

INVESTING IN A NEW CLIMATE

A SUMMARY OF THE ROUNDTABLE FOR UNIVERSITY ENDOWMENT INVESTORS HELD
AT STANFORD UNIVERSITY ON DECEMBER 7TH AND 8TH, 2016.

On December 7th and 8th, 2016, the Steyer-Taylor Center for Energy Policy and Finance gathered university endowment investors together with Stanford faculty and researchers to discuss the challenges and opportunities facing investment portfolios in light of climate change. Informed by the roundtable discussion, and a survey of participating and nonparticipating endowments completed just prior to the roundtable, what follows is a summary of key findings and recommendations for university endowment investors to make progress toward managing climate exposure¹ in their portfolios.

SETTING THE STAGE ([ALICIA SEIGER](#))

This roundtable marks the fourth in a series, which began with a convening of family office investors in February 2015. The objective of the series is to provide a forum that moves beyond just calls for divestment and ESG screens and into the more complex world of measuring and managing climate risk across a portfolio. The roundtable is also designed to illuminate the market trends and themes that could add up to the biggest business opportunity in the 21st century.

To illustrate how far mainstream finance has moved on these topics in just a few years, one must only look as far as the world's largest asset manager, BlackRock. In early 2014, during Q&A at a BlackRock hosted forum on investing in environmental markets, CEO Larry Fink was asked what he thought about climate risk. Fink's response, "I don't know, I've never really thought about it" was not unusual at the time (other than the fact he gave the answer at a program focused entirely on environmental markets.) Less than two years later, Blackrock issued one of the better reports on [adapting portfolios to climate change](#).

What happened? BlackRock's data-driven approach detected what many socially-minded investors and NGOs have been trumpeting for years – climate change presents material market risks and opportunities for investment portfolios.²

¹ The term "climate exposure" is defined as potential gains or losses in a portfolio due to climate change.

² The fact that many large asset owners put pressure on BlackRock to look at climate themes surely accelerated the firm's progress – thus the value of educating and empowering asset owners.

The risks play out across two major categories:

1. **Transition Risks.** As the world transitions to a lower-carbon economy policy, legal, technology, and market changes will pose varying levels of financial and reputational risks.
2. **Physical Risks.** A changing climate creates both event driven (acute) and longer-term shifts in climate patterns (chronic) risks that can take the form of direct damage to physical assets and indirect impacts from supply chain disruption.

While much has changed in terms of the number of reports published on the topic, much remains to be done in terms of providing investors with useful frameworks to manage climate risk.

The G20 Financial Stability Board (FSB) (among many respected institutions), has warned that a late and abrupt transition to a low-carbon economy could have implications for financial stability. To address the risk, the FSB established a task force on climate related disclosure (TFCD), chaired by Mike Bloomberg, to develop voluntary, consistent climate-related financial risk disclosures. The task force released its [recommendations report](#) on December 14th. This is a step in the right direction, but much work remains to be done in order for investors to have x-ray vision into their portfolios to spot climate risk.

But it is not just the risks from climate change that investors need to be thinking about. The transformation to a low-carbon, climate resilient economy is poised to create the biggest business opportunity in a century.

And yet, “we are not investing in this space” is an all too common response to fora that contain the world “climate”. One has to wonder to which “space” those investors are referring. Because unless their assets are comfortably shielded on another planet, their portfolios have material exposure to climate change just like the rest of us.

Or, as Shakespeare would say, there are more risks and opportunities across your portfolio than are dreamt of in your philosophy.

THE CLIMATE ENERGY-EQUITY CHALLENGE ([NOAH DIFFENBAUGH](#))

The world needs to provide more energy than it does currently. The grand challenge is to simultaneously: (1) increase energy supply and access; (2) decarbonize the global energy system, and (3) adapt to continued climate change. Stanford Professor of Earth System Science and Senior Woods Institute Fellow Noah Diffenbaugh’s slides can be found [here](#). His key takeaways are below.

- Energy access is necessary for well-being; every incremental increase in human development leads to an increase in energy consumption and greater climate protection.
- Energy poverty limits development and creates vulnerability to climate stresses.
- The world needs to increase total energy generation ~4x.
- Global emissions from fossil fuels have increased while the annual increase in emissions have leveled out.
- Net zero emissions is required in order to stabilize the climate. This will likely require negative emissions technologies.
- The energy access gap is the greatest source of momentum toward further climate change.

- Whether the gap is closed with carbon-intensive or carbon-free energy sources will determine how much climate change the world will experience in the future.
- If the US stops payments to the UN Climate Fund, the developing world will have more difficulty meeting their commitments to the Paris agreement.

POLICY PERSPECTIVES ([DAN REICHER](#), [ARUN MAJUMDAR](#), AND [DAVID DANIELSON](#))

Stanford Steyer-Taylor Center Executive Director Dan Reicher detailed the US energy toolkit and how it can be cost-effectively applied to capture one of the biggest economic opportunities of the 21st century. In sum: a sustainable energy future lies at the intersection of technology, policy and finance. Dan's presentation can be found [here](#).

Stanford Precourt Institute co-Director Arun Majumdar spoke about what Stanford is working on toward the goal of decarbonizing while continuing economic growth. He discussed several Precourt research initiatives as well as Stanford's investment in electrifying, decarbonizing and improving the efficiency of its physical plant (see [SESI](#)).

Stanford Precourt Institute Fellow David Danielson made a case for investment in energy innovation in pursuit of technologies that don't yet exist. Having lost money in the first wave of cleantech venture investing, most investors have stayed away from funding innovations in energy. Two new large-scale public and private sector responses are aimed at this challenge. On the public side, Mission Innovation (MI) is an effort to double clean energy research and development spending over five years in twenty-two countries and the EU, which together represent 75% of global GHG emissions and over 80% of the world's clean energy R&D investment. To help catalyze MI, a group of private investors formed the Breakthrough Energy Coalition (BEC). In December 2016, a group of BEC members announced the creation of a \$1B fund, Breakthrough Energy Ventures (BEV), focused on clean energy in MI countries. Dave called for new ways of thinking, new partnerships, and new tools to unlock greater pools of capital into early stage ventures.

UNDERSTANDING CLIMATE EXPOSURE IN AN INVESTMENT PORTFOLIO ([DONNA BEBB](#) AND [KATE GORDON](#))

Kate Gordon, Paulson Institute Vice Chair of Climate and Sustainable Urbanization and Risky Business Founding Director, briefed participants on the Risky Business Project's' latest report, released the day prior, entitled "From Risk to Return: Investing in a Clean Energy Economy". The report is focused on those making long-term place-based investments with an emphasis on physical assets. Kate's presentation can be found [here](#). Key points below:

- The [2014 Risky Business](#) report demonstrated that climate change poses a significant risk (specific costs and tail risks) to the US economy.
- Seriously addressing climate change requires reducing carbon emissions by at least 80% by 2050 in the US and across all major economies.
- The [2016 report](#) concludes that this goal is technically and economically achievable using commercial or near-commercial technology and does not require unprecedented spending.

- Decarbonizing our economy will require: (1) end use fuel switching to electric sources; (2) decarbonization of electricity; and (3) energy efficiency.
- At a macro level, there are four pathways: (1) mixed resources; (2) high renewables; (3) high nuclear; and (4) high carbon capture and sequestration.
- To appropriately shift investment, climate risk and returns must be incorporated into asset analysis.

Stanford Steyer-Taylor Center Research Fellow Donna Bebb shared her research on incorporating climate risk and returns into public stock analysis. Her presentation can be found [here](#). Key points below:

- Divestment, as a general rule, is unrealistic and shortsighted. Denying or ignoring climate change is not prudent.
- Climate resides squarely in the basket of un-ignorables, which also includes things such as human rights management, geopolitical risk, and the aging population.
- ESG is not an appropriate tool for addressing climate exposure. (For more, see Bebb's 2016 paper [It's Not You, It's E: Why Relative Return Managers Need to Separate E from ESG](#))
- Example: a climate analysis of Vail Resorts, rated AA for ESG but the rating ignores snowfall trends and warmer weather. Climate exposure considerations include: snowfall, energy use and cost, water resources, seasonality, energy efficiency savings, and snowmaking ability and cost. (Click [here](#) for the Bebb's 2016 Vail case study.)
- Investment managers need to build a climate survival kit so that they are ready to respond to extreme weather, the shifting policy landscape, and changes in resource availability and worker productivity.
- Recommendations for endowments: (1) be wary of ESG products; (2) think about climate exposure in broad terms; (3) invest in the short-term but think for the long-term; (4) construct a climate survival kit for your asset managers.

THE RESOURCE REVOLUTION ([STEFAN HECK](#))

Stanford Precourt Institute Former Fellow Stefan Heck, author of *Resource Revolution: How to Capture the Biggest Business Opportunity in a Century*, talked to the group about how to find alpha on the leading edge of what promises to be an economic-wide transformation on the scale of the industrial revolution. His slides can be found [here](#). Key points below:

- We are on the cusp of another industrial revolution driven by a 10-fold increase in resource rather than labor productivity.
- Applying this lens to investments entails a substantial portfolio shift sometime over the next decade.
- The orthodox view is to shift 15 to 20% of assets in energy to “clean”, but that belies the energy (and resource) intensity of the economy.
- There is a broad misconception that the transformation to a more resource efficient economy is about venture investing.
- Example: Our transportation system today is extremely inefficient. ACES is an investment framework to address the changes in transportation.
 - Autonomous – 90% accident reduction, 1 distraction event / per mile.

- Connected – significantly reduce predictable traffic by having 1% of vehicles leave earlier/later or change route.
- Electrified –15% – 75% system efficiency gains. This is the closest mechanism to a climate lever.
- Shared – increase to 60% usage from a 4% average and 15% usage peak.
- Goals for resource efficient thematic investments: convenient and backwards compatible, greener; cheaper; and scalable.
- Climate change solutions – a simplified guide:
 - Demand side optimization, virtualization and productivity levers + Supply side substitution and productivity levers
 - Major categories:
 - Electricity and heat
 - Agriculture, forestry and other land use
 - Industry (e.g. aluminum)
 - Transport
- Alpha exists with reduction in downside risks and creation of new opportunities.
 - Risks
 - Specific regional challenges (e.g. palm oil) that show up globally
 - Combustion-based transportation; coal energy
 - Opportunities:
 - Batteries, EVs, sensors, mobility, reuse, variable speed drivers
 - Modular development, shale productivity, analytics, plant productivity
 - Renewables deployment
 - Water treatment, circularity
- Most innovative investors are strategics – reinventing an industry.

THOUGHTS ON GOVERNANCE ([DANIEL SICILIANO](#) AND [ASHBY MONK](#))

Stanford Rock Center for Corporate Governance Faculty Director Dan Siciliano spoke to the group about the legal underpinnings of fiduciary duty, primarily from the perspective of the issuer. For institutional investors, the guideposts of the Employee Retirement and Income Security Act (ERISA) and similar laws have driven investor behavior vis a vis climate risk. Dan highlighted two key concepts (1) impartiality - identifying and fairly balancing conflicting interest among different beneficiaries; and (2) prudence - incorporating all relevant information into investment decisions. Factoring climate risk in investment decisions is clearly called for on both counts.

Ashby Monk, Stanford Global Project Center Executive Director and Senior Advisor to the CIO of UC Regents, followed by defining models of excellence among institutional investors. His key points are summarized below:

- Data suggests that for every 10% increase in politicization of pension funds there is a 1% decrease in performance.
- Is climate risk a political or commercial risk? Overwhelming data indicates climate is a commercial risk.
- Funds have a fiduciary duty to consider climate risk if it has an impact on portfolios.

- Models of excellence involve detailed risk models to see where capital needs to be flowing over the next 6 years (not just the next six months).
- It will be hard for smaller endowments to be leaders in this space because of the resource requirements to evaluate risks.
- Intermediaries can cause problems. External managers are not incentivized to look at long-term risks.
- True time horizon of Private Equity funds is 2 years (correlated to fundraising cycle).
- Finance industry makes money by pushing LPs to think on shorter and shorter time horizons.
- Governance tends to reinforce quarterly performance (see: number of hedge fund managers on boards of endowments).
- Agents are disciplining the principle. This is backwards.
- Audit the way managers charge carry.
- Hedge funds have taught people that it's possible to become billionaires without making anything.
- Practice Organic Finance. Know what you are investing in (Twinkies or carrots?) – not just for CDOs but also in your PE funds' Limited Partnership Agreement. Measure what you can measure, bring long-term horizon costs into consideration. Before you know it, you'll be a sustainable investor.

An insightful discussion followed. Below are several takeaways:

- Monte Carlo simulations may be effective in helping balance short-term vs. long-term considerations.
- Compensation structures that support long-term values have less to do with equity-like structures and more to do with creating a culture of long-termism within the organization.
 - One example: 25% salary; 25% annual bonus based on qualitative work and team's work; 50% spread over a four-year vesting cycle.
 - Question: are you compensating people for being good or lucky?
 - Picking the wrong benchmark can cause problems – potential exists to manipulate benchmarks and peer comparisons can be problematic.
- There are good direct investment opportunities in the resource efficiency sector. For teams without direct capabilities, look for small funds with automatic, free co-investment mechanisms or work with peers to do direct investing in low-risk assets e.g. renewables. Know “what you are eating.” Then it is possible to explore new structures.
- Use student movement to get commercial solutions you wanted anyway – better risk analysis and thinking. Hire people (students, if possible) to focus on climate issues, to tag assets with climate risk factors and confidence levels. Share data and best practices.
- Limit the number of funds in a portfolio to write bigger checks and hold GPs accountable.
- A clear and simple list of questions to ask fund managers can go a long way in assessing climate risk (see Exhibit A).

EXHIBIT A

QUESTIONS TO ASK ASSET MANAGERS

A list of questions to begin to effectively explore climate risk with managers was at the top of the wish list for roundtable participants. Appreciating that the conversation is more important than any specific question or answer, below is a suggested list of questions to assess manager quality on climate-related themes.

GENERAL

- How are you planning for a future price on carbon and other regulatory carbon-constraining policies in your portfolio? (Transition risk.)
- The climate is becoming hotter, wetter, and subject to more extreme weather. What strategies do you have in place to prepare for resulting direct damages to assets and/or indirect impacts from supply chain disruption? (Physical risk.)

PHYSICAL ASSET RISK

- How much of your fund's value creation depends on suppliers and materials in locations with near and long-term vulnerabilities to the physical impacts from climate change?
 - How is the fund diversified by geography related to climate risk (e.g. overweight towards coastal assets at risk of flooding)?
- What are your asset and supply-chain sensitivities to specific local climate impacts based on granular level data sources (e.g. crop yields, increasing replacement costs of pavement infrastructure, flooding, rains, etc.)?

TECHNOLOGICAL RISK

- How is your fund taking advantage of disruptive market trends, specifically those that are capitalizing on a transition to a lower-carbon and more climate resilient economy (e.g., decreasing cost of renewables, EVs, storage, efficiency, fracking)?
- How is the fund affected by the price of oil/gas? How is the fund affected by access to water?

REGULATORY / LEGAL RISK

- How are portfolio assets positioned to respond to a carbon tax, such as those being implemented now in China, Canada, and other economies?
 - What are the direct economic implications? Strategy implications?
 - Do portfolio assets currently have an internal price on carbon?
- Does the fund carry environmental risks related to climate litigation?

SOCIAL RISK

- How exposed are portfolio companies to reputational risk (from customers, shareholders) from NOT taking action on climate?