese cement manufacturer	Materials	4.78%	0.05%
North American manufacturer and distributor of nitrogen fertilizers	Materials	1.63%	0.03%
Global manufacturer and distributor of building materials and products	Materials	1.36%	0.05%
Italian multinational energy company	Utilities	1.51%	0.04%
Asian multinational semiconductor contract manufacturing / design company	Information Technology	1.31%	0.02%
US road and rail transport company	Industrials	1.26%	0.04%

However, examining the SFERS top ten holdings with the highest individual carbon intensities, regardless of portfolio weight, the list is dominated by utilities companies, led by utilities in Thailand, India, and China, with carbon intensities (tCO₂e/\$M revenues) between 15,428 and 21,407. This finding supports a continued focus on engaging utilities sector companies around decarbonization.

The weighted average carbon emissions for the Public Equity portfolio (net long position as of June 30, 2020), along with sector and stock attribution effects are shown below. While this portfolio has been increasingly employing short positions, Staff has focused its analysis on the net positions of the portfolio in order to represent the portfolio exposure to carbon risk. In a later section, Staff also highlights the carbon intensities of the portfolio's gross short positions to understand where SFERS is mitigating risk through shorting carbon intensive companies.

Table 3: Public Equity Weighted Average Carbon Intensity by Sector and Attribution

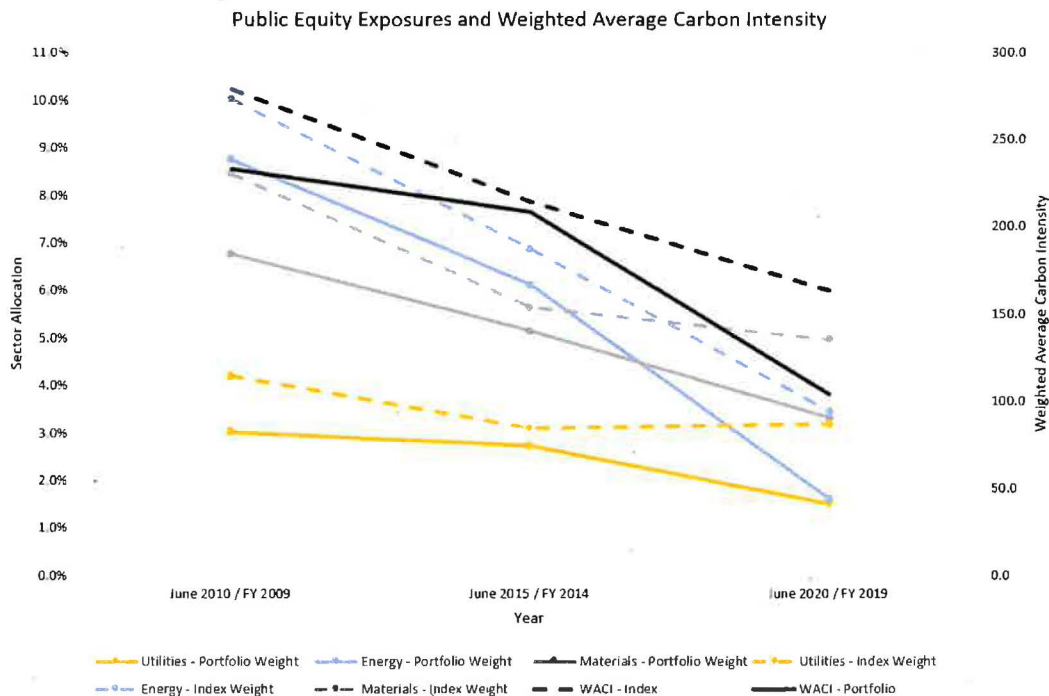
SFERS Public Equity vs MSCI ACWI IMI	Portfolio Weight	Active Weight*	t CO2e / \$M Sales		Percentage Attribution			Total
			Portfolio Wtd Ave Intensity	Benchmark Wtd Ave intensity	Sector Allocation	Stock Selection	Interaction	
Financials	9.7%	-3.5%	11.9	15.3	3.2%	-0.3%	0.1%	3.0%
Consumer Staples	6.0%	-1.7%	58.0	60.1	1.1%	-0.1%	0.0%	1.0%
Consumer Discretionary	11.2%	-0.7%	39.8	36.8	0.5%	0.2%	0.0%	0.7%
Real Estate	2.5%	-1.3%	91.9	114.8	0.4%	-0.5%	0.2%	0.0%
Industrials	9.8%	-0.5%	117.9	122.8	0.1%	-0.3%	0.0%	-0.2%
Communication Services	9.9%	1.3%	17.8	22.1	-1.1%	-0.2%	0.0%	-1.4%
Health Care	16.4%	3.5%	24.5	25.1	-2.9%	-0.1%	0.0%	-3.0%
Energy	1.6%	-1.9%	547.9	506.8	-3.9%	0.9%	-0.5%	-3.5%
Materials	3.3%	-1.7%	892.4	770.7	-6.2%	3.7%	-1.2%	-3.8%
Information Technology	28.2%	8.1%	34.4	33.7	-6.4%	0.1%	0.0%	-6.3%
Utilities	1.5%	-1.7%	1,857.0	2,129.0	-20.4%	-5.3%	2.8%	-22.8%
Total	100%		103.9	163.2	-35.7%	-1.9%	1.4%	-36.2%

Source: MSCI

The weighted average intensity of the SFERS' Public Equity portfolio has declined by approximately 55% over the past 10 years versus a decline in the benchmark's weighted average carbon intensity of 41%. The following chart shows this change in carbon intensity using historical positions and historical carbon intensities for each constituent company.

Much of the reduction in carbon intensity is due to a halving of SFERS' exposure (in terms of weighting, not dollars invested) to the three most carbon intensity sectors – utilities, materials, and energy – over this period.

Chart 3: Exposures in Public Equity and MSCI ACWI



Source: MSCI ESG Research with data sourced from MSCI and Caissa

To better understand the carbon risk exposure of the Public Equity portfolio, staff examined the portfolio's weighted average carbon intensity of the separate long and short positions. When adjusted for relative weighting, the gross long positions have a weighted average carbon intensity of 108.5 tonnes CO₂-e/ \$ million sales while the gross short positions have a weighted average carbon intensity of 190 tonnes CO₂-e/ \$ million sales. Short exposure, excluding cash and FX, in the Public Equity portfolio as of June 30, 2020 was 10.6% of the total portfolio.

The SFERS short portfolio is overweight (around 2x) in the high carbon sectors of utilities and materials. Within certain sectors the aggregate short book is overweight to the most carbon intensive companies. SFERS short positions have 32.6% higher weighted average carbon intensities in the utilities sector along with a 38.7% higher weighted average carbon intensity in the real estate sector. Additionally, in the information technology sector, the short positions have a 52.4% higher weighted average carbon intensity than the long positions. Taking short positions in high emitting companies may further reduce the risk exposure of the SFERS portfolio to carbon emissions.

Staff also analyzed the weighted average carbon intensities of fundamental active, quantitative, and passive managers in the public equity portfolio. As of June 30, 2020, funds managed by fundamental active managers had a weighted average carbon intensity that was 38% lower than indexed managers and 42% below quantitative managers. This analysis indicates that SFERS' fundamental active managers avoid carbon intensive companies.

Staff also drilled down into specific managers and funds to understand their contribution to the weighted average carbon intensity. Allocations to the GSAM RALE and Generation strategies (made in 2018 as part of SFERS' effort to invest \$1 billion in its public equity portfolio to low-carbon strategies) have meaningfully contributed to the reduction in carbon intensity across the Public Equity portfolio. Based GSAM RALE's weighted average carbon intensities of 92.0 tonnes CO₂-e/ \$ million sales and Generation's 36.9 tonnes CO₂-e/ \$ million sales as of June 30, 2020, these strategies

together have reduced the emissions intensity of the asset class by 2.5% versus the index (or 4.1 tonnes CO₂-e/ \$ million sales).

Fixed Income:

The Fixed Income asset class consists of a combination of corporate and non-corporate issuers. Carbon emissions data provided by MSCI (and other data providers) is generally available and relevant only to corporate issuers of credit, although it is relevant to certain agency and supranational issuers.

For sovereign issuers, which are a large part of the SFERS portfolio, an alternative version of carbon intensity, emissions per unit of national economic activity (GDP), can be used.

Carbon emissions data coverage is mostly not available for securitized debt or bank loans since the ability to generate this data would require emissions data from underlying non-public borrowers.

SFERS has analyzed the Liquid Credit and Treasuries components of the Fixed Income portfolio separately. US Treasuries make up 57% of the entire Fixed Income portfolio and staff assigned that component a carbon intensity of 290 tCO₂e/\$m GDP based on the Emissions Database for Global Atmospheric Research (EDGAR)'s data for US emissions per unit of GDP.

The following table highlights the fixed income sectors where SFERS is able to obtain relevant carbon emissions data points, what metrics those are, the percentage of the Liquid Credit portion of the Fixed Income portfolio to which the metric applies, and the weighted average carbon intensity of that sector within the portfolio:

Table 4: Fixed Income – Liquid Credit Emissions Data by Sector

Sector	Portfolio Weighting	Index Weight	Source	Coverage	Portfolio WACI	Metric
Sovereign	34.1%	37.6%	EDGAR	100%	289.5	tCO ₂ e/\$M GDP (USD 2011 PPP)
Agency & Supra	1.9%	3.0%	MSCI	58%	427.0	Scope 1 & 2 tonnes CO ₂ / \$M Revenue
Asset / Mortgage Backed	20.1%	2.2%				
Bank Loans	8.7%	0.0%				
Corporate	30.3%	27.8%	MSCI	79%	556.4	Scope 1 & 2 tonnes CO ₂ / \$M Revenue
MBS Pass Through	3.0%	28.7%				
Other	1.8%	0.7%				
Total	100.0%	100.0%				

Data sourced from MSCI ESG Research, EDGAR and Caissa.

The weighted average carbon intensity of the sovereign component of the SFERS Fixed Income portfolio, as of June 30, 2020, was 289.5 tonnes CO₂-e/\$M GDP, which compares to 287.6 tonnes CO₂-e/\$M GDP for the sovereign component of the benchmark Bloomberg Barclays US Aggregate Bond Index ("US Agg")³.

The weighted average carbon intensity of the corporate portion of the SFERS Fixed Income portfolio, as of June 30, 2020, was 556.4 tonnes CO₂-e/\$M revenue. This figure compares to 303.7 tonnes CO₂-e/\$M revenue for the corporate portion of the US Agg. The comparison is influenced by SFERS holding of a single utility company, a holding company whose subsidiaries generate, transmit, and distribute electricity in Africa. The holding has a carbon intensity of 17,752 and at about 1% of the corporate portion of the portfolio contributes to 27.3% of the corporate weighted average carbon intensity.

³ Staff used holdings (as of 6/30/20) and associated carbon intensity of the Blackrock US Debt Index, which tracks the US Agg, as a proxy for the benchmark carbon intensity.

The carbon intensity within the corporate portion of the Fixed Income portfolio and the benchmark Bloomberg Barclays US Aggregate Bond Index ("US Agg")⁴ is shown below according to sector classifications obtained from Caissa.

Table 5: Fixed Income – Liquid Credit Corporate by Sector WACI

Sector	Portfolio			Index		
	Weighting	CO2 Intensity	Coverage	Weighting	CO2 Intensity	Coverage
Communication Services	7.2%	35.1	98.9%	8.2%	29.5	97.6%
Consumer Discretionary	6.3%	84.0	92.5%	4.6%	34.6	93.9%
Consumer Staples	3.9%	114.0	96.1%	6.3%	60.4	99.9%
Energy	11.9%	572.6	90.5%	7.6%	493.3	99.9%
Financials	8.9%	32.3	72.6%	23.6%	9.3	99.0%
Health Care	5.0%	36.2	86.8%	10.7%	15.8	98.4%
Industrials	6.9%	307.5	78.5%	7.5%	221.5	99.1%
Information Technology	3.0%	30.0	99.9%	9.2%	21.6	99.8%
Materials	6.1%	765.7	85.6%	2.7%	507.0	98.9%
Real Estate	2.2%	65.7	67.8%	2.5%	126.4	97.7%
Utilities	4.4%	4365.0	94.9%	6.6%	2801.4	98.6%
Other / Undefined	34.2%	208.0	67.3%	10.3%	259.3	93.8%
Total	100.0%	556.4	78.8%	100.0%	303.7	98.0%

Data sourced from MSCI ESG Research and Caissa.

The sovereign component of the Fixed Income – Liquid Credit portfolio is shown in more detail below.

Table 6: Fixed Income Liquid Credit Sovereign by Region

Region	Weighting	WACI
Asia (Emerging)	4.2%	218.8
Europe (Developed)	0.05%	158.5
Europe (Emerging)	8.4%	341.4
Latin America (Emerging)	8.5%	177.3
Middle East and Africa (Developed)	0.0%	230.0
Middle East and Africa (Emerging)	7.5%	398.7
North America	5.3%	288.2
Supranational	0.01%	320.0
Total	34.1%	289.5

Data sourced from EDGAR and Caissa.

SFERS Overall Portfolio:

In this report SFERS presents a carbon intensity analysis for its Public Equities and Fixed Income portfolios. The ability to conduct similar analyses for other asset classes is currently difficult. Carbon data is generally not available for Private Markets (including Private Credit, Private Equity and Real Assets), and look-through exposures to underlying securities are generally not available for Absolute Returns.

However, it is possible to get a very general indication of the overall carbon intensity of the overall SFERS portfolio by assessing exposure to the three most carbon intensive sectors – utilities, materials, and energy – through each asset class. The net look-through exposures as of June 30, 2020 (or latest available) are shown below:

⁴ Staff used holdings (as of 6/30/20) and associated carbon intensity of the Blackrock US Debt Index, which tracks the US Agg, as a proxy for the benchmark carbon intensity.

Table 7: Carbon Intensive Sector Weights by Asset Class

Group	Energy	Materials	Utilities
Absolute Return	0.9%	-1.0%	0.4%
Cash	0.0%	0.0%	0.0%
Private Credit	0.2%	0.1%	0.0%
Private Equity	0.2%	0.2%	0.0%
Public Equity	0.5%	1.1%	0.5%
Public Fixed Income	0.1%	0.1%	0.0%
Real Assets	3.3%	1.2%	0.3%
Total	5.1%	1.6%	1.2%

Notes: Other includes other corporate sectors, sovereign, broad market and commodities exposures. Does not sum to 100% as is based on look-through exposures rather than holdings.

Data sourced from Caissa.

Compared to a 70/30 blend of the MSCI ACWI IMI and US Agg Bond Index, the full SFERS portfolio has similar exposure the energy sector, and significantly less exposure to the utilities sector and the material sector. This implies that the full SFERS portfolio carbon footprint would be meaningfully less than a 70/30 blended benchmark.

Conclusion:

The SFERS' Public Equity portfolio has significantly reduced its weighted average carbon intensity over the last 10 years (outpacing the decline in carbon intensity of the benchmark) and is significantly less carbon intensive than benchmark. The sovereign portion of the SFERS Fixed Income portfolio is more or less equal to the analogous portion of the benchmark, while the corporate portion is higher than the analogous portion of the benchmark.

Staff's analysis shows that most carbon emissions are concentrated in three sectors, reinforcing Staff's approach of developing frameworks to address carbon risks within the most intensive sectors (i.e., energy and utilities).

This analysis does not address carbon risks associated with upstream or downstream emissions outside the scope of each constituent company's operations (so-called Scope 3 emissions). These may be material to the financial health of companies in certain sectors, such as energy (emissions associated with combustion of oil, gas, and coal) and consumer discretionary (emissions associated with operation of vehicles). In addition, this analysis does not seek to understand other climate risks such physical impacts from climate change, technology transitions, and certain other regulatory or legal liability risks.

Disclaimer

Certain information ©2020 MSCI ESG Research LLC. Reproduced by permission; no further redistribution. Although San Francisco Employees' Retirement Systems' information providers, including without limitation, MSCI ESG Research LLC and its affiliates (the "ESG Parties"), obtain information from sources they consider reliable, none of the ESG Parties warrants or guarantees the originality, accuracy and/or completeness of any data herein. None of the ESG Parties makes any express or implied warranties of any kind, and the ESG Parties hereby expressly disclaim all warranties of merchantability and fitness for a particular purpose, with respect to any data herein. None of the ESG Parties shall have any liability for any errors or omissions in connection with any data herein. Further, without limiting any of the foregoing, in no event shall any of the ESG Parties have any liability for any direct, indirect, special, punitive, consequential or any other damages (including lost profits) even if notified of the possibility of such damages.