SMART INSTRUMENT MIXES TO PROMOTE GREEN BUILDING

YAYUN SHEN* & MICHAEL FAURE**

A smart mix of legal instruments is not new, but green building (GB) compliance is. As a way to environmental compliance in general, the mixing of instruments may also work to overcome the challenges facing GB compliance. The mix can be justified by the failings of government regulation, liability, and self-regulation. Therefore in theory, a smart mix of instruments makes sense, since each of the above instruments may be subject to imperfect information, private interests, the inaccuracy of measurement, and/or ineffectiveness. In practice, instrument mixes have been around in the U.S. GB laws. The theory and the U.S. case law indicate that, first, GB compliance may owe its survival to self-regulation in early times, but over time law and policy will play a big role. Second, in pursuit of GB compliance, governments can make the most of self-regulation by incorporating industry-based certifications into statutory mandates. Apart from the traditional carrots and sticks, governments eventually can enlist private information as behavioral interventions to encourage GB compliance.

I. INTRODUCTION

Buildings can pose far-reaching environmental impacts,[1] some of which may be mitigated by setting standards to make the buildings green. Green buildings (GBs) are those built in line with

* Yayun Shen is a researcher at Erasmus University Rotterdam. She is a PhD student at the Rotterdam Institute of Law and Economics and focuses on environmental law and economics.

** Michael Faure is a Professor of Comparative and International Environmental Law at Maastricht University. He also serves as the Academic Director of the Ius Commune Research School and the Maastricht European Institute for Transnational Legal Research.

1. *See* Oswaldo Lucon et al., *Climate Change 2014: Mitigation of Climate Change*, INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE 675 (2014), http://www.ipcc.ch/pdf/assessment-report/ar5/wg3/ipcc_wg3_ar5_chapter9.pdf ("In 2010 buildings accounted for 32% of total global final energy use, 19% of energy-related GHG emissions (including electricity-related), approximately one-third of black carbon emissions, and an eighth to a third of F-gases.").

environmentally protective standards.[2] The number of GBs is growing worldwide,[3] and the GB movement owes its survival to the efforts of various parties, including individuals, governments, and self-regulatory agencies (SRA). Yet it is too soon to say that the GB movement has reached its zenith, due to the challenges facing GB compliance. There are four main challenges for the development of GB: the higher initial cost, the lack of incentives, the unawareness of building stakeholders, and the dispersion of stakeholders.[4] Those challenges can boil down to a matter of incentives and preferences shaped by an institutional framework, which consists of rules and players possessing (imperfect) information about GB. This article argues that the law, as part of the institutional framework, precisely guides the institutions and instruments that can play a role to create incentives and steer preferences of stakeholders towards GB.

If the law matters in GB compliance, then one might consider how the law may promote GB compliance. Scholars from various theoretical perspectives have argued that a variety of instruments can be used in environmental governance to deal with externalities and other market failures.[5] Given the fact that none of the instruments in isolation is able to provide an optimal level of environmental protection, increasingly mixes of instruments are advanced as the ideal policy tool.[6] As GB compliance promotes environmental protection, it

2. *See* MCGRAW-HILL CONSTR., WORLD GREEN BUILDING TRENDS 5 (2013), http://naturalleader.com/wp-content/uploads/2016/04/WorldGreenBuildingTrendsSmartMarket Report-2013-Final-Full.pdf (defining a green building as "a construction project that is either certified under any recognized global green rating system or built to qualify for certification"); *See generally* ROB WATSON, GREEN BUILDING: MARKET AND IMPACT REPORT 24–37 (2011), http://www3.cec.org/islandora-gb/en/islandora/object/greenbuilding%3A66/datastream/OBJ-EN/view (listing the benefits of LEED buildings including reduced greenhouse gas emissions, water efficiency, and energy efficiency).

3. DODGE DATA & ANALYTICS, WORLD GREEN BUILDING TRENDS 2016: DEVELOPING MARKETS ACCELERATING GLOBAL GREEN GROWTH 5 (2016), http://fidic.org/sites/default/files/World%20Green%20Building%20Trends%202016%20Smart Market%20Report%20FINAL.pdf.

4. *Id*. at 18–19.

5. "The typical categories of market failures are the following: (a) *lack of competition*, most prominently monopoly; (b) *information problems*, most importantly asymmetric information (but also including uncertainty, bounded rationality, and different attitudes of risk; (c) *missing markets*, including both negative externalities and public goods." Alessio M. Pacces & Roger Van den Bergh, *An Introduction to the Law and Economics of Regulation*, *in* 9 ENCYCLOPEDIA OF LAW AND ECONOMICS: REGULATION AND ECONOMICS 5 (Alessio M. Pacces & Roger Van den Bergh eds., 2d ed. 2012).

6. *See, e.g.*, STEVEN SHAVELL, FOUNDATIONS OF ECONOMIC ANALYSIS OF LAW 571–92 (2004) [hereinafter SHAVELL, FOUNDATIONS] (discussing the various structures of legal intervention); Steven Shavell, *The Corrective Tax Versus Liability as Solutions to the Problem of*

is likely that instruments for environmental compliance also work for GB compliance. In practice, the U.S. government has contributed to GB compliance through law and policy, using different instruments to engage different stakeholders.[7] In this way, the GB movement in the United States not only survives but also thrives.[8]

The joint use of instruments is also what one can observe in practice. Then, the question can be asked why the joint use makes sense in theory. To advocate for the joint use of instruments for GB promotion, this article proceeds as follows: after this introduction, this article briefly explains what it means to build green and what specific challenges are faced by green building (Part II). Next, this article describes why, in theory, a mix of instruments might be better suited than the use of one particular framework, from a law and economic perspective (Part III). The types of instruments at work for environmental compliance are classified into command-and-control, market-based, and suasive instruments, most of which are run by governments, individuals, or professional associations. However, none of those instruments can be free from imperfect information, high costs, private interests or the inaccuracy of measurement. Where government failure, liability failure, and the failure of self-regulation may occur, a joint effort is thus needed. Then this article considers the instruments at work for GB compliance to examine which instruments

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Harmful Externalities, 54 J.L. & ECON. 249, 250–65 (2011) [hereinafter Shavell, *The Corrective Tax*] (discussing the merits and demerits of corrective taxation, regulation, and imposition of liability); Michael G. Faure, *The Complementary Roles of Liability, Regulation, and Insurance in Safety Management: Theory and Practice*, 17 J. RISK RES. 689, 689–702 (2014) (discussing the interaction of liability rules, regulation and insurance to address safety hazards); Daniel C. Esty, *Red Lights to Green Lights: From 20th Century Environmental Regulation to 21st Century Sustainability*, 47 ENVTL. L. 1, 24–42, 59–63 (2017) (proposing a new incentive structure and regulation framework to improve environmental policy).

7. *See, e.g.*, Green Building Certification Systems for Federal Buildings, 79 Fed. Reg. 61,563–71 (Oct. 14, 2014) (codified at 10 C.F.R. §§ 433, 435, 436).

8. *See generally* BLDG. DESIGN + CONSTR., GREEN BUILDINGS AND THE BOTTOM LINE 1 (2006), http://www.lafarge-na.com/BD&C%20White%20Paper%2006.pdf (noting that green building was seeing success in all construction markets); *See also* MCGRAW-HILL CONSTR., RESIDENTIAL GREEN BUILDING SMARTMARKET REPORT 4 (2006), http://ferriercustomhomes.com/MHCResidentialGreenBuildingSmartMarketReport.pdf ("[B]y 2010, between 5% and 10% of new construction starts (both commercial and residential) will be green projects."). In the next couple of years the GB movement in the United States seemed to be more robust than expected. By the year 2013, green building was "becoming standard practice in the United States." Even in the face of a downturn and in time of transition for the U.S. economy, the number of GBs still increased dramatically between 2008 and 2011. MCGRAW-HILL CONSTR., *supra* note 2, at 40. To date, "a strong shift to green is still evident in the US," with commercial and institutional owners, as well as consumers showing strong interests in building green. DODGE DATA & ANALYTICS, *supra* note 3, at 35.

have been put in place and whether this constitutes a joint use (Part IV). This article separately reviews some of the empirical evidence concerning the effectiveness of the specific instruments (Part V). Part VI concludes.

II. GREEN BUILDING AND ITS CHALLENGES

A. Key Elements of Green Building

GB compliance in its early times relied largely on technical industry-made standards used to certify a building as green. The commonly used GB rating systems, especially the Leadership on Energy and Environmental Design (LEED),[9] the Building Research Establishment Environmental Assessment Method (BREEAM)[10] and the Green Globe,[11] identify the five principal elements of GB: energy efficiency, land use, indoor air quality (IAQ), water use, and construction/demolition (C/D) waste management. Performances on the five elements should be reaped throughout a building's lifecycle, getting different stakeholders involved.[12]

Energy efficiency takes into account in-use energy and energy embodied,[13] oftentimes associated with greenhouse gas (GHG)

9. The LEED is an industry-based certification system established by the United States Green Building Council (USGBC), who "works with government, member businesses and allied organizations to support policies and programs that advance greener buildings and communities." *About LEED*, USGBC, https://www.usgbc.org/node/10119744 (last visited Sept. 25, 2018). As of 2016, LEED was the "the world's most widely used green building rating system, with nearly 80,000 projects participating in LEED across 162 countries." Cecilia Shutters & Robb Tufts, *LEED by the Numbers: 16 Years of Steady Growth*, USGBC: LEED (May 27, 2016), https://www.usgbc.org/articles/leed-numbers-16-years-steady-growth.

10. BREEAM was invented by the Building Research Establishment, which was a government establishment devoted to the research for the construction and built environment sectors in the UK. *Our History*, BRE GROUP, https://bregroup.com/about-us/our-history/ (last visited Sept. 25, 2018). The BREEAM is widely-used within the EU, taking up an 80% share of the GB rating market. *Why BREEAM*, BREEAM, https://web.archive.org/web/20160510021519/http://www.breeam.com/why-breeam (last visited May 11, 2016).

11. The Green Globes system was originally developed by ECD Energy and Environmental Canada Ltd., which specializes in assessment and rating services. The Green Globes prevails mainly in Canada and the U.S. as a self-assessment certification tool. *About*, GREEN GLOBES, http://www.greenglobes.com/about.asp (last visited Sept. 24, 2018).

12. *See* AM. INST. OF ARCHITECTS, INTEGRATED PROJECT DELIVERY: A GUIDE 2–5 (2007), http://info.aia.org/siteobjects/files/ipd_guide_2007.pdf; AM. INST. OF ARCHITECTS, AIA GUIDE TO BUILDING LIFE CYCLE ASSESSMENT IN PRACTICE 9–10 (2010), http://www.aia.org/aiaucmp/groups/aia/documents/pdf/aiab082942.pdf.

13. *See* USGBC, LEED V4 FOR BUILDING DESIGN AND CONSTRUCTION 66–68 (2016), https://www.usgbc.org/sites/default/files/LEED%20v4%20BDC_07.2.18_current.pdf; T. Ibn-Mohammed et al., *Operational vs. Embodied Emissions in Buildings – A Review of Current Trends*, 66 ENERGY & BLDG. 232–45 (2013).

emissions. Standards on land use require building work not to do harm to properties in the vicinity or in areas of ecological concern, such as wildlife habitats.[14] In the meantime, GB compliance can be a way to cure contaminated land (brownfields).[15] IAQ standards promote the safe exposure to chemicals released indoors, such as volatile organic compounds (VOCs), and thus reduce sick building syndromes.[16] Water use is measured in terms of outdoor and indoor water use, e.g. water used for gardens and appliances, or that consumed during construction processes.[17] C/D waste management usually goes through two processes required in a rating system, one of which is to collect, sort and store waste before delivering to disposal sites; another is landfill diversion, which can be further grouped into waste disposal and recovery treatment.

By its definition, GB compliance has gone beyond energy efficiency and appears to be a mix of different environmental elements. In other words, GB compliance is holistic in scope, integrative in process, which hints at the challenges ahead.

B. Challenges

A higher initial cost has been reported as the top challenge facing GB compliance.[18] The higher initial cost of GB may be a result of high-end GB technologies and materials (the "hard costs") and the payment for GB certifications (the "soft costs").[19] Yet it has been shown that GBs are getting cheaper by virtue of increasing knowledge about GB and a rising number of GB service suppliers.[20] The obstacle of higher

14. *See id*. at 13 (listing avoidance of critical habitats as a construction requirement).

15. *See id.* at 14, 15 (listing Brownfield remediation activities as a construction requirement).

16. *See, e.g.*, TOM TAYLOR & HELEN PINEO, BREEAM, HEALTH AND WELL-BEING IN BREEAM 6 (2015), http://www.breeam.com/filelibrary/Briefing%20Papers/99427-BREEAM-Health—-Wellbeing-Briefing.pdf (noting that "[p]oor indoor air quality is likely to contribute to Sick Building Syndrome"); USGBC, *supra* note 13, at 107–10 (detailing minimum indoor air pollutant construction requirements).

17. *See* USGBC, *supra* note 13, at 51–65 (outlining multiple water consumption requirements).

18. DODGE DATA & ANALYTICS, *supra* note 3, at 18.

19. *See* WORLD GREEN BLDG. COUNCIL, THE BUSINESS CASE FOR GREEN BUILDING: A REVIEW OF THE COSTS AND BENEFITS FOR DEVELOPERS, INVESTORS AND OCCUPANTS 20 (2013), http://www.worldgbc.org/files/1513/6608/0674/Business_Case_For_Green_Building_Report_WEB_2013-04-11.pdf (defining hard costs and soft costs of building design and construction).

20. *See* LISA FAY MATHIESSEN & PETER MORRIS, DAVIS LANGDON, COST OF GREEN REVISITED: REEXAMINING THE FEASIBILITY AND COST IMPACT OF SUSTAINABLE DESIGN IN THE LIGHT OF INCREASED MARKET ADOPTION 3 (2007), http://sustainability.ucr.edu/docs/leed-cost-of-green.pdf (finding "no significant difference in average cost for green buildings as

initial cost may be exacerbated by stakeholders' misperception that GBs are exclusively high-end projects. This could be the case in jurisdictions where GB development is just looming on the horizon and where there is imperfect information about GB.

The lack of incentives could be another reason why the GB movement has not topped out in some areas.[21] First of all, GB compliance pays off slowly, which may lead stakeholders to be less willing to pay given the higher initial cost.[22] Though building green costs more, as it happens either in reality or in perception, such costs can be offset by the payoffs gained throughout a building's life cycle.[23] However, the payoffs may come in a marginal way over a long term,[24] in which case end-users may overlook the benefits due to "rational inattention."[25]

Second, GB compliance calls for joint efforts from different building stakeholders, but not all of them will make a move in the face of split incentives.[26] Those who invest in GBs may not be the immediate beneficiaries of GB compliance.[27] For instance, a GB developer may pay for a high-end heating, ventilation, and air-conditioning (HVAC)

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compared to non-green buildings"); WORLD GREEN BLDG. COUNCIL, *supra* note 19, at 8 ("While there can be an additional costs associated with building green as compared to a conventional building, the cost premium is typically not as high as is perceived by the development industry."). As a result, perceived higher initial costs are considered less of a challenge to GB construction now than they once were. *See* DODGE DATA & ANALYTICS, *supra* note 3, at 18 (showing that "the percentage [of study participants] that consider [higher perceived first costs] a top challenge has shrunk by 26 percentage points since 2012").

21. *See* DODGE DATA & ANALYTICS, *supra* note 3, at 19 (listing lack of political support or incentives for green buildings as a top concern among developing countries).

22. *See* WORLD GREEN BLDG. COUNCIL, *supra* note 19, at 29 (discussing life cycle cost assessment as a tool to show the long-term payoffs for high initial costs of green buildings).

23. *See id.* at 19.

24. On global average, the payback period of building green is eight years, but this may differ across jurisdictions. For instance the average payback period in China is six years versus seven to eight years in the US. DODGE DATA & ANALYTICS, *supra* note 3, at 6, 37, 43.

25. *See* James M. Sallee, *Rational Inattention and Energy Efficiency*, 57 J.L. & ECON. 781, 781–820 (2014) ("The idea behind rational inattention is that when information is costly to acquire, decision makers may sometimes choose to act on incomplete information rather than incur the cost to become perfectly in- formed.").

26. *See* GRETCHEN CALCAGNI, HOUSEHOLD WILLINGNESS TO PAY FOR IMPROVED ENERGY EFFICIENCY IN THE U.S RENTAL HOUSING MARKET: IMPLICATIONS FOR ROCKY MOUNTAIN INSTITUTE'S SUPEREFFICIENT HOUSING INITIATIVE iv (2012), http://dukespace.lib.duke.edu/dspace/bitstream/handle/10161/5379/GC%20MP%20Final.pdf?sequence=1 (showing that occupiers of larger rental units are willing to pay considerably more for energy efficiency improvement than those who live in smaller units).

27. *Cf.* Jesse Melvin, *The Split Incentives Energy Efficiency Problem: Evidence of Underinvestment By Landlords*, 115 ENERGY POL'Y 342, 342 (2018) (discussing how landlords have little incentive to invest in energy saving technology when tenants pay for utilities).

system to improve the energy efficiency of a building, though the tenants who pay for energy bills actually benefit from the savings. In that case, tenants prefer living in a GB as it provides them with a financial benefit, but developers with "short-term investment horizons" may not prefer GB development.[28]

Low public awareness also impedes GB compliance.[29] Such lack of awareness can result from the stakeholders' misperceptions about building green. First, GBs might be mistaken as high-end projects rather than "business as usual" buildings, despite the rising environmental awareness[30] that has in some ways driven consumers to purchase green products.[31] Second, building stakeholders may not be well-informed about the benefits of GB. For instance, in the case of green leasing, landlords may show less willingness to carry out green renovations due to the split incentive problem. However, such unwillingness might be lessened if the landlords knew that GB compliance can result in a higher rent or asset price of an office building,[32] which could make GB renovations cost-effective. Apart from the cost-effectiveness, environmental benefits may render building green an ethical choice, which has been one of the triggers that raises GB activity level.[33] Such an ethical motivation might resonate with environmental non-governmental organizations (ENGOs) but fail to inspire individuals due to a "causal inefficacy."[34] Lastly, greening a building is a "design-bid-use" process wherein GB suppliers and

28. *See* Avis Devine & Nils Kok, *Green Certification and Building Performance: Implications for Tangibles and Intangibles*, 411 J. PORTFOLIO MGMT. 151, 158 (2015) (finding that "both LEED and BOMA BEST certification lead to an increased probability of lease renewal").

29. NINA KHANNA ET AL., LAWRENCE BERKELEY NAT'L LAB, REPORT NO. LBNL 6609E, COMPARATIVE POLICY STUDY FOR GREEN BUILDINGS IN U.S. AND CHINA 29 (2014), https://china.lbl.gov/sites/all/files/green_buildings_policy_comparison.pdf; *see* DODGE DATA & ANALYTICS, *supra* note 3, at 43 (finding a lack of public awareness to be a challenge to green building).

30. *See* DODGE DATA & ANALYTICS, *supra* note 3, at 5, 18.

31. *See* Shu-Hui Lan & Tzu-Chun Sheng, *The Study on Key Factors of Influencing Consumers' Purchase of Green Buildings*, 7 INT'L BUS. RES. 49, 59 (2014) ("'The awareness of environmental protection' is the secondary factor to impact the consumers to purchase the green building.").

32. Piet Eichholtz, *The Economics of Green Building*, 95 REV. ECON. & STAT. 50, 61 (2013).

33. *See* DODGE DATA & ANALYTICS, *supra* note 3, at 14 (noting that viewing green building as "the right thing to do" triggered construction of green buildings).

34. The idea of causal inefficacy in environmental ethics is that an individual is less likely to take green actions, e.g. fixing up the energy efficient HVAC system, when s/he knows that the action could make little difference in solving large-scale environmental problems, such as GHGs emission reduction. *See* James Garvey, *Climate Change and Causal Inefficacy: Why Go Green When It Makes No Difference?*, 69 ROYAL INST. PHIL. SUPPLEMENTS 157, 157–58 (2011).

consumers need to work together.[35] Yet such coordination with building professionals may be unlikely, since the building industry is where the customers' feedback matters least.[36] In that case, the actual users are less likely to use the GB in ways that can maximize the benefits of GB if they are not well-informed by the building professionals.

III. THEORETICAL FRAMEWORK

From the above, it may be clear that green buildings could have many social advantages and promote sustainability, but that there are quite a few obstacles that explain why green building may not occur spontaneously. This suggests a need for using legal instruments (Subsection A). A variety of legal and policy instruments could be used to promote green buildings. Each instrument has advantages and disadvantages, and some may be better suited than others (Subsection B). The specific problems of instruments used in isolation show the need to develop a smart instrument mix to promote green building (Subsection C). Subsection D concludes.

A. Why Law Matters

1. Law Shapes Change

GB compliance recasts the way human beings shape the built environment and thus can be viewed as a novel change in response to the environmental concerns around buildings. To create a novel change, as North pointed out, one must know correctly the three sources of a novel change: first, an increasing stock of knowledge, demographics, and the institutional matrix;[37] second, incorporation of

35. SUAT GUNHAM & YILMAZ HATIPKARASULN, AM. SOC'Y FOR ENG'G EDUC., AC 2012-3960, SCOPE OF PRECONSTRUCTION SERVICES IN GREEN BUILDING PROJECTS 3 (2012), https://www.asee.org/file_server/papers/attachment/file/0002/2357/Scope_of_Preconstruction_Services_in_Green_Building_Projects.pdf (discussing project delivery method choices for green building projects, such as Design-Bid-Build, Construction Management at Risk, and Design-Build and noting that "[t]here is no doubt that early contractor involvement in the decision making process provides valuable contributions to the project and may significantly change the outcomes including cost, quality and sustainability goals.").

36. AMORY B. LOVINS, ENERGY EFFICIENT BUILDINGS: INSTITUTIONAL BARRIERS AND OPPORTUNITIES 30–31 (1994),https://energyinnovation.org/wp-content/uploads/2014/12/Energy-Efficient-Buildings-Institutional-Barriers-and-Opportunities.pdf ("[R]eal-estate developers remain astonishingly isolated from direct and detailed customer feedback, and any system without feedback is likely to make mistakes.").

37. DOUGLASS C. NORTH, UNDERSTANDING THE PROCESS OF ECONOMIC CHANGES 116–17 (2005).

the new knowledge into the belief systems of those who can make the institutional arrangements;[38] and third, alterations to the institutional matrix composed of formal rules, prominently the law, informal constraints, and the enforcement of the rules to induce desirable outcomes.[39]

Among other factors, the institutional matrix shapes the incentive structure, which can be altered accordingly to deal with the attributes of public goods and the externalities and information problems that cannot be fixed by the market itself.[40] The Coase Theorem tells us that the market can correct itself if property rights are perfectly assigned, enforcement of contracts impose little to no transaction costs, preferences are homogeneous, and parties are rational persons.[41] Because these ideals do not exist in the real world, novel institutional changes are needed to overcome the problems that cannot be solved completely by the market.[42]

However, the alterations may not spontaneously take place, where the rules and the players living on the existing institutional matrix may collaborate to make the GB development overwhelmingly incremental and path-dependent.[43] As part of the institutional framework, law may also affect the incentive structure on different levels. But lawmakers should be aware that law cannot overcome all the challenges in a novel situation, such as the limits of human knowledge or slowly changing preferences. To deal with these challenges, law should not only provide constitutional and collective rules that decide what is desirable for the society but also put more weight on operational rules that lay out how the collective decisions can be implemented. The operational rules usually take the form of specific regulations or property and liability

38. *Id.*

39. *Id.*

40. *Id.* at 49.

41. *See generally* Ronald Coase, *The Problem of Social Cost*, 3 J. L. & ECON 1, 1–44 (1960). This theory aside, a recent experimental result shows that property rights (absolute rights) may not impact that much on efficiency as expected in theory. The experiment went by three situations: a) there is an absolute property right, but it is initially given to the party who places less value on it; b) the property is initially given to the party who values it more, but the other party can take it without paying any price; c) if the two parties cannot reach a contract, the property will be scraped and be worthless. The lab found that the three scenarios of bargaining did not differ significantly in terms of efficiency and the price at which the conveyance occurred. Of note, the game therein was played without considering any transaction costs and time limit though, with only two parties involved. *See* Oren Bar-Gill & Christoph Engel, *Bargaining in the Absence of Property Rights: An Experiment*, 59 J.L. & ECON. 477, 477–93 (2016).

42. NORTH, *supra* note 37, at 7.

43. DOUGLASS C. NORTH, TRANSACTION COSTS, INSTITUTIONS, AND ECONOMIC PERFORMANCE 10–13 (1992).

rules and may have direct impacts on individual decision making. Those individuals' perceptions and mental models on risks, uncertainties, and information may in turn affect the implementation of rules.[44] In other words, it is the interaction between the rules and the players that makes a novel change happen incrementally, and lawmakers should take into account how the players in the market react to the rules, apart from formulating the rules carefully.

2. Law Provides Incentives

Law can spell out the incentive structure regarding who will build green and for what purpose. Governments can use the law to mandate GB compliance and to impose punishment; elsewhere, the incentives can take the form of tax reductions, subsidies, funds, or an emissions trading system that can lead to financial benefits or losses. Also, the law can shape the incentive structure through property rules and liability rules.[45]

For instance, GB compliance can require a reuse of brownfields that have been left in the public domain.[46] However, land reclamation is not without costs and the parties at stake may not take measures spontaneously, particularly in the face of a state property regime. The state property regime is when the ownership of a property resides with the citizenry at large while the management of the property is controlled by the government. If the government fails to take care, a possible result of contaminated land would be "*de jure* state property, but *de facto* open access,"[47] which may lead to the "tragedy of the

44. ELINOR OSTROM, UNDERSTANDING INSTITUTIONAL DIVERSITY 103 (2005).

45. The idea is that, on the one hand, the allocation of entitlements may affect the ways in which resources are used. On the other hand, liability rules may affect stakeholders' level of care or the level of activity. Property rules and liability rules may have different implications, taking into account which is a party of transaction costs. Generally, property rules can score better than liability rules in protecting possessive rights, as property rules reduce the need of bargaining. Put differently, the owner of the property does not need to bargain with all the potential takers if s/he places more value on the property. When the takers are likely to do harm to the entitlement of the property, the owner can use injunctive remedies. By contrast, there is a prima facie case showing that liability may be superior to address harmful externalities, particularly when bargaining is impossible or/and the state has imperfect information about individual acts. In that case, the victim tends to sue the injurer for damages when the harm was done. This general idea can be further reflected in five case scenarios where the different rules interplay to assign entitlements and address pollution. For a more detailed discussion on the implications of the two rules see Louis Kaplow & Steven Shavell, *Property Rules Versus Liability Rules: An Economic Analysis*, 109 HARV. L. REV. 713, 713–90 (1996). *See also* Daniel W. Bromley, *Property Rules, Liability Rules, and Environmental Economics*, 12 J. ECON. ISSUES 43, 43–60 (1978).

46. *See* USGBC, *supra* note 13.

47. Daniel W. Bromley, *The Commons, Common Property and Environmental Policy*, 2

commons." Hence some have proposed lender liability as a vicarious liability to promote GB compliance on brownfields.[48]

3. Law Shapes Preferences

Law as part of the institutional framework may in a broader sense deliver the knowledge to the public and steer preferences. The real world is a mix of both competitive situations and social dilemmas, in which players need to take institutions seriously as not all individuals in all situations are self-interested rational egoists.[49] Different stakeholders may have different reasons to comply, such as economic rationality, situational rationality, and habits or reputation.[50] Norm-following individuals take into account other people's interests as well as their own.[51] It is likely that parties choose to comply with a rule simply because it is the rule. If GB compliance becomes part of the law, law-abiding parties will pursue GB.

Equally important is the way in which law works with individual perceptions and behavior to impact the effectiveness of legal intervention. Individuals may act upon intrinsic motivations related to how they prefer to behave,[52] and social norms may lead players to behave in a certain way, on account of how strongly they value compliance with a norm.[53] In general, consumers' choices for green products, such as GBs and hybrid cars, may have more to do with social norms than changes in relative prices.[54]

It has also been shown that external intervention via monetary incentives or punishments are likely to affect intrinsic motivation in two ways. On the one side, external intervention may crowd-out

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ENVTL. & RESOURCE ECON. 1, 13 (1992).

48. Darren A. Prum, *Greenbacks for Building Green: Does a Lender for Sustainable Construction Projects Need to Make Adjustments to Its Current Practices?*, 43 ENVTL. L. 415, 432–33 (2013).

49. OSTROM, *supra* note 44, at 127–31.

50. Some studies have shown that individuals as well as firms can have different motivations to comply with laws and regulations. Sometimes corporations are motivated by economic rationality. For instance, in a game with regulators, firms are said to cooperate in order to minimize regulatory costs. Other times, corporations and/or executives choose to comply because they value their reputations, or because of a sense of social responsibilities and conformity with the rules. *See* Kevin Marechal, *Not Irrational But Habitual: The Importance of "Behavioral Lock-in" in Energy Consumption*, 69 ECOLOGICAL ECON. 1104, 1104–14 (2010).

51. OSTROM, *supra* note 44, at 112.

52. *Id.*

53. *Id* at 127–29.

54. WILLIAM J. CONGDON, JEFFREY R. KLING & SENDHIL MULLAINATHAN, POLICY AND CHOICE: PUBLIC FINANCE THROUGH THE LENS OF BEHAVIORAL ECONOMICS 113 (2011).

intrinsic motivations if the individuals affected see them as controlling, in which case self-determination and self-esteem suffer.[55] On the other side, external interventions can also crowd-in intrinsic motivation if the individuals concerned perceive it to be supportive.[56] The motivation crowding theory also has some implications in environmental governance, for which the effect of pricing instruments remains in doubt. For instance, a study has shown that subsidization policy may have a negative effect on innovation and entrepreneurship.[57] This may signal that, apart from controlling as a way of external interventions, the government can also work to the intrinsic motives of individuals, using persuasion or nudges, as is the case with the Opower program in the United States.[58]

B. Instruments

There are a variety of instruments that could be used to promote GB. One example is voluntary industry standards, also known as self-regulation. As mentioned in the introduction, even the definition of self-regulation is largely based on industry standards. However, notwithstanding the traditional importance of self-regulation, this article does not discuss self-regulation in the framework of legal instruments because self-regulation is not mandated by law.[59] Because self-regulation in the form of voluntary industry standards has not sufficiently led to the promotion of GB, other types of government intervention may be necessary. This article argues below that precisely the insufficiency of self-regulation is one of the reasons why it is necessary to look for a smart mix that combines legal and policy instruments.[60]

The traditional distinction made in the literature on instrument choice is between the so-called command and control instruments (1), market-based instruments (2) and suasive instruments (3). This article discusses each in turn as well as their potential to play a role in green building.

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55. *See* Bruno S. Frey, *How Intrinsic Motivation is Crowded out and in*, 6 RATIONALITY & SOC'Y 334, 334–52 (1994).

56. *See id.*

57. *See* Bruno S. Frey & Reto Jegen, *Motivation Crowding Theory: A Survey of Empirical Evidence*, 15 J. ECON. SURV'S. 589, 589–611 (2000).

58. *See infra* Part IV.C, Part V.

59. In some cases, government regulation may require compliance with voluntary industry standards, in which case there is a hybrid between government and self-regulation.

60. *See infra* Part III.C and accompanying footnotes.

1. Command-and-Control

The command-and-control instruments are used as direct governmental interventions.[61] The command-and-control approach takes the form of mandates, in which case noncompliance with standards leads to punishment imposed by governments.[62] Examples include licensing, planning, and permitting, most of which are ex ante in character.[63]

The license may come as a wholesale approval on all the elements of a GB, where the government may require a submission of green building documents, such as a checklist before issuing land use entitlements or a construction permit.[64] Other times, the GB features may be individually reviewed during the licensing process on each environmental element, such as a license on producing tolerable construction noise,[65] a license to dispose chemical waste,[66] or an annual license for construction and demolition debris landfill.[67]

GB compliance can also be used in land-use planning or zoning. Land use for large-scale projects and urban development can pose far-reaching environmental impacts, where the GB can play a part to reduce those impacts. There are two basic ways in which the GB development may affect land planning and zoning. First, a GB may bring environmental benefits such as a more efficient transportation network that reduces tailpipe emissions or the redevelopment of brownfields.[68] Land use for GB development can be planned within the local boundary[69] and incorporated into an "extra-local" urban

61. Wallace E. Oates & William J. Baumol, *The Instruments for Environmental Policy*, *in* THE ECONOMICS OF ENVIRONMENTAL REGULATION 91, 101–04 (Wallace E. Oates ed., 1996).

62. ALFRED ENDRES, ENVIRONMENTAL ECONOMICS: THEORY AND POLICY 108–09 (2011).

63. *See, e.g.*, Beatriz Junquera & Jesús Ángel Del Brío, *Preventive Command and Control Regulation: A Case Analysis*, 8 SUSTAINABILITY art. 99, at 1–4 (2016) (analyzing the effects of preventive command-and-control environmental regulation in the automotive industry).

64. Stephen R. Miller, *Enforcement of Local Green Building Ordinances Integrating Third Party Rating Systems*, 27 CAL. REAL PROP. J. 54, 61 (2009).

65. *How to Complete and Submit Construction Noise Permit (CNP) Application Forms*, ENVTL. PROT. DEP'T OF THE GOV'T OF THE HONG KONG SPECIAL ADMIN. REGION, ENVT'L PROT. DEP'T: GUIDANCE NOTES FOR LICENCE APPLICATION, https://www.epd.gov.hk/epd/english/application_for_licences/guidance/cnp.html (last visited Sept. 29, 2018).

66. *See* Waste Disposal Ordinance (2015) Cap. 354, § 3–8 (H.K.).

67. *See* OHIO EPA, *Construction and Demolition Debris (C&DD)*, http://www.epa.ohio.gov/dmwm/Home/C-DD.

68. *See* USGBC, *supra* note 13, at 12, 15.

69. For instance, the Boston Zoning Code was amended in 2007 to require that all projects subject to the city's Large Project Review process should be certified by the LEED system. BOS., MASS., ZONING CODE §§ 37-1–8 (2018).

development.[70] Also planning for GB development may keep buildings off a piece of land where they may cause inevitable or irreversible environmental harm.[71]

2. Market-based Instruments

Market-based instruments avail financial incentives or disincentives, which induce the desirable level of care or the level of activity. Yet none of the market-based instruments in isolation can achieve the desirable care and activity levels simultaneously.[72] Instruments of this type could take the form of liability,[73] subsidies, taxation, or public procurements.

Liability for indoor air pollution and land contamination can provide incentives for GB compliance. Poor IAQ may lead to sick building syndrome (SBS) or building-related illness.[74] Those who suffer from the exposure may file a suit on the basis of negligence,

70. For instance, China and Singapore had made joint efforts into an eco-city project known as the Sino-Singapore Tianjin Eco-city ("中新天津生态城"), where all buildings within the city meet GB standards via integrated design. Further details on the project will be provided in the China chapter. *See* Singapore Government, *Tianjin Eco-city: Introduction*, SINO-SINGAPORE TIANJIN ECO-CITY: A MODEL FOR SUSTAINABLE DEVELOPMENT, http://www.tianjinecocity.gov.sg/bg_intro.htm (last updated Aug. 25, 2017).

71. *See infra* note 197 (Part IV, Section A. at 23).

72. For instance, a study shows that taxation and liability differ in their ways of affecting the level of care or level of activity. In cutting down pollution, a corrective tax may score better than liability as a means of controlling general pollution when the quantity of pollution determines the harm. This is because corrective tax may not affect the parties' level of care as it is levied based on expected harm and fixed tax rate, which means once the parties get involved, there is rarely an excuse for parties not to pay. Strict liability can also help reduce the level of activity by the same token. By contrast, negligence may give the injurer an escape as long as she takes due care in preventing the harm, where the liability of negligence can help higher the level of care. *See generally* Shavell, *The Corrective Tax*, *supra* note 6.

73. Liability can be thought of as a market-based approach, since it has little to say ex ante about what the standards on emissions are and what measures should be taken to meet the standards. In that case, parties on the market can make their own decisions based on the given incentives, and the information about harm and acts will be largely possessed by private parties. SHAVELL, FOUNDATIONS, *supra* note 6, at 575–76 (2004).

74. The term "sick building syndrome" (SBS) is used to describe situations in which building occupants experience acute health effects that appear to be linked to time spent in a building, but no specific illness or cause can be identified. By contrast, the term "building related illness" (BRI) is used when symptoms of diagnosable illness are identified and can be attributed directly to airborne building contaminants. In the case of BRI, building occupants complain of symptoms associated with acute discomfort, e.g., headache; eye, nose, or throat irritation; dry cough; dry or itchy skin; dizziness and nausea; difficulty in concentrating; fatigue; and sensitivity to odors. *See* EPA, AIR AND RADIATION 6609J, INDOOR AIR FACTS NO. 4: SICK BUILDING SYNDROME (1991), https://www.epa.gov/sites/production/files/2014-08/documents/sick_building_factsheet.pdf.

constructive evictions, or worker's compensation.[75] Yet the IAQ-related liability may be understated in environmental law, which mainly deals with outdoor air quality.[76]

Liability for contaminated land can be another way to encourage GB compliance. The transportation, storage, usage, and disposal of building materials and construction wastes are likely to cause harm to land. In a suit against the injurer, liability for land contamination caused by waste disposal does not differ much from the traditional environmental tort liability.[77]

In recent decades, lender liability has been prevalent in the US. Lenders who grant loans to building projects may be responsible for the damages on land reclamation.[78] Liability is mostly harm-based and deals more with negative externalities.[79] In that sense, liability is generally a difficult instrument to promote GB performance in a way that generates positive externalities, such as energy efficiency.[80] The positive externalities problem usually lays the ground for public goods provision, regulation, or subsidies.[81]

Subsidies primarily serve to cover the higher cost of GB compliance. GB compliance can be costly and may not pay off in the

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75. *See infra* Part IV.B, Subsection 4 (Liability).

76. For instance, in the U.S., the Clean Air Act (CAA) and other federal legislation do not have much to say about indoor air quality (IAQ). *See* Pub. L. No. 88-206 (1963), 77 Stat. 392 (codified at 42 U.S.C.ch. 85, subch. I § 7401 et seq.). A bill of the "Radon Gas and Indoor Air Quality Research Act of 1990" was once introduced in the 101st Congress, but it failed to be passed in the end. Despite its failure, the expected bill aimed to establish in the Environmental Protection Agency a program of research on indoor air quality, and tried to provide a nontraditional approach was attempted via public information and technical assistance program. *See All Bill Information (Except Text) for H.R.5155 - Indoor Air Quality Act of 1990*, U.S. CONGRESS, https://www.congress.gov/bill/101st-congress/house-bill/5155/all-info (last visited February 2017).

The USEPA and OSHA provide guidance and information on IAQ management, yet do not regulate IAQ through laws and regulations. *See* OSHA, INDOOR AIR QUALITY IN COMMERCIAL AND INSTITUTIONAL BUILDINGS, OSHA 3430-04 2011, https://www.osha.gov/Publications/3430indoor-air-quality-sm.pdf (last visited February 2017); *Indoor Air Quality*, USEPA, https://www.epa.gov/indoor-air-quality-iaq (last visited February 2017).

77. *See infra* Part IV.B, Subsection 4 (Liability).

78. *See generally* Prum, *supra* note 48.

79. Kaplow & Shavell, *supra* note 45.

80. In recent years, a "negative liability" on positive externalities has been suggested, whereby those who produce benefits would be paid a compensatory award by the gainers. As a matter of law, the negative liability has already existed in the law of restitutions; in a few cases, tort law also supports the negative liability through liability on non-feasance by punishing the failure to produce a positive externality. *See generally* Giuseppe Dari-Mattiacci, *Negative Liability*, 38 J. LEGAL STUD. 21 (2009).

81. *Id*.

short run, so private stakeholders, developers among others, may not be willing to bear the higher initial cost. On that account, some governments provide the stakeholders with subsidies to promote GB compliance. Subsidies can take different forms. In some cases, subsidies will be granted in proportion to the floor-space areas of a building.[82] In another way, a subsidy program may require a building to be certified by a referred rating system.[83]

Taxation can also be used to encourage GB compliance. Governments may award tax reductions on properties certified as green[84]or levy taxes on non-green properties or activities. A typical example is the Pigouvian tax as an attempt to internalize negative environmental externalities.[85] Taxation in this way can advance compliance with a certain GB element, such as a tax on construction wastes disposal.

Finally, by means of green public procurement, governments can use their purchasing power to buy building services or products with less environmental impacts, which may help to jump-start GB compliance.[86] GPP can directly increase GB demand in the short run.[87] In the long run, GPP is likely to make building professionals and customers better aware of GB compliance[88] and hence may indirectly encourage more private parties to engage in GB.

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82. NINA NIRVANA ET AL., COMPARATIVE POLICY STUDY FOR GREEN BUILDINGS IN U.S. AND CHINA, LAWRENCE BERKELEY NATIONAL LABORATORY REPORT NO. LBNL-6609E 44 (2014), https://china.lbl.gov/sites/all/files/green_buildings_policy_comparison.pdf.

83. For instance, in the state of Pennsylvania, a subsidy scheme for schools has been programmed by the government to cover the soft costs of building information modeling, green consultancy & designing, and the certification of the LEED. For more information about the program see the U.S. Department of Energy, High Performance Green School Planning Grant, http://www.portal.state.pa.us/portal/server.pt/community/schools/13838/funding_opportunities/588215 (last visited Oct. 26, 2018).

84. For example, in Baltimore, Maryland, the county council passed a bill stating that new residential construction projects would earn 40%, 60%, and 100% property tax credits for Silver, Gold, and Platinum buildings respectively. *See* BALT., MD., COUNTY CODE, § 11-2-203.2.

85. William J. Baumol & Wallace E. Oates, THE THEORY OF ENVIRONMENTAL POLICY 21–22 (1988).

86. UNITED NATIONS ENV'T PROGRAMME (UNEP), SUSTAINABLE PUBLIC PROCUREMENT: A GLOBAL REVIEW, UNEP FINAL REPORT, 16–24 (Dec. 2013), http://www.unep.org/resourceefficiency/Portals/24147/SPP_Full_Report_Dec2013_v2%20NEW%20(2).pdf.

87. *See* COMM'N OF THE EUROPEAN COMMUNITIES, BUYING GREEN: A HANDBOOK ON GREEN PUBLIC PROCUREMENT, 4 (2016), http://ec.europa.eu/environment/gpp/pdf/Buying-Green-Handbook-3rd-Edition.pdf.

88. Timothy Simcoe & Michael W. Toffel, *Government Green Procurement Spillovers: Evidence from Municipal Building Policies in California*, 68 J. ENVTL. ECON. & MGMT. 413 (2014).

3. Suasive Instruments

The suasive instruments can be taken as information-based tools, using behavioral interventions and private enforcement to promote voluntary compliance.[89]

Environmental information disclosure (EID) can be required from, or provided for, stakeholders to reduce environmental externalities. EID has been used in environmental governance, especially in developing economies where there is a mismatch between the costs and effectiveness of traditional regulatory instruments.[90] Normatively, access to environmental information is a fundamental right laid down in international environmental conventions,[91] while instrumentally, EID proves its value in changing behaviors[92] and helping stakeholders make more sensible decisions related to environmental quality.[93] The law of EID usually enunciates the content, the potential providers and receivers, the way the information will be delivered, and exceptions.

Another suasive instrument could be voluntary environmental agreements (VEAs). They are gaining popularity,[94] and can be used either in isolation or in conjunction with other instruments.[95] A VEA

89. Oates & Baumol, *supra* note 61, at 108–09.

90. WORLD BANK, GETTING TO GREEN—A SOURCEBOOK OF POLLUTION MANAGEMENT POLICY TOOLS FOR GROWTH AND COMPETITIVENESS 123–24 (2012), http://documents.worldbank.org/curated/en/560021468330349857/pdf/716080WP0Box370Getting0to0Green0web.pdf.

91. As stated in the Principle 10 of the Rio Declaration on Environment and Development: "Environmental issues are best handled with the participation of all concerned citizens, at the relevant level. At the national level, each individual shall have appropriate access to information concerning the environment that is held by public authorities, including information on hazardous materials and activities in their communities, and the opportunity to participate in decision-making processes. States shall facilitate and encourage public awareness and participation by making information widely available. Effective access to judicial and administrative proceedings, including redress and remedy, shall be provided." U.N. Conference on Environment & Development, *Rio Declaration on Environment and Development*, ¶ 29–30, U.N. Doc. A/CONF.151/26 (June 3, 1992).

92. *See, e.g.*, Mark Stephan, *Environmental Information Disclosure Programs: They Work, But Why?* 83 SOC. SCI. Q. 190-200 (2002).

93. *See, e.g.*, YANHONG JIN, ET. AL., WORLD BANK DEV. GRP.: ENVT. & ENERGY TEAM, ENVIRONMENTAL PERFORMANCE RATING AND DISCLOSURE: AN EMPIRICAL INVESTIGATION OF CHINA'S GREEN WATCH PROGRAM (2010), http://documents.worldbank.org/curated/en/-497841468011137982/pdf/WPS5420.pdf.

94. *See generally* Allen Blackman et al., *Voluntary Environmental Agreements in Developing Countries: The Colombian Experience*, 46 POL'Y SCI. 335 (2013) (using Colombian examples of voluntary agreements between environmental regulators and polluters to examine trends in the popularity of these agreements in the developing world).

95. *See* OECD, VOLUNTARY APPROACHES FOR ENVIRONMENTAL POLICY: EFFECTIVENESS, EFFICIENCY AND USAGE IN POLICY MIXES 12 (2003),

can be taken as "an agreement or action of self-regulation which is voluntary in character, that involves stakeholders of which at least one is the state."[96] By its definition, a VEA may differ from a command-and-control or a market-based instrument in the following ways.

First, a VEA is voluntary, so they do not require mandatory participation or impose penalties for non-performance.[97] In this way, the enforcement of a VEA may largely rely on self-regulation and employ the least governmental intervention compared to other instruments.[98] In that sense, a VEA is not legally binding, as opposed to a green public procurement contract.[99]

Second, a VEA is an agreement in which at least one of the negotiating parties should be a governmental agency.[100] A VEA can be reached between the industry and the regulator, with environmental NGOs occasionally getting involved as a third-party.[101] A unilateral commitment made by the industry is strictly speaking not a VEA.[102] A VEA can take the form of formal documents such as a memorandum and may at times entail some "informal understandings" whereby the government may informally agree not to invoke regulations later.[103]

Lastly, a VEA may oftentimes be used in conjunction with environmental regulations. On the one hand, it could be formalized on the basis of the objectives and instruments in environmental laws and policies. On the other hand, a VEA can be an experimental response to a new environmental issue, whereby it may lay the foundation for regulations to come.[104]

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http://www.peacepalacelibrary.nl/ebooks/files/C08-0098-OECD-Voluntary.pdf.

96. Betty Gebers, *The Diversity of Environmental Agreements: An International Overview*, *in* CO-OPERATIVE ENVIRONMENTAL GOVERNANCE: PUBLIC-PRIVATE AGREEMENTS AS A POLICY STRATEGY 91, 93 (Pieter Glasbergen ed., 1998).

97. *Id.*

98. Panagiotis Karamanos, *Voluntary Environmental Agreements: Evolution and Definition of a New Environmental Policy Approach*, 44 J. ENVTL. PLAN. & MGMT. 67, 68 (2001).

99. *Id.*

100. Gebers, *supra* note 96, at 93–94.

101. Karamanos, *supra* note 98, at 68–75.

102. Here we adopt a narrow meaning of VEA, upholding that an agreement should at least include two or more parties. Yet there are conflicting views on the typology of VEA, where some researchers may see the unilateral commitment made by firms as a VEA too. *See* Thomas P. Lyon & John W. Maxwell, *Voluntary Approaches to Environmental Regulation*, *in* ECONOMIC INSTITUTIONS AND ENVIRONMENTAL POLICY 75, 76 (Maurizio Frazini & Antonio Nicita eds., 2002) (identifying unilateral commitments as a type of VEA).

103. Matthieu Glachant, *The Setting of Voluntary Agreements between Industry and Government: Bargaining and Efficiency*, 3 BUS. STRATEGY & ENV'T. 43, 43–49 (1994).

104. For instance, there has been a study showing that the "reg-negs" (the "negotiated rule-making") between various groups led to the design of administrative rules based on the

C. The Need for a Smart Mix

The three types of instruments differ in time (i.e. before or after), form (i.e. monetary or non-monetary sanctions), and enforcement level (i.e. public or private enforcement).[105] Yet each of these instruments is susceptible to imperfect information, private interests, the inaccuracy of measurement, and ineffectiveness. Because no instrument in isolation can overcome all of the challenges impeding environmental compliance, a joint use of instruments makes sense.

This article illustrates the need to develop a mix of instruments by first pointing out the limits of government in promoting green building. Next, this article argues that one market-based instrument discussed above, liability rules, likely has a limited applicability to green building. Finally, this article identifies the limits of self-regulation, which cannot on its own internalize environmental externalities in an optimal manner.

1. Government Failure

Promoting GB compliance depends on governmental involvement, but governments may face issues of over-action or inaction (government failure).[106] First of all, governments may not always respond swiftly to environmental problems. This could be a result of regulatory inflexibility or environmental uncertainty. On one hand, governmental intervention by its nature allows less flexibility in order to protect properties from takings or to avoid the misuse of public power.[107] On the other hand, where there is uncertainty, reckless regulation appears to be a disease rather than a cure against the disease.[108]

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involvement and consensus between the interested parties. DAVID WALLACE, ENVIRONMENTAL POLICY AND INDUSTRIAL INNOVATION: STRATEGIES IN EUROPE, THE US AND JAPAN 112–15 (1995).

105. SHAVELL, FOUNDATIONS, *supra* note 6, at 572–74.

106. Barak Orbach, *What is Government Failure?*, 30 YALE J. ON REG. ONLINE 44, 45 (2013).

107. *See* JOHN LOCKE, TWO TREATISES OF GOVERNMENT 360 (Peter Laslett ed., Cambridge Univ. Press 1988) (1690) (arguing that protecting property is the very purpose of government, and the nonconsensual taking of property undermines that duty).

108. For instance, there has been a study showing that where the public has an inaccurate perception of the risks posed by hazardous waste sites, the housing prices will be adversely affected. Then the question arises to what extent the government should address risks that may not be real but "have significant economic consequences in that markets may react to perceptions rather than actual risks." W. Kip Viscusi, *Regulation of Health, Safety, and Environmental Risks*, *in* 1 HANDBOOK OF LAW AND ECONOMICS 591, 599 (A. Mitchell Polinsky & Steven Shavell eds., 2007).

Second, some of the instruments are too costly.[109] Such costs include the amount delivered to the market, as is the case with subsidies or public procurements. Also included are the administrative costs paid to run the institutions and organizations for GB compliance, and the amount may increase for long-term monitoring and enforcement.

Third, governments do not always have enough information to define the optimal level of intervention. For instance, the use of a subsidy conceives of the market as a lens through which the socially desirable volume of goods can be seen,[110] in which case governments may struggle to decide when to cease the subsidy and whether the GB market can function well without the subsidies. After all, a subsidy is just a means to an end and not an end in itself. In the case of taxation, the information problem may also lead to the inaccuracy of the variables of a tax based on expected outcomes.[111]

Last, and by no means least, environmental quality is of public interest, and it may be illusory to say that governments always act on public interest. Though the government as an organization is the actor, individuals within government make decisions. For those individuals, however, "the public interest is mixed with, and is often at odds with, their private and special interest."[112] Chances are that the outcomes of governmental intervention may deviate from the public interest when officials pursue their own agenda.[113]

2. Liability Failure

Liability is meant to deter and compensate environmental harm. But in the case of environmental compliance, the liability regime may fail to provide the correct incentives when it under-deters or under-compensates, or when there are alternatives to make the environment better off than just to deter or compensate on a case-by-case basis.

First, not all environmental harm can be detected and proved. Sometimes there is not a particular victim to file the suit. Even if a victim can be found, the liability system imposes administrative costs

109. *See* Charles Wolf Jr., *A Theory of Nonmarket Failure: Framework for Implementation Analysis*, 22 J.L. & ECON. 107, 124–26 (1979) (discussing how a perceived harm by the public can lead opportunistic political agents to enact redundant or excessive regulation).

110. Julian Le Grand, *The Theory of Government Failure*, 21 BRIT. J. POL. SCI. 423, 438 (1991).

111. *See* Shavell, *The Corrective Tax*, *supra* note 6, at 253–55 (discussing the problems of employing corrective taxes).

112. WALTER LIPPMANN, THE PUBLIC PHILOSOPHY 42 (1955).

113. Le Grand, *supra* note 110, at 435.

on the litigants and the state.[114] In the face of high costs, more than one dollar is spent getting one dollar in compensation. As a result, the caseload may fall below the desirable level when the victims do not take into account the social positive externalities resulting from litigation to compensate ecological losses or deter potential injurers.[115]

Other times, the causation can be hard to prove when there is a lag in time between acts and harm (the "long-tail damage").[116] The causation cannot be set aside in holding parties liable, as liability for minimal harm or without regard to causation will lead parties to take excessive care or to quit the market.[117] Given the uncertainty around causation, the liability regime may avail some rules that reflect such uncertainty, one of which could be the preponderance-of-evidence standard of proof.[118] Yet the preponderance standard may not yield the desirable level of care or activity, at least under strict liability.[119] At some point the preponderance standard may even work worse when coupled with proportionate damages.[120]

Furthermore, being ex post in character, liability may not excel at addressing environmental risks or uncertainty. The liability regime is mostly harm-based, which means it can be enlisted only after the harm

114. Steven Shavell, *Liability for Accidents*, in 1 HANDBOOK OF LAW AND ECONOMICS 139, 151 (A. Mitchell Polinsky & Steven Shavell eds., 2007).

115. *Id.* at 152.

116. Faure, *supra* note 6, at 696.

117. Shavell, *supra* note 114, at 162.

118. The preponderance rule is when a defendant is held liable only if the probability that the defendant caused the loss is over 50%. *Id.* at 162–63.

119. The reason behind this is that the injurer may have no incentive to avoid causing injury if he knows that in any case the possibility that he is the cause of loss will never reach 50%; in a similar vein, if the injurer finds that by no means can he reduce the possibility of being liable, he may not take into account the level of care and increase the product price to cover the potential legal costs. Additionally, the uncertainty around causation may also avail injurers an escape hatch when proximate causation is applied. Where there are atypical or unforeseeable factors interwoven with each other, the injurer may flee from the liability because he is not the proximate cause of loss. But what is foreseeable and what is not will be ruled by the courts, which will probably reduce the incentives of injurers to be informed. *Id.* at 162–64.

120. Proportionate damages here means damages reduced to reflect uncertainty. For instance, if there is 70% chance that the injurer is liable, the damages will be discounted by 30%. There is a study showing that, all else being equal, all-or-nothing damages can do better than the proportionate damages in inducing compliance ex ante; in other words, it would not reduce the deterrence of liability as proportionate damages do. This spells out why the all-or-nothing damages are more commonly used in most of the existing legal systems, in tandem with the preponderance-of-evidence standard of proof. *See* Shmuel Leshem & Geoffrey P. Miller, *All-or-Nothing Versus Proportionate Damages*, 38 J. LEGAL STUD. 345, 345–72 (2009) (comparing the two different damage systems and concluding that all-or-nothing damages create a higher rate of compliance).

occurs.[121] But there might be a time when the outcomes of an activity are uncertain or less than obvious,[122] and it may be too late or too costly to cure when negative consequences result. In that case, a preventive measure would be preferable in light of the precautionary principle, which seems to be less available in the liability regime.

Even if the environmental harm could be successfully detected and proved, the remedies might not always cover the actual losses (under-compensation). This is in part due to an inaccurate measurement on environmental harm, especially when it comes to irreversible harm. Although scientific economics can provide some measurement tools, such as the hedonic pricing method (HPM) or the contingent value method (CVM), these methods are not free from bias,[123] and they might be accused of undermining the intrinsic value of non-human beings.

Additionally, liability undercompensates when a liable party is judgment-proof or unable to pay the damages.[124] One of the solutions to the judgment-proof problem is to seek vicarious liability, in which case parties other than actual injurers, such as lenders of project

121. *See* Shavell, *The Corrective Tax*, *supra* note 6, at 258 (discussing how legal liability for harm can deter potential injurers, but cannot punish them for risks they take until that harm materializes).

122. Particularly with regard to public health, ex post punishment and investigation may be insufficient remedies. In 2016, almost 500 students at a high school near Shanghai, China, had been diagnosed with sickness as the school's new campus located closely to three chemical plants that produced pesticides. The diagnoses ranged from bronchitis and dermatitis to lymphoma and leukemia. The construction permit was granted before a safety assessment was done, at which point nobody was aware of the potential health threat. However, after the outbreak of disease, a separate survey found dangerous amounts of toxic substances, including the chlorobenzene levels that were 78,899 times the safe level in soil, as well as a cocktail of heavy metals such as mercury, cadmium, and lead. *See* Zhang Chun, *Changzhou Pollution Scandal Highlights Holes in China's Environmental Enforcement*, CHINADIALOGUE (Apr. 29, 2016), https://www.chinadialogue.net/article/show/single/en/8892-Changzhou-pollution-scandal-highlights-holes-in-China-s-environmental-enforcement.

123. For example, the HPM only captures people's willingness to pay for perceived differences in environmental attributes, and their direct consequences. Yet if people are not aware of the linkages between the environmental attributes and benefits to them or their property, the value will not be reflected in home prices. In the case of CVM, the measurement may also fall victim to bias when individuals do not necessarily have a strong incentive to think seriously about their answer, or there is a lack of detailed information framing within the contingent scenario the component of willingness to pay questions. *See* SCOTT J. CALLAN & JANET M. THOMAS, ENVIRONMENTAL ECONOMICS AND MANAGEMENT: THEORY, POLICY AND APPLICATIONS 160–65 (6th ed., 2013).

124. A. Mitchell Polinsky & Steven Shavell, *A Note on Optimal Cleanup and Liability After Environmental Harmful Discharges*, 16 RES. LAW & ECON. 17, 22 (Richard O. Zerbe Jr. ed., 1994).

developers, could be held liable.[125] But the vicarious liability may worsen the moral hazard[126] and render the level of activity too high.[127] Moreover, limitations on damages may also result in under-compensation. A statutory or contractual limitation may cap or exempt damages.[128] As such, the liability regime that avails insufficient damages may lead to a too low level of care and a too high level of activity.[129]

Liability insurance may ease the under-compensation problem and in turn lead to under-deterrence.[130] Insurability issues aside, shifting the burden to parties other than the actual injurers will lead to moral hazard, as is the case for the vicarious liability.[131] In the case of moral hazard, the actual injurer's incentive to take precautions decreases as he knows that others will bear the damages. In that case, liability may fail to pose ex ante deterrence on the potential wrongdoers.[132]

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125. Shavell, *supra* note 114, at 171–72.

126. *See* Martin T. Katzman, *Pollution Liability Insurance and Catastrophic Environmental Risk*, 55 J. RISK & INS. 75, 80 (1988) (discussing how joint and several liability can exacerbate moral hazard by spreading risk across an industry and not the defendant who is actually responsible).

127. For instance, lender liability under CERCLA has been shown to "have the unintended effect of increasing the frequency of accidents" under some circumstances. *See* Rohan Pitchford, *How Liable Should a Lender Be? The Case of Judgment-Proof Firms and Environmental Risk*, 85 AM. ECON. REV. 1171, 1183 (1995) (concluding that "with judgment-proof firms and noncontractible precaution, increasing liability of outsider creditors such as lenders could have the unintended effect of increasing the frequency of accidents").

128. For instance, some building professionals would add an exemption clause to a contract so as to be free from the new standard of care required by GB performance. *See* AM. INST. OF ARCHITECTS, Doc. A-201-2007, GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION §15.1.6 (Nov. 17, 2014), http://www.hba.org/wp-content/uploads/2014/11/B-2-AIA-Doc-A201-2007.pdf (detailing contract terms for a waiver of damages between owners and contractors).

129. Shavell, *supra* note 114, at 165.

130. The idea of liability insurance is that a potential injurer can buy ex ante insurance from an insurance company, meaning that once the injurer is held liable for harm, the insurer will pay for the damages per coverage written down in the insurance policy. Recently a type of liability insurance for GB professionals has come into play, hoping that a reduction on occupational risks can encourage those risk-averse building professionals to act upon GB standards. *See generally* David J. Hatem, *Green and Sustainable Design Part I: Professional Liability Risk and Insurability Issues for Design Professionals*, DESIGN & CONSTRUCTION MGMT. PROF. REP. 2 (2010) (discussing "professional liability risk and insurability" issues for design professionals associated with green and sustainable design); Darren A. Prum, *Green Building Liability: Considering the Applicable Standard of Care and Strategies for Establishing a Different Level by Agreement*, 8 HASTINGS BUS. L.J. 33, 61–62 (2012) ("After the owner, the design professional's situation sits squarely at the intersection of all stakeholders in a green building project.").

131. Shavell, *supra* note 114, at 150.

132. Certainly the insurers can encourage the insured to raise their level of care or activity by

Apart from the moral hazard problem, there are other ways in which liability insurance might water down the liability regime. It is likely that liability insurance will become a de facto element of tort when widely used over time.[133] As a result, liability suits will be fettered by liability insurance in terms of damages and coverage.[134] On the one hand, the amount of damages ruled by courts rarely exceeds the policy limit, where the insurers become the only party that pay for the loss.[135] That could exacerbate the moral hazard risk. As such, it is understandable that only suits are brought against insured injurers since those guarantee effective payment. Tort suits beyond the insurance coverage therefore are not regularly presented to the courts.[136]

Lastly, the liability regime alone may not wield total control over environmental quality. The liability regime deters and compensates case-by-case and may not serve the whole picture well. Being ad hoc in implication, liability can be less workable to resolve trans-boundary environmental problems. For instance, if GHG reduction is supposed to be one of the goals of GB compliance, there must be some minimum standards on energy efficiency; otherwise, the reduction reaped in one building will likely be evaporated by the emissions from other less energy-efficient buildings, since GHGs can circulate in the air. Under the liability regime, however, the standard of care determined by the court can be applied only to specific situations.[137]

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fixing the premiums. Yet doing so requires the insurers to have good information about the injurers' level of care, which may sometimes be too costly to get, and thus be the reason to provide flat insurance regardless of the risk potential at an individual level. Gary T. Schwartz, *The Ethics and The Economics of Tort Liability Insurance*, 75 CORNELL L. REV. 313, 319 (1990).

133. In some for-compensation suits, there is a tendency for lawyers to strongly consider the defendant's ability to pay or the mechanism that can be used to compel the defendant to pay, followed by the concerns about damages and proof of liability. Insurance has a fundamental effect on the decision to sue since the insurance company might be the only party that can afford the damages given the escape hatch availed by liability regime, the liquidation of assets in bankruptcy proceedings, and the huge costs of mass environmental harm. *See* Tom Baker, *Liability Insurance as Tort Regulation: Six Ways that Liability Insurance Shapes Tort Law in Action*, 12 CONN. INS. L.J. 1, 4–5 (2005) ("Given the extent of consumer debt, the availability of bankruptcy to discharge civil liabilities, and the existence of limited but important exceptions to the assets that must be liquidated in a bankruptcy proceeding, the practical reality of tort litigation in the United States is that liability insurance is the only asset that plaintiffs can count on collecting.").

134. *Id.* at 5–10.

135. *See id.* at 6 ("For defendants who would not be sued in the absence of liability insurance, the fact that the insurance policy limit functions as a de facto 'cap' on the defendants' tort liability is obvious.").

136. *Id.*

137. *See* Meinhard Lukas, *The Function of Regulatory Law in the Context of Tort Law – Conclusions*, *in* TORT AND REGULATORY LAW 449, 453 (Willem H. van Boom et al. eds., 2007)

Another reason that makes the total control through liability less viable is that the use of a certain liability rule—prominently negligence and strict liability—may not always simultaneously calibrate the desirable level of activity and the desirable level of care at large. In a unilateral case, strict liability may result in the optimal level of care and that of activity taken by injurers, since an injurer's objective is in line with the social objective.[138] In the case of bilateral accidents, strict liability with a defense of contributory negligence leads to both the desirable level of care and level of activity on the injurer side.[139] Yet on the victim side, strict liability with a defense of contributory negligence may lead victims to engage excessively in their activities, as they do not bear the losses when due care has been paid.

Hence, in the end, it is hard to tell in general which liability rule would be most effective. Chances are that strict liability will be more workable if the injurers' level of activity is more important to control; otherwise, the negligence standard will do. In a similar vein, liability under the negligence rule, based on which the injurer is held liable because he fails to take proper precautions, can cause the level of activity to be excessive on the injurer's side.[140] Taken together, neither of the liability rules can reach the optimal level of care and activity on both sides.

3. The Failure of Self-Regulation

Self-regulation has gone beyond its literal meaning as the private ordering independent of government regulation; instead, it is taken as a delegation of rule-making power in a legal context.[141] Self-regulation may outperform governmental regulation in terms of expertise or

(discussing how tort law only specifies general standards of conduct leading to "differences in evaluation").

138. Shavell, *supra* note 114, at 146.

139. *Id.* at 147.

140. *Id.* at 146–47.

141. ANTHONY OGUS, *Self-regulation*, in 9 ENCYCLOPEDIA OF LAW AND ECONOMICS 589–90 (Alain Marciano & Giovanni B. Ramello eds., 2000). There are U.S. laws and regulations incorporating the LEED standards, inter alia those at the local level. *See e.g.,* Cal. Code Regs., tit. 24, Part 11 (2016), chapters 4–8; Wash. Rev. Code § 39.35D.080 (2005). But some of the GB regulations do not expressly refer to a certain version of the LEED system or to any specific requirements. *See id.* The vagueness as such may not accord with the intelligible principle of the non-delegation doctrine, as the rules of a rating system could be changed at the whim of industry rule-makers without due process or government approval. Edward Teyber, *Incorporating Third Party Green Building Rating Systems into Municipal Building and Zoning Codes*, 31 PACE ENVTL. L. REV. 832, 843–44 (2014).

information, flexibility, cost effectiveness,[142] and speeding up innovation with less red tape;[143] meanwhile, it may score better than no regulation when the market fails and cooperation among parties is hard to achieve.[144] However, not all the forms of self-regulation avail those benefits unconditionally.[145]

First of all, better information does not ensure better information processing in any case. It is possible that private parties have better expertise than the government. But not all parties will necessarily act upon what they know, nor will the information always be evenly distributed among private parties. Those problems may as well happen in the case of self-regulation on GB compliance. There are different certifications and standards for GB compliance, which may differ in their requirements on GB performances. Without a minimum bar on what qualifies as a GB, the GB stakeholders are likely to choose a certification system with laxer standards so as to easily "greenwash" their projects.[146] In light of such manipulation, the GB certification may appear less reliable over time.

Second, self-regulation may involve private interest concerns and may not induce competition in a positive way. There are different interest groups that act as self-regulators. Some of them take shape in response to a public problem, as with environmental NGOs. On some occasions, self-regulation consists overwhelmingly of the industry or professionals, who are able to gather as strong lobbies. These lobbies may use its delegated power to reduce competition in the interest of

142. OGUS, *supra* note 141, at 591.

143. *See generally* Christodoulos Stefanadis, *Self-regulation, Innovation, and the Financial Industry*, 23 J. REG. ECON. 5, 5–25 (2003).

144. *See* James C. Miller, *The FTC and Voluntary Standards: Maximizing the Net Benefits of Self-regulation*, 4 CATO J. 897–903 (1985).

145. Industries may comply with environmental standards on a voluntary basis under threat of future more stringent regulation. *See* John W. Maxwell et al., *Self-regulation and Social Welfare: The Political Economy of Corporate Environmentalism*, 43 J.L. & ECON. 583, 583 (2000). There are other conditions in which self-regulation may work. An empirical study has shown that, in pursuit of social welfare, "self-regulation is more likely to yield higher social welfare when uncertainty is higher, when the divergence of interests between producers and consumers is less, or when the government is more populist. In contrast, when uncertainty is low, when the society is polarized on the regulatory issue, or when the producer lobby is strong, social welfare is higher under [regulation] than under [self-regulation]." Peter Grajzl & Peter Murrell, *Allocating Lawmaking Powers: Self-regulation vs. Government Regulation*, 35 J. COMP. ECON. 520, 529 (2007).

146. As the most commonly used GB rating system, the LEED has been accused of manipulating and availing easy points in GB certification. *In U.S Building Industry, Is it Too Easy to be Green?*, USA TODAY (Oct. 24, 2012), https://www.usatoday.com/story/news/nation/2012/10/24/green-building-leed-certification/1650517/.

their members, rather than pursuing goals in the public interest.[147] When governments incorporate industry-based standards into mandates, it is likely that rent-seeking can create perverse incentives through regulation.[148] Once lobbying succeeds, those vested-interest holders are able to create entry barriers on newcomers who may offer more efficient standards.[149] As a result, standards might turn out to be too low to meet the desirable quality; alternatively, they may be so high to go beyond the needs of solving market failures,[150] as there is little outside supervision to attest the proportionality.

Lastly, self-regulation may be abused due to less transparency and accountability. Self-regulation is collective and regulatory in character, whereby it may empower professional associations to control both entry or licensing and performance in some cases.[151] This is slightly different from the case in which governments give licenses for entries, while self-regulatory agencies set or enforce specific standards on performance.[152] But this is not the case for self-regulation in a full sense. Self-regulation can at times be a closed system that "should be subject to external supervision and control in an effort to ensure that . . . power is not abused,"[153] where rules and their enforcement are shaped

147. OGUS, *supra* note 141, at 591–92.

148. ANTHONY OGUS, REGULATION: LEGAL FORM AND ECONOMIC THEORY 108 (1994).

149. OGUS, *supra* note 141, at 591. A case in point could be the LEED referring to the FSC wood products. In an old version of the LEED system, the USGBC required that the wood used in a LEED project should be certified by the Forest Stewardship Council (FSC), which has given rise to a battle between the FSC and another wood certification run by the Sustainable Forestry Initiative (SFI) program. The LEED's exclusive use of the FSC rating system has been accused of violating antitrust laws when adopted by municipal governments. *See* Stephen Del Percio, *Revisiting Allied Tube and Noerr: The Antitrust Implications of Green Building Legislation and Case Law Considerations for Policymakers,* 34 WM. & MARY ENVTL. L. & POL'Y REV. 239, 241 (2009). The USGBC itself has tried to fix the problem. As of 2016, the USGBC seems to open the door to wood certification programs other than the FSC. The USGBC introduced the Alternative Compliance Path (ACP) pilot to close a loophole in the current raw materials credit that required only a certain percentage of wood be FSC-certified. The ACP pilot would require that 100 percent of the wood in a project is verified by a legal source, as defined by ASTM D7612-10. *See* Press Release, Marissa Long, USGBC, USGBC Announces New LEED Pilot ACP Designed to Help Eliminate Irresponsibly Sourced Materials—Like Illegal Wood—From the Building Material Supply Chain (Apr. 5, 2016), https://www.usgbc.org/articles/usgbc-announces-new-leed-pilot-acp-designed-help-eliminate-irresponsibly-sourced-materials%E2%80%94.

150. *See generally* Roger Van den Bergh, *Self-regulation of the Medical and Legal Professions: Remaining Barriers to Competition and EC-Law*, *in* ORGANIZED INTERESTS AND SELF-REGULATION – AN ECONOMIC APPROACH 113 (Bernardo Bortolotti & Gianluca Fiorentini eds., 1999).

151. Thomas G. Moore, *The Purpose of Licensing*, 4 J.L. & ECON. 93, 95 (1961).

152. *Id.* at 97–98.

153. Alan C. Page, *Self-regulation: The Constitutional Dimension*, 49 MOD. L. REV. 141, 142 (1986).

through a less formal procedure, involving less statutory scrutiny and public participation.

Without government or statutory supervision, self-regulation also lacks accountability. This can mean that, on the one side, there are weak constraints to prevent professional associations from preying on the market and on the other side, no one other than the self-regulators will be responsible for the consequences. Such a scenario is unlike co-regulation, where the government is liable for the involvement of self-regulation.[154]

D. Conclusions

The conclusions from these theoretical observations may be relatively straightforward: GB is in society's interest as it promotes sustainability; however, without an adequate legal framework GB will not flourish. The primary function of legal instruments is to provide an institutional framework to lead the stakeholders toward adopting GB. Moreover, given the important expressive value of law, legal rules can equally shape perceptions of stakeholders on the importance of GB.

It is important to consider which instruments from the classic environmental governance toolbox may be most appropriate to promote GB. A variety of traditional command-and-control instruments may serve this goal, but there are limited possibilities for the government to issue efficient command-and-control regulation aiming at the promotion of GB. Market-based instruments could provide efficient incentives to stakeholders, but the limits of some instruments, such as liability rules, reduce the importance of their role. Some suasive instruments, like information disclosure and voluntary agreements, may play a supplementary role, but to the extent that the suasive instruments are part of a self-regulatory framework, they involve the traditional limits of self-regulation in controlling environmental externalities. This article therefore argues that, given the fact that all instruments taken individually have specific shortcomings, a combination of instruments—referred to as a smart mix—may be the proper way to promote green building.

Against this theoretical backdrop, this article now examines which instruments are used in practice to promote GB in the United States.

154. *Id.* at 166.

IV. INSTRUMENTS AT WORK FOR GB COMPLIANCE: THE U.S. CASE

U.S. law often uses many of the instruments discussed in Part III. Most of those can be found in state legislation, although there are examples in federal law as well. Following the discussion in Part III B, this article first provides examples of command-and-control regulation aiming at green building, mostly building permits and land use planning (A). Next, this article shows how, within market-based instruments, financing plays an important role in promoting GB (B). The most important suasive instrument used has been mandatory information disclosure (C). The article focuses specifically on one instrument that recently has gained popularity, the Supplemental Environmental Project, as an example of an instrument mix for GB (D). Section E concludes.

A. Command-and-Control Instruments: Building Permits and Land Use Planning

A possible way to mandate GB compliance is to make it a requirement in building permits, which has been adopted in cities like Chicago[155] and Seattle.[156] Usually, a building permit is ex ante in character, so it may be difficult to ensure a life-cycle compliance. On that account, the City of Pleasanton, California has come up with a Life Cycle Analysis permit, in which case the regulatory process does not end after issuance.[157]

However, when the government makes an industry-based certification a requirement in the issuance of a permit, timing concerns arise. Some of the GB laws at the state or local level require developers to get an industry-based certification, which may sometimes call for final documents that are not available until after construction. For instance, under LEED v. 3.0, building stakeholders must report energy and water-usage data for one year after a building is issued a permit of

155. *See* CITY OF CHI., *Green Permit*, DEP'T OF BLDGS., https://www.cityofchicago.org/city/en/depts/bldgs/supp_info/overview_of_the_greenpermitprogram.html (last visited Sept. 23, 2018).

156. *See* SEATTLE DEP'T OF CONSTR. & INSPECTIONS, *Priority Green Expedited*, GREEN BUILDINGS PERMIT INCENTIVES http://www.seattle.gov/dpd/permits/greenbuildingincentives/prioritygreenexpedited/default.htm (last visited Sept. 23, 2018).

157. According to the city's GB ordinance, it needs to go through four steps for a building permit to be issued. First, the applicant submits application materials and completes "pre-permitting review" in company with a review process for building design; second, a GB official will review the construction prior to issuance of an occupancy permit; third, the GB official then re-inspects the premises after one year; lastly, the GB official re-inspects again after five years, to insure that the building remains in compliance. PLEASANTON, CAL., MUN. CODE § 17.50.070(D)(1–3) (2006).

occupancy.[158] If this reporting requirement is not met, certification can be revoked.[159] The de-certification may lead building professionals to be liable for a failure to achieve the certification, and it is likely that the statutes of limitations would often expire five years after the building is issued a certificate of occupancy.[160]

Increasingly, land use planning is used to promote GBs in pursuit of public health and environmental protection.[161] At the federal level, E.O. 13514, followed by E.O. 13693, has put forward land planning to build up a more efficient transportation network, in conjunction with an environmental impact assessment.[162] Elsewhere, the United States Environmental Protection Agency has used GB compliance as a means to redevelop brownfields,[163] since GB practices can "revive these sites

158. *See* USGBC, LEED 2009 FOR NEW CONSTRUCTION AND MAJOR RENOVATIONS 43–44 (2008), http://www.usgbc.org/Docs/Archive/General/Docs5546.pdf.

159. *Id.*

160. The statute of limitations for common law claims are governed by state statutes and may vary from state to state. *See* Jeanne Schubert Barnum & Levi Jones, *Green Building: Limitations Clock Starts at First Sign of Trouble*, A.B.A. (Sept. 10, 2012), http://apps.americanbar.org/litigation/committees/construction/email/summer2012/summer2012-0912-green-building-limitations-clock.html (documenting a green building related construction case where the state statute of limitations was dispositive).

161. For instance, with regard to land use planning, the model proposed by the Standard State Zoning Enabling Act required that state and local land use regulations should be "designed to lessen congestion in the streets; to secure safety from fire, panic, and other dangers; to promote health and the general welfare; to provide adequate light and air; to avoid the overcrowding of land; to facilitate the adequate provision of transportation, water, sewerage, schools, parks, and other public requirements." *See* A STANDARD STATE ZONING ENABLING ACT (SZEA) § 3 (U.S. DEP'T OF COMMERCE) (1926), http://landuselaw.wustl.edu/StndZoningEnablingAct1926.pdf.

162. *See* Exec. Order No. 13693, Planning for Federal Sustainability in the Next Decade, 80 Fed. Reg. 15871 (Mar. 19, 2015). *See also* Exec. Order No. 13514, Federal Leadership in Environmental, Energy, and Economic Performance, 74 Fed. Reg. 52117 (Oct. 5, 2009) (revoked by Exec. Order 13693, 80 Fed. Reg. 15871 (Mar. 19, 2015)).

163. GBs such as the Brownfields Pilot Projects included: the Springfield in Massachusetts; the National Aquarium in Baltimore's Center for Aquatic Life and Conservation in Baltimore, Maryland; ReGenesis District Redevelopment in Toledo, Ohio; World Headquarters for Heifer International in Little Rock, Arkansas; the Trailnet, Inc. Trailhead Building in St. Louis, Missouri; a Community Culture and Commercial Center in Kauai, Hawaii; and the Volcanic Legacy Discovery Center in Mount Shasta, California. *See* EPA, GREEN BUILDINGS ON BROWNFIELDS INITIATIVE: PILOT PROJECTS FACT SHEET 1–3 (2002), https://nepis.epa.gov/Exe/ZyNET.exe/P1000XR8.TXT?ZyActionD=ZyDocument&Client=EPA&Index=2000+Thru+2005&Docs=&Query=&Time=&EndTime=&SearchMethod=1&TocRestrict=n&Toc=&TocEntry=&QField=&QFieldYear=&QFieldMonth=&QFieldDay=&IntQFieldOp=0&ExtQFieldOp=0&XmlQuery=&File=D%3A%5Czyfiles%5CIndex%20Data%5C00thru05%5CTxt%5C00000015%5CP1000XR8.txt&User=ANONYMOUS&Password=anonymous&SortMethod=h%7C-&MaximumDocuments=1&FuzzyDegree=0&ImageQuality=r75g8/r75g8/x150y150g16/i425&Display=hpfr&DefSeekPage=x&SearchBack=ZyActionL&Back=ZyActionS&BackDesc=Results%20page&MaximumPages=1&ZyEntry=1&SeekPage=x&ZyPURL.

and promote growth and development"[164] in conjunction with the goals and requirements of GB.

As it is highly localized, local planning and zoning codes more frequently require GB compliance. For instance, in Cambridge, Massachusetts, any new or existing building project of 25,000 square feet or more is required to meet GB requirements laid down in the city's Zoning Ordinance.[165] The Zoning Code for the Town of Normal, Illinois also mandates that all new construction should meet the latest LEED standards.[166] Some other cities like Seattle provide expedited permits for GB compliance in its land use code.[167]

Nevertheless, in a legal context, GB compliance may not always be in accord with the existing land use rules. At first blush affordable GB housing sounds like a contradiction in terms, given the higher first cost. The government may require green renovations in a community through land use planning and zoning. Though GB planning may bring environmental benefits to the society at large, it not be affordable to all individuals. In other words, GB planning should take income levels into account. If GB compliance becomes mandatory in those areas, residents who cannot afford to build green may lose places to live. On that account, some state or local governments couple green zoning with ex ante subsidies to help municipalities reach their affordable housing targets.[168]

The second concern around GB compliance involves the preservation of historic and cultural sites. Installations of equipment for energy efficiency, like solar panels or renovations of a HVAC system, may foul a landscape of historic value. The GB law in Illinois deals with this issue by giving exemptions when GB compliance would compromise the historic nature of the structure.[169]

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164. Amy L. Edwards, *When Brown Meets Green: Integrating Sustainable Development Principles into Brownfield Redevelopment*, 18 WIDENER L.J. 861, 870 (2009).

165. CAMBRIDGE, MASS., ZONING ORDINANCE § 22.000 (2011).

166. NORMAL, ILL., CODE § 15.17-14 (1969), Amended 5/18/09 by Ord. No. 5258.

167. *See* SEATTLE DEP'T OF CONSTR. & INSPECTIONS, *supra* note 156.

168. Michael A. Wolf, *A Yellow Light for "Green Zoning": Some Words of Caution About Incorporating Green Building Standards into Local Land Use Law*, 43 URBAN L. 949, 961–62 (2011). As an aside, not only the government but also the USGBC has been aware of this concern. In 2009, the USGBC came up with LEED Neighborhood Development rating system, in which 7 points can be awarded for dwelling units priced for households around or below the average income. *See* USGBC ET AL., LEED 2009 FOR NEIGHBORHOOD DEVELOPMENT RATING SYSTEM 57–59 (2011), http://www.growsmartri.org/training/LEED%20for%20Neighborhood%20Development%20Rating%20System%20v2009%20(Updat.pdf.

169. 20 ILL. COMP. STAT. ANN. 3130/15(e)(4) (LexisNexis 2018).

Lastly, land use regulations often travel with taking claims, which may also plague GB compliance and restrict the use of land. Against the U.S. common law backdrop, GB compliance regarding land use may face less taking claims than other land regulations do.[170] Under U.S. law, regulatory restrictions on land use may count as takings if and only if they reduce the economic value or the utility of properties without a due process and just compensation.[171] GB requirements, unlike other zoning laws, would not completely deny the utility of land, and where possible, may even encourage property owners to make the best use of land, as is the case with brownfields redevelopment. Also, it might be hard for property owners to prove that GB compliance leads to a much lower economic value of the property;[172] at some point GB compliance may even yield financial benefits, like higher premiums for landlords or a lower operation cost for end-users.[173]

In all, it appears that formal regulation often requires compliance with industry codes like the LEED standards. In other cases certification by a private certifier is required. Those are examples of so-called hybrid or co-regulation where the government relies on private standards or certification.

B. Market-based Instruments

1. Tax Reductions

There are many examples of taxation systems at the federal level and in state legislation where taxes for green properties are reduced, rather than imposing higher taxes on non-green properties. At the federal level, tax credits are given to enhance energy-related GB performance: for instance, the Energy Policy Act of 2005 provided the

170. Keith Hirokawa, *At Home with Nature: Early Reflections on Green Building Laws and the Transformation of the Built Environment*, 39 ENVTL. L. 507, 552–53 (2012).

171. The U.S. Constitution provides that private property "shall not be taken for public use, without just compensation." U.S. CONST. amend. V. The identification of a taking was summed up in *Agins v. City of Tiburon*, which states that the application of land-use regulations to a particular piece of property is a taking only "if the ordinance does not substantially advance legitimate state interests." Yet later in *Lingle v. Chevron U.S.A. Inc.*, the Court ruled out the *Agins* test as a way to tell whether or not a regulatory activity is a taking. To file a taking suit, the plaintiff must assert either a physical taking, i.e., a total deprivation/occupation regulation, or a land-use exaction that deprives a property owner of all economically beneficial uses of their properties. *See* Lingle v. Chevron, U.S.A Inc., 544 U.S. 528, 532 (2005); Lucas v. S.C. Coastal Council, 505 U.S. 1003 (1992); Loretto v. Teleprompter Manhattan CATV Corp., 458 U.S. 419 (1982); Agins v. City of Tiburon, 447 U.S. 255, 260 (1980).

172. Hirokawa, *supra* note 170, at 554–55.

173. Eichholtz, *supra* note 32, at 60–61.

owners of commercial or residential buildings with benefits to improve HVAC systems or related insulation.[174] At the state and local level, governments relieve taxes for LEED-certified buildings.[175] Those tax credits are provided for commercial and residential buildings, and in a few cases they are used to award the recovery or the redevelopment of a historic site.[176]

Instead of creating a new tax, tax reductions enable the government to worry less about constitutionality, but tax reductions may cause unmanageable reductions in revenues. Among other jurisdictions, New York State has come up with some ways to prevent excessive losses. On the one hand, the authority to reduce tax is limited to localities of a particular size; for instance, tax reductions can be given to green roofs in cities of one million or more by $ 4.5 per square foot.[177] In another case, a property tax exemption is available in a city with a population of not less than 130,000 and not more than 160,000 for LEED-certified buildings.[178] On the other hand, the tax reductions would not be available indefinitely but instead phase out gradually over a period of seven to ten years.[179]

Apart from tax credits, tax increment financing (TIF) has been used to back green infrastructure development and brownfield redevelopment.[180] Through the use of TIF, municipalities divert future property tax revenue increases from a defined area to a public improvement project in the community. By 2004, 49 U.S. states and the

174. Energy Policy Act of 2005, Pub. L. No. 109-58, § 1331, 119 Stat. 594 (codified at 26 U.S.C. § 179D).

175. For example, Arizona offers tax relief to LEED-certified datacenters that move into substantially vacant buildings; Maryland has extended the Sustainable Communities Tax Credit Program that favors high performance buildings that meet or exceed LEED gold certification, and provide for a tax credit for the rehabilitation of small commercial properties under specified circumstances; Louisiana provides a tax credit for certain solar energy systems; Washington requires the commission to establish eligibility standards considering cost, condition, energy efficiency of available housing to qualify for tax exemption for residential buildings. *See generally* USGBC, BETTER BUILDINGS, BETTER POLICY (2014), http://www.usgbc.org/sites/default/files/STATE_WINS_REPORT_2014-3.pdf.

176. For instance, New Hampshire allows towns and cities to add historic structures in the municipality, preservation and reuse of which would conserve the embodied energy of existing building stock, to the community revitalization tax relief program. *See* N.H. REV. STAT. ANN. § 79-E:2 (LexisNexis 2018).

177. *See* 1 RULES OF THE CITY OF NEW YORK §105-01, ch. 100.

178. *See* N.Y. REAL PROP. TAX LAW § 485-o (LexisNexis 2018).

179. *See* N.Y. REAL PROP. TAX LAW § 470 (LexisNexis 2018).

180. Olaf Merk, et al., *Financing Green Urban Infrastructure* 36 (OECD Reg'l Dev., Working Papers 2012/10, 2011), https://www.oecd.org/gov/regional-policy/WP_Financing_Green_Urban_-Infrastructure.pdf.

District of Columbia have authorized the use of TIF in legislation or regulations.[181]

In response to state legislation, local governments also set out regulations of the TIF. Some of those regulations make GB standards the criteria to evaluate projects requesting TIF.[182]

In recent years, TIF has been misused for urban sprawl instead of for green projects promotion.[183] The designation of a TIF requires that an area be blighted and that the development be contingent on the incentive.[184] The two requirements, however, have nothing to say about the specific conditions on which the TIF can be applied. Given this vagueness, some states may relax the two requirements,[185] which could "become merely a gesture of formality to justify that TIFs are not simply giveaways to developments that would have occurred anyway."[186] As a result, the TIFs for green projects may not accomplish their goal but rather turn farmland into commercial districts that contribute revenues to localities.[187] TIFs also make it possible for governments to condemn homes for a private development project, which may lead to taking actions within a TIF district.[188] Given those concerns, TIFs have been phased out in some areas.[189]

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181. *See generally* COUNCIL OF DEVELOPMENT FINANCE AGENCIES (CDFA), TIF STATE-BY-STATE REPORT (2008), https://www.cdfa.net/cdfa/cdfaweb.nsf/0/8ee94afeece08bc988257936006747c5/$FILE/CDFA-2008-TIF-State-By-State-Report.pdf.

182. CITY OF COLUMBIA, MO., TAX INCREMENT FINANCING: FREQUENTLY ASKED QUESTIONS 3, https://www.como.gov/wp-content/uploads/TIF_FAQ.pdf.

183. Greg LeRoy, *TIF Greenfields, and Sprawl: How an Incentive Created to Alleviate Slums Has Come to Subsidize Upscale Mall and New Urbanist Developments*, 60 PLAN. & ENVTL. L. 3, 6 (2008).

184. *Id.* at 4.

185. Joan Youngman, *TIF at a Turning Point: Defining Debt Down* 3 (Lincoln Inst. of Land Policy, Working Paper No. WP11JY1, 2011), https://www.lincolninst.edu/sites/default/files/pubfiles/1914-1232-tif-final.pdf.

186. Merk et al., *supra* note 180, at 38.

187. LeRoy, *supra* note 183, at 10.

188. In *Kelo v. City of New London*, for instance, The Supreme Court of the United States ruled that the general benefits a community enjoyed from economic growth qualified private redevelopment plans as a permissible "public use" under the Fifth Amendment's Takings Clause. *See generally* Kelo v. City of New London, 545 U.S. 469 (2005).

189. For instance, California passed legislation to put off nearly 400 redevelopment agencies that implemented TIFs in California and set out measures to stabilize school funding by reducing the diversion of property taxes from the public sector including school districts. Assemb. B. X126, 2011 Cal. State Assemb. (Cal. 2011).

2. Public Procurements

The American Recovery and Reinvestment Act of 2009 (ARRA) allows the U.S. government to promote GBs via its purchasing power,[190] in ways that encourage governments at all levels to buy GB products for their own use. For instance, EO 13693 requires renewable energy use in agency buildings[191] and mandates that federal agencies buy green products. Likewise, state and local governments also put in place GB compliance through executive orders or programs authorized by federal law. The New York Governor signed EO No. 111, ordering that all new buildings owned or occupied by state agencies shall be built in light of the guidelines on GB compliance to the maximum extent practicable.[192]

Affordable housing programs, which work on the demand side of the housing market, appear to be another way to make GBs cheaper to residents. The ARRA makes $5 billion available for the Weatherization Assistance Program to make energy-efficient homes affordable for low-income home owners.[193] Authorized by federal law, some state governments have made GB performance a part of their affordable housing plans. The California legislature declared solar energy systems for low-income residential housing a goal, leading to the creation of the Single- Family Affordable Solar Homes Program.[194] The Washington government has put the LEED into its affordable housing scheme, in which case "the Department of Community, Trade, and Economic development shall identify, implement, and apply a sustainable building program for affordable housing projects that receive housing trust fund . . . funding in a state capital budget."[195]

Though widely used, public procurements are meant to jump-start GB compliance by financing it, making private stakeholders aware of GB compliance.[196] Public procurement can be widely used when the

190. American Recovery and Reinvestment Act of 2009, Pub. L. No. 111-5, §§ 14002–04, 123 Stat. 115, 279–82 (codified as amended at 20 U.S.C. § 10002).

191. Exec. Order No. 13693, *supra* note 162, at Sec. 3(d)(i).

192. Exec. Order No. 111 Directing State Agencies to be More Energy Efficient and Environmentally Aware "Green and Clean State Buildings and Vehicles", § II(B) (N.Y. 2001).

193. ARRA, *supra* note 190, tit. IV.

194. GRID ALTERNATIVES, SINGLE-FAMILY AFFORDABLE SOLAR HOMES (SASH) PROGRAM: SEMI-ANNUAL PROGRAM STATUS REPORT, (Jan. 2017), http://gridalternatives.org/sites/default/files/Semi%20Annual%20SASH%20Program%20Status%20Report_January%202017.pdf.

195. WASH. REV. CODE § 39.35D.080 (2018), http://app.leg.wa.gov/RCW/default.aspx?cite=39.35D.080.

196. *See generally* Timothy Simcoe & Michael W. Toffel, *Government Green Procurement Spillovers: Evidence from Municipal Building Policies in California*, 68 J. ENVTL. ECON. & MGMT.

uptake of GBs is low, and when there are few private parties or self-regulators devoted to GB. A further point to note is that public procurement should not be overly engaged in residential or commercial GB projects, lest it crowd out private investments.

3. The PACE Loans

As a way to finance GB projects, federal law authorizes state and local governments to work with lenders to provide green builders with loans at a lower interest rate.[197] Among other programs, Property Assessed Clean Energy (PACE) loans, which were launched by the U.S. Department of Housing and Urban Development (USHUD), have been widely used to finance energy efficiency, renewable energy, and water conservation upgrades to buildings.[198] A PACE loan fully covers a project's costs and is repaid for up to 20 years with an assessment added to the property's tax bill. A PACE loan stays with the property upon sale and may be shared with tenants.[199]

A PACE loan provides two advantages to governments and property owners. First, a PACE loan is a debt tied to a property and not to a property owner. The property owner repays the debt in the form of future property taxes and will not be responsible for the improvements when he or she wants to sell the property.[200] To put in place the PACE program, states need to empower municipalities to create a PACE program through legislation.[201] The PACE financing authority also must include an "opt-in" feature through which property owners agree in writing to receive financing and have assessments made against their property, which appears to be slightly different from a traditional tax assessment.[202]

411–34 (2014).

197. For instance, in support of energy efficiency improvements for homes, the California Housing Finance Agency is authorized to make grants to buyers of residential structures combined with first mortgage loans in association with the Federal Housing Administration's (FHA) Energy Efficient Mortgage Program. *See Cal-EEM + Grant Program*, CALIFORNIA HOUSING FINANCE AGENCY, http://www.calhfa.ca.gov/homebuyer/programs/eem.htm (last visited Mar. 2017).

198. *What is PACE*, PACENATION, http://pacenation.us/what-is-pace/ (last visited Mar. 2017).

199. *Id.*

200. *PACE for Homeowners*, PACENATION, http://pacenation.us/pace-for-homeowners/ (last visited Sept. 24, 2018).

201. *See, e.g.*, MINN. STAT. § 216C.436(2)(11) (2010). For more information about state PACE laws see PACENATION, http://pacenation.us/pace-programs/ (last visited Mar. 2017).

202. Annie Carmichael, *Property Assessed Clean Energy (PACE) Enabling Legislation*, THE VOTE SOLAR INITIATIVE (Mar. 18 2010), http://www.pacenation.us/wp-content/uploads/2012/07/PACE_enablinglegislation-3.18.10.pdf.

Second, a PACE loan may showcase better financing terms derived from the priority given to tax liens when default occurs.[203] In principle, property tax assessments are superior to mortgage loans or other liens on a property, regardless of the date the first or secondary liens are recorded.[204] In that case, local governments and investors in PACE loans can get the balance owed on a PACE assessment before any recovery by a mortgage lender.[205] This may make investors feel more secure about the property owners' ability to repay. Perhaps for that reason, PACE financing may present lower transaction costs and reach a larger group of homeowners.[206]

In July 2010, the U.S. secondary mortgage market regulator, the Federal Housing Finance Agency (FHFA), issued a statement that mortgages originating in a jurisdiction with a PACE program would be subject to significant restrictions.[207] Those restrictions led state and local governments, together with environmental interest groups who supported the PACE financing, to fight back through lawsuits, seeking injunctions or declarations against the underwriting restrictions.[208] Governments and environmental groups tend to assert that PACE financing is not a loan, analogizing the financing to other tax assessment used by local governments to pursue public interest.[209] However, the argument may not hold since the PACE financing by its

203. Prentiss Cox, *Keeping PACE?: The Case Against Property Assessed Clean Energy Financing Programs*, 83 U. COLO. L. REV. 84, 94–95 (2011).

204. In foreclosure, liens on a real estate are put in order, in which case prior liens are paid before liens recorded later in time. The prior liens are usually first mortgage liens, and the later liens are the secondary mortgage liens. Yet tax assessments are not subject to the lien priority rule. In principle, unpaid property tax assessments have priority over other liens, regardless of the date the prior liens were recorded or when the tax assessments became delinquent. I.R.C. § 6323(b) (1986).

205. Cox, *supra* note 203, at 95.

206. THE WHITE HOUSE, POLICY FRAMEWORK FOR PACE FINANCING PROGRAMS 4–6 (Oct. 18, 2009), https://obamawhitehouse.archives.gov/sites/default/files/PACE_Principles.pdf.

207. Press Release, Federal Housing Finance Agency, FHFA Statement on Certain Energy Retrofit Loan Programs (July 6, 2010), https://www.fhfa.gov/Media/PublicAffairs/Pages/FHFA-Statement-on-Certain-Energy-Retrofit-Loan-Programs.aspx [hereinafter FHFA Statement].

208. The governments and environmental groups as plaintiffs asserted that there was no rational relationship between the action taken by the regulators and their statutory authority regarding safety and soundness of the lending institutions. In that sense, the regulators' actions were in violation of Administrative Procedure Act (APA). *See, e.g.*, Cty. of Sonoma v. Fed. Hous. Fin. Agency, 710 F.3d 987 (9th Cir. 2013); Nat'l Res. Def. Council, Inc. v. Fed. Hous. Fin. Agency, 815 F. Supp. 2d 630 (S.D.N.Y. 2011); California *ex rel.* Brown v. Fed. Hous. Fin. Agency, No. 10-cv-03084 CW, 2010 U.S. Dist. LEXIS 137619 (N.D. Cal. 2010).

209. *See, e.g.*, Sierra Club v. Fed. Hous. Fin. Agency, No. CV 10 3317 (N.D. Cal. July 29, 2010); Cal. *ex rel.* Brown v. Fed. Hous. Fin. Agency, No. 10-cv-03084 CW, 2010 U.S. Dist. LEXIS 137619 (N.D. Cal. Dec. 20, 2010).

nature is indistinguishable from a loan, despite that it may work for the public interest.[210]

Apart from litigation, PACE proponents also lobbied for the passage of a bill introduced in Congress known as the PACE Assessment Protection Act, hoping to resolve the conflict between PACE programs and the underwriting restrictions.[211] But the Bill did not get passed in the end. As neither of the efforts worked out, many state and local governments have diverted the PACE financing from residential energy improvements to energy investments by commercial entities,[212] and homeowners quit the PACE programs because of higher interest rates and higher transaction costs.[213] On the other hand, some PACE districts did report that the pilot PACE programs increased homeowners' willingness to pay for energy efficiency improvements.[214] This change may be attributable to local governments' efforts to make the PACE financing smaller in scale and work jointly with other sanctions and incentive programs rather than PACE financing in its original form.[215]

4. Liability

In terms of negative externalities, rules of product liability and liability for land contamination may promote GB compliance.[216]

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210. *See* Cox, *supra* note 203, at 104. Cox further explains why PACE financing should be taken as a loan. Unlike a for-public tax assessment, homeowners assume PACE on a voluntary basis, and the money flowing from PACE loans will be given to homeowners for energy efficiency improvements. For lenders, PACE financing leads to another lien on the property to evaluate the value of the home as security in case of default by the homeowner on the mortgage loan.

211. The bill was introduced for the first time in 2010, but it was not enacted by the 111th Congress. PACE Assessment Protection Act of 2010, H.R. 5766, 111th Cong. (2010). The bill was brought before Congress once more on March 24, 2014, but again failed to pass. PACE Assessment Protection Act of 2014, H.R. 4285, 113th Cong. (2014).

212. CLINTON CLIMATE INITIATIVE ET AL., PROPERTY ASSESSED CLEAN ENERGY (PACE) FINANCING: UPDATE ON COMMERCIAL PROGRAMS 2–4 (2011), http://eta-publications.lbl.gov/sites/default/files/policy-brief-pace-financing.pdf.

213. ANDREW BRAAKSMA ET AL., REPORT ON A PROPERTY ASSESSED CLEAN ENERGY (PACE) PROGRAM FOR THE CITY OF MINNEAPOLIS 36–38 (2010).

214. *See, e.g.*, Memorandum from Eric Angstadt, Director, Planning and Development, City of Berkeley Office of the City Manager, to the Honorable Mayor and Members of the City Council, City of Berkeley (Apr. 7, 2015), https://www.cityofberkeley.info/ Clerk/City_Council/ 2015/04_Apr/Documents/2015-04-07_Item_13_Property_Assessed_Clean.aspx.

215. *See* Cox, *supra* note 203, at 120–21.

216. When GB compliance becomes a part of a building project, it is likely that building professionals or other building stakeholders, like lenders, will bear more obligations or face a higher standard of care in the building contract. Yet it might be difficult for lawmakers to generalize *ex ante* what qualifies as the optimal rules in a contract. What the law can do instead is set up a bottom line to explain what bargaining behaviors are legal, meanwhile ensuring parties'

Interestingly, some buildings or structures, including mobile homes and tract housing, have been considered products, which implies liability for defects in design and construction.[217] Hence, it is more feasible to sue companies whose building products expose users to hazardous substances, such as radon and asbestos, and cause harm.[218]

Liability for land reclamation can be derived from CERCLA,[219] RCRA[220] and TSCA.[221] It is very likely that building stakeholders would be held liable for land contamination when they excavate soil or are found in actual management of hazardous substances disposal, according to CERCLA.[222] Interpretation of CERCLA indicates that two types of liability would be assumed if and only if harm occurs. This corresponds to the theoretical point that tort liability works better in dealing with negative externalities.[223]

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free will to bargain over specific terms. Where GB standards are not mandatory, contracting parties can keep the standard of care in situ and exclude GB compliance, as is the case with GB contracts in which liability for a failure to achieve certification can be waived or limited. Therefore, we would like to look at tort liability, wherein lawmakers have more to say in providing incentives to build green. *See* Prum, *supra* note 48, at 417; Alan Schwartz & Robert E. Scott, *The Common Law of Contract and The Default Rule Project*, 102 VA. L. REV. 1523 (2016); AM. INST. OF ARCHITECTS, *supra* note 128.

217. Grace C. Guiffrida, *The Proposed Indoor Air Quality Acts of 1993: The Comprehensive Solution to a Far-reaching Problem*, 11 PACE ENVTL. L. REV. 311, 345–47 (1993); *see also* Blagg v. Fred Hunt Co., 612 S.W.2d 321, 324 (Ark. 1981).

218. *See* Gene J. Heady, *Stuck Inside These Four Walls: Recognition of Sick Building Syndrome Has Laid the Foundation to Raise Toxic Tort Litigation to New Heights*, 26 TEX. TECH L. REV. 1041, 1049–51 (1995) (summarizing Rogers v. Keller-Martin Org., which assigned liability for inadequate construction standards in an elementary school).

219. Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. §§ 9601–9675 (2012).

220. Resource Conservation and Recovery Act (RCRA), 42 U.S.C. §§ 6901–6992 (2012).

221. Toxics Substances Control Act (TSCA), 15 U.S.C. §§ 2601–2697 (2012).

222. Under CERCLA, the EPA can require liable parties to conduct cleanups or "the EPA can conduct a cleanup and subsequently seek cleanup costs from liable parties. CERCLA § 9607(a) defines a liable party as: (1) the current *owner and operator* of a contaminated property; (2) any *owner or operator* at the time of disposal of any hazardous substances; (3) any person who arranged for the disposal or treatment of hazardous substances, or arranged for the transportation of hazardous substances for disposal or treatment; and (4) any person who accepts hazardous substances for transport to the property and selects the disposal site." CERCLA further clarifies that a person is an "owner or operator" of a facility (or property) if that person: "(1) owns or operates the facility; or (2) owned, operated, or otherwise controlled activities at that facility immediately before title to the facility, or control of the facility, was conveyed to a state or local government due to bankruptcy, foreclosure, tax delinquency, abandonment or similar means." CERCLA § 9601(20)(A).

223. *See, e.g.*, Kaplow & Shavell, *supra* note 45 (explaining how harmful externalities are prevented through use of liability rules).

In dealing with negative externalities, liability may at times under-compensate or under-deter, particularly when it comes to environmental harm. U.S. GB law has its ways to deal with those problems. In the interest of deterrence, U.S. law has a strict liability regime for product liability and makes punitive damages available to the injured, in addition to the actual loss. For instance, in the Austin case, the plaintiffs sought punitive damages, along with damages for medical expenses, attorney's fees and other costs, to compensate for the harm caused by a hazardous exposure to buildings at an elementary school.[224] But the causation can sometimes be hard to prove, especially when a victim is less willing to sue given the high legal cost and low probability of success. Forum-shopping may make it more likely for the victim to win a case.

Problems may still arise when the injurer is not able to pay the damages. On that account, the law has tried to make parties other than the actual injurers pay for the damages, including lenders with deep-pockets who support building projects. The CERCLA of 1980,[225] along with the Superfund Amendments and Reauthorization Act of 1986 (SARA)[226] and the Small Business Liability Relief and Brownfields Revitalization Act (Brownfields Act) in 2002,[227] impose strict liability on owners and operators to jointly and severally bear the costs of cleanups. Lenders would be liable for recoveries should they be able to influence the borrower's hazardous waste disposal.[228]

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224. In Texas, a group of 86 plaintiffs at an elementary school, including 44 children and 42 adults, had been exposed to poor IAQ with hazardous substances, and suffered from sick building syndrome (SBS), e.g. headaches, nausea, dizziness, throat and eye irritation, and allergic reactions. In 1990, the plaintiffs filed a suit against 29 defendants, including materials manufacturers, material suppliers, mechanical engineers, architects and contractors, who were supposed to compensate for the harm due to the violations of the Texas Deceptive Trade Practices-Consumer Protection Act (DTPA). The plaintiffs also sought relief under separate liability rules against different subgroups of the defendants. Referencing the strict liability rule, the plaintiffs claimed that the manufacturers produced products with hazardous chemicals and failed to test and take precautions against the danger lying in the products. Under the negligence rule against building contractors and architects, the plaintiffs alleged that at the planning and construction stages, the defendants breached express and implied warranties that the school would be a safe and non-toxic place to be, and attempted to mislead the plaintiffs about the hazardous exposure. The case was settled with an amount covering punitive damages, tuition and transportation expenses resulting from re-schooling, past and future medical expenses and attorneys' fees. *See* Heady, *supra* note 218, at 1049–51.

225. §§ 9601–9675.

226. Superfund Amendments and Reauthorization Act (SARA) of 1986, Pub. L. No. 99–499, 100 Stat. 1613 (1986).

227. Small Business Liability Relief and Brownfields Revitalization Act (Brownfields Act), Pub. L. No. 107–118 (2002).

228. United States v. Fleet Factors Corp., 901 F.2d 1550, 1559 (11th Cir. 1990).

By the same token, U.S. case law has broadened lender liability, putting lenders who take title at a foreclosure sale in the same position as any other buyer.[229] However, lenders may be deterred by the lender liability in its initial form.[230] Correspondingly, the law has availed a security interest exemption for lenders, whereby a lender is not liable if the lender only maintains a mortgage or lien on a property. Liability does attach when a lender gets involved in the actual management of the property.[231] Despite the exemption, lender liability might help in paying for damages and at some point put bad actors out of business.[232] Of course, these are issues which to some extent go beyond the role of liability law in promoting green building.

C. Suasive Instruments

Information disclosure is a part of U.S. law that advances or oversees GB compliance, particularly with regard to energy use. Information disclosure may "nudge" compliance and cost less than other instruments.[233] The law should clarify what kind of information should be disclosed, by whom, and how. All else being equal, buildings of the same type may have different levels of energy use intensity, so the manner of use may matter more than the energy systems themselves.[234] As such, lawmakers can think to change energy use behaviors via information, rather than merely financing the adoption

229. Guidice v. BFG Electroplating & Mfg. Co., 732 F. Supp. 556, 563 (W.D. Pa. 1989).

230. *See* Prum, *supra* note 48, at 433–34.

231. CERCLA created a security interest exemption that allows lenders to be immune from the owner/operator liability therein, provided that the lenders' activities are meant to protect their security interest in that facility and they do not participate in the management of the facility on a daily basis. "Participation in management" does *not* include activities such as inspecting property, requiring a response action to be taken to address contamination, providing financial advice, or renegotiating or restructuring the terms of the security interest. Of note, foreclosing on a property does not result in liability for a bank, provided the bank takes reasonable steps to convey the property "at the earliest practicable, commercially reasonable time, on commercially reasonable terms." CERCLA § 9601(20)(F)–(G).

232. The lender liability may, however, affect the level of activity in some ways. It has been shown that a full lender liability does not necessarily score better than a no-lender-liability rule in terms of reducing accidents. Too broad lender liability may lead to more accidents. The reason behind this could be the moral hazard noted in the theory. Because lender liability is joint and several, the actual injurers might not be fully incentivized to enhance the level of care if they know that the damages will be borne by others. Besides, an increase in liability will raise the cost of credit and drive some marginal firms out of business. Hence, it is the lawmakers' job to consider the tradeoff between compensating for harm and having more accidents. Pitchford, *supra* note 127, at 1182–83.

233. OGUS, *supra* note 148, at 125.

234. *See* David Hsu, *How Much Information Disclosure of Building Energy Performance is Necessary?*, 64 ENERGY POL'Y 263–72, 271 (2014).

of GB technologies.[235] Information disclosure may differ in its impacts when done by different stakeholders. Sometimes the law may require the government to provide information. For instance, the EPA has built up an Energy Star Portfolio and a consensus-based industry Green Button data access system, which gathers and assesses building performance on energy use.[236] Also, the EPA created the Toxic Release Inventory (TRI) to make parties better aware of hazardous wastes.[237]

The law often requires private stakeholders to disclose information, either on a voluntary or a mandatory basis. E.O. 13415 encouraged vendors and contractors to register with a registry or organization to report their GHG emissions.[238] Under CERCLA, a failure to report the release of hazardous substances may result in fines or imprisonment.[239] As an example at the state level, the New York State Green Building Construction Act requires parties to report annually to the Office of General Services the information about energy consumption, water and waste reduction, IAQ, and maintenance processes.[240]

The means of disclosure is another important consideration. Generally, information disclosure can be done in two ways: product labeling and reporting.[241] Product labeling programs are often used for GB compliance in the United States, prominently for the LEED system and the ENERGY STAR program, and there is evidence showing significant premiums benefiting from both certifications.[242] Yet those labeling programs in isolation are self-regulatory in character. As noted before, self-regulation is no stranger to rent-seeking and lobbying and may at times be subject to private rather than

235. *Id*. at 270–71.

236. *See* Exec. Order No. 13693, § 3(a)(i)(A), 80 Fed. Reg. 34, 149 (June 15, 2015).

237. ENVTL. PROT. AGENCY, TRI FACT SHEET (2017), https://www.epa.gov/sites/production/files/2015-10/documents/2015_tri_for_communities_fact_sheet_final.pdf.

238. Exec. Order No. 13514, § 13, 74 Fed. Reg. 52,117 (Oct. 8, 2009).

239. 42 U.S.C. § 9603(b) (2012).

240. N.Y. ENERGY LAW § 13-107 (McKinney 2009).

241. Robert N. Stavins, *Experience with Market-based Environmental Policy Instruments*, in 1 HANDBOOK OF ENVIRONMENTAL ECONOMICS 355–435 (Karl-Goran Maler & Jeffrey R. Vicent eds., 2006).

242. *See* Franz Fuerst & Patrick McAllister, *Green Noise or Green Value? Measuring the Effects of Environmental Certification on Office Values*, 39 REAL EST. ECON. 45–69 (2011) (addressing the impact of green labelling systems on real estate values); *see generally* Piet Eichholtz., Nils Kok & John M. Quigley, *Doing Well by Doing Good? Green Office Buildings*, 100 AM. ECON. REV. 2492 (2010) (describing green building certification schemes, particularly LEED and Energy Star).

public interest.[243] Such concerns are reflected in the accusations against the LEED system for certifying "green-wash" projects.[244]

Reporting so far seems to be less used in GB compliance. There are two basic ways of reporting, namely benchmarking and auditing. In the case of GB compliance, the former requires owners or occupiers to report some basic information on energy use to a government-made database, usually through energy bills. Energy auditing requires an assessment by a building professional, such as an engineer licensed by the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE). Such a professional reports in a more detailed way about building characteristics, HVAC systems, and occupancy status.[245]

The two ways of reporting may differ in their costs[246] and impacts on stakeholders' energy use behaviors.[247] A study has shown that government-led energy audits can lead industries to commit to energy efficiency projects.[248] But it might not be true to say auditing scores better than benchmarking in any case. On the one hand, energy auditing includes more detail about the specific technologies or property ownerships. [249] The information, however, can sometimes be proprietary and therefore confidential and protected by law. On the other hand, the energy auditing may be more costly but less useful.[250]

In theory, environmental regulation favors more performance-based standards than specification standards.[251] At first blush, benchmarking is more performance-based, and auditing is closer to specification, which suggests that benchmarking better predicts energy

243. OGUS, *supra* note 145, at 591–92.

244. 20 ILL. COMP. STAT. ANN. 3130/15(e)(4) (LexisNexis 2018).

245. *Id.*

246. For instance, benchmarking in New York City is estimated to cost $500-$1500 per building, while auditing will be around $1.50 per square meter, which could yield a higher total cost per building. Hsu, *supra* note 234, at 266.

247. *See* AARON INGLE ET AL., LAWRENCE BERKELEY NAT'L LAB., BEHAVIORAL PERSPECTIVES ON HOME ENERGY AUDITS: THE ROLE OF AUDITORS, LABELS, REPORTS, AND AUDIT TOOLS ON HOMEOWNER DECISION-MAKING 12–16 (2012) (finding differences in the behavioral impact of various energy use auditing tools).

248. *See* Soren T. Anderson & Richard G. Newell, *Information Programs for Technology Adoption: The Case of Energy-Efficiency Audits*, 26 RESOURCE & ENERGY ECON. 27, 27–50 (2004) (observing that approximately 53% of the projects recommended through the Department of Energy's Industrial Assessment Center program were adopted).

249. Hsu, *supra* note 234, at 265.

250. *Id.* at 266.

251. *See* OGUS, *supra* note 148, at 166–68 (noting that performance-based standards are more effective than specification standards because firms generally have better information for efficient implementation).

use and shapes performance standards. In practice, building-level variation is the most important factor in explaining building energy use, based on an analysis of a comprehensive dataset of New York City multifamily buildings.[252] In other words, benchmarking is less costly and can avail a similar quality of information as that of engineer auditing. This indicates that information disclosure laws can gain more by requiring benchmarking data than engineering audits to predict energy performance of buildings. However, by no means should the benefits of engineer auditing be denied. For instance, energy auditing can provide end-users with specific measures on energy conservation, so that the end-users will take action on energy efficiency.[253]

Information can work as non-price intervention when given in comparison and at proper frequency. For example, Opower, a data management company for utilities that has since been acquired by Oracle, enabled utilities to send energy use reports to customers.[254] In partnership with some utility and electricity suppliers, Opower provided peer comparison reports for more than 10 million households in 22 states.[255] Those reports show customers how much energy has been used historically and to what extent they perform better or worse than their neighbors in energy conservation.

D. GB Standard Setting as a Mix of Regulation and Self-Regulation

Before U.S. law had green building standards, the GB movement owed its survival to industry-based standards, prominently the LEED system made by the U.S. Green Building Council (USGBC). In theory, informal rules (like professional conventions and self-imposed standards) as part of the institutional matrix can play a role to make a novel change happen. One of the most important industry-based standards is the LEED system, which increases the stock of knowledge about building green. Building professionals applying their experience and knowledge from GB projects created the earliest version of the

252. Hsu, supra note 234, at 269–70.

253. *Id.* at 271.

254. *See Oracle Buys Opower*, Oracle, https://www.oracle.com/corporate/acquisitions/opower/index.html (last visited Sept. 23, 2018) ("Opower's solutions enable over 100 global utilities, such as PG&E, Exelon and National Grid to deliver a modern digital customer experience. Opower's big data platform stores and analyzes over 600 billion meter reads from 60 million utility end customers, enabling utilities to proactively meet regulatory requirements, decrease the cost to serve, and improve customer satisfaction.").

255. Ian Ayres, Sophie Raseman & Alice Shih, *Evidence from Two Large Field Experiments That Peer Comparison Feedback Can Reduce Residential Energy Usage*, 29 J.L. ECON. & ORG. 992, 1016 (2012).

LEED system. After a series of updates, the LEED system became simpler and better categorized.

Though the LEED system is industry-made, it also works well for government agencies and makes them aware of GBs.[256] The LEED system to some degree also lays the foundation for regulations on GB compliance, in which case LEED also helps the government to define what qualifies as a GB.[257] Additionally, LEED could speed up the GB movement by the competition it causes in the real estate market.[258] Buildings with LEED Silver, Gold or Platinum certificates may be environmentally superior to those without certificates. In that case, LEED certification somewhat creates a marketing distinction for the certified projects. It is likely that more property owners will consider the LEED standards as they do not want to lose the competitive edge.

Over time, GB compliance took off by virtue of the efforts from both public and private organizations. Individual activities might not be influential enough to boost the GB industry as a whole, where the U.S. government, professional associations, and public interest groups (PIGs) all advanced GB compliance.

These public and private players sometimes work together for GB compliance. On the one side, public entities made their own buildings green, which provided GB compliance with laboratories. In the meantime, Congress and executive agencies laid out policies and laws in support of GB compliance.[259] In response to the federal legislation,

256. During the early years of GB certification, federal, state, and local government buildings in the United States made up half the LEED registry. *See* BLDG. DESIGN & CONSTR., WHITE PAPER ON SUSTAINABILITY: A REPORT ON THE GREEN BUILDING MOVEMENT 8 (2003).

257. *See id.* at 23–25 (listing states and municipalities that adopted GB regulations modeled on LEED standards).

258. *See id.* at 8 (describing how the competitive design of the LEED scoring system promotes improving levels of implementation).

259. For instance, in 1992, Congress passed the Energy Policy Act of 1992, which established a new version of the Model Energy Code (MEC). Funded by the USDOE, the MEC was originally developed by a group of building organizations, which sets energy efficiency standards for both new and existing commercial and residential buildings. The MEC has been adopted by some states in light of the local settings. *See* 106 Stat. 2776, Pub. L. No. 102-486 (1992), 102d Congress (codified at 42 U.S.C. § 13201); For a list of states that have adopted the MEC, see *Status of State Energy Code Adoption*, U.S. DEP'T OF ENERGY, https://www.energycodes.gov/adoption/states (last visited Feb. 2017). On the administrative side, E.O. 13514 was signed by President Barack Obama in 2009, aiming to design, construct, maintain, and operate high performance sustainable buildings in sustainable locations. E.O. 13514 laid out a number of reduction targets on energy intensity, water intensity and construction/demolition waste of the federal agencies. *See* Exec. Order No. 13514 (2009), *revoked by* Exec. Order No. 13693 on Mar. 19, 2015, Sec. 16(b). For more about the federal and local GB laws and regulations, see Stephen Del Percio & Preston D. Koerner, *State and Local Green Building Laws and Initiatives*, *in* THE LAW OF GREEN BUILDINGS: REGULATORY AND LEGAL ISSUES IN DESIGN,

state and local agencies also put in place a wide range of instruments.[260] Those GB laws were one of the main triggers of GB activities, as shown in a GB market report.[261] On the other side, the USGBC has been in charge of LEED as one of the most important rating systems, updating LEED standards in light of state-of-the-art technologies; in the meantime, the USGBC also provides education programs to train building professionals on GB techniques.

Yet, at some point, players may oppose one another, especially when PIGs get involved. For instance, the USGBC in its infancy did not allow trade associations to join, fearing that trade associations with strong lobbies would take over the USGBC and water down the GB standards.[262] This position changed over time; the USGBC began meeting with environmental groups alongside trade associations as early as 2003.[263] As is the case with the USGBC, the U.S. government had to deal with different PIGs in the way of GB movement.[264]

A mix of regulation and self-regulation has been around in U.S. GB standard-setting,[265] in which case the regulators use industry-based standards while retaining the authority to change and enforce. This arrangement does not violate the non-delegation principle unless it gives the industry the authority to permit and inspect.[266] But, at some

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CONSTRUCTION, OPERATIONS, AND FINANCING 71–99 (J. Cullen Howe & Michael B. Gerrard eds., 2011).

260. Del Percio & Koerner, *supra* note 259.

261. DODGE DATA & ANALYTICS, *supra* note 3, at 36.

262. BLDG. DESIGN & CONSTR., *supra* note 256, at 8. Trade associations were allowed membership in the USGBC in 2005. Bill Walsh, *Rick Fedrizzi, USGBC President, CEO & Founding Chairman Discusses Trade Associations and the USGBC*, HEALTHY BLDG. NETWORK (Sept. 21, 2005), https://healthybuilding.net/blog/134-rick-fedrizzi-usgbc-president-ceo-founding-chairman-discusses-trade-associations-and-the-usgbc.

263. *See* BLDG. DESIGN & CONSTR., *supra* note 256, at 8.

264. Thomas P. Lyon & John W. Maxwell, *Self-regulation, Taxation and Public Voluntary Environmental Agreements*, 87 J. PUB. ECON. 1453, 1457–58 (2003) (observing support from environmental groups and opposition from industry groups for President Clinton's proposed energy tax); Thomas W. Lippman, *Energy Tax Proposal Has 'Green' Tint: Environmentalists Back Plan They Helped to Draft*, WASH. POST (Mar. 2, 1993), https://www.washingtonpost.com/archive/business/1993/03/02/energy-tax-proposal-has-green-tint/a638b16b-45d8-4473-bc91-4cad55da6538/?utm_term=.b4a5ba1e920e.

265. *Compare* California Green Building Standards Code, CAL. CODE REGS. tit. 24, §§ 401–901 (2008) (showing that the California Green Building Standards Code does not incorporate any existing certifications in GB mandates, and only in a few cases refers to the Energy Star or draws on some specific requirements in the LEED system without specifically referencing the LEED program), *with* WASH. REV. CODE § 39.35D.080 (2018) ("The department of community, trade, and economic development shall not develop its own sustainable building standard, but shall work with stakeholders to adopt an existing sustainable building standard or criteria appropriate for affordable housing.").

266. Edward Teyber, *Incorporating Third Party Green Building Rating Systems into*

point, the government may incorporate industry-based rating systems without expressly referring to a certain version or any specific requirements. The vagueness as such may not accord with the non-delegation principle,[267] since the rules of a rating system could be changed at the whim of the industry rule-makers without due process or government approval. Some state and local GB laws have ways of reflecting the non-delegation principle. Should the government want to use the LEED system, it can articulate the LEED standards in the building or zoning codes as appendixes, rather than referring to the LEED system as a whole; or the government can obtain regulatory control over changes to industry standards, as is the case with the Green Buildings Act in Illinois, which requires that the industry rating system incorporated be analyzed and evaluated by the Capital Development Board.[268]

The antitrust issue may be another concern that plagues the combination of mandates and industry-based standards. Where GB compliance makes an industry-made GB certification mandatory, the GB certification, together with the products it referred to, will dominate the market. In that case, the GB mandates may de facto reduce competition and create an entry barrier for those who can supply greener building standards or products.[269] For instance, in an old version of the LEED system, the USGBC required that the wood used in a LEED project should be verified by the Forest Stewardship Council (FSC), which has given rise to a battle between the FSC and another wood certification run by the Sustainable Forestry Initiative (SFI) program.[270] The LEED's exclusive use of the FSC rating system has been accused of violating antitrust laws when adopted by municipal governments.[271]

Municipal Building and Zoning Codes, 31 PACE ENVTL. L. REV. 832, 843–44 (2014).

267. *Id*.

268. Green Buildings Act, 20 Ill. Comp. Stat. 3130/15(g) (2009) ("The green building standards contained in this Act shall be analyzed and evaluated by the Board 5 years after the effective date of this Act or upon the completion of 10 Board green projects, whichever comes first."), repealed by 2018 Ill. Laws 100-729, § 15 (2018).

269. OGUS, *supra* note 145, at 591.

270. *See generally* Stephen Del Percio, *Revisiting Allied Tube and Noerr: The Antitrust Implications of Green Building Legislation and Case Law Considerations for Policymakers*, 34 WM. & MARY ENVTL. L. & POL'Y REV. 239 (2009).

271. The USGBC itself has tried to fix the problem. As of 2016, the USGBC seems to open the door to wood certification programs other than the FSC. The USGBC introduced the Alternative Compliance Path (ACP) pilot to close a loophole in the current raw materials credit that required only a certain percentage of wood be FSC-certified. The ACP pilot would require that 100 percent of the wood in a project is verified by a legal source, as defined by ASTM D7612-10. *See* Marisa Long, *USGBC Announces New LEED Pilot ACP Designed to Help Eliminate*

Yet a remedy for the excluded parties may not always be workable, as the U.S. Supreme Court has established a state-action immunity doctrine, which allows state and local governments to be immune from an antitrust action against their anticompetitive standards under the FTC or the DOJ.[272] This doctrine can apply to provide immunity to non-state actors as well if a two-pronged requirement is met.[273] Under this doctrine, industry entities that actually make or enforce GB regulations can reason their anti-competitive activities by proving that what they are doing is authorized by the state.[274]

E. The SEP as an Instrument Mix: Liability Meets Regulation

The Supplemental Environmental Projects (SEPs) are environmentally beneficial projects undertaken by defendants as part of the settlement of an enforcement action.[275] In 2004, the EPA started to encourage parties to deliver GB projects or other GB strategies on contaminated properties in exchange for penalty mitigation.[276] The SEP program per se is a dispute settlement policy and not meant to be used as law by the EPA, defendants, courts, or administrative law judges in a trial.[277] Thus, it largely relies on the EPA's discretion to determine whether or not a project will be accepted as a SEP and how much of the penalty abatement can be given.[278]

Irresponsibly Sourced Materials—Like Illegal Wood—From the Building Material Supply Chain, USGBC (Apr. 5, 2016), https://www.usgbc.org/articles/usgbc-announces-new-leed-pilot-acp-designed-help-eliminate-irresponsibly-sourced-materials%E2%80%94.

However, this may not eliminate the antitrust concern, as chances are that the old version of LEED system is still working when referred by some GB mandates. For instance, LEED v 2009 (or LEED V3) requires parties to ensure that the FSC-certified wood products are installed and quantify the total percentage of FSC-certified wood products installed. *See* USGBC, LEED 2009 FOR NEW CONSTRUCTION AND MAJOR RENOVATIONS 55 (2009).

272. *See generally* Parker v. Brown, 317 U.S. 341 (1943) (establishing antitrust immunity where the state has sanctioned and supervises restraints on competition).

273. The two requirements are: a) there must be a clearly articulated policy to displace competition, and b) there must be active supervision by the state of the policy or activity. *See* California Retail Liquor Dealers Ass'n. v. Midcal Aluminum, Inc., 445 U.S. 97, 104–06 (1980) (clarifying the two-point inquiry).

274. Darren A. Prum, Robert J. Aalberts & Stephen Del Percio, *In Third Parties We Trust? The Growing Antitrust Impact of Third-Party Green Building Certification Systems for State and Local Governments*, 27 J. ENVTL. L. & LITIG. 191, 221 (2012).

275. U.S. ENVTL. PROT. AGENCY, SUPPLEMENTAL ENVIRONMENTAL PROJECTS POLICY 2015 UPDATE 1 (2015), https://www.epa.gov/sites/production/files/2015-04/documents/sepupdatedpolicy15.pdf.

276. Edwards, *supra* note 164, at 878–80.

277. *See id.*

278. U.S. ENVTL. PROT. AGENCY, *supra* note 275, at 1–2.

The SEP policy has as its goals environmental justice,[279] pollution reduction, and technological innovation.[280] Perhaps for its pro-environment goals, the SEP program has been referred to by the federal and state laws as a method of environmental enforcement.[281] In the case of GB compliance, the SEPs are taken by the EPA as a means of environmental restoration, like building energy efficiency improvement, or of pollution prevention, such as waste disposal.[282] It is more often the case that the regulator makes GBs as the SEPs, in the interest of brownfield redevelopment. In this way, a violator can agree to pay or use GB technologies for the redevelopment of brownfields in the vicinity.[283] The regulator can more easily spot noncompliance as the EPA or its regional counterparts are close to the violators.[284]

The SEP program appears to be a mix of liability and regulation. It is derived from liability suits originally,[285] where private parties detect harm. An incentive for a defendant to propose an SEP is the potential reduction in penalties. When the defendant seeks an SEP, the settlement of a suit is in the EPA's hands, so the EPA determines and

279. The idea is that defendants are encouraged to conduct SEPs in communities where there are environmental justice concerns. SEPs can help the government to identify and address disproportionately high and adverse human health or environmental impacts of its programs, policies, and activities on minority and low income populations in the United States and its territories. *See* U.S. ENVTL. PROT. AGENCY, *supra* note 275, at 3–4.

280. As declared in the SEP policy, "SEPs provide defendants with an opportunity to develop and demonstrate new technologies that may prove more protective of human health and the environment than existing processes and procedures. SEPs also provide the EPA with a unique opportunity to observe and evaluate new technologies which might, should they prove effective and efficient, lead to better standard industry practices." *See* U.S. ENVTL. PROT. AGENCY, *supra* note 275, at 5.

281. The CAA is the only environmental statute in which Congress has explicitly mentioned the use of SEPs. 42 U.S.C. § 7604(g)(2) (2000). The USEPA has tried to incorporate SEPs into settlements for violations of various federal statutes, including the TSCA, the Emergency Planning and Community Right-to-know Act (EPCRA), RCRA, the Clean Water Act (CWA) and the Clean Air Act (CAA). Laurie Droughton, *Supplemental Environmental Projects: A Bargain for the Environment*, 12 PACE ENVTL. L. REV. 789, 793 (1995). At the state level, at least 30 out of the 50 states have laid out legislation or regulations to run the SEPs. *See* Steven Bonorris et al., *Environmental Enforcement in the Fifty States: The Promise and Pitfalls of Supplemental Environmental Projects*, 11 HASTINGS W-NW J. ENVTL. L. & POL'Y 185, 188 (2005).

282. U.S. ENVTL. PROT. AGENCY, SUPPLEMENTAL ENVIRONMENTAL PROJECTS: GREEN BUILDING ON CONTAMINATED PROPERTIES 3 (2004).

283. *Id.* at 2.

284. *Id.*

285. Until mid-1980s, the CWA was the only statute that allowed citizens to file suits against polluters on behalf of the United States and to seek civil penalties. The use of SEPs was partly facilitated by citizen suits brought under CWA. *See* Charles S. Abell, *Ignoring the Trees for the Forests: How the Citizen Suit Provision of the Clean Water Act Violates the Constitution's Separation of Powers Principle*, 81 VA. L. REV. 1957, 1957 (1995).

oversees what the defendant should do to compensate the harm through the proposed SEP. However, the SEP policy in its current form does not seem to make the SEPs work in any case.[286] One of the reasons behind the policy could be that the SEP might somewhat undermine the deterrence of liability. It could at times allow a defendant to benefit from her or his wrongdoing.

The EPA has stressed that the SEPs are not meant to replace penalties and thus excluded projects that generate profits in the first five years.[287] In the brownfield case, for instance, GBs as SEPs cannot be built on brownfields owned by the violator.[288] Yet some pro-environment projects by their nature would not bring quick profits, but over time, it could be a lucrative business. As is the case for GB compliance, the average payback period of a GB renovation is five to seven years in the United States.[289] Apart from profits, the SEPs can also bring other non-monetary benefits such as a good public image or a better environmental audit that can improve a company's compliance status and reduce the risk of future enforcement actions.[290] In either case, the SEPs may de facto allow polluters to benefit from their wrongdoing, which is at odds with the SEP policy. When the penalty turns into profits or other benefits, "the SEP dollars simply do not have the same deterrent effect as penalty dollars."[291] On that account, the SEPs done by third parties have been proposed to reinforce the deterrence of the SEP policy.[292] But this way may be at odds with the environmental justice goal of the SEP policy as it is in some ways likened to liability.

On the other side, the SEP may be misused by governments to bog down citizen suits.[293] The SEPs were not based on any statutory ground until the section 505 of the CWA was amended to allow the government to find and deter problematic settlements wherever

286. A study shows that, in cases involving penalties, fewer than 12% of settlements annually used SEPs from 1992 to 2006. Kenneth T. Kristl, *Making a Good Idea Even Better: Rethinking the Limits on Supplemental Environmental Projects*, 31 VT. L. REV. 217, 219 (2006).

287. U.S. ENVTL. PROT. AGENCY, *supra* note 275, at 32.

288. U.S. ENVTL. PROT. AGENCY, *supra* note 282, at 3.

289. DODGE DATA & ANALYTICS, *supra* note 3, at 37.

290. Kristl, *supra* note 286, at 263.

291. *Id.*

292. Edward Lloyd, *Supplemental Environmental Projects Have Been Effectively Used in Citizen Suits to Deter Future Violations as Well as to Achieve Significant Additional Environmental Benefits*, 10 WIDENER L. REV. 414, 449 (2004).

293. *See generally* David R. Hodas, *Enforcement of Environmental Law in a Triangular Federal System: Can Three Not Be a Crowd When Enforcement Authority is Shared by the United States, the States, and Their Citizens?*, 54 MD. L. REV. 1552, 1552–1657 (1995).

possible. According to the amended section 505, a citizen suit would be excluded if any state agency starts prosecuting the issue within 45 days.[294] This has become the rule rather than the exception in some jurisdictions, where the government tends to over-file citizen suits at the requests of polluters. This will make some citizen suits that seek environmental protection end up releasing the polluters.[295] In the case of GB compliance, citizen suits could be a way to combat land contamination or building-related illness. The Clean Air Act (CAA) is meant to regulate outdoor air quality rather than indoor air pollution. Citizen suits allow plaintiffs to file a suit against personal injuries caused by building materials. Under the citizen suit provision, the plaintiffs may not receive damages but are still able to abate the harm.[296] Elsewhere, citizen suits have played a role in C/D waste disposal and brownfields reclamation. Public interest groups (PIGs) as well as commercial plaintiffs are entitled to seek cleanup of wastes alleged to be causing an imminent and substantial endangerment, according to RCRA's citizen suit provision.[297]

Yet the SEPs may not always be in accordance with the existing U.S. laws. The SEPs are bound by the Miscellaneous Receipts Act (MRA), which mandates that all penalties should go to the Treasury.[298] This has led the EPA to be more cautious in seeking SEPs and to stress in its latest policy that the SEPs are not penalties.[299] Elsewhere, some SEP proponents suggest setting up an Environmental Trust run by the EPA, as an attempt to quell any legal doubt. The money is delivered to

294. Clean Water Act §505, codified at 33 U.S.C §1365 (2006).

295. *See* Hodas, *supra* note 293, at 1648 (noting that "states sometimes take action against a polluter at its request in order to shield that polluter from a citizen suit; this type of preemptive action does not succeed in protecting the environment.").

296. Guiffrida, *supra* note 217, at 339 n.192.

297. *See* 42 U.S.C. § 6972 (2012) ("[A]ny person may commence a civil action on his own behalf . . . against any person, including the United States and any other governmental instrumentality or agency, to the extent permitted by the eleventh amendment to the Constitution, and including any past or present generator, past or present transporter, or past or present owner or operator of a treatment, storage, or disposal facility, who has contributed or who is contributing to the past or present handling, storage, treatment, transportation, or disposal of any solid or hazardous waste which may present an imminent and substantial endangerment to health or the environment.").

298. *See* 31 U.S.C. § 3302 (2000); Memorandum from Walker B. Smith, Dir., U.S. Envtl. Prot. Agency Office of Regulatory Enf't, to Reg'l Counsel et al., 2 (Oct. 31, 2002) ("An adequate nexus is important because it ensures that the Agency complies with the SEP Policy and the requirements of the MRA.").

299. *See* Douglas Rubin, *How Supplemental Environmental Projects Can and Should Be Used to Advance Environmental Justice*, 10 U. MD. L.J. RACE, RELIGION, GENDER & CLASS 179, 195 (2010) ("The EPA apparently justifies its restrictive SEP policies by claiming that they are bound by the MRA.").

the environmental trust, not to the EPA. The environmental trust would later be used by the EPA or a third-party contractor to implement an SEP.[300]

However, the SEP policy, as one of its goals suggests, means more than just paying for harm. It might also take into account environmental justice.[301] If the money goes into the Environmental Trust, instead of being dedicated to a particular use, there is no guarantee that penalty funds will be reinvested in vulnerable communities that bear the harm.[302] Besides, an SEP does not simply create a money-for-right-to-pollute situation, it might also relate to restorative justice.

An SEP largely relies on the defendant to carry out the project once accepted, in which situation the defendant should not only write a check but also correct her wrongdoing.[303] This appears to be slightly different from the Superfund under CERCLA, wherein the EPA generally is in charge of remedial work with the money collected from injurers. As the description makes clear, the SEP has mainly been used so far for environmental concerns other than the implementation of a GB policy. However, SEPs can and have also been used to promote GB compliance, although their primary goal is, of course, broader than that.

F. Conclusions

This description of the use of instruments to promote GB in the United States shows that a joint use of instruments is both theoretically sound and successfully implemented in practice.

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300. *See* Brooke E. Robertson, *Expanding the Use of Supplemental Environmental Projects*, 86 WASH. U. L. REV. 1025, 1038 (2009) ("The EPA's current SEP policy could be improved by taking three steps: creating and managing an Environmental Trust that would be used to complete SEPs, increasing the mitigation percentage to 100% and relaxing the nexus requirement, and allowing third-party contractors to bid on and carry out SEP contracts.").

301. The SEP policy aims to "ensure that residents who spend significant portions of their time in, or depend on food and water sources located near the areas affected by violations will be protected." *See* U.S. ENVTL. PROT. AGENCY, *supra* note 275, at 4. Corresponding to the SEP goal, the California EPA was required by legislature to establish a SEP policy to create a public process to solicit potential SEPs from "disadvantaged communities." The California EPA may assign "disadvantaged community" status based on socioeconomic factors, but the underlying statute does not mention indicators like race, ethnicity, or national origin. The Act also emphasizes SEP's value to disadvantaged communities, but it does not limit SEPs to those communities. *See* A.B. 1071, 2015 Leg., Reg. Sess. (Cal. 2015), § 2(b)(3), (c); § 2(b)(4).

302. Eric A. DeBellis, *Implementing Supplemental Environmental Project Policies to Promote Restorative Justice*, ECOLOGY L. Q. (2016), http://elq.typepad.com/currents/2016/03/implementing-supplemental-environmental-project-policies-to-promote-restorative-justice.html.

303. *Id.*

Self-regulation was critical to the start of GB compliance. Given the benefits of GB compliance, the U.S. government used three types of instruments that encouraged GBs to grow faster over the past decade. On the one hand, the U.S. government tends to finance GBs through tax reductions, public procurements, and loans, rather than providing subsidies. On the other hand, mandates are increasingly used in GB promotion. It is usually the case that the government incorporates industry-based standards into mandates, meanwhile retaining the power to permit and change the standards, lest it delegate too much lawmaking authority to the industry. The suasive approach, which mainly takes the form of information disclosure, can perform better than behavioral interventions for building energy efficiency. The logic behind this is that sometimes the way energy is used matters more than the technologies per se. Giving real-time or peer-comparison information to end-users can nudge them to perform better in energy use, as is the case in the Opower program.

V. PRACTICE

After this sketch of the instruments to promote GB compliance, it is equally interesting to briefly address the empirical evidence—albeit scarce—that is available concerning the relative effectiveness of the various instruments. Unfortunately, the empirical evidence does not address all of the instruments discussed above.

Of the market-based instruments, public procurement in particular has been subject to empirical research. Some evidence shows a positive relationship between the adoption of government GB procurement policies and the number of LEED-certified private buildings.[304] An empirical study shows that the LEED standard prevails twice as fast among private developers in cities that have GB public procurement policies compared to cities without similar policies but of similar size, demographics, and environmental preferences.[305] The study further suggests that public procurements encourage building professionals to invest in GB skills. However, public procurements may not make a significant difference in making consumers, developers, and suppliers more aware of LEED

304. *See* Timothy Simcoe & Michael W. Toffel, *Public Procurement and the Private Supply of Green Buildings* 29 (Harvard Envtl. Econ. Program, Discussion Paper 12-42, 2012) (finding that the positive spillovers from public procurement are based on private developers adopting the LEED certification in line with municipal bylaws that encourage GB practices).

305. *Id.* at 2.

certification.[306] There are other reasons for which public procurement can pay off, as the study points out, including "demonstration effects, moral suasion, scale economies, learning effects, anticipated regulatory changes, and a correlation between municipal GB policies and preferential treatment in the municipal permitting process for developers offering GBs."[307]

Empirical evidence is also available concerning the effects of PACE loans. It was expected, as mentioned above, that PACE would allow the property owner to repay a debt in the form of future property taxes and that it could lead to better financing terms. However, the empirical evidence shows that these two anticipated benefits of PACE financing fail to make PACE loans attractive. On the one hand, it might be illusory to say that homeowners would be free from long-term PACE financing obligations, as homeowners are not the only parties that leverage the bargaining.[308] Rational buyers take into account any lien on a property, including a PACE lien. Throughout the bargaining process, sellers are likely to be asked by buyers, or by lenders who have secured interests in the properties, to fulfill the financing obligations on a PACE loan;[309] alternatively, buyers may take over the PACE financing obligations in return for a lower selling price of the property. In neither case will PACE financing lead to lower transaction costs to property owners than a normal private mortgage loan. On the other hand, the priority given to a PACE lien appears to clash with the underwriting restrictions in financial regulations.[310]

There is a great deal of empirical literature on the effects of liability litigation in the United States. Just to mention a few studies related to the issue of forum-shopping discussed above: some empirical evidence has shown that the plaintiffs' lawyers in asbestos litigations tend to file a suit in jurisdictions with the most favorable legal rules, judges, or juries.[311] Yet forum-shopping may create too many trials for

306. *Id.* at 25.

307. *Id.* at 11.

308. Cox, *supra* note 203, at 96.

309. *See* JASON COUGHLIN, NAT'L RENEWABLE ENERGY LAB., U.S. DEP'T OF ENERGY, PHOTOVOLTAICS AS AN ELIGIBLE MEASURE IN RESIDENTIAL PACE PROGRAMS: BENEFITS AND CHALLENGES 3 (2010) (noting that these programs are still new and need further research but "it is possible that both mortgage lenders and prospective home buyers will be influenced by the existence of a special lien on the house").

310. *See* FHFA Statement, *supra* note 207.

311. *See* Michelle J. White, *Asbestos Litigation: Procedural Innovations and Forum Shopping*, 35 J. LEG. STUD. 365, 366 (2006) (examining how forum shopping and procedural innovations affect the outcomes of asbestos trials using a new data set of all asbestos trials from 1987 to 2003 in the US).

the court to handle expeditiously. On that account, the U.S. courts have made use of bifurcated trials, bouquet trials, or consolidated trials to shorten long dockets.[312] These trials, together with forum-shopping, help to directly raise damage awards and higher settlement levels indirectly.[313] But those studies are obviously of interest for liability rules and less related to the effectiveness of GB.

There is interesting research concerning the effects of the creation of the Toxic Release Inventory (TRI) by the EPA: some studies find that the release of information by the EPA can result in positive outcomes, such as better environmental behavior by firms,[314] or increased spending on environmental and natural resource programs.[315] On the flip side, it may also lead to inefficient allocation of costs and benefits for clean firms and polluters.[316]

Also, other suasive instruments have been subject to empirical study, more particularly the difference between auditing and benchmarking with respect to energy efficiency projects, discussed above. In practice, it is empirically shown that building-level variation

312. A consolidated trial is where suits filed by different plaintiffs are heard by the same jury. The jury then makes separate decisions for each plaintiff. Bifurcation is a way to divide trials into two phases. After the first phase, the judge will suspend the case and allow parties to negotiate. If the parties cannot reach a settlement, the judge will resume the trial. In most of the cases, liability will be determined in the first phase, followed by damages decided in the second phase; however, this would go the other way around when it comes to asbestos trials. Bouquet trials are like consolidated trials but with a smaller group of plaintiffs chosen from a large group of claims. The decision on the bouquet trial would later be used as a model to settle all of the cases in the large group. *Id.* at 372–76.

313. *Id.* at 396 (explaining that while bifurcated and bouquet trials can increase plaintiffs' expected returns, consolidated suits feature mixed impacts with small consolidations of less than five claims raising the probabilities of plaintiffs winning and receiving punitive damages and larger consolidations lowering expected returns).

314. *See* Shameek Konar & Mark A. Cohen, *Information as Regulation: The Effect of Community Right to Know Laws on Toxic Emissions*, 32 J. ENVTL. ECON. & MGMT. 109, 123 (1997) ("New information concerning a firm's toxic emissions that has a significant effect on market valuation is likely to induce that firm to significantly reduce subsequent emissions and to otherwise improve its environmental performance.").

315. *See* Dennis M. Patten, *The Impact of the EPA's TRI Disclosure Program on State Environmental and Natural Resource Expenditures*, 17 J. ACCT. & PUB. POL'Y 367, 368 (1998) ("[H]igher levels of reported toxic releases per capita per square mile for 1988 are correlated with increases in state allocations to environmental and natural resource programs over the subsequent two fiscal years.").

316. *See* Magali Delmas, Maria J. Montes-Sancho & Jay P. Shimshack, *Information Disclosure Policies: Evidence from the Electricity Industry*, 48 ECON. INQUIRY 483, 485 (2010) ("Our results suggest that firms that already use substantial amounts of clean fuels most significantly increase clean fuel percentages in response to disclosure programs. Similarly, firms that already use relatively small amounts of fossil fuels most significantly decrease fossil fuel usage in response to disclosure programs.").

is the most important factor in explaining building energy use, based on an analysis of a comprehensive dataset of New York City multifamily buildings.[317] This indicates that information disclosure laws can be more cost-effective by requiring less costly benchmarking data than the use of engineering audits to predict energy performance of buildings.[318]

The most interesting empirical studies involve the information program by the Opower company. Empirical studies have tested whether the Opower program can work in different areas. A field experiment of 80,000 households in Minnesota has shown that monthly peer feedback could reduce energy consumption by 1.9 to 2.0 percent relative to the baseline.[319] Likewise, evidence from another two field experiments have shown that, among 170,000 household customers of two utilities, the Sacramento Municipal Utility District (SMUD) and Puget Sound Energy (PSE), households getting peer comparison reports tend to reduce energy use by 1.2% (PSE) to 2.1% (SMUD).[320] In addition, households with more pre-treatment energy use score better than those with less baseline energy consumption.[321]

The two studies have shown that information can modify customer behaviors, yet a "boomerang effect" is likely to happen when customer behaviors are put in comparison.[322] In that case, customers with lower reported energy use may be less motivated to reduce or may even increase their energy use. Even if the information is able to improve customer behavior, one might further question how long the effects of behavioral interventions could possibly last. Through data from 234,000 households receiving personalized energy use reports under the Opower program, a study found that consumers are likely to reduce energy use shortly after being informed about their energy performance; however, the effects would die out if no further information follows.[323] Such an "action-and-backsliding" situation

317. Hsu, *supra* note 234, at 263.

318. However, by no means should the benefits of engineer auditing be denied. For instance, energy auditing can provide end-users with specific measures on energy conservation, so that the end-users will take action on energy efficiency. *Id.* at 270.

319. HUNT ALLCOTT, SOCIAL NORMS AND ENERGY CONSERVATION, CTR. ENERGY & ENVTL. POLICY RESEARCH 3 (Oct. 2009).

320. Ayres, Raseman & Shih, *supra* note 255, at 992.

321. *Id*. at 1015; *see also* Allcott, *supra* note 319, at 1093 ("I also show that treatment effects increase markedly as a function of pre-treatment usage.").

322. ALLCOTT, *supra* note 319, at 1093.

323. Hunt Allcott & Todd Rogers, *The Short-Run and Long-Run Effects of Behavioral Interventions: Experimental Evidence from Energy Conservation*, 104 AM. ECON. REV. 3003, 3004 (2014).

would be less likely to happen as consumers get used to the reports coming monthly over a long term, in which case the consumers may change their capital stock of habits or physical technologies.[324] But it might take more than two years for those behavioral changes to happen and last.[325] The Opower program suggests that, when it comes to changing behaviors, an informational program could better pay off when the treatment is frequently available.

In practice, the SEP policy may not always turn out the way the federal policy has pictured. The SEPs have been more commonly used in citizen suits and by state environmental regulators, mostly in light of the Clean Water Act.[326] By contrast, the SEPs did not appear to play a big part in the EPA's enforcement,[327] but it has been suggested that they should play a larger role at the federal level.[328] At the state level, the SEPs are said to work for larger companies rather than small violators.[329] Small violators will be otherwise required to pay cash or small contributions to a large SEP, rather than to implement an SEP on their own. The implementation of the SEP will then change hands to a third party. This method has been utilized in Vermont, California, New Hampshire, and Pennsylvania.[330] Elsewhere, the SEPs are not meant to be done handled a third party, as the regulator may not be able to oversee and hold a third party liable in case of noncompliance.[331] Equally important, state regulators are not strangers to trans-boundary issues when it comes to environmental compliance. Perhaps on that account, some states make it possible for an SEP to go beyond borders, as has been the case in Texas.[332]

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324. *Id*. at 3034.

325. *Id*. at 3005.

326. Daniel Press, Peter Holloran & Brian Petersen, *Enforcement-Driven Financing of Water Quality in California: The Case of Supplemental Environmental Projects* 5 (Univ. Cal. Water Res. Ctr, Tech. Completion Report Project No. WR1022, 2010), https://escholarship.org/uc/item/0cv8d56h.

327. During fiscal years 2001-2009, the EPA settled 4,133 formal enforcement actions that resulted in an administrative penalty, but only 163 ended up with a SEP. The record on the use of SEPs may vary with the Administration. *Id.* at 8; *see also* William Galose & Musa Essayyad, *What Determines Whether the Settlement of a US EPA Case Includes A Supplemental Environmental Project: Lessons Learned from US History*, 1 GLOBAL REV. BUS. & ECON. RES. (2014).

328. *See* Robertson, *supra* note 300, at 1046–51.

329. Bonorris et al., *supra* note 281, at 216.

330. *Id.* at 217. However, states do differ in their requirements for the contributions. For instance, Pennsylvania "requires that the donation must be dedicated to a specified project, and not merely to the general accounts of a non-profit organization," but in California, a contribution to a non-profit organization may count.

331. *Id.*

332. *Id.* at 218 (The Texas SEP rules allow violators, on some conditions, to undertake SEPs

In the use of SEPs, regulators and the regulated tend to focus more on the deterrent effects[333] and the reduction of transaction costs, whereas the environmental justice goal is less frequently discussed.[334] On the regulators' side, an SEP may not be cheap and easy to oversee, despite its environmental benefits.[335] In the case of liability, a violator only needs to pay the damages, yet the remedy may not end that easily if an SEP comes into play as part of a settlement. In that case, a long-term commitment is needed from the regulated and the regulators at stake. Differently put, an SEP solution may avail less certainty and lead to a higher cost, particularly in the case of a loose-end project.

A better way to oversee the SEPs with a lower cost is to encourage projects with a definite timeline, as has been the case in Maine and Pennsylvania.[336] Apart from the time limit, the regulator in Maine requires the violator to prove that he or she is financially capable of doing the project.[337] In the meantime, Maine outsourced its oversight power in part to the University of Maine and made the violator pay the oversight costs.[338] In this way, the regulator may bear less oversight costs, and the third-party supervisor may be neutral to push forward the project. Violators view the SEP policy as actually lowering the costs of noncompliance, given the uncertainty around the amount reported and calculated by the regulated.[339]

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in Mexico, which sits next to and shares natural resources with Texas); *see also* TEX. COMM'N ON ENVTL. QUALITY, GI-352, SUPPLEMENTAL ENVIRONMENTAL PROJECTS. PUTTING FINES TO WORK CLOSER TO HOME 4 (Oct. 2015), https://www.tccq.texas.gov/assets/public/comm_exec/pubs/gi-/gi-352.pdf.

333. *See* Robert L. Glicksman & Dietrich Earnhart, *The Comparative Effectiveness of Government Interventions on Environmental Performance in the Chemical Industry,* 26 STAN. ENVTL. L.J. 317, 364–68 (2007) (discussing the industry perceptions of SEPs as deterrents).

334. Bonorris et al., *supra* note 281*,* at 218–19.

335. For instance, in Colorado, a big Denver company was found to be non-compliant with air pollution prevention regulations and was fined a noncompliance penalty of $30,065 and a civil penalty of $395,000 (which was later reduced to $316,000 because of the company's cooperation with the state). At the approval of the Colorado Department of Public Health & Environment, Air Pollution Division, the company undertook an SEP that made use of the utility's wind power and would result in an 80% reduction of the penalty. The SEP also led to a reduction in nitrous oxide, sulfur dioxide, and carbon dioxide, as well as the need for landfill disposal. NAT. RENEWABLE ENERGY LAB., U.S. DEP'T OF ENERGY, SUPPLEMENTAL ENVIRONMENTAL PROJECTS USING RENEWABLE ENERGY: A NEW APPROACH TO ADDRESSING AIR QUALITY VIOLATION PENALTIES 1 (2001), https://www.nrel.gov/docs/fy01osti/29661.pdf.

336. Bonorris et al., *supra* note 281, at 219–20.

337. *Id.* at 219.

338. *Id.*

339. David A. Dana, *The Uncertain Merits of Environmental Enforcement Reform: The Case of Supplemental Environmental Projects*, 1998 WIS. L. REV. 1181, 1184.

It is also likely that violators will overestimate the costs of an SEP in an attempt to reduce penalties.[340] As a result, the SEP policy may lead to under-deterrence. Some empirical evidence has reflected this observation. In the case of compliance with the Clean Water Act ("CWA-related performance") at facilities, Glicksman and Earnhart have shown that an SEP can better deter violators that are already subject to the SEP ("specific deterrence") than it does to the potential violators in the general regulated community ("general deterrence").[341]

This brief overview of some of the available empirical evidence provides interesting information on the relative effectiveness of the various instruments used in the United States to promote green building. There is no empirical study to the best of our knowledge, on the effectiveness of command-and-control regulation; however, that is not to say that those regulations are ineffective for GB. The studies with respect to the market-based instruments show that at least the public procurement policy seems to have the desired effects. This is not the case for the PACE program. However, this result may have more to do with particular design defects in the PACE program rather than proving that financial instruments do not work.

However, the most striking results possibly come from the suasive instruments. All three studies, and especially the Opower program, show positive effects of the various information programs. In this domain, encouraging stakeholders toward energy efficiency seems to work. Again, one should be careful with drawing too strong of a conclusion on the basis of the few empirical studies available, especially since not all instruments have been tested and comparisons between the different instruments are also difficult. But at least the positive effects of the suasive (information disclosure) instruments are striking. Perhaps it is related to the fact that GB is a domain of environmental law and policy where the goal is indeed not so much to cure negative

340. Bonorris et al., *supra* note 281, at 206.

341. *See* Glicksman & Earnhart, *supra* note 333, at 367–68. Using data from the 499 major chemical manufacturing facilities across the United States during the years 1995 and 2001, Glicksman and Earnhart compared the effectiveness of different governmental interventions on environmental performance in the chemical industry. *Id.* at 326. The study made a distinction between general deterrence and specific deterrence. *Id.* at 321–22. Specific deterrence is meant to identify and return specific violators to compliance, on the assumption that the regulated will comply when it costs less to comply than to violate. *Id.* at 335–36. General deterrence can work to induce compliance in the broader regulated community, based on the increased subsequent penalty likelihood and increased subsequent penalty size. *Id.* at 335. Given the distinction, the study tests the effectiveness of fines, injunctions and the SEPs in the CWA-related performance. Part of their findings have shown that fines and SEPs are equally effective in reaping specific deterrence; yet fines turn out to be more effective than the SEPs as general deterrents. *Id.* at 367.

externalities but to promote positive externalities related to energy efficiency. To create those positive externalities, the most important function of legal intervention is to influence subjective perceptions of stakeholders by creating behavioral changes.

VI. CONCLUSION

GB compliance deals with various environmental elements and thus needs to engage different building stakeholders, including individuals, governments, and professional associations. Yet not all of those stakeholders have the incentives to build green, and they may fail to work cooperatively. The law can play an important role in shaping the incentive structure and integrating the dispersion of stakeholders and knowledge, as it might do for GB compliance.

The theoretical analysis showed that a variety of instruments could be put in place to promote GB—more particularly command-and-control, market-based, and suasive instruments. However, this article equally argued that no single instrument in isolation can adequately promote GB because no instrument in isolation can overcome all challenges that confront GB compliance. Therefore, this article argued that law should search for a smart mix of instruments to promote GB.

One may notice that in the United States the joint use of instruments has indeed, as predicted, been used to promote GB. A few conclusions can be drawn from the evolution of the use of instruments in GB promotion in the United States. First, in early times self-regulation can play an important role, at which point the governments should not immediately make regulations; instead, governments could lend support by greening their own buildings to showcase the benefits of GB compliance. Second, GB compliance might be voluntary at first, but it is likely to become mandatory over time, in which case laws and regulations may play a bigger role to further GB compliance. Third, a joint effort of government regulation and self-regulation could have a major place in GB laws by transforming industry-based certifications into mandates. Apart from sanctions and financial incentives, eventual government regulation can also be expected to enlist private information or non-price interventions to foster GB compliance, preferably through reporting and liability.