TEACHERS' RETIREMENT BOARD

INVESTMENT COMMITTEE Item Number: 11

SUBJECT: Special Mandate – Low Carbon Strategies

CONSENT: _____ ATTACHMENT(S): 2

ACTION: __X__ DATE OF MEETING: July 14, 2016 / 20 mins.

INFORMATION: _____ PRESENTER(S): June Kim / Anne Sheehan

POLICY

This item is covered under the CalSTRS Special Mandate Policy and The CalSTRS Global Equity Investment Policy (Teachers' Retirement Board Policy Manual, Section 1000, Page B-1).

BACKGROUND

At its March 3, 2016 meeting, the Subcommittee of the Investment Committee heard presentations by representatives from MSCI and FTSE on no carbon and low carbon indices. At the May 5, 2016 Subcommittee meeting, staff presented a review of special mandates and index options that looked at scenario analyses for a $1 billion and a $2.5 billion investment into low carbon and ex-fossil fuel index strategies in the CalSTRS global equity portfolio. At that May meeting, the Subcommittee asked staff to prepare a recommendation for the Investment Committee on an investment of up to $2.5 billion in a low carbon equity index strategy.

PURPOSE

This report is provided as a follow-up to the May 2016 Subcommittee meeting and addresses the requirements outlined in the recently approved CalSTRS Special Mandate Policy for a special mandate to be incorporated into the investment portfolio.

DISCUSSION

The CalSTRS Special Mandate Policy states that in order to decide upon the implementation of a special mandate, the Investment Committee is to receive a written evaluation of the proposed special mandate including at least the items listed below. Each item is discussed for the proposed low carbon equity index strategy.

(a) A detailed review and affirmation (or disaffirmation) of the theory and economic justification for why the proposed special mandate satisfies the definition of a special mandate;

Low carbon and ex-fossil fuel indices (collectively, "low carbon indices") are designed with specific objectives to reduce exposure to companies with high carbon emissions and fossil fuel reserves. A portfolio that is passively implemented to match the holdings and performance of such indices will have lower carbon exposure than that of the broad market.

The MSCI low carbon indices have relatively low tracking error (less than 1%) versus the MSCI ACWI and as a result, have shown in backtests to have fairly small performance differences to MSCI ACWI over a full market cycle. Low carbon indices, in general, do not target performance in excess of comparable market capitalization (cap) weighted indices. Forward-looking expectations are that their performance should be similar to that of the market cap-weighted index; however, the low carbon indices have a live track record of less than two years so no conclusive statement can be made about performance results at this time.

In the event that carbon gets priced meaningfully, low carbon indices could provide a positive performance impact. There is still no clear indication whether a price on carbon might be implemented, and if so, what form that carbon pricing might take (i.e., a carbon tax or a cap on emissions). There are currently some localized carbon pricing mechanisms in place outside Europe, but they are minimal and fractionalized.

If a carbon tax or cap on emissions is imposed, it would result in increased costs to high carbon emitting companies or those with fossil fuel reserves, which should detract from profits and share prices of those companies. If this occurs, an investment in an index that is tilted away from such companies would benefit because it does not hold or holds less of companies that may suffer negative financial impact.

(b) An analysis of the risk, return, and potential costs of the proposed special mandate;

Risk characteristics for the MSCI ACWI Low Carbon Target Index and the MSCI ACWI Ex-Fossil Fuels Index compared to the market cap-weighted MSCI ACWI are shown in Table 1. The beta and total risk of the low carbon indices are similar to that of MSCI ACWI. The “Potential Gain/Loss (1 SD)” column shows the dollar amount of potential gain or loss for one standard deviation in performance relative to MSCI ACWI over one year. Statistically, two thirds of the indices’ performance results are expected to fall within this range.

Please note that for this analysis, staff used standard MSCI index data that was not modified for CalSTRS custom restricted securities list because that is the data that is currently available. If this strategy is eventually implemented as a portfolio, staff would work with MSCI to create “Custom” Low Carbon Indices that exclude the CalSTRS restricted securities. The index license fee and customization fee would be explicit costs of the proposed special mandate.

Table 1
MSCI Indices
Risk Characteristics Compared to MSCI ACWI

Risk Profile	ACWI Low Carbon Target	ACWI Ex-Fossil Fuels
Predicted Beta	1.00	0.97
Index Total Risk	15.86	15.44
Benchmark Total Risk	15.85	15.85
Tracking Error	*0.36*	*0.91*
Mandate Size	$ 2,500,000,000	$ 2,500,000,000
Potential Gain/Loss (1 SD)	+/- $9,000,000	+/- $22,750,000

As of 5/31/16

The inception date is September 2014 for the MSCI Low Carbon Index and October 2014 for the MSCI Ex-Fossil Fuels Index, so performance data is not meaningful given the short live history. Back tests have indicated positive and negative performance results as the tilts in the indices could have added value or underperformed, depending on the time period. The ex-fossil fuels index has a higher tracking error, and therefore, a portfolio invested in this index would have a wider range of potential performance outcomes compared to the lower tracking error low carbon index.

Table 2 displays performance for the low carbon indices and traditional cap-weighted MSCI ACWI. As previously noted, the MSCI indices do not exclude CalSTRS' restricted securities list. Performance of the energy sector is also included to show its significant underperformance in recent years. That sector's underperformance is the main reason for the outperformance of the low carbon indices versus the MSCI ACWI over the 1, 3, and 5 year periods. Year-to-date 2016, the energy sector has significantly outperformed the broad market (11.56 percent versus 1.85 percent), and the low carbon indices have trailed the MSCI ACWI.

Table 2
Performance (Gross of Fees*)
As of May 31, 2016

	YTD	1 year	3 years	5 years
MSCI Low Carbon Target Index	1.71%	-5.34%	5.33%	5.54%
MSCI Ex-Fossil Fuels Index	1.20%	-4.68%	6.39%	6.45%
MSCI ACWI	*1.85%*	*-5.42%*	*5.20%*	*5.17%*
MSCI ACWI Energy Sector	11.56%	-13.29%	-6.41%	-5.12%

Source: MSCI. Periods greater than one year are annualized.
**Performance is shown gross of index license fees.*

A potential cost is the impact of being underweight the energy sector. As of May 31, 2016, the underweight was about 1.1 percent in the Low Carbon Index and about 5.1 percent in the Ex-Fossil Fuels Index. The underweight to energy implies a bet on low or declining energy prices. So while the tracking errors of both indices are relatively low, they would introduce a different risk into the portfolio based on oil price volatility and the performance of the energy sector.

If oil prices and the energy sector underperform the broad market index (MSCI ACWI), a strategy that is underweight the energy sector would experience positive performance contribution from the underweight. However, if oil prices and the energy sector outperform, these low carbon and ex-fossil fuels strategies would experience negative performance from their energy underweights, which could cause them to underperform the broad market index.

(c) A forecast of the impact of including the proposed special mandate on the applicable asset class and sub-asset class structure, within the overall investment portfolio;

The proposed low carbon and ex-fossil fuels index strategies, although passively implemented, have expected tracking errors of 30-50 bps and 90 bps, respectively. As a result, the portfolio would be placed in the U.S., Non-U.S. Developed, and Emerging Markets active portfolios within Global Equity.

Table 3 displays the impact on the CalSTRS Global Equity portfolio of a $2.5 billion low carbon investment. The first column of figures shows the CalSTRS Global Equity portfolio and the second column is the impact on the portfolio if $2.5 billion is invested in the MSCI ACWI Low Carbon Target Index. The result is a 1 bp decrease in the overall tracking error of the CalSTRS Global Equity portfolio and minimal to no impact on the portfolio's total risk.

Table 3
$2.5 Billion Investment in the MSCI ACWI Low Carbon Target Index
Data as of May 31, 2016

Risk Profile	Current CalSTRS Global Equity	100% to ACWI Low Carbon Target
Predicted Beta	1.00	1.00
Total Risk	15.75	15.75
Benchmark Risk	15.75	15.75
Tracking Error	0.36	0.35

The Low Carbon Target Index has modest sector weight differences versus the cap-weighted MSCI ACWI, with the largest being a 1% underweight each to energy and materials and 1.2% overweight to industrials. The country level misweights are not large. Sector and country weights for the indices are included in Attachment 1.

(d) *A determination of whether there are elements of the special mandate that could be revised or eliminated to improve the likely impact of the special mandate on the economic performance of the Fund;*

A lower tracking error strategy would reduce the risk of substantial underperformance relative to market cap weighted equity indices.

(e) *A statement about the proposed special mandate's consistency with the strategic policy, the Investment Policy and Management Plan, and Investment Beliefs (when adopted);*

While the Board has not taken a consensus position on climate change, CalSTRS' 21 Risk Factors includes a risk factor specific to environmental exposure. Risk Factor 19, "Environmental" states:

> "The investment's long-term profitability from activities and exposure to environmental matters such as: depleting or reducing air quality, water quality, land protection and usage, without regard for remediation. Consideration should be given to how a company is dealing with the impact of climate change, including whether the government is taking steps to reduce its impact, exacerbating the problem, or oblivious to the risk."

The expected tracking error of these strategies is relatively low versus their cap-weighted equivalent indices, and the portfolio would be passively implemented to match the performance of the low carbon index. Given this, internal management of most of these strategies would be allowed under the CalSTRS Global Equity Investment Policy based on the Internal/External Decision Criteria Matrix. Management of a low carbon portfolio is discussed in more detail in the Implementation section of this report.

Risk Factor 19 states that "consideration should be given to how a company is dealing with the impact of climate change". One drawback of a passive implementation approach is that these low carbon indices do not take into account a company's remediation efforts related to climate change. The low carbon indices primarily measure the amount of greenhouse gas emitted or potentially emitted through reserves. For example, a large energy producer would most likely be underweighted in the low carbon index even if it dedicates substantial remediation resources to limiting emissions.

(f) *A proposed source of funding for the proposed special mandate and how that impacts the asset class and overall portfolio.*

The proposed source of funding for a $2.5 billion allocation to this special mandate would be approximately half from the Global Equity active portfolio, including the Corporate Governance portfolio, and half from the passive index portfolio. Part of the funding would need to come from the passive portfolio in order to keep the U.S. and Non-U.S. portfolios within their active/passive policy ranges.

The low carbon index portfolio would have lower tracking error and lower fees than the active portfolios that would be funding sources. The impact of funding this special mandate from both the active and passive portfolios is expected to be little change in the overall tracking error for the Global Equity portfolio and a net decrease in investment management fees. Active strategies are expected to generate long-term returns in excess of the index, whereas low carbon indices do not have an excess return objective. Therefore, funding this special mandate partly from the Global Equity active portfolio would also result in a slight decrease in expected return.

RECOMMENDATION

Staff recommends a passively implemented investment into the MSCI ACWI Low Carbon Target Index. This index includes U.S., developed markets, and emerging markets countries, and it targets an ex ante (forecasted) tracking error of about 30 basis points (bps).

The carbon exposure of every security in the MSCI Low Carbon Target Index is measured in terms of its greenhouse gas emissions and also potential carbon emissions from its fossil fuel reserves. The index re-weights securities with the objective of maximizing the reduction in greenhouse gas emissions given its target tacking error. Compared to the market cap weighted MSCI ACWI, the Low Carbon Target Index achieves a 76 percent reduction in carbon emissions and a 99% reduction in exposure to fossil fuel reserves[1]. Key metrics for the index are included as Attachment 2.

Staff recommends the MSCI Low Carbon Target Index due to its lower targeted tracking error of 30 bps and relatively smaller sector and country misweights versus the cap weighted MSCI ACWI. In comparison, the expected tracking error of the MSCI Ex-Fossil Fuels Index is higher, at about 90 bps. A lower tracking error implies less risk of substantial underperformance relative to the market cap weighted index. In addition, the MSCI Low Carbon Target Index achieves a much greater reduction in carbon emissions (76 percent) versus the Ex-Fossil Fuels Index (21 percent) and a comparable decrease in fossil fuel reserves (99 percent versus 100 percent).

Implementation

Staff recommends phasing in the implementation of the low carbon investment over time starting with U.S. equity, followed by developed markets, and then lastly emerging markets, as outlined below.

- Phase 1 – $1.3 billion U.S. equity investment in the MSCI USA Low Carbon Target Index.

- Phase 2 – $1 billion invested into the non-U.S. developed markets countries of the MSCI World Low Carbon Target Index (this would bring the total low carbon investment to-date to $2.3 billion).

- Phase 3 – $200 million invested in the emerging markets countries of the MSCI ACWI Low Carbon Target Index (this would bring the total investment to-date to $2.5 billion).

[1] Source MSCI, as of 5/31/16.

The current top priority of the Global Equity internal management team is to manage non-U.S. developed markets (EAFE) index assets internally at CalSTRS. After the assets have been transferred to in-house management, the EAFE portfolio will remain a key focus for the team, the Director of Global Equity, as well as Operations for several months. Given this, staff anticipates being able to implement Phase 1 of a low carbon strategy by the first or second quarter of 2017.

In addition, the Global Equity internal management team has two open positions for fiscal year 2016-2017. The goal is to have the two positions manage other index mandates such as this low carbon special mandate. The ability to implement Phase 1 would also depend on successfully filling at least one of the two open Global Equity positions.

Implementation of Phase 2 could occur six to nine months after the successful completion of Phase 1. The final Phase 3 (emerging markets portfolios) would most likely take longer to implement because the Global Equity team and Operations are not currently set up for internal management of emerging markets assets. An assessment of the portfolio management, operations, and systems requirements to manage emerging markets assets would need to occur first, and then the project and implementation would be planned out.

If the Board decides to move forward with this low carbon investment, staff will provide the Board with periodic updates once Phase 1 and 2 have been implemented and the requirements for Phase 3 have been thoroughly reviewed.

CONCLUSION

Staff prepared this report in response to the Subcommittee's request for a recommendation for an investment of up to $2.5 billion in a low carbon equity index strategy. Staff recommends a passively implemented investment into the MSCI ACWI Low Carbon Target Index, with the implementation phased in over time starting with U.S. equity.

Staff and the two Board consultants, Pension Consulting Alliance and Meketa Investment Group, will be available for questions and comments. Staff requests direction from the Investment Committee on this special mandate investment.

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MSCI Indices
Sector Weights Comparison
As of May 31, 2016

Sector	MSCI ACWI	MSCI ACWI Low Carbon Target		MSCI ACWI Ex-Fossil Fuels	
	Wgt (%)	Wgt (%)	Diff (%)	Wgt (%)	Diff (%)
Consumer Discretionary	12.75	12.57	(0.18)	13.61	0.86
Consumer Staples	9.10	9.14	0.04	9.71	0.61
Energy	6.82	5.76	(1.06)	1.63	(5.19)
Financials	20.98	21.85	0.87	22.42	1.44
Health Care	12.30	12.46	0.16	13.14	0.84
Industrials	10.64	11.81	1.17	11.33	0.69
Information Technology	15.08	15.33	0.25	16.11	1.03
Materials	4.91	3.90	(1.01)	4.66	(0.25)
Telecommunication Services	3.96	4.29	0.33	4.23	0.27
Utilities	3.44	2.88	(0.56)	3.16	(0.28)

Source: MSCI, FactSet

MSCI Indices Country Weights Comparison
Developed Markets
As of May 31, 2016

Region / Country	MSCI ACWI	MSCI ACWI Low Carbon Target		MSCI ACWI Ex-Fossil Fuels	
	Weight (%)	Wgt (%)	Diff (%)	Wgt (%)	Diff (%)
U.S.	**53.53**	**53.23**	**(0.30)**	**54.18**	**0.65**
Non-U.S.	**46.47**	**46.77**	**0.30**	**45.82**	**(0.65)**
Developed	**36.70**	**37.05**	**0.35**	**36.21**	**(0.49)**
Africa/Mideast	0.23	0.21	(0.02)	0.24	0.01
Israel	0.23	0.21	(0.02)	0.24	0.01
Asia/Pacific Ex Japan	3.94	3.89	(0.05)	3.85	(0.09)
Australia	2.37	2.35	(0.02)	2.21	(0.16)
Hong Kong	1.09	1.04	(0.05)	1.12	0.03
New Zealand	0.06	0.07	0.01	0.06	0.00
Singapore	0.43	0.43	0.00	0.46	0.03
Europe	21.62	21.44	(0.18)	21.01	(0.61)
Austria	0.06	0.04	(0.02)	0.05	(0.01)
Belgium	0.49	0.45	(0.04)	0.52	0.03
Denmark	0.68	0.63	(0.05)	0.73	0.05
Finland	0.33	0.39	0.06	0.35	0.02
France	3.32	3.30	(0.02)	3.15	(0.17)
Germany	2.99	2.94	(0.05)	3.13	0.14
Ireland	0.17	0.04	(0.13)	0.18	0.01
Italy	0.70	0.59	(0.11)	0.52	(0.18)
Netherlands	1.01	1.07	0.06	1.08	0.07
Norway	0.20	0.25	0.05	0.16	(0.04)
Portugal	0.05	0.02	(0.03)	0.04	(0.01)
Spain	1.07	1.16	0.09	1.10	0.03
Sweden	0.95	0.94	(0.01)	1.00	0.05
Switzerland	3.06	3.09	0.03	3.27	0.21
United Kingdom	6.54	6.53	(0.01)	5.73	(0.81)
Japan	7.74	7.79	0.05	8.19	0.45
Japan	7.74	7.79	0.05	8.19	0.45
Canada	3.15	3.69	0.54	2.90	(0.25)

Source: MSCI, FactSet

MSCI Indices Country Weights Comparison
Emerging Markets
As of May 31, 2016

Region / Country	MSCI ACWI	MSCI ACWI Low Carbon Target		MSCI ACWI Ex-Fossil Fuels	
	Weight (%)	Wgt (%)	Diff (%)	Wgt (%)	Diff (%)
Emerging	**9.77**	**9.72**	**(0.05)**	**9.61**	**(0.16)**
Africa/Mideast	0.90	0.90	0.00	0.89	(0.01)
Egypt	0.02	0.01	(0.01)	0.02	0.00
Qatar	0.09	0.13	0.04	0.10	0.01
South Africa	0.70	0.68	(0.02)	0.68	(0.02)
United Arab Emirates	0.09	0.08	(0.01)	0.09	0.00
Asia/Pacific Ex Japan	6.88	6.69	(0.19)	6.97	0.09
China	2.38	2.36	(0.02)	2.34	(0.04)
India	0.84	0.77	(0.07)	0.80	(0.04)
Indonesia	0.26	0.27	0.01	0.27	0.01
Korea	1.50	1.46	(0.04)	1.57	0.07
Malaysia	0.32	0.30	(0.02)	0.34	0.02
Philippines	0.15	0.10	(0.05)	0.16	0.01
Taiwan	1.21	1.22	0.01	1.29	0.08
Thailand	0.23	0.20	(0.03)	0.20	(0.03)
Europe	0.74	0.63	(0.11)	0.50	(0.24)
Czech Republic	0.02	0.00	(0.02)	0.01	(0.01)
Greece	0.05	0.08	0.03	0.05	0.00
Hungary	0.03	0.00	(0.03)	0.03	0.00
Poland	0.12	0.13	0.01	0.10	(0.02)
Russia	0.38	0.32	(0.06)	0.16	(0.22)
Turkey	0.14	0.10	(0.04)	0.15	0.01
Latin America	1.25	1.50	0.25	1.26	0.01
Brazil	0.64	0.74	0.10	0.62	(0.02)
Chile	0.12	0.11	(0.01)	0.11	(0.01)
Colombia	0.05	0.17	0.12	0.04	(0.01)
Mexico	0.42	0.44	0.02	0.45	0.03
Peru	0.03	0.04	0.01	0.03	0.00

Source: MSCI, FactSet

MSCI Indices
Key Metrics
As of May 31, 2016

	MSCI ACWI Index	MSCI ACWI Low Carbon Target Index	MSCI ACWI ex Fossil Fuels Index
Total Return* (%)	7.8	8.2	8.9
Total Risk* (%)	13.4	13.4	13.0
Return/Risk	0.58	0.61	0.68
Sharpe Ratio	0.57	0.60	0.67
Active Return* (%)	0.0	0.4	1.1
Tracking Error* (%)	0.0	0.4	1.0
Information Ratio	NA	0.86	1.00
Historical Beta	1.00	1.00	0.97
Turnover** (%)	2.0	13.0	2.3
Carbon Emissions (t CO2e/$M Invested)	184	45	145
Reduction from benchmark		76%	21%
Potential Carbon Emissions (t CO2e/$M Invested)	2094	19	0
Reduction from benchmark		99%	100%
Carbon Emission Intensity (t CO2/$M Sales)	242	65	206
Reduction from benchmark		73%	15%

* Gross returns annualized in USD for the 11/30/2010 to 05/31/2016 period

** Annualized one-way turnover for index reviews

Source: MSCI