

CALSTRS

# GREEN INITIATIVE TASK FORCE

2017-18 Annual Report  
period ending June 30, 2018

CalSTRS environmental-themed  
investments and environmental  
risk-management efforts



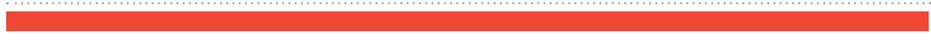
GLOBAL  
STEWARDSHIP  
AT WORK

12th Annual Report



## **CALSTRS INVESTMENTS BRANCH 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.*



November 1, 2018

Dear Reader:

I am pleased to present the 12th 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 have the potential to affect 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 disclose information on both the financial and nonfinancial aspects of company operations as 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. CalSTRS Investments staff has led collaborative engagements with the world's largest investors through the SASB Investor Advisory Group as a means of promoting the SASB standards in order to further push for corporate adoption and participation.

Our staff also leads several engagements through Climate Action 100+, a five-year initiative led by investors to engage the world's most significant greenhouse gas emitters. We are joined by nearly 300 investors from 29 countries that collectively manage US\$31 trillion in assets under management. Investors are calling on companies to improve governance on climate change, curb emissions and strengthen climate-related financial disclosures.

As you explore our 12th annual report, you will notice several examples of sustainable and green investments, and some of the methods that each of our asset classes uses to identify and evaluate environmental risks throughout the investment management process.

Finally, I am happy to announce the second phase of the CalSTRS \$2.5 billion Low-Carbon Index will take place in fiscal year 2018–19. This phase will include an approximate \$1.0 billion investment in non-U.S. developed markets. This follows the successful initial implementation of the CalSTRS Low-Carbon Index which took place July 1, 2017, and represented a \$1.3 billion investment in the U.S. market. Over time, CalSTRS will invest an additional \$200 million in emerging markets.

I thank you for taking the time to consider this report, and 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:*

<b>1</b>	Continuing education on environmental risk issues and environmental-themed investment opportunities.
<b>2</b>	Integrating environmental risk factors into manager procurement processes and ongoing due diligence efforts.
<b>3</b>	Improving the ability to consider increased allocations to environmental-themed investments.
<b>4</b>	Integrating environmental considerations into asset allocation processes.

**1** During 2017–18, Initiative One was undertaken as staff brought in industry experts to discuss risk management and investment opportunity capture. This included **Colin McKerracher**, Bloomberg New Energy Finance Head of Advanced Transport, speaking with Green Team staff about the **future of mobility**. Additionally, **Sushant Barave**, Regional Transmission Engineering Lead at California ISO, spoke about current trends in California energy, provided insight on energy spot prices, and discussed how battery and further renewable adoption will affect the grid. In addition, members of the Green Team attended the Goldman Sachs Sustainable Finance Innovation Forum and Bloomberg’s **Future of Energy Summit**. In 2018–19, we continue to seek educational opportunities and work to grow our knowledge base.

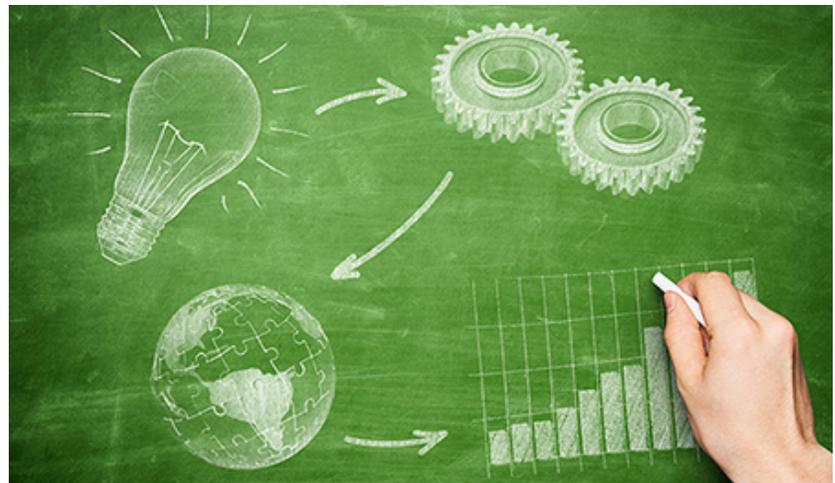
**2** Staff implemented Initiative Two in 2017–18. CalSTRS’ Investments asset classes continued to engage external managers on environmental issues, with environmental consideration part of the manager investment selection process. Additionally, staff continued to enhance the reporting mechanism through 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

the CalSTRS Investment Portfolio. In 2018–19, 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 continues to analyze the results of the study to better understand what climate scenario we are most likely facing. Additionally, 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 and announced the selection of ESG-focused public equity managers to potentially receive future allocations.

Members of the Green Team attended meetings with Bloomberg New Energy Finance on the future of mobility and with California ISO on energy trends and how renewable adoption will affect the grid.





*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 active in this area. We understand that working collaboratively with other investors is an excellent way to broaden engagement reach, and we 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 our 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.

## ESG RISK FACTOR COMMITTEE

*When any manager, internal or external, is making an investment decision on behalf of CalSTRS, the manager must consider the CalSTRS ESG 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

<b>Environmental</b>	The 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.
<b>Climate Change</b>	The investment’s long-term profitability from inadequate attention to the impacts of climate change, including attention to relevant climate policy considerations and emerging climate risk mitigating technologies.
<b>Resource Efficiency</b>	The investment’s long-term profitability from inadequately managing resource usage in a resource-constrained environment amid growing resource demand.

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 ESG 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 decision or other activity that potentially violates CalSTRS ESG Policy, the Investments staff, CIO and Investment Committee will undertake the following actions:*

1	The CIO will assess the potential ESG policy violation both as an ESG risk and as an impact to the CalSTRS Investment Portfolio. The extent of the responsibility of staff to devote resources to address these issues will be determined by the size of the investment and the gravity of the violation of CalSTRS' ESG Policies.
2	At the CIO's direction, Investments staff will directly engage corporate management or other appropriate parties to seek information and understanding concerning the ESG policy violation and its ramifications on our portfolio.
3	The CIO and Investments staff will provide a report to the Investment Committee of the findings associated with an ESG policy violation engagement and recommend any further action of engagement or need to commit further portfolio resources. The Investment Committee can marshal further resources given the gravity of the situation.

Environmental risk consideration is part of the CalSTRS ESG Policy. During 2017-18, the Investment Committee considered environmental-related issues that potentially violated the policy. 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:

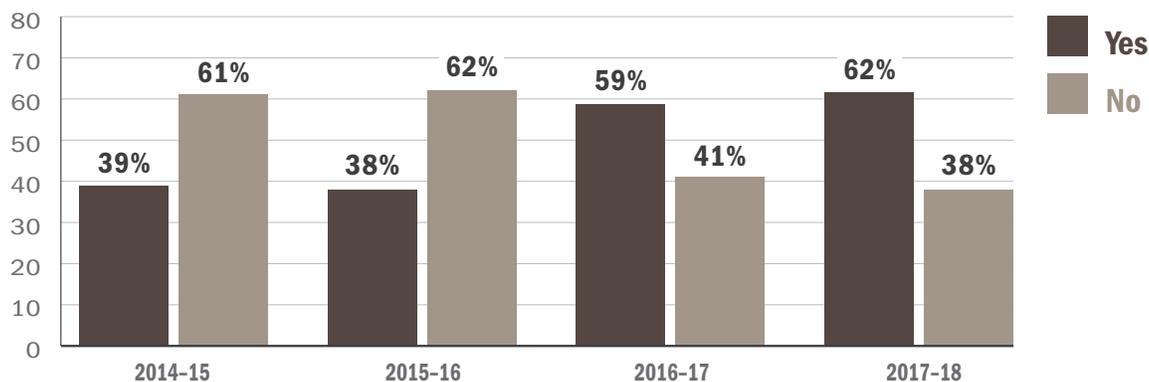
- 4 Do you consider the carbon profile of a company when making investment decisions?**



# 1

## DO YOU EXPLICITLY INCORPORATE CLIMATE RISK INTO YOUR INVESTMENT PROCESS?

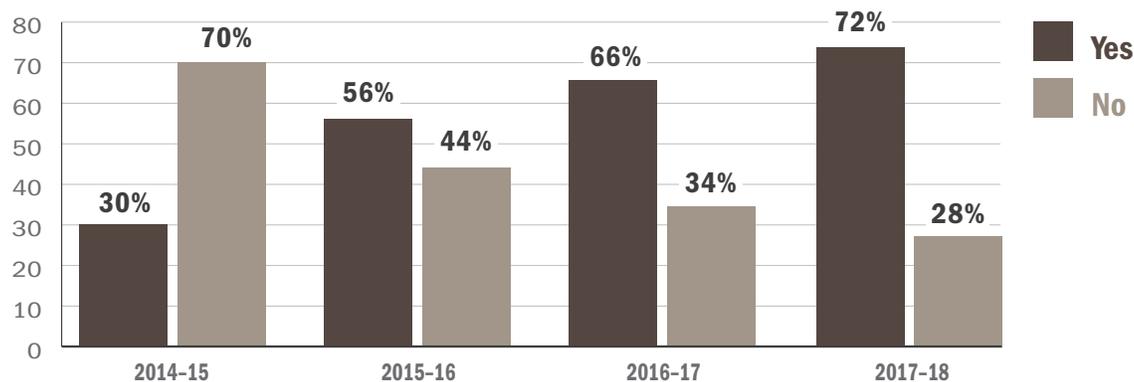
For 2017–18, 62 percent of the Global Equity external managers indicated that they incorporated climate change into their processes. The following chart provides a historical perspective of external manager responses to this question:



# 2

## HAVE YOU TAKEN STEPS IN 2017-18 TO BETTER INCORPORATE CLIMATE RISK INTO YOUR INVESTMENT PROCESS?

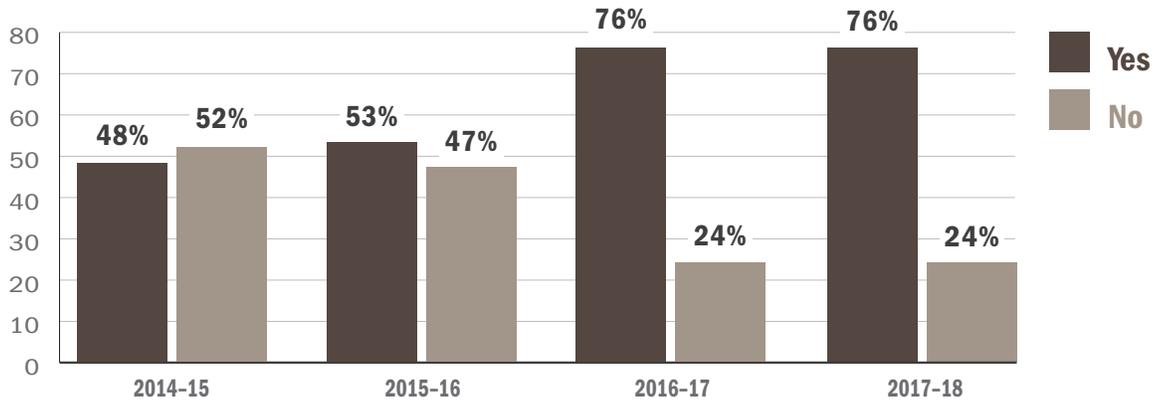
For 2017–18, 72 percent of the Global Equity external managers reported that they had. The following chart provides a historical perspective of external manager responses to this question:



### 3

## IS YOUR ORGANIZATION A UNPRI SIGNATORY?

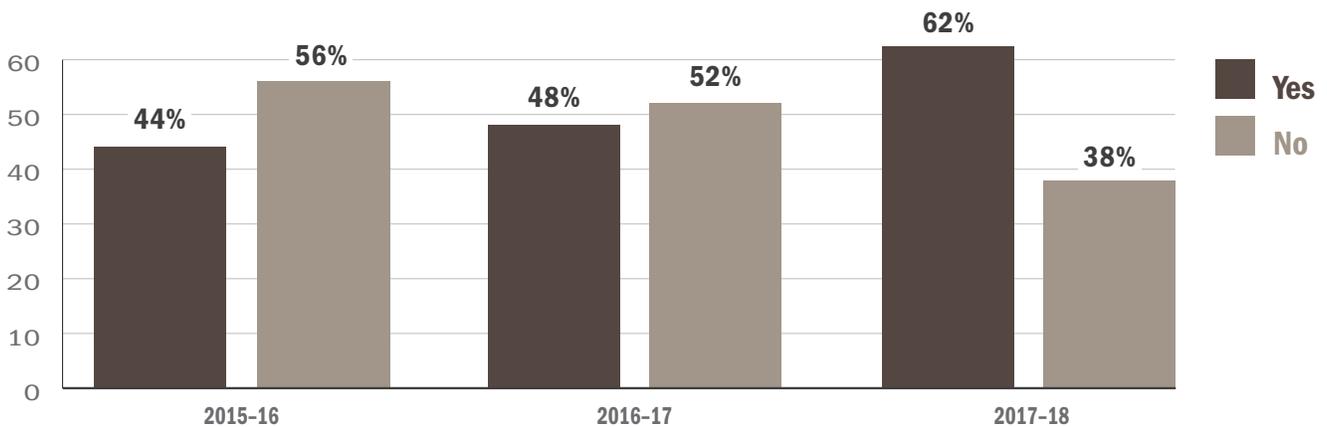
For 2017–18, 76 percent of external managers indicated that they were signatories to the UN-supported Principles for Responsible Investment initiative. The following chart provides a historical perspective to this question:



### 4

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

For 2017–18, 62 percent of external managers indicated that they considered the carbon profile of a company when making investment decisions. The following chart provides a historical 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 Risk and Sustainability

Investor Network on Climate Risk working groups offer investors the opportunity to engage with their peers and 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.

#### 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 the INCR 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.



### PRI Methane Engagement Group

In 2017, CalSTRS joined the PRI Methane Engagement Group, consisting of 35 other investors from 11 countries representing \$4.2 trillion in assets under management. This engagement encourages energy and utility companies to improve their management and disclosure of methane emissions. It targets 29 companies across all segments of the natural gas value chain from upstream production to downstream utilities. The engagement follows a two-year PRI-coordinated collaborative engagement on fracking that identified methane emissions as an area where oil and gas companies were failing to appropriately manage and disclose information. Our work with PRI complements the individual work that CalSTRS has done over the last several years on engaging more than 40 oil and gas and gas utility companies on methane-related risks.

# WATER RISK

For the past three 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.

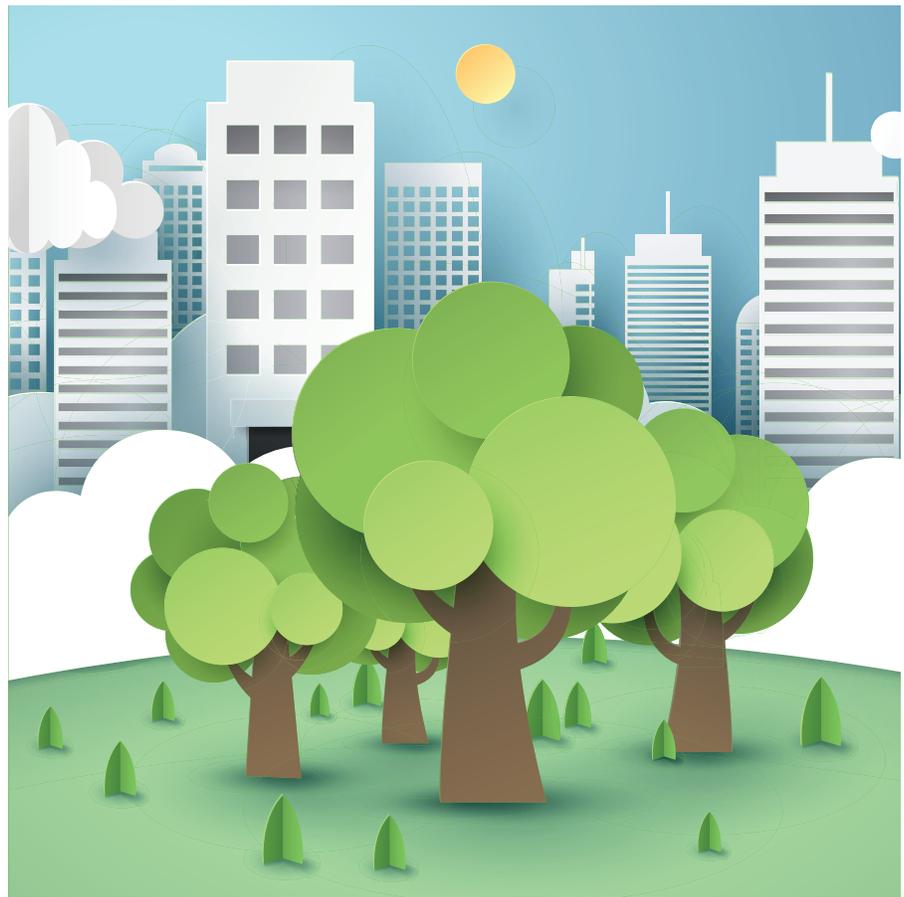
In a fall 2017 refresh of the Ceres' 2015 *Feeding Ourselves Thirsty* analysis, Ceres ranked more than 40 of the largest food sector companies on how they responded to water risks and how performance shifted since the first round of benchmarking. CalSTRS has had meetings with several of these companies during recent years. Using the metrics for the ranking, CalSTRS identified an additional poultry farming company that could make improvements to its water risk management disclosure. CalSTRS began engaging the company in late 2017 and will continue during 2018-19.

## ECO-EFFICIENCY INITIATIVE

During 2017–18, CalSTRS continued to participate in the Boston Common-led eco-efficiency engagement. Five large-cap companies across energy-intensive industries have been selected to be engaged to assess and identify where these companies can save energy and water and eliminate wastes. Additionally, best practices from these companies will be identified during the engagement to provide other companies and their shareholders specific areas where they can improve.

This engagement was developed through the understanding that 50 percent or more of greenhouse gas emissions reductions can come from energy efficiency and that energy efficiency can reduce a company's operating expenses. More efficient companies can improve their sustainability profiles while also improving financial returns for investors. This engagement combines water efficiency and waste elimination with energy efficiency to help companies take a multidimensional approach to retooling their products, processes and policies in order to achieve sustainable profitable growth. This can be accomplished by creating desirable products produced in efficient ways that improve margins and support low natural resource use. In the end, these efforts create a win-win situation for investors and society.

This multiyear engagement began in 2016 and has continued to gain traction. CalSTRS and more than 60 global institutional investors, with more than \$1 trillion assets under management combined, co-signed letters to one or more companies.



# 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 summarizes the disclosures 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><b>Recommended Disclosures</b></p>	<p><b>Recommended Disclosures</b></p>	<p><b>Recommended Disclosures</b></p>	<p><b>Recommended Disclosures</b></p>
<p>a) Describe the board's oversight of climate-related risks and opportunities.</p>	<p>a) Describe the climate-related risks and opportunities the organization has identified over the short, medium and long term.</p>	<p>a) Describe the organization's processes for identifying and assessing climate-related risks.</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) Describe management's role in assessing and managing climate-related risks and opportunities.</p>	<p>b) Describe the impact of climate-related risks and opportunities on the organization's businesses, strategy and financial planning.</p>	<p>b) Describe the organization's processes for managing climate-related risks.</p>	<p>b) Disclose Scope 1, Scope 2, and, if appropriate, Scope 3 greenhouse gas emissions, and the related risk.</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>c) Describe how processes for identifying, assessing and managing climate-related risks are integrated into the organization's overall risk management.</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.

In 2017–18, staff developed the TCFD 100 engagement plan where staff is committed to engaging at least 20 companies each year to raise awareness on TCFD and promote TCFD-aligned climate change risk management.



Having completed the first year of engagements with companies, including Amazon, Total and Chevron, staff has noted an increase in climate-related disclosure that is in alignment to the TCFD. A number of companies, including Eni, Shell, Total and Chevron, have released reports with disclosure that is in the theme of the TCFD. These reports may not be perfect and may not have everything that some investors want, but it should be acknowledged that there is clearly positive momentum around companies reporting on climate-related disclosure.

An example of a company that has increased its climate-related financial disclosure is Chevron with their 2018 **Climate Change Resilience report**. The report explains how Chevron assesses climate change risks in connection with other risks affecting their business. Chevron outlines their rigorous risk management processes and their governance framework, including how they use them to assess and manage potential risks with active board of directors and executive-level oversight. The report also explains Chevron's strategic decision-making approach as it applies to climate change-related risks and opportunities, including its ongoing evaluations of their portfolio and future investments.

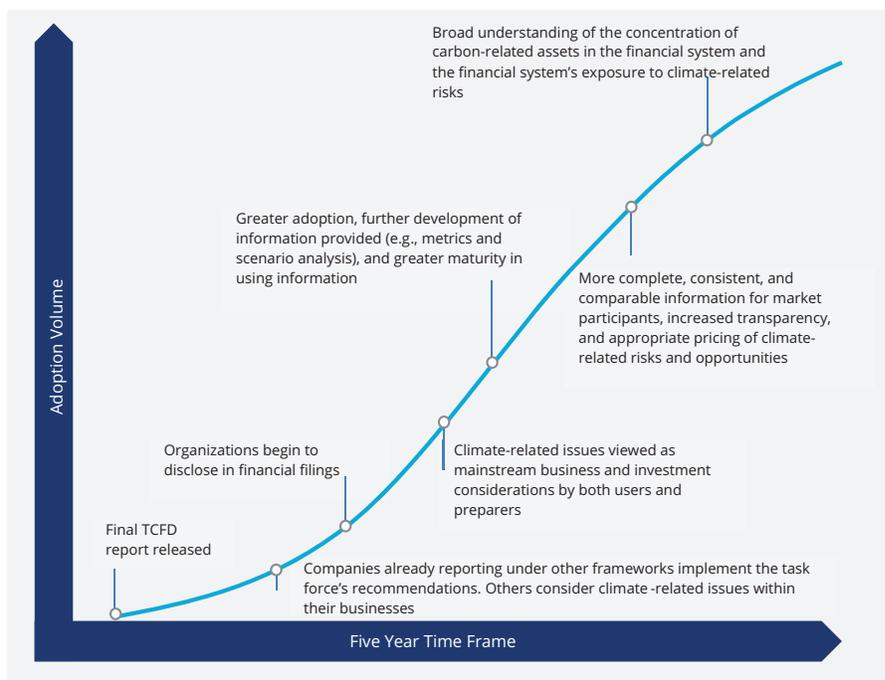
Chevron also provides insight regarding its approach to supply, demand, commodity and carbon prices, and the factors that drive global economic change.

In 2018–19, CalSTRS staff continues to engage at least 20 companies concerning TCFD guidance and encourages them to assess and report on climate-related risks in alignment with TCFD recommendations.

CalSTRS staff realizes that broad corporate adoption of TCFD

recommendations will take time and that continual interaction between corporations, that will disclose information based on the TCFD recommendations, and investors, that will use such information to make better-informed investment decisions, is necessary to find the appropriate balance of disclosure.

TCFD also realizes that broad adoption will take time as documented in its implementation path.



Source: TCFD

## SASB INVESTOR ADVISORY GROUP



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. CalSTRS Investments staff has led collaborative engagements with the world's largest investors through the SASB Investor Advisory Group, working to promote the SASB standards in order to further push for corporate adoption and participation. The SASB standards tie directly into TCFD disclosure as they are a means to report on material climate-related metrics and targets.

CalSTRS led one of the Investor Advisory Group teams composed of CalSTRS, BlackRock, the Ontario Teachers' Pension Plan and Breckinridge. Over the course of the year, these investors engaged Hewlett-Packard, Intel, Biogen and Manulife. In 2018–19, CalSTRS will continue to join additional investors in the next round of engaging portfolio companies and promoting corporate adoption of the SASB standards.

## CLIMATE ACTION 100+



CalSTRS staff leads several engagements through **Climate Action 100+**, a five-year initiative led by investors to engage the world's most significant greenhouse gas emitters. We are joined by nearly 300 investors from across 29 countries, that collectively manage US\$31 trillion in assets under management. Investors are calling on companies to improve governance on climate change, curb emissions, and strengthen climate-related financial disclosures.

The Climate Action 100+ requests companies have similar actions to the TCFD recommendations. CalSTRS is the lead investor for six companies: Duke Energy, Phillips 66, Southern Company, Daikin Industries, Nippon Steel and Toray Industries. We are joined by more than 30 other investors as co-leads or collaborators.

# CALSTRS ENVIRONMENTAL RISK SHAREHOLDER PROPOSALS

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Since 2008,  
CalSTRS  
has filed **53**  
environmental-related  
shareholder proposals  
that called on  
companies to improve  
their environmental  
risk-management  
disclosure efforts.

When CalSTRS 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 53 environmental-related shareholder proposals that called on companies to improve their environmental risk-management disclosure efforts. Of these 53 shareholder proposals, 40 were ultimately withdrawn before the company's annual meeting because staff was able to negotiate a mutually agreeable outcome with the company. Since 2008, the 11 proposals voted on by shareholders have received, on average, approximately 28 percent support.

## **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.

# OIL AND GAS AND GAS UTILITY COMPANIES

During 2017–18, CalSTRS continued to engage oil and gas and gas utility companies on how they approach the issue of fugitive methane emissions. The focus of this ongoing engagement is to determine how companies consider the risk associated with methane emissions, to what degree they already capture fugitive methane emissions, and whether they have analyzed the business case associated with improving methane capture.

Engagement candidates were identified through an analysis of companies within the Russell 3000 and MSCI World indexes that had a potentially material fugitive methane emissions risk. The level of disclosure of methane risk management strategy combined with an assessment of the potential leakage rate—the amount of methane leaked per unit of equivalent production or delivery—were the driving factors determining which oil and gas and gas utility companies that were ultimately engaged. In fall 2017, staff filed one shareholder proposal with an oil and gas company. The proposal was withdrawn after staff successfully negotiated a mutually agreeable outcome with the company.



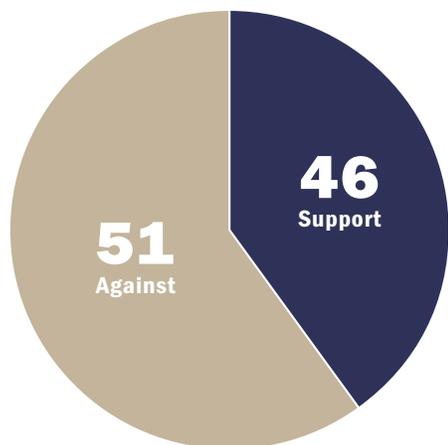
## PROXY VOTING

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 2017–18 fiscal year, CalSTRS considered 97 environmental proposals, supporting 46 of them and voting against 51. The table below provides a breakdown of the issues considered.

### 2017–18 Fiscal Year

CalSTRS considered **97** environmental proposals, supporting **46** of them and voting against **51**.



**Total: 97**

Environmental Proposals, July 1, 2017 – June 30, 2018			
Issue Description	Votes FOR	Votes AGAINST	TOTAL
Adoption of Comprehensive Recycling Strategies	3	1	4
Environment Report	7	2	9
Formation of Environmental/Social Committee of the Board	1	3	4
Miscellaneous Energy/Environmental Issues	4	4	8
Miscellaneous Environmental Issues	0	11	11
Phase Out of Nuclear Power	0	12	12
Report/Action on Climate Change	8	1	9
Reporting and Reducing Greenhouse Gas Emissions	6	5	11
Review Energy Efficiency and Renewables	3	2	5
Review Nuclear Facilities and Waste	0	1	1
Sustainability or Environmental Reports	5	9	14
Sustainability Report	9	0	9
<b>Total</b>	<b>46</b>	<b>51</b>	<b>97</b>
<b>Percentage</b>	<b>47%</b>	<b>53%</b>	<b>100%</b>

CalSTRS reviewed each of these 97 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, we do not support environmental proposals intended to substitute for management's operational judgments. We believe that companies should manage environmental risk, but also that they should decide how to design and implement risk management systems. We supported 22 of the 32 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> <b>The rate of progress and investment in the development of technology to support the low-carbon economy.</b></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> <b>The impact of chronic weather patterns; for example long-term changes in temperature or precipitation.</b></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> <b>The physical impact of acute weather incidence such as extreme or catastrophic events.</b></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> <b>Collectively refers to all international, national and subnational regulation, including legislation and targets, intended to reduce the risk of further man-made climate change.</b></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

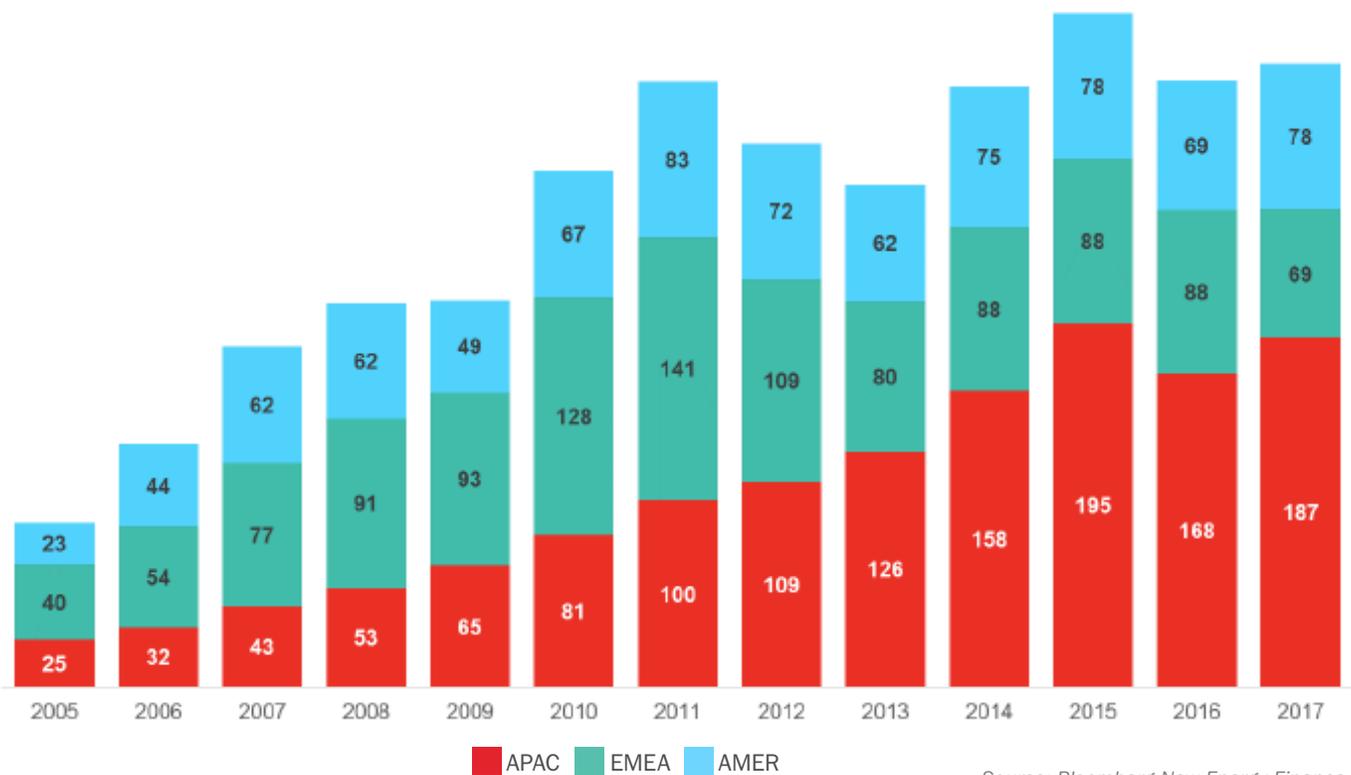
To be more aware of how climate change could impact the investment portfolio, staff determined that it would be appropriate to monitor the status of the four risk factors Mercer identified. It's important to understand how policy that promotes carbon emissions reductions and how advances in technology 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 year over year from 2015 to 2016, falling from \$361 billion in 2015 to \$325 billion in 2016. From 2016 to 2017, the global new investment in clean energy grew only 3 percent to \$334 billion. The Asia-Pacific region has remained the dominant leader, representing between 51 and 56 percent of the global new investments in clean energy for each year between 2015 and 2017. Bloomberg New Energy Finance states that global investment in clean energy for the first six months of 2018 was \$138 billion, with China and the U.S. accounting for 65 percent of the total. If the pace of new investment for the first half of 2018 stays consistent during the second half, the total global new investment in clean energy will be \$276 billion, a significant decrease from the average of the last four years. Even if there was no decrease in the level of investment, it would still fall 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.

### Global New Investment in Clean Energy, by Region 2005–17



Source: Bloomberg New Energy Finance

The following Global New Investment in Clean Energy by Sector chart provides a perspective of which clean energy sectors are getting new investments. For the last several years, wind and solar have led the way. Interestingly, the first half of 2018 shows solar investment down 19 percent compared to the same period last year at \$71.6 billion, with wind up 33 percent at \$57.2 billion. One of the largest growths of wind investment came from the U.S., which reached \$17.5 billion for the first half of 2018, up an impressive 121 percent over the same period the year prior.

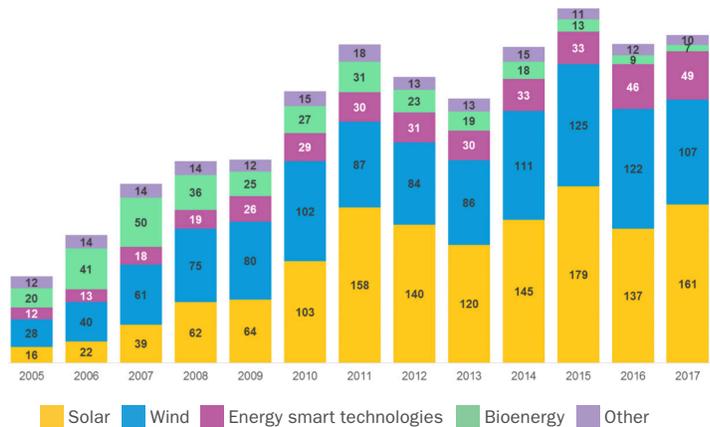
During the first half of 2018, China invested \$35 billion in solar, which is a decrease of 29 percent from the first half of 2017. Part of the slowdown can be explained by the fact that in May 2018, the Chinese government announced it would decrease the subsidies provided to their domestic solar companies. Time will tell how much the lack of subsidies for Chinese solar companies will affect the supply and demand of solar on a global level. Surprisingly, many of the Chinese solar companies have recently committed to increasing production capacity. China-based Jinko Solar Company, the world's largest solar panel manufacturer, plans to increase production capacity 40 percent even as solar prices continue to fall. It will be important to watch how subsidies may continue to help the advancement of battery development and ultimately drive down the cost per kilowatt-hour.

Another barometer for clean technology uptake is electric vehicle sales. According to Bloomberg New Energy Finance, global electric vehicle sales will rise to more than 50 percent of annual global light duty vehicle sales by 2040. Battery electric vehicles will represent the bulk of electric vehicle sales, followed by plug-in hybrid electric vehicles.

Current estimates show that electric vehicles represent only 1 to 2 percent of the annual global sales. The annualized growth rate in electric vehicles sales will need to be quite significant in order to hit more than 50 percent by 2040.

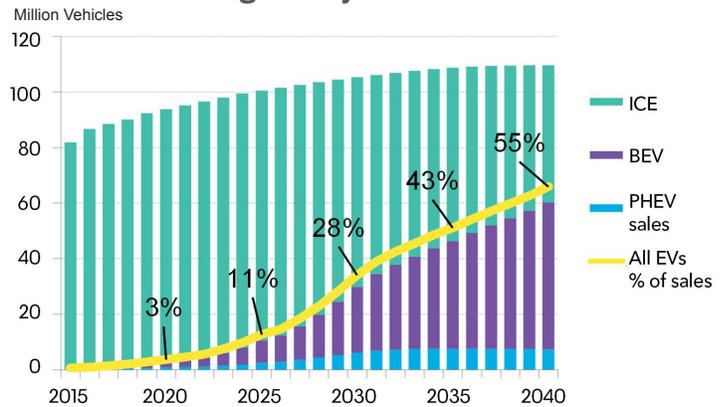
As the Passing 10 Percent chart on the right illustrates, some regional markets have already seen a more positive rate of adoption. One such market is California, which in the first half of 2018 had vehicles with a battery representing more than 10 percent of total new vehicle sales in the state.

## Global New Investment in Clean Energy by Sector



Source: Bloomberg New Energy Finance

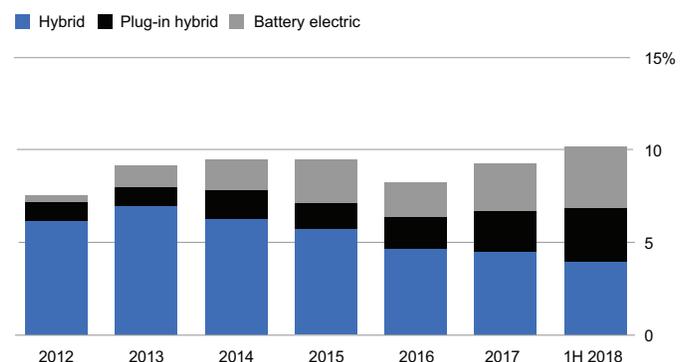
## Annual Global Light Duty Vehicle Sales



Source: Bloomberg New Energy Finance

## Passing 10 Percent

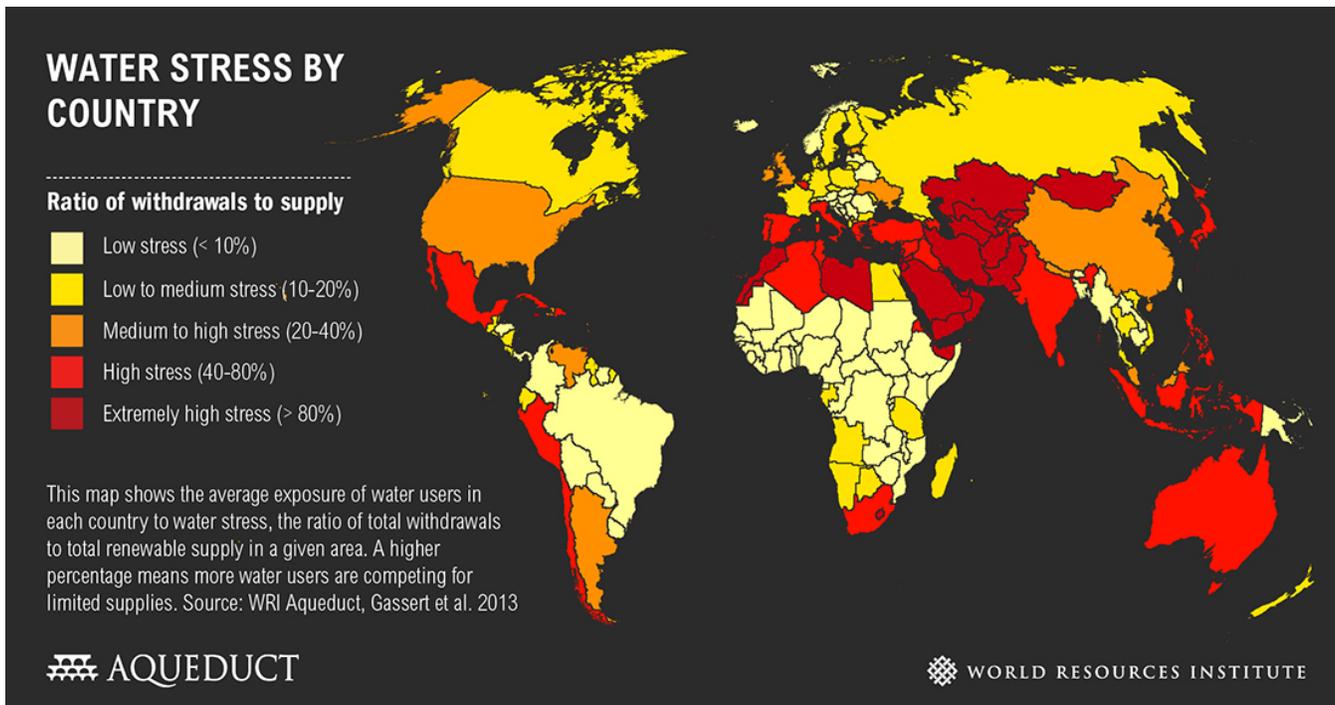
California hybrid and electric vehicle sales as a percent of total vehicle sales



Source: Bloomberg New Energy Finance

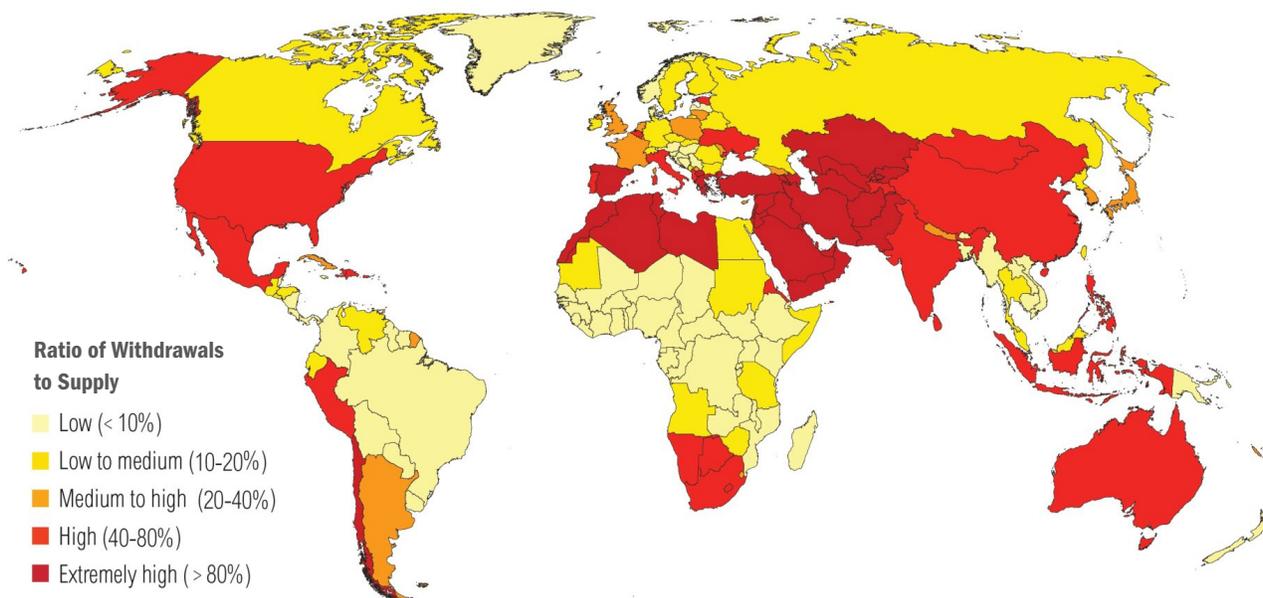
## Resource Availability

The following maps, provided by the World Resources Institute, show global water stress, defined as the ability, or lack thereof, to meet human and ecological demand for water. The first map shows significant portions of the Americas, Europe and Asia are currently experiencing medium to extremely high water stress. The second map documents the projected water stress by country in 2040. As the maps show, many regions, including the United States, will be in more of a dire state.



Source: WRI Aqueduct

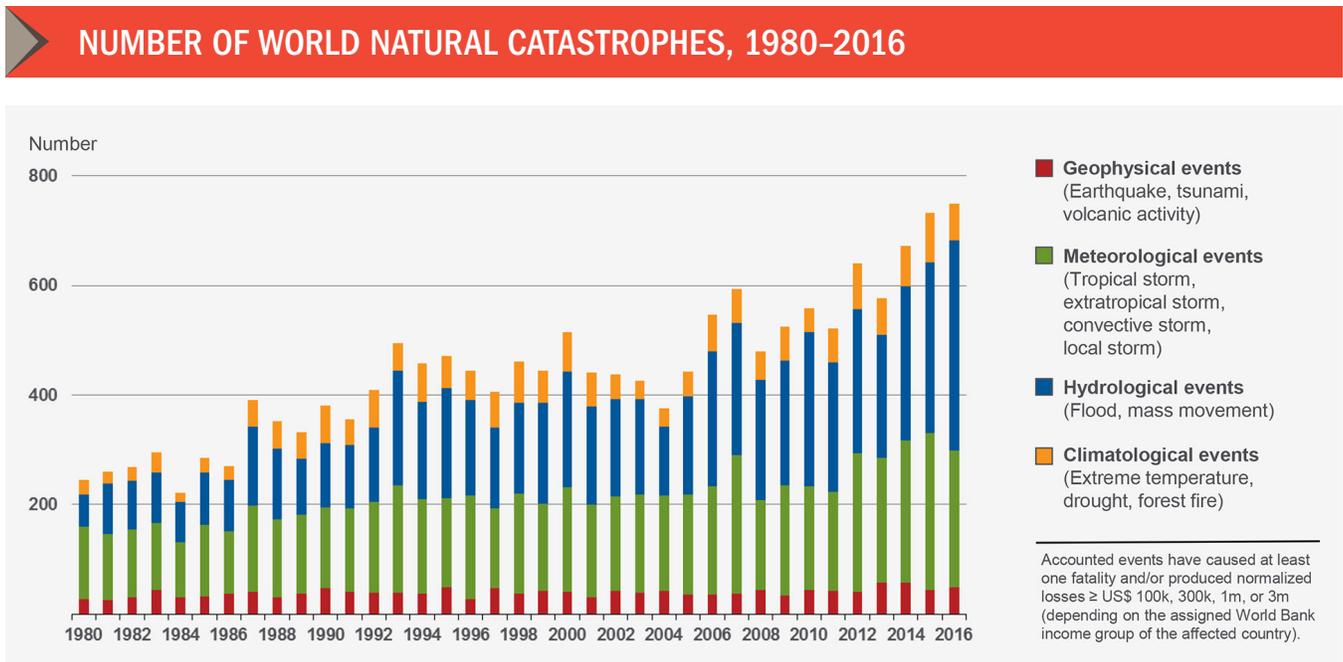
## Water Stress by Country: 2040



Source: WRI Aqueduct

## Impact of Physical Damages

As the following chart shows, since 1980, the number of global natural catastrophes has been increasing, with a significant increase experienced in the last decade that has manifested through meteorological and hydrological events.

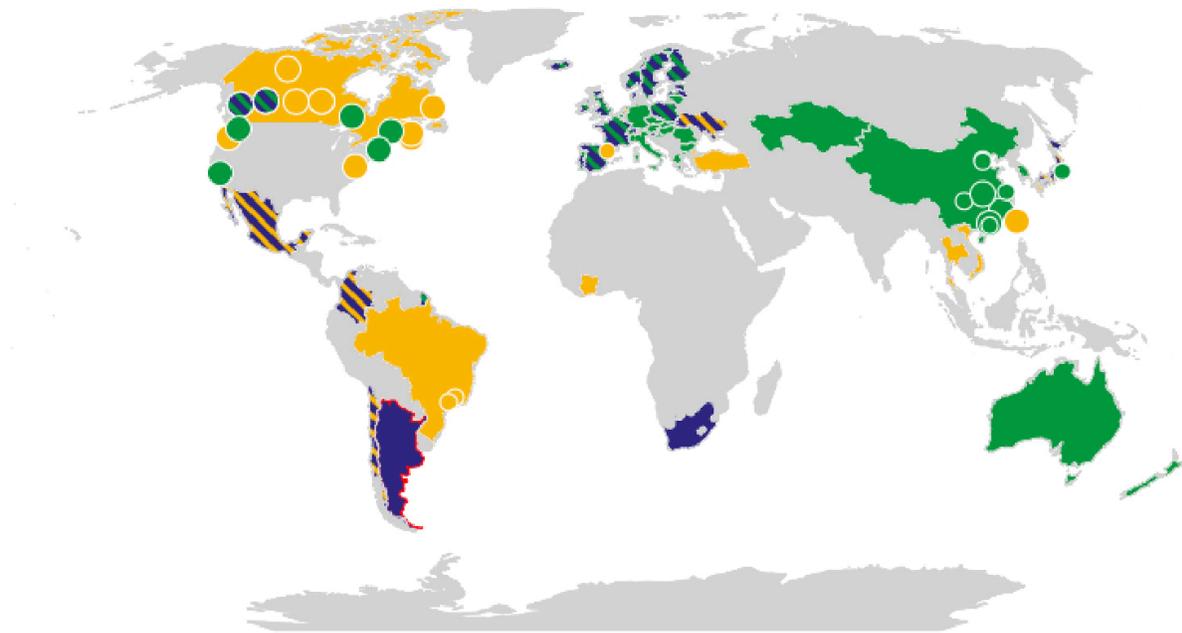


According to Munich Re Group, overall losses from worldwide natural catastrophes in 2017 totaled \$330 billion, up from \$184 billion in 2016. 2017 losses resulted from 710 events, compared with 780 events in 2016. Insured losses from these events rose to \$135 billion in 2017, up from \$50.7 billion in 2016. Insured losses in 2017 were almost three times higher than the average of the past 10 years, at \$49 billion and almost four times higher than the average for the past 30 years, at \$35 billion, adjusted for inflation. There were 10,000 fatalities from natural catastrophes in 2017, compared with 9,650 deaths recorded in 2016.

## Policy

Below is a map from the World Bank Group that features the regional, national and subnational carbon pricing initiatives that are implemented, scheduled for implementation and under consideration.

### EXISTING AND EMERGING EMISSIONS TRADING SYSTEMS AND CARBON TAXES



- ETS implemented or scheduled for implementation
- ETS or carbon tax under consideration
- ETS implemented or scheduled, tax under consideration
- Carbon tax implemented or scheduled for implementation
- ETS and carbon tax implemented or scheduled
- Carbon tax implemented or scheduled, ETS under consideration

Source: World Bank Group (2018), "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.

### KEY STATISTICS ON REGIONAL, NATIONAL AND SUBNATIONAL CARBON PRICING INITIATIVES

**51** Carbon Pricing initiatives implemented or scheduled for implementation

**45** Carbon Pricing initiatives implemented or scheduled for implementation

**25** Carbon Pricing initiatives implemented or scheduled for implementation

In 2018, these initiatives would cover **11 GtCO<sub>2</sub>e**, representing **20.0%** of global GHG emissions

Total value (US\$ Bn) of carbon pricing initiatives in 2018



Source: World Bank Group

## 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 Accord outcome, ambitious and stringent climate policy and mitigation action have yet to materialize. Also debatable is 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 2 degrees Celsius continues to seem possible. Staff will continue to monitor, analyze and report on these climate risk factors.

*2017 was one of the three warmest years on record. But even more important is the fact that it was the hottest year ever recorded without the warming effect of the natural climate oscillation, El Niño. All 17 years since 2001 rank among the 18 warmest years ever. And in all of this, scientists see a clear signal of climate change. – Eberhard Faust, Munich Re Group*



## 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 11 of these methods, including a short description and icon for each. 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.*



### ESG 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 ESG Risk Factors. The risk factors are also part of the continuous diligence process staff undertakes with existing investments and investment managers. CalSTRS staff regularly queries external fund managers about how they consider these risk factors into investment decisions made on our behalf.



### 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.



### 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.



### 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.



### Engineering Technical

**Assessment**—Engineering technical assessment evaluates the design, construction, maintenance and ongoing use of the physical and naturally built environment. For a business or building, this can impact energy and water usage, building air quality, and even work productivity.



### 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.



### 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.



### 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.



### 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.



### 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.



### Public Company Engagement—

Staff often engages 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

**\$6.0  
BILLION**

as of June 30, 2018

## Environmental Integration



ESG Risk Factor  
Investment Management Agreement



Dedicated Sustainability  
Investment Strategy



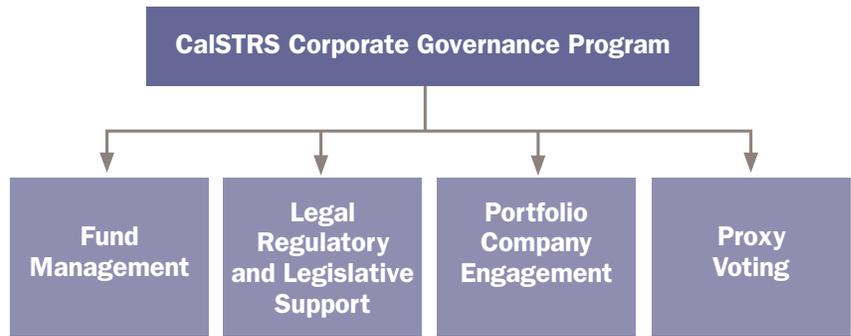
Proxy Voting



ESG Score Analysis



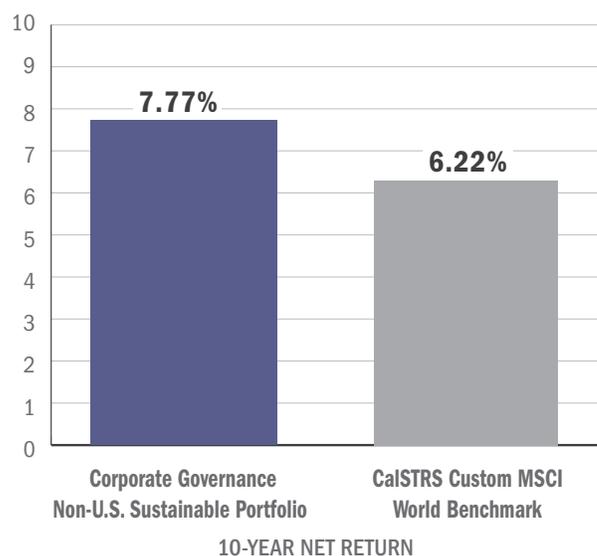
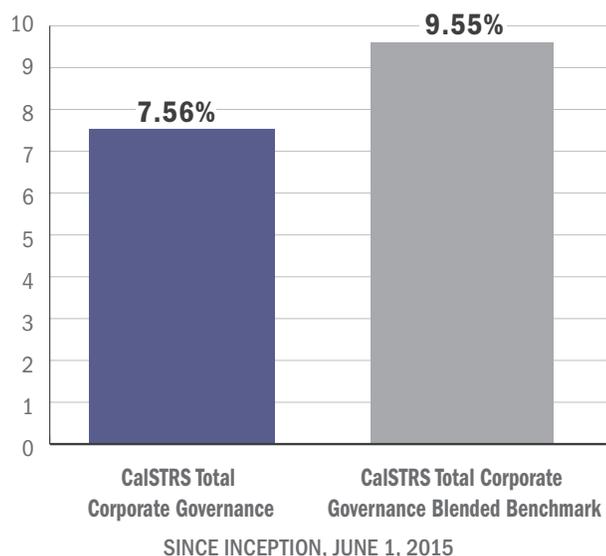
Public Company Engagement



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, 2018



## 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	\$314.4	CalSTRS Custom MSCI World	<b>AGF Investments</b> invests in companies with viable business models categorized as environmental innovators, environmental leaders and environmentally benign companies.
Generation Investment Management	2007	\$872.8	CalSTRS Custom MSCI World	<b>Generation Investment Management</b> 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.
<b>Total</b>		<b>\$1,187.2</b>		

Source: State Street as of June 30, 2018

## 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. Corporate Governance staff conducted due diligence and interviews with a number of investment firms. In 2018, CalSTRS selected eight ESG-focused asset managers to be eligible to receive future investment allocations. We expect to announce which asset managers will receive an initial investment allocation in 2019.

# FIXED INCOME

Total staff

**21**

Total AUM

**\$27.5  
BILLION**

as of June 30, 2018

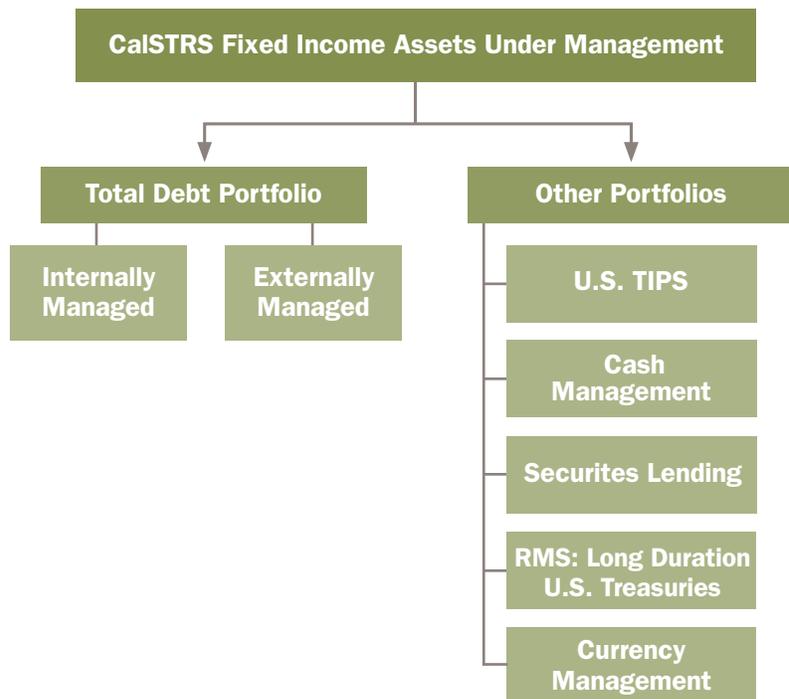
## Environmental Integration



ESG Risk Factor  
Investment Management Agreement

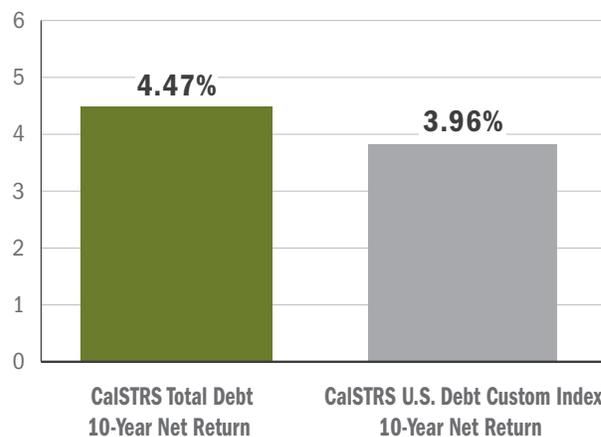


Credit Rating Analysis



The goal of the Fixed Income Division is to improve the diversification of CalSTRS' total investment portfolio, enhance its risk-adjusted total return, preserve capital and liquidity, and generate current income while facilitating the fund's cash needs.

## Asset Class Performance



## 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 Bonds 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 underwriters, and serve as voluntary guidelines on the recommended process for the development and issuance of green bonds. The 2018 edition of the Green Bond Principles was released in June 2018, after a consultation period with members and observers active in the green

bond market. CalSTRS Fixed Income is a member of the Green Bond Principles and previously served as an executive committee member. Additional information on the group and the Green Bond Principles can be found at [icmagroup.org/green-social-and-sustainability-bonds/green-bond-principles-gbp/](http://icmagroup.org/green-social-and-sustainability-bonds/green-bond-principles-gbp/).

The Fixed Income Division will continue to expand our leadership role in the green bond market and work with peers, underwriters 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.

## 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.

### CALSTRS GREEN BOND HOLDINGS: \$239,791,423 as of June 30, 2018

Issuer	Years Issued	% of Green Bonds	Use of Proceeds
KfW Group	2014, 2016, 2017, 2018	<b>11.26%</b>	Renewable energy projects
Apple Inc.	2016, 2017	<b>7.09%</b>	Environmentally sustainable projects
Southern Power Company	2015, 2016	<b>6.26%</b>	Renewable energy generation projects
European Investment Bank	2016, 2017, 2018	<b>5.00%</b>	Renewable energy and energy efficiency
Asia Development Bank	2016, 2017	<b>4.17%</b>	Climate change mitigation
Bank of America	2016, 2018	<b>4.17%</b>	Renewable and energy efficiency projects
Export-Import Bank of Korea	2016	<b>4.17%</b>	Renewable energy projects
Mexico City Airport	2016, 2017	<b>4.17%</b>	Airport construction
Swedish Export Credit	2015	<b>4.17%</b>	Transition to low-carbon and climate-resilient growth
European Bank for Reconstruction and Development	2016, 2017	<b>3.34%</b>	Energy efficiency, clean energy, water management, environmental services, public transport and waste management

# GLOBAL EQUITY

Total staff

**18**

Total AUM

**\$112.9  
BILLION**

as of June 30, 2018

## Environmental Integration



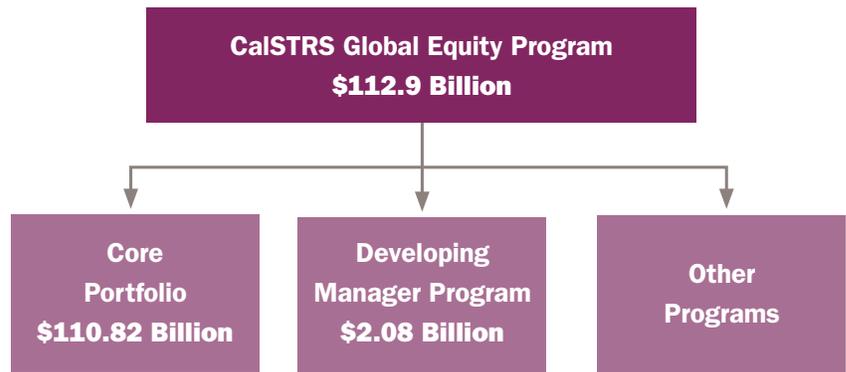
ESG Risk Factor  
Investment Management Agreement



ESG Score Analysis

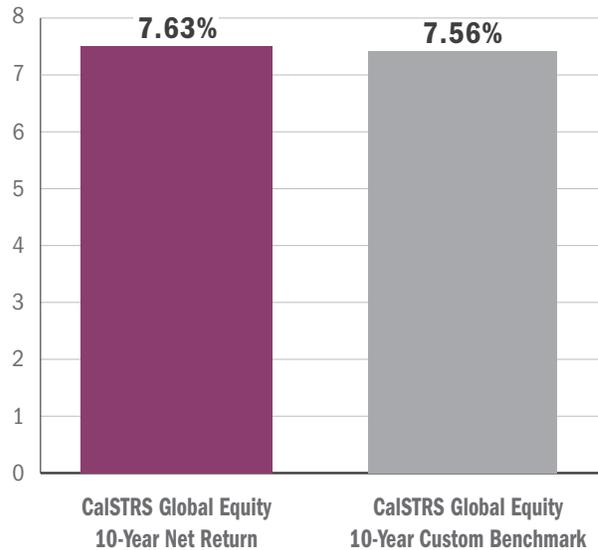


Dedicated Sustainability  
Investment Strategy



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

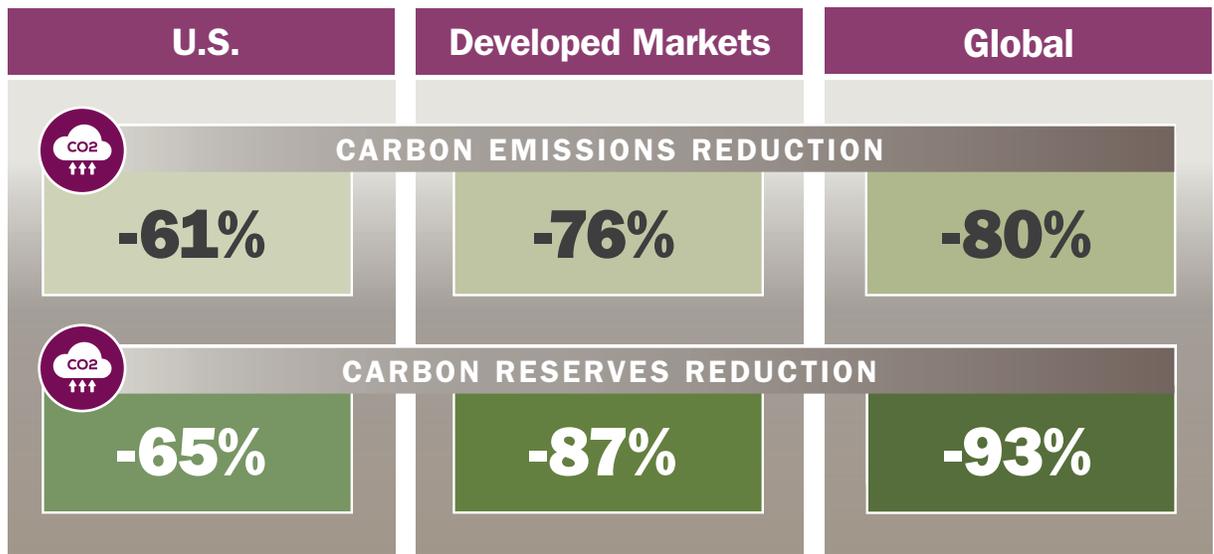
The initial implementation of CalSTRS' \$2.5 billion Low-Carbon Index took place July 1, 2017. This first phase represents a \$1.3 billion investment in the U.S. market. Over time, we plan to invest an additional \$1.2 billion between non-U.S. developed markets and emerging markets.

The Low-Carbon Index is managed internally by Investments staff. The index's first year of performance, over fiscal year 2017–18, was 14.79 percent, outperforming its benchmark by four basis points.

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

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

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

**9**

Total AUM

**\$4.1 BILLION**

as of March 31, 2018



## Environmental Integration



ESG Risk Factor Investment Management Agreement



Investment Advisory Boards



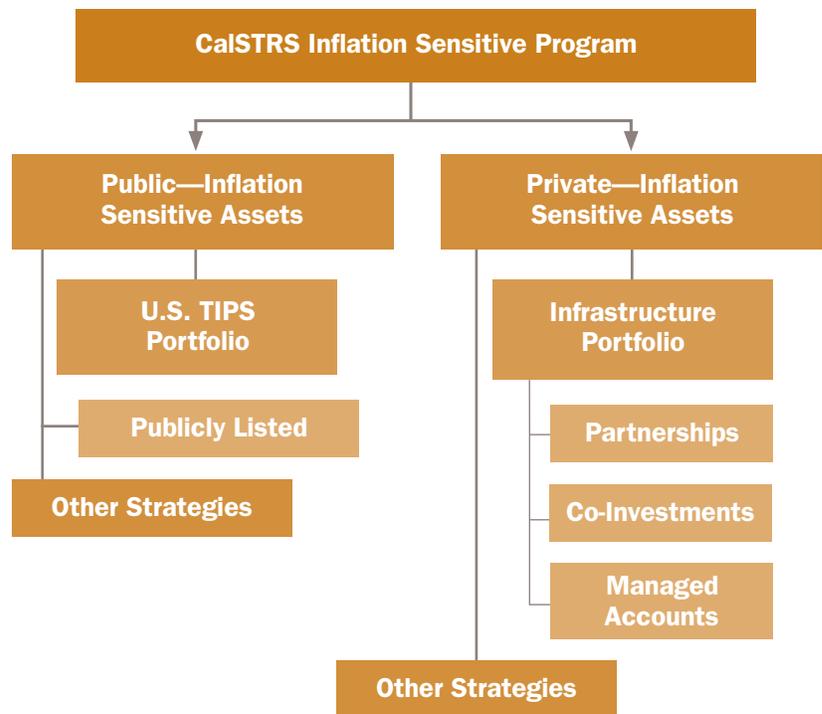
Commodity Risk Analysis



Environmental Impact Assessment



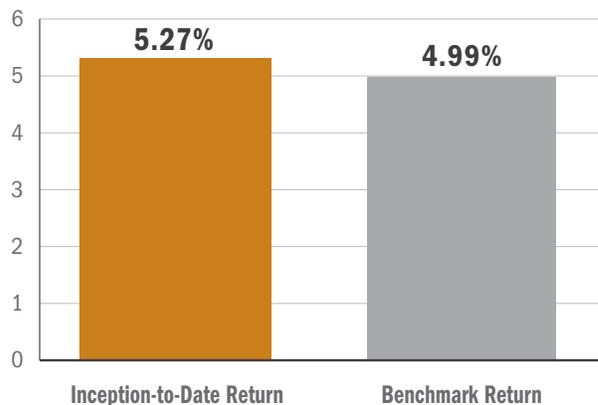
Engineering Technical Assessment



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 5.27 percent inception-to-date return relative to a custom benchmark return of 4.99 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 **\$364** million invested in solar, wind and other renewable power generation and LEED-certified assets.

	Asset Type	Approximate Investment Value (In millions)
	Solar Power Generation	<b>\$210</b>
	Wind Power Generation	<b>\$69</b>
	Other Renewable Power Generation	<b>\$67</b>
	LEED-Certified Assets	<b>\$18</b>
	<b>TOTAL</b>	<b>\$364</b>

# PRIVATE EQUITY

Total staff

**21**

Total AUM\*

**\$18.2  
BILLION**

as of March 31, 2018

\*AUM is defined as net asset value

## Environmental Integration



ESG Risk Factor  
Investment Management Agreement



Investment Advisory Boards



Dedicated Sustainability  
Investment Strategy



Environmental Impact Assessment



Engineering Technical Assessment

## TOTAL EXPOSURE BY STRATEGY

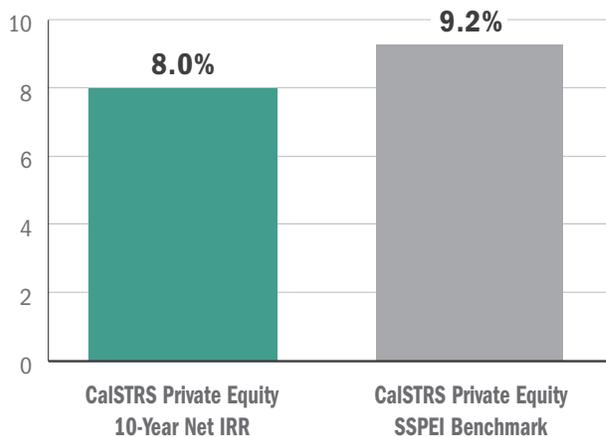
Buyout <b>69%</b>	Venture Capital <b>11%</b>	Opportunistic <b>1%</b>
Private Debt <b>11%</b>	Special Mandates <b>7%</b>	Core PE <b>1%</b>

The Private Equity asset class was established in 1988 with a global mandate. Currently, 81 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 2018, the Private Equity Portfolio has \$18.2 billion in assets under management, defined as net asset value, and has generated a 10-year net internal rate of return of 8.0 percent and a 13.1 percent net IRR since inception. The performance of the benchmark over the same period was 9.2 percent and 12.5 percent, respectively. CalSTRS has outperformed the benchmark since inception by 60 basis points.

As of March 31, 2018, the overall performance of the Clean Energy Portfolio is 0.81x 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 0.91x MOIC to date. The buyout portion of the portfolio represents \$415 million of remaining market value. The performance of the clean energy venture capital funds, representing 20 percent of committed capital, has generated a 0.48x MOIC to date. The venture capital portion of the Clean Energy Portfolio represents \$66 million of remaining market value.



## INVESTMENT SUMMARY: CLEAN ENERGY PORTFOLIO

Investment Type	Vintage Year Span	Aggregate Commitment (In Millions)	Comments
Buyout Funds	2006–2010	\$533.8	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	\$75.5	<p>Venture capital refers to investments in young, emerging growth companies in different stages of development. The stages of venture capital investing include the following:</p> <ul style="list-style-type: none"> <li>• Seed Stage—An entrepreneur seeking capital to conduct research or finish a business plan.</li> <li>• Early Stage—A company developing products and seeking capital to commence manufacturing.</li> <li>• Late Stage—A profitable or near-profitable high-growth company seeking further expansion capital.</li> </ul> <p>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.</p>
Co-Investments	2005–2010	\$84.5	Co-Investments are privately negotiated purchases of equity or quasi-equity from privately 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.
<b>Total Green Portfolio</b>		<b>\$693.8</b>	

# REAL ESTATE

Total staff

**21**

Total AUM

**\$28.7  
BILLION**

as of June 30, 2018

## Environmental Integration



ESG Risk Factor  
Investment Management Agreement



Investment Advisory Boards



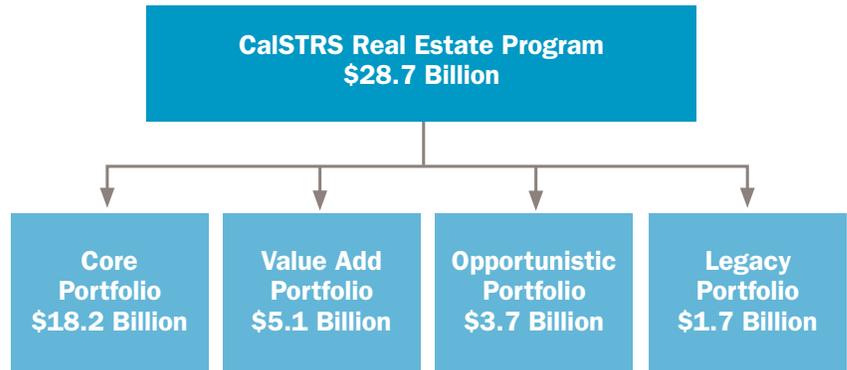
LEED & Energy Star Certifications



Environmental Impact Assessment



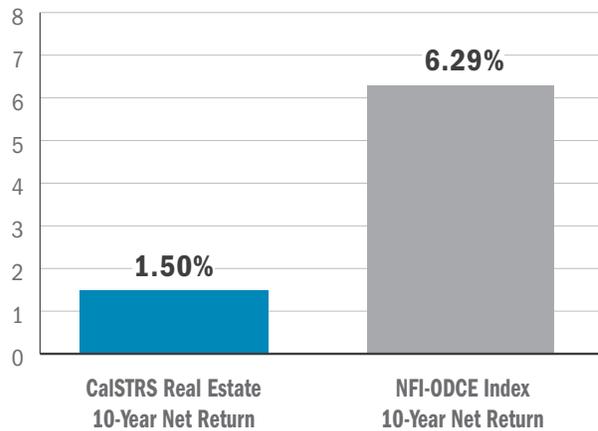
Engineering Technical Assessment



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, 2018



**Program Summary**

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

In 2003, Real Estate staff directed all separate account investment managers to include a conservation and 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.

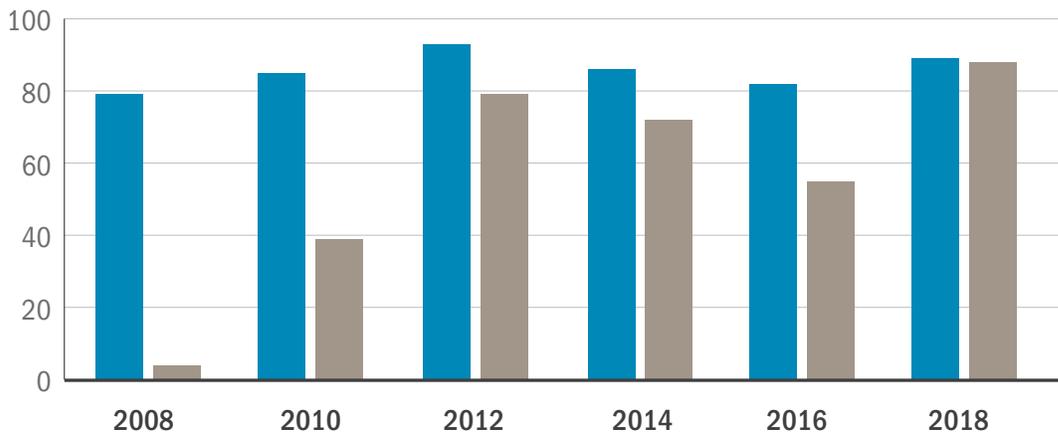


The LEED rating systems and the four levels of LEED recognition—Certified, Silver, Gold and Platinum—reflect projected or actual performance beyond certain prerequisites in five critical areas of environmental sustainability: sustainable site development, water savings, energy efficiency, materials selection 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, 2018, 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 presented in this chapter.*

# INVESTMENTS TAKING ENERGY EFFICIENCY INTO CONSIDERATION

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This recently developed Class A office property was built to LEED certification standards and targeted LEED Silver certification. However, the final submission made to the U.S. Green Building Council in early July 2018 included enough points to achieve LEED Gold certification.

Some of the key sustainability features include:

## Energy Conservation

- Designated parking spaces for low-emitting and fuel-efficient vehicles.
- Four electric vehicle charging stations through the Electrify America Initiative.
- On-site renewable energy through light harvesting and photo cells to control lighting circuits.

## Water Conservation

- Water use reduction through automatic faucets and flush valves in the restrooms.

This property also features a white, reflective, intensive Hydrotech roof that functions as one of the city's only rain gardens allowed to drain into the nearby river. In effect, water throughout the site drains to the courtyard where it is filtered through up to 36 inches of soil and then directed immediately to the adjacent river.





This office property implemented a number of comprehensive, multifaceted programs with the intent to promote greater energy and water conservation, waste recycling, and new sustainability initiatives.

## **Energy Conservation**

### **Real-Time Electricity Monitoring**

This building was the first office property in its city to partner with the local government to install special metering equipment that allows real-time electricity monitoring from a computer or smartphone. The system facilitates smart morning building startup and afternoon and weekend shutdown to minimize energy usage during nonbusiness hours. This initiative is projected to reduce overall base building electricity use by 7 to 10 percent.

### **Building Equipment Upgrades**

- Replaced older, inefficient HVAC and lighting equipment with new high-efficiency equipment, such as variable frequency drives on motors and LED lighting fixtures that reduce electricity usage by 50 to 75 percent.
- Upgraded the main air conditioning chillers with a high-efficiency design that reduces energy use by over 50 percent.

## **Water Conservation**

- Installed a system that recovers condensate water from the air conditioning systems on each floor of the building and redirects the water for landscape irrigation water in the entrance plaza.
- Added new water softeners on the cooling tower system, which significantly reduced water usage and saved over one million gallons of water per year.

## **Recycling and Waste Disposal**

- Implemented separate food waste collection from office tenants and five restaurant tenants for off-site composting.

## **Sustainability**

- Installed honeybee hives and gardens on the roof, which allowed building tenants to share in the honey and harvested vegetables.

# INVESTMENTS TAKING SUSTAINABLE MANUFACTURING INTO CONSIDERATION



## Environmental Integration



### Company Description

A personal care consumer products manufacturer based in Asia.

**Strategy** The investment manager implemented several value-added improvements, including:

- Becoming the first company in Asia to earn the Planet Mark certification. As part of the certification, the company has made a commitment to reduce carbon emissions over the next three years by:
  - » Investing in a new, more productive and energy efficient manufacturing plant.
  - » Engaging employees to drive improvements.
  - » Implementing a sustainability platform to track and measure key ESG-related data, specifically energy and water consumption.
  - » Using performance dashboards to generate reports that allow it to continually monitor trends and identify areas for improvement.

The Planet Mark is an internationally recognized and trusted sustainability certification program that acknowledges commitment to continuous improvements in sustainability. The certification is awarded to businesses, products and buildings that are committed to reducing their carbon emissions. Data from 2016 shows that on average, Planet Mark-certified businesses make a 10-percent carbon saving per employee year over year through reductions in energy, waste, water, travel and procurement.



### Company Description

A food manufacturer based in Europe

**Strategy** The investment manager implemented several value-added improvements, including:

- Reducing the environmental impact of operations and production facilities. Specifically, the company:
  - » Reduced its carbon footprint in France by 70 percent by installing cogeneration (generation of electricity and useful heat at the same time) and green steam (recycling of thermal energy previously lost to the environment). Cogeneration and green steam cover 25 and 70 percent of the site's heat, respectively. Therefore, only 5 percent of the site's heat coverage is required by gas.
  - » Installed cogeneration in Germany, which now covers 35 percent of the site's power consumption.
- Forming a corporate social responsibility organization to oversee the implementation of its environmental, social and governance strategy.

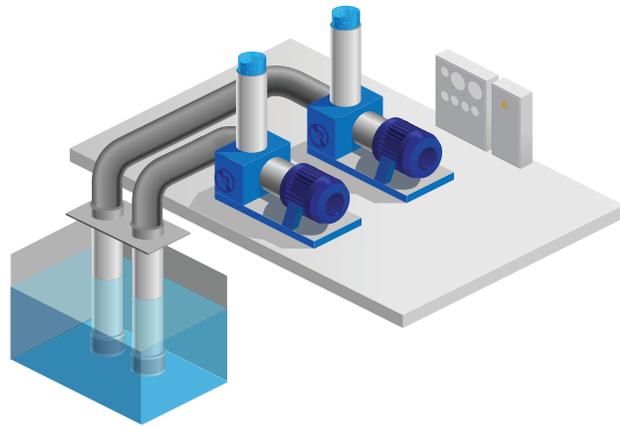


### Xylem Inc.

Xylem Inc. is a water technology company that is committed to solving the world's water, wastewater and energy needs by creating innovative and smart technology solutions. Its industrial pumps and application solutions use less energy, reduce life-cycle costs and promote sustainability. It offers a portfolio of products and systems designed to meet the demands and challenges of treating water and wastewater.

### Oxelia

The Leopold Oxelia is an ozone-enhanced biological active filtration system. The Oxelia multi-barrier removal produces a cleaner and safer effluent by reducing pathogens and destroying difficult to treat pollutants. The result is an energy and water efficient treatment system. The Oxelia system combines the treatment synergy of ozone oxidation and biologically active filtration into a single process solution.



### Trex Company Inc.

Trex Company, Inc. is the top decking brand and the inventor of wood-alternative composite decking. Its eco-friendly composite decks are developed from a blend of 95 percent recycled wood and plastic film. The company uses an earth-friendly manufacturing process that reclaims factory waste and eliminates the use of harmful chemicals. As of June 30, 2018, the company's stock performance was up more than 85 percent from the previous year.

*The average 500-square foot composite Trex deck contains 140,000 recycled plastic bags, which makes Trex one of the largest plastic bag recyclers in the U.S.*



## INVESTMENTS WITH A RENEWABLE ENERGY FOCUS

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### MidAmerican Energy Has Issued Three Green Bonds Since 2017

MidAmerican Energy, a subsidiary of Berkshire Hathaway Energy, provides service to both electric and natural gas customers in Iowa, South Dakota and Nebraska. In 2004, 70 percent of MidAmerican's energy generation was produced from coal with zero from wind generation. At this time, MidAmerican began investing in renewable energy with the goal of providing 100 percent renewable energy to its customers. By the end of 2016, coal provided just 31 percent of energy generation and wind provided 48 percent. Since 2017, MidAmerican has issued three green bonds totaling \$1.55 billion to help support the funding costs of developing and installing renewable resources, and more specifically, its Wind X and Wind XI projects. Wind X is complete and Wind XI is expected to be completed by the end of 2019.



### Avangrid

Avangrid is a sustainable energy company with operations in 24 U.S. states. The company has two primary business lines: Avangrid Networks, which includes eight electric and natural gas utilities in New England and New York, and Avangrid Renewables, which provides 7.1 gigawatts of electricity capacity primarily through wind power.

In November 2017, Avangrid issued its first green bond. Three projects that reached commercial operation in 2017 have been allocated proceeds: North Carolina's first wind farm, the Amazon Wind Farm, provides 208 megawatts of power from its 104 high-tech turbines; Colorado's Twin Buttes II produces 75 megawatts of wind power; and Oregon's Gala Solar Plant provides 56 megawatts of solar power.

### Renewable Investment Examples

#### Investment 1

CalSTRS is a partner of a renewable energy platform in Brazil, which currently includes roughly 647 megawatts of operational wind power projects in its portfolio and plans to expand capacity in the near future.

Wind energy, a clean and renewable source of energy, significantly reduces air pollution and carbon dioxide emissions when compared to traditional fossil fuel power plants.

Sustainable and clean energy is crucial to the growth of Brazil's economy. A recent study shows hydropower is one of the primary sources of renewable energy in Brazil and provides upward of 75 percent of its electricity. However, hydropower may not be sustainable with the increased frequency and duration of droughts in the region. Wind energy, an emerging source of clean and reliable power for Brazil, may help mitigate an energy crisis. Today, Brazil is one of the top 10 largest global producers of wind energy. Reliable and consistent wind along Brazil's vast coastline provides a natural and reliable energy source.

#### Investment 2

CalSTRS recently pledged \$400 million to a follow on investment fund focused specifically on buying renewable electrical generation projects and owning them for a long period of time. This fund, in addition to the several renewable assets owned by commingled funds, will continue to increase our exposure to renewable investments that provide zero-emission power generation on five continents.



## 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.*

**PREPARED BY:**



Brian Rice  
*Portfolio Manager, Corporate Governance*



Travis Antoniono  
*Investment Officer III, Corporate Governance*



Daniel Bain  
*Investment Officer I, Corporate Governance*



Paul Shantic  
*Investment Director, Inflation Sensitive*



John-Charles Gish  
*Investment Officer II, Inflation Sensitive*



Guldip Dhillon  
*Investment Officer I, Inflation Sensitive*



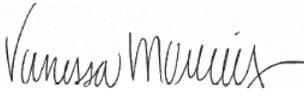
Cathy DiSalvo  
*Associate Portfolio Manager, Fixed Income*



Matthew Schott  
*Investment Officer III, Fixed Income*



Geetika Misra  
*Associate Portfolio Manager, Private Equity*



Vanessa Morris, CAIA  
*Investment Officer II, Private Equity*



Mitch Pleis  
*Portfolio Manager, Real Estate*



Orintheo Swanigan, CFA  
*Investment Officer III, Real Estate*



Raymond Venner  
*Portfolio Manager, Global Equities*



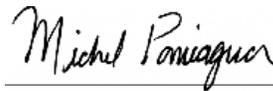
Tiffany Lau  
*Investment Officer II, Global Equities*



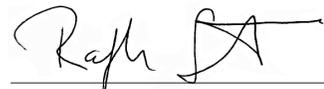
Glen Blacet, CAIA  
*Portfolio Manager, Innovation and Risk*



Parry Wang, CFA  
*Investment Officer III, Innovation and Risk*



Michel Paniagua  
*Investment Officer I, Innovation and Risk*



Ralph Smith  
*Investment Officer II, Operations*



Daniel Thai  
*Investment Officer II, Operations*

**APPROVED BY:**



Christopher J. Ailman  
*Chief Investment Officer*



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