

The Potential Use of Sustainability Scenarios as a Supplement to Stock Price in Equity Valuation by Long-term Investors

Steve Lydenberg
Domini Social Investments LLC

September 2014

Contact:

Domini Social Investments LLC
532 Broadway 9th Floor
New York, New York, 10012
(212) 217-1113
slydenberg@domini.com

The Potential Use of Sustainability Scenarios as a Supplement to Stock Price in Equity Valuation by Long-term Investors

Steve Lydenberg, Domini Social Investments¹

Abstract

This paper examines the potential use of sustainability scenarios as a supplement to stock price in equity valuation and investment decision-making by long-term investors. It argues that stock price as a valuation tool is often too short-term in its predictive abilities to fully serve the needs of investors concerned about environmental, social and governance (ESG) and sustainability challenges. It traces the development and contemporary use of scenario analysis by corporations in strategic management decision-making, in particular when situations of uncertainty are involved, and reviews the use of scenario analysis by ecological scientists in the understanding and management of complex physical systems. Through a summary of one case study and a number of interviews with corporate social responsibility and strategic management officers and chief executive officers, an anecdotal account of the range of the contemporary use of scenario analyses with a sustainability focus in contemporary corporate strategic decision-making is provided.

¹ The author would like to thank Michael Greis, Jonathan Hansen, Valerie Yu and Mohit Anand for their valuable assistance in the research and writing for this paper. Thanks also to Monika Freyman, Julie Gorte, Liz Holzman, Jerome Lavigne-Delville, Tim Smith and Richard Wells for their insights and comments on its drafts.

The paper notes the current use of interest-rate and economic scenario analyses by mainstream investors in making asset allocation decisions and considers the potential for their use of data on corporations' incorporation of sustainability scenario analysis into strategic management decision-making. With the commitments of various long-term investors (primarily pension funds) to the incorporation of ESG and sustainability factors into their investment decision-making as background, the paper then summarizes a case study and a number of interviews with asset managers on their views of the potential usefulness of such data. It concludes that, for long-term investors concerned with sustainability, data on the corporate use of sustainability-related scenario analyses could be a useful supplement to stock-price considerations in investment decision-making and outlines how these investors might make use of such data.

Introduction

In September 2013, Accenture published the results of interviews with approximately 1,000 chief executive officers of companies around the world on the incorporation of sustainability into their operations. It reported that 67 percent believed that business was not doing enough to address global sustainability challenges, and that they have “become stuck on their ascent.” They are:

in many cases unable to locate and quantify the business value of sustainability;
are struggling to deliver the business case for action at scale; and see market failure hindering business efforts to tackle global challenges.

Most CEOs view themselves as caught in “a cycle of ‘pilot paralysis’—individual, small-scale projects, programs and business units with an incremental impact on sustainability metrics.” They are unable to make systematic progress on sustainability issues in part because they believe they cannot meet the financial markets’ requirements for a business case. Market reforms by government that create incentives for sustainability initiatives and more active support from institutional investors would be necessary for them to adopt more comprehensive sustainability policies and practices.²

Simultaneously, various efforts have been launched to better align financial markets with the creation of sustainable and inclusive economies. For example, in early 2014 the United Nations Environment Programme initiated its “Inquiry into the Design of a Sustainable Financial System: Policy Innovations for a Green Economy” project.³ Similarly, in June 2014, the financial services firm Aviva published “A Roadmap to Sustainable Financial Markets” targeted at policy makers.⁴ Market reforms alone, however, will not be sufficient to persuade investors to reward companies in the marketplace unless they are convinced that corporations are making fundamental commitments to sustainability—commitments that are systematic and core to their business operations, not simply “pilot” projects.

Although calls are now increasingly frequent for quantum leaps in commitments to sustainability in both the business and financial communities, we currently confront a kind of stalemate. Corporations are reluctant to make fundamental investments in

² United Nations Global Compact, Accenture. *The United Nations Global Compact-Accenture CEO Study on Sustainability 2012: Architects of a Better World* (New York: United Nations) September 2013: 11.

³ “Inquiry into the Design of a Sustainable Financial System: Policy Innovations for a Green Economy” A description of the project is available at its website <http://www.unep.org/greeneconomy/financialinquiry/#sthash.7xXueVpd.dpuf> Last visited July 28, 2014.

⁴ Aviva. “Roadmap for Sustainable Financial Markets” June 2014. Available at <http://www.aviva.com/research-and-discussion/roadmap-sustainable-capital-markets/> Last visited July 30, 2014.

sustainability beyond their pilot programs (and what is already required by law) because they are not convinced that investors will reward them in the marketplace. Investors hesitate to reward them in the marketplace on the basis of voluntary pilot programs alone, and wait for more fundamental commitments.

This paper examines the question of whether, if long-term investors could better understand when and how corporations systematically incorporate sustainability into their strategic planning, they would possess a valuation tool that would allow them to reward corporations in the markets in ways stock price alone is ill equipped to do. The existence of such a valuation tool in the hands of long-term investors could then provide incentives to corporations to incorporate sustainability considerations fundamental to their core businesses into their strategic planning.

PRICE, SHORT-TERMISM AND EQUITY VALUATION

[W]hat American asset management today suffers from is “excess of competition.” It has become so competitive and so volatile that the participants outdo each other in promising miracles to “beat the market” and to “beat inflation.” Both are, of course, impossible. Pension funds cannot beat the market – they are the market. . . . But because the ability of the asset managers to attract pension fund business heavily depends on their promises to perform such miracles, they tend to concentrate on short-term results the next ninety days or, perhaps, the next swing the stock market. Yet, by definition, pensions are long-term. Pension fund management therefore requires long-term strategies for true performance.⁵

--Peter Drucker

The shortcomings of short-termism in the financial markets and corporate management have long been noted. Their prevalence and potential harm is increasingly well documented. Andrew Haldane of the Bank of England, for example, has cited evidence that “suggests short-termism is both statistically and economically significant in capital

⁵ Peter Drucker *The Unseen Revolution*, (New York, HarperCollins) 1976: 70-71

markets” today.⁶ This is of concern because, as Keynes famously commented, “Speculators may do no harm as bubbles on a steady stream of enterprise. But the position is serious when enterprise becomes the bubble on a whirlpool of speculation.”⁷

In a market dominated by short-term considerations, corporate managers seize present profits and investors capitalize on opportunities for today’s returns at the expense of investments that create future wealth of long-term benefit to companies and investors alike. Academics have studied the detrimental aspects of this phenomenon.⁸ Surveys have documented corporate managers’ susceptibility to the short-term pressures from Wall Street. One 2005 survey of 421 corporate executives published in 2005, for example, found that most would rather forgo investment in a project that would be profitable in the long-term than lower their quarterly earnings report below market expectations in the short run.⁹

Long-term investments, by contrast, are said to have several advantages over short-term profit-taking. As the World Economic Forum notes in its white paper *The Future of Long-term Investing*, they:

- might offer better returns to certain investors
- could bring benefits to individual corporations
- may be a “social good” by helping to stabilize the financial markets, promote global economic growth and bring wider social benefits¹⁰

⁶ Andrew G. Haldane, “The Short Long” Speech given May 2011 at 29th Société Universitaire Européenne de Recherches Financières Colloquium: *New Paradigms in Money and Finance?* Brussels, May 2011.

⁷ John Maynard Keynes, *The General Theory of Employment, Interest, and Money*. (Amherst, New York: Prometheus Books) 1997: 159. Originally published (New York: Harcourt, Brace & World) 1936.

⁸ See for example, Jeremy Stein (1988, 1989).

⁹ Graham, J., Harvey, C. and Rajgopal, S. “The Economic Implications of Corporate Financial Reporting.” *Journal of Accounting and Economics*, 2005, 40: 3-73.

¹⁰ World Economic Forum. *The Future of Long-term Investing* (New York: World Economic Forum USA) 2011: 35. The paper noted that empirical studies of these potential benefits of long-term investing found “half a dozen key challenges” and were often contradictory.

It is the third of these potential advantages—the ability, or even obligation, of long-term investors to promote economic growth and broad social benefit—that is of interest in this paper and to which the question of the integration of ESG and sustainability factors into long-term corporate strategic management is linked.

The presupposition of this paper is that today's stock-market price, as well as analysts' stock-price targets for tomorrow, are inherently short-term in their predictive ability and that long-term investors—those with decades-long investment horizons—need measurement tools that can supplement these short-term measurements. One such tool, this paper argues, is an assessment of the ability of corporate managers to incorporate ESG and sustainability factors into their strategic management decision-making—in particular through the use of scenario analysis.

Corporate managers' skill in the incorporation of ESG factors into strategic decision-making is a potentially useful indicator of long-term thinking because sustainability issues frequently play out over long time periods. Scenario analysis is also well suited to sustainability-related issues because these issues often involve considerable uncertainty—and it is in matters of uncertainty that scenario analysis has its most powerful applications. Therefore, understanding corporations' use of sustainability scenario analysis could be a powerful tool for investors seeking to evaluate companies' ability to cope in situations of long-term uncertainty.

Today's stock price, as well as tomorrow's target prices, have two primary disadvantages for long-term investors. First, their predictive abilities are essentially short term. This is true because the factors affecting future earnings are so varied and uncertain that they can produce dramatic changes in estimates that look out more than

several years. It is the exceptional stock analyst who is willing to predict the future earnings more than three to five years out. For this reason, Paul Samuelson has distinguished between “micro efficiency” and “macro inefficiency” in the markets.

Modern markets show considerable micro efficiency (for the reason that the minority who spot minor aberrations from micro theory can make money from those occurrences and, in doing so, they tend to wipe out any persistent inefficiencies). In no contraction to the previous sentence, I had hypothesized considerable macro inefficiency, in the sense of long waves in the time series of aggregate indexes of security prices below and above various definitions of fundamental values.¹¹

That is to say, it is easier for analysts to predict the over- and under-pricing of stocks or markets in the short term than to predict the price of a company’s stock—or the valuation of entire financial markets—ten years out.

Second, valuation models seeking to establish stock price targets have extreme difficulty in assessing the financial implications of many of the ESG and sustainability issues of increasing concern to corporations these days. That this is so can be seen in the difficulty of stock analysts today in incorporating into stock-price such sustainability issues as climate change, water scarcity, environmental carrying capacity, social inequality, access to medicines, human rights, privacy and other issues that have a bearing on “helping to stabilize the financial markets, promote global economic growth and bring wider social benefits.”

Similarly, Rappaport, for example, pointed out in a 2005 *Financial Analysts Journal* essay that “earnings data are not well suited for use in valuation” because valuation depends on a company’s “long-term ability to generate cash.” Investment professionals will not—or cannot—estimate distant cash flows because such estimates

¹¹ Paul Samuelson’s correspondence with Robert Shiller, cited by in Peter L. Bernstein *Capital Ideas Evolving*. (Hoboken, New Jersey: John Wiley & Sons, Inc.) 2007: 73.

are “too time-consuming, costly, and speculative to be useful.” However, in the absence of other effective measures of value, short-term earnings have become “the most widely accepted metric” for investment valuation, leading to “a mutually reinforcing obsession with short-term performance” between corporate management and investment professionals.¹² Rappaport suggested a number of other indicators of long-term value that can supplement earnings data, including “industry growth potential, the company’s competitive position, the likely behavior of competitors, technological change, and quality of management.”¹³

The World Economic Forum in its 2011 white paper on the benefits of long-term investing has noted that the financial crisis of 2008 raised questions about “the correctness of fundamental investing assumptions, most notably the role of portfolio diversification.”¹⁴ It proposed various performance benchmarks for long-term investors as alternatives to the inherently short-term measurements of today, including changes in dividends and incomes of portfolio companies, the absolute returns of portfolios (as opposed to returns relative to price-based indexes) and the investment turnover ratio of fund managers.¹⁵ Equally significant was the white paper’s suggestion that long-term investors might incorporate “future economic scenarios, such as high economic growth, stagnation, broad economic dislocation and inflation” into their asset allocation process, along with scenarios relating to:

the uncertain likelihood and timing of a coming event or economic trend. . .in order to isolate themes and secular trends that, over the longer term, should help to drive both risk and return. For example, the fund manager could allocate investment to themes such as renewable energy, ageing populations in developed economics, or scarcity of key commodities.¹⁶

¹² Alfred Rappaport. “The Economics of Sort-Term Performance Obsession” *Financial Analysts Journal* May/June 2005. Vol.61 No. 3: 65.

¹³ Ibid. 66.

¹⁴ World Economic Forum. Op. cit. p. 50.

¹⁵ Ibid. p. 57.

¹⁶ Ibid. pp. 63-4.

The mainstream financial community's growing need for alternative valuation methods was illustrated in the March 2014 letter that Laurence Fink, the CEO of the large financial services firm BlackRock, wrote to the CEOs of the Standard and Poor's 500 companies. In it BlackRock stated its commitment "to be a trusted, responsible shareholder with a longer term horizon" and to challenge "the short-term demands of the capital markets." Because BlackRock seeks to invest in "what drives real value," it asked these corporations to help it in understanding "what metrics shareholders should use to assess their management team's success over time." Today's readily available stock price alone is apparently inadequate to this task.¹⁷

Stock-price analysis is today the basic tool for investors seeking to ferret out mispricing in the marketplace. But for investors whose definition of the long-term includes the creation and preservation of stable, sustainable financial markets, a vital economy, a healthy environment and a just society, stock prices and stock-price targets are weak reeds upon which to lean.¹⁸

This paper argues that an assessment of the ability of corporate management to integrate sustainability factors into strategic management planning, particularly through the use of scenario analysis, could help investors understand the longer term aspects of corporate valuation in ways that differ from, but simultaneously supplement, such tools as cash-flow analyses.

¹⁷ See the March 21, 2014 letter from Laurence D. Fink to CEOs of the Standards & Poor's 500 companies. Available at http://online.wsj.com/public/resources/documents/LDF_letter_to_corporates_2014_public.pdf Last visited June 30, 2014.

¹⁸ Other important studies of the benefits of long-term investment include the Aspen Institute's *Long-Term Value Creation: Guiding Principles for Corporations and Investors*; John Kay's *The Kay Review of UK Equity Markets and Long-Term Decision Making*; Global Network of Director Institute's *Curbing Excessive Short-Termism*; and Generation Investment Management, *Sustainable Capitalism*.

BACKGROUND ON SCENARIOS

Definitions of Scenarios

Scenarios can be distinguished from predictions and forecasts. Predictions are said to consist of “the best possible estimate of future conditions.” Forecasts can be described as “the best estimate from a particular method, model, or individual.”¹⁹ Scenarios, although they may begin with analyses of current trends, are rather visions of a set of alternative futures.

Peter Schwartz, one of the pioneers of scenario use by corporations, has variously described scenarios as “a series of what-if stories,” “a tool for helping us to take a long view in a world of great uncertainty,” and “a tool for ordering one’s perceptions about alternative future environments in which one’s decisions might be played out.”²⁰ Michel Godet, a proponent of the French school of scenario analysis, has emphasized the usefulness of scenarios in identifying “desirable” futures. “A scenario is not a future reality, but a way of foreseeing the future, thus throwing light on the present in terms of all possible and desirable futures.”²¹ Swart et al. have defined scenarios in the context of sustainability science as “coherent and plausible stOries, told in words and numbers,

¹⁹ Garry E. Peterson, Graeme S. Cumming, and Stephen R. Carpenter. “Scenario Planning: a Tool for Conservation in an Uncertain World” *Conservation Biology* April 2003, Vol. 17, No. 2: 359.

²⁰ Peter Schwartz. *The Art of the Long View: Planning for the Future in an Uncertain World* (New York: Crown Business) 1996: 3-4.

²¹ Michel Godet. *Creating Futures: Scenario Planning as a Strategic Management Tool*. (London: Economica) 2006: 109.

about the possible co-evolutionary pathways of combined human and environmental systems.”²²

The Uses of Scenarios

Scenario analysis is widely used as a planning tool in a variety of disciplines including military strategic analysis, civilian crisis management, scientific and economic modelling, public policy, and economic-development budget allocations, as well as by futurologists in imaging the utopian and dystopian worlds of tomorrow.

This usefulness of scenario analysis is attributable to its ability to deal with situations that have three characteristics: 1) their possible outcomes are highly uncertain; 2) they will play out over an indefinite timeframe; and 3) the potential for disruptive system change is substantial. Scenarios, as Schwartz points out, can be as an essential tool in managing in the face of such unpredictabilities. “By imaging where we are going, we reduce this complexity, this unpredictability which . . . encroaches upon our lives.”²³ The same point is made by Godet when he asserts that

Futures-thinking exercises, la prospective, or strategic scenario building do not claim to eliminate uncertainty with predictions, instead they seek to reduce uncertainty as much as possible and to enable people to make decisions in view of desired futures.²⁴

Godet also notes that, in his view, it is important that scenario analyses rely both “on the analysis of trends and the risks of discontinuities (breakdowns or breakthroughs).”²⁵

Indeed, one of the virtues of scenarios—as opposed to forecasts that simply extrapolate

²² R.J. Swart, P. Raskin and J. Robinson. “The Problem of the Future: Sustainability Science and Scenario Analysis” *Global Environmental Change*. 2004: 139.

²³ Schwartz. Op. cit. p. 15.

²⁴ Godet. Op. cit. p. 8.

²⁵ Ibid. p. 116.

from current trends—is that they can help us image those type of game-changing develops that so often come as surprise, but in retrospect could have been profitably considered.²⁶ As Michael Porter has observed,

By considering only apparent trends, however, important discontinuities may be overlooked. Scenarios built only on apparent trends may reflect conventional wisdom and may not provide insights into future structure not available to competitors.²⁷

History and Types of Scenario Analysis

The use of scenarios to anticipate possible futures can be traced back in the United States to Herman Kahn and military policy development in the 1960s.²⁸ The use of scenarios was then gradually incorporated into a variety of disciplines, including corporate management, starting in the early 1970s. Bradfield et al. distinguish two schools of scenario analysis.²⁹ The “intuitive logics” school—a basically intuitive, non-quantitative approach which has taken on myriad incarnations until, as Bradfield describes it, “there are almost as many ways of developing scenarios [using this approach] as there are practitioners in the field.” The second is the more quantitative “probabilistic modified trends” school, which in turn has two major variations: trend impact analysis, which creates a number of modified projections determined to be probable from current trends and is associated with work that has evolved from the Futures Group; and the cross-impact analysis school, which draws on probabilistic

²⁶ Similarly, in its *Global Trends 2030: Alternative Worlds*, the U.S. National Intelligence Council, a sophisticated user of scenario analysis, considers both “megatrends”, which are largely predictable extrapolations from today’s world in such areas as demographics and resources demands—and “game changers”, which are highly unpredictable geopolitical developments such as a collapse of the European Union, a global pandemic, or the rapid acceleration of global warming. Available at <https://publicintelligence.net/global-trends-2030/> Last accessed September 14, 2014.

²⁷ Michel Porter. *Competitive Advantage: Creating and Sustaining Superior Performance*. (New York: The Free Press) 1998 edition: 452.

²⁸ For a lively account of Herman Kahn’s career see Louis Menand, “Fat Man: Herman Kahn and the Nuclear Age” *The New Yorker* June 27, 2005.

²⁹ Ron Bradfield, George Wright, George Burt, George Cairns, and Kees van der Heijden. “The Origins and Evolution of Scenario Techniques in Long Range Business Planning” 2005 *Futures* 37: 799-803.

analyses based on causal and correlational variations of scenario factors and is associated with RAND and its various spin-offs.

The French have played a prominent role in promoting scenario analysis through a school known as “la prospective”. This approach grew out of work in the 1950s by the French philosopher Gaston Berger, who argued the future was not necessarily predetermined, but could be “consciously modeled to be humanly beneficial.”³⁰ Since the 1990s, Godet has been a prominent proponent of this school. He has combined a belief that “creating futures depends not only upon chance and necessity, but also on human will” and “whatever happens tomorrow depends less on prevailing trends, and more on individual and collective decisions taken in the face of these trends,”³¹ with highly quantitative, probabilistic analyses to determine the likelihood of various scenarios occurring in the future.

CURRENT USES OF SCENARIOS

Scenarios and Sustainability

Scenario analysis is frequently used by scientists and policy experts to help understand the viability of ecological systems. Swart et al. have argued that for there to be such a thing as “sustainability science”—that is, the study of the sustainability of ecological systems—the discipline needs to be open to consideration of human factors. It needs to integrate across policy themes and issues; reflect uncertainty; account for human volition; combine qualitative and quantitative analysis; and become more

³⁰ Ibid. p. 802.

³¹ Godet. Op. cit. pp. 9, 12.

relevant through stakeholder participation. “Sustainability science must consider the interplay and dynamic evolution of social, economic and natural systems—it requires an *integrated and long-term perspective*.” [emphasis in original] For Swart et al. scenario planning is a tool ideally suited to expand scientific analyses in these directions.³² As Bell and Morse observe, “Originally, scenario analysis was developed for strategic organizational planning. It is also highly valuable for sustainability planning.”³³

In their article “Ecology in Global Scenarios,” Cumming and Peterson place the usefulness of scenarios in a two-by-two matrix-typology of sustainability systems measured along the axes of controllability and uncertainty.

Insert Figure 1 around here.

In those ecological systems where uncertainty is at its highest and the ability to exercise control is at its lowest, scenarios are most useful.³⁴

Scenarios are particularly valuable in an ecological context because of the inherently unpredictable nature of these complex ecological systems over long periods of time. As Ehrenfeld stresses, sustainability is not the characteristic of a product or a “thing”, but rather the characteristic of a complex “living system.”³⁵ As such “Ecological

³² Swart et al. Op. cit. 139, 141.

³³ Simon Bell and Stephen Morse. *Sustainability Indicators: Measuring the Immeasurable?* (London: Earthscan) 2008: 131.

³⁴ Graeme Cumming and Garry Peterson. “Ecology in Global Scenarios” *Global & Multiscale Assessment Reports, Volume Two: Scenarios*. (Washington, DC: Island Press) 2005: 45-70. According to the authors, command and control approaches are appropriate where “Solutions are expected to be direct, appropriate, feasible, and effective over relevant scales.” The goal of the resilience approach is “to maintain ecosystems that can persist despite environmental changes, management mistakes, and unexpected events.” Adaptive management is appropriate when decisions can be viewed “as alternative hypotheses and management actions as experiments.” See pp. 60-61.

³⁵ John Ehrenfeld. *Sustainability by Design* (New Haven: Yale University Press) 2009.

predictions have three fundamental, interacting problems: uncertainty, contingency, and reflexivity” that make scenario analysis particularly helpful.³⁶

Scenarios have been used for many decades in ecological sustainability analyses at both the global and regional/local levels. As part of the United Nation’s Millennium Ecosystem Assessment (MEA) of “the consequences of ecosystems change for human well-being” Raskin et al. provide an overview of the application of sustainability scenarios at a global level, including those used by the Global Scenario Group, the World Business Council for Sustainable Development, and World Water Vision.³⁷ From 2001 to 2005, the MEA conducted its own assessments of the future of ecological systems worldwide, involving some 1,300 authors from 95 countries organized into four working groups of which Scenarios was one.³⁸ The Group’s four principle scenarios—Global Orchestration, Order from Strength, Adapting Mosaic, and TechnoGarden—explored the consequences of varied emphases on global versus regional economies and on reactive versus passive management of environmental systems to better understand how resilient ecological services could be achieved.³⁹

A second frequently cited example of the use of global sustainability scenarios has been that of the Intergovernmental Panel on Climate Change (IPCC). Since 1990, in collaboration with thousands of scientists worldwide, the IPCC has issued periodic assessments of the effects of greenhouse gas emissions on the world’s climate and analyzed the potential for substantial climate change. In 2014 the IPCC issued its fifth

³⁶ Peterson et al. Op. cit. p. 350.

³⁷ Paul Raskin, Frank Monks, Teresa Ribeiro, Detlef van Vuuren, Monika Zurek. “Global Scenarios in Historical Perspective” *Global & Multiscale Assessment Reports, Volume Two: Scenarios*. (Washington, DC: Island Press) 2005: 35-44.

³⁸ For more detail on the Millennium Ecosystems Assessment project, see its website at <http://www.maweb.org/en/About.aspx> Last visited May 21, 2014.

³⁹ Stephen R. Carpenter, Elena M. Bennett, and Garry D. Peterson. “Scenarios for Ecosystem Services: An Overview” *Ecology and Society* Vol. 11, No. 1: 29.

assessment report which, like previous reports, used scenarios relating to greenhouse gas emissions and associated climate model projections, as well as a variety of temperature, mitigation, adaptation and stabilization scenarios for ecosystems, agriculture and species survival.⁴⁰

At a regional and local level, scenarios have been used as part of the Coastal Area Management Programs within the United Nations Environmental Program's Action Plan to encourage sustainable management of various Mediterranean coastal regions. In their account of the development of one such sustainability plan for southern Spain, Bell, Peña and Prem included scenario development as an important part of a methodology dubbed Imagine.⁴¹ Among other examples of use of scenario analysis in local sustainability assessments are a study of ecosystems services in the Northern Highlands Lake District of Wisconsin⁴² and the Georgia Basin Futures Project on the west coast of British Columbia.⁴³

The phenomenon of regime shift ("abrupt change from one state to another after crossing a threshold or tipping point") loom large in scientific studies of sustainability, particularly when these changes adversely affect humans. Because the tipping points for regime changes are difficult to predict, as are their ultimate results (ie., the characteristics of the new regime), scenario analysis has proven useful in coping with these uncertainties. One study of how human interactions with ecological systems affect regime changes found, not surprisingly, that

⁴⁰ Christopher B. Field, et al. *Climate Change 2014: Impacts, Adaptation, and Vulnerability: Summary for Policy Makers*. (New York: United Nations Intergovernmental Panel on Climate Change) 2014.

⁴¹ Simon Bell, Ana Correa Peña, and Marko Prem. "Imagine Coastal Sustainability" *Ocean and Coastal Management* 2013, 83: 39-51. For a further description of the role of scenarios in the "amoeba" sustainability process, see also Bell and Morse (2008) pp. 185-189.

⁴² Garry E. Peterson, Graeme S. Cumming, and Stephen R. Carpenter. "Scenario Planning: a Tool for Conservation in an Uncertain World" *Conservation Biology* April 2003, Vol. 17, No. 2: 363-364.

⁴³ Swart et al. Op. cit. 143.

[I]nstitutions that fail to account for, and manage, feedbacks among human choices and ecological systems can lead to undesirable states of the world. In contrast, strong institutions that account for such feedbacks not only create the possibility for desirable states of the world, but also can cause undesirable states to cease to exist as possibilities.⁴⁴

Among the characteristics of the strong institutions portrayed here are the “ability to coordinate a range of policy choices.”

Uses of scenario analysis by corporations

Historical use of scenario analysis by corporations. Scenario analysis was, according to Godet, first used within the corporate community by “a few specific sectors where long-term heavy investment was the norm, e.g., air and rail transportation, electricity, aluminum and petroleum production.” It was subsequently adopted by other industries such as finance, telecommunications, and information technology as they faced “the threefold bind of deregulation, economic problems, and market globalization.”⁴⁵ In short, it has been most useful in those industries where capital-intensive investment require long payback periods—and therefore long-term planning—and those industries subject to rapid change, particularly technological or regulatory change.

The use of scenario analysis in the United States made inroads into corporate strategic management decision-making in the 1980s when Michael Porter incorporated it into his competitive-advantage analyses. Porter defines scenarios as “an internally

⁴⁴ Richard D. Horan, Eli P. Penichel, Kevin L. A. Drury, and David M. Lodge. “Managing Ecological Thresholds in Coupled Environmental-Human Systems” *Proceeding of the National Academy of Sciences* 2011. Vol. 108. No. 18: 7334..

⁴⁵ Godet. Op cit. p. 218.

consistent view of what the future might turn out to be.”⁴⁶ He recommends that corporations develop five strategies based on a range of scenarios—strategies for: 1) the most probable scenario; 2) the most preferable scenario; 3) hedging against the worst-case scenario; 4) developing the most flexible responses to a variety of scenarios; and 5) influencing the future toward favorable scenarios.⁴⁷

Given its affinity for the long-term and the uncertain, scenario analysis can be useful in preparing managers for a variety of futures, should they materialize, but not necessarily for action today. For example, Godet, in his case study of a scenario analysis exercise conducted by AXA in the mid-1990s, observed that, “[t]he shift from scenario building to planning is never easy.” In AXA’s case, the primary—i.e., most likely—scenario that emerged was rated as having a 25% probability of occurrence. This scenario became the basis for AXA’s strategic plan, but at the same time the company recognized that “it would be foolhardy to decide upon a strategy for the next five years on the basis of one main strategy” if that scenario had only a one-in-four chance of occurring. It was therefore necessary for managers to evaluate “breaks” and “bifurcations” in its scenario in order to be prepared for other eventualities.⁴⁸

Similarly Peter Schwartz describes the purpose of scenario analysis as not to “find the most probably future and adapt to it or ‘bet the company’ on it”, but rather “to make strategic decisions that will be sound for all plausible futures.”

⁴⁶ Porter. Op. cit. p. 446.

⁴⁷ For a summary of Porter’s approach to scenario analysis, see Daniel Golan, Marie-Luise Lorenz, George Mendes, Alex Milne and Paul Obexer. *Scenario Thinking: A Literary Review*. The Strategy Tank. No date: 3-7. This paper also provides an overview of the evolution of academic research on scenario use in strategic management. Available at <http://strategytank.awardspace.com/articles/Scenario%20Thinking%20-%20A%20Literary%20Review.pdf> Last visited May 26, 2014. For further details on Porter’s descriptions of how scenario analysis can be used in corporate strategic planning, see Porter, op. cit. pp. 445-481.

⁴⁸ Godet. Op. cit. pp. 230-231.

No matter what future takes place, you are much more likely to be ready for it—and influential in it—if you have thought seriously about scenarios.⁴⁹

As a case in point, Schwartz describes the scenario analysis process that he undertook with Paul Hawken prior to the launch of the gardening supply company Smith & Hawken. They built three possible economic scenarios in which the company might be operating and took comfort in the thought that the basic business plan looked viable in all three scenarios. “Reality,” in the end “turned out to be a combination of all three scenarios.”⁵⁰

This concept of scenarios as useful preparation for multiple, uncertain outcomes also bears a resemblance to the concept of adaptive management, which is commonly used in ecology and the management of natural systems.⁵¹

Argument for use of scenario analysis in corporate sustainability management.

⁴⁹ Schwartz. Op. cit. p. xiv.

⁵⁰ Ibid. 18-28. Schwartz also describes using scenario analysis in strategic management planning through his Global Business Network prior to the mid-1990s with companies such as AT&T, BellSouth, Inland Steel, Unocal, BP, Pacific Gas & Electric, Statoil and ABB. Case studies of the use of scenario analysis are also provided by Michel Godet for the aluminum industry, Electricité de France, AXA and BASF.

A further example of industry-level scenarios analyses was conducted by Meteos, the non-profit think tank and strategy consulting organization in the United Kingdom. Meteos convened an investor-led dialogue with the pharmaceutical industry (PharmaFutures) and energy industry (EnergyFutures) “exploring the long-term political, social and economic drivers of value” for these two industries, effectively using scenario analysis to envision a variety of futures and assess value drivers under these various scenarios.

An extensive network of consultants dedicated to working with corporations on the incorporation of scenario analysis into strategic management has evolved. For a review of the academic literature on the use of scenarios in corporate strategic management see Daniel Golan, Marie-Luise Lorenz, George Mendes, Alex Milne and Paul Obexer. *Scenario Thinking: A Literary Review*.

The Strategy Tank. No date. Available at <http://strategytank.awardspace.com/articles/Scenario%20Thinking%20-%20A%20Literary%20Review.pdf> Last visited May 26, 2014.

⁵¹ See for example C.S. Holling and Lance H. Gunderson, “Resilience and Adaptive Cycles” in *Psnarchy: Understanding Transformations in Human and Natural Systems*. Gunderson and Holling, eds. (Washington, DC: Island Press) 2002: 25-62.

Rebecca Henderson is among those who argue that scenario planning is potentially a useful tool for corporate managers contending with sustainability challenges. For corporate decision makers, she points out that the business case for investing in sustainability initiatives or products faces three major uncertainties that could “have a significant effect on the profitability of sustainable action.” These three are:

Whether and when mainstream consumers come to value sustainable products and services enough to pay for them; whether and when increasingly acute environmental pressures generate political pressure for additional environmental regulation; and whether and when scientific and technological advances across a range of fields are likely to make responding to environmental issues significantly cheaper.

Because of these uncertainties, the business case for investing in sustainability initiatives is often difficult to justify. Companies that tackle sustainability challenges, however, can profit in the long-run in three ways: “forestalling risk, increasing operational efficiency, and selling to the environmental niche.”

Henderson constructs a two-by-two sustainability-related matrix assuming varying levels of consumer demand and/or regulatory action versus varying levels of technological change. These assumptions result in four possible outcomes.

Insert Figure 2 around here.

The four scenarios are “Business as Usual” (by and large consumers and regulators ignore sustainability issues and no technological breakthroughs occur); “Demand-Driven Opportunity” (consumers and regulators respond to sustainability challenges, but no technological breakthroughs occur); “Supply-Driven Opportunity” (technological

advances change consumer behavior); and “Green Goes Mainstream” (game-changing developments in consumer demand, regulation and technology take place). In three out of four of these possible outcomes, companies that have made long-term investments that might be difficult to justify through a short-term business case will be in a position to prosper in the long term.

For corporate managers, this suggests that “developing a deep understanding of key uncertainties—and incorporating them directly into the firm’s strategic thinking—may be critically important to building an accurate and persuasive business case for sustainability.” Because envisioning long-term change is difficult in the face of these uncertainties and the default for most managers is to assume that the future will be a version of business as usual, and because “sustainability requires the explicit recognition that the firm faces a multiplicity of possible futures,” Henderson asserts that “*using a tool like scenario analysis . . . can be enormously helpful in reframing perceptions.*”⁵² [emphasis added]

Most well managed corporations—companies that plan for their future with a reasonable degree of thoroughness—can be said to engage explicitly or implicitly in some form of scenario or forecasting analysis. These analyses might relate to the potential for technological innovation in their industry, regulatory developments, changing tastes or fashions, demographic developments, natural resources availability or pricing, geopolitical factors, emerging markets trends or similar concerns. To the extent that companies are involved in industries related to the extraction or processing of natural resources, the production of energy, agricultural goods and services or similar

⁵² Rebecca Henderson. “Making the Business Case for Environmental Sustainability” forthcoming in *Leading Sustainable Change: An Organizational Perspective* Oxford University Press.

environmentally related products, these scenarios or forecasts can also be said to involve, to a greater or lesser extent, sustainability-related issues.

The range of possible approaches to issues relevant to a company's future, however, is substantial. Some companies may engage primarily in forecasting—i.e., predicting and acting on a single, most-probable projection of the future. Others may consider scenarios involving only macroeconomic trends. Others may include ESG or sustainability issues to a greater or lesser extent. It is through their understanding of the differences in degree and scope of these varying approaches that long-term investors may find a tool useful in their investment decision-making.

Case Study

Godet provides a number of detailed case studies of corporations employing scenario analysis in their strategic planning in his 2006 book *Creating Futures*. These companies come from a variety of industries and the scenario-analysis processes profiled are elaborate, typically requiring several years. In the case study of the agricultural chemicals firm BASF, sustainability challenges such as food safety and environment played a crucial role. Its “futures-thinking” exercise began in 1995 and continued through 1998. Initially it involved BASF staff and distributors and later incorporated farmers, consumers and environmental experts.

Three scenarios portraying different relationships between the agricultural industry and the environment in the future year of 2010 resulted. The first was pessimistic—with “conflictual relations” between the public and an agricultural sector insufficiently committed to environmental protection and food safety. The second was

optimistic—with the entire agricultural chain fully committed to environmental management in ways that responded to public concerns. The third projected the then current trends without major deterioration or improvement—with the agricultural sector continuing to view environmental issues as “restrictions” and only “shaky trust” on the part of the general public.

From this exercise emerged a Futures Studies Group at the firm, which developed a list of ten “battlefield” issues; identified 18 major actors in the agricultural chain and assessed their relative power to influence outcomes and drew up a list of the 21 key objectives for these actors. From this exercise also came an understanding of which issues generated agreement and which were divisive, as well as various lessons learned. Among the principle conclusions of the exercise was that “four battle lines will shape the future: distribution of added value, applications of the principle of precaution, implementation of eco-taxes, scientific and technical controversies.”

BASF found the exercise “extremely valuable as a means to animate interprofessional debate or discussion.” The exercise prompted it to modify certain strategic goals and practices. For example, in its research and development into genetically modified plants, it expanded its R&D from the development of pesticide-resistant crops to include crops that would be more resilient to climate change, changes in soil composition, or other external factors. BASF also commented that it was not always easy, even for those who had been involved in the scenario exercise, to “see the basic changes that this process would have on their own behavior.”⁵³

Interviews with corporations

⁵³ Godet. Op. cit. pp. 245-91.

Individuals with nine corporations and one corporate consultant were interviewed for this paper. The interviews were with CEOs, corporate strategists, or current or former CSR specialists. The corporations were from financial services (3), consumer products (3), capital goods (2) and energy (1). Of the nine, two were headquartered in emerging markets.

Although only three companies reported that they had made explicit use of sustainability factors in scenario analyses at the highest levels of management, all acknowledged a variety of initiatives to integrate sustainability issues within the management of the firm and its products and services. A number noted the challenges of “translating” the language of sustainability into that of business as a prerequisite for sustainability scenario-building and their integration into day-to-day management.

One CSR specialist from a Fortune 100 company observed that implementation of ESG and sustainability issues tended to progress through a three-phased life-cycle at large corporations. First, ESG is perceived as a compliance issue—consisting primarily of the identification of legal requirements with CSR implications and implementation of appropriate compliance systems. At the next stage, the company perceives a self-interest in participating in voluntary environmental or social/sustainability initiatives. These can be industry- or government-sponsored, or consist of partnerships with NGOs. In the third and most challenging stage, ESG is integrated into the company’s culture and business model. They felt that at this third level scenario analysis is a particularly useful tool in educating managers and executives.

Two ESG specialists commented specifically on the challenges of “translating” ESG issues into the business language of the firm. They argued that sustainability concepts cannot be integrated into strategic management decisions unless they are linked to the language of the company’s daily business. One noted that the most effective language for this integration was the metrics against which managers’ job performance was measured, such as meeting goals for product quality, price control, and production schedules. By working backwards from these metrics, ESG issues can be integrated into business decision-making.

That translation takes place most effectively in the language of the company’s dominant culture. For one interviewee, the translation of climate change challenges into the language of its engineering culture was a necessary first step. At another company where marketing was the driving force, climate change concerns needed to be translated into the language of brand protection and enhancement through an association of its products with nature and the outdoors.

Several interviewees commented on the obstacles posed by the difficulty of translating long-term sustainability issues into financially quantifiable risks. One noted that a Board of Directors could be unwilling to consider issues as material unless risks were quantifiable in substantial dollars amounts (*e.g.*, \$50 million)—only then would sustainability scenarios be considered seriously. Another observed that product managers simply are not used to considering issues where risks are further out than three to five years, making longer-term scenario building an challenging exercise. A third viewed the challenges of quantification of long-term risks as an overwhelming obstacle and expressed skepticism that such long-term sustainability issues could ever be successfully raised at a fundamental level with management and integrated into product

development. If customers were not willing to pay for future uncertain risks, this person observed, companies would be unable to price them into their products and services. A fourth observed that responsible investors themselves often did not adequately understand the strategic management processes and needed education in this area. One interviewee provided examples of obstacles that can interpose themselves in the implementation of a commitment to sustainability scenario analysis: a merger with a major company not committed to this process or the arrival of similarly skeptical CEO could derail plans already underway.

One medium-sized firm in an emerging market did not directly integrate ESG into strategic management or explicitly use scenario analysis, but did so indirectly. Its CEO is committed to CSR and stresses the connection between CSR initiatives and the cultivation of long-term stability—both at the societal and corporate levels. At a societal level, its CSR initiatives help in the providing of housing, education and infrastructure (e.g., bridges). At the corporate level, its CSR initiatives help to build trust with employees and to convey the importance of issues such as the environment to the success of the firm. Another interviewee in an emerging market noted that their company used scenarios for political contingencies, competitors' moves and natural calamities, but that sustainability factors were incorporated more on the operational than on the strategic-management level.

A strategic management officer at a financial services firm pointed to the need for clients to trust in the firm's long-term viability and ability to cope with emerging issues. That recognition prompted it to incorporate long-term sustainability issues such as climate change into its strategic management, but without necessarily the specific use of

scenario analysis. At the Board level these ESG issues were considered for the company as a whole, rather than at the business unit level.

One interviewee indicated that its mandate to integrate ESG issues into daily operations came primarily from the Board of Directors, in part because the executive team was caught up in the day-to-day challenges of running the firm. These Board members had a deep commitment to sustainability issues, but didn't necessarily use scenario analysis to drive the issue into the corporate culture. The long-term continuity of these Board members contributed to their ability to assure this integration.

Two companies used sustainability-related scenario analyses explicitly in the development of CSR initiatives and integrated them into the company's high-level strategic management processes. One attributed this success to the pivotal role of a visionary CEO with long-tenure at the firm. It found that scenario analysis for sustainability issues forced it to extend the time period involved in its product development cycle, in effect creating longer-term management planning. In addition it had resulted in substantial commitments to modifications of some of its core products in order to achieve sustainability goals identified in the scenario analysis. Another firm stressed that in its scenario planning it involved NGOs and outside experts, which allowed for substantial, open communications on controversial issues. It perceived these communications as beneficial in positioning the company as thoughtful on controversial issues and contributed to its modification of some of its business practices, although it didn't necessarily resolve the issues.

One interviewee suggested that investors might ask four questions to determine if companies were making good use of sustainability scenario analysis: 1) Does your

company incorporate sustainability scenarios into its strategic management process? 2)

Who at the firm is responsible for overseeing the development and the review process for

these sustainability scenarios? 3) What is the process used for incorporating these

scenarios into strategic management planning? 4) What are examples of changes in

strategic management that have resulted from this process?

POTENTIAL USE OF SUSTAINABILITY SCENARIOS BY LONG-TERM INVESTORS

Scenarios and Institutional Investors

Within the financial industry institutional investors frequently use economic and interest-rate scenarios in their strategic asset allocation processes. For example, the Australian Government Future Fund describes its use of scenarios as follows.

Scenarios form an important component of the strategic risk assessment and management process. Scenario analysis starts with the development of a central case, which is our best estimation for the global macro environment over the next three years. We then develop scenarios around this central case, each with different growth and inflation outcomes. We also supplement this analysis by examining possible future shocks. These shocks help model non-linear outcomes that cut across scenarios.⁵⁴

Financial consultants working with institutional investors frequently construct a series of economic and interest-rate scenarios and then analyze how investments in various asset classes are likely to perform under these differing circumstances. For example, Barrie & Hibberts, a subsidiary of Moody's, promotes its customized scenario-building services on its home page.⁵⁵

⁵⁴ Australia's Sovereign Wealth Fund *Future Fund: Annual Report 2012/2013*.

⁵⁵ See <http://www.barrhibb.com/> Last visited July 21, 2014.

Typically, however, financial consultants do not engage in ESG or sustainability-related scenario analysis with institutional investors. One long-time consultant commented that the volatility of various asset classes tends to be “heavily muted” over longer time periods and that the effect of long-term ESG factors on the performance of entire asset classes would be “washed away” over longer periods of time and therefore of limited use.

The financial consulting operations of Mercer—a subsidiary of Marsh & McLennan Companies—has, by contrast, recently stressed the importance of sustainability and ESG scenario analysis for institutional investors in strategic asset allocation. Its 2011 report *Climate Change Scenarios: Implications for Strategic Asset Allocation* argued that “Institutional investors must develop new tools to more effectively model systemic risks such as climate change.” This is so, according to Mercer, because “Uncertainty is a key stumbling block in climate-change research....Therefore, investors cannot simply rely on a best guess as to how the future will unfold when planning their investments.”

Climate change requires forward-looking analysis and cannot rely on the traditional technique of modelling historical asset-class relationships. This means utilizing *tools such as scenarios analysis*. [emphasis added]

In this report, Mercer developed four climate-change scenarios in order to help investors “begin the process of managing climate change risks” and “improve the resilience of their portfolio.”⁵⁶ These sustainability-related scenario analyses, however, are a tool for asset allocation, not for the valuation of specific securities.⁵⁷

⁵⁶ Mercer. *Climate Change Scenarios: Implications for Strategic Asset Allocation*. 2011: 1-7. Available at http://www.ifc.org/wps/wcm/connect/6b85a6804885569fba64fa6a6515bb18/ClimateChangeSurvey_Report.pdf?MOD=AJPERES Last visited July 21, 2014.

⁵⁷ See also the work of Hazel Henderson, a futurist who has worked closely with the responsible investment community and the Calvert Social Investment Fund to apply future-looking methodologies that take social

Scenarios and Long-Term Institutional Investors

If Rebecca Henderson is correct, corporations that use scenario analysis to contend with the uncertainties of sustainability-related investments will be more resilient in the long run and better positioned to generate profits than their peers that focus only on short-term analyses. Investors would then be well advised to assess specific companies' use of sustainability scenario analysis in strategic management.

Universal Investors, Scenario Analysis and Resilience. Hawley and Williams have argued that large institutional investors that invest in the vast majority of all assets in all asset classes can be regarded as “universal investors.” From a financial point of view, universal investors should be concerned about the long-term underlying growth of the economy because that is where their primary source of returns will come from, rather than from specific security selection.⁵⁸

The definition of sustainable economic growth is therefore an important consideration for these investors. What constitutes healthy economic growth and what its sources are, however, are not immediately obvious. According to Goerner et al., “healthy development” and “long-term economic vitality” can be distinguished from “mere growth” in GDP monetary exchange volume, which is an inadequate measure of economic sustainability “because it measures volume, while ignoring the network structure” necessary to maintain the health of the underlying economic system. That is,

and environmental factors into consideration to both economics and investment. Details on her work in this area are available on her website at <http://www.hazelhenderson.com/>.

⁵⁸ James P. Hawley and Andrew T. Williams. *The Rise of Fiduciary Capitalism: How Institutional Investors Can Make Corporate America More Democratic* (Philadelphia: University of Pennsylvania Press) 2000.

there is such a thing as unhealthy economic growth that comes at the cost of the fundamental structures and drivers of an economy that is healthy in the long term.

Resilience alone, however, is not sufficient for economic growth and long-term success. Economic systems must also be efficient. Like ecological systems, economic systems need to strike a balance between efficiency and resilience. “[R]esilience and efficiency are essentially complementary,” Goerner et al. assert,

because the streamlining that increases efficiency automatically reduces resilience. In general, greater efficiency means less resilience, and conversely, greater resilience means less efficiency....The upshot is that systems become *unsustainable* whenever they have either too much or too little diversity/connectivity (or too much or too little efficiency). Since resilience and efficiency are both necessary, but pull in opposite directions, nature tends to favor those systems that achieve and optimal mix of the two.

The trick, the authors’ argue is to identify that correct balance. As they succinctly put it, “Balance, of course, is the key.”⁵⁹

Insert Figure 3 around here.

Universal investors will therefor want to identify and encourage those investment opportunities that optimize this balance between efficiency and resilience. Financial accounting measures supply indications of today’s efficiency; the use of scenario analysis can help assess tomorrow’s resilience.

Pension Funds and Investment for the Long-Term. An increasing number of pension funds describe themselves as long-term investors with commitments to sustainability and the public interest. In doing so they point to the prospects of enhanced

⁵⁹ Sally J. Goerner, Bernard Lietaer, and Robert E. Ulanowicz. Quantifying Economic Sustainability: Implications for Free-Enterprise Theory, Policy and Practice.” *Ecological Economics*. 2009 69:76-81.

financial performance, opportunities to help grow the economy, and an increased ability to reduce investment uncertainties.

PGGM—the large Dutch manager of pension funds for the healthcare and social services sectors—believes that:

Responsible investment pays off: We firmly believe that sustainability factors materially influence the risk-return profile of the investments and that this influence will steadily increase in the future. ⁶⁰

The Canadian Plan Investment Board asserts that “organizations that manage ESG factors effectively are more likely to create sustainable value over the long term than those that do not.”⁶¹ Storebrand, the Norwegian financial services and pension-fund management company states that, “Our aim is to invest in the most sustainable companies, because we expect that they will give the best results for our customers, society and the future.”⁶²

The California Public Employees Retirement System favors “investment strategies that create long-term, sustainable value and recognize[s] the critical importance of a strong and durable economy in the attainment of funding objectives.”⁶³ In France, the government-affiliated Caisse des Dépôts, which manages pension funds and savings accounts, describes itself as “a long term investor serving [the] general interest and the economic development of the country” and “[a]s a creator of sustainable solutions.”⁶⁴

⁶⁰ PGGM. *Responsible Investment Report 2014*. 2014: 11.

⁶¹ Canadian Pension Plan Investment Board. *Investing for Long-Term Value: 2013 Report on Responsible Investing*. 2013: 2.

⁶² Storebrand ASA. *Opportunities for a Better Pension. The Annual Report of Storebrand ASA*. 2013: 10.

⁶³ CalPERS. *Toward Sustainable Investment and Operations: Making Progress, 2014 Report*. 2014: 34

⁶⁴ See the website of Caisse des Dépôts at <http://www.caissedesdepots.fr/en/the-group/who-are-we.html> Last visited May 20, 2014.

ABP, the large pension fund for the Dutch government, civil service and education workers, includes the addressing of sustainability challenges as part of its mandate.

Through its investments, ABP aims to make a positive contribution to challenges facing society, such as climate change, scarcity of water and materials, health care and combating poverty.⁶⁵

The Norwegian Folketrygdfondet, which manages assets of the Norwegian national pension fund monitors the ability of the companies in which it invests to reduce environmental and social uncertainties.

Not all companies can turn environmental considerations or other social matters to their competitive advantage. However, every company can reduce uncertainty about its own operations. We expect boards of directors to deal with this issue effectively by being open about and relating the dilemmas they face.⁶⁶

Case Study

Institutional investors and climate change. One of the few contemporary examples of institutional investors asking companies to respond to specific ESG scenarios occurred in 2013-14 when a coalition of 75 institutional investors with a cumulative \$3 trillion in assets under management wrote to 45 fossil-fuel companies. This coalition, coordinated by the environmental organizations Ceres and Carbon Tracker, was concerned that the fossil-fuel assets of these companies might become “stranded” by secular shifts away from carbon-based fuels in response to the dangers of climate changes and, in addition, that these companies’ facilities and workforce might suffer losses due to extreme weather events caused by climate change.⁶⁷

⁶⁵ ABP. *Your Investment for Life: Responsible Investment Report 2012*. 2013: 3, 9.

⁶⁶ Folketrygdfondet, *Ownership Report 2013*: 10

⁶⁷ Ceres. “Carbon Asset Risk Initiative” Project description. Available at <http://www.ceres.org/files/investor-files/car-factsheet> Last visited July 21, 2014.

The coalition asked these 45 companies to assess their risks under two scenarios: a business-as-usual scenario and a low-carbon scenario under which GHG emissions would be reduced by 80% worldwide by 2050. The coalition was “not making a prediction about the future” but rather was “seeking to understand how well companies are positioned regarding the risk associated with alternative demand scenarios.”

One company that responded was ExxonMobil, which in March 2014 issued its annual *Outlook for Energy* along with its report “Energy and Carbon—Managing the Risks.” Based on its analyses ExxonMobil state that it was:

[c]onfident that none of our hydrocarbon reserves are now or will become “stranded.” We believe producing these assets is essential to meeting growing energy demand worldwide, and in preventing consumers—especially those in the least developed and most vulnerable economies—from themselves becoming stranded in the global pursuit of higher living standards and greater economic opportunity.

It argued that given its current projections for population and economic growth, the world was likely to need 35 percent more energy by 2040 than today and that all energy sources—including coal, oil and natural gas—would be necessary to fill that need.

In this report, the company acknowledged that climate change is a risk that needs to be taken seriously, although at the same time it noted that it does not “project overall atmospheric GHG concentration, nor do we model global average temperature impacts” since they would be “well beyond” the company’s ability to reasonably measure or verify. It did, however, anticipate on multiple grounds that governments around the world would not impose “a so-called carbon budget.” According to the company, implementation of a carbon budget would likely cost American households an additional \$2,350 annually for energy; require some \$45 trillion in energy supply and infrastructure investment; and for the developing world could lead to “scarcity of

affordable, reliable and accessible energy and additionally lead to social instability.” The company therefore concluded that “it is difficult to envision governments choosing this path in light of the negative implications for economic growth and prosperity that such a course poses, especially when other avenues may be available....”

At the same time, the company acknowledged that

Governments’ constraints on use of carbon-based energy sources and limits on greenhouse gas emissions are expected to increase throughout the Outlook period [i.e., through 2040]. However, the impact of these rising costs of regulations on the economy we expect will vary regionally throughout the world and will not rise to the level required for the “low carbon scenario.”

The company also reported that it conducts “stress tests” when it makes oil and natural gas capital investments for “an added margin of safety against uncertainties, such as those related to technology, costs, geopolitics, availability of required materials, service, and labor etc.” Although the company considers these stress tests “an opportunity to fully consider different economic scenarios in our planning and investment process,” it asserts that this testing “differs from alternative scenario planning, such as alternate Outlooks.”⁶⁸

Among the investors calling on ExxonMobil to respond to the low-carbon scenario was Arjuna Capital, an asset management firm with expertise in environmental, social and governance risks. In 2013, along with others, it filed a shareholder resolution asking the company to respond to a low-carbon scenario, but withdrew the resolution when the company agreed to issue its climate-change risk-assessment report. When the report appeared, however, Arjuna criticized the company failing to address directly the low-carbon scenario. “The question is not

⁶⁸ ExxonMobil. “Energy and Carbon—Managing the Risks” Report March 31, 2014. Available at <http://cdn.exxonmobil.com/~media/Files/Other/2014/Report%20-%20Energy%20and%20Carbon%20-%20Managing%20the%20Risks.pdf> Last visited July 21, 2014.

whether or not we'll face the low carbon standard," Arjuna told the press, "but whether they are prepared to address it. We need to know what's at stake. But at least now investors know that Exxon is not addressing the low carbon scenario and [is] placing investor capital at risk." As to the company's observation that social instability might result from a substantial cutback in energy supplies, Arjuna argued that there is "greater risk of social upheaval from climate change" and that the report "ignores the cost of inaction."⁶⁹

Interviews with long-term investors

Interviews were conducted with 11 asset managers (ten equities, one fixed income) and two consultants to asset managers. The managers were selected because of their firms' publicly stated commitments to responsible investment. In general these managers believed that an understanding of when and how companies use sustainability-related analyses would be, or already was, useful to them as long-term investors. They noted a number of potential uses of this understanding, including as a tool to assess quality of management and company resilience in the face of uncertain futures, to fill in the long tails of discounted cash-flow analysis, and to help identify companies likely to pursue sustainability opportunities in the marketplace. A number commented on the potential usefulness of industry-specific sustainability scenarios, while acknowledging that, for a variety of reasons, companies might be reluctant to disclose substantial amounts of information about specific scenario-analysis results.

On the whole, these managers identified themselves as long-term investors. Two distinguished their active (fundamental) equity investment style from their more passive

⁶⁹ Jonathan Fahey. "World won't cut fossil fuels drastically, Exxon says" *Boston Globe* April 2, 2014: B7.

(index and quantitative) styles, noting that the concept of long-term investment was more applicable to the former than the latter. One had recently changed the name of their sustainability-themed fundamental equity strategy from “responsible investment” to “long-term investment” on the grounds that long-term investors must look at both financial and sustainability issues and that the term “responsible” was therefore unnecessary.

A third manager preferred the phrase “indeterminate-term” investing, because ESG issues have the potential to play themselves out either in the short term or the long term. They observed that the problem for investors making buy/sell decisions is that it is not clear when ESG issues will in fact work themselves into stock valuations. Another manager of a portfolio of funds using sustainability themes (e.g., clean tech, water, climate change) invested with an essentially short-term 9-12 month time horizon. In addition, one manager used ESG issues solely for engagement purposes, as opposed to integrating them into the buy-sell discipline, but stressed that these engagements were often long term.

Most interviewees believed that understanding when and how corporations used sustainability scenario analysis would be useful in their investment disciplines. Two felt that their investment disciplines already assessed whether companies implicitly used sustainability scenario analysis. One observed that scenario analysis was implicit in that well managed companies today consider the potential impacts of such social and environmental issues as climate change, consumer trends, obesity or droughts. Another interviewee already asked all companies in which they invest how they planned to deal with material social and environmental issues and felt they could determine from the

companies' responses whether or not they were engaging in an exercise thorough enough to be considered scenario analysis.

Three managers noted that scenario analysis would be most useful when developed in the context of the industry-specific sustainability key performance indicators now being developed by such organizations as the Sustainability Accounting Standards Board and Delphi Project. A fourth would like to see scenarios developed for the industry-specific KPIs their firm had already developed in-house.

One manager felt that their understanding of corporations' use of sustainability scenario analysis would be most valuable in filling in the long tails of discounted cash flow analysis, since the longer-term the projections of earnings are the less certain they become. Another felt that as more investors seek out solutions-oriented sustainability investment products, understanding corporations' long-term scenario analyses would be increasingly useful.

Five managers viewed knowing which companies use scenario analysis as potentially useful in assessing the quality of management and the company's prospects for long-term resilience. These factors could then be overlaid on stock-price valuations. One firm began its equity analyses with establishing quantitative financial ratings, then had its ESG team develop a long-term sustainability assessment that was overlaid on the financial rating, potentially moving its valuation up or down.

The simple fact of knowing whether companies were engaged in scenario analysis on specific ESG issues, without necessarily knowing the specifics or outcomes of these exercises, was seen as valuable information in and of itself by a number of interviewees.

One interviewee pointed out that companies would not be likely to disclose scenario-related information that would be valuable to competitors. By contrast, another felt that not knowing the outcome of scenarios analyses was like seeing only the tip of an iceberg.

Seven interviewees stated that *industry-level* scenarios would be useful. One expressed doubt that useful scenarios could be developed by industry participants, however, due to anti-trust concerns. Another asked who would pay for the development of such industry-level scenarios. It was also pointed out that that scenario analysis was more likely to take place in certain industries than others. Among those likely to do scenario analysis are industries involving real assets or requiring the deployment of capital over long period of times.

Challenges and Opportunities

In June 2014, 12 experts with experience in scenario analysis met to discuss the use and usefulness of sustainability scenario analysis. These experts included representatives from the corporate, consultant, investment and research communities.

The discussion was wide-ranging, focusing on the current and potential future use of sustainability scenarios within the corporate community and on how corporate reporting on such scenarios might be useful to long-term investors. The discussion identified certain obstacles to the use of sustainability scenarios by corporations and ways in which these obstacles might be overcome; and identified challenges for investors in the interpretation of corporations' use of sustainability scenarios.

One issue that arose at both the corporate and investor level was that of the intersection of the languages of sustainability and business or finance—that is, from the corporate perspective how sustainability concerns could be translated into compelling and decision-useful metrics for corporate managers; and from the investor perspective, how reporting metrics on corporate use of sustainability scenario analysis could allow investors to measure and compare company performance within industries.

To make a persuasive case for the corporate use of sustainability scenarios, today's short-term biases would need to be overcome. Various participants commented that these biases may arise in part from the short tenure of today's CEOs, a lack of commitment by managers at various levels to build strong businesses beyond their immediate tenure at a firm, and a competitive environment in which managers worry about the short-term survival of their firms. They may also arise from the difficulty of translating long-term, low-probability sustainability risks into the metrics of daily corporate management, as well as from the analogous problems of quantifying the costs of risk in time frames of more than three to five years. In addition, one participant pointed out that corporate managers can be uncertain as to whether it is appropriate to consider normative sustainability scenarios, as opposed to simply making forecasts—that is, should they be considering the most desirable, as well as the most probable futures.

It was also pointed out that actual implementation strategic plans resulting from scenario analysis can be difficult for corporations for several reasons. Entry points into the planning cycle may be difficult to identify. Tools or roadmaps for change may not be readily available. It may not be clear to management when fundamental, game-changing shifts in the models of their business are taking place. In addition, managers are paid to act on what they can affect and may become paralyzed when confronted with the broad

scope and long time-frame of many sustainability issues. Similarly, if the need for collective action at an industry level is implied, action by a single company on its own can be problematic.

A number of ideas potentially helpful in overcoming such challenges were reviewed. A commitment of CEOs and Boards of Directors to sustainability issues was cited as key to driving these issues into strategic planning. In addition, one participant observed that both government regulation and legal actions have historically been effective means of prompting systematic change. Simultaneously it was pointed out that changing corporate cultures was key to creating an environment in which sustainability scenarios can be fully integrated into management and that sustainability scenarios themselves might be a useful tool in changing these corporate cultures.

As to the challenges of translation, it was suggested that tying sustainability scenarios both to businesses' prospects for growth and to their material risks, as well as separating the question of risks from that of timeframes, could be useful steps. In addition, the idea of the development of industry-level sustainability scenarios by industries themselves or other third parties was raised as a means of prompting individual companies to confront consideration of key sustainability issues and helping address industry-level collective action problems.

From the investors' viewpoint, a number of participants agreed that information on corporate use of sustainability scenario analysis could be useful in assessing corporations' quality of management and resilience in the face of uncertain futures. It was pointed out that scenario-related analogies exist today on the risk side, with large financial services companies required to report on stress tests assessing their ability to

withstand potential financial crises, or with companies required to document their disaster recovery plans. One participant stressed that to be useful in assessing corporations' resilience, sustainability scenarios would need to encompass more than environmental issues and, like quality today, sustainability would eventually need to be integrated into all aspects of management.

A number of points were made about the need to define the format for corporate reporting on sustainability scenario analysis so that it would be useful to institutional investors. As with the challenges of the translation of sustainability language into the language of corporate management, the potential usefulness for investors of reporting that could combined both quantitative and qualitative aspects was noted—for example, reports that provide listings of formal policies and practices on the integration of scenarios into strategic management decision-making as well as examples of how such practices had influenced specific decisions. Standardized, quantitative metrics would facilitate formal company-to-company comparisons. Qualitative examples would facilitate an understanding of the future direction a company envisions and allow investors to compare these visions across an industry.

Potential implications for practice.

From this overview, a broad outline can be derived of what the implementation of a scenarios approach might entail for long-term investors. To begin with, long-term investors should understand how well-managed corporations today use scenario analyses in their strategic planning: the types of scenarios they address, the processes they use to evaluate these scenarios, the level at which these scenario analyses take place within the corporation, the circumstances under which these scenarios do or do not

result in the implementation of specific programs, and the degree to which these scenario analyses incorporate ESG and sustainability factors.

In particular, these investors will want to understand the degree to which corporations are incorporating sustainability issues into scenario analyses that 1) the corporations themselves believe are most material to success; and 2) the investors themselves believe are most material to success. This implies that these investors would want to communicate to corporations what industry-specific sustainability scenario analyses they believe are most crucial to the success of the company and, to the extent that they view themselves as universal investors, crucial to the creation of an efficient and resilient economy.

Most useful would be scenario analyses involving sustainability issues where uncertainty about these issues was the greatest; where the potential for systems change affecting the corporations' operations was the most unpredictable; and where the corporations had the least ability to exercise control over outcomes. Of particular importance would be scenario analyses for capital-intensive industries and industries most likely to be subject to substantial technological innovation or regulatory reform.

The specifics on individual companies' scenario analyses would vary from issue to issue and company to company and, due to confidentiality and other proprietary considerations, would often not be disclosed in their entirety. Nevertheless, investors could benefit from certain basic data. Data that might be gathered include: Who at the firm is responsible for the development of sustainability-related scenarios? What are the primary sustainability factors that the company has decided to address through scenario analysis? How are these factors identified? Through what procedures are these

sustainability scenarios integrated into the strategic management planning process? At what level? What are examples of changes in management decisions that have resulted from these scenario analyses?

Long-term investors would undoubtedly find approaches by some corporations to sustainability scenarios more convincing than others. The net effect would be to provide insights into a range of long-term visions by different corporate managements as to how they will confront sustainability concerns. This would allow for long-term, sustainability-related comparisons between companies within given industries, as well as between industries themselves. These comparisons would then be useful in investment-related assessments of corporations' quality of management, their potential for resilience in the face of uncertain change, and their potential ability to integrate sustainability factors into core business practices.

In some cases long-term investors may be able to translate these insights into traditional stock-price valuation models. In other cases—particularly those where uncertainties predominate—they may be more useful in an asset allocation approach in which specific industries or specific stocks are over- or under-weighted in a portfolio. In this case, data on sustainability scenario analyses would serve as a supplement to, but not a replacement of, traditional pricing-based investment-decision models. That is to say, short-term pricing considerations would continue to drive the timing of the buy/sell decisions for specific securities, but long-term, sustainability scenarios-related considerations would influence decisions about industry allocation and the size of the holdings of particular securities within a portfolio.

The distinctions that a scenarios approach could provide, would also help long-term investors with the difficult task of valuing the intangibles that markets often price into specific securities. In addition, these distinctions could help direct long-term investors' engagement with corporations toward those material issues involving substantial uncertainties that they believe companies or industries have yet to adequately consider.

CONCLUSION

For long-term investors, the ability to understand when and how companies are considering ESG- and sustainability-related scenarios could provide a valuation tool that would supplement that of stock price targets. Knowledge that long-term investors were using these valuation tools would in turn provide corporations with an incentive to integrate sustainability-related scenarios into their strategic planning and to communicate to the investment community their visions for decision-making that balances the competing goals of resilience and efficiency in their operations and as well as in the economy in which they play a such vital role.

References

Aspen Institute. *Long-Term Value Creation: Guiding Principles for Corporations and Investors* (New York: Aspen Institute) 2007.

Australia's Sovereign Wealth Fund *Future Fund: Annual Report 2012/2013*.

Aviva. "Roadmap for Sustainable Financial Markets" June 2014.

Simon and Stephen Morse. *Sustainability Indicators: Measuring the Immeasurable?* (London: Earthscan) 2008.

Bernstein, Peter L. *Capital Ideas: the Improbable Origins of Modern Wall Street* (Hoboken, New Jersey: John Wiley & Sons, Inc.) 2005.
--*Capital Ideas Evolving*. (Hoboken, New Jersey: John Wiley & Sons, Inc.) 2007.

Bogle, John. *The Little Book of Common Sense Investing* (Hoboken, New Jersey: John Wiley & Sons, Inc.) 2007.

Bradfield, Ron, George Wright, George Burt, George Cairns, and Kees van der Heijden. "The Origins and Evolution of Scenario Techniques in Long Range Business Planning" 2005 *Futures* 37: 795-812

CalPERS. *Toward Sustainable Investment and Operations: Making Progress, 2014 Report*.

Carpenter, Stephen R., Elena M. Bennett, and Garry D. Peterson. "Scenarios for Ecosystem Services: An Overview" *Ecology and Society* Vol. 11, No. 1

CBUS. *Strength in Structure: 2012/13 Annual Report*.

Cumming, Graeme and Garry Peterson. "Ecology in Global Scenarios" *Global & Multiscale Assessment Reports, Volume Two: Scenarios*. (Washington, DC: Island Press) 2005: 45-70.

Drucker, Peter. *The Unseen Revolution*, (New York, HarperCollins) 1976

Ehrenfeld, John. *Sustainability by Design* (New Haven: Yale University Press) 2009.

ExxonMobil. "Energy and Carbon—Managing the Risks" Report March 31, 2014. Available at http://cdn.exxonmobil.com/~/_media/Files/Other/2014/Report%20-%20Energy%20and%20Carbon%20-%20Managing%20the%20Risks.pdf

Field, Christopher B., et al. *Climate Change 2014: Impacts, Adaptation, and Vulnerability: Summary for Policy Makers*. (New York: United Nations Intergovernmental Panel on Climate Change) 2014.

Folketrygdfondet, *Ownership Report* 2013.

Future Fund Board of Guardians. *Future Fund: Australia's Sovereign Wealth Fund, 2012/2013 Annual Report*. (Melbourne: Future Fund Board of Guardians) 2013.

Global Network of Director Institute. *Curbing Excessive Short-Termism*. May 2014. Available at <http://www.gndi.org/> Last visited July 3, 2014.

Godet, Michel. *Creating Futures: Scenario Planning as a Strategic Management Tool*. (London: Economica) 2006.

Goerner, Sally J., Bernard Lietaer, and Robert E. Ulanowicz. Quantifying Economic Sustainability: Implications for Free-Enterprise Theory, Policy and Practice." *Ecological Economics*. 2009 69:76-81.

Graham, J., Harvey, C. and Rajgopal, S. "The Economic Implications of Corporate Financial Reporting." *Journal of Accounting and Economics*, 2005, 40: 3-73.

Haldane, Andrew G. "The Short Long" Speech at 29th Société Universitaire Européenne de Recherches Financières Colloquium: *New Paradigms in Money and Finance?* Brussels, May 2011.

Hawley, James P. and Andrew T. Williams. *The Rise of Fiduciary Capitalism: How Institutional Investors Can Make Corporate America More Democratic* (Philadelphia: University of Pennsylvania Press) 2000.

Henderson, Rebecca. "Making the Business Case for Environmental Sustainability" forthcoming in *Leading Sustainable Change: An Organizational Perspective* Oxford University Press.

Holling, C.S. and Lance H. Gunderson, "Resilience and Adaptive Cycles" in *Psnarchy: Understanding Transformations in Human and Natural Systems*. Gunderson and Holling, eds. (Washington, DC: Island Press) 2002.

Horan, Richard D., Eli P. Penichel, Kevin L. A. Drury, and David M. Lodge. "Managing Ecological Thresholds in Coupled Environmental-Human Systems" *Proceeding of the National Academy of Sciences* 2011. Vol. 108. No. 18: 7333-38.

Keynes, John Maynard. *The General Theory of Employment, Interest, and Money*. (Amherst, New York: Prometheus Books) 1997.

Kay, John. *The Kay Review of UK Equity Markets and Long-Term Decision Making*. July 2012. Available at http://www.ecgi.org/conferences/eu_actionplan2013/documents/kay_review_final_report.pdf Last visited July 3, 2014.

Menand, Louis. "Fat Man: Herman Kahn and the Nuclear Age" *The New Yorker* June 27, 2005.

Mercer LLC, Carbon Trust and International Finance Corporation. *Climate Change Scenarios: Implications for Strategic Asset Allocation* (Toronto, Canada: Mercer) 2011.

Peterson, Garry E., Graeme S. Cumming, and Stephen R. Carpenter. "Scenario Planning: a Tool for Conservation in an Uncertain World" *Conservation Biology* April 2003, Vol. 17, No. 2: 258-366.

Porter, Michael. *Competitive Advantage: Creating and Sustaining Superior Performance*. (New York: The Free Press) 1998 edition.

Rappaport, Alfred. "The Economics of Short-Term Performance Obsession" *Financial Analysts Journal* May/June 2005. Vol.61 No. 3: 65-79.

Raskin, Paul, Frank Monks, Teresa Ribeiro, Detlef van Vuuren, Monika Zurek. "Global Scenarios in Historical Perspective" *Global & Multiscale Assessment Reports, Volume Two: Scenarios*. (Washington, DC: Island Press) 2005: 35-44.

Schwartz, Peter. *The Art of the Long View: Planning for the Future in an Uncertain World* (New York: Crown Business) 1996.

Stein, Jeremy. "Takeover Threats and Managerial Myopia" *Journal of Political Economy*, 1988, 96(1), 61-80.

-- "Efficient Capital Markets, Inefficient Firms: A Model of Myopic Corporate Behavior" *Quarterly Journal of Economics*, 1989, 104: 655-669.

Storebrand ASA. *Opportunities for a Better Pension. The Annual Report of Storebrand ASA*. 2013.

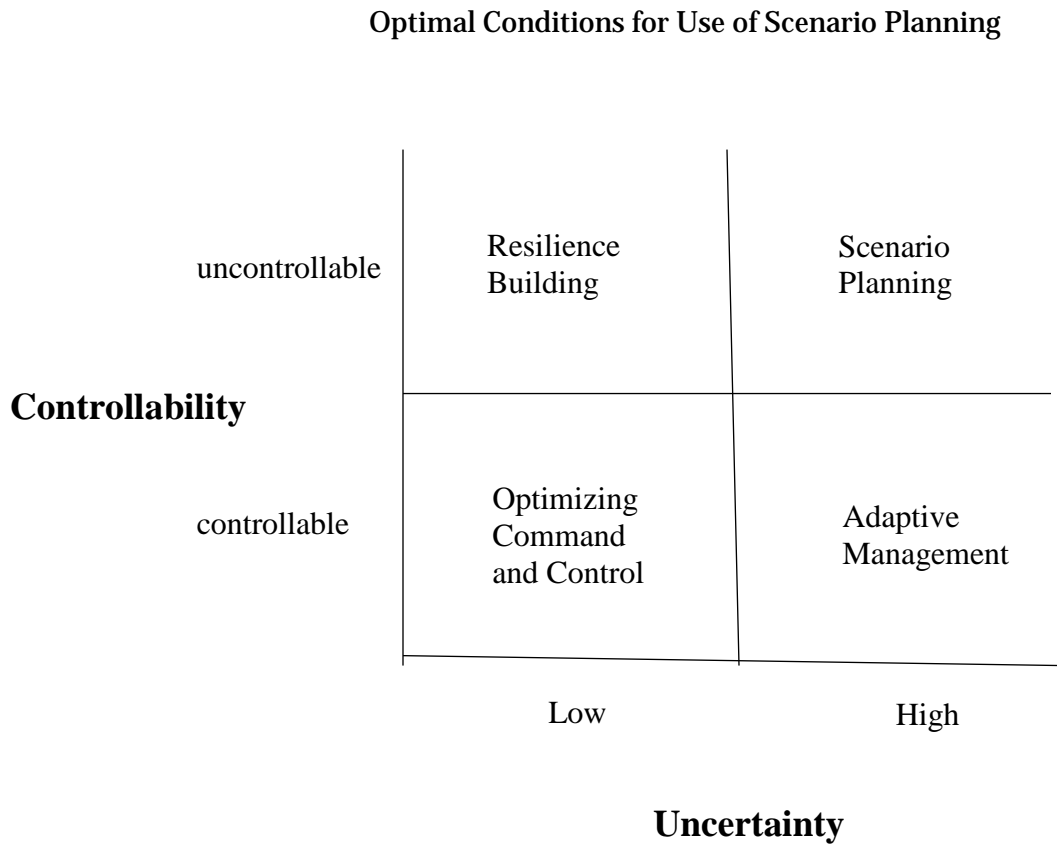
Sullivan, Rodney N. and James X. Xiong. "How Index Trading Increases Market Vulnerability" *Financial Analysts Journal*. March/April 2012. Vol. 68, No. 2: 70:84.

Swart, R.J., P. Raskin and J. Robinson. "The Problem of the Future: Sustainability Science and Scenario Analysis" *Global Environmental Change*. 2004: 137-146.

United Nations Global Compact, Accenture. *The United Nations Global Compact-Accenture CEO Study on Sustainability 2012: Architects of a Better World* (New York: United Nations) September 2013.

World Economic Forum. *The Future of Long-term Investing* (New York: World Economic Forum USA) 2011.

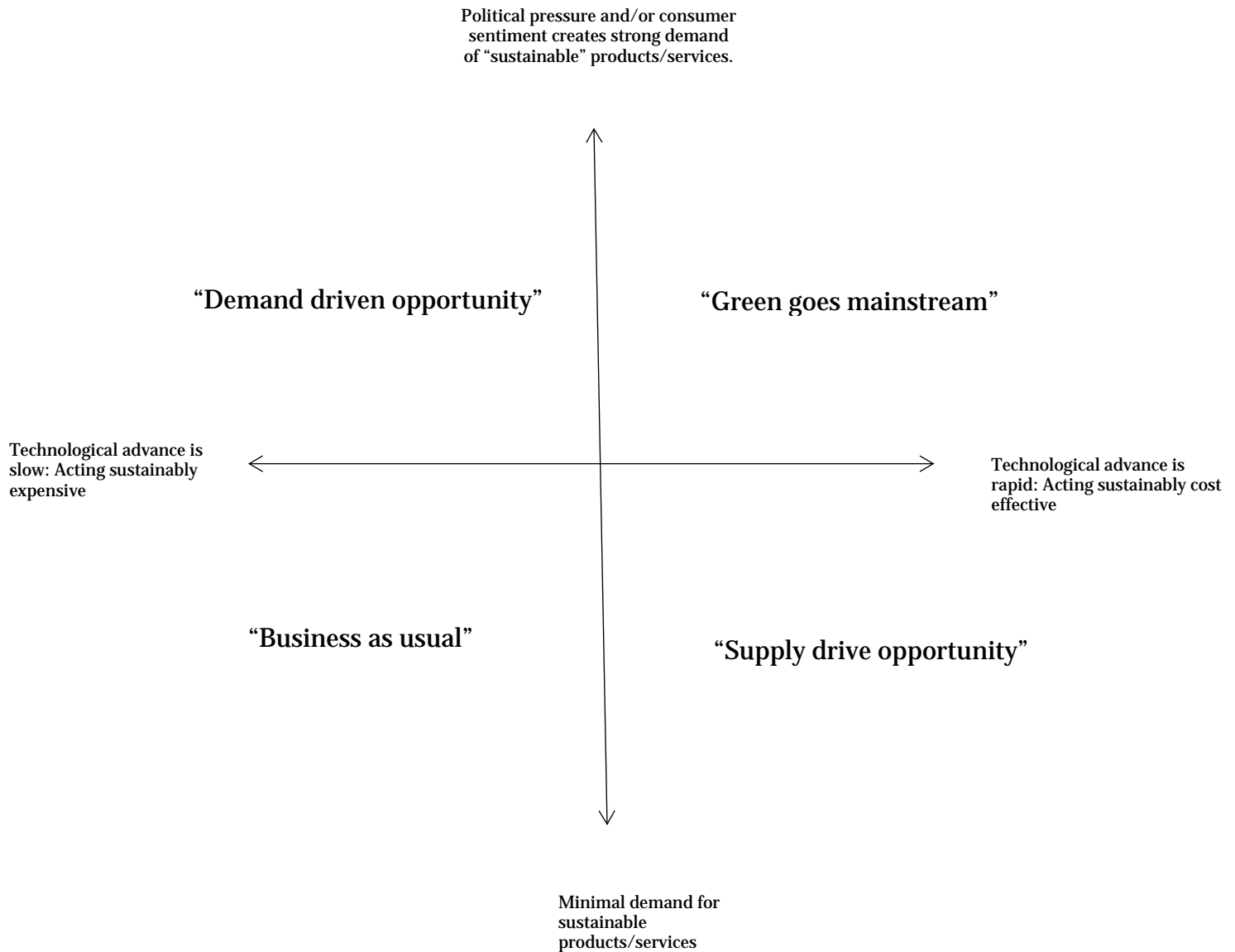
Figure 1.



Source: (Cumming and Peterson, adopted from Peterson et al.)

Figure 2

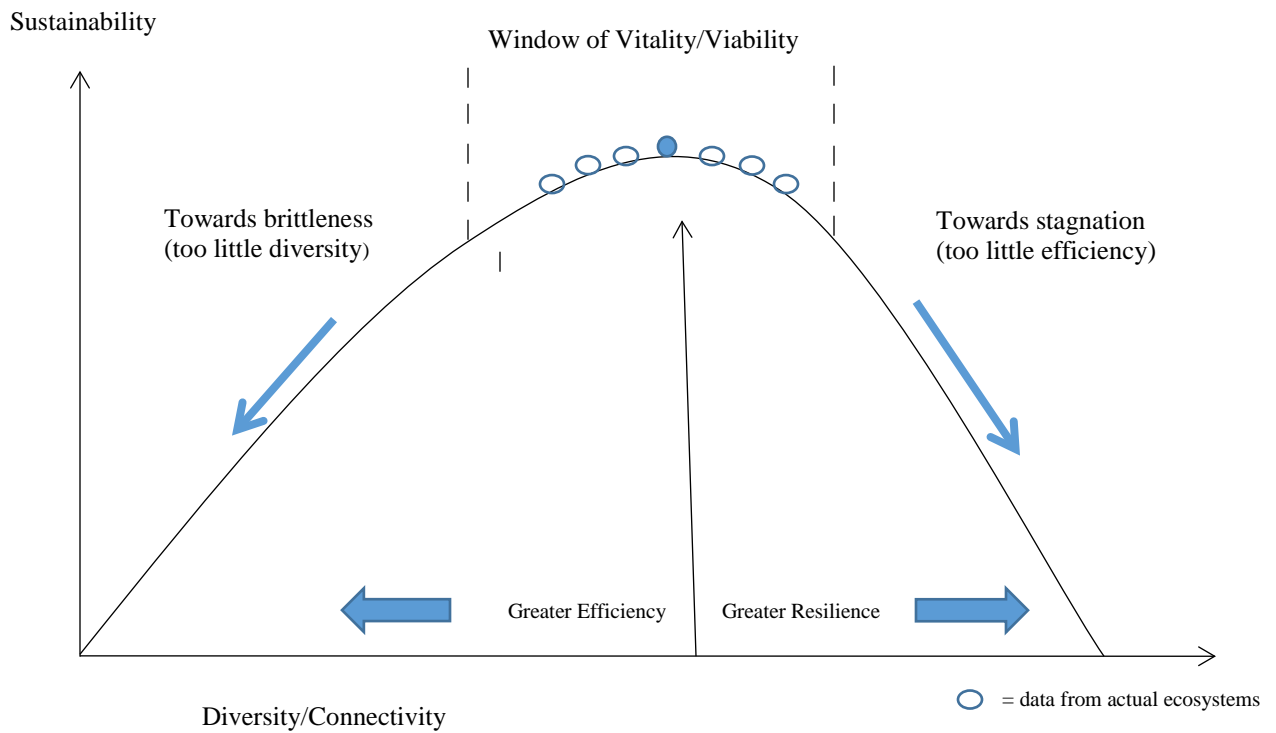
Four Scenarios for Sustainability



Source: Rebecca Henderson, "Making the Business Case for Environmental Sustainability" forthcoming in *Leading Sustainable Change: An Organizational Perspective* Oxford University Press.

Figure 3

Sustainability as a function of efficiency and resilience



Source: Goerner et al. *Ecological Economics* 69 (2009) 79.