

11th
Annual Report

GREEN INITIATIVE TASK FORCE

.....
*2016–17 Annual Report
period ending June 30, 2017*

HIGHLIGHTING

CalSTRS environmental-themed
investments and environmental
risk-management efforts

 **MISSION**

To manage the risks and capture the opportunities associated with global sustainability issues by identifying environmentally focused strategies intended to enhance the risk-adjusted returns of the CalSTRS Investment Portfolio.

—CALSTRS INVESTMENTS BRANCH

November 1, 2017

Dear Reader:

I am pleased to present the 11th annual report from the CalSTRS Green Initiative Task Force, “the Green Team,” detailing the Investments Branch activities relating to environmental risk management and opportunity capture. This report reflects CalSTRS’ recognition that environmental issues impact the performance of the CalSTRS Investment Portfolio across companies, sectors, regions and asset classes. The increasing importance of environmental considerations in investing has rarely been more evident than it is today. We are routinely made aware of environmental-related events that impact society and the economy.

CalSTRS has long advocated the need for companies to provide integrated reporting to investors. Corporate disclosure that provides information on both the financial and nonfinancial aspects of company operations is important. There is no question that many companies still are not providing a sufficient level of sustainability-related disclosure and that this disclosure is needed to comprehensively assess risk and properly value investments. However, simply providing more disclosure is not the solution. Companies need to provide the right disclosure—disclosure on environmental, social and governance issues that present significant material risks to corporate value.

CalSTRS believes that the use of industry-specific ESG accounting standards, such as those developed by the Sustainability Accounting Standards Board, will help public corporations simplify their ESG disclosures while providing valuable information to investors. We also believe that constructive engagement is a best-practice means of influencing a company’s behavior. Therefore, CalSTRS Investments staff regularly considers SASB metrics for companies that we engage. Also, in fall of 2016, I joined SASB’s Investor Advisory Group as a means of promoting the SASB standards in order to further push for corporate adoption and participation.

As you explore our 11th annual report, you will notice changes from previous reports. We listened to our members and stakeholders and made this report more concise and visually engaging. While we continue to provide examples of sustainable and green investments, we have more clearly presented some of the methods each CalSTRS asset class uses to identify and evaluate environmental risks throughout the investment management process.

Finally, I am happy to announce that the initial implementation of CalSTRS’ \$2.5 billion Low-Carbon Index took place July 1, 2017. This first phase represents a \$1.3 billion investment in the U.S. market. Over time, we will invest an additional \$1.2 billion between non-U.S. developed markets and emerging markets.

I thank you for taking the time to consider this report, and I encourage you to join us and our collaborative partners as we promote environmental risk management and investment awareness throughout the global financial markets.

Sincerely,



Christopher J. Ailman
Chief Investment Officer
California State Teachers' Retirement System

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CALSTRS INVESTMENTS COLOR GUIDE

 CalSTRS	 Inflation Sensitive
 Corporate Governance	 Private Equity
 Fixed Income	 Real Estate
 Global Equity	



STRATEGIC PLAN

The CalSTRS Green Team identified several initiatives that it believes will allow the team to achieve its goals of incorporating environmental considerations into investment risk management and opportunity capture. Over the past few years, team members have been working on the following initiatives:

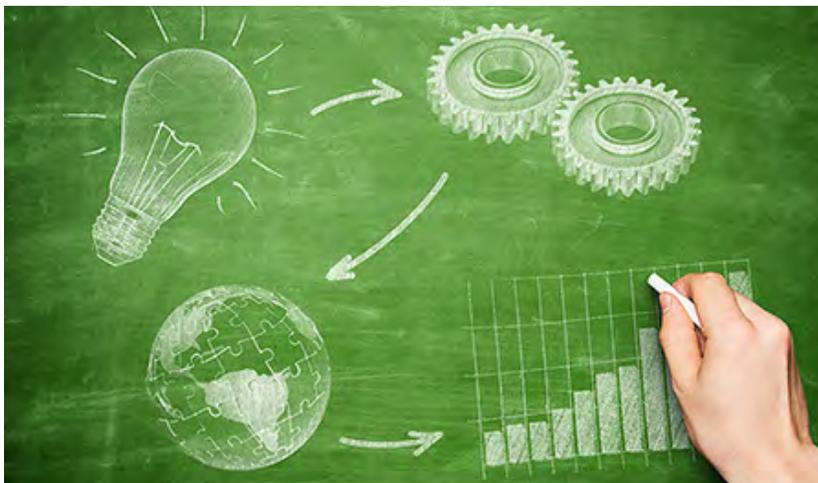
1	Continued education on environmental risk issues and environmental-themed investment opportunities.
2	Integration of environmental risk factors into manager procurement processes and ongoing due diligence efforts.
3	Improving the ability to consider increased allocations to environmental-themed investments.
4	Integration of environmental considerations into asset allocation processes.

GREEN TEAM STRATEGIC PLAN

- 1** During 2016–17, Initiative One was undertaken as staff brought in several environmental experts to discuss risk management and investment opportunity capture. Representatives of CalSTRS' external investment managers spoke with Green Team staff. In addition, members of the Green Team attended the McKinsey & Company Sustainability & Resource Productivity Summit. For 2017–18, we will continue to seek educational opportunities and work to grow our knowledge base.
- 2** Staff implemented Initiative Two in 2016–17. CalSTRS' Investments asset classes continued to engage external managers on environmental issues, and environmental consideration is part of the manager selection process. Additionally, staff continued to enhance the reporting mechanism through which external managers affirm they are considering environmental risks.
- 3** As part of CalSTRS' commitment to Initiative Three, our Fixed Income asset class continued to invest in green bonds, and the Inflation Sensitive asset class, through our infrastructure program, added new green investments to our investment portfolio. For 2017–18, Green Team staff will continue to look for opportunities to consider additional green investments that meet CalSTRS' risk and return requirements.
- 4** Staff also achieved progress in support for Initiative Four. In 2015, CalSTRS was a participant in Mercer's climate change asset allocation study, which analyzed how various asset classes would be expected to perform under differing climate change scenarios. Staff considered environmental risks during the asset allocation process as CalSTRS pursued and announced a \$2.5 billion commitment to a low-carbon public equities index.

Members of the Green Team attended the McKinsey & Company Sustainability & Resource Productivity Summit. For

2017–18, we will continue to seek educational opportunities and work to grow our knowledge base.





RISK MANAGEMENT

As directed by the Teachers' Retirement Board, Investments Branch staff developed techniques and tools designed to mitigate the level of environmental risk that the CalSTRS Investment Portfolio faces. As a large, diversified global investor, CalSTRS needs to be mindful that we are exposed to a variety of environmental risks and therefore must engage financial market participants who might influence risk within markets we invest in.

CalSTRS works with our external managers to recognize and manage environmental risks. Direct engagement with portfolio companies is an important and effective means of managing risk, and CalSTRS is very active in this area. We understand that working collaboratively with other investors is an excellent way to broaden engagement reach and strive to partner with others whenever possible.

Being active owners and voting proxies also helps reduce risk. CalSTRS routinely submits environmental-related shareholder proposals to companies held in its Public Equity Portfolio to raise their level of environmental risk awareness. Staff considers and votes all environmental-related proposals in a manner that aligns with our objectives of improving disclosure and mitigating risk.

21 RISK FACTOR COMMITTEE

When any manager, internal or external, is making an investment decision on behalf of CalSTRS, the manager must consider the CalSTRS 21 Risk Factors. The risk factors are also part of the continuous diligence process staff undertakes with existing investments and investment managers. We regularly query our external fund managers on how they are factoring these risk factors into investment decisions made on our behalf.

CALSTRS ENVIRONMENTAL, SOCIAL AND GOVERNANCE RISK CONSIDERATIONS

Environmental Risk Consideration

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

CalSTRS staff recognized that developing a set of ESG risks and ESG risk management procedures was not enough to ensure an appropriate level of risk management. A process needed to be developed that would allow CalSTRS to implement our ESG risk management procedures.

To that end, Investments staff developed the 21 Risk Factor Review Committee. This committee, led by the CalSTRS Chief Investment Officer and composed of senior staff representatives from each asset class, helps the CIO evaluate exposure to ESG-related risks and take appropriate actions to ensure that external and internal managers adhere to CalSTRS' policy surrounding the management of ESG risk exposure.



CALSTRS ENVIRONMENTAL, SOCIAL AND GOVERNANCE RISK MANAGEMENT PROCEDURES

When faced with a corporate decision that violates the CalSTRS 21 Risk Factors, at the direction of the Teachers' Retirement Board's Investment Committee or at the discretion of the CIO, the Investments staff will directly engage a company's management to seek a change in that corporate behavior in the following ways:

1	CalSTRS will actively engage, in a constructive manner, corporate management whose actions are inconsistent with this policy. All forms of engagement are used, including letter writing, meetings, participation in advocacy groups, media campaigns and proxy voting.
2	After all reasonable efforts have been made to constructively engage corporate management and there is a clear nexus between the corporate behavior and the CalSTRS policy violation and, in the CIO's opinion, the corporate remedies are insufficient or nonresponsive, CalSTRS will inform our active investment managers that, to the extent suitable alternate investments are available and their inclusion in the portfolio would result in no diminution in portfolio return or increase in risk, the managers will invest in these alternatives until the CalSTRS policy violations cease.
3	Upon remedy of the policy violation, CalSTRS will inform the active investment managers and passive managers that the securities can be purchased and report this action in writing to the Investment Committee.

Environmental risk consideration is part of the CalSTRS 21 Risk Factors and during 2016–17, the committee considered environmental-related issues that potentially violated the 21 risk factors. The principal environmental issue staff considered was CalSTRS' exposure to fossil fuel companies and if, or to what degree, the

activities of these companies presented a material risk to the CalSTRS Investment Portfolio. Staff continues to evaluate the portfolio's exposure to fossil fuels and to engage companies involved in fossil fuel exploration and production.



GLOBAL EQUITY EXTERNAL MANAGER ENGAGEMENT

Background and Responses

Since 2010, all of our Global Equity external investment managers have been surveyed annually to assess the level of climate considerations in their respective processes. From 2010 through 2012, the question asked was:

- 1 Do you explicitly incorporate climate risk into your investment process?**

Beginning in 2012, Global Equity external managers were also asked:

- 2 Have you taken steps to better incorporate climate risk into your investment process since last year?**

Starting in 2013, a third question was asked:

- 3 Is your organization a UNPRI Signatory?**

In 2016, we added the question:

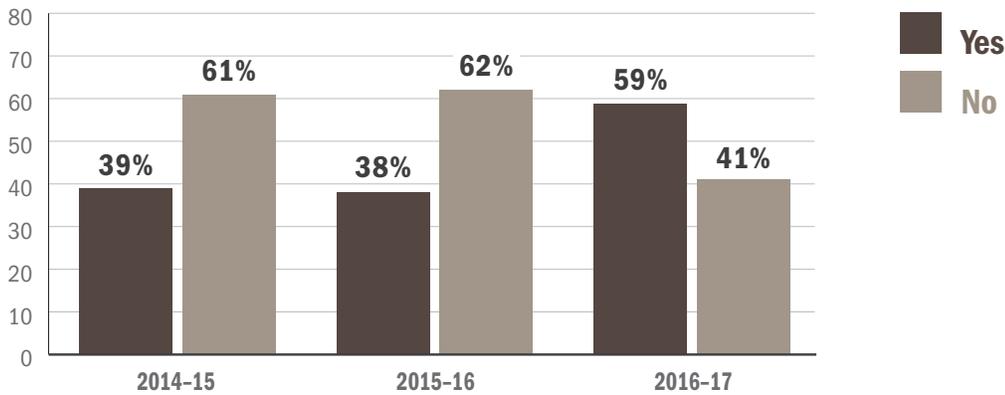
- 4 Do you consider the carbon profile of a company when making investment decisions?**



1

DO YOU EXPLICITLY INCORPORATE CLIMATE RISK INTO YOUR INVESTMENT PROCESS?

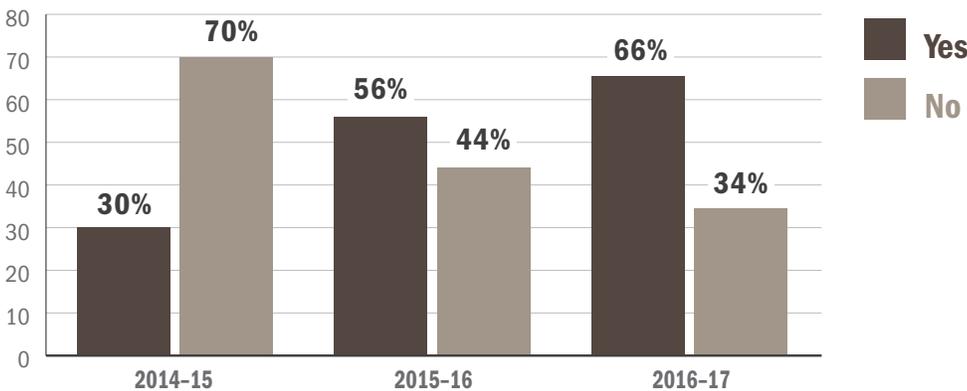
For 2016–17, 59 percent of the Global Equity external managers indicated that they incorporated climate change into their processes. The following chart provides a historical perspective of external manager responses to this question:



2

HAVE YOU TAKEN STEPS IN 2016-17 TO BETTER INCORPORATE CLIMATE RISK INTO YOUR INVESTMENT PROCESS?

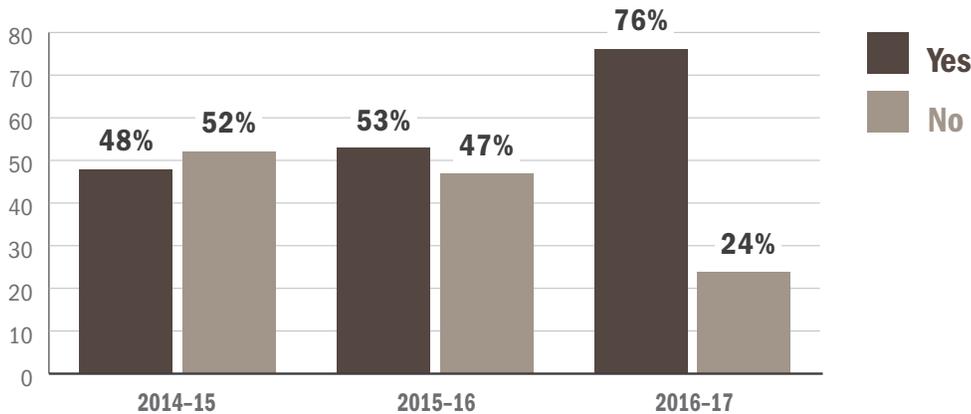
For 2016–17, 66 percent of the Global Equity external managers reported that they had. The following chart provides a historical perspective of external manager responses to this question:



3

IS YOUR ORGANIZATION A UNPRI SIGNATORY?

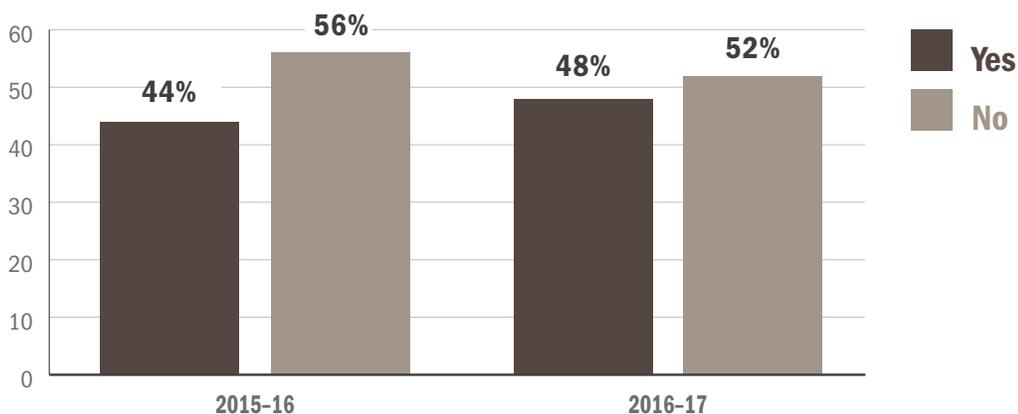
For 2016–17, 76 percent of external managers indicated that they were signatories to the UN-supported Principles for Responsible Investment initiative. The following chart provides a historical perspective to this question:



4

DO YOU CONSIDER THE CARBON PROFILE OF A COMPANY WHEN MAKING INVESTMENT DECISIONS?

For 2016–17, 48 percent of external managers indicated that they considered the carbon profile of a company when making investment decisions. The following chart gives a year-over-year comparison for this question:



CORPORATE ENGAGEMENT

PEER NETWORKING AND COLLABORATIONS

CalSTRS staff continues to participate in peer networking and collaborations on sustainability issues. The benefits of collaboration are tremendous and include education for staff and the ability to leverage the strength of the CalSTRS portfolio while giving a bigger voice to issues and engagements CalSTRS is involved with. Below are brief descriptions of some of these opportunities.



Ceres Investor Network on Climate Change and Sustainability

Investor Network on Climate Risk working groups offer investors the opportunity to engage with their peers to share updates on key research and best practices, develop strategies, and advance ESG issues on a variety of fronts, from corporate disclosure and performance to sustainability policy and regulations. Working groups meet monthly, bimonthly or quarterly via phone or web meeting. Staff participates extensively within the INCR working groups.

Investor Water Hub

The INCR Investor Water Hub undertakes activities that help drive greater consideration of water in investment decision-making. This group offers peer-to-peer sharing of leading ESG and water integration and engagement practices, and a forum to develop more effective research methods to assess water risks and opportunities. The Investor Water Hub

also explores ideas that help drive investing in solutions that support sustainable water resources. CalSTRS regularly participates on the Investor Water Hub calls. We have led multiple engagements or partnered with others that began through the discussions and research developed within this group. We also invited Ceres staff who lead the INCR Investor Water Hub to provide a water risk management briefing to the CalSTRS Green Team.

INCR Shareholder Initiative on Climate and Sustainability

The INCR Shareholder Initiative on Climate and Sustainability coordinates the efforts of investors seeking to engage investee companies on climate, clean energy and related sustainability risk and opportunity issues through corporate engagements on key ESG issues. The goal is to reduce long-term portfolio-wide risks and enhance returns. Staff members attended Ceres Shareholder Initiative on Climate and Sustainability Winter and Summer In Person Strategy meetings where they were able to meet and strategize with more than 15 other institutional investors and provide updates and guidance on our ongoing engagements and shareholder proposals.



Hydraulic Fracturing Engagement

CalSTRS is a signatory to the PRI and often joins PRI-led collaborative engagements that align with our long-term value accretion philosophy. CalSTRS continued to be part of PRI-led collaborative engagement of oil and natural gas-producing companies that focused on the risks associated with hydraulic fracturing. This engagement centered on 56 companies held in the Global Equity Portfolio. CalSTRS' holdings in these companies have a combined portfolio value of more than \$4 billion. Although this specific engagement concluded in fall 2016, staff continued to engage a number of these companies in 2017.



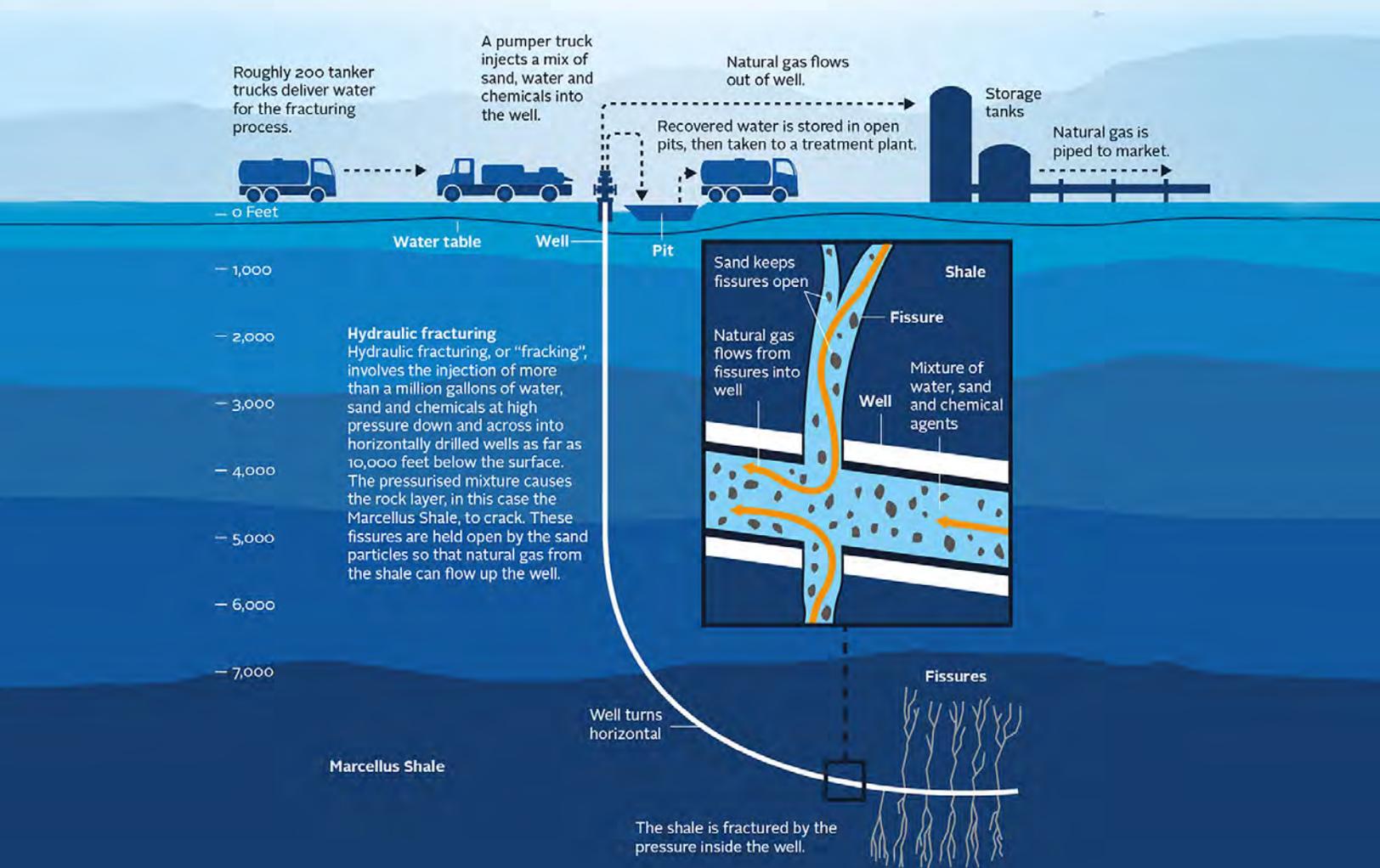
HYDRAULIC FRACTURING

According to the PRI, the production of oil and gas via hydraulic fracturing, or “fracking,” remains important, and yet it can be viewed as a contentious method in some regions, with community controversies, bans and moratoria in different areas. Local communities and the media have brought attention to the environmental and social impacts of fracking worldwide. Complaints include traces of chemicals from fracking fluids being found in drinking water and health implications from fracking-related air pollution. Fracking risks of concern to investors include:

1. Operational and physical risks can increase costs and impact the value of an investment.
2. The leakage of methane and other greenhouse gas emissions contributes to climate change. Methane can also be a loss of revenue for the company.

3. Reputational risk and social license to operate. A company’s ability to adequately respond to and manage local community concerns can affect reputational risks and the social license to operate.
4. Policy and regulation. Companies need to be able to adapt to meet changing regulatory requirements, potentially raising costs.

Company disclosure of fracking practices were benchmarked before and after engagement. Eighty-seven percent of the engaged and benchmarked companies improved their disclosure of fracking-related policies, practices and management systems during the period of engagement.



Based on AI Granberg’s illustration

CALSTRS ENVIRONMENTAL RISK SHAREHOLDER PROPOSALS

When Investments' staff believes that a company is not willing to make the necessary progress toward managing environmental risks, staff will strongly consider exercising CalSTRS' equity ownership rights by filing a shareholder proposal with the company, calling on the company to improve its environmental risk-management efforts. The intent of the shareholder proposal is to bring our concerns to the company's shareholders and generate enough support from the investor base to convince the company to commit to our recommendations. Often, the filing of a shareholder proposal will increase a company's willingness to engage further with staff and lead to a commitment to improve risk-management and disclosure.

Since 2008, CalSTRS has filed 52 environmental-related shareholder proposals that called on companies to improve their environmental risk-management disclosure efforts. Of these 52 shareholder proposals, 40 were ultimately withdrawn before the company's annual meeting as staff was able to negotiate a mutually agreeable outcome with the company. In fall 2016, staff filed five shareholder proposals, one of which went to a shareholder vote in spring 2017. Since 2008, the 11 proposals voted on by shareholders have received, on average, approximately 28 percent support.

Most of the engagements that staff pursued during fiscal year 2016–17 focused on methane and water risk management.

Methane Emissions Engagement

Over a 20-year period, methane, the primary component of natural gas, is a climate pollutant 84 times more powerful than carbon dioxide. According to Environmental Defense Fund calculations, methane is responsible for a quarter of the warming the earth is experiencing today. Unmanaged methane emissions could undermine the value proposition of natural gas for delivering cleaner, low-cost energy through increasing scrutiny from the public, environmental and health groups, and state and federal policymakers.

Gas Utility Companies

During the summer of 2016, CalSTRS staff began researching gas utility companies for engagement. Similar to companies in the oil and gas industry, gas utility companies were targeted for engagement because the industry presents tremendous opportunities to strengthen its methane emissions risk-management strategy. For gas utility engagement, staff used a bottom-up approach by first assessing the underlying publicly disclosed data of all gathering, transmission and distribution utility subsidiaries. Then staff analyzed, both on a relative and absolute basis, the number of known leaks in both high consequence and non-high consequence areas, the total miles of pipeline, and the rate of unaccounted for gas. After that, staff assessed the current pipeline Integrity Management Program disclosure of 35 gas utility

companies and specifically evaluated disclosure of pipeline infrastructure investments, emissions rates, emissions reduction targets or goals, leak detection and repair protocol, and emergency preparedness. Lastly, staff benchmarked the results across the gas utility companies in the CalSTRS Public Equity Portfolio to identify which 15 companies may be most financially exposed to the Pipeline and Hazardous Materials Safety Administration's 2016 proposed rulings.

Nearly all 15 of the targeted gas utility companies that responded to our engagement letter communicated with us. After an initial dialogue, the majority of the companies indicated that they were committed to enhancing their methane emissions risk-management activities and making their disclosure for all their shareholders more clear. About a third of the companies required a deeper dialogue over several months before committing to more meaningful future disclosure on methane emissions. This included one gas utility company that CalSTRS eventually filed a shareholder proposal with to request a report on how it is monitoring and managing the level of methane emissions from its operations.

Since 2008, CalSTRS
has filed **52**
environmental-related
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disclosure efforts.

THE PIPELINE AND HAZARDOUS MATERIALS SAFETY ADMINISTRATION

The Pipeline and Hazardous Materials Safety Administration, PHMSA, is the U.S. Department of Transportation agency that develops and enforces regulations for the safe, reliable and environmentally sound operation of the nation's 2.6 million-mile pipeline transportation system and the nearly 1 million daily shipments of hazardous materials by land, sea and air. PHMSA comprises two safety offices: the Office of Pipeline Safety and the Office of Hazardous Materials Safety.

High Consequence Areas, HCAs, for natural gas transmission pipelines focus solely on populated areas. An equation based on research and experience estimates the distance from

a potential explosion at which death, injury or significant property damage could occur. This distance is known as the potential impact radius, and is used to depict potential impact circles. Operators must calculate the potential impact radius for all points along their pipelines and evaluate corresponding impact circles to identify the population contained within each circle. The following are defined as HCAs: potential impact circles that contain 20 or more structures intended for human occupancy; buildings housing populations of limited mobility; buildings that would be hard to evacuate such as nursing homes and schools; and buildings and outside areas occupied by more than 20 persons on a specified minimum number of days each year.

WATER RISK

For the past two years, CalSTRS has been a member of the Ceres Investor Water Hub, which works to help drive greater consideration of water risk in investment decision-making. In 2015, Ceres developed the *Feeding Ourselves Thirsty: How the Food Sector Is Managing Global Water Risks* report, which evaluated publicly available information on the water use, stewardship and policies of 37 major food sector companies. CalSTRS was a signatory to a letter directed to many of these companies that asked for better water risk-related disclosure from their direct operations and supply chains. From this involvement, many of the companies opted to enhance their water-related disclosure during 2016.

In 2016, CalSTRS identified one specific beverage company that had yet to make any improvements to its water risk management disclosure. During the course of the year, CalSTRS engaged the company and was able to have productive meetings addressing the company's water risk. Unfortunately, the company has refrained from adequately providing public disclosure on its risk management efforts. At the end of 2016, CalSTRS filed a shareholder proposal with the company requesting a report on its sustainability efforts, including an analysis of material water-related risks. The shareholder proposal went to a vote and received 32 percent support. Despite falling short of majority support, company management has committed to continuing to work with CalSTRS staff on water risk-management issues.



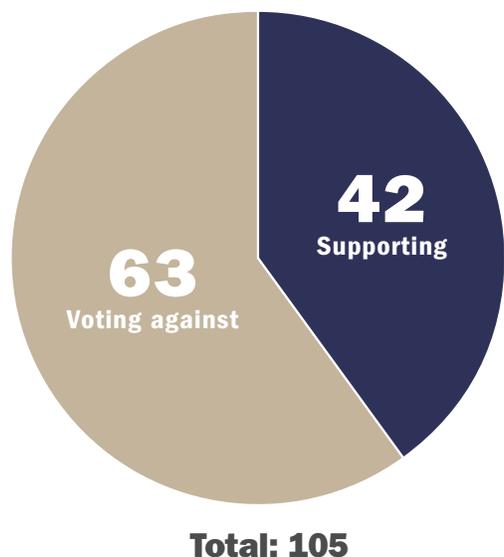
PROXY VOTING

Voting corporate proxies is a fiduciary responsibility and an important way to manage the risks associated with public equity ownership. The Teachers' Retirement Board delegated the responsibility for voting CalSTRS proxies to staff. The [CalSTRS Corporate Governance Principles](#) are guidelines that staff uses to assist in making proxy vote decisions. Appendix A to the principles is the Statement of Shareowner ESG Responsibility, which provides direction in determining how ESG-related proposals should be considered. The board regularly reviews, revises and approves the CalSTRS Corporate Governance Principles.

Over the course of any fiscal year, staff considers dozens of environmental-related shareholder proposals that cover a variety of issues and ask for varying levels of action. Environmental proposals cover issues such as greenhouse gas emissions, energy efficiency, waste disposal and recycling. These proposals request actions such as preparing reports, establishing emissions targets, and setting waste reduction goals. During the 2016–17 fiscal year, CalSTRS considered 105 environmental proposals, supporting 42 of them and voting against 63. The table below provides a breakdown of the issues considered.

2016–17 Fiscal Year

CalSTRS considered **105** environmental proposals, supporting **42** of them and voting against **63**.



Shareholder Proposals: Environment	Total
Shareholder Proposals: Environment	105
Adoption of Comprehensive Recycling Strategies	3
Bioengineering/Nanotechnology Safety	3
Environmental Report	11
Formation of Environmental/Social Committee of the Board	4
Miscellaneous Energy/Environmental Issues	14
Miscellaneous Environmental Issue	8
Phase Out of Nuclear Power	13
Report on Antibiotics in Animal Agriculture	1
Report/Action on Climate Change	19
Reporting and Reducing Greenhouse Gas Emissions	9
Review Energy Efficiency & Renewables	6
Sustainability or Environmental Reports	4
Sustainability Report	12

CalSTRS reviewed each of these 105 proposals and assessed whether the proposal, if passed, would add value to the investment. The environmental proposals not supported were considered to be lacking shareholder value or substantially involved in day-to-day management of the company. Traditionally, CalSTRS supports proposals that call for improved environmental risk reporting, unless we believe that the company already adequately discloses these risks. In general, CalSTRS does not support environmental proposals intended to substitute for management's operational judgments. We believe that companies should be managing environmental risk, but also that companies should be the ones to decide how to design and implement risk management systems. CalSTRS supported 30 of the 35 proposals that called on companies to report on sustainability or climate change risks.

MERCER TRIP RISK FACTOR ANALYSIS



In 2015, CalSTRS collaborated with several other large institutional investors to help produce Mercer Consulting’s second report that focused on integrating climate change considerations into asset allocation decisions. The report, *Investing in a Time of Climate Change*, was a follow-up to Mercer’s 2011 groundbreaking effort around climate change and asset allocation. The second report was intended to provide guidance to investors on how they could position themselves to better manage the risks and take advantage of the opportunities associated with climate change.

One of the most helpful outcomes of the Mercer report was the identification of investment risks, or risk factors, that most likely would be driving the response to climate change and altering the investment landscape. According to the Mercer report, the four key investment risks associated with climate change are Technology, Resource Availability, Impact of Physical Damage and Policy. The following graph explains these risks.

Technology (T)	Resource Availability (R)
<p> The rate of progress and investment in the development of technology to support the low-carbon economy.</p> <p>The technology factor captures technological advancement and the opportunity for increased efficiency through technological change.</p> <p>The speed, scale and success of low-carbon technologies of existing sectors, or development of new sectors, are key considerations for investors.</p>	<p> The impact of chronic weather patterns; for example long-term changes in temperature or precipitation.</p> <p>Resource availability is a new aspect being added to the previous Mercer study to identify how changes to the physical environment might impact investments reliant on the use of resources, such as water and agricultural resources, at risk of becoming scarcer or, in some cases, more abundant over the long-term as a result of changes to weather patterns. The impacts on agriculture, energy and water are key.</p>
Impact of Physical Damages (I)	Policy (P)
<p> The physical impact of acute weather incidence such as extreme or catastrophic events.</p> <p>This factor can be interpreted as the economic impact of climate change on the physical environment caused largely by changes in the incidence and severity of extreme weather events.</p> <p>Examples include damage to property caused by flooding as a result of sea level rises, damage caused by hurricanes and damage caused by wildfire.</p>	<p> Collectively refers to all international, national and sub-national regulation, including legislation and targets, intended to reduce the risk of further man-made climate change.</p> <p>This factor can be interpreted as the level of coordinated ambition of governments to adopt and adhere to policies and regulations to reduce greenhouse gas emissions.</p> <p>Examples of climate-related policy include greenhouse gas emissions targets, carbon pricing, subsidies and energy efficiency standards.</p> <p>Policies can be classified into those that focus on the supply side (by encouraging the substitution of high emission products with lower emission alternatives) and those that focus on the demand side (by reducing demand for high emission products).</p>

Source: Mercer

To be more aware of how climate change could impact the investment portfolio, staff determined that it would be appropriate to monitor the status of the four risk factors Mercer identified. It's important to understand how policy that promotes carbon emissions reductions and how technology advances that support a low-carbon economy are evolving, and to recognize how extreme weather events and resource constraints might drive policy and technology changes. This information can help us ascertain what the most likely climate change outcome is.

To gain this better understanding, staff reviewed and analyzed events associated with the climate change risk factors, on both a year-over-year and trend basis, and provides its analysis here.

Technology

As the following chart shows, investment in clean energy projects decreased noticeably from 2015 to 2016, falling from \$348.5 billion in 2015 to \$287.5 billion in 2016. Most of this new investment reduction occurred in the Asia-Pacific region. However, clean energy investment in 2016 continued to remain within a \$250 billion to \$350 billion investment range established back in 2010. During this seven-year period, clean energy investment averaged \$300 billion annually. While this is a sizeable level of investment, it falls significantly below the \$1 trillion annual investment levels that climate experts claim are needed to achieve a 2 degree Celsius or less global warming outcome.

CLEAN ENERGY INVESTMENT

Clean Energy Investment*



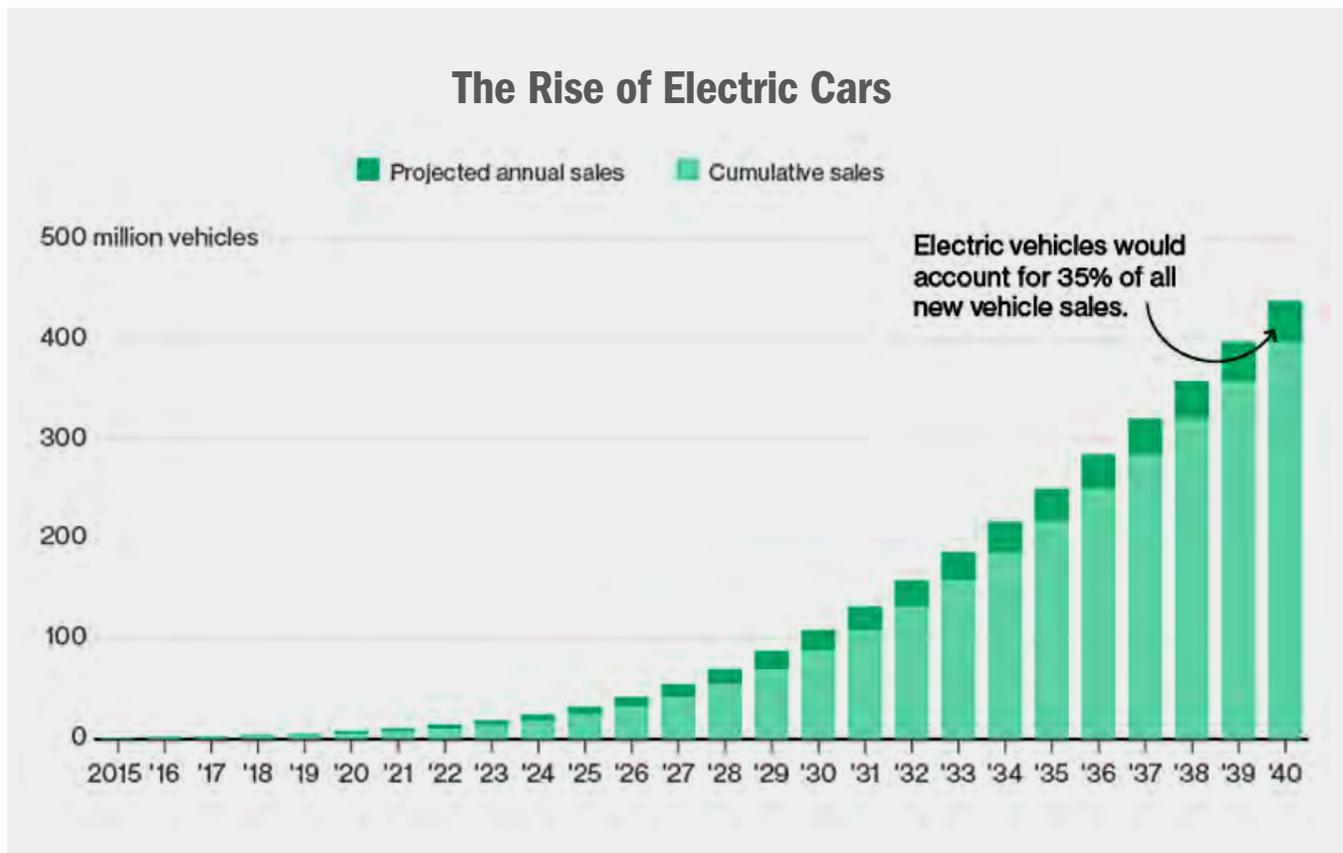
*Investment in billions

Asia-Pacific
 Europe, the Middle East and Africa
 The Americas: North, Central and South

Another barometer for clean technology uptake is electric vehicle sales. According to Bloomberg New Energy Finance, global electric vehicle sales rose to 695,000 in 2016, up from 448,000 sold in 2015. BNEF estimates that in 2017, electric vehicle sales will rise to over one million units sold. However, these one million units represent only 1 to 2 percent of global market share.

The following chart shows BNEF’s long-term expectations for annual electric vehicle sales.

THE RISE OF ELECTRIC CARS



Sources: Data compiled by Bloomberg New Energy Finance, Marklines

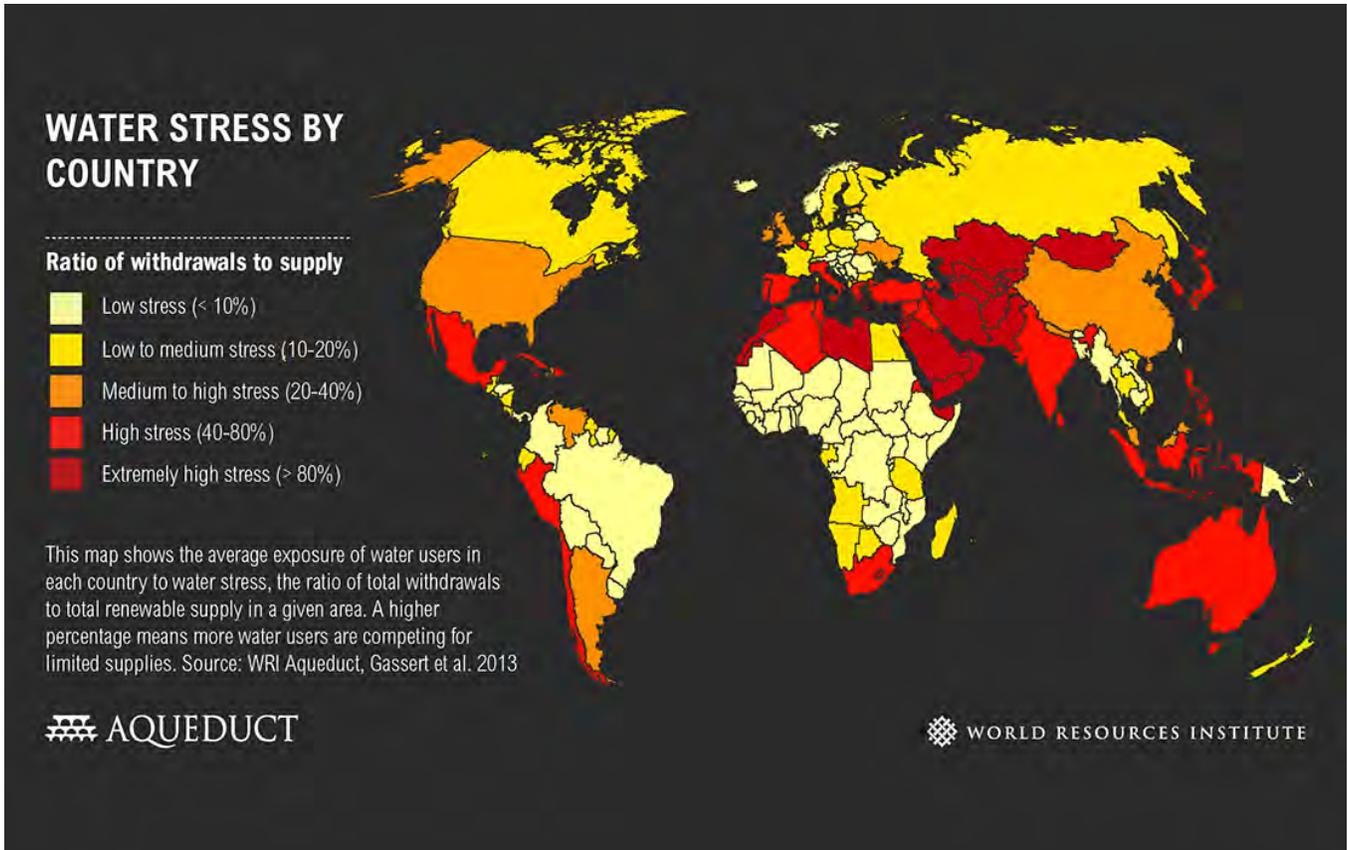
As the chart shows, it isn’t until 2030 that electric vehicle sales exceed the 100 million unit mark, and electric vehicles are not expected to account for more than one-third of all new vehicle sales until about 2040.

Affordable, reliable renewable energy storage is often cited as what is needed to properly accelerate the transition away from fossil fuel energy. According to BNEF, U.S. homes and businesses, mostly utilities, installed storage systems with 336 megawatt-hours of storage capacity in 2016, which is double the storage capacity installed in 2015. Since 2010, developers have installed 643 megawatts of energy-storage projects in the United States. Costs associated with battery storage continue to drop. BNEF reports that from 2010 to 2016, lithium-ion battery costs have fallen 73 percent.

Resource Availability

The following map, provided by the World Resources Institute, shows global water stress, defined as the ability, or lack thereof, to meet human and ecological demand for water. As the map shows, significant portions of the Americas, Europe and Asia are currently experiencing medium to extremely high water stress.

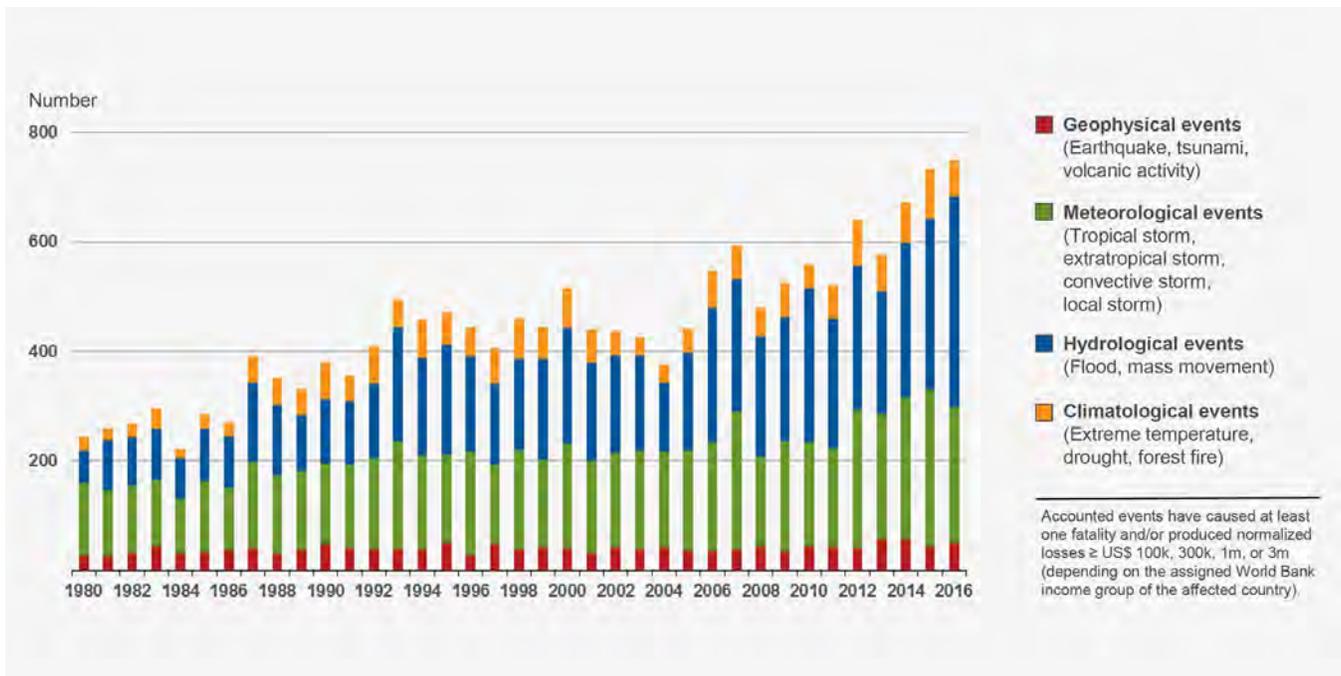
WATER STRESS BY COUNTRY



Impact of Physical Damages

As the following chart shows, since 1980, the number of global natural catastrophes has been increasing, with much of this increase seen in the last few years and manifested through meteorological and hydrological events.

NUMBER OF WORLD NATURAL CATASTROPHES, 1980-2016



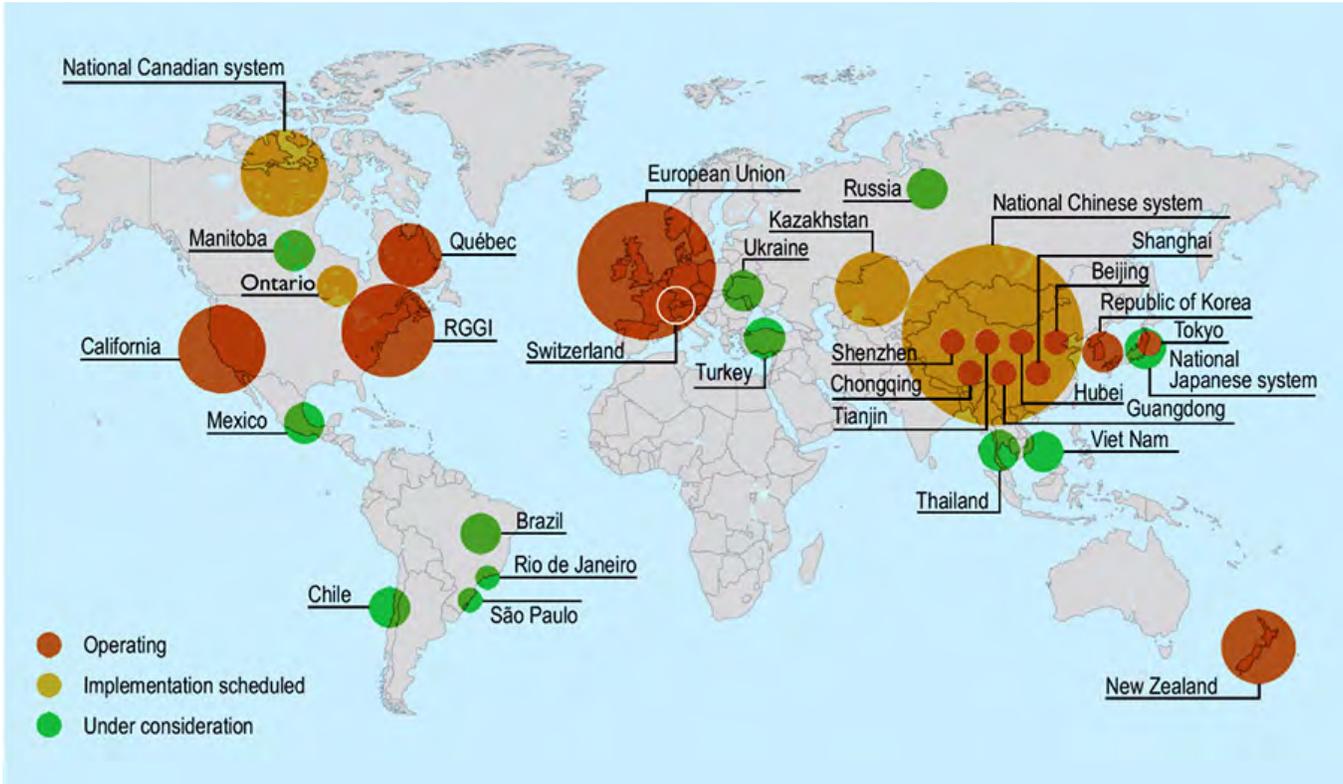
Source: Munich Re

2016 saw a significant number of natural catastrophes around the globe. According to Munich Re, the overall global loss amount derived from natural catastrophes was \$175 billion, making 2016 one of the top 10 costliest years on record.

Policy

The following chart, provided by the International Energy Agency, shows global carbon emissions schemes in 2016.

EXISTING & EMERGING EMISSIONS TRADING SYSTEMS & CARBON TAXES



Source: Adapted from country sources and International Carbon Action Partnership (2016), "ETS Map"

While most regions have implemented some level of carbon emissions regulation, pending or under consideration, most countries around the world have not implemented, or do not seem to be considering, any type of emissions reduction program. In light of the country commitments made in conjunction with the 2015 Paris climate accord, staff would expect to see more of a rise in the level of carbon pricing schemes. The level of carbon pricing shown in the above chart is largely unchanged from the level of carbon pricing seen in 2015.

Analysis

After considering the current profiles of the TRIP risk factors, it seems apparent that we are not on a pathway toward a scenario with an expected global temperature rise limited to 2 degrees Celsius. Despite the Paris

Climate Change Conference outcome, ambitious and stringent climate policy and mitigation action have yet to materialize. It is also debatable whether existing policy and mitigation efforts are aligned and cohesive. When existing levels of water stress and the growing number of meteorological and

hydrological catastrophes are also considered, a scenario outcome with a global temperature rise of at least 4 degrees Celsius continues to seem possible.

Staff will continue to monitor, analyze and report on these climate risk factors.

TASK FORCE ON CLIMATE-RELATED FINANCIAL DISCLOSURES



In 2015, the Financial Stability Board established the Task Force on Climate-related Financial Disclosures to develop voluntary, consistent climate-related financial risk disclosures that companies could use to provide information to investors, lenders, insurers, and other stakeholders.

The task force considered the physical, liability and transition risks associated with climate change and what constitutes effective financial disclosures across industries in order to help companies understand what financial markets want from them regarding how they measure and manage climate change risks.

On June 29, 2017, the task force released its final report that provides the context, background and framework for climate-related financial disclosures. The following graphic provides a summary of the disclosure highlighted in the report.

RECOMMENDATIONS AND SUPPORTING RECOMMENDED DISCLOSURES

Governance	Strategy	Risk Management	Metrics and Targets
<p>Disclose the organization's governance around climate-related risks and opportunities.</p>	<p>Disclose the actual and potential impacts of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning where such information is material.</p>	<p>Disclose how the organization identifies, assesses and manages climate-related risks.</p>	<p>Disclose the metrics and targets used to assess and manage relevant climate-related risks and opportunities where such information is material.</p>
<p>Recommended Disclosures</p> <p>a) Describe the board's oversight of climate-related risks and opportunities.</p> <p>b) Describe management's role in assessing and managing climate-related risks and opportunities.</p>	<p>Recommended Disclosures</p> <p>a) Describe the climate-related risks and opportunities the organization has identified over the short, medium, and long term.</p> <p>b) Describe the impact of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning.</p> <p>c) Describe the resilience of the organization's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario.</p>	<p>Recommended Disclosures</p> <p>a) Describe the organization's processes for identifying and assessing climate-related risks.</p> <p>b) Describe the organization's processes for managing climate-related risks.</p> <p>c) Describe how processes for identifying, assessing, and managing climate-related risks are integrated into the organization's overall risk management.</p>	<p>Recommended Disclosures</p> <p>a) Disclose the metrics used by the organization to assess climate-related risks and opportunities in line with its strategy and risk management process.</p> <p>b) Disclose Scope 1, Scope 2, and, if appropriate, Scope 3 greenhouse gas (GHG) emissions, and the related risks.</p> <p>c) Describe the targets used by the organization to manage climate-related risks and opportunities and performance against targets.</p>

Source: TCFD-Recommendations-Overview June 2017

CalSTRS staff reviewed the TCFD disclosure guidance and believes that much of what is recommended, and shown above, is already provided within CalSTRS' ESG-related reporting. Staff strongly supports the work of the task force and is developing ways to integrate TCFD disclosure recommendations into our climate-related reporting and corporate engagement efforts.



ASSET CLASS PROFILES

The CalSTRS Green Team identified the various methods Investments staff uses to incorporate environmental risk factors and considerations into investment risk management and ongoing due diligence efforts. On the next page is a legend with 10 of these methods, including a short description and icon for each one. For the individual asset class profiles, one or more of the methods and icons are used to showcase some of the ways each asset class integrates environmental risk factors into the investment management process.



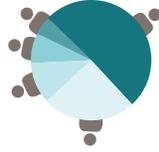
21 Risk Factor Investment Management Agreement—When any manager, internal or external, makes an investment decision on behalf of CalSTRS, the manager must consider the CalSTRS 21 Risk Factors. The risk factors are also part of the continuous diligence process staff undertakes with existing investments and investment managers. CalSTRS regularly queries external fund managers about how they consider these risk factors into investment decisions made on our behalf.



Dedicated Sustainability Investment Strategy—Even though environmental risks are incorporated throughout the CalSTRS Investments Portfolio, certain asset classes have more specifically defined sustainability investment strategies than others.



Credit Rating Analysis—Many leading credit ratings agencies have committed to including the use of ESG factors in a more systematic way when assessing the creditworthiness of a company participating in the debt capital markets.



Investment Advisory Boards—An advisory board is a body that provides strategic advice to the management of a corporation, organization or partnership. CalSTRS staff or representatives participate as members of many investment advisory boards.



Proxy Voting—Proxy voting is the primary means by which shareholders can influence a company’s operations, its corporate governance, and even its social and environmental responsibility activities. Voting corporate proxies is a fiduciary responsibility and an important way to manage the risks associated with public equity ownership. Over the course of any fiscal year, staff considers dozens of environmental-related shareholder proposals covering a variety of issues.



ESG Score Analysis—ESG scores help investors identify environmental, social and governance risks and opportunities within their portfolio. Staff conducts research on CalSTRS’ exposure to industry-specific ESG risks and a portfolio company’s ability to manage those risks relative to peers.



LEED & Energy Star Certifications—LEED and Energy Star certifications are two of the most widely used frameworks to assess and benchmark a building’s energy efficiency and environmental sustainability.



Environmental Impact Assessment—Environmental impact assessment is a process of evaluating the likely environmental impacts of a proposed project or development. The assessment may also propose measures to avoid, mitigate or offset environmental risks.



Commodity Risk Analysis—Commodity risk analysis refers to the assessment of future market values and investment return caused by the fluctuation in the prices of commodities. These commodities may be grains, metals, gas or electricity, and may be used extensively during operations.



Public Company Engagement—Staff often engage a portfolio company that is not willing to make the necessary progress toward managing material environmental risks by developing a dialogue to better understand and motivate the company to mitigate such risks. This would also include collaboration with many other asset managers and organizations.

CORPORATE GOVERNANCE

Total staff

12

Total AUM

**\$4.2
BILLION**

as of June 30, 2017

Environmental Integration



21 Risk Factor
Investment Management Agreement



Dedicated Sustainability
Investment Strategy



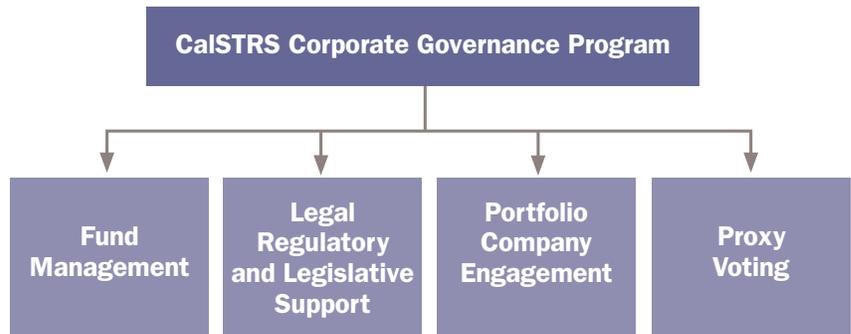
Proxy Voting



ESG Score Analysis



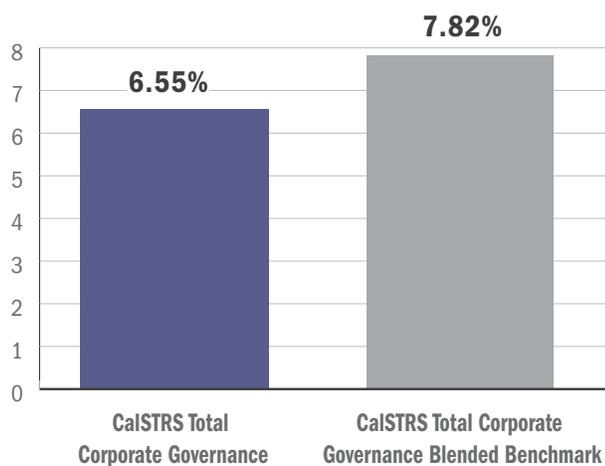
Public Company Engagement



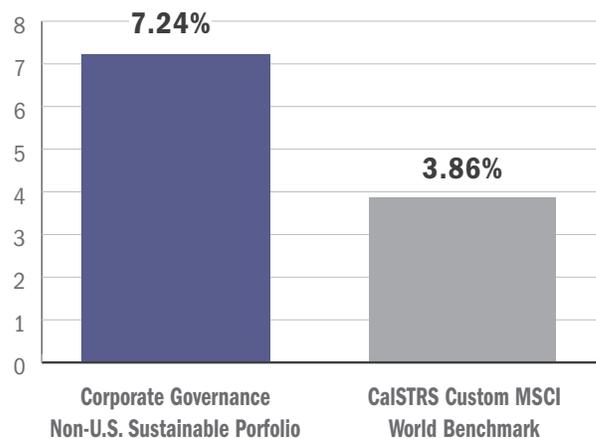
The Corporate Governance Division includes proxy voting, portfolio company engagements, filing of shareholder proposal initiatives and portfolio management. Our investment strategy is to be an active owner and engage CalSTRS' portfolio companies to mitigate risk and create opportunities for improved performance. Corporate Governance has two investment strategies: Activist and Sustainability.



Corporate Governance Investment Strategies Performances as of June 30, 2017



SINCE INCEPTION JUNE 1, 2015



10-YEAR NET RETURN

CORPORATE GOVERNANCE SUSTAINABLE INVESTMENT MANAGER PORTFOLIO

Within the active components of the Non-U.S. Public Equity Portfolio, the Corporate Governance team pursues the double bottom line goals of both competitive returns and sustainable investing through allocations to two investment managers: AGF Investments and Generation Investment Management.

Manager Name	Funded	Market Value (In Millions)	Benchmark	Comments
AGF Investments	2007	\$284.9	CalSTRS Custom MSCI World	AGF Investments invests in companies with viable business models categorized as environmental innovators, environmental leaders and environmentally benign companies.
Generation Investment Management	2007	\$767.0	CalSTRS Custom MSCI World	Generation believes sustainability issues can impact a company's ability to generate returns; therefore, companies must fully integrate rigorous fundamental equity analysis to achieve optimal long-term investment results.
Total		\$1,051.9		

Source: State Street as of June 30, 2017

ESG Manager Search

In October 2016, the Corporate Governance Division began the search process for public equity investment managers with an environmental, social and governance focus. During 2017, CalSTRS intends to award up to six new ESG investment management firms for our Sustainable Portfolio. Corporate Governance staff will continue to conduct due diligence and interviews with a number of investment firms.

FIXED INCOME

Total staff

22

Total AUM

**\$30.7
BILLION**

as of June 30, 2017

Environmental Integration



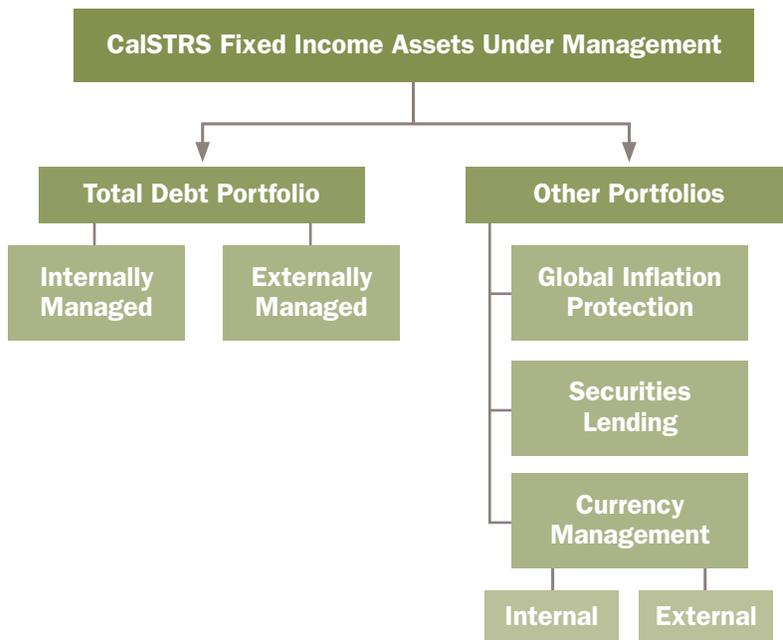
21 Risk Factor
Investment Management Agreement



Credit Rating Analysis

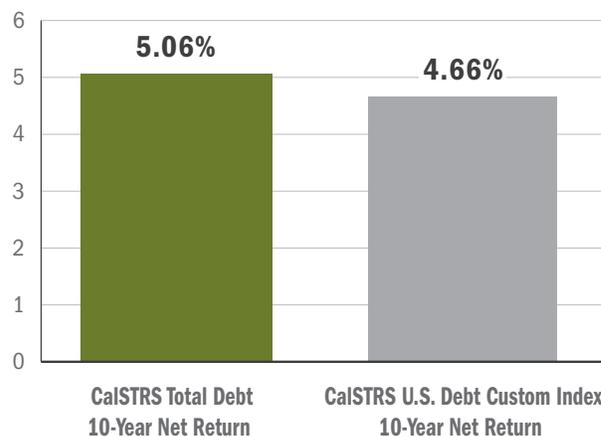


Dedicated Sustainability
Investment Strategy



The goal of the Fixed Income Division is to maximize risk-adjusted total return within a multi-asset class portfolio. Fixed Income provides value through innovative and active asset allocation and bond selection, taking advantage of internally and externally managed strategies.

Asset Class Performance



Why Invest in Green Bonds?

Green bonds offer competitive returns that complement our Fixed Income Portfolio, with the added benefit of investing in projects that benefit the environment.

Green Bond Memberships

CalSTRS' Fixed Income staff continues to provide guidance to members of climate-related groups, including the Climate Bonds Initiative and the International Capital Market Association's Green Bond Principles.



CalSTRS is on the Climate Bond Standards Board of the [Climate Bonds Initiative](#), a multidisciplinary and multimember nonprofit organization that seeks to establish standards along with a certification schedule for issuers and underwriters interested in issuing green bonds. A number of technical and working

groups are attempting to establish rigorous standards in areas ranging from solar energy to biofuels. Fixed Income continues to work closely with Corporate Governance on this initiative.



In January 2014, the Green Bond Principles were developed through guidance from issuers, investors and environmental groups, and serve as voluntary guidelines on the recommended process for the development and issuance of green bonds. The 2017 edition of the Green Bond Principles was released in June 2017, after a consultation period with members and observers active in the

green bond market. 2017 marked the third Green Bond Principles Annual Green Meeting in Paris, which CalSTRS staff attended. CalSTRS Fixed Income staff serves on the Green Bond Principles executive committee. Executive committee membership is based on a rotating election. Additional information on the group and the Green Bond Principles can be found at icmagroup.org/Regulatory-Policy-and-Market-Practice/green-bonds/.

The Fixed Income Division will continue to expand its leadership role in the green bond market and work with peers, bankers and issuers to better define the green bond space. Fixed Income staff will also serve as a resource to others looking to enter the field as an investor or issuer.

CALSTRS GREEN BOND HOLDINGS: \$254,735,306 as of June 30, 2017

Issuer	Year(s) Issued	% of Green Bonds	Use of Proceeds
KFW	2014, 2015, 2016	8.64%	Renewable energy projects
Toyota Motor Corporation	2015, 2016	7.47%	Financing hybrid/electric vehicles
Apple	2016, 2017	6.67%	Environmentally sustainable projects
Southern Power Company	2015, 2016	5.89%	Renewable energy generation projects
European Bank for Reconstruction and Development	2013, 2016	5.10%	Energy efficiency, clean energy, water management, environmental services, public transport and waste management
European Investment Bank	2014, 2016, 2017	5.10%	Renewable energy and energy efficiency
Swedish Export Credit	2015	3.93%	Transition to low-carbon and climate resilient growth
Export-Import Bank of Korea	2016	3.93%	Renewable energy projects
International Finance Corporation	2015, 2016	3.34%	Renewable energy, energy efficiency and other climate-smart projects in developing countries
Hyundai Capital Services	2016	2.75%	Financing hybrid/electric vehicles
Kommuninvest	2016, 2017	2.75%	Climate mitigation and adaption
Nordic Investment Bank	2014	2.49%	Environmentally sustainable projects
Export Development Canada	2015	2.36%	Climate change mitigation
MidAmerican Energy	2017	2.36%	Renewable energy

GLOBAL EQUITY

Total staff

15

Total AUM

**\$112.6
BILLION**

as of June 30, 2017

Environmental Integration



21 Risk Factor
Investment Management Agreement



ESG Score Analysis

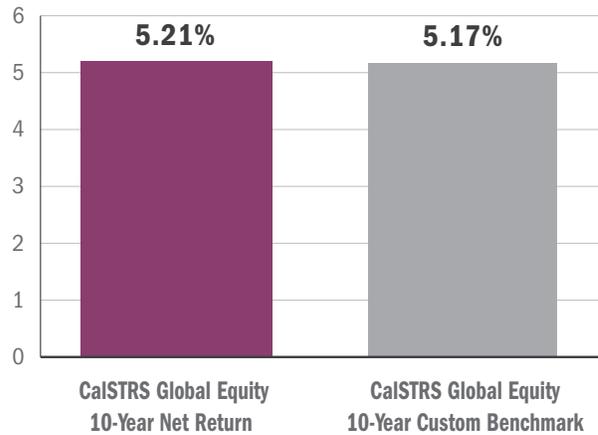


Dedicated Sustainability
Investment Strategy



The CalSTRS Global Equity Division manages U.S. and international publicly traded equities. Approximately half the stocks are internally managed, most of which are indexed to a market cap weighted index. The balance is actively managed by external investment managers.

Asset Class Performance



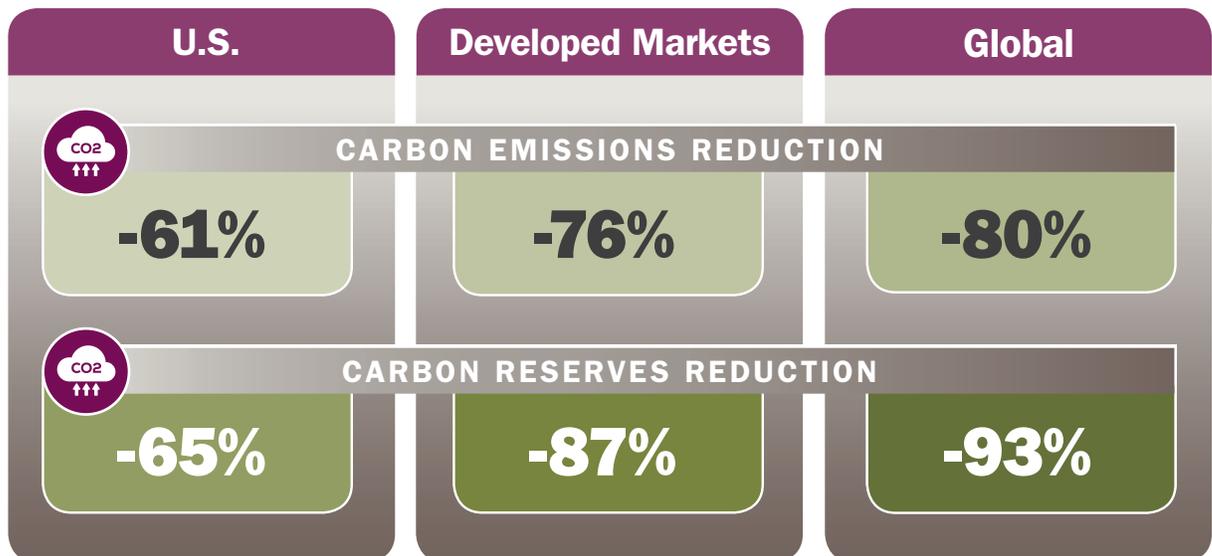
CalSTRS Low-Carbon Index

The initial implementation of CalSTRS' **\$2.5 billion Low-Carbon Index** took place July 1, 2017. This first phase represents a **\$1.3 billion investment in the U.S. market**. Over time, we will invest an additional **\$1.2 billion between non-U.S. developed markets and emerging markets**.

MSCI ACWI Low-Carbon Target Index: Implementation Roadmap for \$2.5 Billion

Phase 1	<ul style="list-style-type: none"> • \$1.3 billion into U.S. market » Implemented July 1, 2017
Phase 2	<ul style="list-style-type: none"> • \$1.0 billion into non-U.S. developed markets
Phase 3	<ul style="list-style-type: none"> • \$200 million into emerging markets

The projected carbon emissions reduction and carbon reserves reduction for the \$2.5 billion allocation is presented below. Carbon emissions represent current emissions and carbon reserves represent potential future emissions. In the MSCI ACWI Index, utilities, materials and energy companies accounted for more than four-fifths of the total current carbon emissions. Not surprisingly, energy companies represent more than 80 percent of total fossil fuel reserves.



INFLATION SENSITIVE



Total staff

7

Total AUM

\$2.3 BILLION

as of March 31, 2017



Environmental Integration



21 Risk Factor Investment Management Agreement



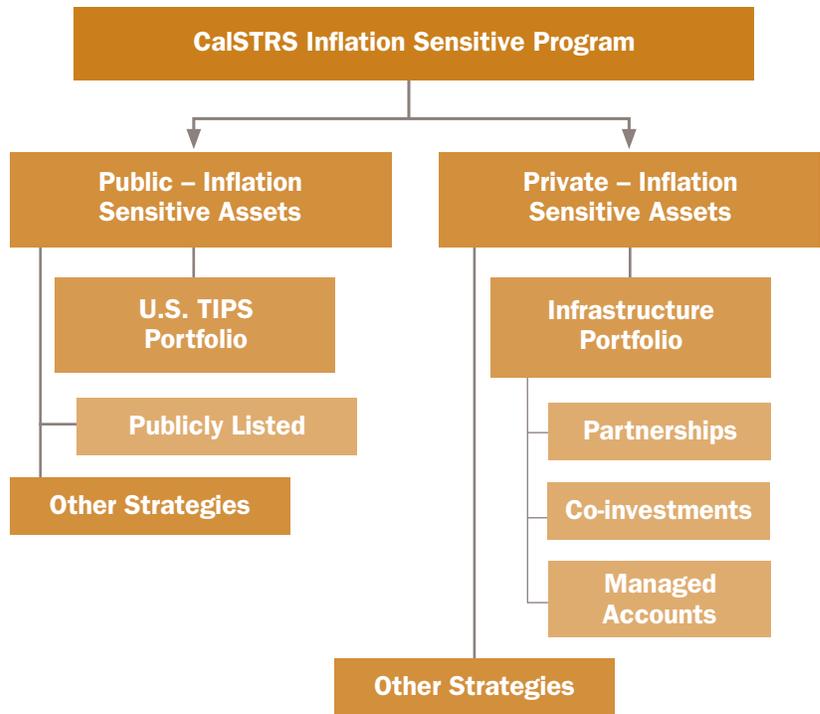
Investment Advisory Boards



Commodity Risk Analysis



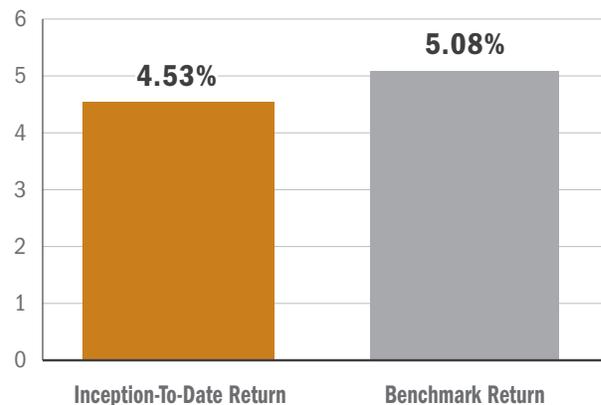
Environmental Impact Assessment



The Inflation Sensitive asset class consists of multiple sub-asset classes that, when combined, seek to provide investment returns in excess of the U.S. Consumer Price Index at a level that appropriately considers risk and return. The Inflation Sensitive Portfolio seeks to lower the macroeconomic risks that pervade the other asset classes while capturing changes in inflation. Inflation Sensitive considers both public and private strategies in areas such as infrastructure, commodities, agriculture, forestland and Treasury Inflation-Protected Securities.

Asset Class Performance

Inflation Sensitive generated a 4.53 percent inception-to-date return relative to a custom benchmark return of 5.08 percent. The program started in 2010 and doubled in size over the last three years. The current custom benchmark is a weighted blend of CPI+4%, Bloomberg Barclays U.S. Government Inflation-Linked Bond Index, Bloomberg Commodity Index and Alerian MLP Index.



ASSET CLASS SPECIFIC AREA

The CalSTRS Inflation Sensitive asset class has **\$243** million invested in solar, wind and other renewable power generation and LEED-certified assets.

	Asset Type	Approximate Investment Value (In millions)
	Solar Power Generation	\$117
	Wind Power Generation	\$54
	Other Renewable Power Generation	\$58
	LEED-Certified Assets	\$14
	TOTAL	\$243

PRIVATE EQUITY

Total staff

22

Total AUM

**\$29.4
BILLION**

as of March 31, 2017

Environmental Integration



21 Risk Factor
Investment Management Agreement



Investment Advisory Boards



Dedicated Sustainability
Investment Strategy



Environmental Impact Assessment

TOTAL EXPOSURE BY STRATEGY

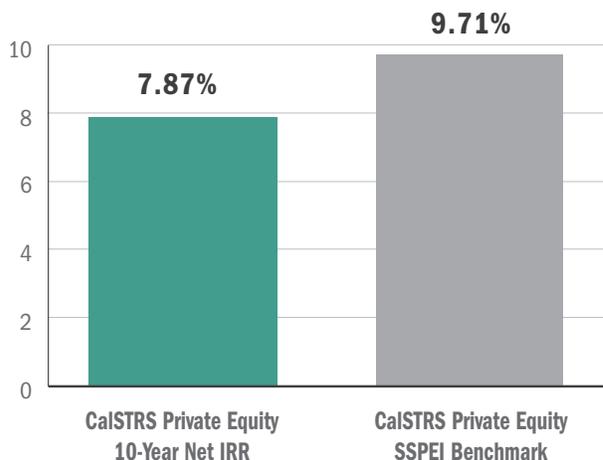
Buyout 68%	Venture Capital 11%	Opportunistic 1%
Private Debt 12%	Special Mandates 8%	Core PE 0%

The Private Equity asset class was established in 1988 with a global mandate. Currently, 78 percent of the portfolio is U.S.-based. Components include limited partnership commitments, side-by-side co-investments and secondary transactions.

Asset Class Performance

As of the first quarter of 2017, the Private Equity Portfolio has \$29.4 billion in assets under management, defined as total exposure—the sum of uncalled capital plus net asset value—and has generated a 10-year net IRR of 7.87 percent and a 13.16 percent net IRR since inception. The performance of the benchmark over the same periods was 9.71 percent and 12.72 percent, respectively. CalSTRS has outperformed the benchmark since inception by 44 basis points.

As of March 31, 2017, the overall performance of the Clean Energy Portfolio is 0.83x on a multiple of invested capital, or MOIC, basis. The performance of the clean energy buyout funds, representing 80 percent of committed capital, has generated a 0.88x MOIC to date. The buyout portion of the portfolio represents \$398 million of remaining market value. The performance of the clean energy venture capital funds, representing 20 percent of committed capital, has generated a 0.64x MOIC to date. The venture capital portion of the Clean Energy Portfolio represents \$87 million of remaining market value.



INVESTMENT SUMMARY: CLEAN ENERGY PORTFOLIO

Investment Type	Vintage Year Span	Aggregate Commitment (In Millions)	Comments
Buyout Funds	2006–2010	\$532.7	Buyouts involve the purchase of all or part of the stock or assets of a company using a significant amount of borrowed capital as well as equity capital. Borrowed capital typically consists of some combination of senior and subordinated debt. The company may be privately or publicly owned, or a subsidiary or division of a privately or publicly owned company.
Venture Capital Funds	2005–2012	\$75.4	Venture capital refers to investments in young, emerging growth companies in different stages of development. The stages of venture capital investing include the following: Seed Stage—an entrepreneur seeking capital to conduct research or finish business plan; Early Stage—a company developing products and seeking capital to commence manufacturing; Late Stage—a profitable or near-profitable high-growth company seeking further expansion capital. The common theme underlying all venture capital investments is the high-growth nature of the industries in which the investee companies operate and the active role played by the investor to identify additional management expertise and provide general business advice.
Co-Investments	2005–2010	\$84.5	Co-investments are privately negotiated purchases of equity or quasi-equity from private or publicly traded entities. Such investments involve the purchase of unregistered securities, which by their private, illiquid nature command a premium over comparable publicly traded securities.
Total Green Portfolio		\$692.6	

REAL ESTATE

Total staff

19

Total AUM

**\$25.4
BILLION**

as of March 31, 2017

Environmental Integration



21 Risk Factor
Investment Management Agreement



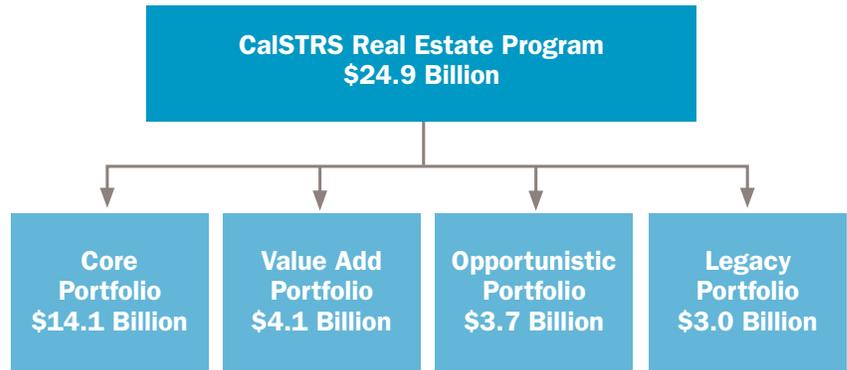
Investment Advisory Boards



LEED & Energy Star Certifications



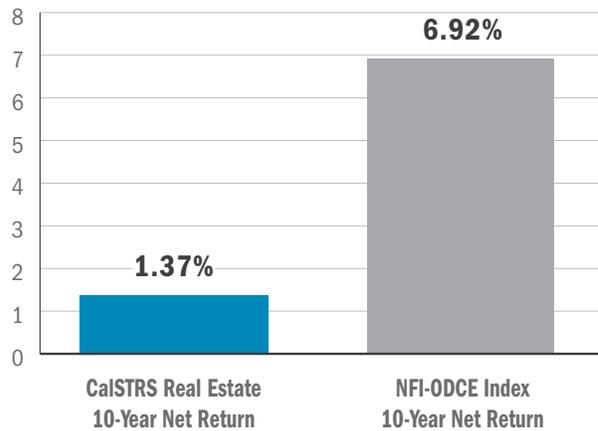
Environmental Impact Assessment



The Real Estate asset class strives to provide stable cash flow and enhanced yield while also providing total fund diversification and an inflation hedge. To accomplish this objective, the portfolio invests in both equity and debt positions across multiple property types, including office, retail, multifamily and industrial.

Asset Class Performance

10-year net returns as of March 31, 2017



Program Summary

Incorporate conservation and sustainability into the planning cycle for the existing portfolio.

In 2003, CalSTRS Real Estate staff directed all separate account investment managers to include a conservation/sustainability assessment in the annual planning and budgeting process. Our goal was to enhance value, create awareness and become more socially responsible investors. The planning process challenges managers to assess strategies relating to green buildings. A green building is defined as “a structure that is designed, built, renovated, operated or reused in an ecological and resource-efficient manner.”

While we encourage green-related programs in the planning and budgeting process, all capital expenditures must be supported by appropriate return on investment measures and payback periods.

In 2005, CalSTRS partnered with the EPA's Energy Star program, which is widely accepted and used by leaders within the real estate industry. The partnership provided us with a tool to take control of energy use by providing the best information and resources for improving energy and environmental performance. More specifically, the partnership provided us with a tracking and audit tool to benchmark and measure energy consumption.

CalSTRS establishes benchmarks in order to track energy use, develop capital improvement plans, make energy efficiency upgrades and measure the benefits by reduced consumption of energy. By reducing resource consumption, value is added to the portfolio.



The Rating Systems: Energy Star + LEED

The Energy Star Rating System

Energy Star, a voluntary labeling program for commercial and industrial buildings, is sponsored by the U.S. Department of Energy and the U.S. Environmental Protection Agency, and managed by the EPA. It uses a scale of 1–100 to rate the relative energy performance of new and existing buildings. The rating, which is certified by a professional engineer, is based on the amount of energy the building uses over a 12-month period as evidenced by utility bills, the amount of CO2 it emits, the nature and intensity of its occupancy, and its location.

A score of 75 or more qualifies a building for an Energy Star label. This means the building is in the top 25 percent of like structures in energy efficiency for the year rated.





The LEED Certification Green Building Rating System

The Leadership in Energy and Environmental Design Green Building Rating System is the nationally accepted benchmark in the U.S. for the design, construction and operation of high performance green buildings. Established by the U.S. Green Building Council, LEED addresses different types of development with distinct rating systems, among them LEED for New Construction and Major Renovation, LEED for Commercial Interiors, and LEED for Existing Buildings: Operations and Maintenance.

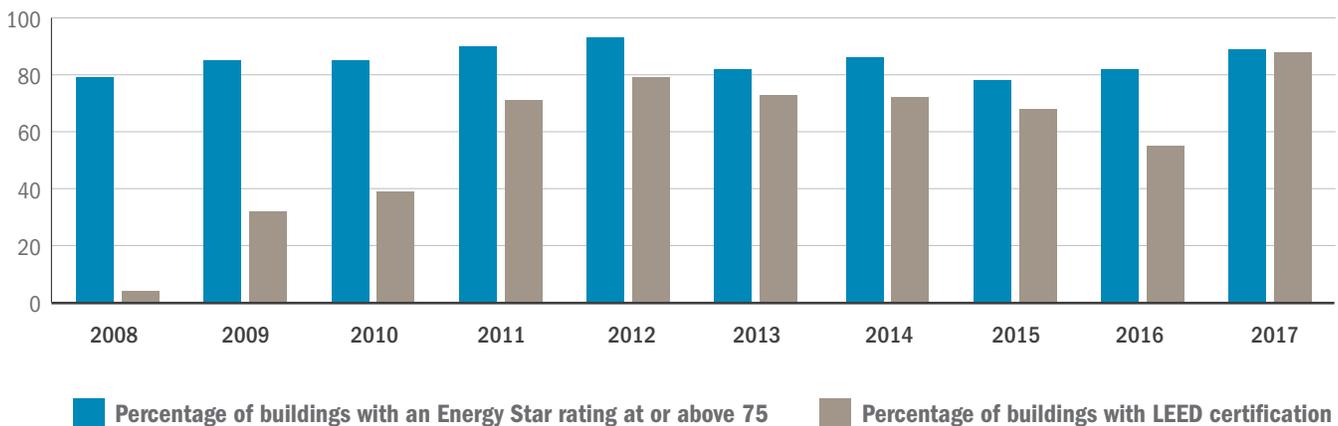
The LEED rating systems and the four levels of LEED recognition—Certified, Silver, Gold and Platinum—reflect projected or actual performance beyond certain prerequisites in five critical areas of environmental sustainability: sustainable site development, water savings, energy efficiency, materials selection and indoor environmental quality.

The rating systems for the various types of development, and from property to property, require and reward somewhat different technologies and strategies and give different relative weight to the sustainability categories. Consistently, however, almost 50 percent of the points at stake are in the areas of energy and water conservation.



Sustainability Achievements

As of June 30, 2017, nearly 90 percent of CalSTRS’ directly controlled office buildings are Energy Star-certified and have achieved LEED certification.



New or newly acquired buildings under redevelopment work are prevented from being eligible for LEED certification for that particular year. After the redevelopment work is complete, the buildings will be submitted for certification and the improvements will help them achieve LEED certification standards.



INVESTMENT EXAMPLES

CalSTRS has a long history of investing while taking into consideration environmental risk factors. Examples of investments that we or our partnerships have made are on the next pages.

INVESTMENTS TAKING ENERGY EFFICIENCY INTO CONSIDERATION

Challenge

The property below, built in 1966, has undergone major renovations over the past several years and recently achieved a LEED Gold certification and an Energy Star score of 92.

Despite the renovations, however, the property continues to depend on older infrastructure and building systems, leading to a higher than average energy usage per square foot.



Montgomery-San Francisco 1966

Action Plan

Evaluate and implement a comprehensive, multifaceted sustainability program, which includes:

- Night-time lights off program
 - » Ensures office lights are shut off when tenants leave their offices at the end of the day. Approximately 15 percent of the building's lights are unnecessarily left on each night.
- Electricity load reduction
 - » Participate in the local electric utility's voluntary program during heat waves, or limited periods of extremely high electric demand.
- Real-time electricity monitoring
 - » Use real-time electricity usage data to allow smart morning building startups and afternoon shutdowns to minimize energy usage during nonbusiness hours.
- Equipment upgrades
 - » Replace older, inefficient HVAC and lighting equipment with new high-efficiency equipment.

Based on these initiatives, our partner's project energy consumption will be reduced by **15.2** percent, while energy-related costs will be reduced by **20.6** percent.

Challenge and Action Plan

The recently developed Class A office property shown below had a host of sustainability features integrated into its design to promote greater energy and water conservation. Key features included:

- View dynamic glass
 - » Reduces energy consumption using state-of-the-art glazing that automatically adjusts its tint to the position of the sun, preserving views by eliminating shades, reducing glares and heat load.
- Green power
 - » Commits to purchase green power through a local utility provider.
- Cool roof
 - » Reduces solar heat gain in the building through a combination of reflective white roofing materials overlaying a highly insulated roof.
- Public transportation access
- Bicycle storage and locker rooms
- Water reduction efficiency measures on all fixtures



CalSTRS Class A Office Property



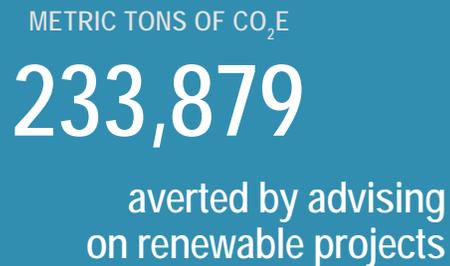
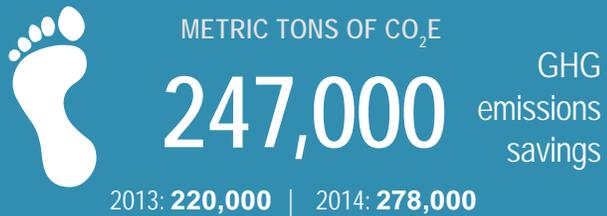
JLL Incorporated is a financial and professional services company specializing in real estate. It offers integrated services on a local, regional and global basis to owner, occupier, investor and developer clients. Its real estate service is organized into five product categories: leasing; capital markets and hotels; property and facility management; project and development services; and advisory, consulting and other services.

From customized smart building solutions to portfolio energy management, and from integrated energy retrofits to alternative energy services, JLL offers a range of services specifically designed to curb energy consumption and reduce costs.

JLL's stock performance has done well in recent times. As of June 30, 2017, JLL is up more than 21 percent for the trailing year.

Working with clients to reduce their environmental footprints

U.S. client project savings in 2015



Source: JLL 2015 Global Sustainability Report

INVESTMENTS IN CHEMICAL AND MATERIAL INNOVATION

Environmental Integration

Company Description:

A manufacturer of paints and coatings.

Strategy:

The investment manager implemented several value-added innovations, including:

- Implementing the Monocoat 3-Wet Paint System, which reduced drying time and energy use for the most energy-intensive part of the car manufacturing process.
- Introducing waterborne coatings that emit far less volatile organic compounds.
- Using Vacuprime technology, which virtually eliminated VOCs and reduced the weight of the finished product.



Company Description:

A former state-owned pharmaceutical company based in Romania.

Strategy:

The investment manager addressed several of the company's environmental issues, including:

- Decommissioning a former chemicals plant, which involved cleaning, dismantling, removing and selling the chemical equipment, and then demolishing and clearing a large part of the real estate.
- Decontaminating the land where the plant had stood, making it fit for commercial use or future expansion.
- Creating a new secure waste disposal site, which met international environmental standards—a first of its kind in Romania.



Apple Inc. \$1 Billion Green Bond

Apple plans to use the bond proceeds to finance projects involving renewable energy resources and energy efficiency. The latest bond offering includes a focus on advancing Apple's goal of a closed-loop supply chain, through which products are made using only renewable resources and recycled material.



Apple is also investing in solar energy, hydroelectric plants and biogas facilities in Oregon, North Carolina, Nevada, Arizona and California. This includes a 130-megawatt solar farm near San Francisco.



Waste Connections Inc.

Waste Connections Inc. is an integrated solid waste services company that provides waste collection, transfer, disposal and recycling services in mostly exclusive and secondary markets in the U.S. and Canada. Through its R360 Environmental Solutions subsidiary, the company is also a leading provider of nonhazardous oilfield waste treatment, recovery and disposal services in some of the most active natural resource producing areas in the U.S., including the Permian, Bakken and Eagle Ford

basins. Waste Connections serves more than six million residential, commercial, industrial, and exploration and production customers from a network of operations in 39 states, six provinces and the District of Columbia. Waste Connections also provides intermodal services for the movement of cargo and solid waste containers in the Pacific Northwest.

The stock performance of Waste Connections has been strong. As of June 30, 2017, Waste Connections is up more than 34 percent over the trailing year.



INVESTMENTS WITH A RENEWABLE ENERGY FOCUS



Renewable Power Assets

CalSTRS recently pledged \$400 million to an investment fund focused specifically on buying renewable electrical generation projects and owning them for a long period of time. This fund will dramatically increase our exposure to renewable investments. These investments are providing zero-emission power generation on five continents.

Korea Development Bank \$300 Million Inaugural Green Bond

KDB, a South Korean government-owned financial institution, has been the leading bank in the country with respect to supplying industrial capital to assist the nation's economic growth and development.

An amount equal to the net proceeds of the green bonds will be allocated toward financing or refinancing projects related to the development,

construction or expansion of new or existing renewable energy-related facilities, including solar, wind and biomass projects.

KDB plans to include information regarding the allocation of green bond proceeds on an annual basis in an investor newsletter, which will be available on KDB's website. This information will include amounts allocated to eligible green projects, a brief description of selected projects and, where feasible, the environmental impact of these projects on a per-project or project portfolio basis.

Electrical Transmission Asset

CalSTRS is a partner of a transmission line that connects two significant power grids in the U.S. This asset reduces carbon dioxide emissions by allowing a region to import electricity that was produced using more efficient technologies. A recent study estimated that over the asset's life, carbon

dioxide emissions will be reduced on average by 226,000 tons per year, the equivalent of the electricity usage of 30,000 homes.

In addition, the transmission line improves grid stability, increasingly important as a greater share of power is generated by intermittently available renewable energy sources.





CONCLUSION

Consistent with CalSTRS' commitment to manage environmental risks and take advantage of appropriate environmental-themed investments, the Green Initiative Task Force will continue to work on identifying environmentally focused strategies intended to enhance the risk-adjusted returns of the overall CalSTRS portfolio. It will also continue to search for new investment opportunities while providing leadership and maintaining CalSTRS' position at the front of the green movement.

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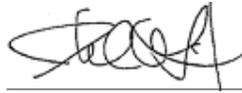
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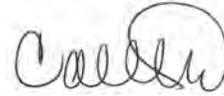
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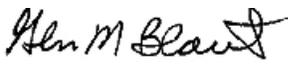
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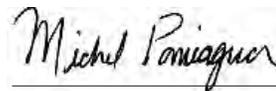
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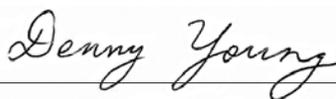
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