

Cleantech Redefined

Why the next wave of cleantech infrastructure, technology and services will thrive in the twenty first century

Dallas Kachan & Danielle Fugere
October 2013

www.kachan.com
www.asyousow.org
www.endowmentethics.org



Featured Speakers

Andrew Behar
As You Sow



Dallas Kachan
Kachan & Co.



Anne Simpson
California Public Employees'
Retirement System



Alicia Seiger
Stanford Steyer-Taylor
Center for Energy Policy &
Finance

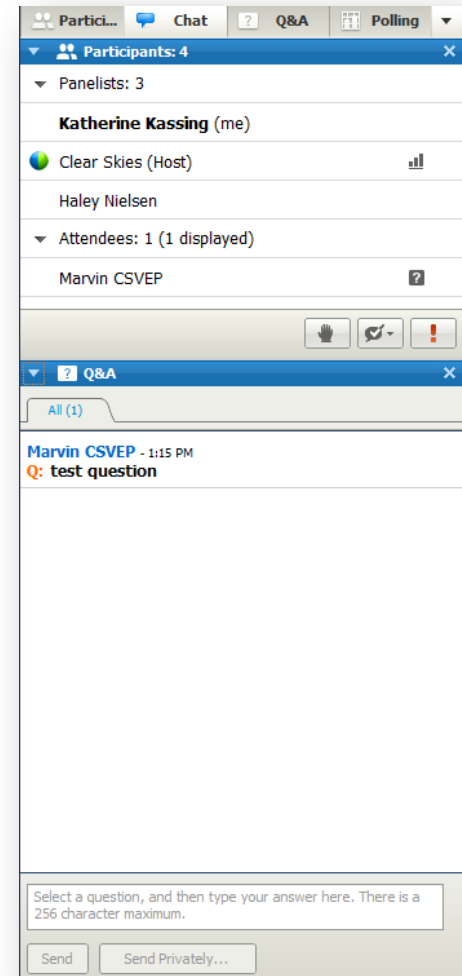


General Information

- For technical support call 1-866-863-3904
- Use the Q&A window to send us your questions
- You will receive an email with a link to the recording within 24 hours
- Report will be available for download after the webinar

www.kachan.com www.asyousow.org www.endowmentethics.org

Q&A Window



Agenda

Introduction (5 min)

Andrew Behar, As You Sow

Report Highlights (15 min)

Dallas Kachan, Kachan & Co.

Cleantech and CALPERS (10 min)

Anne Simpson, CALPERS

Cleantech and Steyer-Taylor Center (10 min)

Alicia Seiger, Stanford Steyer-Taylor Center for Energy Policy and Finance

Q&A (15 min)

moderated by Andrew Behar

Closing Remarks (1.5 min)

Conclusion (2 min)

Andrew Behar

Cleantech is an umbrella investment theme for a wide range of technologies and services.

Cleantech is now everywhere, and poised for even more rapid expansion.

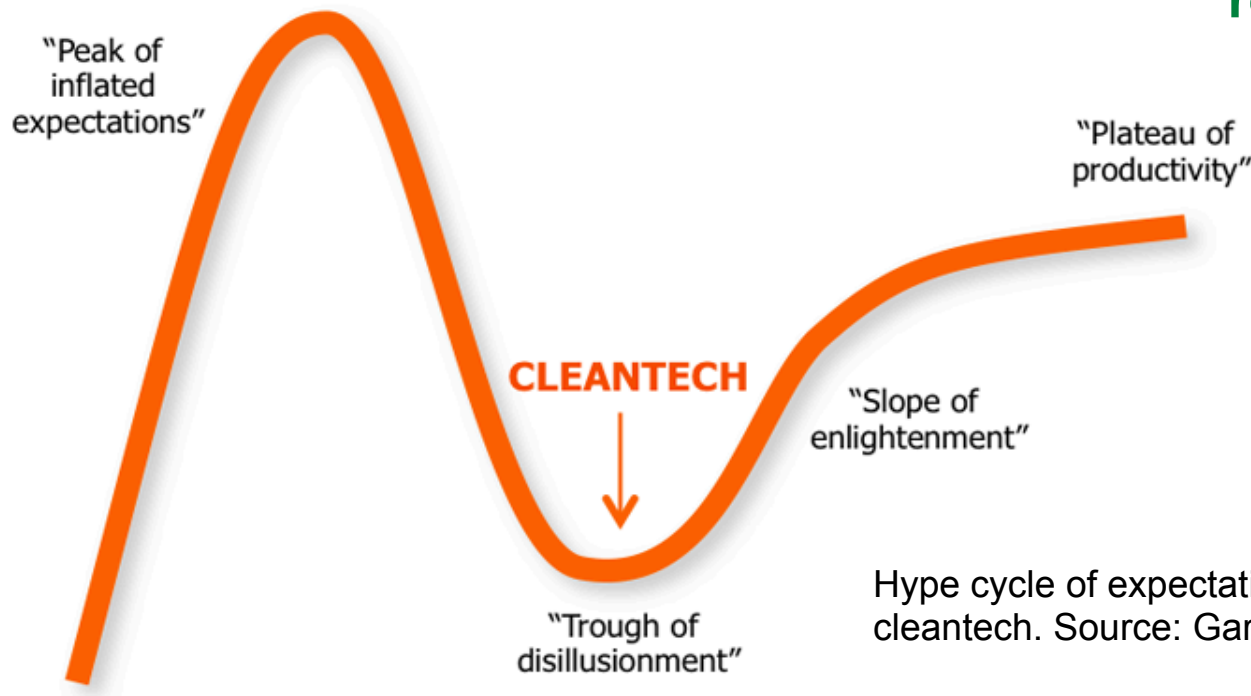
The Cleantech Story

- **Redefining cleantech**
- **Cleantech's many drivers**
 - **Increased resource scarcity**
 - **Climate change**
 - **Changing policy and regulatory requirements**
 - **Risk mitigation**
 - **Many more**

To achieve our economic and environmental objectives, capital needs to be allocated toward products and services that can do and provide more with less.

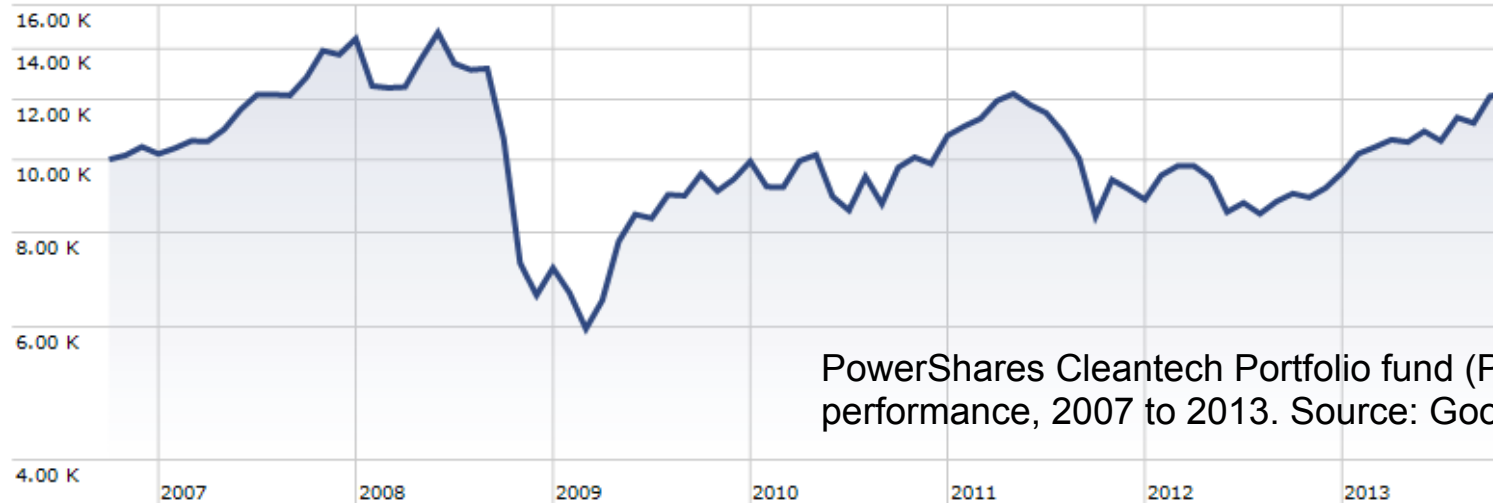
Cleantech's growth mimics the dot com curve

Clean technology has had 10 years of mostly underwhelming returns. Yet there have been bright spots. And a broad recovery seems to be underway.



Hype cycle of expectations over time related to cleantech. Source: Gartner

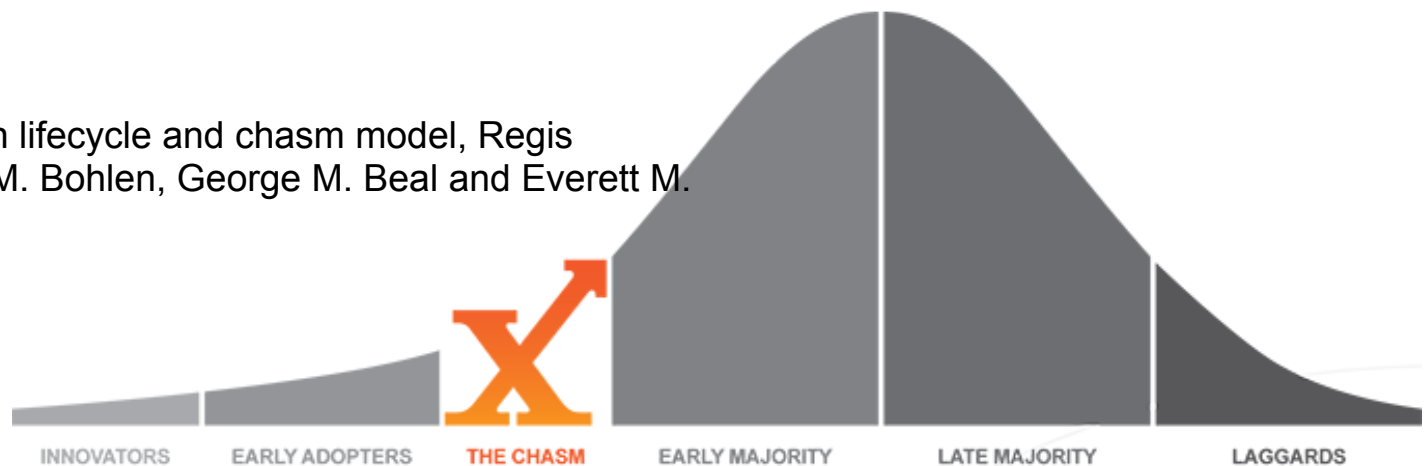
PowerShares Cleantech:12,236.89

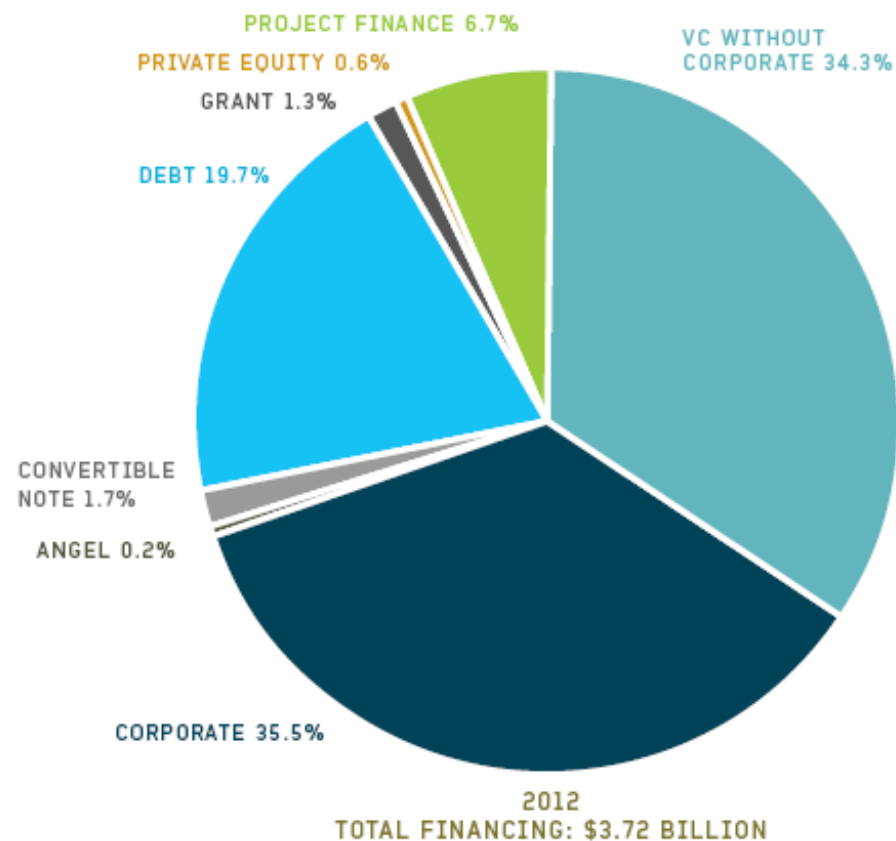
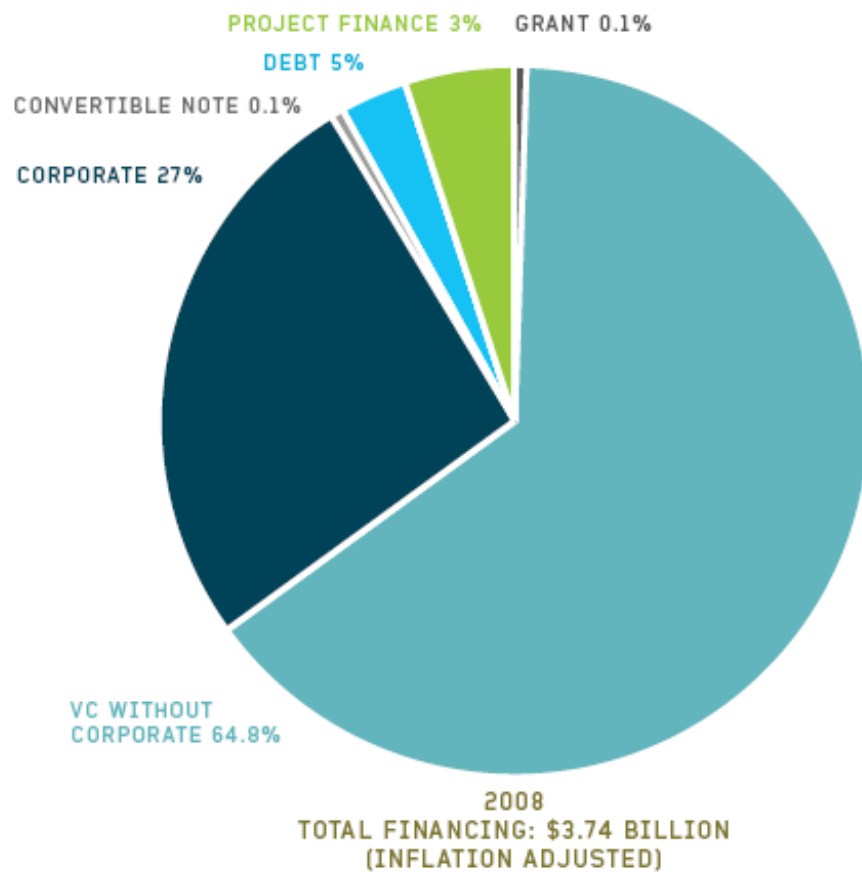


Recovering from overhyped expectations and poor returns

Transitioning to the mass market

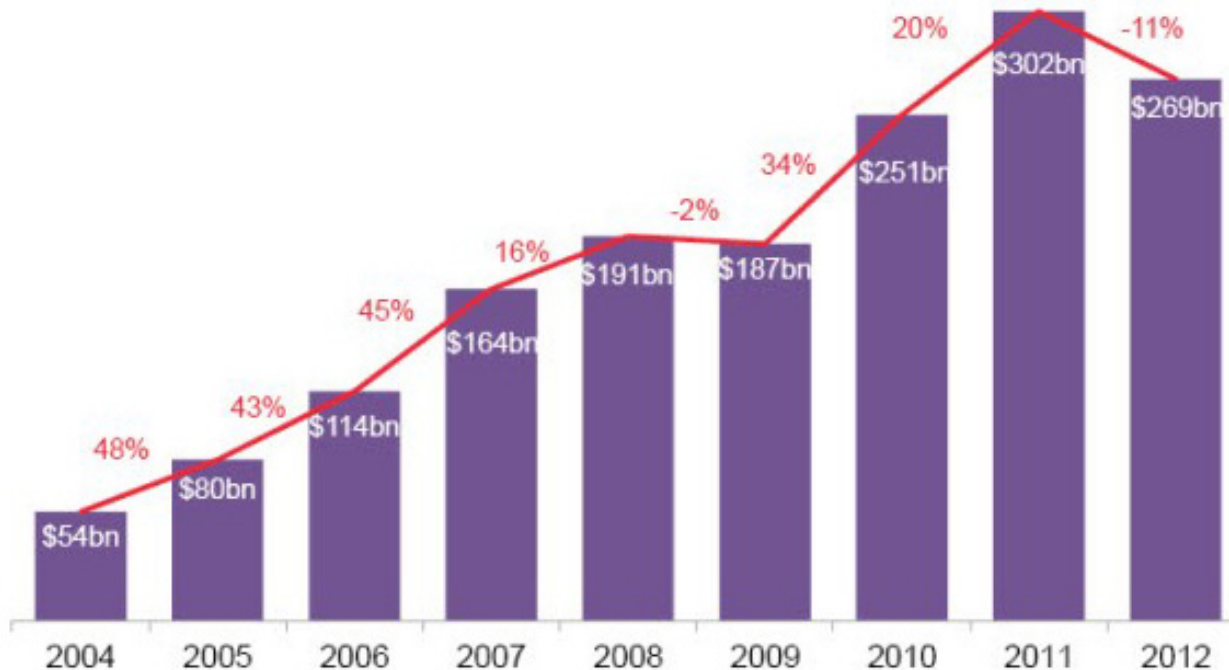
The technology adoption lifecycle and chasm model, Regis McKenna. Source: Joe M. Bohlen, George M. Beal and Everett M. Rogers





Sources of clean technology financing in California,
2008-2012. Source: CB Insights Analysis, Collaborative
Economics

Moving beyond the venture capital bubble



Global total investments in clean energy (2004 – 2012, \$B).
Source: Bloomberg New Energy Finance

“A shift in the sources of cleantech funding shows that the industry is changing from one that relies on seed stage venture capital to one ready for investment from major corporations.”

-Noel Perry, Next 10 founder and venture capitalist

Investment opportunities



Clean energy

- Wind
- Solar
- Renewable fuels
- Marine
- Biomass
- Geothermal
- Fuel cells
- Emerging
- Measurement & analytics



Efficiency

- Smart grid
- Green building
- Building automation
- LED lighting
- Data centers & devices
- Smart appliances
- Semiconductors
- Collaborative consumption systems
- Infrastructure



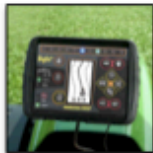
Transportation

- Vehicles
- Traffic management
- Fleet management
- Fueling/charging infrastructure
- Vehicle-to-grid
- Battery swapping
- Alternative fuel conversion



Water

- Production
- Treatment
- Transmission
- Efficiency
- Monitoring & compliance



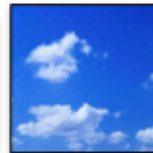
Agriculture

- Crop farming
- Controlled environment agriculture
- Sustainable forestry
- Animal farming
- Aquaculture



Energy storage

- Batteries
- Thermal storage
- Mechanical storage
- Super/ultracapacitors
- Hydrogen storage



Air & environment

- Emissions control
- Bioremediation
- Recycling & waste
- Materials reclamation
- Waste treatment
- Monitoring & compliance
- Sensors, measurement/testing hardware



Clean industry

- Materials innovation
- Design innovation
- Equipment innovation
- Production
- Monitoring & compliance
- Advanced packaging

Eight major groupings of clean technologies. Source: Kachan analysis



Clean energy

“Poster child” of the clean technology theme

Energy storage

Enabling technology for other promising industries



Efficiency

Green construction materials; automation; control systems



Transportation

Growth in the transportation sector is mirrored by growth in clean transportation technologies

Water

Irrigation;
water treatment
and reuse;
desalination



Agriculture

Crop farming; urban agriculture;
sustainable forestry; animal farming;
aquaculture



Air & environment

Policy support will ensure continued markets for industrial emissions control equipment



Clean industry

Continued efficiency improvements; reduced toxicity in industrial equipment and processes; advances in materials science

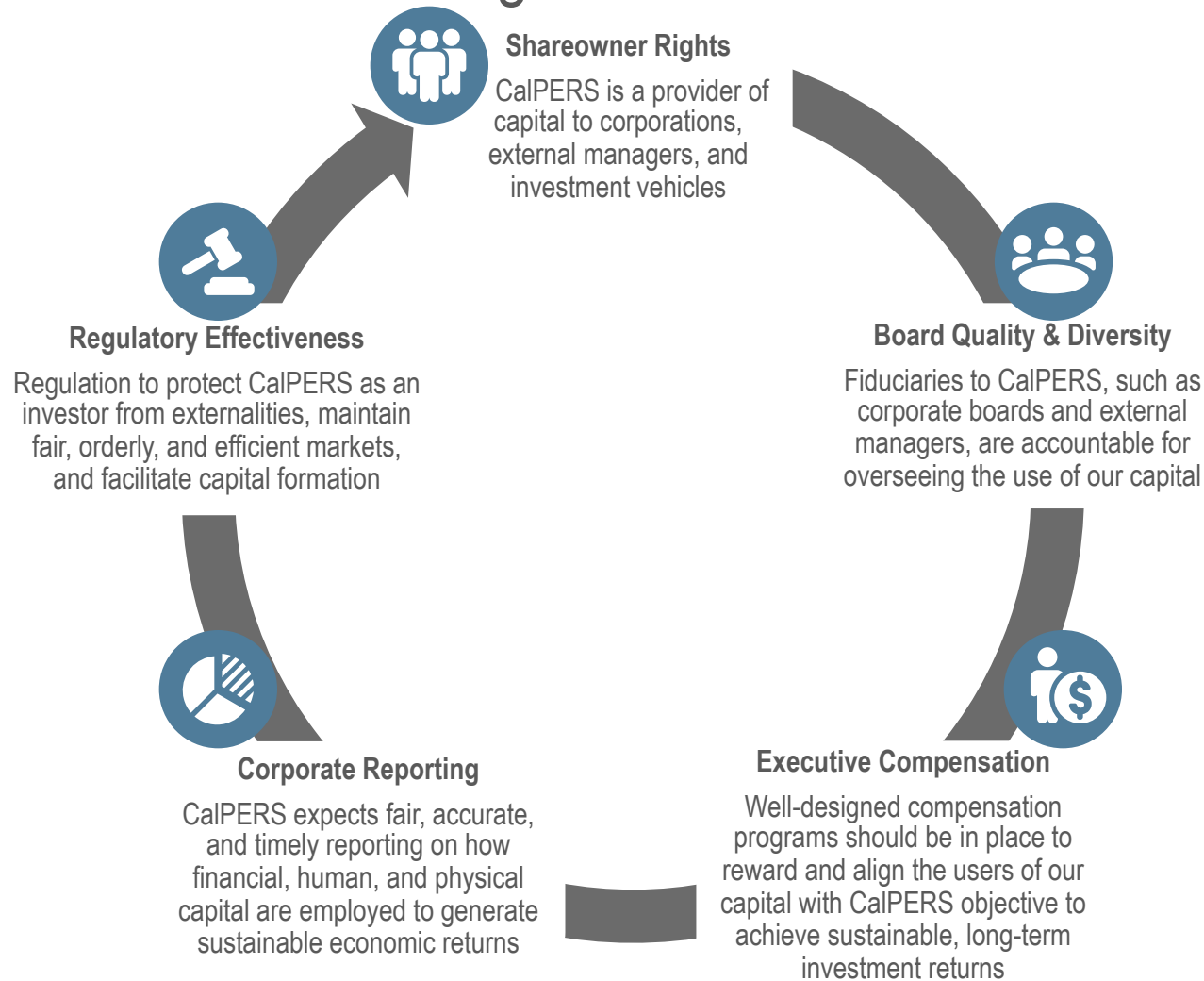
The best technologies and most exciting opportunities for wealth creation in cleantech are yet to come.

*How to stay on top of new
opportunities in cleantech*

- ❑ asyousow.org/cleantech-redefined
- ❑ cleantechwatch.com

CalPERS Sustainable Investment

The Virtuous Circle of Long-term Value Creation



Investment Beliefs Policy

- “...this Policy ensures that the Committee and the CalPERS Investment Staff, along with external managers and investment consultants, take prudent and careful action when managing CalPERS assets. This Policy Require that CalPERS develop and maintain a set of Investment Beliefs.”

Purpose

- Provide a basis for strategic management of the investment portfolio, inform organizational priorities, and ensure alignment between the Board and CalPERS staff and become part of the CalPERS culture.
- Serve as a guide for making decisions that often require balancing multiple, inter-related decision factors.
- Provide context for CalPERS actions, reflect CalPERS values, and acknowledge CalPERS responsibility to sustain its ability to pay benefits for generations.

Process

- **November 2012** – launched a formal project to develop a set of Investment Beliefs, which included in-depth one-on-one interviews with IC Members and staff.
- Analyzed and clustered input into themes with a focus on identifying themes that had contentious and unsettled elements that required resolution.
- **March 2013** – An Investment Beliefs Stakeholder Panel provided a forum for CalPERS stakeholders to engage in dialogue and share their perspectives on Investment Beliefs.
- **April 2013** – Held an Investment Committee Workshop to facilitate a discussion around contentious and unsettled themes and to understand various points of view.
- **July 2013** – Presented 10 draft Investment Beliefs to the IC Members at the Board Offsite and sought feedback.
- **October 2013** – Staff incorporated the feedback received at the September 2013 IC Meeting and presented the Investment Beliefs for adoption.

CalPERS Investment Beliefs

Adopted September 16, 2013

Investment Belief 1

Liabilities must influence the asset structure

Sub-beliefs:

- Ensuring the ability to pay promised benefits by maintaining an adequate funding status is the primary measure of success for CalPERS
- CalPERS has a large and growing cash requirement and inflation-sensitive liabilities; assets that generate cash and hedge inflation should be an important part of the CalPERS investment strategy
- CalPERS cares about both the income and appreciation components of total return
- Concentrations of illiquid assets must be managed to ensure sufficient availability of cash to meet obligations to beneficiaries

Investment Belief 2

A long time investment horizon is a responsibility and an advantage

Long time horizon requires that CalPERS:

- Consider the impact of its actions on future generations of members and taxpayers
- Encourage investee companies and external managers to consider the long-term impact of their actions
- Favor investment strategies that create long-term, sustainable value and recognize the critical importance of a strong and durable economy in the attainment of funding objectives
- Advocate for public policies that promote fair, orderly and effectively regulated capital markets

Investment Belief 2 continued

A long time investment horizon is a responsibility and an advantage

Long time horizon enables CalPERS to:

- Invest in illiquid assets, provided an appropriate premium is earned for illiquidity risk
- Invest in opportunistic strategies, providing liquidity when the market is short of it
- Take advantage of factors that materialize slowly such as demographic trends
- Tolerate some volatility in asset values and returns, as long as sufficient liquidity is available

Investment Belief 3

CalPERS investment decisions may reflect wider stakeholder views, provided they are consistent with its fiduciary duty to members and beneficiaries

Sub-beliefs:

- As a public agency, CalPERS has many stakeholders who express opinions on investment strategy or ask CalPERS to engage on an issue. CalPERS preferred means of responding to issues raised by stakeholders is engagement
- CalPERS primary stakeholders are members/beneficiaries, employers, and California taxpayers as these stakeholders bear the economic consequences of CalPERS investment decisions

Investment Belief 3 continued

CalPERS investment decisions may reflect wider stakeholder views, provided they are consistent with its fiduciary duty to members and beneficiaries

In considering whether to engage on issues raised by stakeholders, CalPERS will use the following prioritization framework:

- **Principles and Policy** – to what extent is the issue supported by CalPERS Investment Beliefs, Principles of Accountable Corporate Governance or other Investment Policy?
- **Materiality** – does the issue have the potential for an impact on portfolio risk or return?
- **Definition and Likelihood of Success** – is success likely, in that CalPERS action will influence an outcome which can be measured? Can we partner with others to achieve success or would someone else be more suited to carry the issue?
- **Capacity** – does CalPERS have the expertise, resources and standing to influence an outcome?

Investment Belief 4

Long-term value creation requires effective management of three forms of capital: financial, physical and human

Sub-beliefs:

- Governance is the primary tool to align interests between CalPERS and managers of its capital, including investee companies and external managers
- Strong governance, along with effective management of environmental and human capital factors, increases the likelihood that companies will perform over the long-term and manage risk effectively

Investment Belief 4 continued

Long-term value creation requires effective management of three forms of capital: financial, physical and human

- CalPERS may engage investee companies and external managers on their governance and sustainability issues, including:
 - Governance practices, including but not limited to alignment of interests
 - Risk management practices
 - Human capital practices, including but not limited to fair labor practices, health and safety, responsible contracting and diversity
 - Environmental practices, including but not limited to climate change and natural resource availability

Investment Belief 5

CalPERS must articulate its investment goals and performance measures and ensure clear accountability for their execution

Sub-beliefs:

- A key success measure for the CalPERS investment program is delivery of the long-term target return for the fund
- The long time horizon of the fund poses challenges in aligning interests of the fund with staff and external managers
- Staff can be measured on returns relative to an appropriate benchmark, but staff performance plans should include additional objectives or key performance indicators to align staff with the fund's long-term goals
- Each asset class should have explicit alignment of interest principles for its external managers

Investment Belief 6

Strategic asset allocation is the dominant determinant of portfolio risk and return

Sub-beliefs:

- CalPERS strategic asset allocation process transforms the fund's required rate of return to the market exposures that staff will manage
- CalPERS will aim to diversify its overall portfolio across distinct risk factors / return drivers
- CalPERS will seek to add value with disciplined, dynamic asset allocation processes, such as mean reversion. The processes must reflect CalPERS characteristics, such as time horizon and size of assets
- CalPERS will consider investment strategies if they have the potential to have a material impact on portfolio risk and return

Investment Belief 7

CalPERS will take risk only where we have a strong belief we will be rewarded for it

Sub-beliefs:

- An expectation of a return premium is required to take risk; CalPERS aims to maximize return for the risk taken
- Markets are not perfectly efficient, but inefficiencies are difficult to exploit after costs
- CalPERS will use index tracking strategies where we lack conviction or demonstrable evidence that we can add value through active management
- CalPERS should measure its investment performance relative to a reference portfolio of public, passively managed assets to ensure that active risk is being compensated at the Total Fund level over the long-term

Investment Belief 8

Costs matter and need to be effectively managed

Sub-beliefs:

- CalPERS will balance risk, return and cost when choosing and evaluating investment managers and investment strategies
- Transparency of the total costs to manage the CalPERS portfolio is required of CalPERS business partners and itself
- Performance fee arrangements and incentive compensation plans should align the interests of the fund, staff and external managers
- CalPERS will seek to capture a larger share of economic returns by using our size to maximize our negotiating leverage. We will also seek to reduce cost, risk and complexity related to manager selection and oversight
- When deciding how to implement an investment strategy, CalPERS will implement in the most cost effective manner

Investment Belief 9

Risk to CalPERS is multi-faceted and not fully captured through measures such as volatility or tracking error

Sub-beliefs:

- CalPERS shall develop a broad set of investment and actuarial risk measures and clear processes for managing risk
- The path of returns matters, because highly volatile returns can have unexpected impacts on contribution rates and funding status
- As a long-term investor, CalPERS must consider risk factors, for example climate change and natural resource availability, that emerge slowly over long time periods, but could have a material impact on company or portfolio returns

Investment Belief 10

Strong processes and teamwork and deep resources are needed to achieve CalPERS goals and objectives

Sub-beliefs:

- Diversity of talent (including a broad range of education, experience, perspectives and skills) at all levels (Board, staff, external managers, corporate boards) is important
- CalPERS must consider the government agency constraints under which it operates (e.g., compensation, civil service rules, contracting, transparency) when choosing its strategic asset allocation and investment strategies

Investment Belief 10 continued

Strong processes and teamwork and deep resources are needed to achieve CalPERS goals and objectives

- CalPERS will be best positioned for success if it:
 - Has strong governance
 - Operates with effective, clear processes
 - Focuses resources on highest value activities
 - Aligns interests through well designed compensation structures
 - Employs professionals who have intellectual rigor, deep domain knowledge, a broad range of experience and a commitment to implement CalPERS Investment Beliefs

Next Steps

Sustainable Investment Research Initiative (SIRI) Phase 2

- CalPERS and its academic partners launched a searchable database of more than 700 academic studies on sustainability factors that examine the impact of these factors on investment risk and return.
- In Phase 2 we will work to define the issues uncovered in Phase 1 and continue gathering the data.

Manager Expectations Document:

- Develop a total fund document on sustainable investment expectations for internal and external managers.
- These questions will address two aspects of the potential manager's capacity: their institutional policy and practices on ESG and their investment policy and practices on ESG, if any.

CalPERS website:
www.calpers.ca.gov

View and download the full Investment Beliefs at:
<http://www.calpers.ca.gov/eip-docs/about/press/news/invest-corp/board-offsite.pdf>

View and download Full Sustainable Investment Report at:
<http://ow.ly/aoHfm> or scan the QR code

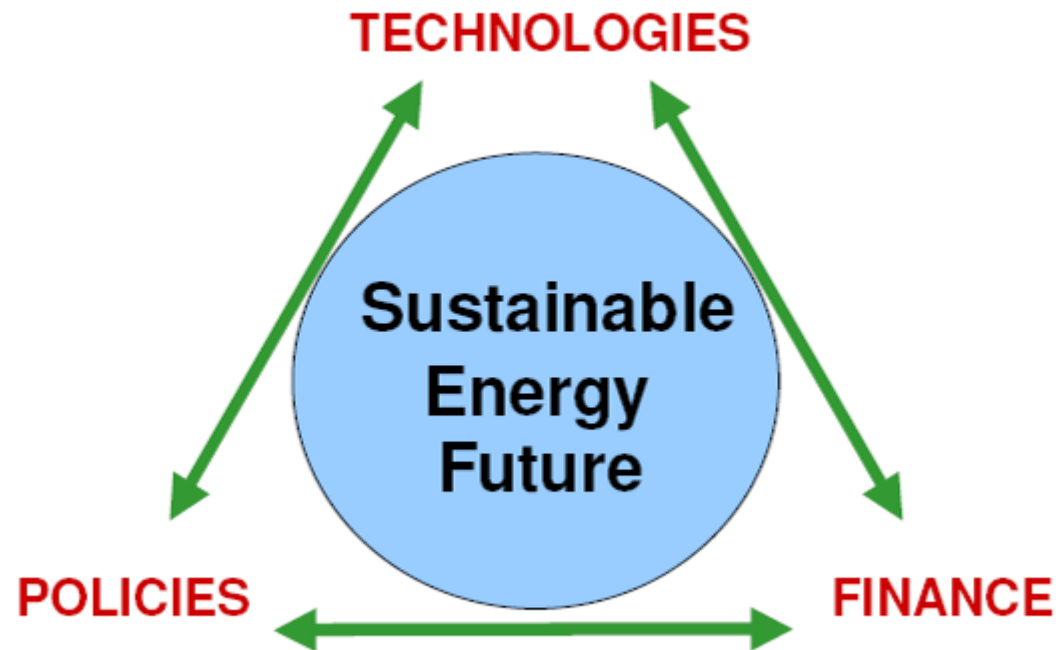


The background of the slide features a large, light gray watermark of the Stanford University seal. The seal is circular with a diamond-patterned border. Inside the border, the words "STANFORD JUNIOR UNIVERSITY" are written in an arc at the top, and "1891" is at the bottom. The center of the seal depicts a redwood tree on a rocky outcrop, with the Latin motto "DIE LUXT DER FREIHEIT" (The Light of Freedom) written in an arc above the tree.

Steyer-Taylor Center for Energy Policy & Finance

Alicia Seiger
Deputy Director

Mission: To develop and explore economically sensible policy and finance solutions that advance cleaner and more secure energy



Cleantech Growing Pains

FINANCE

- VC 1.0
- PROJECT FINANCE
- FEDERAL SPENDING

POLICY

- RIP CAP & TRADE
- ARPA-E, EFFICIENCY & FUEL ECONOMY STANDARDS, STATE RPS
- EPA REGULATIONS

Relevant Steyer-Taylor Research

INCREASING FLOWS OF CAPITAL TO CLEAN ENERGY

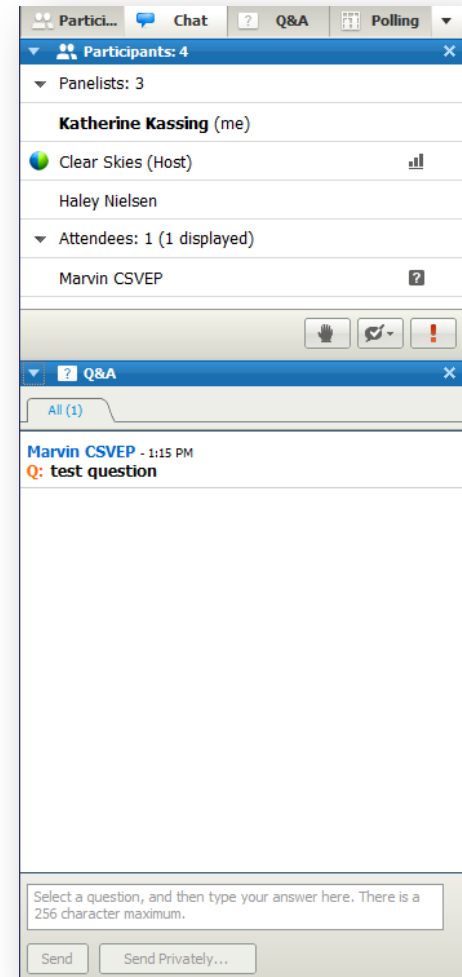
- REITs / MLPs
- COMMERCIALIZATION VALLEY OF DEATH
- FAMILY OFFICES, FOUNDATIONS ENDOWMENTS

Q&A

- For technical support call 1-866-863-3904
- Use the Q&A window to send us your questions

www.kachan.com www.asyousow.org www.endowmentethics.org

Q&A Window



Thank You

This report was made possible by the generous support of (in alphabetical order)

- **Educational Foundation of America**
- **Libra Foundation**
- **Wallace Global Fund**

Additional support was provided by

- **Arntz Family Foundation**
- **Fred Gellert Family Foundation**

Featured Speakers

Andrew Behar
As You Sow



Dallas Kachan
Kachan & Co.



Anne Simpson
California Public Employees'
Retirement System



Alicia Seiger
Stanford Steyer-Taylor
Center for Energy Policy &
Finance



Cleantech Redefined

Why the next wave of cleantech infrastructure, technology and services will thrive in the twenty first century

Dallas Kachan & Danielle Fugere
October 2013

www.kachan.com
www.asyousow.org
www.endowmentethics.org

