The Center for Global Energy, International Arbitration and Environmental Law
The University of Texas School of Law

Research Paper No. 2014-06
September 2014

"Imagining Corporate Sustainability as a Public Good Rather than a Corporate Bad"

Wendy E. Wagner

ENERGY CENTER
The Center for **Global Energy, International Arbitration** and **Environmental Law**
THE UNIVERSITY OF TEXAS SCHOOL OF LAW

IMAGINING CORPORATE SUSTAINABILITY AS A PUBLIC GOOD RATHER THAN A CORPORATE BAD

Wendy E. Wagner∗

INTRODUCTION

Corporations have been criticized for their environmental misdeeds for over a century,[1] so it is not surprising that many view corporate approaches to sustainability with skepticism.[2] Reports of green-washing and other forms of misleading advertising by a handful of corporations only serve to reinforce this negative perception.[3]

∗ Joe A. Worsham Centennial Professor, University of Texas School of Law. Many thanks to Gabriel Markoff for his able research assistance and to the students and faculty at the *Wake Forest Law Review* Symposium for their helpful comments on an earlier draft. Contact: WWagner@law.utexas.edu.

1. *See, e.g.*, MORTON MINTZ, AT ANY COST: CORPORATE GREED, WOMEN, AND THE DALKON SHIELD (1985) (describing A.H. Robins Company's decisions to market dangerous products and to suppress research indicating that the products could kill users); PAUL BRODEUR, OUTRAGEOUS MISCONDUCT: THE ASBESTOS INDUSTRY ON TRIAL (1985) (describing similar issues in the asbestos industry); DEVRA DAVIS, WHEN SMOKE RAN LIKE WATER: TALES OF ENVIRONMENTAL DECEPTION AND THE BATTLE AGAINST POLLUTION (2002) (describing the same for polluting industries); STANTON A. GLANTZ ET AL., THE CIGARETTE PAPERS (1996) (describing the same for the tobacco industry); GERALD MARKOWITZ & DAVID ROSNER, DECEIT AND DENIAL: THE DEADLY POLITICS OF INDUSTRIAL POLLUTION (2002) (describing the same for lead industry).

2. *See, e.g.*, Cynthia A. Williams, *Corporate Law and the Internal Point of View in Legal Theory: A Tale of Two Trajectories*, 75 FORDHAM L. REV. 1629, 1631 (2006). Professor Williams reports, for example, how energy traders chortle with delight at out-of-control fires in California, which from their standpoint mean only greater revenues in energy sales as a result of the decreased supply. *Id.* at 1658.

3. *See, e.g.*, Markus J. Milne et al., Wither Ecology? The Triple Bottom Line, the Global Reporting Initiative, and the Institutionalization of Corporate Sustainability Reporting 11 (unpublished manuscript) (on file with authors), *available at* http://ebookbrowse.com/wither-ecology-tbl-gri-and-corporate-sustainability-reporting-pdf-d81243137 (observing that "while some companies have been quick to publicize their high [Global Reporting Initiative] scores . . . , in some cases this may have been less about gaining credibility and more about deflecting attention from poor social and environmental performance *per se*"); Williams, *supra* note 2, at 1643 (noting that "[o]f the twenty-seven organizations comprising the charter group [that endorsed the Global Reporting Initiative], only five were companies . . . [and] four of those five companies have

Based on this evidence of poor corporate behavior, a number of analysts have concluded that sustainability should be regulated in the same way as other industrial polluting activities.[4] Just as laws require corporations to disclose information on their polluting activities because these activities are wrongs to society, so the thinking goes, corporations should be required to engage in an internal accounting of their unsustainable practices. Specifically, corporations should be required to assess the sustainability of their operations in standardized disclosures and take their resulting, publicly-administered medicine, whether it involves being shamed in the marketplace or subjected to greater regulatory control with respect to resource use or disposal practices.[5]

This Article argues that addressing corporate sustainability by putting the onus on corporations to assess the sustainability of their operations may get the solution exactly backwards, at least at this early stage in advancing sustainability. Rather than view the lack of sustainability efforts as another corporate bad that individual corporations should be required to redress,[6] this Article advocates that corporate sustainability should be treated instead as a public good that becomes the government's responsibility. Information about an industrial sector's sustainability profile—for example, a life cycle analysis of a typical facility—has clear public good qualities associated with it. This type of assessment allows for cross comparisons between competitors, identifies areas for possible synergies among producing companies, and highlights areas that may ultimately deserve further regulatory oversight.[7] Equally important, if sustainability analyses concerning various production processes and services are produced in the first instance by publicly funded, third-party experts rather than extracted from private actors, the resulting reports are more likely to be reliable, complete, and accessible to a wide-range of stakeholders who can use them in public-benefitting ways.

The argument for treating corporate sustainability as a public

pretty clear public relations reasons to want to be associated with a corporate accountability initiative [because of concerns about stricter regulation or a preexisting reputation for being a bad corporate citizen]"); *see generally* Jacob Vos, Note, *Actions Speak Louder than Words: Greenwashing in Corporate America*, 23 NOTRE DAME J.L. ETHICS & PUB. POL'Y 673 (2009) (discussing greenwashing more generally).

4. *See, e.g.*, *infra* note 77 and accompanying text; *see also Regulation Eclipses Innovation as Main Driver in Sustainability*, BUSINESS GREEN (Apr. 29, 2010), http://www.businessgreen.com/bg/news/1806699/regulation-eclipses-innovation-main-driver-sustainability.

5. *See infra* Part I.A.

6. This approach seems, at least superficially, to help circumvent some of the barriers to sustainability identified by Professor Sjåfjell. *See generally* Beate Sjåfjell, *Regulating Companies as if the World Matters*, 47 WAKE FOREST L. REV. (forthcoming 2012).

7. *See infra* Part III.

good, rather than as a corporate bad, unfolds in four Parts. Part I details the need for much greater information on the sustainability of corporate practices. At present, there appears to be little dispute that rigorous sustainability assessments of major corporate production processes are a valuable tool for directing change, and that life cycle analyses excel in providing this kind of comprehensive assessment. Part II outlines how these life cycle assessments nevertheless face numerous informational and related obstacles that impede their usefulness when they are produced by corporations. Part III then argues that sustainability life cycle analyses, at least at this early stage, are better viewed as public goods that should be conducted by a neutral third party and subsidized by the public, rather than treated as an extension of pollution disclosures that are the sole responsibility of the firm. This public good characterization also manages to dodge the landmine of issues that ordinarily afflict the reliability of information provided by regulated parties with a stake in the outcome. Part VI offers specific suggestions for how corporate sustainability assessments might be prepared by public experts and financed through a collective tax on corporations.

I. INFORMED SUSTAINABILITY

There are multiple avenues for advancing corporate sustainability, but a key component to all of these methods is greater information about corporate practices.[8] Individual corporate decisions about production processes, when amalgamated, yield a global market of goods and services which may be badly inefficient from an ecological point of view. Yet, until the relevant information is gathered and synthesized, the overall impact of corporate practices and the areas for the most promising gains with regard to sustainability are obscured.[9] As Professor Gaines notes, "shared information and mechanisms of social response to that information" are some of the primary keys to sustainable development.[10] This

8. *See, e.g.*, Judd Sneirson, *The Sustainable Corporation and Shareholder Profits*, 46 WAKE FOREST L. REV. 541, 556 (2011) (discussing Jensen's theories and the critical role of information in sustainability); *see also* Beate Sjåfjell, *Regulating Companies as if the World Matters*, 47 WAKE FOREST L. REV. (forthcoming 2012) (discussing the barriers to sustainability, which include accessing critical information).

9. For a superb discussion of the tyranny of small decisions in the environmental context, see William E. Odum, *Environmental Degradation and the Tyranny of Small Decisions*, 32 BIOSCIENCE 728 (1982), *available at* www.onlyoneplanet.com/Tyranny_of_small_decisions.doc.

10. Sanford Gaines, *Reflexive Law as a Legal Paradigm for Sustainable Development*, 10 BUFF. ENVTL. L.J. 1, 9 (2002). Gaines goes further to suggest "the social functions of information disclosure and discourse between subsystems serve the core ideals of reflexive law because they enhance learning by all the participants and foster re-examination of (reflection on) attitudes and assumptions in all subsystems, not just the subsystem that generated the

Part outlines the critical role that information plays in making progress toward corporate sustainability.

A. *The State of Information on Corporate Sustainability*

Top commentators on corporate sustainability agree that information is not just an important ingredient, but it is also essential to establishing a meaningful sustainability program.[11] At the most basic level, rigorous information on corporate sustainability informs the market—not simply downstream consumers, but also insurers, investors, corporate partners, and others who ultimately keep the corporation in business.[12] Rigorous information on corporate sustainability informs internal practices as well: Enhanced corporate self-assessment is touted as one of the primary virtues of mandating information disclosures.[13] Corporate sustainability information also identifies corporate practices that are most likely to benefit from greater regulatory oversight or market intervention.[14]

---

information." *Id.*

11. *See, e.g.*, *id.* at 21–22; *see also* John C. Dernbach, *Navigating the U.S. Transition to Sustainability: Matching National Governance Challenges with Appropriate Legal Tools*, 44 TULSA L. REV. 93, 113–14 (2008) (discussing the importance of information on sustainability, although focusing primarily on sustainability indicators as a way to provide information to multiple audiences and advance policy, market, and legal reforms simultaneously). Arguably, this type of information may even be a prerequisite to some of the shifts in corporate thinking advocated by scholars like Professor David Millon. *See generally* David Millon, *Two Models of Corporate Social Responsibility*, 46 WAKE FOREST L. REV. 521 (2011). Information is needed both to focus the corporation itself on possible gains as well as to empower external parties to pressure for change from without.

12. *See, e.g.*, Bradley C. Karkkainen, *Information as Environmental Regulation: TRI and Performance Benchmarking, Precursor to a New Paradigm?*, 89 GEO. L.J. 257, 346 (2001) (discussing the range of stakeholders that will use information disclosures and exert pressure on corporations to do better); *see generally* Virginia Harper Ho, *"Enlightened Shareholder Value": Corporate Governance Beyond the Shareholder-Stakeholder Divide*, 36 IOWA J. OF CORP. L. 59 (2010) (discussing the role of informed investors and shareholders in altering choices made by corporations); Grant M. Hayden & Matthew T. Bodie, *One Share, One Vote and the False Promise of Shareholder Homogeneity*, 30 CARDOZO L. REV. 445 (2008) (discussing the possibility for corporate partnerships to encourage more sustainable practices by leveraging one corporation's social responsibility to alter other corporations' conduct).

13. *See, e.g.*, William M. Sage, *Regulating Through Information: Disclosure Laws and American Healthcare*, 99 COLUM. L. REV. 1701, 1778 (1999) (arguing that information disclosures can exert a powerful influence on internal decision making and can reveal valuable information that changes these internal decisions).

14. The TRI disclosures revealed very high levels of air toxic emissions, which in turn produced public pressure for greater regulation and led to much more stringent regulations in the 1990 Amendments to the Clean Air Act. *See, e.g.*, Sidney M. Wolf, *Fear and Loathing About the Public Right to Know: The Surprising Success of the Emergency Planning and Community Right-to-Know*

Yet current regulatory programs provide only limited information on corporate sustainability.[15] The Right-to-Know Act in the United States requires annual disclosures of corporate use and disposal of large amounts of hazardous substances.[16] The resulting Toxic Release Inventory ("TRI") disclosures provide useful information about corporate sustainability with regard to handling and disposal of hazardous substances, but these load estimates offer little insight into meaningful opportunities for a facility to reduce natural resource use, to minimize pollution, or to otherwise decrease a facility's ecological footprint.[17]

The Global Reporting Initiative ("GRI"), established by the United Nations Environment Programme ("UNEP") and the Coalition for Environmentally Responsible Economies ("CERES"), provides a more robust measure of a corporation's ecological footprint because it measures not only outputs, but natural resource use as well.[18] The GRI offers external parties, like investors and

Act, 11 J. LAND USE & ENVTL. L. 217, 300 (1996).

15. *See generally* Jeff Civins & Mary Mendoza, *Corporate Sustainability and Social Responsibility: A Legal Perspective*, 71 TEX. B. J. 368 (2008) (discussing limited legal regulation to encourage sustainability).

16. Emergency Planning and Community Right-To-Know Act, 42 U.S.C. §§ 11002–11003, 11022–11023 (2006) [hereinafter EPCRA] (requiring covered facilities to self-identify; to report their storage, use, and disposal of hazardous substances; and to prepare an emergency response plan).

17. Other regulatory requirements restrict the amount of pollution that a firm can discharge into air, water, or onto land. *See, e.g.*, Clean Water Act, 33 U.S.C. § 1321(a)(2) (2006) [hereinafter CWA] (prohibiting the point source discharge of pollution without a permit that, in turn, is based on the capabilities of the best available technology); Resource Conservation and Recovery Act, 42 U.S.C. § 6922 (2006) [hereinafter RCRA] (requiring generators to test their wastes to determine whether they are hazardous); *id.* §§ 6923–25 (2006) (requiring transporters and treatment, storage, and disposal units handling hazardous wastes to self-identify and follow regulatory requirements); Clean Air Act, 42 U.S.C. § 7412(i) (2006) [hereinafter CAA] (prohibiting the emissions of large amounts of air toxins without a permit specifying emissions limits for the source). These regulatory programs reduce the facility's footprint, but they do not regulate the overarching consumption and output of a company. Thus, if a company elects to use the dirtiest input and produce high quantities of waste for disposal, there are no regulatory impediments except for the costs of pollution control.

18. *See* GLOBAL REPORTING INITIATIVE, http://www.globalreporting.org/Home (last visited Aug. 30, 2011); *see also* David W. Case, *Corporate Environmental Reporting as Informational Regulation: A Law and Economics Perspective*, 76 U. COLO. L. REV. 379, 395–401 (2005); GLOBAL REPORTING INITIATIVE, YEAR IN REVIEW 2008–2009, *available at* http://www.globalreporting.org/NR/rdonlyres/E8B6ED9E-1A29-4154-A6DA-F14E6F71A2C9/3830/GRI_Year_In_Review_241209.pdf. For sample reports, see DUKE ENERGY, ENVIRONMENTAL INDICATORS, *available at* http://www.duke-energy.com/sustainability/environmental-indicators.asp; THE COCA-COLA COMPANY, 2008/2009 SUSTAINABILITY REVIEW, *available at* http://www.thecoca-colacompany.com/citizenship/pdf/2008-2009_sustainability_review.pdf. *See generally* Williams, *supra* note 2, at 1640–61 (describing the

customers, an even stronger basis for evaluating a corporation's commitment to and progress toward sustainability as compared with the TRI disclosures.[19] GRI reporting is voluntary, however. Thus, while a number of Fortune 500 companies have conducted self-audits over the last fifteen years, participation in GRI still remains the exception rather than the rule.[20]

GRI and TRI provide useful barometers to measure corporate sustainability, but because both are exclusively input and output focused, they miss opportunities to focus corporations on the ways that production operations can be altered to provide significant sustainability advances.[21] GRI and TRI also allow firms to be self-

development of the GRI as well as other voluntary initiatives by corporations to minimize their environmental impacts).

19. *See, e.g.*, Case, *supra* note 18, at 429–34 (describing these benefits). Other voluntary developments continue along this disclosure path, although they produced fewer success stories, at least in the literature. The slowest progress may be occurring on the investment front; investors show interest in sustainability but appear, in the United States at least, to be making only limited accommodations for sustainability considerations in making important investment decisions. *See* Alan Hecht, *The Next Level of Environmental Protection: Business Strategies and Government Policies Converging on Sustainability*, 8 SUSTAINABLE DEV. L. & POL'Y 19, 24 (2007) (describing the slow trends in the investment community to act on sustainability goals); *see also* Williams, *supra* note 2, at 1640–42 (providing a more optimistic picture of investor commitment to sustainability in some sectors, including banks and other finance organizations that follow the banking industry's "Equator Principles" to encourage sustainable development in project finance); *id.* at 1645 (describing the growth of socially responsible investors "whose information needs are broader than those of typical 'financial' investors"). Some insurers have developed green insurance programs that offer reduced premiums to qualifying companies that are in turn based, at least in part, on a demonstrated commitment to sustainability. *See Domani and Garnet Offer 'Sustainable' Insurance Program*, GREENBIZ (May 15, 2007), http://www.greenbiz.com/news/2007/05/14/domani-and-garnet-offer-sustainable-insurance-program. There are even accounting requirements in the United States that require businesses to identify assets that may cause long-term damage and to identify how to reduce these risks. *See* Hecht, *supra*.

20. By 2009, over one thousand companies had voluntarily conducted GRI reports. *See, e.g.*, *Facts and Figures about GRI Reports*, GLOBAL REPORTING INITIATIVE, http://www.globalreporting.org/AboutGRI/FactSheet.htm (last visited Aug. 30, 2011). *See also* Williams, *supra* note 2, at 1640–41.

21. *See, e.g.*, Raine Isaksson & Ulrich Steimle, *What Does GRI-Reporting Tell Us About Corporate Sustainability?,* 21 TQM J. 168 (2009), *available at* http://doc.isiri.org.ir/c/document_library/get_file?p_l_id=18924&folderId=20977&name=DLFE-19078.pdf (examining the GRI reports of five cement plants and concluding that they do not provide this type of information about sustainability practices; specifically the reports do not allow for easy comparisons between firms nor in relation to the actual capabilities of the firm's actual production process); Penny Sinclair & Julia Walton, *Environmental Reporting within the Forest and Paper Industry*, 12 BUS. STRATEGY ENV'T 326, 335, (2003) *available at* http://onlinelibrary.wiley.com/doi/10.1002/bse.376/pdf (criticizing firms' GRI reports for failing to provide the larger context within which they operate, which highlights the gains they are theoretically capable of making in

referencing in benchmarking their progress, a focus that neglects to reward ecologically-innovative business practices.[22] Indeed, because both measures simply report on input and output over time, they are indifferent to the possibility that some types of processes or firms are unsustainable relative to competitors and need to be phased out.[23] In addition, rather than keeping a firm focused on sustainability goals, a "good score" in the GRI risks becoming an end in itself which can distract firms from searching for design and other process innovations that may make more significant progress in the firm's sustainability profile.[24]

B. The Unparalleled Virtues of Life Cycle Analysis

Although life cycle analysis is more information-intensive, it offers a substantially improved measure of corporate sustainability relative to the input and output measures embodied in the GRI and TRI reports.[25] Life cycle analysis, which originated in industrial ecology, begins at the "cradle," where raw materials are produced, and follows that production process through transport and manufacturing to the ultimate disposal, often by the consumer.[26] The goal of this analysis is to identify materials and burdens at each stage of the production process that are not recycled in a closed loop, paralleling natural processes.[27] See Figure 1. Such a holistic view of the process allows for a greater range of options for minimizing a facility's ecological footprint, including redesigning the process entirely.[28] By focusing on the design of production processes, rather

advancing sustainability goals); Mark Stoughton & Elizabeth Levy, *Voluntary Facility-Level Sustainability Performance Reporting: Current Status, Relationship to Organization-Level Reporting, and Principles for Progress*, 21 PACE ENVTL. L. REV. 265, 269 (2004) (identifying the lack of facility-based information and reporting as a major weakness in voluntary initiatives).

22. *See, e.g.*, Milne et al., *supra* note 3, at 9 (raising this concern).

23. *See, e.g.*, *id.* at 17–18.

24. *See, e.g.*, *id.* at 11 (raising this concern).

25. *See, e.g.*, D. ELCOCK, LIFE-CYCLE THINKING FOR THE OIL AND GAS EXPLORATION AND PRODUCTION INDUSTRY 72 (2007), *available at* http://www.evs.anl.gov/pub/dsp_detail.cfm?PubID=2154 (stating that "[s]ustainable development is the ultimate goal of the application of all life-cycle approaches").

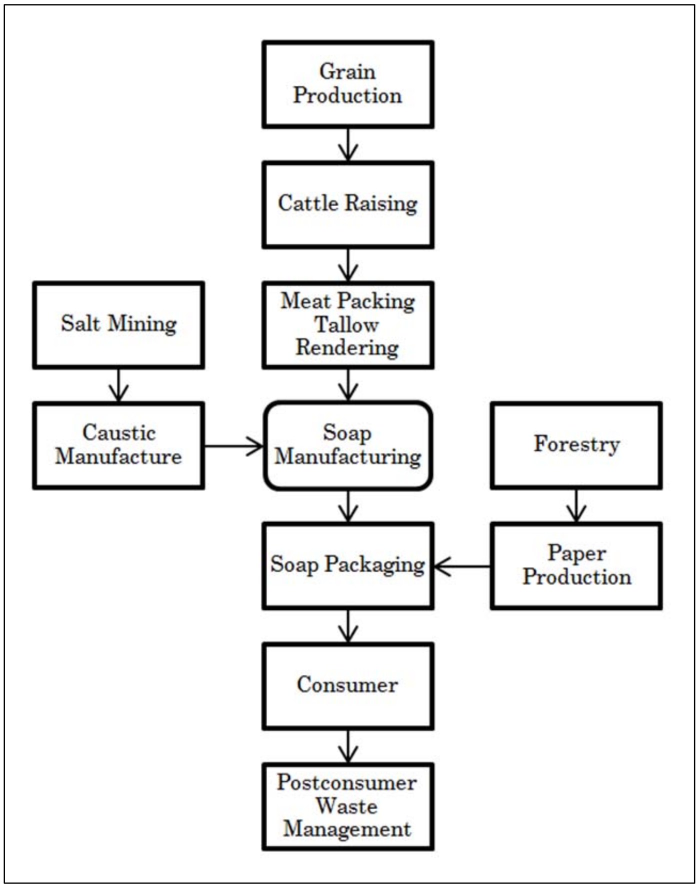
26. *See, e.g.*, Robert J. Klee, *Enabling Environmental Sustainability in the United States: The Case for a Comprehensive Material Flow Inventory*, 23 STAN. ENVTL. L.J. 131, 143 (2004) (defining environmental sustainability in a narrower and more precise sense of carrying capacity based on materials flow, where the limits to the ecosystems' ability to assimilate loading and material flows help identify the biggest burdens that threaten the limited carrying capacity).

27. *See, e.g., id.* at 145–46 (describing this cycling ideal for industrial processes as revealed through life cycle assessments and material flow analysis).

28. Facility-based assessments can also be tailored to individual plants and, thus, involve community groups and other stakeholders with a close

than simply the end-of-the-pipe or output adjustments, much greater environmental gains, as well as cost-savings, are possible.[29]

FIGURE 1: EXAMPLE FLOW DIAGRAM OF A HYPOTHETICAL BAR SOAP SYSTEM[30]



Because the virtues of life cycle assessment ("LCA") enjoy strong consensus among experts, the methods for conducting these assessments are becoming standardized by organizations such as

relationship to the plant. *See generally* Stoughton & Levy, *supra* note 21.

29. Nike, for example, redesigned shoes to reduce the use of glues or solvents. *See, e.g.*, DELOITTE, LIFECYCLE ASSESSMENT: WHERE IS IT ON YOUR SUSTAINABILITY AGENDA? 2 (2009), *available at* http://www.deloitte.com/assets /Dcom-UnitedStates/Local%20Assets/Documents/us_es_LifecycleAssessment .pdf.

30. SCIENTIFIC APPLICATIONS INTERNATIONAL CORPORATION, LIFE CYCLE ASSESSMENT: PRINCIPLES AND PRACTICE 15 (May 2006), [hereinafter SAIC], *available at* http://www.epa.gov/nrmrl/lcaccess/pdfs/600r06060.pdf.

the International Standards Organization ("ISO").[31] A typical life cycle assessment begins with a qualitative inventory of each stage of the process,[32] which can provide useful information for decision making in and of itself.[33] Most life cycle assessments are quite rigorous, however, and take the form of computational models that measure environmental burdens—often through a single unit—which can then be used to identify the most promising areas for redesign or process adjustments.[34]

To the extent that there is proof in the pudding, life cycle analyses boast of concrete victories. A life cycle approach helped Tropicana learn that it was not the transportation of its juice, but the agricultural inputs that led to its larger-than-necessary carbon footprint.[35] As a result, Tropicana focused its primary efforts on reducing fertilizer use rather than dedicating the same resources to increasing the energy efficiency of its vehicles.[36] In a life cycle analysis of coal-fired power plants, Department of Energy ("DOE") consultants compared cleaner coal-fired plants with older plants.[37] This analysis not only quantitatively identified the additional environmental burdens associated with the older plants, but pinpointed those costs to specific features within the life cycle. This analysis also identified design changes that might improve the environmental performance of the older coal-fired systems.[38]

From a regulatory standpoint, life cycle analysis can also

---

31. The ISO has developed standards for LCA. ISO, ENVIRONMENTAL MANAGEMENT: THE ISO 14000 FAMILY OF INTERNATIONAL STANDARDS (2009), *available at* http://www.iso.org/iso/theiso14000family_2009.pdf. The Society of Environmental Toxicology and Chemistry ("SETAC") and UNEP are exploring ways to utilize LCA more extensively in their programs and recommendations. *See, e.g.*, UNEP/SETAC INTERNATIONAL LIFE CYCLE INITIATIVE PROCESS ON "GLOBAL GUIDANCE FOR LCA DATABASES," *available at* http://www.estis.net/sites/lcinit/default.asp?site=lcinit&page_id=ABD68212-F8D8-48A6-83A0-9D82DE7ED61A.

32. *See supra* Figure 1. *See also* D. ELCOCK, *supra* note 25, at 3.

33. *See* D. ELCOCK, *supra* note 25, at 3; *see also* Walter Kloepffer, *Life Cycle Sustainability Assessment of Products*, 13 INT. J. LCA 89, 93 (2003) (observing that "the assessment methods used [for LCA] should be simple and not always quantitative").

34. *See, e.g.*, EUROPEAN ENVIRONMENT AGENCY, LIFE CYCLE ASSESSMENT (LCA): A GUIDE TO APPROACHES, EXPERIENCES AND INFORMATION SOURCES 55 (1998) *available at* http://www.greenbiz.com/sites/default/files/document/O16F34323.pdf (describing the importance of identifying a single functional unit that is used throughout the assessment).

35. DELOITTE, *supra* note 29.

36. Andrew Martin, *How Green Is My Orange?*, N.Y. TIMES, Jan. 21, 2009, http://www.nytimes.com/2009/01/22/business/worldbusiness/22iht-22pepsi.19583527.html.

37. *See, e.g.*, PAMELA L. SPATH, MARGARET K. MANN, & DAWN R. KERR, LIFE CYCLE ASSESSMENT OF COAL-FIRED POWER PRODUCTION i–iv (June 1999), *available at* http://www.nrel.gov/docs/fy99osti/25119.pdf.

38. *See id.* at iv.

pinpoint occasions when adverse environmental impacts are simply shifted within a production process—for example, how end-of-the-pipe controls may reduce one source of pollution only to move the problem elsewhere in the production process where it might be more difficult to address.[39] A life cycle assessment of offshore drilling waste disposal, for example, revealed how strict prohibitions on the discharge of cuttings extracted with certain drilling fluids may have precluded opportunities to identify ways to convert the resulting hazardous waste (disposed in hazardous waste landfills) into a useful product.[40] This internal recycling would have ultimately done much more to limit waste, production costs, and environmental risk than flat prohibitions on the generation of the waste.[41]

Given the virtues of life cycle analysis, coupled with what has now become a relatively robust methodology for conducting the assessments, it is no wonder that many commentators are clamoring for greater use and incorporation of life cycle analysis into sustainability calculations.[42] There has even been a movement to use life cycle analysis for a wide range of environmentally intensive practices, and not simply the design, packaging, or manufacture of products.[43] Life cycle analysis is so highly regarded that its methods are also being expanded to encompass more than purely environmental concerns.[44]

II. IMPEDIMENTS TO CORPORATE SELF-ASSESSMENTS OF SUSTAINABILITY

Just as life cycle assessments offer great potential for advancing corporation sustainability, the information-intensive quality of these assessments introduce some formidable challenges. The most significant impediment, by far, is that a great deal of the

---

39. *See, e.g.*, D. ELCOCK, *supra* note 25, at 37, 75.

40. *See id.* at 48–52.

41. *See id.* at 75, 49–52 (discussing a Paulsen study from 2003 that reaches this conclusion).

42. *See, e.g.*, *id.* at 6 (touting benefits of life cycle analysis when conducted appropriately); SAIC, *supra* note 30; *see also* CELIA CAMPBELL-MOHN ET AL., SUSTAINABLE ENVIRONMENTAL LAW 1367–71 (1993) (calling for more sustainability-based strategies in environmental law that consider production processes from resource extraction through consumption to disposal).

43. *See, e.g.*, D. ELCOCK, *supra* note 25, at 44; Claire Early et al., *Informing Packaging Design Decisions at Toyota Motor Sales Using Life Cycle Assessment and Costing*, 13 J. OF INDUS. ECOLOGY 592, 594 (2009) (describing how forty percent of LCA are used to assess packaging processes).

44. Some analysts are attempting to sweep social and economic features of production into the methods and comparative assessments of sustainability. These features have traditionally resisted a life cycle methodology. *See* Evan Andrews et al., *Life Cycle Attribute Assessment*, 13 J. OF INDUS. ECOLOGY 565 (2009) (developing LCA analysis to measure number of worker hours in a greenhouse tomato supply plant in order to identify some of the social costs of production); *see also* Kloepffer, *supra* note 33.

information needed to conduct facility-specific or even industry-wide life cycle assessments lies in the hands of the companies. And, for a variety of reasons, these firms often lack the incentives to collect, analyze, or even share this basic information in a complete or comprehensive way.[45] While some corporations may receive accolades for their forward-looking sustainability practices revealed in life cycle assessments, many more are likely to view these assessments as yet another opportunity for the public release of unflattering internal information about their environmental problems. Much like environmental audits, and even basic TRI and GRI disclosures, corporations may be wary of conducting these assessments and, if they are required, may resist conducting them in a rigorous or comprehensive way.[46] Indeed, the challenges associated with self-conducted life cycle analyses are more significant than TRI and GRI since the data collection and methods are difficult to prescribe in advance.

This Part identifies several impediments to the production of reliable life cycle analyses when the analyses are conducted by corporations that have a stake in the outcome.

A. Reliability of Data

A life cycle assessment requires a great deal of data about a large range of inputs (including water usage and various chemicals) and outputs (including pollutant streams and discharges) at each stage of the production process, from natural resource extraction to disposal.[47] Yet, since this data is largely in the hands of the corporation, it can be difficult to collect.[48] A number of other environmental programs have relied, out of necessity, on corporations to produce much of the basic information about their compliance with laws and regulations,[49] and in these cases the EPA has often found itself in a cat-and-mouse game with regulated parties in its effort to acquire reliable information.

Over time, additional regulatory innovations have helped increase the reliability of some self-produced information from

45. *See generally* Wendy E. Wagner, *Commons Ignorance: The Failure of Environmental Law to Produce Needed Information on Health and the Environment*, 53 DUKE L.J. 1619 (2004) (making the argument that environmental law often ignores the asymmetrical quality of information that favors regulated parties).

46. *See infra* notes 55 and 62 and accompanying text.

47. *See, e.g.*, D. ELCOCK, *supra* note 25, at 38 (discussing the challenges associated with data collection); EUROPEAN ENVIRONMENT AGENCY, *supra* note 34, at 59–60 (discussing the steps to data collection); SAIC, *supra* note 30, at 22–45 (describing the steps involved in identifying useful data and developing a data collection plan).

48. *See, e.g.*, Wagner, *supra* note 45 at 1632–59 (discussing, generally, the problems that have arisen in collecting information from regulated parties).

49. *See, e.g.*, *id.* at 1663–70.

regulated parties. For example, to gather accurate information about the pollutant emissions emanating from large utility stacks, Congress required that continuous monitors be installed on the stacks,[50] and the EPA promulgated supplemental rules that penalize facilities when their continuous monitors break down.[51] The EPA has also experimented with the use of external auditors who, like financial auditors, inspect companies to assess their violations and help bring them into compliance.[52]

Unfortunately, most of the tools developed to collect more reliable information from regulated parties are only useful in a narrow set of circumstances that do not extend to the data-intensive needs of sustainability life cycle assessments. Expensive continuous monitors at the end of discharge pipes provide only a fraction of the internal data needed to produce a meaningful life cycle assessment. Deploying external auditors to oversee data production is both expensive and incomplete in providing a rigorous accounting of industrial practices over time.[53] Some of the information on processes and inputs can even be trade secret protected and therefore disclosed to only a few agency officials.[54] In fact, even GRI reporting, which is far more standardized because of GRI's emphasis on input and output quantities and indicators, has encountered challenges in ensuring the reliability of the reported information.[55]

50. 42 U.S.C. § 7651k(a) (2006).

51. EPA Acid Rain Program, 58 Fed. Reg. 3590, (Jan. 11, 1993). Congress initially required the EPA to issue rules that addressed monitoring breakdowns. *See* 42 U.S.C. § 7651k(d) (2006).

52. *See, e.g.*, *Pork Producers Clean Water Act Compliance Incentive Program*, EPA, http://www.epa.gov/oecaerth/incentives/programs/porkprodcip .html (last visited Aug. 30, 2011) (utilizing independent auditors to audit compliance problems for pork producers that signed a voluntary agreement to be audited and agreed to conduct needed remedial work in return for reduced penalties); *see also* Williams, *supra* note 2, at 1642 (describing the growth of this auditing and nonfinancial rating industry); *see infra* notes 66–68 and accompanying text.

53. There are internal checks that can be instituted on data collection to ensure the reliability of the data. *See, e.g.*, EUROPEAN ENVIRONMENT AGENCY, *supra* note 34, at 70–71. To determine whether these steps have been followed faithfully, however, some type of peer review or oversight is still necessary.

54. Confidential business information ("CBI") claims are regularly used to limit access to health information on toxic substances and pesticides, including information on exposure risks, and on chemical identity and ingredients. *Confidential Business Information*, EPA, http://www.epa.gov/pesticides/foia/cbi .htm (last visited Aug. 21, 2011). Such claims may even be used to protect information collected by inspectors in the course of environmental compliance inspections. *See* EPA Definitions, 40 C.F.R. § 2.201 (2003) (defining a business confidentiality claim).

55. GRI specifies a number of indicators and measures but some discretion is necessarily involved in application. *See, e.g.*, Case, *supra* note 18, at 435–46 (discussing these features of GRI); *see also* UNEP/SUSTAINABILITY, RISK & OPPORTUNITY: BEST PRACTICE IN NON-FINANCIAL REPORTING 39 (2004) (identifying a lack of clarity in how the reporting principles work in practice).

As a result, there are substantial challenges in ensuring the reliability of corporate-conducted life cycle assessments. Compared with GRI, life cycle assessments allow for even more error and bias in extracting basic internal data since there is much greater discretion for the corporation in identifying the types of data to collect, selecting the units of analysis (both in time and scale), and assembling the requisite information from company operations.[56]

B. Disinterested Methods

Beyond problems with ensuring the reliability of the input data, the methods for conducting a life cycle analysis also afford the analyst considerable discretion in how to conduct the assessment. This too presents problems when the company conducting the assessment has a stake in the outcome.[57] For example, there are numerous discretionary points that arise in framing the scope of a life cycle assessment, developing the methods, and interpreting the data.[58] When a company is conducting its own LCA, this remaining methodological discretion raises a risk that it might select the most beneficial assumptions in conducting its assessment and ignore others that might cast the company in a less positive light. The resulting self-assessment could thus be prepared in ways that are afflicted with systemic biases that tilt in favor of the firm, but these biases will remain difficult to detect without careful review.

The development of rigorous methods for other types of open-ended assessments, like risk assessments, have posed similar challenges to environmental regulators.[59] For example, there is evidence of sponsor-bias in manufacturers' assessments of the

---

56. *See, e.g.*, D. ELCOCK, *supra* note 25, at 12, 13, 39. Elcock describes how life cycle analysis was manipulated initially, and this led to a lack of confidence in its approach. He also notes how methods are becoming more standardized but identifies a number of ways that the standardization cannot eliminate all important areas of user discretion and remains rather "general". *Id. See also* SAIC, *supra* note 30, at 6 (noting the judgment and multiple methods that are available to conduct LCA).

57. *See supra* note 56 (identifying the discretion involved in life cycle analysis methods); *see also* SAIC, *supra* note 30 (summarizing some of the discretion in conducing life cycle analysis).

58. *See, e.g.*, SAIC, *supra* note 30. By their very nature, life cycle analysis methods need to be flexible and adaptive, improving with experience and broader application. A curse for devising a one-size fits all comprehensive model is the need for flexible assessments that are constantly changing, improving, and adapting to the needs of the locale (the stream), the operations (a particular type of plant), and the transit system. Some of this can be built into computer methods, but a single model cannot identify all of these decision trees adequately. *See, e.g.*, D. ELCOCK, *supra* note 25, at 13, 39.

59. *See, e.g.*, THOMAS O. MCGARITY & WENDY E. WAGNER, BENDING SCIENCE: HOW SPECIAL INTERESTS CORRUPT PUBLIC HEALTH RESEARCH 50–54 (2008) (discussing how there is room for manipulation in these types of assessments).

chronic hazards of their products and waste streams.[60] In the biomedical literature, this systemic bias has been dubbed "the Funding Effect" since privately sponsored research is more likely to produce results favorable to the sponsor than research that is financed by disinterested parties, like the federal government.[61] Even more standardized sustainability disclosures, like GRI, have suffered from some of these challenges, since they too provide wiggle room for firms that prefer to highlight successes and downplay failures in applying the GRI indicators.[62]

This discretion in methods has also been a continuing problem for life cycle assessments. Relatively blatant evidence of self-serving biases in corporate life cycle self-assessments was discovered in the 1990s which, in turn, sparked greater attention to the development of more rigorous methods for conducting these assessments.[63] UNEP, ISO and SETAC all worked to improve the methods for life cycle analyses in ways that guard against sponsor discretion to the extent possible.[64] Nevertheless, the dynamic features of LCA make it difficult to develop a prescriptive method that guards against all forms of discretion.[65] Methods that are too rigid run the risk of sacrificing innovation and creativity in the drive for reduced analyst discretion.

Precisely for that reason, ISO attempts to increase reliability by encouraging the external peer review of a corporation's life cycle assessment.[66] Yet this external review is simply voluntary and, at least in 2005, there were indications that this review was not being used comprehensively or uniformly by corporations in their self-

60. *See, e.g.*, *id.* at Chapter 4 (providing numerous examples of how sponsors shaped research to suit their predetermined ends); *see generally* SHELDON KRIMSKY, SCIENCE IN THE PRIVATE INTEREST: HAS THE LURE OF PROFITS CORRUPTED BIOMEDICAL RESEARCH? (2003) (discussing this problem throughout the book with considerable support).

61. *See, e.g.*, Justin E. Bekelman, Yan Li & Cary P. Gross, *Scope and Impact of Financial Conflicts of Interest in Biomedical Research*, 289 JAMA 454 (2003) (conducting a meta-review of the literature and identifying a strong positive correlation between the outcome of research and the beneficial interests of the sponsor).

62. *See, e.g.*, Milne et al., *supra* note 3, at 8 (summarizing the literature which suggests a "gap between the benchmarks provided by guidelines like the GRI and UNEP/SustainAbility and what companies *actually* report") (emphasis in original); *id.* at 9 (noting the tendency of firms to "cherry pick" successes and ignore major social issues).

63. *See, e.g.*, D. ELCOCK, *supra* note 25, at 12.

64. *See, e.g.*, *id.*

65. *See, e.g.*, *id.* at 13 (noting that because the ISO standard for LCA "must be applicable to many industrial and consumer sectors, it is rather general"); *id.* at 39 (elaborating on these issues).

66. *See* ENVIRONMENTAL MANAGEMENT, *supra* note 31. *See also* SAIC, *supra* note 30, at 59–60 (describing the importance of a rigorous peer review process for life cycle analysis).

assessments.[67] For example, even when peer review is conducted, it may not be rigorous—either because the reviewers are biased themselves (and selected accordingly) or because reviewers face inadequate resources or incentives to engage in robust analyses of a firm's LCA.[68] Obviously, too, if there are not corresponding audits of the data-inputs, then shoring up the assessments may win the battle on methods but still lose the larger war on reliable assessments.

When a company has considerable discretion to determine the methods for its life cycle self-assessment and when that assessment can affect the company negatively if it reveals unflattering information, then this discretion may translate into systemic, self-serving biases that undermine the reliability of the assessment.[69] Unless regulators have substantial resources to scrutinize the models used for self-assessments, significant discretion in a company's life cycle assessment will remain.

C. Comprehensibility

A critical, third feature of a robust life cycle assessment is its comprehensibility to a wide range of users.[70] Because multiple stakeholders will use the assessments, it is important that the assessments be understandable to those outside the life cycle assessment field.[71]

---

67. *See, e.g.*, Joyce Smith Cooper & James A. Fava, *Life-Cycle Assessment Practitioner Survey*, 10 J. INDUS. ECOLOGY 12, 13 (2006) (noting that 45% of the respondents said they have conducted or contributed to LCA with no peer review; in response to another question, 38% had used internal company peer review, 33% had used one person external peer review, and 28% has used an external peer review panel).

68. *Cf.* DARYL E. CHUBIN & EDWARD J. HACKETT, PEERLESS SCIENCE: PEER REVIEW AND U.S. SCIENCE POLICY (1990) (identifying in detail the practical limitations of peer review in ensuring reliability and accuracy).

69. *See, e.g.*, Thomas O. McGarity & Ruth Ruttenberg, *Counting the Cost of Health, Safety, and Environmental Regulation*, 80 TEX. L. REV. 1997, 2042 (2002) (discussing the inflated estimates of the costs of compliance that are common in cost-benefit analyses and attributing some of this inflation to industry worst-case estimates); *see generally* MCGARITY & WAGNER, *supra* note 59 (describing how a variety of sponsors, but particularly industries, "bend" science to predetermined ends to advance their interests).

70. *See, e.g.*, HERBERT A. SIMON, ADMINISTRATIVE BEHAVIOR: A STUDY OF DECISION-MAKING PROCESSES IN ADMINISTRATIVE ORGANIZATIONS 242 (4th ed. 1997) (criticizing organizations' information systems as generally not being designed "to conserve the critical scarce resource—the attention of managers").

71. *See supra* notes 12–14 and accompanying text (referencing this broader audience). Even a simple pictorial of the life cycle costs of a production process can provide consumers with immediately accessible and valuable information that may alter their consumption patterns. Investors, regulators, policymakers, and other more sophisticated audiences can digest well-drafted executive summaries, summary graphics, and tables in order to ascertain where the greatest insults to the environment lie within the larger network of production

When left to the discretion of an interested party who produces the report, however, the comprehensibility of life cycle assessments can be controlled or even manipulated.[72] If a corporation conducts a life cycle analysis that reveals embarrassing information, for example, it enjoys considerable discretion to obscure the negative findings by writing the analysis in as technical a way as possible or obfuscating the most incriminating revelations.[73]

GRI reporting would seem immune from this comprehensibility problem given its emphasis on comparable, input and output calculations in generic tables. Yet even GRI reports can be "cluttered with information of little apparent use to readers, while missing out on the big picture risks and opportunities."[74]

Life cycle assessments magnify these comprehensibility challenges several-fold since the assessments are complex and give considerable discretion to the assessors to determine how the results ought to be communicated. It is thus difficult, if not impossible, to prescribe the comprehensibility of a life cycle assessment in advance. Even when results are communicated clearly, however, the comprehensibility of life cycle analysis may be impaired if the reports cannot be cross-compared among competitor firms.[75] Yet in most cases, this cross-comparison will only occur when facilities use the same models for their assessments, which they may not be inclined to do without external pressure.

III. CORPORATE SUSTAINABILITY AS A PUBLIC GOOD

Extracting reliable life cycle analyses from corporations is fraught with difficulty,[76] but one simple move can help avoid this impasse: sustainability analysis can be reconceived as a public good rather than a responsibility that should be shouldered by corporations. Reconceptualizing life cycle assessments as public information helps sidestep the impediments to collecting reliable and comprehensible information identified in the prior section. It also manages to produce considerably more relevant, accurate, and

---

phases and processes and then they can begin to demand changes.

72. *See, e.g.*, Stoughton & Levy, *supra* note 21, at 281 (noting the "entry barrier" to stakeholders that is often associated with sustainability reporting, particularly reporting at the facility level).

73. *See, e.g.*, BRUCE M. OWEN & RONALD BRAEUTIGAM, THE REGULATION GAME: STRATEGIC USE OF THE ADMINISTRATIVE PROCESS 4–5 (1978) (describing these and other types of information-based strategies for controlling the message).

74. *See, e.g.*, UNEP/SustainAbility, *supra* note 55, at 34.

75. *See, e.g.*, J. Emil Morhardt, *Scoring Corporate Environmental Reports for Comprehensiveness: A Comparison of Three Systems*, 27 ENVTL. MGMT. 881, 891 (2001).

76. *Cf.* Gaines, *supra* note 10, at 21 (noting that "mechanisms for dealing with uncertainty, ambiguity, and inequity in the distribution of information are poorly developed in both theory and practice").

hopefully path-breaking types of analyses and recommendations in forms that would not occur if individual firms, who have a clear stake in the findings, were the primary source of this information.

Admittedly, a reconceptualization of sustainability assessments as public goods is at odds with conventional wisdom. In most national and international circles, sustainability reporting is understood to be a natural extension of pollution reporting that discloses negative externalities and other bads that a corporation extracts from society.[77] Yet this conception seems to be based more on analogies to TRI reporting and other corporate disclosures than on a thorough analysis of the unique features of sustainability assessments. Such a close analysis reveals a number of ways that life cycle assessments fall closer to the public good side of environmental information than to regulating corporate bads.

There are at least four features of industrial life cycle analyses that are more closely associated with public goods, at least at this early stage in improving corporate sustainability. First, and perhaps most important, it is not clear what a life cycle analysis will reveal for any given industrial sector, and thus a life cycle analysis may not identify the excessive use of natural resources or polluting activities (i.e., negative externalities) in need of intervention. For some manufacturing sectors it is possible that there are no environmentally smarter options available. As such, life cycle analysis may often be informational and exploratory—identifying areas in need of innovation—rather than exposing corporate dereliction of core environmental responsibilities.

Second, and along these same lines, conducting life cycle analyses and developing innovative solutions for more sustainable approaches in the future constitutes a type of intellectual property or public good for which a firm is unlikely to be able to capture its investment.[78] Because the methods for LCA are constantly evolving, one corporation's bright idea for how to conduct a life cycle analysis or capture sustainability gains through facility-based innovations may quickly become a good that its competitors can copy. Without

77. TRI and GRI seem to be based on this model of placing responsibility on corporations to provide sustainability disclosures not only because firms possess superior control over much of this information, but because these inventories provide evidence of negative externalities and firms then must bear the primary responsibility for collating and producing this information. *See supra* Part I.A. (discussing these programs). Much of the scholarly commentary on sustainability disclosures seems to repeat this basic "social responsibility" basis for disclosure. *See, e.g.*, Case, *supra* note 20. In earlier work, I also argue that these generic types of information disclosures are justified by the firms need to explicate the extent of their negative externalities. *See* Wagner, *supra* note 45, at 1632.

78. *See, e.g.*, Stoughton & Levy, *supra* note 21, at 280 (recognizing the proprietary information that might be revealed through facility level sustainability audits).

patents, copyrights, or other ways to convert these intellectual discoveries into property, sustainability innovations can be co-opted by competitors without compensating the originator of the idea.[79] Firms could even copy and embellish on another facility's life cycle assessment and enjoy reputational gains without doing the initial work associated with conducting the basic assessment.

Ironically, at the same time that first-mover firms who conduct LCAs and identify ways to improve the sustainability of their operations may be providing competitors with a ready template for copying their green advancements, they may also be providing a playbook for competitors to capitalize on their weaknesses. If the life cycle analysis reveals inefficient or excessive waste in a manufacturing system, for example, then this internal self-evaluation can be used against the company before it has had an opportunity to make improvements. Ironically, some firms may contribute to their own demise by providing this type of admission against interest through voluntarily produced LCAs.[80]

Third, just as the benefits of LCA are broadly dispersed toward public goods, the costs are concentrated on individual firms and can be quite high.[81] Unlike other types of disclosures, like TRI or even Security Exchange Commission ("SEC") disclosures, life cycle assessments can consume considerable resources.[82] Data collection

---

79. In the past, the public good features of required information provisions in environmental law arose most pointedly with required testing of pesticide products. Manufacturers proposing new pesticides were concerned that their tests would be used by other companies who did not have to pay to produce them. *See* H.R. REP. NO. 92-511, at 1–2 (1971). In response to this concern, Congress created a compensation program that allows companies to be compensated for the use of their test data by others. *See* Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), 7 U.S.C. § 136a(c)(1)(F) (2006) (providing the original applicant a right to "exclusive data use" for registration of pesticides after 1978). Analogously, the patent system protects drugs and other unique products from this theft of expensive public health assessment simply by providing a blanket product right to the product itself. *See* Benjamin N. Roin, *Pharmaceutical Innovation and Limits of the Patent System*, PETRIE-FLOM CENTER FOR HEALTH LAW AND POLICY, BIOTECHNOLOGY AND BIOETHICS, HARVARD LAW SCHOOL (Aug. 31, 2007), http://www.law.harvard.edu/faculty/workshops/climenko/Roin.pdf.

80. *See, e.g.*, Williams, *supra* note 2, at 1644 (discussing how the GRI reports set up "a dynamic where companies are potentially more susceptible to environmental or social political pressures" and thus may be worse off, in the end, by voluntary reporting).

81. *See, e.g.*, Cooper & Fava, *supra* note 67 (listing as the three major barriers: "1. Time and resource requirements for the collection of data. 2. Complexity of the LCA method. 3. Lack of clarity as to the relevant benefits compared to the costs of conducting the LCA studies, including lack of apparent downstream interest or demand.").

82. *See, e.g.*, Early et al., *supra* note 43, at 595 (noting that "[a] comprehensive LCA can take months to prepare, costs thousands of dollars, and provides data on only one product rather than the suite of options that are of interest to decision makers").

can be extremely costly[83] and applying the models or methods of LCA requires expertise.[84] From the firm's perspective, then, conducting this detailed, introspective sustainability analysis is not a simple or inexpensive exercise.[85]

Utilizing the outputs of LCA also requires an organizational structure that can act on the results, a feature that adds still more costs to the LCA process. Some firms, and perhaps many, lack the internal management structures that allow for the internal cross-fertilization that LCA demands.[86] In one case study, for example, Toyota Motor Sales lacked the internal capacity to conduct the assessment and contracted with UCLA to develop a model for its system.[87] Ultimately, Toyota enjoyed considerable environmental and cost savings by eliminating a particular packaging feature of its process;[88] yet without this investment, the areas for improvement would not have been brought to light.[89]

Last but not least, the large-scale costs associated with developing methods, models, and databases and viewing the problem more synoptically, rather than at an individual level, all favor a public good approach to life cycle analysis. Publicly produced assessments can identify areas for cross-fertilization and better allow for the diffusion of information as compared with private assessments, which might not only lack this broader perspective, but might deliberately avoid sharing internal information since it could undermine a firm's competitive edge.

IV. REFORM

Expert, neutral assessments of a manufacturing process are critical ingredients to a rigorous life cycle assessment and help pave the way to the development of sustainable innovations in processes,

---

83. In 2005, almost 70% of the survey participants identified this as the most costly feature of LCA. *See* Cooper & Fava, *supra* note 67.

84. The development of off-the-shelf models has helped to keep these costs under some control, although expertise in applying the methods is still necessary. *See, e.g.*, *id.* at 13–14. In a survey of LCA experts in 2005, only 20% percent listed the methodological applications as the most costly part of the exercise. *Id.* at 13 (also noting that 15% listed application of the methods as the most time-consuming part of the process).

85. *See, e.g.*, D. ELCOCK, *supra* note 25, at 5–6, 38 (noting the costs as a major barrier to LCA); Early et al., *supra* note 43, at 593 (noting the same).

86. For example, one firm may recognize the need for LCA of packaging systems that may present both environmental wastes and process inefficiencies, but they may lack the expertise and time to carry out such an assessment. Early et al., *supra* note 43, at 593.

87. *Id.* at 600.

88. *See id.* at 595 (reporting on other similar types of collaborations for conducting LCA, such as the collaboration between McDonald's and Environmental Defense Fund on packaging).

89. *See, e.g.*, *id.* at 604 (describing the environmental gains from changes in packaging).

technologies, and even product lines. Yet it seems naïve to expect corporations will conduct these types of expensive analyses voluntarily, particularly when their own innovations can be easily co-opted by competitors. Even if LCA was mandatory for corporations, the unavoidable discretion afforded to the analyst makes it difficult to ensure that the resulting assessments are reliable and comprehensible. This final Part proposes that a public entity should conduct these assessments and describes how this might be done. The Part closes by considering what the public good qualities of LCA suggest about other types of environmental information.

A. Step 1: Public Life Cycle Assessments

Since life cycle assessments come closer to being public goods than the straightforward disclosure of negative externalities, a disinterested public organization is the most appropriate entity to produce life cycle assessments.[90] The resulting LCAs would be based on an average firm within a particular industrial sector, much as is currently done by the EPA in setting technology-based air and water pollution standards under the Clean Water and Clean Air Acts.[91] If this generic assessment reveals reasonable areas for improvements, then consumers, investors, shareholders, and even regulators may begin to demand sustainability progress from firms. Individual facilities themselves will also learn of ways they can operate more sustainably, thanks to these public assessments.

Under this public good view of sustainability assessments, life cycle assessments would be done by respected experts who are completely independent of the companies, but have access to internal corporate information. Ideally, much of the analysis would be done cooperatively with firms since the goal is to identify areas for improvement and possibly cost savings. To the extent that the life cycle analysts face opposition from some firms, information extraction tools—like EPA's authority to request information under its various statutory mandates—would be needed to secure internal records or to ensure that the voluntarily provided records are complete.[92] Indeed, because it has legal authority to access private

---

90. *Cf.* Stoughton & Levy, *supra* note 21, at 282–83 (emphasizing the need for facility-based reporting that derives "both from the intrinsic differences between facilities and the organizations of which they are a part and from the differences between organization and facility-level stakeholders").

91. For the complete list of industrial sectors for which EPA developed air toxic emission standards under the Clean Air Act, see 40 C.F.R § 63 (2011). *See also* EPA, NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS (NESHAP), http://www.epa.gov/ttn/atw/mactfnlalph.html. For the discharge standards promulgated by the EPA for industrial sectors under the Clean Water Act, see 40 C.F.R. §§ 400–471.

92. The EPA, for example, has extensively used its information collection power under Section 114 of the Clean Air Act to obtain internal, industry

records, the EPA is perhaps best situated to conduct these life cycle assessments,[93] or it could subcontract the work to a respected nonprofit body like CERES.[94] The resulting, industrial-sector life cycle assessments would ideally be peer reviewed and subjected to comments from the affected industry, although the expert assessor group would have complete independence in how to respond to comments. Much like technology-based standards, the life cycle analyses would also be updated at regular intervals[95] or could be subject to more informal updating processes (for example, the expert assessor could post a website that invited comments on revisions over time).

In conducting the assessment, the expert assessor should produce two different, bookend life cycle analyses for each industrial sector: (1) a reasonable worst case life cycle assessment, and (2) the very best life cycle assessment for each industrial sector. The reasonable worst-case analysis would present the assessment for a

information about processes that inform its selection of best technologies under the Clean Air Act. 42 U.S.C. § 7414(a) (2006). *See, e.g.*, Wendy Wagner, Katherine Barnes & Lisa Peters, *Rulemaking in the Shade: An Empirical Study of EPA's Air Toxic Emission Standards*, 63 ADMIN. L. REV. 99, 125 (2011) (counting, on average, over eighty "formal" communications initiated through Section 114 between industry and the EPA per air toxic emission rule).

93. The EPA's establishment of technology-based standards involved some of this internal process analysis, so the EPA is not new to this type of internal assessment. *See, e.g.*, D. Bruce La Pierre, *Technology-Forcing and Federal Environmental Protection Statutes*, 62 IOWA L. REV. 771, 810–11 (1977) (specifying three steps in setting technology-based standards: (1) categorizing industries; (2) identifying the contents of their respective wastewaters; and (3) identifying the range of control technologies available, all of which parallel the types of operational study that will be needed to conduct life cycle analysis). *See also* Sanford E. Gaines, *Decisionmaking Procedures at the Environmental Protection Agency*, 62 IOWA L. REV. 839, 853 (1977) (discussing the EPA's study of the effectiveness of pollution control technologies under various plant ages, sizes, and manufacturing conditions in each industrial sector).

94. CERES consists of a mix of all affected stakeholders committed to advancing sustainability. Specifically, "Ceres is a nonprofit organization that leads a national coalition of investors, environmental organizations and other public interest groups working with companies to address sustainability challenges such as global climate change and water scarcity." CERES, http://www.ceres.org/about-us/who-we-are (last visited Aug. 21, 2011).

95. *See, e.g.*, 42 U.S.C. § 7411(b)(1)(B) (2006) (giving the Clean Air Act revision expectations for new source performance standards) ("The Administrator shall, at least every 8 years, review and, if appropriate, revise such standards . . . . [T]he Administrator need not review any such standard if the Administrator determines that such review is not appropriate in light of readily available information on the efficacy of such standard."); 33 U.S.C. § 1316(b)(1)(B) (2006) (giving the Clean Water Act expectations for revision of technology-based discharge standards and declaring that the EPA "shall, from time to time, as technology and alternatives change, revise such [new source performance] standards following the procedures required by this subsection").

typical facility that falls in the bottom third relative to its competitors with respect to the sustainability of its operations. The very best case analysis would be based on the sustainability profile of an imaginary facility that employs all of the best sustainable innovations and process inventions that are reasonably available. This best case sustainability profile serves not only to set a high bar, but to showcase the types of innovations that are possible.[96]

Publicly-prepared life cycle assessments would operate much like penalty defaults: using the worst case assessment as a baseline, corporations would be able to distinguish their processes or boast of accomplishments that go well beyond the laggard facilities in their sector.[97] The corporations can then use this positive comparison in the market to gain a competitive edge with insurers, investors, and the public at large. Unlike a full-blown life cycle analysis, however, this distinguishing effort would limit the opportunities for worrisome discretion since the firm would be forced to compare specific industrial processes against a centralized, detailed model. Nevertheless, a process for validating a corporation's claims in making these positive distinctions should also be established to provide added reliability to the firm's efforts to compare its processes against the publicly produced sustainability assessments.

Ultimately, a more reliable process for benchmarking and validating a corporation's sustainability claims could go a long way towards improving available, environmental information in the current marketplace.[98] One of the difficulties that front-mover firms currently face is the challenge of distinguishing themselves in the marketplace in ways that can be trusted by outsiders.[99] As one leading sustainability consultant notes, "[i]ronically, green marketing has become one of the greatest threats to the success and scale of corporate sustainability practices. Ubiquitous (and often unsubstantiated) green claims have created a green-washed, eco-

96. Ideally, profiling the advances will also change the "strategic thinking of companies. . . . [by] demonstrat[ing] that the next level of environmental protection will arise not only from disincentives to pollute, but also from the positive vision of sustainability that is acceptable to business operation." Hecht, *supra* note 19, at 24.

97. *See generally* Ian Ayres & Robert Gertner, *Filling Gaps in Incomplete Contracts: An Economic Theory of Default Rules*, 99 YALE L.J. 87, 91 (1989) ("[P]enalty defaults are purposefully set at what the parties would not want—in order to encourage the parties to reveal information to each other or to third parties.").

98. *See, e.g.*, Williams, *supra* note 2, at 1648 (describing the incentives of corporations to distinguish themselves in the market, beyond what the law requires, in order to enhance their reputation in the market and with investors).

99. *See, e.g.*, Markus J. Milne et al., *The Five Principles of Sustainable Branding*, 3.ZERO (Sept. 25, 2008), http://3pointzero.org/blog/five-principles-sustainable-branding.

cluttered and eco-saturated marketplace."[100] The public assessments suggested here should help limit the ability of facilities to exaggerate or "green-wash," since they offer specific baselines against which a firm's boasting can be more readily compared.

A central entity could also use these public life cycle assessments to identify innovations across multiple industrial sectors more generally,[101] as well as gain a bird's-eye view of American production processes.[102] "Ecological rucksacks," material flows, and other ecological accounting tools are also facilitated by life cycle analyses that are conducted by a central organization. These analyses can be used to provide a more systematic view of production and service processes that facilitate the redesign of larger systems as well as firms.[103] The assessments are also likely to identify blind spots that are otherwise missed by regulatory approaches or voluntarily incentives. For example, the assessments may highlight goods or services that are so costly to the environment that they should be significantly curtailed or even eliminated. Finally, centralized LCA can help identify and compare national differences in the sustainability of industrial operations. One study compared United States and Canadian industries and identified differences in energy use, import and transit inputs, and other features that were specific to the company of origin that might otherwise be lost in an individualized LCA.[104]

There are a variety of other, supplemental LCA tools that could be developed by a centralized expert analyst body to reduce the costs to firms of conducting their own facility-based assessments.[105] For

100. *See, e.g.*, *id.*

101. *See, e.g.*, Milne et al., *supra* note 3, at 15 (describing a variety of tools that can link to LCA).

102. As the Department of Energy report notes:

> Results from existing LCA studies could be reviewed to identify common areas of concern, i.e., those processes or life-cycle stages that consistently produce higher impacts . . . . For example, transportation emissions are major contributors to aquatic toxicity, acidification, and CO_2 loading. Thus, transportation may be an important consideration in decisions to build small process or disposal sites rather than centralized sites.

D. ELCOCK, *supra* note 25, at 76.

103. *See, e.g.*, *id.* at 17; Klee, *supra* note 26, at 172 (describing the advantages of a Material Flow Inventory, which could be based in part on the results of individual LCAs).

104. *See, e.g.*, D. ELCOCK, *supra* note 25, at 40.

105. Databases that contain LCA software programs and even inventory data could be made available to firms in ways that enable more expansive and useful LCA to be prepared. *See, e.g.*, Cooper & Fava, *supra* note 67, at 14 (calling for "greater development of and funding for life-cycle inventories . . . [and] databases"). These databases have already been initiated in other countries, therefore some of the preliminary work is already underway and the EPA may only need to follow the lead of these other countries in identifying the kinds of information that is useful and link that information to

example, a web-based model for a facility-specific LCA could be developed with user-friendly interfaces that allow corporations to insert a few parameters and then run the model.[106] Commentators observe that "companies frequently look for simplified assessment tools that offer quick, approximate results," such as checklists and simplified calculators, and this type of model could fill a needed niche.[107] Guides and other learning materials, including workshops and symposia, might also be provided to help firms use the generic, industry-specific LCA for their facility as a springboard to improving sustainability processes. The EPA has already made progress in preparing these types of guidelines,[108] but further outreach and education is needed since "[m]any companies [in the United States] do not see how life-cycle thinking can be applied to their specific operations—or even the benefits of doing so."[109]

With strong public leadership, LCA models can also be improved and expanded. Since there have been relatively few validation checks on LCA models to ensure that they are robust, a central body like EPA or CERES could develop ways to match LCA models against the outputs of real systems to enhance the validity of the models.[110] This central organization could also expand the range of features included in life cycle analyses to encompass adverse social and ecological impacts.[111] Finally, the EPA or CERES could develop ways to improve the comprehensibility of the results of LCA and related sustainability assessments.[112]

---

other publicly available LCA databases that have already been created. *See, e.g.*, D. ELCOCK, *supra* note 25, at 38 (identifying Europe, Japan, and Korea as having developed publicly shared databases on specific parts of the life cycle, such as energy systems, transportation, waste management, and production of bulk materials). The development of simplified LCA that reduce the costs and time and begin with EPA's generic assessments could also greatly accelerate the use of LCA by individual firms. *See, e.g.*, Cooper & Fava, *supra* note 67, at 14 (noting that "anything that can be done to simplify the conduct of an LCA and reduce the costs and time required to complete the study" will be useful).

106. *See, e.g.*, Early et al., *supra* note 43, at 595.

107. *Id.*

108. *See, e.g.*, SAIC, *supra* note 30. See the EPA's web site dedicated to providing guidance to those interested in LCA at http://www.epa.gov/ORD/NRMRL/lcaccess/index.html.

109. *See, e.g.*, D. ELCOCK, *supra* note 25, at 41; Cooper & Fava, *supra* note 67, at 14 (advocating for "an internal champion for the promotion of LCA within an organization, development and dissemination of the value that LCA provides").

110. *See, e.g.*, D. ELCOCK, *supra* note 25, at 39–40.

111. A number of efforts are afoot to expand and develop the social features of LCA. *See, e.g.*, *id.* at 73–74. To the extent that the EPA becomes an important developer of the methods of LCA, it would seem to have valuable expertise to contribute to these efforts. *See, e.g.*, *id.* at 73 (recommending greater attention to developing these socially based assessments).

112. The results of LCA and related reports should be accessible to a wide range of stakeholders and, thus, the communication may need to be tiered in

B. Step 2: Regulatory Incentives to Do Better

In order to produce meaningful incentives for firms to take sustainability seriously, the life cycle assessment could also be used as a baseline for imposing additional regulatory controls that encourage or even require specific sustainability improvements from corporations. Firms might be "commanded" to reach certain sustainability goals in ways that parallel something like the technology-based standards of the Clean Water and Clean Air Acts. For example, all firms would be required to reach some mid- or best-available level of sustainability within their industrial sector, likely required through legislation.

Alternatively, all firms in a given industrial sector could be charged a sustainability tax based on the total resource use and waste production of the reasonable worst-case life cycle for their industrial sector (perhaps further adjusted by the size or production volume of the facility). Facilities that provide validated accounts of how they accomplish sustainability gains above this baseline could then earn tax credits. Companies that go further and actually pioneer innovations in sustainable technologies or operations might not only enjoy even greater tax credits, but also reputational benefits—for example, being officially certified by the EPA, or another nonprofit, as a corporate leader in sustainable innovation.

Identifying meaningful distinctions between individual firms and the default worst-case sustainability life cycle will require a detailed review of a company's submission and thus will necessitate the dedication of considerable agency resources. One way to finance these important facility-specific evaluations is through the sustainability tax itself. The sustainability tax would operate simultaneously as an incentive for companies to innovate or do better (hence lowering the tax) and as a mechanism to fund the ability of an external party, like the EPA, to certify differences between firms that warrant recognition.

It is ultimately possible that some sustainable innovations will be valued as intellectual property due to the high research costs involved in developing the product. At the same time, however, it is counterproductive to reward innovation in sustainable practices with patents that then allow firms to charge others a licensing fee in

---

detail to reflect this diverse audience. *See, e.g.*, Stoughton & Levy, *supra* note 21, at 280–81 (emphasizing the importance of comprehensibility in these reports). At base, however, the reports should be clear and as simple as possible to maximize their value to these constituencies. *See, e.g.*, Raphael Bemporad & Mitch Baranowski, *Branding for Sustainability*, PACKAGE DESIGN MAG. (Dec. 2008), *available at* http://www.packagedesignmag.com/sites/packagedesignmag.com/files/BBMG_sustainability_white_paper.pdf (discussing the need to create "opportunities for multiple stakeholders to help shape, realize and share the benefits of products and services based on a seamlessly integrated business and sustainability strategy").

order to become more sustainable themselves.[113] Since innovations in sustainability should be shared with the larger community, barriers to the diffusion of sustainable innovation due to patents and other forms of corporate intellectual property need to be monitored closely. Ultimately, more targeted subsidies may need to be developed to encourage still greater private innovation.

C. Information as a Public Good

Traditionally, information disclosures have been used to force firms to disclose their negative externalities; yet this narrow view of information disclosures may be foreclosing opportunities for advances in corporate sustainability.[114] Indeed, a "public good" dimension to environmental information may be a perspective that has been lacking in the design of environmental programs more generally. Professor Biber, for example, has argued that a rigorous ambient monitoring regime should not be established piecemeal, but instead benefits from a single, collective entity that oversees the data collection so that the data is reliable and amenable to cross-comparisons across regions and over time.[115] In drug regulation there in fact appears to be a shift occurring that depends more substantially on the Food and Drug Administration to collect and analyze all publicly available information, including adverse effects reports, and use that information to supplement the research submitted by drug manufacturers.[116] Even historically, the first, often noncontroversial, step toward enacting pollution standards began with an agency like EPA that identifies what the better pollution control technologies could accomplish within various industrial sectors.[117] In these programs, firms were expected to

113. *See supra* notes 79–80 and accompanying text.

114. *Cf.* Sulaiman A. Al-Tuwaijri, et al., *The Relations Among Environmental Disclosure, Environmental Performance, and Economic Performance: A Simultaneous Equations Approach*, 29 ACCT., ORGS. AND SOC'Y 447, 469 (2004).

115. *See*, *e.g.*, Eric Biber, *The Problem of Environmental Monitoring*, U. COLO. L. REV. (forthcoming 2011), *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1680000.

116. *See, e.g.*, Pasky Pascual, Liz Fisher & Wendy Wagner, *FDA Modernization and the Revolutionization of Collective Science in Public Health Law* (forthcoming) (on file with author); *see generally* Title IX of the Food and Drug Administration Amendments Act of 2007, Pub. L. No, 110-85, 121 Stat. 823.

117. *See, e.g.*, Clean Water Act, 33 U.S.C. § 1311(b)(2)(C)–(D) (2006) (stating that the EPA is required to set technology-based standards for water toxins from point sources); Clean Air Act, 42 U.S.C. § 7412(b) (2006) (listing 189 air toxins for which technology-based standards must be promulgated). This collective, public information baseline then serves as the benchmark against which firms are measured to ensure that they were doing their "best" or, more accurately, doing their legally required reductions in pollution control. *See* Julie Thrower, *Adaptive Management and NEPA: How a Nonequilibrium View

meet publicly established targets but were not required to conduct their own research and development to discover what these targets should be.[118]

Figure 2 provides a re-conceptualization of different types of information-based disclosures according to their public good qualities. Sustainability life cycle analyses for industrial sectors, at least initially, fall closer to the public good axis because they have only a limited assurance of highlighting negative externalities and a much greater probability of introducing information on sustainable innovation that will benefit other firms. Other types of environmental programs might similarly benefit from attention to the fundamental public good qualities of the underlying information. For example, the creation of environmentally superior substitutes, such as green chemistry, is not currently encouraged through regulatory processes even though the development of these innovations primarily benefits the general public.[119] Even some of the green chemistry inventions that receive presidential awards are patented and presumably must be purchased through licenses, thus impeding companies from adopting the inventions.[120] Identifying the public goods qualities of this environmental information helps focus analysts on the need to subsidize certain research and development while at the same time ensuring the rapid and low-cost diffusion of the information into the marketplace.

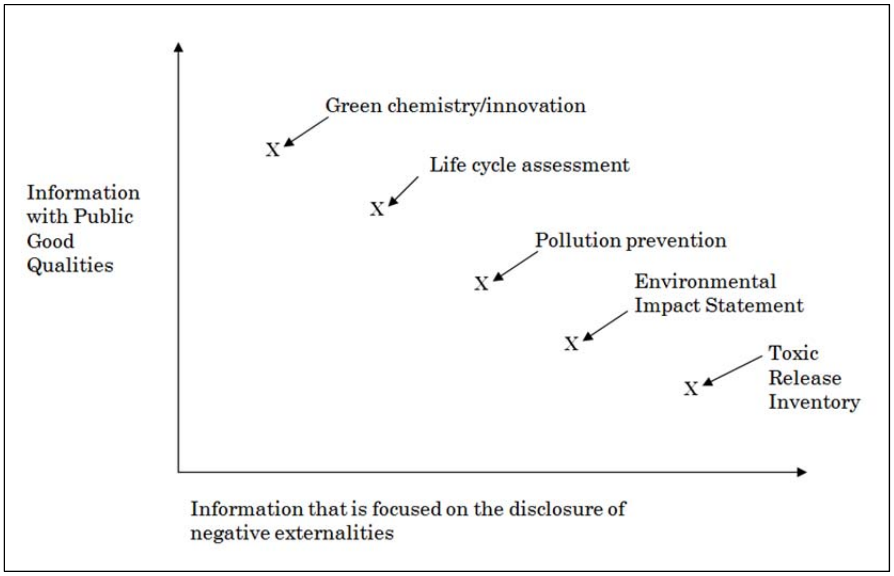
of Ecosystems Mandates Flexible Regulation, 33 ECOLOGY L. Q. 871, 879 (2006).

118. *See* 33 U.S.C. § 1311(m)(1)(G) (2006) (stating that research and development of water pollution control technology is only required if an applicant is permitted to abide by differing standards than those listed in the rest of the section for industrial discharges into deep seas). Research and development is not mentioned anywhere else in the Clean Water Act.

119. Because of its public good character, the EPA has a team of researchers that are dedicated to green chemistry innovation. *See Green Chemistry and Engineering,* EPA, http://www.epa.gov/nrmrl/std/cppb/greenchem. The EPA also has a grant program that funds green chemistry innovation. *See Grants and Fellowships,* EPA, http://www.epa.gov/gcc/pubs/grants.html. But the EPA does not actively encourage green chemistry through its regulation of private activity (nor is this contemplated in the authorizing legislation passed by Congress).

120. The EPA has an annual Presidential Green Chemistry Challenge Award that is given to several recipients and is awarded by the President. Both universities and industry members are eligible to enter. While there is an emphasis on broad applicability in terms of both transferability to other sectors and economic feasibility, most of the entries have already been patented, trademarked, and commercialized by the time they are entered. *See Presidential Green Chemistry Challenge,* EPA, http://www.epa.gov/greenchemistry/pubs/pgcc/presgcc.html.

FIGURE 2



This analysis of the public good features of sustainability may only be a start in identifying ways in which reframing some intractable information problems as public goods begins to break up the information logjam that has stalled progress in environmental law.[121] Developing a strong base of public information builds on the expert capabilities of the administrative state and approaches particularly intractable information-based challenges in a more collaborative way. Once information is developed on these environmental practices, complementary political, economic, and related market forces can use the information as a springboard to encourage greater sustainability and related gains in the future.

CONCLUSION

The United States still "does not have a sustainability strategy."[122] The most promising proposals in the current economically and politically fragile climate are those that can be accomplished without political warfare and that build on progress in incremental ways.[123] The proposal here—to assign to regulators or

121. *Cf.* Bradley C. Karkkainen, *Bottlenecks and Baselines: Tackling Information Deficits in Environmental Regulation*, 86 TEX. L. REV. 1409, 1410 (2008) (stating that environmental assessments have not led to any significant impact).

122. Hecht, *supra* note 19, at 23.

123. *See, e.g.,* UNITED STATES GOVERNMENT ACCOUNTABILITY OFFICE, GLOBALIZATION: NUMEROUS FEDERAL ACTIVITIES COMPLEMENT U.S. BUSINESS'S GLOBAL CORPORATE RESPONSIBILITY EFFORTS 15 (2005).

neutral third-party institutions the task of developing facility-specific life cycle analyses—seems to be a modest first step in this long march towards corporate sustainability. This information-generation approach also develops a partnership with business that is in line with larger goals for enhancing corporate social responsibility in ways that go beyond what specific legal requirements can accomplish standing alone.[124]

While the proposal advanced here will by no means produce perfect information, by trading off detail and specificity in individual firm LCAs on the one hand for comprehensiveness and more general illumination of the sustainability of diverse processes and practices through industry-wide LCAs on the other, progress can be made on the sustainability front more quickly.[125] By producing large amounts of fresh and relevant information about corporate sustainability, consumers, investors, and other actors will be better able to compare and evaluate the sustainability of corporations and, if necessary, demand change.

124. The GAO report on corporate responsibility identified four ways to enhance corporate social responsibility: (1) endorsing or rewarding good behavior, (2) facilitating improvements through outreach and education, (3) partnering with voluntary and collaborative partnerships, and (4) mandating through the law. *See id.* at 23–25.

125. *Cf.* Gaines, *supra* note 10, at 21 (noting the need to accept imperfections in information collection almost as a prerequisite to developing robust information disclosure strategies).