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Rethinking Sustainability to Meet the Climate Change Challenge

by Michael Burger, Elizabeth Burleson, Rebecca M. Bratspies, Robin Kundis Craig, David M. Driesen, Alexandra R. Harrington, Keith H. Hirokawa, Sarah Krakoff, Katrina Fischer Kuh, Stephen R. Miller, Jessica Owley, Patrick Parenteau, Melissa Powers, Shannon M. Roesler, and Jonathan Rosenbloom

Summary

A group of environmental law professors formed the Environmental Law Collaborative with the goal of engaging environmental law scholars in the thorny issues of the day. The members of the Collaborative gathered in the summer of 2012 to produce an intensive and collective assessment of sustainability in the age of climate change. Their writings examine the process of adapting the principles and application of sustainability to the demands of climate change, including framing the term sustainability in climate change discussions; coordinating sustainable practices across disciplines such as law, economics, ethics, and the hard sciences; and conceptualizing the role of sustainability in formulating adaptation and resiliency strategies. Their work also contemplates the role of law and legal systems in crafting effective climate change adaptation strategies and considers feasible strategies in the context of specific examples.

This document is the first publication from the Environmental Law Collaborative. A few hardy souls formed the Environmental Law Collaborative with the goal of engaging environmental law scholars in the thorny issues of the day. In the summer of 2012, scholars gathered in the woods of Connecticut to debate the value of scholarly research and the potential of legal literature to effect social and environmental change. With visions of Airlie House and armed with the principles of collaboration and the necessities of ecological fragility, the group sought to foster progress toward an adaptive, conscious, and equitable governance of actions that impact local and global ecologies.

This inaugural workshop addressed the reconceptualization of sustainability in the age of climate change. Climate change is forcing developments in the norms of political, social, economic, and technological standards. As climate change continues to dominate many fields of research, sustainability is at a critical moment that challenges its conceptual coherence. Sustainability has never been free from disputes over its meaning and has long struggled with the difficulties of simultaneously implementing the "triple bottom line" components of environmental, economic, and social well-being. Climate change, however, suggests that the context for sustainable decisionmaking is shifting.

The event produced an intensive and collaborative assessment of sustainability in the age of climate change. The essays that memorialize the proceedings of this collaboration examine the process of adapting the principles and application of sustainability to the demands of climate change, including (but not limited to) framing the term "sustainability" in climate change discussions; coordinating sustainable practices across disciplines such as law, economics, ethics, and the hard sciences; and conceptualizing the role of sustainability in formulating adaptation and resiliency strategies. These essays also contemplate the role of law and legal systems in crafting effective climate change-adaptation strategies and consider feasible strategies in the context of specific examples.

It is not the intention here to have the last word on sustainability in an age of climate change, and it is not the point of this collaboration to adjudicate among the ideas offered to resolve the conflicts and competition among sustainable alternatives. Although we collectively consider the convergence of climate change and sustainability to cover important ground, the driving force for this collaborative

Authors' Note: The authors collectively engaged in this project as the Environmental Law Collaborative. We would like to thank several institutions for the support needed to make this project possible, including Albany Law School, Pace University School of Law, Roger Williams University School of Law, and the Baldy Center for Law and Social Policy at SUNY-Buffalo.

publication has been a matter of professional function. The Environmental Law Collaborative facilitates dialog among thought leaders on environmental policy priorities, practical implementation strategies, assessment mechanisms, and cooperative analysis of science, economics, and ethics. It has become increasingly apparent that although environmental policy benefits from a robust drive for the dissemination of information, environmental policy is also influenced by strategic misinformation and effective use of persuasive communication. To advance society and secure welfare at local and global scales, our professional activities must contribute to resolution of the divisive issues that confront our environment. Here, the Environmental Law Collaborative explores the means of progressing toward an adaptive, conscious, and equitable governance of actions that impact local and global ecologies.

Sustainability is at a critical moment of reexamination. The principles of sustainability have not previously been as scrutinized as they are today; nor has there been so much importance placed on getting the principles of sustainability right. Climate change is pressing the concept of sustainability into a defensive position. In the melee, this collaborative found that the concept of sustainability that has served as such an important provocateur for the last four decades may be ill-equipped to play such a role in the future.

Transparency in Support of Sustainability

Katrina Fischer Kuh, Associate Professor of Law, Maurice A. Deane School of Law, Hofstra University.

Including only those activities over which individuals have substantial and direct control, emissions from individuals and households constitute 30-40% of U.S. greenhouse gas (GHG) emissions[1]; individuals are responsible for an even larger volume of emissions when indirect emissions, such as the energy required to manufacture and transport purchased goods, are included.[2] The United States has, however, infamously approached international environmental negotiations adamant that "the American lifestyle is not up for negotiation."[3] This attitude can persist in part because the environmental harms occasioned in support of U.S. lifestyles are often most acutely experienced elsewhere, in the countries that produce the inexpensive goods that we consume. We "let them eat pollution" so that we need not[4] and, in the process, prop up unsustainable lifestyles, obscure the environmental harms these lifestyles occasion, and quiet potential objections through the economic benefits that flow to the developing world.

At least in one sense, climate change does not so readily permit this sleight of hand.[5] The climate harms occasioned by the GHG emissions associated with the production and supply of goods cannot be relegated to the country of manufacture. Climate change thus presents an opportunity to force a reckoning with the unsustainable practices that underlie U.S. lifestyles. In another sense, however, GHG emissions are not readily visible and frequently driven indirectly by lifestyle; there is thus a danger that the connection between U.S. lifestyles, underlying unsustainable practices, and resulting climate harms will remain obscured, underscoring the importance for law and policy to promote transparency to reveal the GHG emissions attributable to individuals. Possibilities for creating such transparency include carbon footprint labeling of goods, smart meter technology, individual carbon footprint calculators, and reorienting domestic climate policy to better engage individuals.[6] If achieved, this transparency could support a new openness to reimagining more sustainable lifestyles.

Ultimately, we must build communities, infrastructure, and systems that support sustainable lifestyles; proposals abound for how this can occur, and some communities have made significant progress.[7] It will, however, require significant will and commitment to give effect to the insights and specific policies of sustainability. Generating the commitment—personal, public, political—necessary to achieve and maintain this goal may, in the United States, first require a revelation about how current lifestyles occasion environmental harms, including through GHG emissions. One challenge for legal scholars, then, is how to use law and policy to reveal—or at least not obscure—the environmental harms occasioned by our lifestyles.

The "What" and "How" of Sustainability

Alexandra R. Harrington, Visiting Associate Professor of Law, Albany Law School.

Sustainability has become a popular topic in law and society, yet the exact meaning of sustainability is often

1. Michael P. Vandenbergh et al., *Individual Carbon Emissions: The Low-Hanging Fruit*, 55 UCLA L. Rev. 1701, 1710 (2008).
2. Shui Bin & Hadi Dowlatabadi, *Consumer Lifestyle Approach to U.S. Energy Use and the Related CO_2 Emissions*, 33 Energy Pol'y 197, 203-05 (2005).
3. James Salzman, *Sustainable Consumption and the Law*, 27 Envtl. L. 1243, 1256 (1997) (quoting Joe Kirwin, *Less Than $5 Billion Pledged for Agenda 21 Action Plan; Final Document to Be Released by United Nations in September*, 15 Int'l Env't Rep. (BNA) No. 14, at 486 (July 15, 1992)).
4. *Let Them Eat Pollution*, Economist, Feb. 8, 1992, at 66.
5. *See generally* Michael P. Vandenbergh & Mark A. Cohen, *Climate Change Governance: Boundaries and Leakage*, 18 N.Y.U. Envtl. L.J. 221 (2010) (describing how developed country controls on GHG emissions may be undercut by leakage of carbon-intensive production to developing countries).
6. John C. Dernbach, *Harnessing Individual Behavior to Address Climate Change: Options for Congress*, 26 Va. Envtl. L.J. 107 (2008) (suggesting how national climate legislation could better engage individuals).
7. *E.g.*, John C. Dernbach, *An Agenda for Sustainable Communities*, 4 Env't & Energy L. & Pol'y J. 170 (2009).

glossed over or assumed without any substantial analysis. Without an understanding of what sustainability means overall, it is impossible to determine what it might mean in any particular context or problem. This essay argues that there are two essential elements to a holistic meaning of sustainability: the "what" and the "how." To understand the meaning of sustainability in an age of climate change, we must examine both of these elements and their interrelationship with climate change rather than focusing simply on a one-dimensional concept of sustainability that lacks a defined meaning.

The "what" element of sustainability is fluid. Sustainability, using the classic definition from the Brundtland Commission, encompasses "development that meets the needs of the present without compromising the ability of future generations to meet their own needs."[8] This wide-ranging definition includes environmental protection/conservation along with other issues such as poverty eradication, economic development, health concerns, and labor issues. Thus, sustainability is perhaps one of the best vehicles to address climate change, since from the "what" perspective it encompasses the concerns of the present—through such concepts as adaptation and mitigation—while also seeking to ensure that the ways in which we adapt to climate change are not harmful to future generations. The issue here, of course, is that climate change introduces an element of unforeseeability to determining the needs of future generations because the climate they inhabit will present unique challenges and opportunities. However, the crux of sustainability does not require clairvoyance. Rather, it requires the present generation to act in a responsible way toward future generations given the knowledge that is presently available. And, since knowledge is ever-evolving in law as it is in science, the actions needed to further sustainability will continue to evolve as well. This is why the "what" element is necessarily fluid.

This brings us to the "how" element of sustainability. The standard definition of sustainability is expansive and can include adaptation and mitigation practices. In many geographical areas, these practices are quite useful. However, key issues of the "how" element of sustainability render its meaning questionable in relationship to climate change. How, for example, do we promote sustainability in the Maldives when the nation will be uninhabitable within decades due to rising sea levels? Does sustainability support a plan to help the Maldivians remain in their homes, even though the island will be underwater within decades? Or do we assist the Maldivians in finding alternative locations for their people and their state now, in advance of a future immigration and governmental crisis, and call that sustainability instead? The "how" element of sustainability is key to the meaning of sustainability in an age of climate change because it must deal with both the charge to assist present and future generations and the reality that the needs of these generations will be quite different due to climate change-related forces.

Taken together, the "what" element and the "how" element of sustainability provide the meaning of sustainability in an age of climate change that is necessarily flexible while at the same time encompassing the core principles established in the Brundtland Commission Report. Although there will be challenges in squaring some climate change-induced issues with the "how" element of sustainability, the fluidity of the sustainability definition ensures that the concept will continue to have meaning and—more importantly—a place in the dialogue regarding climate change. In this way, viewing sustainability as being composed of the "what" and "how" elements makes the definition and concept of sustainability itself sustainable.

Sustainability: Defining It Provides Little Value, But Its Meaning Is Essential

Jonathan Rosenbloom, Associate Professor of Law, Drake University Law School.

> *Depend upon it, Sir, when a man knows he is to be hanged . . . it concentrates his mind wonderfully.*[9]—Samuel Johnson

What does sustainability mean in an age of climate change? The question presents a dichotomy between the critical importance of acting, regulating, and legislating sustainably and the almost meaningless task of defining sustainability. On the one hand, climate change makes our continued survival and development as a society dependent upon the infiltration and incorporation of sustainability into all contexts and all facets of life. On the other hand, defining sustainability may prove to be a meaningless task (in or out of the climate change context) that misdirects a discourse on how to incorporate sustainability into our lives that must move forward.

Settling on a universal definition of sustainability is difficult (if not impossible) because the real-life application of sustainability is highly contextual and is based on a number of factors, including substantive areas of application and geography. For each substantive subject matter, the relevant characteristics and metrics necessary to define or understand the applicable meaning of sustainability change. For example, the role of sustainability in mergers and acquisitions is drastically different than its role in zoning. Similarly, defining sustainability is dependent upon the geographical area: what is sustainable for purposes of land use in rural Africa is fundamentally different from what is sustainable for purposes of land use in dense, urban China.

Because applying sustainability is highly contextual, a single definition is relevant to multiple contexts only at a highly generalized level.[10] For example, to garner a defini-

8. *See* World Commission on Environment and Development, Our Common Future (1987), *available at* http://www.un-documents.net/our-common-future.pdf.

9. James Boswell, The Life of Johnson 550 (new ed. John Murray 1876). Samuel Johnson (1709-1784), an author, poet, essayist, and moralist, made the remark while trying to save William Dodd from being hanged.

10. John Elkington, Cannibals With Forks: The Triple Bottom Line of 21st Century Business ix (1998); United Nations, Report of the World Commission on Environment and Development: Our Com-

tion of sustainability that is relevant to land use in rural Africa and land use in urban China we may sacrifice all helpful specifics of the term. Common generalized definitions include the triple bottom line of "economic prosperity, environmental quality, and social justice," along with intergenerational equity. Those generalized definitions are insufficient to move sustainability forward in any concrete way. They provide minimal value in directing or promoting actual changes necessary to avoid climate catastrophe. They tell CEOs and local planners, for example, little operationally about how to measure sustainability in a particular context, how to monitor it, or how to move toward a sustainable society.[11]

And yet, while defining sustainability may provide little benefit, the functional application of sustainability could not be more meaningful. Sustainability serves to change fundamentally the way we approach almost every aspect of our lives. It requires us to alter our thinking in how we understand and solve the challenges we face, including expanding the relevant inquiry to seek "a more rigorous pursuit of equity as a matter of governance, a more honest incorporation of economics into environmental quality considerations, and a more effective regulation of the interaction between the natural and built environments."[12] Thus, the question of *how* we incorporate sustainability into our lives in a specific context is a far more relevant and proactive inquiry that can have a positive effect on climate change.

I recognize that some definitions of sustainability may be attempting to achieve something other than an operational roadmap to meet the challenges of the future. Rather, those definitions are to provide us with a starting point and the flexibility to apply sustainability to a variety of contexts. They are purposefully broad and inclusive to be applicable to a large spectrum of substantive areas. If true, we have achieved this objective. Now, our focus and resources should be spent on designing creative solutions to apply the existing general definitions to new contexts. We will not make the innovative changes necessary to address climate change if we are consumed with obtaining a uniform or universal definition for sustainability. For example, to effect positive change related to sprawl and zoning, a conversation with local planners, developers, and community groups about the triple bottom line, intergenerational equity, the precautionary principle, etc., is a show-stopper. Instead, a conversation about exploring new and concrete options for measuring, baselining, and assessing sustainable zoning and mass transit would get us closer to avoiding climate catastrophe.[13]

The pressing need to take action on sustainability is particularly true in an era of climate change. As the effects of climate change become more apparent, decisions pertaining to the future of society must be made within the context of the risks associated with climate change. Climate change alters the factors necessary to make a decision, but does not alter the sustainability paradigm. Accordingly, however one defines sustainability, the application of that definition in an era of climate change plays a more prominent role as our survival (a minimum definition of sustainability) depends upon it—and that, to paraphrase Samuel Johnson, should concentrate our minds wonderfully.

Making Sustainability Count

Melissa Powers, Associate Professor of Law, Lewis & Clark Law School.

Sustainability is an increasingly important concept in environmental and climate change law. To the extent sustainability means that people should reduce their environmental impacts and shrink their carbon footprints, it seems that the increased focus on sustainability offers significant promise. But it is unclear that sustainability has that meaning; indeed, the term sustainability has become so ubiquitous and amorphous that it seems to have no common meaning. That might not matter very much when the idea of sustainability is used to promote gratuitous or individual acts of environmental stewardship. However, successful climate change mitigation will require GHG emissions and atmospheric carbon dioxide (CO_2) concentrations to reach specific numeric levels. If governments replace quantifiable emissions reduction targets with ambiguous sustainability goals, this could undermine long-term efforts to reduce GHG emissions and mitigate climate change. Therefore, in the context of climate change, it is critical that governments make their sustainability programs count by measuring the benefits of their sustainability measures.

Over the past several years, a number of cities around the country have adopted climate action plans to reduce municipal GHG emissions. Many of these climate action plans focus on similar sectoral emissions-reduction strategies, such as reducing vehicle miles traveled by steering people away from single-passenger car trips; reducing waste-related emissions by encouraging composting and recycling; encouraging energy efficiency and localized renewable energy production; and encouraging other mitigation strategies such as tree planting, urban gardening, and other activities to reduce urban heat (and thereby reduce the need for air conditioning). Although these strategies may have significant potential to reduce urban GHG emissions and mitigate climate change, cities often fail to quantify the anticipated reductions the strategies will pro-

MON FUTURE 16 (1987), *available at* http://www.un-documents.net/wced-ocf.htm. This is not to suggest that arriving at these definitions is an easy task.

11. Notwithstanding the above, if compelled to define sustainability, I believe prior individuals correctly acknowledged that it is more useful and less open to manipulation to define unsustainable practices. *See, e.g.*, J. William Futrell, *Defining Sustainable Development Law*, 19 NAT. RESOURCES & ENV'T 9 (2004); David R. Hodas, *The Role of Law in Defining Sustainable Development: NEPA Reconsidered*, 3 WIDENER L. SYMP. J. 1 (1998).

12. Keith Hirokawa, *Sustainability as Process: Seeing Climate Change Opportunities in Sustainability Approaches*.

13. *See, e.g.*, *Sustainable Community Development Code*, *available at* http://www.law.du.edu/index.php/rmlui/rmlui-practice/code-framework.

duce. Even where cities can point to emissions reductions they have achieved—for example, Portland, Oregon, has lowered its emissions to 1990 levels after pursuing elements of its climate action plan—they typically do not link emissions reductions to specific measures. Instead, cities have begun to promote the general concept of sustainability rather than develop specific strategies to meet the numeric metrics in their climate action plans.

Why should this matter? After all, if a city can show that it is simultaneously implementing a climate action plan, becoming more "sustainable," and reducing GHG emissions, it would seem that sustainability efforts deserve praise. The problem, though, is that climate change mitigation ultimately relies on numbers: to avoid temperature increases above 2°C, scientists estimate that global CO_2 concentrations must fall back to 350 parts per million (ppm) (which may actually be too high), which requires quantifiable emissions reductions measured in tons of CO_2 equivalent. If cities are serious about mitigating climate change, they need to link their plans to quantifiable targets. Sustainability should not be exalted at the expense of governmental accountability.

That does not mean that sustainability (whatever it may mean) should not play a role in climate change mitigation. Local climate action plans may help promote and reinforce behavioral norms necessary for societal changes that comprehensive climate change mitigation demands. City leaders in Portland, Oregon, and New York City have tapped into the idea of sustainability to garner support for those cities' climate plans, to encourage participation in the cities' sectoral mitigation efforts, and to change the culture in ways that could lead to deeper emissions cuts over the longer term. The vague concept of sustainability seems to promote participation and buy-in from residents in those cities, because it provides city residents positive reinforcement as they work to improve their communities.

This concept of sustainability—that it serves to promote good will and emotional benefits—may seem weak. But research has shown in various contexts that positive reinforcement and messaging may do more to promote behavioral change than scolding and shaming do. For example, voter turnout efforts that emphasize the civic benefits and positive aspects of voting have a greater impact than efforts designed to play on voters' fears and anger, contrary to some social scientists' expectations. If government leaders use the concept of sustainability as a positive, upbeat strategy to enlist urban residents in climate change mitigation efforts, this could help change societal norms. Changing norms, in turn, could allow city leaders to take more aggressive measures to achieve their quantifiable targets.

To make sustainability count in the climate change context, we should insist that cities establish quantified emissions targets and demonstrate that their sectoral strategies will achieve these targets. The concept of sustainability can help cities implement their climate action plans, but it should not displace a quantified approach.

The Sustainable, Inevitable Exploding City

Stephen R. Miller, Associate Professor of Law, University of Idaho College of Law.

The global urban footprint will expand from two to five times what it is today by 2050.[14] This is in part due to the estimated population growth of 2.4 billion between now and 2050,[15] most of which will occur in urban areas.[16] Urban areas also have a persistently declining density in both developed- and developing-world cities.[17] As a result, an extensive new infrastructure will be built in the 21st century that will exceed the size and scale of all previous city building. The dismal fact looms: our cities are exploding, inevitably.[18]

Making the inevitably exploding city of the 21st century sustainable should be the cornerstone to long-term conservation and adaptability efforts to address climate change. It only makes sense that an environmental problem derived from human development revisit the source of the problem. Consider: transportation is a major source of GHG emissions, as are the construction and operation of residential and commercial buildings; land use change resulting from city growth will also increase GHG emissions through acts such as deforestation; and increased building stock will drive greater electricity use.[19] Sustainable solutions to reducing GHG emissions in exploding cities will require equal parts pragmatic policy, legal tools, and a new narrative of development. Here is what this approach might look like:

Policy. To accept the exploding city as inevitable does not mean we stop trying to improve city form and increase

14. *See Atlas of Urban Expansion*, Lincoln Inst. of Land Pol'y, http://www.lincolninst.edu/subcenters/atlas-urban-expansion/Default.aspx (last visited Mar. 5, 2013) (follow link: "Urban Land Cover Projections for Countries and Regions, 2000-2050"); *see also* World Bank, The Dynamics of Global Urban Expansion, *available at* http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTURBANDEVELOPMENT/0,,contentMDK:20970341~pagePK:148956~piPK:216618~theSitePK:337178,00.html [hereinafter Dynamics of Global Urban Expansion].
15. United Nations, Department of Economic and Social Affairs, World Urbanization Prospects, The 2011 Revision, *available at* http://esa.un.org/unpd/wup/CD-ROM/Urban-Rural-Population.htm.
16. *Id.* The United Nations (U.N.) estimates that, as of 2010, 51.7% of the population lived in urban areas, while by 2050, some 67.2% of the world population will be in urban areas.
17. *See* Dynamics of Global Urban Expansion at 1. Average worldwide density declines are estimated at an annual rate of 1.7%. If annual worldwide densities continue at this rate, the urban footprint worldwide would expand close to five times in the next 40 years from its 2000 baseline.
18. History provides more dismal facts: the only cities that have effectively contained themselves were either cities circumscribed by large landholders (the Cotswolds); contained within walls (Lucca); planned under *fiat* of monarchs (Hausmann's Paris, Fontanta's Rome); composed of homogenous cultures (the Netherlands, Denmark); or circumscribed by political (Hong Kong, Singapore) or geographic (Vancouver, San Francisco) circumstance that proscribed growth. Democratic, diverse societies with strong property rights regimes that make land use decisions at the local level and without any of the above characteristics fight an uphill battle in controlling the growth of the urban footprint. This is not to say it cannot, and should not, be tried, but only to acknowledge its difficulty.
19. For a detailed analysis of the urban environment's GHG emissions, see U.S. Environmental Protection Agency, *Global Emissions*, *available at* http://epa.gov/climatechange/ghgemissions/global.html.

density, but it does mean we move beyond efforts simply to contain growth of the urban footprint. For instance, California's approach to the transportation sector has been a "three-legged stool" of GHG emissions standards for new model vehicles; low-carbon fuel standards; and land use policies intended to reduce vehicle miles traveled.[20] As a second example, building standards must be changed to achieve two ends: reduce climate emissions from the operation of buildings; and adapt to a changing climate. To wit, Amory Lovins once famously grew a banana tree in a well-insulated hothouse in the middle of a Colorado winter with little heating.[21] Similarly, we can substantially reduce buildings' resource demands within the scope of existing technology: we must deploy it in this generation of buildings that will redefine human habitation.[22]

Law. Cities must be places people want to live. Great places are not built as a monolith but by empowering local communities in megapolitan regions to build communities in their images. In developed countries, this means advancing sub-local government structures, which I have called "legal neighborhoods,"[23] to service sub-local needs, while still using local government to address regional issues. In developing countries, it means advancing concepts such as Brazil's City Statute,[24] which, broadly speaking, seeks to bring its slum areas, or *favelas*, into civil society; seeks to bring both social and environmental justice to those communities; and allows those communities to participate in the fruits of cities' developments. Densely settled environments must become more than merely tolerable and more than a place for economic opportunity: they must become the places people would choose to live over all other choices. The legal and political tools must make this choice evident.

Narrative. Sustainability's narrative must move beyond its famous definition from the Brundtland Commission as "meet[ing] the needs of the present without compromising the ability of future generations to meet their own needs."[25] In the context of the exploding city, I propose a "dwelling ethic."[26] A dwelling ethic, as I see it, incorporates the "land ethic" approach of Aldo Leopold, which he stated "enlarges the boundaries of the community to include soils, waters, plants, and animals, or collectively: the land,"[27] with the teachings of Martin Heidegger that construction must be for "dwelling," or long-term inhabitance, not just "building," a consumerist approach to the physical environment.[28] To achieve Leopold's vision for the land in an age of exploding cities, we must decide to dwell, as Heidegger would say, as if we intended to stay put—in this house, on this planet—for some time to come. Such an ethic is of particular importance in this, humanity's most peripatetic age.

20. Mary D. Nichols, *California's Climate Change Program: Lessons for the Nation*, 27 UCLA J. Envtl. L. & Pol'y 185, 203-08 (2009).
21. *See* Rocky Mountain Institute, *Amory's Private Residence*, *available at* http://www.rmi.org/Amory's+Private+Residence.
22. *See, e.g.*, Stephen R. Miller, *Commercial Green Leasing in the Era of Climate Change: Balancing Risks, Burdens, and Incentives*, 40 ELR 10487 (May 2010).
23. *See* Stephen R. Miller, *Legal Neighborhoods*, 37 Harv. Envtl. L. Rev. (forthcoming), *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2013565.
24. *See, e.g.*, Cities Alliance, *The City Statute of Brazil: A Commentary*, *available at* http://www.citiesalliance.org/node/1947.
25. United Nations, Report of the World Commission on Environment and Development: Our Common Future 16, *available at* http://www.un-documents.net/wced-ocf.htm.
26. I am currently at work on an article exploring this concept, to be presented and submitted for publication within the next year.
27. Aldo Leopold, A Sand County Almanac 171 (Oxford Univ. Press 2001) (1949).
28. Martin Heidegger, *Building Dwelling Thinking*, *in* Poetry, Language, Thought 143-62 (Albert Hofstadter trans., Harper & Row 1971) (1959).
29. Millennium Ecosystem Assessment, Synthesis Report 2 (2010).
30. Peter M. Vitousek et al., *Human Domination of Earth's Ecosystems*, Sci. 277, 494-99 (1997); Will Steffen et al., *The Anthropocene: From Global Change to Planetary Stewardship*, 40 Ambio 739-61(2011).
31. Anthony D. Barnosky et al., *Approaching a State Shift in Earth's Biosphere*, 486 Nature 52 (2012).
32. Wolfgang Knorr, *Is the Airborne Fraction of Anthropogenic CO_2 Emissions Increasing?*, 36 Geophysical Res. Letters L21710 (2009).
33. Malte Meinshausen et al., *Greenhouse-Gas Emission Targets for Limiting Global Warming to 2° C*, 458 Nature 1158 (2009).

It's the Biosphere, Stupid

Patrick Parenteau, Senior Counsel to the Environmental and Natural Resources Law Clinic, and Professor of Law, Vermont Law School.

Let's be honest: there is nothing sustainable about the way humans are using the resources of the planet. By almost any measure, we are exceeding the earth's carrying capacity.[29] Human population, currently numbering seven billion and projected to hit nine billion by mid-century, coupled with a rapidly rising per capita consumption rate underlie all of the other present drivers of global change. Though humans make up less than one-half of one percent of the global biomass, we use up 25-32% of the earth's net primary productivity.[30] Humans have converted 43% of land to agricultural or urban landscapes, with much of the remaining natural landscape fragmented by roads and utilities. This exceeds the physical transformation that occurred at the last global-scale critical transition when 30% of the earth's surface went from being covered by glacial ice to being ice-free.[31] With extinction rates already 100 to 1,000 times background rates, and projected to increase dramatically in response to anthropogenic global warming, humans are literally altering the course of evolution.

Speaking of climate change, atmospheric concentrations of CO_2 have increased by 39% since the Industrial Revolution and, at approximately 400 ppm, are now the highest in 15 million years.[32] We are adding 2.2 ppm per year. At this rate, worldwide CO_2 levels will substantially exceed 1,000 ppm by the end of this century. The level of heating that would result from this degree of concentration would be beyond anything seen during any period in which earth supported complex life. To have even a 50-50 chance of holding temperature increases to the 2°C target agreed to in the Copenhagen Accord, atmospheric concentrations cannot exceed 1 trillion tons.[33] We are already halfway there, and the rate of increase is accelerating. To

limit emissions to 1 trillion tons, three-quarters of fossil fuels must be left in the ground as nations switch to renewable energy sources.

And rising temperatures with devastating extreme weather events aren't the only problem. The oceans, which have been soaking up a lot of the CO_2 and masking the full impacts of global warming, are more acidic than at any time in the past 300 million years.[34] Acidification can affect many marine organisms, but especially those that build their shells and skeletons from calcium carbonate, such as corals, oysters, clams, mussels, snails, and phytoplankton and zooplankton, the tiny plants and animals that form the base of the marine food web. Three of the five largest extinctions of the past 500 million years were associated with global warming and acidification of the oceans.

Nor is carbon the only threat to the oceans. According to the United Nations (U.N.) Food and Agriculture Organization (FAO), over 70% of the world's fish species are either fully exploited or depleted.[35] Further, nitrogen and phosphorous loadings from fertilizer runoff and fossil fuel combustion have created over 400 "dead zones" around the globe. More than 235,000 tons of food is lost each year to hypoxia in the Gulf of Mexico alone.[36] The oceans are in crisis.[37] We have only decades left before the damage we have inflicted on the oceans becomes permanent.

Without belaboring the obvious, the point is that sustainability is a physical concept grounded in science and bounded by the very real limits of the planet's life support systems. The danger is not that we will run out of oil or natural gas or other stuff, but that we will run out of the assimilative capacity of the biosphere and trigger a planetary-scale shift in biological systems. It won't be the end of the world, but it could well be the end of human civilization as we've known it.

The problem with thinking about sustainability as an economic concept is perfectly illustrated by the Norway-United Kingdom Energy Partnership for Sustainable Growth calling for accelerated oil and gas development in the increasingly ice-free Arctic. British Prime Minister David Cameron and his Norwegian counterpart Jens Stoltenberg called the deal a prime example of sustainable development that will ensure the drilling is done in a "safe and environmentally sensitive" manner; provide a "long term gas supply"; create "good jobs"; and generate income for "investment in renewable energy." The Arctic, of course, has just experienced a record loss of sea ice this past summer. "Sustainable" is not a word scientists would use to describe what is happening in the Arctic. Rather, words like "death spiral" and "global disaster" are closer to the mark. There is nothing sustainable about chasing every last molecule of fossil fuel on the planet. "All of the above" is not an energy policy; it's a bumper sticker.

It's the ninth inning, we're behind, there are two outs, and we're down 0-2 in the count. With his reelection, President Barack Obama has one last at bat. A home run would be a carbon tax sending a strong price signal to the market and an aggressive program of investment in clean energy based on a strong national Renewable Electricity Standard as part of a robust plan for economic recovery.[38]

Adaptive Management, Resiliency, and Why Sustainability Discussions Give Me a Headache

Jessica Owley, Associate Professor of Law, SUNY Buffalo Law School.

Climate change does not change our view of sustainability; it heightens the importance of sustainability thinking. The concept of sustainability is inextricably linked with ideas of planning and management. From an ecological standpoint, sustainability guides resource management—helping ensure that current use of a resource will not deplete the resource and that future generations (or even just future versions of us) will be able to use the resource as well.

Take the simple example of sustainable timber management. If we cut down all the trees today, we won't have any trees available for timber next year. If we harvest timber in a way that leaves the soil vulnerable, we'll make it even harder to have trees in the future. Therefore, when deciding how to manage the forest, we make a plan that involves cutting down only some of the trees. We look at water, soils, and nutrients to determine what actions will protect our ability to cut down more trees in the future. We consult scientists and economists and take ecological and social considerations into account. And then we realize that our simple sustainable forest example is not really so simple. To meet our goal of sustainable timber harvest, we must also adopt an approach that considers many factors *and* is open to change and adaptation as inputs change or our information about (and understanding of) the system grows.

Sustainable timber management offers a glimpse into the complexity of thinking broadly about sustainability, yet climate change makes sustainability analysis even harder. Keeping with our forest example, climate science tells us that we are likely to see even greater changes in water regimes, nutrient availability, and species richness. Things are going to get harder because our earlier predictions about the future were wrong. Things are going to get harder because our current understanding of the natural world is still wrong. Things are going to get harder because all of our natural and social systems will be facing increased stress.

34. Bärbel Hönisch et al., *The Geological Record of Ocean Acidification*, 335 Sci. 1551 (2012).
35. FAO Marine Resources Service, Fishery Resources Division, *Review of the State of the World Marine Fishery Resources*, FAO Fisheries Technical Paper. No. 457 (2005).
36. David Biello, *Oceanic Dead Zones Continue to Spread*, Sci. Am. (Aug. 15, 2008), http://www.scientificamerican.com/article.cfm?id=oceanic-dead-zones-spread (last visited Mar. 5, 2013).
37. *Oceans in Crisis*, 1:10 CQ Global Researcher (Oct. 2007).
38. Mark Muro & Jonathan Rothwell, *Institute a Modest Carbon Tax to Reduce Carbon Emissions, Finance Clean Energy Technology Development, Cut Taxes, and Reduce the Deficit*, Brookings Inst. (Nov. 2012).

Sustainability thinking necessarily involves both (1) thinking about the future and (2) taking an adaptive approach. Sustainability as a concept and approach means considering the future health of ecosystems and seeking to maintain functioning systems. If we seek to sustain anything, we must establish some projections of what the future conditions will be. We need to determine what prescriptions are needed. Climate science (along with many other fields) tells us that the world is a changing place and that the future is not always easy to predict.

Adaptability is what makes sustainability effective in an era of climate change. Mechanisms like adaptive management enable us to revisit policies and programs as circumstances change. A call for embedding ideas of adaptive management in our environmental laws is not new. Yet, we have only been minimally successful on that front. Much of law, especially laws regarding environmental protection and property, are static. Our methods of land conservation, for example, have focused on park-like protection where we set land aside for public ownership or protect it with conservation easements. We set static rules regarding the land, often adopting a hands-off approach and hope that will serve future needs. This means we sometimes get part one of the equation right—we think about the future. But we leave off part two. We don't create mechanisms to reexamine our rules or management strategies. In our changing world, we are too focused on fixed points.

Breaking free from current practices and norms is not an easy task. The ecological concept of resiliency, however, may help us approach environmental protection from a new direction. Resilience is the capacity of an ecosystem to respond to perturbation or change.[39] High resiliency is a function of both an ability to resist impacts and to recover quickly from disturbances. Importantly, a resilient system is not one that continues to look the same throughout the ages, but one that responds and reorganizes while retaining function.[40] Environmental protection should not be an effort to retain ecosystems and amenities in their current state, but should promote resiliency. Healthy functioning systems are not wedded to a specific external appearance. Working toward resiliency means assessing what the thresholds of a system are and how close we are to those thresholds. Thinking of adaptation in resiliency terms goes beyond assessing whether humans will be able to respond to the coming climatic changes and considers our capacity to manage resistance and influence resilience. This shift toward resiliency thinking is a fundamental component in updating our principles of sustainability in an era of climate change.

39. Crawford S. Holling, *Resilience and Stability of Ecological Systems*, 4 Ann. Rev. Ecological Sys. 1 (1973).
40. Brian Walker et al., *Resilience, Adaptability and Transformability in Social-Ecological Systems*, 9 Ecology & Soc'y, Issue 2, Art. 5 (2004), *available at* www.ecologyandsociety.org/vol9/iss2/art5.

Social Equity and Environmental Policy

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Most contemporary definitions of sustainability incorporate key principles from the 1987 Brundtland Report by the World Commission on Environment and Development. In addition to the notion that sustainability necessarily involves a commitment to intergenerational equity, the Brundtland Report emphasizes the interdependence of environmental quality, social equity, and economic policies. International documents since the Brundtland Report have also linked income inequality and environmental degradation.[41] For example, economic policies designed to mitigate poverty by increasing the production of goods may result in the overuse of natural resources, leading to an eventual decline in both natural resources and income levels.[42] Today, examples of this relationship appear in the climate change context. For instance, as the climate changes, some populations are forced to use ecologically fragile land for agricultural purposes. The decline in land quality further contributes to income inequality, and the agricultural practices further degrade the land.

This link between poverty and the environment may *sometimes* be empirically accurate, but it may not be true in all cases. For example, it may be the case that people with fewer economic resources tend to conserve the resources they have; they may be better at using less and recycling the waste they generate.

If, however, we assume that this link is empirically true often enough—or that environmental policies simply *should* incorporate concerns of social equity—then the next question is *how* governments at every level should understand the relationship between income inequality and the environment for purposes of policymaking. Even if we assume that the physical sustainability of the environment is a condition for social equity (or vice versa), we still need to define what social equity is in order to design policies that further it. In doing so, we necessarily identify who we think the winners and losers of environmental policies should be.

So, what exactly is social equity and what does it require in the context of environmental policymaking? In the United States, the environmental justice movement has long stressed that social equity requires the fair distribution of environmental benefits and burdens, an approach now reflected in U.S. law and policy.[43] The idea that social

41. *See, e.g.*, *The Future We Want*, *in* U.N. Conference on Sustainable Development, Rio de Janiero, Brazil, June 20-22, 2012, Report §1.A., *available at* http://www.uncsd2012.org/content/documents/814UNCSD%20Report%20final%20revs.pdf; Johannesburg Declaration on Sustainable Development, World Summit on Sustainable Development, Johannesburg, South Africa, Aug. 26-Sept. 4, 2002, *available at* http://www.un-documents.net/jburgdec.htm.
42. *See* U.N. Conference on Environment and Development, Rio de Janeiro, Brazil, June 3-14, 1992, Agenda 21, §I.3, *available at* http://www.un-documents.net/agenda21.htm.
43. *See, e.g.*, Exec. Order No. 12898, 59 Fed. Reg. 7630 (Feb. 11, 1994).

equity necessarily involves the distribution of something is relatively straightforward, but the idea of *fairness* is less clear. How, for example, can environmental policies fairly distribute carbon emissions worldwide?

Resolution of this question requires a distributive rule that reflects a normative principle of equality. Theories of social justice supply various options. In the international context, policymakers could decide to allocate emissions equally, granting governments a per capita share. Or, policymakers could adopt a prioritarian rule that would grant the least advantaged societies a greater share than they would receive on a per capita basis to ensure that the economic losses incurred by these societies are relatively less than those incurred by more well-off societies. Another possibility is to ensure that all societies are guaranteed a level of emissions that will continue to meet their basic needs, however defined.

Deciding what social equity requires raises other questions as well. Some questions help identify how far considerations of equity extend. For example, should policymakers consider the effects of climate change on both humans and nonhuman animals? Should they consider the effects on those outside their political borders? What about the consequences for future generations? Other questions involve the nature of the decisionmaking process. Should policymakers attempt to create a fair process for environmental decisionmaking or simply attempt to reach fair results? In other words, do we evaluate the fairness of a particular decision by looking at how it was made (e.g., by evaluating levels of citizen participation and governmental transparency) or by assessing the consequences of the policy (e.g., by evaluating actual impacts to the environment and income inequality)?

Current definitions of sustainability address a few of these questions. As noted above, definitions of sustainability require consideration of a policy's effect on future generations. In emphasizing the need to reduce poverty while protecting the environment, these definitions also appear to be consequentialist, or result-oriented—although proponents of environmental justice certainly recognize the need to incorporate democratic values into decisionmaking processes. The apparent resolution of these questions highlights an important tension in environmental policymaking, particularly in democratic societies.[44] Liberal theories of justice often emphasize the importance of fair decisionmaking processes, rather than fair results, and resist adopting a particular conception of the good. On the other hand, definitions of sustainability contemplate results that are fair both in the present and in the future, and they appear to adopt a vision of the good that connects human welfare to environmental conditions.

Questions of social justice do not have easy answers, but we cannot ignore them. The international community apparently accepts the idea that social equity should be part of environmental decisionmaking. To make this a reality, we need to focus on how this can and should be done.

44. *See* Andrew Dobson, Justice and the Environment: Conceptions of Environmental Sustainability and Dimensions of Social Justice 202-03 (1998).

Climate Sustainability Through Ethics, Economics, and Environmental Coordination

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Sustainability can become more than the sum of its parts by transcending its literal meaning to become the synergistic trampoline for ethical, economic, and environmental resilience and coherence. From sustainability of forests and fish stocks to sustainability of future generations and a call for fusion of ethical, economic, and environmental understandings, complex systems are increasingly challenging humanity to adapt both language and governance. It makes little sense to speak of literal sustainable extraction of ancient water from aquifers nor of fossil fuels. The diplomacy that emerged from Rio in 1992 sought to bind a mindfulness of ecological carrying capacity with equitable use of resources to alleviate poverty. To date, both environmental and development communities find sustainable development lacking. Yet, time is running out to rename policy approaches without genuine follow-through in the form of environmental and human security. The international community has the capacity to embrace sustainability as an overarching framework for coordinated ethical, economic, and environmental decisionmaking. It is not the only means by which to proceed, but represents one plausible response to increasingly disconnected fields that impact one another. A sensible first step down this coherence path is to recognize good governance as crucial to achieving sustainability and climate cooperation.

How do we calibrate efforts to build a sustainability arc that can enhance human and environmental integrity? High-level forums for inclusive meaningful dialog can enhance network creation and expansion into new public-private, local-regional-international, and a myriad of interdisciplinary patterns of cooperation. Complex adaptive systems and good governance principles can inform decisionmaking that results in rule of law enhancing predictable, efficient, and fair outcomes. The rule of law depends upon accessible, independent, and efficient decisionmaking. None of these processes is rapid or inexpensive. Yet, they can be rightly called investments and folded into respected economic climate-energy-water recommendations when decisionmakers use sensibly long-term time horizons for efficiency analysis and recognize the value of equity, ecosystems, and other important yet not easily measured public and private goods.

As Dan Taylor has noted, "the answer still is Gandhi's. We know more clearly the processes for how to move toward his vision that improving people's wellbeing is grounded in their mobilization, and that vision can be

summed up as: begin simply, be true to process, the means are the ends, grow capacity in the partnership."[45] Sharing best practices from human rights and environmental law may provide a synergistic catalyst for ethics, economic, and environmental coherence.

International human rights law offers a robust justice framework with which to address climate change. Applying human rights thresholds to climate change may catalyze sustainability cooperation. Decisions informed by an understanding of climate justice can bring together dialogue from development, human rights, environment, trade, and business communities. Energy-food-climate security can be discussed as the interwoven crisis that threatens humanity, rather than as unrelated dilemmas. What appear to be fragmented trade, environment, and human rights regimes can be sustainability framework building blocks.

Challenges to transitioning to greater efficiency and renewable energy use include the degree to which fossil fuel is embedded in the economy and the degree to which pricing carbon is a prerequisite for substantial private-sector investment in environmentally sound innovation and participation in diffusion. A good starting point would be for trade and environment regimes to set clear criteria for what constitutes environmentally sound innovation based upon ongoing life-cycle analysis that is mindful of science and equity. Network coordination can facilitate breakthroughs in trade and environment relations and build upon best practices.

With a background in economics, human rights, and environmental law, I have participated in the drafting process for the U.N. Framework Convention on Climate Change (UNFCCC), Agenda 21, and the Rio Declaration. More recently, I was a member of U.N., intergovernmental organization (IGO), and nongovernmental organization (NGO) delegations to the climate negotiations. It is my understanding that substantive life-cycle analysis, procedural capacity-building, and cultural sensitivity remain open issues. Bringing together a wide range of perspectives in a catalytic manner can converge insights that resonate. A collage of narratives from ecology, ethics, economics, and environmental law may be able to galvanize collective action—with or without a single shared sustainability vision.

Individuals have gained subject status at international law, and civil society voices are not only being heard, but responded to. The quiet desperation of humanity that Henry David Thoreau spoke of has become a powerful force—potentially capable of incentivizing climate coordination. Irrespective of the rhetoric with which we converse, we need to figure out how to come together as a global community that feels its collective loss enough to cooperate (both quickly and effectively) to achieve a sustainability arc that enhances ethical, economic, and environmental cooperation.

45. Daniel C. Taylor et al., Empowerment on an Unstable Planet: From Seeds of Human Energy to a Scale of Global Change (2012).

What Does Sustainability Mean in the Age of Climate Disruption?

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Sustainable development traditionally demands that we meet future generations' needs without sacrificing the current generation's needs. Since climate disruption already promises to compromise both current and future generations' needs, climate disruption demands a refinement of our understanding of sustainable development. I would suggest that sustainable development demands approximating this ideal of meeting current and future generations' needs as best we can, by minimizing damage to our attempt to meet the basic needs of both future and current generations. Concretely, this requires a transition to a zero-fossil-fuel economy as quickly as we can, while generating (probably through a carbon tax or sale of allowances) sufficient revenue to fund adaptation both here and in developing countries that will bear the most serious consequences. A fossil-fuel economy is not sustainable, because the resources it relies upon are not renewable and because CO_2 harms this generation and threatens to destroy future generations. Herman Daly's definition of sustainability as demanding harvesting of renewable resources that do not exceed the rates at which these resources replace themselves probably needs revision in light of climate disruption. For resources that we need as carbon sinks or that are already dangerously depleted, we may need to embrace growth in the resource (when possible), rather than a steady state.

In the United States, the political constraints on moving toward zero fossil fuels appear so formidable that it's hard to think about a key question this leads to: What does sustainability teach us about managing the costs of a transition to zero fossil fuels? But it's a philosophically important question and will become practically important even in this country if the politics change significantly. First, the concept of sustainable development rules out delaying a transition to zero fossil fuels because of undifferentiated concerns about costs. For that reason, cost-benefit analysis does not help much in analyzing a policy's sustainability. Sustainability concerns itself with meeting people's *basic needs*, however we define that, and embraces sustaining quite significant decreases in surplus wealth if necessary to meet the basic needs of future generations (or this one). At the same time, sustainable development requires some attention to easing transitional impacts on low-income people and to ameliorating impacts associated with dislocating workers in the fossil-fuel industry, even if the green economy generates more jobs than we lose.

My own work has focused primarily on the problem of operationalizing sustainability (or something like it) when crafting pollution control policies and other policies affecting development (e.g., financial regulation).[46]

46. *See* David M. Driesen, The Economic Dynamics of Law (Cambridge Univ. Press 2012); David M. Driesen, *Sustainable Development and Market*

Sustainability demands changes in the focus, goals, and methods we bring to bear on almost all areas of law. It requires a focus on the shape of change over time, rather than near-term costs and benefits. It suggests a goal of avoiding systemic risk, not achieving efficiency at the margin. And it invites an analysis of economic incentives that aims at efficacy in avoiding systemic risk, by asking how government actions will influence the actions of boundedly rational institutions and individuals responding to incomplete information.

The principal advantage of this elaboration involves its ability to address directly the pathologies emanating from neoclassical law and economics and to make the sustainability concept meaningful in other areas of law that influence development. One might argue that the deregulation of the financial industry advanced sustainable development, as it precipitated a rapid decline in carbon emissions as the economy collapsed. I would reject that conclusion on the grounds that it harms our efforts to meet current basic needs. We need to maintain basic social as well as environmental systems even as we drastically change the economy's material basis and financial structure, as the goal of avoiding systemic risks implies. The economic-dynamic concept described above (and elaborated in more detail in *The Economic Dynamics of Law*) captures the change in thinking about how government operates that we will need to move us toward sustainability in the era of climate disruption.

Sustainability Is the Answer—Now What Was the Question?

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On September 16, 2012, the National Ice and Snow Center announced a record-breaking loss of Arctic sea ice.[47] That day also happened to be my 47th birthday. In my relatively short life, the Arctic has changed beyond imagination—and more change is coming. We have a growing litany of climate ills—wildfires, heat-waves, droughts, floods—each perhaps not directly attributable to climate change, but collectively harbingers of the emerging Anthropocene. Yet, rather than prompting any urgent response, each new climate disaster leaves us, in the words of Bill McKibben, "in the same position we've been in for a quarter-century: scientific warning followed by political inaction."[48] The explanations for our impotence in the face of overwhelming evidence that human activities are destroying the very fabric of life on earth tend to focus on economics—too many powerful actors are making too much money from business as usual and therefore use their power to prevent change.

Without really challenging this basic outline, this essay suggests that this power-based narrative is incomplete. It leaves out the role that law and legal systems play in obscuring this power dynamic. The system by which we structure our decisions in a democratic society—the rule of law itself—actually prevents us from perceiving or confronting this more fundamental power conflict.

It is all too easy to dismiss sustainability as a contentless marketing label lost in a fog of meaningless verbiage. The marketplace of "sustainable" practices, technologies, and gadgets contains far too many gimmicks intended to maintain the cherished illusion that sustainability will just somehow "happen." As a marketing ploy, sustainability encapsulates our fantasy of a sudden technological breakthrough that will allow 7 billion, or 10 billion, humans to live the typical American consumption-based lifestyle, only without destroying the earth in the process. This belief that an external, game-changing solution will save the day is a dangerous fiction. There can be no sustainability when we start with the existing economy and then try to graft change onto its margins. If we needed proof that this approach has failed, is failing, and will continue to fail, we need look no further than the rate of melting sea ice—which continues to accelerate despite decades of high-level international climate negotiations.

If we heed climate change's call, we might begin to rethink sustainability—to take seriously its mandate to maintain, support, and hold. If so, sustainability can offer us a set of organizing principles by which to restructure the core, yet largely invisible, functions of production and transportation that precede the consumption on which so much current sustainability rhetoric focuses. To change these less visible aspects of society, we need to mobilize the power of the law as a framing institution. We can, if we choose, arrange our infrastructure and define our markets to cause sustainable outcomes. Embracing sustainability as our primary framing narrative would create space for new thinking about the ways to balance the power of the state, the market, and civil society.

Getting from here to there may be daunting, and sustainability may seem a slender reed on which to pin our hopes. Yet, the fundamental choices about balance that are sustainability's essential feature have the capacity to offer us a new vision of the basic social contract—one that could transform human life on planet earth. To make that happen, we do not need perfect conceptual clarity about sustainability—core indeterminacy is, after all, a definitional part of post-modern existence. Instead, we need to embrace sustainability's potential for multiple, independent generation of ideas. A range of social, cultural, and political forces seek to frame sustainability through multiple disciplinary lenses. Each frame offers a different conception of the problem and its component parts. From this base, each approach proposes an alternative array of

Liberalism's Shotgun Wedding: Emissions Trading Under the Kyoto Protocol, 84 IND. L.J. 1 (2008); DAVID M. DRIESEN, THE ECONOMIC DYNAMICS OF ENVIRONMENTAL LAW (2003).

47. National Snow and Ice Data Center, *Arctic Sea Ice Extent Settles at Record Seasonal Minimum* (Sept. 19, 2012), http://nsidc.org/arcticseaicenews/ (last visited Mar. 6, 2013).

48. Bill McKibben, *Global Warming's Terrifying New Math*, ROLLING STONE (July 19, 2012), http://www.rollingstone.com/politics/news/global-warmings-terrifying-new-math-20120719#ixzz21AzDsP6F (last visited Mar. 6, 2013).

solutions along with the tools by which those solutions might be implemented.

This contest between alternative frames for sustainability has both declarative and constitutive significance. Framing does more than shape how we analyze the sustainability of any particular choice—which variables must be assessed, weighted, and evaluated; and which can safely be ignored. Framing also shapes the process by which we define what constitutes a choice (or a variable) in the first place. Once we acknowledge that framing matters—that disciplines have blind spots and path dependencies—it becomes clear that the very articulation of sustainability is itself a consequence of inevitable disciplinary limitations.[49]

This insight is as liberating as it is daunting. It means that by posing our questions differently we might begin the process of uncovering hidden possibilities, thereby paving the way for a new understanding of the sustainability challenge and opening space for new responses. Perhaps, a good beginning would be to shift from a conception of "the environment" to "Mother Earth"—which might help us rediscover a deeper, more profound relationship with the world we are rapidly recreating than the consumption-focused conception that currently predominates.

The future of our children, our species, and our planet hinges in the balance. The window for change is narrow—and closing. Unless we transition away from our consumptive, single-use society into a sustainable one, we will doom our children (as well as our future selves) to life in an increasingly impoverished, depleted, and inhospitable planet.

Sustainability as Process: Seeing Climate Change Opportunities in Sustainability Approaches

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Much has been said about the elusive nature of the term, "sustainability." Some argue that the term is rudderless in the absence of some acceptable matrix for measuring success. This claim makes sense where we demand accountability in governmental decisionmaking. Some argue the term is inconsistent in different contexts or at different scales. This claim identifies inconsistencies in all sustainability programs that operate at or are justified in different scales (as they all do and all are). Others continue to believe the term invokes a liberal political agenda. Although the arguments supporting this claim are less apparent, there certainly has been an association between liberal democratic politics and the types of social and economic changes suggested by sustainability.

My sense is that most of the above discussions are irrelevant. Sustainability implies (at the very least) a more rigorous pursuit of equity as a matter of governance, a more honest incorporation of economics into environmental quality considerations, and a more effective regulation of the interaction between the natural and built environments. This basic definition is more functional than its critics allow, but only if we approach the application of the sustainability framework with a little light-heartedness on our demands for substance and certainty. Indeed, we might consider whether sustainability is (or has ever been) so substance-driven (and in the meantime, we might reconsider whether we have any actual needs for such certainty). We might productively think of sustainability as a lesson in process. For instance, if we define "governance" as protection against systemic and catastrophic risks, sustainable governance involves the process of identifying known and unknown risks to our social, economic, and environmental dependencies and in formulating solutions to address each of these three legs of sustainability. Process here involves pluralism that is not necessarily democratic, precaution that is not necessarily presumptive, and flexibility that is not necessarily unprincipled. Another way of articulating the "process" point of sustainability is that we are all pragmatists when it comes to sustainable governance.

The present struggle over climate circumstances presents an illustration of this type of process-oriented thinking. On the one hand, climate change presents a context in which sustainability is unquestionably challenged. Climate change has dominated politics, science, conservation planning, and even education. Of course, it is easy to see that climate change provides talking points, models, and mandates in each of these areas because of its reluctance to conform to past models of equity, economics, and environment (not to mention morality, metaphysics, and ontology). It is also easy to recognize that the depth and range of climate change impacts will uproot human livelihood and well-being in unimaginable ways. Water and food scarcity, loss of soil productivity and biodiversity, and uncontrollable spread of disease are common climate change consequences. In the context of runaway climate change, it is arguable that the long-term, future-generation vision represented by sustainability is impractical to pursue and impossible to implement. Shifting baselines resulting from climate shifts challenge our present ability to match future needs with future environmental circumstances, thereby making it difficult to chart a course today. Island cultures will be lost to rising seas, and the Stern Report predicts the largest market failure we have ever seen. In this context, the salient but complex question on the usefulness of sustainability might be, "what are we trying to sustain?"

Yet, applying sustainability to the challenges of climate change adds a process for understanding the character of the challenge without being subsumed by the breadth or rhetorical commitments of any particular principle. Sustainability is a framework for thinking and is not illustrated by facts so much as by goals. Sustainability demands that each decision reflect good governance on economic, environmental, and equity—regardless of whether we face the threats of climate change or the circumstances of cli-

49. Hermann Kantorowicz, *The Battle for Legal Science,* 12 GERMAN L.J. 2005 (2011) (trans. Cory Merrill).

mate stabilization. In the meantime, sustainability helps us understand the dynamics of human interactions with nature, human dependencies on ecosystem services, and social and cultural adaptations to environmental circumstances. Sustainability provides a framework for understanding why funding choices, human capital, cultural bias, and economic tensions become important in the context of particular challenges—like climate change—and a process for making good governance decisions.

Climate Change Means the Death of Sustainability

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Climate change requires that we replace goals of sustainability with something else, at least for any policy goal more concrete and specific than leaving a functional planet to the next generations. Sustainability is by definition the ability to sustain *something*: the verb needs an object, and the goal of sustainability needs a particular focus or foci—an ecosystem, a socioecological system, extant biological diversity, economic growth, development, human health—but *something*. To talk about sustainability in the abstract is to philosophize, not to pursue meaningful policies and laws.

Climate change, however, is a game-changer. And, from a sustainability perspective (among others), we have absolutely no idea how to play this new game, even though we (accidentally) invented it.

But before we go too far down that road, let's start with some basics. First, all human well-being—oxygen to breathe, food to eat, habitable environments, fuel, health, economic and cultural development—ultimately depends on the physical, chemical, and biological processes proceeding at multiple physical and temporal scales throughout earth, including its atmosphere and oceans. Second, climate change is already changing most of the important components of those processes: the temperature of the atmosphere, of regions of the oceans, of land, and of various freshwater bodies; atmospheric and oceanic currents; the chemical composition of the atmosphere; the chemical composition of regions of the oceans; the relative humidity in various regions; precipitation patterns throughout the world; the habitability of particular ecosystems by particular species; natural checks on pest species through temperature and other seasonal changes; and the productivity of various landscapes. Third, these processes are proceeding, and interact with each other, in complex and unpredictable ways, stymieing (or at least limiting) human ability to predict future states of being. Fourth, even if all GHG emissions ended tomorrow (which will *not* be the case), CO_2 in particular takes a long time to cycle back out of the atmosphere. As a result, humans are stuck with change-inducing CO_2 levels in the atmosphere for a while—almost certainly at least a couple of centuries, and probably much longer, especially if climate change mitigation efforts remain half-hearted.

As a result, the bases of human life, health, society, culture, and economics are all changing and almost certainly will continue to change—again, in complex and often unpredictable ways—for the foreseeable (and unforeseeable) future. Climate change impacts will, almost certainly, be a fact of human existence for longer into the future than the United States has been a country into the past; indeed, under current scientific predictions, humans will likely be dealing with climate change for longer than they've already been dealing with the European colonization of the New Worlds.

So, back to the main point: When the only constant in life is continual socioecological change, sustainability is a practically meaningless concept. You can't sustain an ecosystem if the fundamental features of that ecosystem are constantly changing. You can't sustain a socioecological system if its foundations are radically different than they were 20 years ago and will be radically different again 20 years from now. You can't sustain a particular economy if the bases of that economy are disappearing. You can't sustain cultural integrity if the society's members are rapidly becoming climate change refugees, or if the traditional ecological components of that culture have transformed into something else.

And that's all before we fully consider the darkest of climate change's many dark sides. At least three of the four horsemen of the Apocalypse—War, Famine, and Death—are likely to be riding tall and strong through the climate change era, and we shouldn't discount the fourth, even if you name him Conquest rather than Pestilence (Pestilence, of course, will be present in force). All of these, moreover, are likely to be joined by a younger sibling, Thirst, who may just turn out to be the most insidious of the lot. In places where these horsemen ride in force, it's not hard to conclude that anything approaching sustainability will be a distant dream; instead, avoiding absolute chaos and permanent destruction will be the goal *de jour*.

This is an admittedly dark vision of what climate change means for at least some parts of the world. That does not, however, mean that it's an inaccurate vision. Moreover, even in the lucky places and for the lucky people destined to be climate change winners, changing conditions will be a continuous reality—indeed, for some, it will be precisely the fact of changing conditions that makes them climate change winners. In those places, sustainability will be both impossible *and* undesirable.

Finally, it's important to remember that we were never very good at sustainability to begin with. For example, since the world officially adopted sustainable development as a goal at the 1992 U.N. Conference on Environment and Development (the Rio de Janeiro Earth Summit), human consumption of resources has only increased, with no signs of stopping.

So, what *should* we pursue, if not sustainability? *Adaptability*, for one—that is, the ability to change (foods, jobs, health regimes, industries, etc.) in response to, and preferably in tandem with, climate change impacts. Nostalgic conservatism will be, sometimes literally, a dead end. *Resilience*, for two—that is, the ability to absorb change without losing overall functionality, such as food production, water supply and sanitation, law and order, individual and cultural self-expression. Moreover, while resilience theory grew primarily out of ecological science, the concept needs to apply to other socioecological system components besides the environment, from economic resilience at the macro scale to social and cultural resilience at the more local scale to psychological resilience at the individual scale. As Charles Darwin emphasized: "It's not the strongest of the species that survives, nor the most intelligent, but the one most responsive to change."

What Are We Sustaining, Exactly?

Sarah Krakoff, Professor and Wolf-Nichol Fellow, University of Colorado Law School.

From top to bottom, climate change has altered the earth's systems in ways that render impossible a static notion of sustainability. The idea of fixed natural baselines, contested to begin with, today is nearly quixotic. The many losses accompanying this state of affairs include the homelands of small island nations, Native Alaskan villages, and flood-prone communities throughout the world. They also include untold numbers of species, large and small. For many communities, the shocks and adjustments will be ongoing. The challenge for all will be to reconfigure economies and cultures that have been structured around an anachronism—what used to be the local climate.

This may seem like a terrible time to cast a critical eye on the past of the American environmental movement. Instead of looking at its flaws, we might be drawn to glossing over problems in order to unify support for strong climate change mitigation and adaptation policies. Yet, glossing over might prove counterproductive. The inescapably damaged state of the world we are trying to preserve provides an opportunity to escape from narratives that have divided communities over environmental policies. Those narratives include saving the environment from people and preserving pristine places from contamination.

Let's explore those narratives in two places. Aspen, Colorado, is a former mining town reborn as a luxury ski resort. Efforts to preserve the wilderness and other natural resources of the surrounding mountains have coincided with pricing Aspen out of any reasonable housing market and creating a distant commuter class of service workers, composed mostly of Latino immigrants. The two phenomena do not have to coincide. The conversion from a boom-and-bust extractive industry economy to an amenity- and service-based economy can be managed in ways that produce equitable distributions of environmental and social benefits. But often it is not. The path to easy money for developers is the path of environmental privilege. Wealthy people come for real estate or experiences near beautiful and sparsely populated public lands, and then structure a service economy around the protection of their privileges. (To be clear, I do not mean to say that individual wealthy people do this intentionally; the logic of this type of development is naturalized in a way that makes it invisible to many well-intentioned people.) This often includes, as it has in Aspen, externalizing a range of costs and impacts to outlying communities. Service workers must commute by car from distant places. The towns where they live, which have lower tax bases than Aspen, provide the schools and other services to Aspen's working class. In short, Aspen is a place of environmental and class extremism, where the very wealthy enjoy the best that the Rocky Mountains can offer in terms of scenery and access to wilderness and other outdoor activities, and low-income workers live in distant communities, drive hours to and from their jobs, and barely have time to notice that the supposedly transformative experience of pristine nature surrounds them.

Black Mesa, Arizona, is a high desert plateau, most of which is on the Navajo Nation, but portions of which comprise the Hopi Tribe's land. The Navajo and Hopi people of Black Mesa are among the more traditional Native communities in the country in terms of maintaining their ancestral lands as well as the religions and cultures tied to those places. The community is not a monolith, but it is fair to say that most of the Navajo and Hopi people who live there have strong interests in ensuring that their water (from underground pristine aquifers), their land, and their air can sustain many future generations who will perpetuate Navajo and Hopi life ways. The threats to their ability to ensure that future come from two main sources: the strip mining of coal on Black Mesa (and the accompanying pumping of groundwater from the aquifers to mine and transport the coal), and the pollution from the several coal-fired power plants that surround the Navajo Nation, including the Navajo Generating Station, which receives all of its coal from Black Mesa. None of the electricity generated at the Navajo Generating Station supplies power to people on the Navajo or Hopi reservations. Instead, the power is used by the Salt River Project, Los Angeles Water & Power, Nevada Energy, Arizona Public Service Co., Tucson Electric Power, and the U.S. Bureau of Reclamation. The beneficiaries of coal mining, aquifer pumping, and emissions from the coal-fired power plant are therefore corporations and people in the distant cities of Los Angeles, Las Vegas, Phoenix, and Tucson. The recipients of all of the environmental burdens are the Navajo and Hopi people, whose land, resources, and water serve as raw material to develop these faraway places.

Contemporary environmental laws, in place since the early 1970s, have done tremendous good, but have done little to curb the extreme inequities in the distribution of environmental burdens and benefits exemplified in

these two very different places. In Aspen, the narrative of keeping people out of pristine places is at play. On Black Mesa, the narrative at work is one that separates the plight of subordinated people from the structural forces that harm our environment. The buildup of Los Angeles and Phoenix surely seemed foregone, inevitable, and right to those involved in it. But what thought was given to the Native communities on whose backs those cities were built? Their lands were seen as nothing but the disposable raw material from which to build something better.

As we move forward, post-climate change, with only a murky comprehension of how best to preserve remnants of the faultless nonhuman world, perhaps we can reconsider how to weave human communities and their just demands for equitable treatment into the picture. Otherwise, we may lean toward sustaining only nonhuman nature, and that will inevitably also benefit only certain classes and strata of humanity. We might unwittingly be sustaining a very hierarchical and increasingly rigid system of doling out environmental privileges and harms. If this is a moment of reconsideration, my vote is to construct a competing narrative of environmentalism, one that has a vision of vibrant, equitable, just, and diverse communities of humans and nonhumans as its end.

The Story With Sustainability

Michael Burger, Associate Professor of Law, Roger Williams University School of Law.

Sustainability is the most influential environmental idea of the last 30 years. Yet, what sustainability is, what it looks like, is hard to define. One can read through all 50 pages of "The Future We Want," the outcome document from last summer's Rio+20 conference, and still not know what, exactly, the term means. I suggest that we can more completely understand sustainability if we recognize it is not only an idea or a policy goal, but also a particular kind of environmental story: the pastoral utopia. And we can understand what sustainability means in the age of climate change if we recognize that this utopian vision has come into conflict with a competing story: the environmental apocalypse.

The differences between sustainability and climate change, utopia and apocalypse, are stark. Sustainability promises that humanity—operating on scales from global civilization to local enclaves—can achieve simultaneous economic development, environmental protection, and social equity, a kind of holistic harmony that requires hard labor but no sacrifice. Climate change, in contrast, reveals that existing patterns of economic development have led to massive environmental disruption and potentially gross inequities that fundamentally threaten the world as we know it. Sustainability focuses on humanity's technical ingenuity and imaginative potential. Climate change focuses on crisis and catastrophe. Sustainability promises we can thrive. Climate change demands we figure out how we can survive. Sustainability is a comedy, showing us how despite and because of our foibles we can overcome serious obstacles to find a new, happy equilibrium. Climate change is an epic drama, pitching forces of good against evil, creation versus destruction, and calling on heroes to aid in the fight.

Accepting, as I do, that climate change poses a real crisis, the question arises: How does sustainability figure into contemporary environmental discourse? Here, I propose three possible answers:

Sustainability Is Bad: Sustainability emerged as an inclusionary, reform-oriented storyline, promoted by and within the context of institutional actors like the U.N. Environment Program, the Organization for Economic Cooperation and Development, the World Bank, the environmental sciences community, and the highly professionalized environmental NGOs. Serious problems have emerged from these origins. Most importantly, sustainability has failed (and was designed to fail) to compel the radical transformation at the core of the countercultural social movement that invented modern environmental politics. Rather than inspire changes in the way we live necessary to actually redress the environmental crisis, the sustainability story brackets big-ticket items like capitalism and consumerism, reifies existing actors and hierarchies, and affirms basic patterns of social organization, production, and consumption. In short, it is a deceptive story that perpetuates existing power dynamics that are in many respects the causes of climate change.

Sustainability Is Mostly Harmless: Sustainability's utopian vision has had little impact on actual decisionmaking, yet nonetheless represents a maturation of environmental discourse, rather than a selling-out of environmentalist ideals. Perhaps, it overrelies on the capacity of markets and market actors to find solutions to problems made by the demands of markets and market actors, and perhaps it has become something of a placebo, a green Band-Aid on a life-threatening wound, but it has the benefit of providing a powerful ideal and an aspirational goal that, if honestly adhered to and pursued, could substantially improve our world. Sustainability has always sought to reframe humanity's role, placing the reconciliation of environmental management and economic growth at the center of our own story. Arguably, there is sufficient evidence that with enough technological savvy, political commitment, and hard work, a sustainable ecology and economy can coexist.

Sustainability Is Good: Sustainability is a vital and necessary story for achieving real improvements in our overall environmental and social health. However, it has become subsidiary to the twin challenges of climate change mitigation and adaptation, and now must complement these less-inspiring storylines—mitigation is irredeemably technocratic, adaptation is potentially paralyzing—by offering a positive vision for environmental change. Sustainability's narrative and rhetorical force should be

harnessed not to promote sustainable development, but to motivate us to innovate for greater energy efficiency, to transition to a renewable energy economy, to reduce and alter consumption habits, to move roads and fortify infrastructure to account for sea-level rise, to translocate populations of humans, animals, and plants from places that are no longer habitable, or even existent, and to take on the myriad other demands of climate change mitigation and adaptation.

Can the conflicting stories of sustainability and climate change be reconciled, without surrendering something essential about one or the other? Can we have both comedy and epic drama at the same time? And how do these stories interact with the law? Neither sustainability law nor climate change law is, at this point, well-settled; both are in relatively early stages of development. As legislation, regulation, and litigation in these areas proceed, it will be worth keeping tabs on the narrative pitch.