

LEGAL HURDLES FACED BY DEEP GREEN BUILDINGS: CASE STUDIES AND RECOMMENDATIONS

Kathleen O'Brien,* Nicole DeNamur,** and Elizabeth Powers***

ABSTRACT: The recent emphasis on building design, construction, and performance has revealed legal challenges and risks an owner or project team may face when attempting to construct a “deep green” building. The intent of this article is to encourage and facilitate the development of deep green and high performing buildings by reducing perceived and actual risks as well as challenges associated with their development, construction, and operation. This article explores these risks and challenges through a discussion of specific examples from two case study projects located in Seattle, Washington. These examples are arranged in two broad categories: (1) the process of achieving a deep green, high performing project, and (2) specific aspects of the technology employed to achieve deep green goals. As most technical challenges that the case study projects faced could be resolved through process improvements, the reader will note that solutions identified through the case studies are heavily weighted toward process. The authors’ recommendations, based on input from policy

* LEED AP, CSBA, Cascadia Fellow and Founder, O'Brien and Company, Inc., one of the first green building consultancies in the country. Ms. O'Brien brings over thirty years of personal knowledge and technical experience in the green building field to this discussion.

** J.D. and LEED Green Associate, Pacifica Law Group. Ms. DeNamur's practice has focused on construction and insurance related topics. She has organized and moderated panel presentations on green building and sustainability, presented on the legal issues associated with green buildings, and lectured on the impacts of how we define “green.” Ms. DeNamur collaborated in the article's execution and served as a contributing editor.

*** LEED AP BD+C, LEED AP ID+C, CSBA, Principal, O'Brien and Company. Ms. Powers brings over eighteen years of personal knowledge and technical experience in the green building field to this discussion.

The authors would like to extend their deepest gratitude to all of the many individuals who contributed in some way to this article and without whom it never would have come to fruition. In particular, the authors wish to thank the owners and project team members we interviewed for the Bertschi School and Bullitt Center case studies as well as representatives from the Group Healthcare Puyallup project. In addition, we would like to thank Chris Edlin and Justus Stewart, both of O'Brien & Company, for providing research and analysis that helped produce the final article. Finally, we would like to thank the following for their generous contributions to the recommendations section of this article: Tom Owens of Tom Owens Consulting, Sandra Mallory and Duane Jonlin of the City of Seattle, Dave Low of Kidder Mathews, and John Parnass and Zak Tomlinson of Pacifica Law Group.

planners, construction lawyers, and leasing and operations professionals, are also heavily process-oriented. These recommendations include aligning code with municipal goals, integrating green codes, leading by example, leveraging existing regulations, developing demonstration ordinances (for policy planners), assigning risk reasonably, understanding appropriate responsibilities, encouraging an integrated process (for construction lawyers), and encouraging the use of green leases and collection of building performance data (for leasing professionals).

TABLE OF CONTENTS

I.INTRODUCTION.....	127
II.HISTORY OF GREEN OR HIGH PERFORMING BUILDINGS ..	129
III.CHALLENGING THE INDUSTRY TO RAISE THE BAR.....	132
IV.INCREASING EMPHASIS ON INTEGRATION FOR GREEN BUILDING PROJECTS	136
V.LIVING BUILDING CHALLENGE CASE STUDIES	140
A. Learning and Leading.....	140
B. The Bertschi School Science Wing	142
C. The Bullitt Center.....	144
VI. PROCESS.....	146
A. Document Green Building Goals	146
1. The Bertschi School Science Wing	148
2. The Bullitt Center	149
B. Integrate the Process.....	152
C. Promote Green Building Operations	157
VII.TECHNOLOGY	162
A. Net Zero Water & Ecological Flow.....	163
1. Blackwater.....	164
2. Greywater	165
3. Potable Water	166
4. Stormwater and Site Detention.....	168
B. Net Zero Energy	169
C. Appropriate Sourcing and “Red List” Materials	171
1. Code Requirements.....	172
2. Performance Warranties	173
3. Product Information.....	173
4. Assigning Responsibility for Vetting Materials	175
5. Marketplace Shifts	175
VIII.RECOMMENDATIONS.....	176
A. Policy Planners	179
1. Align Code and Goals.....	179
2. Integrate Green Codes	179
3. Lead by Example	179
4. Leverage Existing Regulations	180
5. Develop Demonstration Ordinances.....	180
B. Construction Lawyers.....	181
1. Assign Risk Reasonably	181
2. Understand Appropriate Responsibilities Within	

Rating Systems 181

3. Encourage IP and IPD 182

C. Leasing and Operations Professionals..... 183

1. Encourage Green Leasing..... 183

2. Collect Data on Performance..... 184

IX.CONCLUSION 184

I. INTRODUCTION

Since the early 1990s, and especially since the advent of the U.S. Green Building Council® (USGBC)¹ in 1993, a steady movement toward the acceptance of “green” building practices has arisen in the United States. Because “green” implies a departure from designing to code minimums and emphasizes environmentally sound practice, those who have implemented “green” (especially those involved from the beginning) have encountered a variety of challenges ranging from permitting non-conforming systems to designing, building, financing, insuring, and marketing green projects. These challenges have increased the financial and legal risks associated with a green, or non-traditional, design and construction project generally by blocking or delaying aspects of the intended design and its implementation or by increasing costs of implementation.

As experience with green building practice has grown, many of these challenges have been addressed in some fashion. At the same time, the green building movement has evolved. As confidence in green building design and construction has increased, the desire and capacity to target green building practices for the achievement of specific, measurable, and beneficial outcomes on a project has also increased. Along with this has come a sense of urgency to accelerate progress towards truly sustainable building practices.

This article provides background on the recent market shift towards “deep green”² and high performing buildings, and discusses some of the

1. LEED®, and the related ‘Certification Mark,’ is a registered trademark owned by the U.S. Green Building Council® (USGBC) that the authors use with permission.

2. For the purposes of this article, a “deep green” or high-performing building means its design and construction is significantly beyond code, and the building is expected to perform at a very high level of energy and water efficiency, indoor air quality, materials resource efficiency, and site protection. The authors consider Living Buildings® designed, built, and operated to the Living Building Challenge™ standards to meet this description and so use them as examples of deep green, high performing buildings in this article. Note that others have used both terms to describe projects with these aspirations; at times, these aspirations have not been realized. By the nature of the rating system requirements, Living Buildings have to reach the desired

more significant legal challenges an owner or project team may face when attempting to develop, construct, and operate such a project. The intent is to reduce industry concern over both perceived and actual risks associated with developing, constructing, and operating a deep green and high performance building by highlighting specific legal challenges and offering approaches to solving these challenges based on case studies. To identify challenges, we reviewed deep green, innovative, and high performing projects that have recently been developed in Washington State. Primarily, we studied two Living Building Challenge™ (Challenge)³ projects, the Bertschi School Science Wing (Challenge certified),⁴ and the Bullitt Center (Challenge designed)⁵ by interviewing project team members and by reviewing materials published by the International Living Future Institute™ (the Institute)⁶—the entity responsible for developing and administering the Living Building Challenge. We also examined relevant elements from a few other Washington projects.⁷

We approached this subject from two vantage points: the process of achieving a deep green, high performing project, and the technology that might be employed to achieve it. For process, we identified three key aspects to achieving a deep green, high performing project: (1) documenting green building goals, (2) integrating the process, and (3) promoting green building operations. For technology, we looked at the specific legal hurdles that the case study project teams faced, and how they addressed them with an eye towards ways to overcome these hurdles (such as workarounds or regulatory solutions). Although our case studies do not cover every single challenge project teams might encounter, we believe they illustrate some of the most significant ones. Also, to provide more detail on specific regulatory barriers, we reference the work that others have already accomplished, rather than duplicate it.⁸

performance in order to earn certification.

3. Living Building Challenge, and the related logo, is a trademark of the International Living Future Institute that the authors use with permission.

4. Certified under version 2.0, April 10, 2013. Int'l Living Future Inst., *Living Building Challenge, Case Studies: Bertschi Living Building Challenge Science Wing* (Jun. 13, 2013, 17:55 PDT), <http://living-future.org/case-study/bertschiscience>.

5. Designed to meet the Living Building Challenge.

6. See generally, Int'l Living Future Inst., *About the International Living Future Institute* (Nov. 20, 2013, 10:27 PDT), <http://living-future.org/ilfi/about-international-living-future-institute>.

7. These projects include the Group Health Cooperative's Puyallup Medical Center and the Energy Efficiency & Conservation Strategy (EECS) and Land Development Code Update.

8. See, e.g., David Eisenberg et al., *Code, Regulatory and Systemic Barriers Affecting*

In the authors' view, the most significant risk for project teams working on deep green buildings is the possibility that they will not be able to achieve their environmental goals cost-effectively, if at all. If they do not, the environmental and financial costs can be significant, resulting in the loss of correspondingly significant societal benefits. As we will explain, an integrated process is a risk mitigation tool that encourages collaboration and communication, which can temper the risk of a project failing to achieve green or performance goals.⁹ While project teams can use an integrated process, as well as some of the contractual mechanisms that have been developed to assist with such a process, they will also likely face a fragmented regulatory landscape.¹⁰ This fragmentation makes constructing and operating buildings with systems that work together synergistically—a necessity for Living Buildings®—difficult at best.¹¹

II. HISTORY OF GREEN OR HIGH PERFORMING BUILDINGS

According to the United States Environmental Protection Agency (EPA), in the United States, buildings account for thirty-nine percent of

Living Building Projects, 16 (Jul. 29, 2009), <https://ilbi.org/education/reports/codestudy3>. This document is one example of a detailed analysis of the barriers to Living Building projects.

9. The authors recognize that the terminology surrounding Integrative Process and Integrated Project Delivery is not necessarily standardized, and these terms mean different things to different parties. As used in this article, the term Integrative (or Integrated) Process ("IP") describes a process and Integrated Project Delivery ("IPD") refers to contract forms used to facilitate an Integrative Process.

10. See Cascadia Green Bldg. Council for King Cnty Green Tools, *White Paper, Local Ordinances Related to the Living Building Challenge*, 13 (Sept. 2012), <http://living-future.org/ilbi/ideas-action/research/building-codes/local-ordinances-related-living-building-challenge>. (Recommendation No. 5 says, "It is essential to align code incentives for Living Building Challenge projects with city and county policies related to environmental protection, climate change, waste prevention, public health, economic development[,] and other related priorities in city and county comprehensive plans.")

11. See David Eisenberg et al., *Code, Regulatory and Systemic Barriers Affecting Living Building Projects*, 16 (Jul. 29, 2009), <https://ilbi.org/education/reports/codestudy3>. ("The third pattern is that risks are addressed independently—as if they exist in isolation rather than in the context of the whole systems from which they emerge—giving the entire regulatory sphere an ad hoc and fragmented nature. The existence of regulatory silos and boundaries that do not match the interconnected reality of the risks they are supposed to address leads to gaps and overlaps in authority, both of which are problematic").

total energy use and thirteen percent of total water consumption.¹² Buildings also consume the largest amounts of electricity and contribute thirty-eight percent of carbon dioxide emissions.¹³ The importance of reducing these significant, detrimental impacts has inspired design and construction professionals, property owners, and real estate developers in the green building industry to push for improvements in building performance for two decades. The initiative started with efforts to solve particular environmental problems, such as heightened energy consumption, sick building syndrome, or the alarming rate of construction waste entering landfills, and then later expanded to embrace the concept of providing an alternative, “green” building practice that would solve these problems comprehensively.

In the early 1990s, formal initiatives began to appear, such as the American Institute of Architects Committee on the Environment in 1990,¹⁴ the launch of the Energy Star Program by the EPA and the Department of Energy in 1992,¹⁵ and the creation of the USGBC in 1993.¹⁶ The phenomenon of green building certification first appeared in the United States in Austin in 1990 with the Austin Energy Green Building Program.¹⁷ Many other local green building programs—municipal and industry-created—followed in Austin’s footsteps. Nationally, the USGBC piloted Version 1.0 of the Leadership in Energy and Environmental Design green building certification program, known as LEED[®],¹⁸ in 1998. For the past fifteen years, many states (including

12. See U.S. Env’tl. Prot. Agency, *Buildings and their Impact on the Environment: A Statistical Summary*, 2-3 (revised April 22, 2009), available at <http://www.epa.gov/greenbuilding/pubs/gbstats.pdf> (highlighting that “[b]uildings accounted for [thirty-eight point nine] percent of total U[nited States] energy consumption in 2005,” and that “[b]uilding occupants use [thirteen] percent of the total water consumed in the United States per day”).

13. *Id.* at 2 (highlighting that, “[b]uildings accounted for [seventy-two] percent of total U.S.[United States] electricity consumption in 2006[,] and [that] this number will rise to [seventy-five] percent by 2025,” and “[b]uildings in the United States contribute to [thirty-eight point nine] percent of the nation’s total carbon dioxide emissions . . .”).

14. See Am. Inst. of Architects, *AIA Committee on the Environment*, The American Institute of Architects (Jun. 25, 2013, 19:41 PDT), <http://network.aia.org/committeeontheenvironment/home/>.

15. See *About Energy Star*, U.S. Env’tl. Prot. Agency (Jun. 25, 2013, 19:40 PDT), http://www.energystar.gov/index.cfm?c=about.ab_index.

16. See *USGBC History*, U.S. Green Bldg. Council (Jun. 25, 2013, 19:30 PDT), <http://www.usgbc.org/about/history>.

17. See *What is the Austin Energy Green Building Program?*, Austin Energy® Green Bldg. (Jun. 25, 2013, 19:36 PDT), <https://my.austinenergy.com/aegb/aegb/about/>.

18. See *generally*, U.S. Green Bldg. Council, *LEED* (2013), <http://www.usgbc.org/leed> (containing more information on LEED).

Washington), cities, counties, and the federal government have embedded LEED into their capital improvement projects. Similarly, the private sector has incentivized the use of LEED through public policy.

LEED has measurably impacted the built environment. In the “Green Building Market and Impact Report 2011,” Rob Watson, colloquially referred to the “Godfather of LEED,” reported that, although expectations were higher, “more than [one] third of all LEED floor area ever certified in the history of the system was certified in 2011”¹⁹ At the time of his report, Mr. Watson estimated that by 2030 “nearly [seventy] billion vehicle miles traveled will be reduced each year due to more location-efficient LEED projects, resulting in over [three] billion gallons of gasoline savings each year”²⁰ He also declared, “Overall, water savings in LEED buildings remained strong, with an average of approximately [thirty] percent savings compared with the LEED baseline, an increase from the roughly [twenty-five] percent average savings from previous versions of the standard,” and further estimated that “LEED buildings will save over [eleven] percent of total non-residential energy use by the year 2030.”²¹

The turn of the millennium has seen greater initiatives to change commercial and residential real estate markets to not only reduce negative impact but to also contribute positively to the environment. These initiatives and the generally improved but inconsistent energy savings from applying the LEED Standard²² have resulted in a shift in focus to outcomes, or actual performance of buildings, rather than building features. Government entities have also become greater advocates, pushing for performance outcomes as they see the benefits to their constituents. According to the Institute for Market Transformation, “[s]even cities and two states in the U.S. have passed policies requiring the benchmarking and disclosure of energy use in existing buildings, starting with California in 2007.”²³ According to the Institute, these

19. See Rob Watson, *Green Building Market and Impact Report 2011*, 4 (2011), <http://www.greenbiz.com/research/report/2011/11/07/green-building-market-and-impact-report-2011>.

20. See *Id.* at 5.

21. *Id.*

22. See Cathy Turner and Mark Frankel, *Energy Performance of LEED® for New Construction Buildings*, New Bldgs. Inst. (Mar. 4, 2008), available at http://newbuildings.org/sites/default/files/Energy_Performance_of_LEED-NC_Buildings-Final_3-4-08b.pdf.

23. Caroline Keicher, *Comparison of U.S. Commercial Building Energy Benchmarking and Disclosure Policies in the U.S.*, Institute, Inst. for Mkt. Transformation (Jun. 23, 2013, 00:14 PDT), <http://www.imt.org/performance-policy/usresources/detail/comparison-of-commercial-building-benchmarking-policies>.

policies are “still new and being phased in, [but] they will soon affect roughly [four] billion square feet of floor space in major real estate markets—making them powerful catalysts for energy efficiency in the built environment.”²⁴

Other government programs have focused on incentivizing buildings that exceed LEED performance standards. Notably, Seattle’s Living Building and Deep Green Pilot Program allows project teams to request departures from the Seattle Land Use Code through Design Review for buildings attempting to meet the stringent performance standards of the Living Building Challenge or Seattle Deep Green program.²⁵ Diane Sigamura, Director of the Department of Planning and Development for the City of Seattle notes, “[o]ur codes weren’t developed to [permit] a Living Building™. We didn’t know what changes needed to be made in our codes, which is why we did the demonstration ordinance, which basically [allowed for] greater flexibility, but still said ‘meet community standards for designs.’”²⁶ The Bullitt Center participated in the City’s Pilot Program, but the Bertschi School Science Wing could not because it did not require a Master Use Permit—a requirement for program eligibility.²⁷

III. CHALLENGING THE INDUSTRY TO RAISE THE BAR

Non-regulatory programs to drive better outcomes beyond LEED have also been initiated. In 2006, The American Institute of Architects® (AIA) adopted the 2030 Challenge initiated by the nonprofit organization Architecture 2030.²⁸ This initiative seeks to achieve a “fossil fuel reduction standard” for all new construction and major renovations equivalent to “carbon neutral” by 2030, with carbon neutral

24. *Id.*

25. Seattle Mun. Code § 23.40.060 allows qualifying projects to request departures from code requirements that might otherwise discourage or prevent buildings from meeting the Living Building Challenge or the standards set for Seattle Deep Green, which are less than the Living Building Challenge but well beyond LEED Platinum in the LEED 2009 Rating Systems. *See* City of Seattle, *Living Building and Seattle Deep Green Pilot*, City of Seattle (Jun. 23, 2013 12:22 PDT), <http://www.seattle.gov/dpd/permits/greenbuildingincentives/livingbuildingpilot/default.htm>.

26. Bullitt Ctr., *Living Proof: Building the Bullitt Center* (Jan. 11, 2013, 19:01 PDT), <http://bullittcenter.org/news/blog/new-video-living-proof> (The Demonstration Ordinance referenced by Ms. Sigamura enabled the Living Building Pilot Program).

27. *See* City of Seattle, *Living Building and Seattle Deep Green Pilot*, City of Seattle (Jun. 23, 2013, 12:22 PDT), <http://www.seattle.gov/dpd/permits/greenbuildingincentives/livingbuildingpilot/default.htm>.

28. Architecture 2030, *The 2030 Challenge* (Jun. 23, 2013, 14:25 PDT), http://architecture2030.org/2030_challenge/the_2030_challenge.

defined as “using no fossil fuel [greenhouse gas] emitting energy to operate.”²⁹ The 2030 Challenge does not grant building certification. Instead, it requests that organizations signing on to the challenge develop an implementation plan to reach the 2030 aspirations on all their projects.³⁰ In addition to the 80,000-member AIA, many industry-related professional organizations, numerous universities and educational non-profits, businesses, professional offices, and organizations representing public sector elected officials and representatives nationwide have adopted the 2030 Challenge.³¹ Several states, including Washington, as well as numerous cities and counties have also adopted this initiative as policy.³²

The Living Building Challenge was launched the same year as the Architecture 2030 Challenge. According to the Institute, the Challenge defines the most advanced measure of sustainability in the built environment possible today and acts to diminish the gap between current limits and ideal solutions.³³ Two key aspects differentiate the Living Building Challenge from LEED and the other rating systems preceding it: the Living Building Challenge consists entirely of requirements, called imperatives, and does not grant certification until the project has demonstrated acceptable performance standards for at least a year.³⁴ This year-long requirement marks a significant difference for those considering investing in a Living Building because a building certified by the International Living Future Institute is much more likely to deliver the designed performance. However, as the bar is higher than the highest LEED bar (i.e. beyond LEED Platinum), a correspondingly greater risk exists that the project will not achieve certification.

The Living Building Challenge’s twenty imperatives are grouped into performance areas called Petals.³⁵ The International Living Future

29. *Id.*

30. Architecture 2030, *2030 Implementation Guidelines: A Resource for Firms and Organizations Adopting The 2030 Challenge*, available at <http://architecture2030.org/files/2030ImplementationGuidelines.pdf> (Last retrieved Jul. 23, 2013, 14:06 PDT).

31. Architecture 2030, *Adopters* (Jun. 23, 14:30 PDT), http://architecture2030.org/2030_challenge/adopters.

32. *Id.*

33. See Int’l Living Future Inst., *Living Building Challenge v. 2.1*, 5 (May 2012), available at http://living-future.org/sites/default/files/LBC/LBC_Documents/LBC%202012-0501.pdf.

34. See generally, *Id.*

35. See, *Id.* at 4. The twenty imperatives are as follows: Limits to Growth, Urban Agriculture, Habitat Exchange, Car Free Living, Net-Zero Water, Ecological Water Flow, Net-Zero Energy, Civilized Environment, Healthy Air, Biophilia, Red List, Embodied Carbon Footprint, Responsible Industry, Appropriate Sourcing,

Institute uses the analogy of a flower for certification rather than metals as used in LEED.³⁶ The seven petals that make up the flower of certification are Site, Water, Energy, Health, Materials, Equity, and Beauty.³⁷ The premise of the energy and water imperatives is to meet all of the project's needs for energy and for water through on-site resources (net-zero energy and net-zero water) and to fully infiltrate any water not used (ecological water flow).³⁸ These three imperatives are performance-based and must be verified through a year of operations.³⁹ Other imperatives, such as a ban on the use of toxic materials or a mandate that the building provide educational opportunities and function in a more prescriptive manner, yet still maintain an outcome-focused approach across all types of built environment structures (buildings, parks, neighborhood, etc.).⁴⁰

Living Building certification is not awarded unless all applicable imperatives are fully met; however, real world restrictions experienced through the first few certified buildings have led to some exemptions from the strictures of the imperatives. In those cases, a required action meant to challenge those constraints and lead to market change or to allow the building to engage in the activity when the restrictions are lifted always exists. For example, in the water section, we discuss the fact that even though most projects are unable to obtain the proper permits to reuse water for drinking purposes, all Living Buildings must demonstrate due diligence by filing an appeal(s) with the appropriate agency or agencies, and the team must demonstrate that a design approach to meeting this imperative is feasible.⁴¹ As another example, in the Materials Petal, a project can get an exception to use the material if the project team cannot find a product that does not use a series of

Conservation + Reuse, Human Scale + Humane Places, Democracy + Social Justice, Rights to Nature, Beauty + Spirit, Inspiration + Education.

36. *Id.*

37. *Id.*

38. *Id.*

39. *Id.*

40. *Id.* While meeting the imperatives of all 16 petals of the Living Building Challenge is the ultimate goal, the International Living Future Institute allows and encourages projects to achieve individual petals as a platform for informing other projects and accelerating adoption of the Challenge, and it grants "Petal Certification" for projects that achieve three petals (and meet some additional requirements). See International Living Future Institute, *Living Building Challenge, Certification Options* (Jun. 24, 2013, 00:45 PDT), <http://living-future.org/living-building-challenge/certification/certification-options>.

41. See Int'l Living Future Inst., *Living Building Challenge 2.0/2.1: Water Petal Handbook*, 5 (May 2013), available at <http://living-future.org/lbc/petalhandbooks>.

restricted chemicals (called the Red List), but the project team must notify the supplier or manufacturer they are using it under protest.⁴² As further described below, this mandatory communication with manufacturers has created positive, tangible change in the marketplace.⁴³

The Living Building Challenge verifies performance of all imperatives through a thorough review of project documentation, including data and calculations confirming net-zero energy and net-zero water was achieved for one year, as well as an on-site audit. Because of the one year performance period, the owners and operators of Living Buildings will most likely have to set up requirements for occupant consumption and behavior and develop building user education programs (as well as a thorough commissioning process) to help assure the building performs as designed. These extra measures provide added insurance to those investing in Living Buildings that the results desired will actually be achieved.⁴⁴

The focus on performance offered by the Living Building Challenge or Architecture 2030 has not been ignored by the USGBC. In 2004, they launched the LEED[®] for Existing Buildings: Operations & Maintenance[™], the only current USGBC rating system to tie certification to actual building performance. This program is aimed at the existing building stock and operational practices. It does not require building upgrades, but depending on the building, project teams may find it necessary to start with a round of upgrades in order to meet the prerequisites or to earn the desired level of points for energy or water performance.⁴⁵ The Energy Star[®] program,⁴⁶ which the USGBC uses to collect information on LEED buildings certified under the 2009 version of the rating system, tracks and verifies energy performance. All new

42. See generally, Int'l Living Future Inst., *Living Building Challenge v. 2.1*, (May 2012), available at http://living-future.org/sites/default/files/LBC/LBC_Documents/LBC%202_1%2012-0501.pdf.

43. To further assist projects, the Institute has developed Declare 'nutrition labels' for products. Declare offers Living Building Challenge Project teams a materials guide for product specification. For manufacturers, it offers an expanded point of entry into these groundbreaking sustainable projects. See generally, Declare (2013), <http://www.declareproducts.com/>

44. *Id.* See generally, Int'l Living Future Inst., *Living Building Challenge v. 2.1*, (May 2012), available at http://living-future.org/sites/default/files/LBC/LBC_Documents/LBC%202_1%2012-0501.pdf.

45. See generally, U.S. Green Bldg. Council, *Existing Buildings* (2013), <http://www.usgbc.org/ebom>.

46. See generally, Energy Star, *Portfolio Manager Overview*, (Jun. 26, 2013 10:25 PDT), http://www.energystar.gov/index.cfm?c=evaluate_performance.bus_portfoliomanager.

LEED buildings are required to participate in this initiative, called the Building Performance Partnership,⁴⁷ but unlike the Living Building Challenge, performance itself is not a condition of certification. According to Scot Horst, Senior Vice President of the USGBC, the long term vision is to link the Building Performance Partnership with LEED for Existing Buildings and O&M for on-going performance verification and re-certification of LEED buildings.⁴⁸ Steps to better assure the performance of LEED buildings were unveiled in the launch of LEED version 4 this November, such as additional prerequisites for building metering, additional credits for building commissioning, and a new credit for early performance analysis to inform decision making.⁴⁹ As such, LEED is likely to also continue to raise the bar and to actively engage its practitioners to focus on long-term performance.

IV. INCREASING EMPHASIS ON INTEGRATION⁵⁰ FOR GREEN BUILDING PROJECTS

As the design and construction industries have shifted focus towards documenting actual building performance, a corresponding emphasis on further developing processes to support high performing buildings and the synergistic systems they contain has developed. In a conventional construction project, the contracts generally flow in a top-down manner, such as the owner contracting with the architect, the general contractor contracting with subcontractors, and so on. By conducting the work in a linear fashion, players come into the process as their section of the work begins, not sooner. With project integration, though, the design process is iterative and a collaboration of the entire project team. A comparison of these two approaches is shown below:

47. U.S. Green Bldg. Council, *It Doesn't stop at the LEED Certification Plaque: Why Ongoing Building Performance Tracking Matters* (Mar. 13, 2012), <http://www.usgbc.org/articles/it-doesnt-stop-leed-certification-plaque-why-ongoing-building-performance-tracking-matters>.

48. Scot Horst, "*LEED = Performance, Learning and Feedback*," Remarks at Greenbuild® Conference, San Francisco, CA (Nov.14, 2012).

49. Summary based on author review of LEED v4 for BUILDING DESIGN AND CONSTRUCTION, Ballot Version, first published on the USGBC web-site for member review May 31, 2013. This version is no longer posted as it was approved by the membership and is being launched as the final version at the national GreenBuild Conference in November of 2013

50. The authors recognize that the terminology surrounding Integrative Process and Integrated Project Delivery is not necessarily standardized, and that these terms mean different things to different parties. When used in this article, the terms refer to the specific standards described in this section.

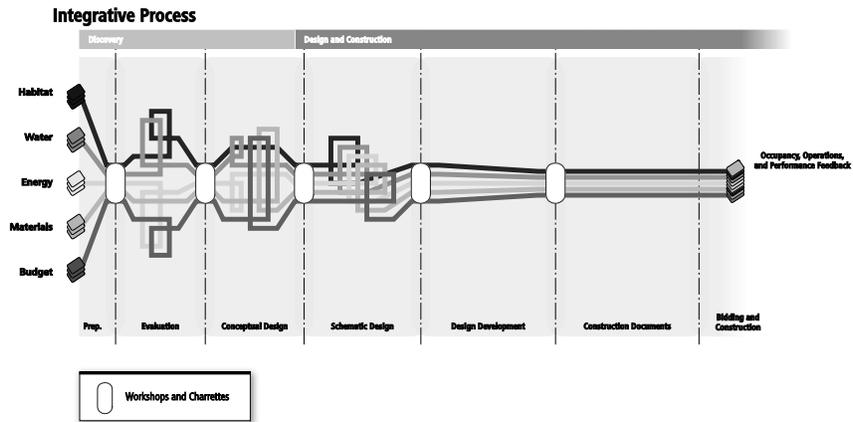


Figure 1. Graphic Depicting Integrative Process⁵¹

51. Figure 1 depicts the interrelationships and interactions between subsystems, cost, and disciplines in the integrative process. Image courtesy of 7group and Bill Reed, graphics by Corey Johnston. 7group & Bill Reed, *The Integrative Design Guide to Green Building: Reframing the Practice of Sustainability*, John Wiley & Sons, 2009.

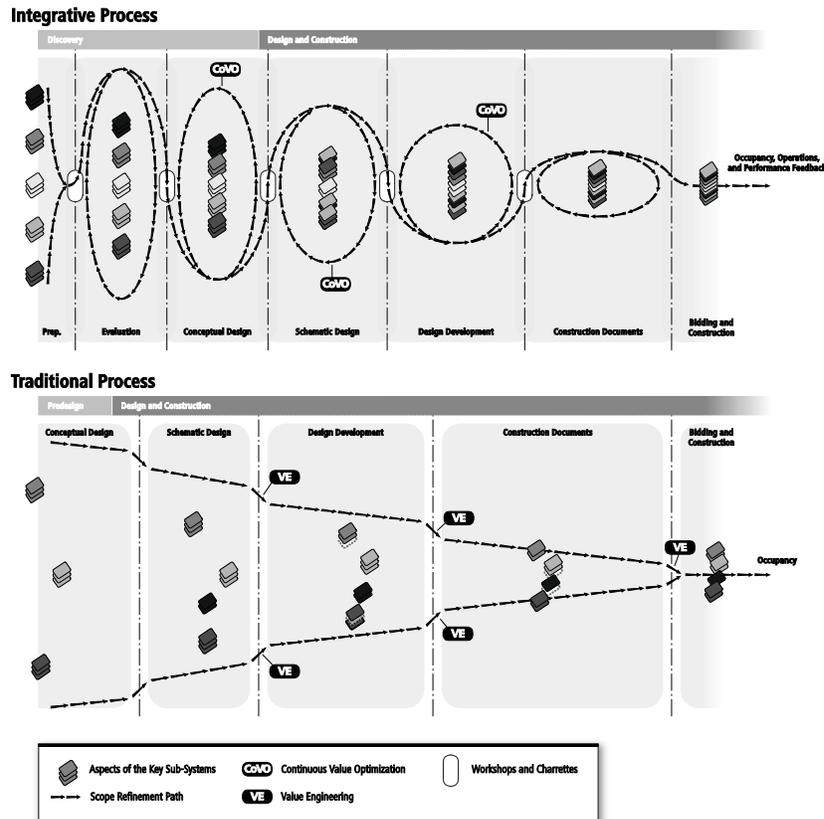


Figure 2. Graphic Comparing Integrative and Traditional Processes⁵²

This distinction is relevant in that the ability to achieve deep green, high performing buildings cost-effectively correlates directly with the quality of collaboration among project team members throughout design, construction, and early occupancy. Meaningful collaboration throughout design and construction provides opportunities for the project team to integrate building systems, which optimizes cost efficiencies and building performance and reduces risk. For this reason, green building standards, such as LEED, have recently begun to acknowledge and encourage project “integration” by rewarding points for using this type of approach.⁵³ In 2010, the LEED green building certification program

52. Figure 2 depicts the optimal integrative process compared to the traditional process along the same timeline. Image courtesy of 7group and Bill Reed, graphics by Corey Johnston. 7group & Bill Reed, *The Integrative Design Guide to Green Building: Reframing the Practice of Sustainability*, John Wiley & Sons, 2009.

53. U.S. Green Bldg. Council, *LEED Pilot Credit Library, Pilot Credit 5 & 6: Preliminary Integrative Project Planning & Design* (Jul. 2010), available at

began piloting two credits: “Preliminary Integrative Project Planning & Design” and “Integrative Project Planning & Design.”⁵⁴ The Pilot Credits reference ANSI / MTS 1.0 Whole Systems Integrated Process Guide (WSIP) – 2007 for Sustainable Buildings and Communities©, which ANSI / MTS 2.0 Integrative Process for the Design and Construction of Sustainable Buildings and Communities© (“ANSI IP Standard 2.0”) further improved.⁵⁵

The ANSI IP Standard 2.0 articulates the purpose of an Integrative Process (IP) as “to effectively manage and optimize synergies between the complex set of technical and living systems associated with design and construction in order to effectively pursue sustainable practices.”⁵⁶ According to Nora Daley-Peng, a member of the team advising the authors of the Standard Guide, “[a]s a national standard, the IP Standard [provides] a common reference for all industry practitioners (owners, architects, builders, engineers, landscape architects, ecologists, manufacturers, and so on) in support of process changes needed to effectively realize cost savings, a deeper understanding of human and environmental interrelationships, and an improved environment for all living systems.”⁵⁷ According to the Standard Guide, “To achieve cost effective and increasingly more effective environmental performance, it is necessary to . . . focus on interrelated systems integration.”⁵⁸

To support the implementation of integrated design practice, the AIA has developed a family of contracts under the title “Integrated Project Delivery.”⁵⁹ According to the AIA, it provides “agreements for three levels of integrated project delivery”:⁶⁰

<http://www.usgbc.org/Docs/Archive/General/Docs6330.pdf>.

54. *Id.*

55. *Integrative Process (IP) ANSI Consensus National Standard Guide© 2.0 for Design and Construction of Sustainable Buildings and Communities* (Feb. 2, 2012).

56. *Id.* at 6. IPD formalizes an integrated process, but it does not necessarily dictate a result. Thus, you could use IPD on a building in which “deep green” goals or sustainability is not an explicit goal. In contrast, IP is an approach, and does not require a contract.

57. Nora Daley-Peng, *Clarifying the Integrative Design Process: ANSI Standard gets an overhaul with IP Version 2.0*, BUILDING CAPACITY BLOG, O’Brien & Co. (Jun. 8, 2013, 16:00 PDT), <http://buildingcapacity.typepad.com/blog/2011/02/clarifying-the-integrative-design-process-ansi-standard-gets-an-overhaul-with-ip-version-20.html>.

58. See *Integrative Process (IP) ANSI Consensus National Standard Guide© 2.0 for Design and Construction of Sustainable Buildings and Communities*, 6 (Feb. 2, 2012).

59. *Contract Documents: Integrated Project Delivery (IPD) Family*, Am. Inst. of Architects (Jun. 8, 2013, 14:55 PDT), <http://www.aia.org/contractdocs/AIAS076706referencematerial/aia099123>.

60. *Id.* In addition to the citation listed above, readers can find more information in the document *Integrated Project Delivery: A Guide*, Am. Inst. of Architects (2007,

Transitional Forms are modeled after existing construction manager agreements and offer a first step into integrated project delivery. The Multi-Party Agreement is a single agreement that the parties can use to design and construct a project utilizing integrated project delivery. The Single Purpose Entity (SPE) creates a limited liability company for the purpose of planning, designing and constructing the project. The SPE allows for complete sharing of risk and reward in a fully integrated collaborative process. AIA documents for IPD can be used on large private sector commercial projects.⁶¹

While these contracts were not utilized on either of the case study projects, it is important to understand their potential usage and role.

V. LIVING BUILDING CHALLENGE CASE STUDIES

The LEED green building certification program and the Challenge intentionally evolve, such that new versions replace older ones. In addition, the systems are subject to local laws and regulations that may support or otherwise impact their implementation. This article provides examples and insights based on projects in the Pacific Northwest. Thus, readers are cautioned not to assume the same conditions apply to projects outside this region. We will draw heavily on the Bertschi School Science Wing and the Bullitt Center, both located in Seattle, Washington, for examples of legal challenges and discussions of how the associated project teams managed those challenges. Therefore, the authors first provide some background on these projects.

A. *Learning and Leading*

The Bertschi School Science Wing has achieved Living Building certification, while the Bullitt Center must demonstrate satisfactory performance for twelve months before the International Living Future Institute can certify it. Both project teams were motivated to use the Bertschi School Science Wing and the Bullitt Center as learning opportunities as they envisioned and constructed these projects. They also sought to illustrate that meeting the Living Building Challenge was both a possibility and a necessity.⁶² The projects were similar in two

version 1).

61. *Id.* See also, Am. Inst. Of Architects, *Integrated Project Delivery: A Guide* (2007, version 1).

62. For example, Mr. Stan Richardson, Dir. of Tech. and Campus Planning for the Bertschi School has commented, “[i]t was a coordinated effort on everyone’s part to learn how to do a Living Building project.” Telephone interview with Stan Richardson,

regards: the project teams felt dedicated to an integrated approach (described in the “Process” section below), and the projects were placed in tight infill urban locations. Besides these similarities, the projects’ narratives differ significantly.

The compensation structure for the Bertschi project evidences the team’s dedication to using the project as a learning opportunity. In this case, the entire design team organized itself as a collective (the Restorative Design Collective) and agreed to do the work pro bono.⁶³ The Restorative Design Collective is a group of Seattle-area design professionals who “share the desire to keep themselves and their firms at the forefront of the sustainable building movement by meeting the 2030 Challenge and creating net-zero buildings.”⁶⁴ The contractor waived its contingency fee and profit (and in the end donated a significant amount of time and materials).⁶⁵ Sub-contractors for the Bertschi project, hired at or below cost, also donated significant amounts of labor.⁶⁶

Similarly, the Bullitt Foundation had an interest in accelerating adoption of the Challenge in the marketplace and in playing a key role in stimulating policy and market shifts that would facilitate this result.⁶⁷ The Bullitt Center’s President and Chief Executive Officer Denis Hayes has noted, “If this building is alone five years from now this whole thing would have been a waste[W]e want to be an instrument of change. We want to influence builders, architects, financiers, and city governments.”⁶⁸ In particular, Mr. Hayes wanted to use the project experience and process both to create change and to highlight needed changes in codes and regulations that stand in the way of the innovation that the Living Building Challenge represents. “If you really want to

Dir. of Tech. and Campus Planning, Bertschi School (May 28, 2013); Joe David, Project Assoc. for Point32 has also commented, “[m]ost regulatory agencies we were working with were really excited about the [Bullitt Center]; they saw it as an opportunity to learn about innovative systems, and to evaluate the successes of this kind of building.” Telephone interview with Joe David, Project Assoc., Point32 (Jun. 5, 2013).

63. Int’l Living Future Inst., *Living Building Challenge, Case Studies: Bertschi Living Building Challenge Science Wing* (Jun. 13, 2013, 17:55 PDT), available at <http://living-future.org/case-study/bertschiscience>.

64. *Bertschi Living Science Building*, O’Brien & Co., LLC (Jun. 12, 2013, 13:45 PDT), <http://www.obrienandco.com/portfolio/bertschi-living-classroom>.

65. Telephone interview with Chris Toher, Executive V.P., Skanska, Seattle, WA. (May 31, 2013).

66. Telephone interview with Chris Hellstern, Project Manager, formerly with KMD Architects (May 23, 2013).

67. *Who We Are: Mission, Bullitt Foundation*, BULLITT FOUND. (Jun. 12, 2013, 14:55 PDT), <http://bullitt.org/who-we-are/mission-et-cetera>.

68. Bullitt Ctr., *supra* note 26.

build a green building today in any city [you will] find yourself in violation of two dozen regulations and laws . . . We want city governments to change the codes that currently make Living Buildings illegal . . . We want the environmentally sound thing to be the convenient thing.”⁶⁹

B. *The Bertschi School Science Wing*

The Bertschi School, a private, non-profit primary school, possesses an environmental, community, and civic ethic that carries over to the design, construction, and operation of campus buildings.⁷⁰ The Bertschi School enrolls 235 students within a seven-building campus spanning half of a city block (shared with single family housing) in Seattle’s Capitol Hill neighborhood.⁷¹ The Bertschi School’s green building leadership was recognized in 2008 when the School’s new gymnasium and community building earned LEED Gold certification. The judges of the AIA Seattle’s juried “What Makes It Green?” competition recognized the design as one of the ten best.⁷² In addition, the school reached the first level of Washington Green Schools certification, a program focused on green operations, before most others.⁷³

The Bertschi School furthered its commitment with the School’s

69. *Id.*

70. Int’l Living Future Inst., *Living Building Challenge, Case Studies; Bertschi Living Building Challenge Science Wing* (Jun. 13, 2013, 17:55 PDT), available at <http://living-future.org/case-study/bertschiscience>.

71. *Id.* E-mail from Stan Richardson, Dir. of Tech. and Campus Planning, The Bertschi School, to K. O’Brien, Founder, O’Brien & Co. (Jul. 1, 2013 18:52 PDT) (on file with author K. O’Brien).

72. AIA Seattle recognizes exemplary sustainable design and construction projects in the Pacific Northwest and Pacific Region through its annual “What Makes it Green?” program. Am. Inst. Of Architects Seattle, *What Makes it Green?* (Jun. 24, 2013, 01:25 PDT), <http://www.aiaseattle.org/wmig>.

73. O’Brien & Co., LLC, *Bertschi Living Science Building* (Jun. 12, 2013, 13:45 PDT), <http://www.obrienandco.com/portfolio/bertschi-living-classroom>; *Living Building Challenge, Case Studies: Bertschi Living Building Challenge Science Wing* (Jun. 13, 2013, 17:55 PDT), <http://living-future.org/case-study/bertschiscience>. Washington Green Schools is a web-based program that “challenges students and communities to create a sustainable region through educational experiences that transform school environments.” Wash. Green Schools, *About Us* (Jun. 24, 2013, 01:35 PDT), <http://www.wagreenschools.org/31/about-us.html>. The program is “organized into five levels (Levels 1-5) and five environmental categories. Certification at each level is achieved by choosing a focus category and completing six key steps. These include forming a Green Team, completing an assessment and related lasting change, verifying results, and sharing your (team’s) story.” Wash. Green Schools, *Program Information* (Jun. 24, 2013, 01:35 PDT), <http://www.wagreenschools.org/1178/program-info.html>.

Science Wing, a 1425 square-foot interactive classroom and grounds.⁷⁴ The Science Wing is the fourth project in the world and the first in Washington State to achieve full certification under the Challenge, and the first project ever to receive certification under Version 2.0 of the system.⁷⁵ This distinction means that the project met all of the Challenge's twenty imperatives, including providing acceptable performance data and documentation from one year of operation.⁷⁶ In addition, the Science Wing has earned industry recognition, which suggests that its Living Building status will indeed influence the market. Awards include AIA National 2012 CAE Educational Facility Design Award, U.S. Green Building Council Best of Green Schools 2012, EDC 2012 Excellence in Design Award (Educational Honorable Mention), Sustainable Buildings Industry Council Beyond Green™ High Performance Building 2011, Design and Build with FSC Award 2011, Washington Association of Landscape Architecture 2012, the Associated General Contractors of America Alliant Build America Award 2011, and NAIOP's Private Education Development of the Year, 2012.⁷⁷

The Science Wing includes an attached greenhouse, called the Ecohouse, and the grounds incorporate an urban agricultural element with a learning garden and outdoor classroom where students can learn how to grow and harvest native huckleberries, wild strawberries, and other vegetation.⁷⁸ The Ecohouse has a ground floor, mezzanine, and an eighteen-foot-high "greenwall."⁷⁹ The Science Wing provides students

74. E-mail from Stan Richardson, *supra* note 71.

75. O'Brien & Co., LLC, *Bertschi Living Science Building* (Jun. 12, 2013, 13:45 PDT), <http://www.obrienandco.com/portfolio/bertschi-living-classroom>; Int'l Living Future Inst., *Bertschi Living Building Challenge Science Wing* (Jun. 13, 2013, 17:55 PDT), <http://living-future.org/case-study/bertschiscience>.

76. O'Brien & Co., LLC, *Bertschi Living Science Building* (Jun. 12, 2013, 13:45 PDT), <http://www.obrienandco.com/portfolio/bertschi-living-classroom>; Int'l Living Future Inst., *Bertschi Living Building Challenge Science Wing* (Jun. 13, 2013, 17:55 PDT), <http://living-future.org/case-study/bertschiscience>.

77. O'Brien & Co., LLC, *Bertschi Living Science Building* (Jun. 12, 2013, 13:45 PDT), <http://www.obrienandco.com/portfolio/bertschi-living-classroom>; Int'l Living Future Inst., *Bertschi Living Building Challenge Science Wing* (Jun. 13, 2013, 17:55 PDT), <http://living-future.org/case-study/bertschiscience>.

78. O'Brien & Co., LLC, *Bertschi Living Science Building* (last visited Jun. 12, 2013, 13:45 PDT), <http://www.obrienandco.com/portfolio/bertschi-living-classroom>; Int'l Living Future Inst., *Living Building Challenge, Case Studies: Bertschi Living Building Challenge Science Wing* (Jun. 13, 2013, 17:55 PDT), available at <http://living-future.org/case-study/bertschiscience>.

79. O'Brien & Co., LLC, *Bertschi Living Science Building* (last visited Jun. 12, 2013, 13:45 PDT), <http://www.obrienandco.com/portfolio/bertschi-living-classroom>; Int'l Living Future Inst., *Living Building Challenge, Case Studies: Bertschi Living Building Challenge Science Wing* (Jun. 13, 2013, 17:55 PDT), available at <http://living-future.org/case-study/bertschiscience>.

with a healthy indoor environment, and the Science Wing operates in a self-sufficient manner because it generates all the energy it requires from a twenty kilowatt photovoltaic system, harvests rainwater for irrigation and flushing the composting toilet, and infiltrates all rainwater on site.⁸⁰

In keeping with the desire to foster implementation of the Living Building Challenge and the educational mission of the Bertschi School, the new Science Wing remains available for tours to the public and institutions far in excess of the minimum one tour per year required by the Living Building Challenge for the facilitation of “direct contact with the Living Building Challenge.”⁸¹ The hard costs for the project (land excluded) were \$935,000,⁸² and as Stan Richardson, Director of Technology and Campus planning, noted, “[W]e got a [two] million [dollar] project for half that price[] because of the amazing contributions by all involved.”⁸³

C. *The Bullitt Center*

Initially, Dorothy Bullitt founded the Bullitt Foundation in 1952, to provide civic and cultural leadership.⁸⁴ In 1983, the Bullitt Foundation began to focus on the environment, children, and peace, and in 1992, when it hired internationally recognized conservationist (and first organizer of Earth Day) Denis Hayes, it began to devote its financial resources exclusively to protecting and restoring the environment of the Pacific Northwest.⁸⁵ The Foundation currently envisions a “future that safeguards the vitality of natural ecosystems while accommodating a sustainable human population in healthy, vibrant, equitable, and prosperous communities.”⁸⁶ The 50,000 square-foot, six-story Bullitt Center physically manifests the Foundation’s vision.

The Bullitt Center, designed to last 250 years, was the first heavy-

future.org/case-study/bertschiscience.

80. *Id.*

81. See Int’l Living Future Inst., *Living Building Challenge v. 2.1*, 42 (May 2012), available at http://living-future.org/sites/default/files/LBC/LBC_Documents/LBC%202_1%2012-0501.pdf.

82. Int’l Living Future Inst., *Living Building Challenge, Case Studies: Bertschi Living Building Challenge Science Wing* (Jun. 13, 2013, 17:55 PDT), <http://living-future.org/case-study/bertschiscience>.

83. Telephone interview with Stan Richardson, *supra*, note 62.

84. *Who We Are: History, Bullitt Foundation*, BULLITT FOUND. (Jun. 12, 2013, 14:55 PDT), <http://bullitt.org/who-we-are/history>.

85. *Id.*

86. *Who We Are: Mission, Bullitt Foundation*, BULLITT FOUND. (Jun. 12, 2013, 14:55 PDT), <http://bullitt.org/who-we-are/mission-et-cetera>.

timbered commercial building constructed in Seattle since the 1920s.⁸⁷ The Center is located in Seattle's Pike/Pine neighborhood and offers Class A office space at competitive rates, advertised at twenty-eight to thirty dollars per square foot.⁸⁸ The Center prominently displays a dramatic overhanging photovoltaic rooftop array, composting toilets, and a central staircase with sweeping views. While these features demonstrate that the building functions as a prototype, the goal of the project, according to Managing Broker Angela Faul, is for tenants "to be able to successfully conduct business as they would in any other commercial property."⁸⁹

The Bullitt Center has received widespread recognition in the press as the "Greenest Commercial Building in the World," even though it must still wait for a full year of operational documentation prior to receiving official Challenge certification.⁹⁰ Regardless, it has already received awards, such as the 2012 Design & Build with Forest Stewardship Certified® (FSC) Award for commercial project of the year⁹¹ and recognition as the first commercial building in the United States to receive independent certification for responsible wood use, as 100% of the wood used in the heavy timber structure is FSC certified.⁹² Like the Bertschi School Science Wing, the Bullitt Center plans to far exceed the minimum educational requirements of the Challenge, and currently offers daily tours conducted by the Urban Ecology Partnership of the building's exhibition space, mechanical and electrical rooms, and central staircase—a feature termed "irresistible" by CEO Denis Hayes.⁹³

87. Brad Kahn "This is not your grandfather's heavy timber structure," DAILY JOURNAL OF COMMERCE GREEN BLDG. BLOG, Aug. 17, 2012. (Jun. 24, 2013, 11:20 PDT), <http://www.djc.com/blogs/BuildingGreen/?p=2720>.

88. Bryn Nelson, *A Building Not Just Green, But Practically Self-Sustaining*, N.Y. TIMES (Jun. 30, 2013, 20:17 PDT), http://www.nytimes.com/2013/04/03/realestate/commercial/the-bullitt-center-in-seattle-goes-well-beyond-green.html?pagewanted=all&_r=0.

89. Telephone interview with Angela Faul, Managing Broker, ACJK Consulting (Jun. 5, 2013).

90. Several articles and media reports referred to this accolade. See, e.g., *Seattle's Bullitt Center Opens Today as World's Greenest Office Building*, PBS VIDEO, <http://www.pbs.org/newshour/rundown/2013/04/seattles-bullitt-center-opens-today-as-worlds-greenest-office-building.html>; The Bullitt Ctr., *Supposedly World's Greenest Office Building Opens*, (Jun. 24, 2013, 02:00 PDT), <http://www.seattlepi.com/local/connelly/article/The-Bullitt-Center-World-s-greenest-building-is-4454096.php>.

91. *Design and Build with FSC Awards*, FOREST STEWARDSHIP COUNCIL USFOUNDATION, (Jun. 24, 2013, 02:10 PDT), <https://us.fsc.org/2012-design-build-awards.299.htm>.

92. *The Bullitt Center*, FOREST STEWARDSHIP COUNCIL USFOUNDATION, (Jun. 24, 2013, 02:10 PDT), <https://us.fsc.org/the-bullitt-center.300.htm>.

93. *Interested in a Bullitt Center Tour?*, BULLITT CTR. (Jun. 12, 2013, 16:20 PDT),

As of June 2013, eighty percent of the tenant space of the Bullitt Center had been leased,⁹⁴ with some of the space leased by early adopters with major investments in the building's success, such as PAE Consulting Engineers, the project's lead engineering firm; Point32, the project's developer who will also manage a forty-desk co-working space; the University of Washington's Integrated Design Lab, which played a major consulting role and will have both office space and a forty-seat classroom; and the International Living Future Institute. Intentional Futures, a product innovation studio, has also leased a full floor.⁹⁵ As described in further detail below, tenants will need to adjust to lease-mandated energy and water consumption budgets, as well as to restrictions on materials that can be brought into the building for the purpose of maintaining compliance with Living Building Challenge imperatives.⁹⁶ The New York Times deemed these first tenants "guinea pigs in a [thirty] million [dollar] living laboratory."⁹⁷

VI. PROCESS

Process is an important aspect of any construction project. A project team's end goal of a deep green or high performing building amplifies the importance of having a well-planned and well-executed process. Therefore, three aspects of process are discussed below: documenting the project's green building goals, integrating the process, and promoting green building operations. These process elements impact the beginning and "end" of the project as well as all points in between.

A. *Document Green Building Goals*

A project will not achieve its high performance goals when these goals are not explicitly stated in the project's documentation or clearly communicated amongst all parties. Both the Bertschi School Science Wing and the Bullitt Center incorporated the project's deep green goals

<http://bullittcenter.org/news/blog/tours-at-the-bullitt-center>.

94. Telephone interview with Angela Faul, *supra* note 89.

95. Bryn Nelson, *A Building Not Just Green, But Practically Self-Sustaining*, N.Y. TIMES (Jun. 30, 2013, 20:17 PDT), http://www.nytimes.com/2013/04/03/realestate/commercial/the-bullitt-center-in-seattle-goes-well-beyond-green.html?pagewanted=all&_r=0.

96. Telephone interview with Angela Faul, *supra* note 89.

97. Bryn Nelson, *A Building Not Just Green, But Practically Self-Sustaining*, N.Y. TIMES (Jun. 30, 2013, 20:17 PDT), http://www.nytimes.com/2013/04/03/realestate/commercial/the-bullitt-center-in-seattle-goes-well-beyond-green.html?pagewanted=all&_r=0.

into their contractual documents in some way. This explicit directive, understood by all parties, functions as an excellent (and free) risk mitigation tool.

The Bertschi School and the Bullitt Center share the challenge of gaining certainty in regards to the International Living Future Institute's expectations and meeting specific Challenge Imperatives. As early adopters, these owners, and their projects, were essentially "learning grounds" for the Institute to evolve the Challenge. Mr. Richardson sometimes felt that the Bertschi School Science Wing team felt its way through the Living Building Challenge.⁹⁸

The Bertschi School and the Bullitt Center teams were not without any resources in this regard, though. In addition to the Living Building Challenge 2.0/2.1 StandardTM documents,⁹⁹ both participated in an online forum, called the Dialogue, where teams can submit questions for clarification or request interpretations.¹⁰⁰ For teams now pursuing the Living Building Challenge, they will find their efforts further supported by "Petal Handbooks,"¹⁰¹ essentially user's guides, which expand on the spare guidance contained in the Standard Documents. Petal Handbooks did not exist at the initiation of either case study project, and they were developed, to a degree, based on the International Living Future Institute's experience with these early adopters documented in the conversations on the Dialogue. At this writing, the International Living Future Institute has published three Petal Handbooks for the Site, Water, and Materials Petals.¹⁰² The Petal Handbooks "describe the rule set or 'body of law' for achieving all imperatives that make up the (particular petal) within the Living Building Challenge."¹⁰³ For example, the Water Petal Handbook addresses the water-related imperatives, net-zero water

98. Telephone interview with Stan Richardson, *supra* note 62.

99. Int'l Living Future Inst., *Living Building Challenge v. 2.1* (May 2012), available at http://living-future.org/sites/default/files/LBC/LBC_Documents/LBC%202_1%2012-0501.pdf. According to Chris Edlin, Project Assoc. for O'Brien & Company, the "update from Version 2.0 to 2.1 was largely clarifications of intent; no substantive changes were made to any one imperative intent or requirement. Other changes were minor corrections."

100. See Int'l Living Future Inst., *Living Building Challenge: Dialogue* (Jul. 23, 2013, 02:35 PDT) <http://living-future.org/living-building-challenge/tools-support/dialogue>.

101. Int'l Living Future Inst., *Living Building Challenge: Petal Handbooks* (2012-2013), available at <http://living-future.org/lbc/petalhandbooks>. (Petal Handbooks are available for download to members at this site).

102. *Id.*

103. See Int'l Living Future Inst., *Living Building Challenge 2.0/2.1: Water Petal Handbook, 2* (May 2013), available at <http://living-future.org/lbc/petalhandbooks>.

and ecological water flow, by providing an intent statement, list of requirements, exemptions, documentation requirements, definitions, and a list of resources.¹⁰⁴ The Handbooks are intended for use in conjunction with the Living Building Challenge version under which the project team works. Given the increased level of specificity within the Petal Handbooks, referencing the Handbooks in contract documents, as well as the applicable and agreed upon version of the Living Building Challenge, should help to align the project team's dialogue regarding, and understanding of, specific Petal and Imperative requirements and to reduce the risk of multiple interpretations of the more general requirements outlined in the Living Building Challenge summary document.

1. *The Bertschi School Science Wing*

The Bertschi School Science Wing utilized standard AIA contract documents for both design (AIA Document B101™ – 2007) and construction (AIA Document A102™ – 2007 and AIA Document A201™ – 2007) phases of the project, and, according to Mr. Richardson, this meant “calling out our intent to meet the Living Building Challenge requirements and achieve Living Building Certification.”¹⁰⁵ In the owner-architect agreement, the Challenge “certification process[,] as defined by the International Living Building Institute,” is included in the introductory list of Basic Services.¹⁰⁶ Other amendments in the body of the document include listing the final Challenge certification date as part of substantial completion and defining additional services related to an “extensive environmentally responsible design” as a “design intended to achieve the standards of a Living Building set forth by the International Living Building Institute.”¹⁰⁷

The description of additional services also includes the architect's responsibility, as part of the Post Occupancy Evaluation, for providing “performance documentation necessary for submittal to the International Living Building Institute after twelve consecutive months of building occupation for Living Building Challenge certification.”¹⁰⁸ In addition

104. *See generally, Id.*

105. Telephone interview with Stan Richardson, *supra* note 62.

106. *Id.* (The organization changed its name from The International Living Building Institute to the International Living Future Institute in 2011.)

107. AIA Document B101™ – 2007: Standard Form of Agreement between Owner and Architect (The Bertschi School) and Architect (Kaplan McLaughlin Diaz), dated and executed Sept. 15, 2009; Telephone interview with Stan Richardson, *supra* note 62.

108. *Id.*

to assisting with the sustainable design, the architect's sustainability consultant maintains responsibility for performance documentation and the actual submittal of documentation to the Institute.¹⁰⁹ Mr. Richardson notes that for the Bertschi project, the contract, as modified, provided a "more direct relationship with the design sub-consultants" than typically used for the institution and that "[i]n this case, the Civil, Structural, and Geotechnical Engineers' and the Landscape Designer's additional services regarding the 'environmentally responsible design' [were] specified in the Owner-Architect agreement."¹¹⁰

The owner-contractor agreement for the Bertschi Science Wing did not incorporate Challenge requirements per se, but relied on specifications for outlining Living Building-related requirements for systems, equipment, and materials.¹¹¹ However, as further detailed in the Appropriate Sourcing and Materials section, total reliance on specifications can be problematic if specific guidelines are not provided for vetting materials to ensure Red List items.

2. *The Bullitt Center*

The larger Bullitt Center project took an incremental approach to contracting the process. With Point32, the Bullitt Foundation "set the table" for the project by "securing the property, partnering with the City of Seattle to pass the demonstration ordinance (Seattle Municipal Code 23.40.060, the "Living Building Pilot Program"¹¹²) that made the Living Building Challenge achievable, identifying any additional code issues, and performing a very preliminary energy analysis[] using the University of Washington's Integrated Design Lab services."¹¹³

The Bullitt Center then directly hired all of the design consultants (to "ensure everyone had an equal seat at the table"¹¹⁴), including the architect, mechanical/electrical/plumbing engineer, civil engineer, structural engineer, landscape architect, geotechnical engineer, solar consultant, and water engineer.¹¹⁵ Point32, the owner's representative and project manager, was also contracted to perform materials research for the project, a significant task (see Appropriate Sourcing and Red List

109. *Id.*

110. *Id.*

111. *Id.*

112. The Living Building Pilot Program "originally enacted in 2008, was amended in the summer of 2012 to the "Living Building and Seattle Deep Green Pilot Program."

113. Telephone interview with Chris Rogers, CEO, Point32 (Jun. 26, 2013).

114. *Id.*

115. *Id.*

Materials, below).¹¹⁶ The Bullitt Center also hired Schuchart, the contractor, for pre-construction services at this time.¹¹⁷ Team members were contracted to participate collaboratively in an early schematic feasibility study, during which weekly team meetings commenced and continued for two years.¹¹⁸ Although the Bullitt Center hired Schuchart, Schuchart staff spent so much time at the architect's office, they "joked [they] should have a desk there."¹¹⁹

To outline preliminary issues, the Bullitt Foundation and the Miller Hull Partnership entered into a very simple agreement consisting of just a few pages.¹²⁰ The document outlined Challenge goals and the desire to identify the "simplest and most direct solution" to achieve them¹²¹ for the purpose of determining "if achieving the Challenge was even technically feasible on the given site."¹²² The work outlined in this early agreement included conceptualizing and testing multiple schemes.¹²³ "Typically you would be evaluating concepts based on aesthetics and programming at this point; we went beyond what you might usually do (for the conceptual design phase)," notes Chris Rogers, CEO of Point32.¹²⁴

The contract structure for the Bullitt Center also featured a provision for contractor's pre-construction services that included cost estimation for concept versions, materials research, and working with the architect to convert Living Building Challenge terminology into "construction-architect speak" for pre-submittals.¹²⁵ Regarding the latter, Mr. LaRocco explained:

Originally, the Living Building Challenge used the analogy of a shopping cart going up and down the aisle of a big box store to discuss material constraints: for example, extraction, weight, and chemical make-up. Although this analogy works great for raising awareness and education, it unfortunately [does not] align well with the Construction Specification

116. *Id.*

117. *Id.*

118. *Id.*

119. Telephone interview with Christian LaRocco, Project Manager, Schuchart (Jun. 7, 2013).

120. Telephone interview with Margaret Sprug, Project Manager, The Miller Hull P'ship (May 28, 2013); E-mail from C. Rogers, CEO, Point 32 to Kathleen O'Brien, Founder, O'Brien and Co. (Jul. 15, 2013 15:47 PDT) (on file with author K. O'Brien).

121. *Id.*

122. *Id.*

123. Telephone interview with Chris Rogers, *supra* note 113.

124. *Id.*

125. Telephone interview with Christian LaRocco, *supra* note 119.

Institute (CSI) framework we work with in the commercial construction industry.¹²⁶

LaRocco noted that in the CSI context, “the same material or product can appear in multiple CSI format categories. [F]or example[,] aluminum can be in the glazing category[] or in the exterior grade HVAC ductwork.”¹²⁷ It is important to note that the Challenge shifted to using the CSI Format 2004 with the emergence of 2.0 in 2009.¹²⁸

Once the Bullitt Center determined an acceptable design scheme, work moved forward under standard contracts, AIA Document B101TM – 2007 for the architect and AIA Document A102TM – 2007 for the contractor.¹²⁹ In the owner-architect agreement, initial information identified the goal of certification as a Living Building.¹³⁰ It also, similar to the Bertschi School Science Wing project’s contract documents, lists all of the owner’s design consultants as part of the team,¹³¹ however, unlike the Bertschi project, the design consultants were contracted separately, not as part of the owner-architect agreement.¹³² The document also made clear that although Point32 had the authority in its separate agreement with the owner to manage the project, the role of team coordination and facilitation resided with The Miller Hull Partnership.¹³³ An important aspect of this agreement was an exhibit, which was used, according to Rogers, “to manage and clarify expectations.”¹³⁴

Rogers shared language from Exhibit 1: Assumptions & Exclusions of their owner-architect agreement that is notable for this discussion:

The primary goal of the singular design option is to achieve net-zero energy use on an annualized basis[] and to meet the ‘imperatives’ of the Living Building Challenge. By designing to the Living Building Challenge Imperatives, the project should also qualify to achieve a LEED certification at the Platinum level. All other project criteria are secondary.¹³⁵

126. *Id.*

127. *Id.*

128. E-mail from Amanda Sturgeon, V.P., Living Bldg. Challenge (Jul. 16, 2013, 23:26 PDT) (On file with author K. O’Brien).

129. Telephone interview with Chris Rogers, *supra* note 113.

130. *Id.*

131. *Id.*

132. *Id.* As design consultants for the Bertschi project were acting as a collective, separate contracts would not have made sense.

133. *Id.*

134. *Id.*

135. *Id.* Telephone interview with Chris Rogers, *supra* note 113.

The Exhibit also states:

The [parties] agree that certain aspects of the (design) that will be pursued may, and probably will, be in conflict with certain municipal, county[,] and state regulations, including but not limited to [names of city, county, and state regulatory agencies]. It is the responsibility of the [owner and owner's representative] to obtain all necessary regulatory modifications required to meet the goals of the project[] with support from the [consultants]. If certain regulations ultimately cannot be modified, any redesign to comply with those regulations will be an additional service.¹³⁶

No references exist in the owner-contractor agreement to the Living Building-related goals.¹³⁷ “There was no reason to spell this out,” notes Rogers, as “the contractor had been working with us all along.”¹³⁸ Rogers did note, however, that there was written correspondence accompanying the pre-construction services agreement stating that the project targeted Challenge certification.¹³⁹

In conclusion, careful project teams will consider the importance of defining and highlighting key aspects of green building design and performance in their contract documents.¹⁴⁰ As described above, the Bertschi School Science Wing and Bullitt Center projects chose different contracting pathways, but nonetheless, both chose to back up their goals with some form of documentation.

B. *Integrate the Process*

Neither the Bertschi School Science Wing nor the Bullitt Center used specific IPD contractual instrument(s).¹⁴¹ IPD contracts are generally intended for larger commercial projects,¹⁴² and as a result, they do not apply to the modest Bertschi School Science Wing project. In the case of the Bullitt Center, early team discussions revealed that none of the project's design or construction team members had practical experience

136. *Id.*

137. *Id.*

138. *Id.*

139. *Id.*

140. See J. Cullen Howe et al., *The Law of Green Buildings: Regulatory and Legal Issues in Design, Construction, Operations, and Financing*, 238-41 (J. Cullen Howe & Michael B. Gerrard eds., 2010).

141. Telephone interview with Stan Richardson, *supra* note 62; Telephone interview with Margaret Sprug, *supra* note 120.

142. *Contract Documents: Integrated Project Delivery (IPD) Family*, AM. INST. OF ARCHITECTS (Jun. 8, 2013, 14:55 PDT), <http://www.aia.org/contractdocs/AIAB099123>.

with IPD contracting.¹⁴³ According to Margaret Sprug, Project Manager for The Miller Hull Partnership, given the challenges the team faced concerning first-time application of the Living Building Challenge framework, they felt reluctant to add “figuring out how to use IPD along with everything else.”¹⁴⁴ Despite this fact, Sprug did note that the stakes are higher with a Living Building Challenge project because, “[w]hen you are trying to achieve a net-zero project, every move you make is in the balance . . . , as [o]ne decision can impact so many building systems; we wanted to achieve net-zero goals the most cost-effective way we could.”¹⁴⁵

Despite not incorporating IPD or IP formally, both projects applied IP principles to their respective projects to a considerable extent.¹⁴⁶ For the most part, this consisted of bringing on the contractor and sub-consultants much earlier than typically done in traditional design and construction; conducting frequent and inclusive team meetings, at some points twice weekly; and analyzing concepts at and between these meetings.¹⁴⁷ Mr. Richardson of the Bertschi School justified the time associated with this process when he declared, “Your success rate is higher [and costs lower] when everyone is talking together.”¹⁴⁸

Contrast the above examples with the Group Health Puyallup project, the first project in the world to achieve certification using the LEED® for Healthcare™ rating system that also reached the Gold level,¹⁴⁹ and one example of a project with a deeply integrated process embedded in the contract documents. Not surprisingly, the project also earned a

143. Telephone interview with Margaret Sprug, *supra* note 120.

144. *Id.*

145. *Id.*

146. Telephone interview with Christian LaRocco, *supra* note 119 (One aspect of constructing an integrated design is the coordination of trades that must occur when building assemblies are conceptualized to perform multiple functions. For example, because motorized windows designed for the Bullitt Center were expected to communicate with the building’s main control system, electricians had to work in concert with glaziers to create the end product. Anticipating this issue and communicating the benefit of cooperation to all trades, at meetings and/or through project guidelines, early in the process, may help reduce delays due to this issue.)

147. *Id.* Telephone interview with Margaret Sprug, *supra* note 120.

148. Telephone interview with Stan Richardson, *supra* note 62.

149. U.S. Green Bldg. Council, *Articles, LEED, First LEED for Healthcare Certification in the Country Complete* (Jun. 30, 2013, 20:24 PDT), <http://www.usgbc.org/articles/first-leed-healthcare-certification-country-complete>. Released in 2009, LEED® for Healthcare™ is one of the newest LEED rating products. See generally U.S. Green Bldg. Council, *LEED* (Jun. 30, 2013, 20:24 PDT), <http://www.usgbc.org/leed/rating-systems/healthcare>. The Group Health Puyallup project achieved LEED Gold.

LEED innovation credit for conducting an advanced integrated design process.¹⁵⁰ Michele Spackman, Senior Project Manager with CBRE Global Corporate Services and Group Health's Owners Representative for the project, reports that as part of the integrated process, a shared written set of metrics was created, agreed upon by all the parties, and used as a guidance document.¹⁵¹ The document is concise but covers a wide range of topics with specific and clear performance goals set for schedule, safety, timeliness of LEED application, percentage of energy consumption reduction, overall system performance (after 12 months of occupancy), and punch list completion.¹⁵² Ms. Spackman further elaborated, "[O]nce the GMP was executed, I didn't have a [single] change order for the construction portion of the project. I suspect this is unusual to some extent."¹⁵³

Given the fact that GLY Healthcare was brought on very early in the project to provide pre-construction advice, this is not surprising.¹⁵⁴ Todd Karr, Senior Project Manager at GLY Healthcare, concurs with Ms. Spackman's analysis:

We definitely benefited from being brought on early [along with the architect Collins Woerman]. It provided us with valuable information about what was important to our client, both in terms of their goals for delivering healthcare and for their approach to maintenance and future flexibility of the space.¹⁵⁵

By incorporating this forward planning, the design and construction process reduced potential expenses for future renovations and regular maintenance, on top of the savings experienced during the initial design and construction project.¹⁵⁶

Spackman feels it is important to understand that

Group Health started the integrated design process several years prior to the Puyallup project. Group Health's integration model was called ICFD (Integrated Care and Facility Design) and was managed by their Lean

150. US Green Bldg. Council, *Project Directory, Group Health, Puyallup* (Jun. 24, 2013, 04:00 PDT), <http://www.usgbc.org/projects/group-health-puyallup>.

151. E-mail from Michele Spackman, Senior Project Manager, CBRE Corp. Services to Kathleen O'Brien, Founder, O'Brien & Co. (Jun. 17, 2013, 16:18 PDT) (on file with author K. O'Brien).

152. *Id.*

153. *Id.*

154. *Id.*

155. E-mail from Todd Karr, GLY Healthcare, to Kathleen O'Brien, Founder, O'Brien & Co. (June 17, 2013, 15:40 PDT) (on file with author K. O'Brien).

156. *Id.*

Management Team. A new clinic model or prototype was designed in a warehouse. Puyallup is the first physical manifestation of the prototype.¹⁵⁷

During prototype development, two sets of ICFD metrics were developed, one for clinical performance, care delivery cost metrics, patient and staff satisfaction, and one for the facility. The facility metrics “were almost identical to metrics actually included in the IPD agreement for the Group Health Puyallup project,” according to Spackman.¹⁵⁸

Spackman believes the team project:

Would have always achieved collaboration because it is Group Health’s culture. But I do not think that all of the performance/delivery metrics would have been achieved without the looming risk of “fee at risk” for poor performance or incentive bonus payments for good performance, attached to the contract. An IPD agreement allows that client to carry a big stick and a big carrot.¹⁵⁹

Spackman further states that if she “were to do another green building, especially at the deep green [level discussed in this article]” she “would not manage it without an IPD contract. It simply requires intense collaborative behaviors. Without the risks and incentives associated with this contract type,” [she thinks], “clients would be leery of the potential unknown costs of deep green projects. Forging ahead with sustainable innovation always has risk and the IPD forces parties to be at the same playing field of interest, dedication, and performance to the stated charter.”¹⁶⁰

When project teams are highly motivated to work together to achieve the same result of a certified Living Building, they may decide it is not necessary to “enforce” team integration contractually, but the authors anticipate that projects with deep green goals, including Living Building certification, will begin to avail themselves of the IPD contract documents discussed earlier as the market inevitably increases its demand for these projects, particularly in larger commercial developments. However, Bill Reed, co-author of the ANSI IP Standard, a guideline intended to facilitate an integrated process, along with John Boecker, cautions that an IPD contract does not necessarily result in a sustainable building in return for the extra legal documentation and

157. E-mail from Michele Spackman, Senior Project Manager, CBRE Corp. Services, to Kathleen O’Brien, Founder, O’Brien & Co. (July 2, 2013, 09:18 PDT) (on file with author K. O’Brien).

158. *Id.*

159. *Id.*

160. *Id.*

negotiation that goes along with IPD:¹⁶¹ “If sustainability goals are not part of the project, then IPD may earn you efficiencies in the process, but not necessarily sustainability.”¹⁶² The authors of this article anticipate contract documents referencing the ANSI IP standard to increase in frequency, in part because the Standard was specifically written to result in a sustainable design, construction process, and finished structure.

The IP Standard is becoming valued as a risk mitigation tool from multiple fronts. The authors of the IP Standard note, “In national public meetings on green building underwriting conducted at Federal Reserve regional offices in 2010, a consensus determined ‘IP has sufficient value that it should be a condition of financing.’”¹⁶³ In addition, in a “risk reduction” statement released by the Capital Markets Partnership, Steve Bushnell of the Fireman’s Fund Insurance Company concluded that the “Integrative Design and Construction Process can have a positive impact on the risks associated with green buildings,” emphasizing that this risk mitigation can continue through occupancy and operations.¹⁶⁴ According to John Boecker, “the National Consensus Green Building Standard has determined that using the IP Standard could improve cash flow.”¹⁶⁵ Project integration can also reduce the impact of regulatory barriers innovative projects often face by allowing project teams to identify these barriers early in the design process, thus offering the opportunity to engage permitting and other regulatory agencies in a more constructive approach to mitigating or eliminating them.¹⁶⁶

161. E-mail from Bill Reed, Principal, Regenesi Group, to Kathleen O’Brien, Founder, O’Brien & Co. (Jun. 11, 2013, 23:19 PDT) (on file with author K. O’Brien).

162. *Id.*

163. Inst. for Mkt. Transformation to Sustainability, INTEGRATIVE PROCESS (IP) – ANSI CONSENSUS NAT’L STANDARD GUIDE© 2.0 – DESIGN AND CONSTR. OF SUSTAINABLE BLDGS AND COMMUNITIES 56 (Feb. 2, 2012).

164. Capital Mkts P’ship, RISK REDUCTION STATEMENT, ANSI INTEGRATIVE PROCESS STANDARD© FOR SUSTAINABLE BLDGS & COMMUNITIES (2013), *available at* http://mts.sustainableproducts.com/CMP_FFIC_Risk_Reduction_Statement.pdf.

165. E-mail from J. Boecker, 7Group, to Kathleen O’Brien, Founder, O’Brien & Co. (Jun. 22, 2013, 22:01 PDT) (on file with author K. O’Brien).

166. *See* Robert A. Leiter et al., GREEN BLDGS AND THE LAW 38 (Julie Adshead ed., 2011) (“Legislation is typically passed for a particular component or problem in the system, rather than addressing the entire system. This lack of a systems approach extends to the built environment and is evident in standards, codes, and regulations set forth by governing agencies that oversee the building design and construction industry”).

C. *Promote Green Building Operations*

As described above, the actual performance of a building depends significantly on how it is operated. In an owner-occupied building, the motivation to reap the benefits of investment incentivizes smart management of the building and close attention to energy and other resource usage. Even so, commissioning processes¹⁶⁷ combined with occupant education are generally necessary to achieve the performance anticipated with green design, or at minimum energy savings. For this reason, publicly funded buildings are often required to do some form of building systems commissioning and, in Washington, all commercial buildings are required to perform building systems commissioning.¹⁶⁸ The 2012 Washington State Energy Code has a more thorough requirement¹⁶⁹ that should result in full systems commissioning for all new buildings. The latest version of LEED (in draft form as of this writing), contains credits for building envelope commissioning. It goes beyond verifying systems performance and includes verifying the building envelope will perform as designed.¹⁷⁰

For tenant-occupied spaces, “green” leases are a legal tool “designed to help building owners and managers achieve high performance in resource conservation, material purchasing, waste diversion, and indoor air quality,”¹⁷¹ according to Brett Phillips, Director of Sustainability for Unico Properties. Phillips further elaborates that, “While green-lease language can vary, sometimes significantly, from building-to-building, its general intent is to overcome barriers that prevent the advancement of sustainable best practices in the built environment.”¹⁷² A major barrier is

167. See Wash. Admin. Code §51-11C-20202 (2013), available at <http://apps.leg.wa.gov/WAC/default.aspx?cite=51-11C-20202> (“BUILDING COMMISSIONING. A process that verifies and documents that the selected building systems have been designed, installed, and function according to the owner’s project requirements and construction documents, and to minimum code requirements”).

168. See Wash. Admin. Code § 51-11C (2013), available at <http://apps.leg.wa.gov/wac/default.aspx?cite=51-11C> (“State Building Code Adoption and Amendment of the 2012 Edition of the International Energy Conservation Code, Commercial”).

169. *Id.* at § C408, *et seq.*, Sys. Commissioning.

170. U.S. GREEN BLDG COUNCIL, BLDG DESIGN & CONSTR. 76 (4th public comment draft) (not available online, the public comment period is concluding simultaneous with this writing. However, comments and responses to the draft are available at <http://www.usgbc.org/resources/leed-v4-6th-public-comment-responses>).

171. E-mail, Brett Phillips, Dir. of Sustainability, Unico Properties, to Kathleen O’Brien, Founder, O’Brien & Co. (Jun. 27, 2013, 19:37 PDT), (on file with author K. O’Brien).

172. *Id.*

the split incentive for conservation found in triple net leases.¹⁷³ With traditional triple net leases the landlord pays for capital improvements, but tenants, who pay the utility bills, receive the financial benefit of the savings resulting from capital improvements.¹⁷⁴ A green-lease can include language that passes on capital costs resulting in lower total operating costs to the tenants.¹⁷⁵ More advanced language might include, in the definition of operating costs, costs associated with green building certifications and/or other sustainable building practices.¹⁷⁶ Mr. Phillips notes, “These language changes, and others similar to them, are a break in long-accepted common practices and are considered by many as the Holy Grail to achieving deep levels of resource savings in commercial buildings.”¹⁷⁷

While not universally accepted, integration of green-lease language is on the rise as owners and brokers adapt to tenants who express an interest in leasing space in high performing green buildings.¹⁷⁸ This is evidenced by the 2008 update of the Building Owners and Managers Association International (BOMA International) standard lease document: *Guide to Writing a Commercial Real Estate Lease*, which includes green-lease language.¹⁷⁹ Published in 2008 and updated in 2010, BOMA International’s *Commercial Lease: Guide to Sustainable and Energy Efficient Leasing for High Performance Buildings*¹⁸⁰ now serves as the industry’s standard providing common language for green leases.¹⁸¹

“Even with this progress,” notes Phillips, “the industry continues to innovate,” pointing to the recent development by the City of New York with the Natural Resource Defense Council of the Energy Aligned Clause (EAC).¹⁸² “The EAC is designed to solve the split incentive in modified gross commercial leases—the most common commercial lease

173. *Id.*

174. *Id.*

175. *Id.*

176. *Id.*

177. *Id.*

178. *Id.*

179. U.S. ENV’T’L PROT. AGENCY ENERGY STAR, *BOMA Int’l Promotes and Facilitates Energy Efficiency in Commercial Real Estate* (2008) available at http://www.energystar.gov/ia/business/comm_real_estate/bus_comm_realestate_boma.html.

180. Steven A. Teitelbaum, Esq., *Commercial Lease: Guide to Sustainable and Energy Efficient Leasing for High-Performance Bldgs* (2010) available at <http://store.boma.org/products/commercial-lease-guide-to-sustainable-and-energy-efficient-leasing-for-high-performance-buildings>.

181. E-mail from Brett Phillips, *supra* note 171.

182. *Id.*

type in New York City (and, notably, in Seattle).”¹⁸³ This provision creates a pass-through structure where both landlord and tenant share the costs and benefits of energy retrofits by agreeing on a predicted amount of annual savings; the tenant pays the owner recovery costs based on the predicted savings.¹⁸⁴ As a result, Mr. Phillips notes, “A ‘performance buffer’ is established to hedge against underperforming projects.”¹⁸⁵

The Bertschi School Science Wing is an owner-occupied space, so this discussion will focus on the Bullitt Center, a space that is being leased to various tenants. As noted above, the Challenge requires documentation of one year of building performance prior to certification, creating an added incentive for an owner who has invested in certification to ensure the building is operated in a manner consistent with the Challenge’s requirements. The Bullitt Center illustrates how one might engage tenants in an effort to meet performance imperatives through leasing requirements, incentives, and education. According to Angela Faul, the Bullitt Center’s leasing agent, the building’s leases are conventional commercial leases with exhibits that apply to Challenge-related programs and systems, and specifically reference the Living Building Challenge Version 2.0, the version of the Challenge the Bullitt Center will attempt to certify under.¹⁸⁶ The lease provides guidelines for the design and operation of the space, including specific information about sustainable practices, such as using GREENGUARD® Certified furniture work systems, rather than conventional work systems.¹⁸⁷ However, “the guidelines are not intended to be hard and fast; the emphasis is on working together” and providing education and incentives.¹⁸⁸

Tenant education begins at pre-qualification. Faul notes:

When the tenant calls, we find out how much they know about the building, and talk about their needs; during a tour of the building we drill in further. As we get further into it,

183. *Id.*; see also PLANYC, NEW YORK CITY’S OFFICE OF LONG-TERM PLANNING AND SUSTAINABILITY, *The Energy Aligned Clause* (2012), available at http://www.nyc.gov/html/gbee/downloads/pdf/121211_eac_overview_and_language.pdf (In addition to an overview, this document provides model language for an EAC).

184. *Id.*

185. E-mail from Brett Phillips, *supra* note 171.

186. Telephone Interview with Angela Faul, *supra* note 89.

187. *About GREENGUARD Certification*, GREENGUARD CERTIFICATION (Jun. 25, 2013, 21:44 PDT), <http://www.greenguard.org/en/about.aspx>. (GREENGUARD® is an example of a certification system that rates products for potential hazardous chemical exposure. “All certified products must meet stringent emissions standards based on established chemical exposure criteria”).

188. Telephone Interview with Angela Faul, *supra* note 89.

the property manager works with the prospective tenant through multiple meetings to understand how their particular business can operate effectively and meet the energy and water budgets set for their spaces. We work with them to ensure they understand what we are encouraging them to do with our material guidelines, and why, and provide them with a pre-vetted ‘basket’ of materials and finishes that meet [those guidelines].¹⁸⁹

Faul elaborated on how in one case, a tenant selected a carpet sourced from Europe, in violation of Challenge requirements for regional sourcing.¹⁹⁰ Point32, the Bullitt Center’s developer partner and property manager worked with the tenant to find the same carpet, reused, from a local source.¹⁹¹ The lesson is that owners may need to proactively monitor tenant decisions to avoid jeopardizing certification. With the Bullitt Center, the owner has taken the approach of tenant engagement rather than policing. However, concerned owners may consider outlining specific instances and conduct that constitutes a breach of the lease agreement to avoid debate over whether a particular activity, such as adding a second photocopier, actually constitutes a breach of the lease agreement.

The Bullitt Center’s leases also contain language that tenants will participate in commissioning, operation, and display of energy and water consumption, and waste reduction.¹⁹² Dashboards in the lobby and on-line demonstrate each floor’s consumption and, even though individual lessees are not called out by name, Ms. Faul anticipates that this transparency may result in “friendly competition” among tenants.¹⁹³ As far as actual costs go, unlike most commercial properties, each floor of the Bullitt Center is separately metered for water and energy consumption, allowing billing to be split based on actual usage.¹⁹⁴

There are two tools that tenants can use to help compare their anticipated energy consumption against their estimated annual energy budget.¹⁹⁵ An Excel spreadsheet created by project team consultants allows the tenant to project their plug load consumption.¹⁹⁶ The tenant inputs information from the labels for devices they plan to use in their

189. *Id.*

190. *Id.*

191. *Id.*

192. *Id.*

193. Telephone Interview with Angela Faul, *supra* note 89.

194. *Id.*

195. *Id.*

196. *Id.*

space; this produces an estimate of the plug load.¹⁹⁷ They can then compare the result to the plug load budget for their space, and work with Point32 to take measures to decrease their projected plug load.¹⁹⁸ In addition, a tenant can purchase (and a few tenants have opted to do so) a plug load management system that measures and manages electrical plug loads individually.¹⁹⁹

The Bullitt Center plans to reimburse tenants for all of their energy costs if they meet their budget and this reimbursement is reduced proportionately by the amount they exceed their budget.²⁰⁰ Funding for the tenant energy conserving incentive program is provided through a Metered Energy Efficiency Purchase Agreement (MEEPA) the Bullitt Center is piloting with Seattle City Light.²⁰¹ A MEEPA is similar to a power purchase agreement, where a utility purchases power from an independent power producer, but it differs in that the utility is actually purchasing energy that is not used.²⁰² MEEPA relies on an energy metering system that “measures actual energy use in a building—normalized for factors including weather and occupancy—before and after efficiency improvements are made. The metered savings are the difference between this ‘dynamic baseline’ of energy usage and the actual energy usage after the improvements.”²⁰³ As noted by author Benjamin Romano,

Seattle City Light will . . . collect [six] cents per kilowatt hour from the Bullitt Center for both the electricity it uses and the metered efficiency savings. It will pay the Bullitt Foundation . . . [two and one-half] cents per kilowatt hour—an already-established rate for energy efficiency—plus the [six] cents per kilowatt hour of retail electricity revenue the utility is not losing because of the new transaction structure²⁰⁴

Faul anticipates that, depending on how well the program works, the Bullitt Center may “refine the incentive agreement in the future, perhaps

197. *Id.*

198. *Id.*

199. Telephone Interview with Angela Faul, *supra* note 89 (Enmetric Systems is one example of a manufacturer of plug load management tools).

200. *Id.*

201. BENJAMIN ROMANO, *Seattle Trying Innovative Financing Model for Building Efficiency*, XCONOMY, (Jun. 12, 2013), <http://www.xconomy.com/seattle/2013/06/12/seattle-trying-innovative-financing-model-for-building-efficiency/2/>.

202. *Id.*

203. *Id.*

204. *Id.*

providing a bigger hit at the beginning.”²⁰⁵

Building water for tenant consumption will be sourced from rainwater (see potable water section below), which means that tenants do not have any water bills.²⁰⁶ However, tenants will have a water budget, and if they exceed this budget, which would then require purchasing city water, they could expect to pay for the auxiliary water supply.²⁰⁷ This means that while there is no incentive to stay under budget, there is a financial incentive not to exceed the budget.²⁰⁸ Ms. Faul notes that at the time of this writing, the Bullitt Center is focusing less on water consumption and more on greywater infiltration.²⁰⁹ Eventually though, “we may put timers in shower stalls” as a tool to encourage water conservation.²¹⁰

Building operations matter because certification ultimately depends on how the tenants use the building. Owners of tenant-occupied buildings are at the mercy of their tenants, and while leases can provide some level of control, as we have seen, tenant engagement, education, and incentives are other strategies that may accomplish the same goals.

VII. TECHNOLOGY

Regulatory impediments most typically arise when selecting and implementing building systems and materials (which we refer to as “technology”) necessary to achieve the Living Building Challenge, and thus far are primarily found when implementing the Site, Water, Energy, and Materials Petals. A full study of these impediments, and recommendations for mitigating or eliminating them, as well as taking a different and more Living Building-friendly approach to risk reduction through policy can be found in Code, Regulatory, and Systemic Barriers Affecting Living Building Projects, a document that contains a high level of detail regarding these issues.²¹¹ As noted earlier, the Bullitt Center was specifically intended to shine the light on regulatory impediments with the goal of working towards their elimination. This was not an explicit goal of the Bertschi School Science Wing project, but both projects ultimately faced regulatory hurdles related to these

205. Telephone Interview with Angela Faul, *supra* note 89.

206. *Id.*

207. *Id.*

208. *Id.*

209. *Id.*

210. *Id.*

211. See David Eisenberg, et al., CASCADIA REGION GREEN BLDG COUNCIL, *Code, Regulatory and Systemic Barriers Affecting Living Building Projects* (Jul. 29, 2009), available at <https://ilbi.org/education/reports/codestudy3>.

Petals.

A. *Net Zero Water & Ecological Flow*

Living Buildings “must source 100% of occupants’ water use from captured precipitation or closed-loop water systems, while also managing 100% of stormwater and building water discharge onsite. The most complex regulatory barriers encountered by projects pursuing Living Building status regulate the use of water supply and discharge.”²¹² An additional complicating factor is the fact that water does not obey jurisdictional boundaries and is within the purview of multiple regulations and regulators at various levels.²¹³ When addressing the challenge of creating a closed-loop, net-zero water system, civil engineers classify water into a variety of sources and uses. Blackwater is water used to flush toilets. Greywater is from bathroom and kitchen sinks, showers, tubs, and laundry. Potable water can refer to municipally

212. *Id.* at 49.

213. *Id.*

supplied clean water or any source of water clean enough to safely drink. Stormwater is general rainwater run-off from sites.²¹⁴

1. *Blackwater*

Most composting toilets have been installed in rural locations, not urban sites. However, composting toilets are used in both the Bertschi School Science Wing and the Bullitt Center as part of their plans for reducing the amount of water consumed and managing water outflow. For the Bertschi School Science Wing project, the solution was relatively easy as the project team benefited from the recent approval of a composting toilet in a City of Seattle neighborhood park,²¹⁵ which made their permit for a single composting toilet straightforward.²¹⁶ For the Bullitt Center the scale was much larger, with twenty or more composting toilets located over six stories. Fortunately Seattle, King County, and Washington State were really “excited about making it work.”²¹⁷

Although the compost produced on site is considered “field-ready,” a term used to identify compost that is safe to spread on a field,²¹⁸ over time it will represent a significant stream of material. The building owners negotiated with King County to take the material produced by the Center’s toilets to the County’s composting facility, where a long-established and robust composting program was in place. By merging the material from the Bullitt Center toilets with the material being treated at King County’s composting facility, the building’s owners are able to ensure that the compost produced by the toilets meets public health criteria without the expense of building a Class A Bio-Solids processing facility.²¹⁹ The Challenge allows removal and offsite disposal of biosolids but prefers those wastes be managed onsite. Offsite receiving facilities must be within a hundred miles of the project site, as

214. 2020 Eng’g, *Wholistic Engineering: Applied to a Living Building Water System (Abstract)*, (2008), available at <http://www.2020engineering.com/projects/pdf/building/LivingBuildingWaterSystem2008.pdf>.

215. News Release, Seattle Dep’t of Neighborhoods, *Seattle Installs First Public Composting Toilet—Picardo Farm P-Patch to Celebrate Achievement* (Mar. 25, 2010), <http://www.seattle.gov/neighborhoods/news/newsdetail.asp?id=10593&dept=30>.

216. Telephone Interview with Chris Hellstern, *supra* note 66.

217. Telephone Interview with Joe David, *supra* note 62.

218. See Nina Smith-Gardiner, *Composting Toilets at the Bullitt Center*, BULLITT CTR (Jun. 14, 2012, 05:00 PDT), <http://bullittcenter.org/news/blog/composting-toilets-at-the-bullitt-center> (for more information on the system at the Bullitt Center).

219. Telephone Interview with Joe David, *supra* note 62.

is the King County site from Bullitt.²²⁰ The Bertschi composting toilet wastes are applied to the school grounds, though not to areas where food is grown.²²¹

The Bullitt Center installation represents a further challenge, in that most manufacturers, accustomed to supplying composters for rural locations, are not accustomed to dealing with the specific dimension tolerances presented in a highly engineered Class A office building.²²² In addition, only two manufacturers (one based in the U.S. and one in Japan) produce a foam flush toilet/composter combination, the kind of toilet Bullitt wanted to use to meet the Class A standard in appearance and user experience.²²³ Not satisfied with these options, the Bullitt Center team worked with a regional composting toilet manufacturer to create a new foam flush composting toilet prototype, even advancing money to begin fabrication.²²⁴

2. *Greywater*

Greywater is typically discharged outside a building into subsurface soils. This requires sufficient site area for a drainfield and extra permitting time, neither of which were appealing (or even feasible) for the Bertschi School Science Wing, largely due to the tight urban location. The Bertschi School avoided this by planning to keep the water indoors and therefore subject only to indoor plumbing regulations.²²⁵ The project's three classroom sinks and one restroom sink are plumbed to discharge water into two filtration units, where it is collected and then pumped up to an indoor green (vegetated) wall for irrigation purposes.²²⁶ This idea presented a unique workaround to a potential regulatory barrier.

However, regulatory officials were reluctant to allow this process, having not seen anything like it before. According to project architect Chris Hellstern, the concern was that greywater from the green-wall

220. Int'l Living Future Inst., *Living Building Challenge 2.0/2.1: Water Petal Handbook* 10 (May 2013), available at <http://living-future.org/lbc/petalhandbooks>.

221. Telephone Interview with Stan Richardson, *supra* note 62.

222. Telephone Interview with Colleen Mitchell, Project Manager, 2020 Eng'g (Jun. 13, 2013).

223. *Id.*

224. *Id.*

225. Telephone Interview with Stan Richardson, *supra* note 62.

226. Int'l Living Future Inst., *Living Building Challenge, Case Studies: Bertschi Living Building Science Wing* (Jun. 13, 2013, 17:55 PDT), <http://living-future.org/case-study/bertschiscience>; E-mail from Stan Richardson, *supra* note 71.

would be dripping off leaves and “available for kids to lick.”²²⁷ The project team and the green-wall manufacturer met with the City to discuss how the system operates, and illustrated how the greywater is contained within the soil system.²²⁸ After this open dialogue, the City determined that the system was not a health risk to Bertschi students and visitors and permitted the system.²²⁹ The owner then contracted with a vendor to maintain the green-wall in exchange for a monthly fee.²³⁰ Language in the owner-vendor Letter of Agreement requires the vendor to address the fact that the greywater supply contains soap and mild chemicals, and requires the owner to provide the proper light level and temperature.²³¹

The Bullitt Center collects greywater from the building’s sinks and showers, and circulates the water through a wetland on the third floor, where a system of gravel, filter media, and plants absorb any nutrient/solids.²³² This water is then pumped to a series of wells in the right of way.²³³ The project team worked with the Washington State Department of Health (DOH) to identify a regulatory pathway to test the water, established criteria for testing it on a monthly basis, and as a result believe they are the first commercial building in the United States that is treating its greywater with natural processes and infiltrating it back into soil on site.²³⁴ Monthly sampling and testing of the greywater is conducted by Seattle University students, further amplifying the educational value of the project to the community.²³⁵

3. *Potable Water*

For both projects, the design intent was to collect rainwater and use this as a sole source of potable water. Both have installed systems that collect, store and treat rainwater to potable standards. There is a regulatory path for allowing this use for systems that serve over twenty-five people per day year round, which includes creating a Public Group A Water Utility. Protocols for operating such a system include daily testing of the water, with results verified by an independent third party.

227. Telephone Interview with Chris Hellstern, *supra* note 66.

228. *Id.*

229. *Id.*

230. Telephone Interview with Stan Richardson, *supra* note 62.

231. *Id.*

232. Telephone Interview with Joe David, *supra* note 62.

233. *Id.*

234. *Id.*

235. Telephone Interview with Colleen Mitchell, *supra* note 222.

In addition, the ruling agency, the DOH, requires chlorination of the harvested rainwater, a process considered hazardous and unnecessary by the International Living Future Institute.²³⁶ Ironically, the tests on which DOH are relying test for chlorine residuals, not bacteria or other “bad guys,” according to the Project’s “Water Engineer” Colleen Mitchell, which means that “currently regulatory protocols do not actually focus on the main issue, which is: ‘Is the water healthy to drink?’”²³⁷ Since the Bertschi project’s system was installed, the International Living Future Institute has provided a temporary exemption from the prohibition on chlorination.²³⁸ The roadblock actually begins at the national level because the DOH relies on EPA regulations for setting polices regarding potable water use.²³⁹ Denis Hayes of the Bullitt Foundation has lobbied EPA for a change in its rainwater treatment requirements, but so far, they remain unchanged.²⁴⁰

An added regulatory challenge is that Seattle Public Utilities (SPU) will not permit another public drinking water utility within its jurisdiction, which bars DOH from considering this system for permit.²⁴¹ For the Bertschi School, this was not an issue, as the burden of operating a utility at the small, non-profit school far exceeded their institutional capacity. Their rainwater system, which uses a non-chlorination method for treatment, awaits a time in the future when these regulatory impediments and/or the costs associated with meeting them, are eliminated.²⁴² The Bullitt Center intends to eventually work through these regulatory hurdles with SPU, and hopes to set up its own utility, with testing conducted by Seattle University students.²⁴³ The Bullitt Center team argues that, like other innovative aspects of the project that

236. Int’l Living Future Inst., *Living Building Challenge v. 2.1* 28–29 (2012), available at http://living-future.org/sites/default/files/LBC/LBC_Documents/LBC%202_1%2012-0501.pdf (Although chlorine is not explicitly listed on the red list, it is an ingredient in several items on the list, and is considered undesirable by the ILF Institute. Although there is an exception in place at the moment, the intention is that the process of chlorinating potable water be eliminated).

237. Telephone interview with Colleen Mitchell, *supra* note 222.

238. *Id.*

239. *Id.*

240. *Id.* (As a result, as of this writing, the Bertschi School is not currently utilizing the system it has in place to use rainwater as drinking water).

241. Int’l Living Future Inst., *Living Building Challenge, Case Studies: Bertschi Living Building Science Wing* (Jun. 13, 2013, 17:55 PDT), <http://living-future.org/case-study/bertschiscience>.

242. Telephone Interview with Stan Richardson, *supra* note 62; Telephone Interview with Chris Hellstern, *supra* note 66.

243. Telephone Interview with Colleen Mitchell, *supra* note 222; Telephone interview with Joe David, *supra* note 62.

find themselves confronted with a regulatory roadblock, this is a learning opportunity, and as discussed earlier, civic leaders generally agree.²⁴⁴ The rainwater treatment systems that are currently installed in the Bullitt Center are considered a bit of a “science project,” according to Engineer Colleen Mitchell.²⁴⁵ Following an integrative design process, the project team installed three rainwater systems that offer five different ways to treat the water.²⁴⁶ However, until the regulatory pathway is cleared, the Bullitt Center’s system will “not be operationalized.”²⁴⁷

4. *Stormwater and Site Detention*

Low Impact Development (LID) strategies were applied to treat the stormwater at both case study projects. These strategies are recognized as best practices by the State of Washington and its municipalities.²⁴⁸ For example, the Bertschi School Science Wing team had the goal of ensuring that all stormwater not used for building or irrigation purposes was infiltrated back into the soil.²⁴⁹ One strategy the team employed was to install pervious concrete for walking surfaces which allows stormwater to infiltrate, while removing debris and pollutants. Additionally, surplus water from the project’s cisterns is directed to a raingarden that both treats and attenuates water flow prior to infiltration.²⁵⁰ The idea, notes the team, is to “mimic the pre-development hydrology of the site, and help to recharge the groundwater beneath the site.”²⁵¹

For the Bullitt Center, stormwater from the project’s approximately 7000 square-foot clean roof area is collected and stored for indoor use in a large cistern in the basement of the building (see Potable Water,

244. Telephone Interview with Joe David, *supra* note 62; see also Bullitt Ctr., *Living Proof: Building the Bullitt Center*, <http://bullittcenter.org/news/blog/new-video-living-proof> (last visited May 23, 2013).

245. Telephone Interview with Colleen Mitchell, *supra* note 222.

246. *Id.*

247. Telephone Interview with Joe David, *supra* note 62.

248. Focus on Stormwater Guidance: Water Quality Program, WASH. STATE DEP’T OF ECOLOGY, *Ecology Updates Stormwater Management Manual for Western Washington* (2012), available at <https://fortress.wa.gov/ecy/publications/publications/1210028.pdf> (as of 2012 Low Impact Development is actually the required approach in many cases).

249. Int’l Living Future Inst., *Living Building Challenge, Case Studies: Bertschi Living Building Science Wing* (Jun. 13, 2013, 17:55 PDT), <http://living-future.org/case-study/bertschiscience>.

250. *Id.*

251. *Id.*

above).²⁵² According to Mitchell, “[s]tormwater runoff from the green roof and roof patio areas is collected and conveyed to perimeter landscaping around the building, including a raingarden near the southern corner of the building.”²⁵³ Stormwater not used within the building, or not infiltrated beneath the raingarden, is conveyed to a City of Seattle’s storm sewer.²⁵⁴ Mitchell further notes that,

When the rainwater is used for all indoor uses, the annual volume of stormwater estimated to leave the site closely mimics that of an old growth forest with the same site conditions (soils, slope, etc.). The Challenge calls for stormwater management systems to mimic natural hydrological conditions. This allows for small, occasional stormwater discharges typical to the pre-development conditions of the area congruent with the concepts of Low Impact of Development.²⁵⁵

B. *Net Zero Energy*

The Living Building Challenge requires that “[o]ne hundred percent of the project’s energy needs must be supplied by on-site renewable energy on a net annual basis.”²⁵⁶ Green codes commentator David Eisenberg and his co-authors note in *Code, Systemic, and Regulatory Barriers Affecting Living Building Projects* that,

The majority of energy generated today is from unsustainable sources including coal, gas, oil, and nuclear energy. The effects of these energy sources on regional and planetary health are becoming more and more evident, with climate change signaling the most worrisome environmental impact globally. The intent of the Living Building Challenge’s net zero energy prerequisite is to encourage a safe, reliable, decentralized power grid relying completely on renewable energy powering highly efficient buildings.²⁵⁷

Both the Bertschi School Science Wing and the Bullitt Center utilize photovoltaic (PV) rooftop arrays for their electricity.

²⁵² E-mail from Colleen Mitchell, Project Manager, 2020 Eng’g, to Kathleen O’Brien, Founder, O’Brien & Co. (Jun. 19, 2013 09:36 PDT).

²⁵³ *Id.*

²⁵⁴ *Id.*

²⁵⁵ *Id.*

²⁵⁶ Int’l Living Future Inst., *Living Building Challenge v. 2.1*, 22 (2012), available at http://living-future.org/sites/default/files/LBC/LBC_Documents/LBC%202_1%2012-0501.pdf.

²⁵⁷ David Eisenberg, et al., Cascadia Region Green Bldg Council, *Code, Regulatory and Systemic Barriers Affecting Living Building Projects*, 46 (Jul. 29, 2009), available at <https://ilbi.org/education/reports/codestudy3>.

A 20.1kW PV rooftop array supplies power for the Bertschi School Science Wing and is used for heating, cooling, lighting, pumping, estimated plug loads and equipment, heating domestic hot water, and operating the composting toilet.²⁵⁸ There were no legal hurdles to installation of the PV system, but there were issues related to the size of the array and the non-profit status of the school that impacted the school's budget. To promote the use of PV systems nationally, the federal government provides tax incentives for their installation.²⁵⁹ However, non-profit organizations such as the Bertschi School are not allowed to directly benefit from these incentives.²⁶⁰ To promote the use of PVs in Washington, state tax law allows for a 100% sales and use tax exemption for labor and equipment due to PV installation.²⁶¹ The project team expected to enjoy an exemption worth roughly \$6500. However, the exemption is limited to smaller systems (10kW or less), and, as explained by Richardson, "Had we understood that we might have split the system and been able to meet that requirement."²⁶²

For the Bullitt Center, the PV array presented a land use permitting challenge. In order to maximize solar harvesting potential, the installation extends curb-line to curb-line, overhanging the right of way.²⁶³ According to Chris Rogers of Point32:

We used Seattle's existing skybridge permit legislation to permit our solar canopy. It is the only mechanism available to permit encroachments into public rights-of-way. The City Council approved a new category of encroachments for sustainable features that established a per square foot cost that is significantly less than if it were a pedestrian bridge. The rationale was that the benefits far outweigh any impacts

258. Int'l Living Future Inst., *Living Building Challenge, Case Studies: Bertschi Living Building Science Wing* (Jun. 13, 2013, 17:55 PDT), <http://living-future.org/case-study/bertschiscience>.

259. See *Washington Incentives/Policies for Solar*, DSIRE SOLAR™, DATABASE OF STATE INCENTIVES FOR RENEWABLES & EFFICIENCY (Jun. 26, 2013, 19:45 PDT), http://www.dsireusa.org/solar/incentives/incentive.cfm?Incentive_Code=WA04F&re=1&ee=1.

260. See *Community Solar*, CMTY ENERGY SOLUTIONS (Jun. 25, 2013, 22:57 PDT), <http://cenergysolutions.org/ourwork/community-solar/>. (There are public school districts or other public facilities that have allowed community investors to use their roof for a PV array, collect the federal incentive, and in some way compensate the building owner for the use of their roof and provide benefit. The City of Bainbridge Island's City Hall is an example).

261. See *Washington Incentives/Policies for Solar*, *supra* note 259.

262. Telephone Interview with Stan Richardson, *supra* note 62; E-mail from Stan Richardson, *supra* note 71.

263. Telephone Interview with Joe David, *supra* note 62.

on mobility or visibility, unlike a typical skybridge.²⁶⁴

C. *Appropriate Sourcing and “Red List” Materials*

As noted in the Challenge, “throughout their lifecycle, materials are responsible for many adverse environmental issues including illness, squandered embodied energy, pollution, and resource depletion.”²⁶⁵ The Challenge requires five imperatives for the Materials Petal.²⁶⁶ Two imperatives, Appropriate Sourcing and Red List Materials, raised notable challenges for both the Bertschi School Science Wing and the Bullitt Center. Appropriate Sourcing focuses primarily on the distance materials and services travel to reach the project.²⁶⁷ As the name implies, the “Red List” refers to fourteen materials that are considered “the worst known offending materials”²⁶⁸ and as a result may not be incorporated into or brought into a Living Building. However, as mentioned earlier, there are “temporary exceptions for numerous Red List items due to current limitations in the materials economy.”²⁶⁹ These exceptions played a role in both the certification of the Bertschi School Science Wing and the material selections for the Bullitt Center.²⁷⁰ Challenges highlighted by the two projects include: code provisions requiring the use of Red List materials, instances when a product containing a Red List material or materials is the only product known to perform in a manner that can be warranted, a lack of transparency on the part of manufacturers, and the complexity of available information. Examples of each of these challenges and potential solutions are described below.

264. E-mail from Chris Rogers, CEO, Point32, to Kathleen O’Brien, Founder, O’Brien & Co. (Jul. 8, 2013, 08:46 PDT) (on file with author K. O’Brien).

265. Int’l Living Future Inst., *Living Building Challenge v. 2.1* 27-28 (2012), available at http://living-future.org/sites/default/files/LBC/LBC_Documents/LBC%202_1%2012-0501.pdf.

266. *Id.*

267. *Id.* at 31 (For purposes of the Living Building Challenge, the less distance an item has to travel, the better).

268. *Id.* at 27 (Red List materials and chemicals banned by the Living Building Challenge include: asbestos, cadmium, chlorinated polyethylene and chlorosulfonated polyethylene, chlorofluorocarbons (CFCs), chloroprene (Neoprene), formaldehyde (added), halogenated flame retardants, hydrochlorofluorocarbons (HCFCs), lead (added), mercury, petrochemical fertilizers and pesticides, phthalates, polyvinyl chloride (PVC), and wood treatments containing creosote, arsenic or pentachlorophenol); *Id.* at 28.

269. *Id.* at 28.

270. See also *Declare and the Living Building Challenge*, DECLARE (2011), available at <http://www.declareproducts.com/content/declare-and-living-building-challenge> (for more information on Red List materials)..

1. *Code Requirements*

Three examples related to material selection highlight the friction between code requirements for a particular material(s) and the Red List. The first relates to a Seattle code requirement for “listed” electrical conduits (such as by UL²⁷¹) for use in corrosive environments.²⁷² The two materials primarily used in these situations are galvanized metal and polyvinylchloride (PVC) pipe. Metals are galvanized to inhibit corrosion (rust), extending the service life of the material in place. PVC does not corrode. However, galvanized materials have been excluded from use in Living Buildings because two banned materials (mercury and cadmium) are used in the galvanizing process and PVC is banned outright. To address this challenge, the Bertschi School Science Wing team reached a compromise with the Institute. It was determined acceptable by code to use aluminum conduit for applications exterior to the building but a Seattle electrical inspector informed the electrical team that aluminum conduit could not be used in the concrete slab. The Institute granted an exception for use of galvanized metals in interior and enclosed environments first for the Bertschi Project²⁷³ and since then created a temporary exception for all projects for galvanization.²⁷⁴

A second example is lead. Lead is required for certain types of plumbing, but is also a Red List item. However, according to Chris Hellstern “there is no such thing as absolutely ‘lead-free’ plumbing.”²⁷⁵ The Bertschi School Science Wing team identified a California standard²⁷⁶ that sets a very low level of lead, and negotiated with the

271. UL is a global independent safety science company. UL Listing means that UL has tested representative samples of the product and determined that it meets UL’s requirements. These requirements are based primarily on UL’s published and nationally recognized Standards for Safety.

272. E-mail from Mark Gibbs, Electrical Inspector Supervisor, Dept. of Planning and Dev., City of Seattle, to Chris Hellstern, Project Manager, formerly with KMD Architects (Sept. 13, 2010, 09:42 PDT) (on file with author K. O’Brien).

273. Telephone Interview with Chris Hellstern, *supra* note 66.

274. Int’l Living Future Inst., *Living Building Challenge 2.0/2.1: MATERIALS PETAL HANDBOOK 6* (Nov. 2012), available at <http://living-future.org/lbc/petalhandbooks>.

275. Telephone Interview with Chris Hellstern, *supra* note 66.

276. See USA Lead Laws California, WE ARE LEAD FREE (Jun. 26, 2013, 20:15 PDT), http://www.weareleadfree.net/about_lead_free/lead_laws/usa/california; see also, Jeffery Kempic, Office of Water/USEPA Stakeholder Meeting, Lead-Free Definition Under the Safe Water Drinking Act (Aug., 16, 2012), available at <http://water.epa.gov/drink/info/lead/upload/leadfreedefined.pdf> (The most recent lead legislation enacted in California, and effective January 1, 2010, requires “all pipes, etc. be certified as lead-free by an independent 3rd party accredited by the American National Standards Institute (ANSI), including, but not limited to NSF International.” The law “defines ‘lead-free’ to refer to a weighted average lead content of the wetted

Institute to apply this standard.²⁷⁷ To document compliance, the Bertschi team then had to calculate “the entire wetted surface area of plumbing” to determine if the building met the stringent California threshold.²⁷⁸ This demonstration was deemed acceptable to the Institute.

The final example is an exterior insulation product made with Phenol Formaldehyde Binder.²⁷⁹ The Bullitt Center’s heavy timber structure was required by code to include a non-combustible, waterproof exterior insulation.²⁸⁰ There was only one product available that met these requirements, but it was not compliant with the Challenge because it includes a binder that contained phalates, a banned ingredient.²⁸¹ The Institute provided a temporary exception.²⁸²

2. *Performance Warranties*

Another challenge related to the Materials Petal is the situation where the only warrantable product contains Red List material(s). For example, the product used to coat the metal roof on the Bertschi School Science Wing does not meet the Living Building Challenge requirements due to the presence of Dimethyl Phthalate and Formaldehyde.²⁸³ According to Hellstern, “the product is globally accepted, has a long history, and we believe there is no other option that would provide any warranty to the owner.”²⁸⁴ The project team had to make the case to the Institute that the product was truly the only durable and viable option.²⁸⁵ The International Living Future Institute offered a temporary exception, with the idea that eventually there would be product that complied.²⁸⁶

3. *Product Information*

Ensuring a product does not include a banned material sounds more straightforward than it is. Joe David, Project Associate with Point32, noted that the Bullitt Center team, “quickly found that researching

surface area of not more than 0.25% and to be determined by a prescribed formula”).

277. Telephone Interview with Chris Hellstern, *supra* note 66.

278. *Id.*

279. Telephone Interview with Joe David, *supra* note 62.

280. *Id.*

281. *Id.*

282. *Id.*

283. Telephone Interview with Chris Hellstern, *supra* note 66.

284. *Id.*

285. *Id.*

286. *Id.*

product Material Safety Data Sheets (MSDS) was not going to provide all the information needed. [The team] found aliases for formaldehyde, for example, or ingredients were labeled as ‘proprietary.’”²⁸⁷ The Challenge refers users to the “Pharos Project Chemical and Material Library for more information about [Red List products] .”²⁸⁸ David followed this suggestion and the Pharos Project provided the Chemical Abstract Survey Number (CASN) for the fourteen materials on the Red List.²⁸⁹ With these numbers as a second reference, the fourteen materials quickly expanded to 363, because of the various ways these materials show up in ingredient lists.²⁹⁰ To help resolve this issue, the Bullitt Center team, “reached out to manufacturers and told them what [the team was] doing, and asked them to state if their product contained these substances.”²⁹¹ If the manufacturer did not wish to reveal their ingredients, David was reduced to asking for the manufacturer to “at least say if the ingredient was present or not.”²⁹² The team “had to take the manufacturers at their word; [the team] couldn’t perform testing on hundreds of products.”²⁹³

The Bertschi School Science Wing project was complicated by the fact it was on a particularly short schedule and products were being purchased and delivered at a fast pace.²⁹⁴ The speed at which the team needed product information or rulings was often faster than the manufacturing industry or the Institute could address. However, when the team expressed a lack of confidence regarding some of the materials, the job was put on hold because “[n]obody wanted to bury banned materials in the ground.”²⁹⁵ At that point in the project, Skanska USA, the general contractor, spent a significant amount of time and money bringing staff up from their Portland office to research products before the job could move forward.²⁹⁶ Mr. Hellstern observed that, in the end,

287. *Id.*; Telephone Interview with Joe David, *supra* note 62.

288. Int’l Living Future Inst., *Living Building Challenge v. 2.1*, 39 (2012), available at http://living-future.org/sites/default/files/LBC/LBC_Documents/LBC%202_1%2012-0501.pdf.

289. *Id.*

290. *Id.*

291. *Id.*; Telephone Interview with Joe David, *supra* note 62.

292. *Id.*

293. *Id.*

294. Telephone Interview with Chris Edlin, Project Assoc., O’Brien & Co. (Jun. 25, 2013 10:30 PDT) (Mr. Edlin was responsible for coordinating the Living Building Challenge certification process for the Bertschi School Science Wing project).

295. Telephone Interview with Stan Richardson, *supra* note 62.

296. *Id.*

“The last big hurdle with materials is disclosure. We need manufacturers to be more transparent.”²⁹⁷ Full disclosure of products ingredients by manufacturers is the only way a design team can identify products to avoid, engage manufacturers in possible changes, and find compliant materials in a reasonable timeframe.

4. *Assigning Responsibility for Vetting Materials*

Another issue related to the Red List is the challenge of ensuring that responsibility for determining product content is clearly communicated and agreed upon. Despite the high level of collaboration and project team communication, Richardson reports that, on the Bertschi School Science Wing project, “there was a disconnect; the contractor assumed that materials specified had already been vetted vis-a-vis the Red List, and the design team assumed the contractor would sort that out. This was not covered in the contract and certainly needs to be.”²⁹⁸ To avoid this type of disconnect, the authors suggest that when project teams are drafting project specifications, which will ultimately become part of any applicable contract document(s), project teams should also provide summary information on the sustainable building requirements necessary for certification of the project through the relevant certification or rating system in Division 1 (which lists general requirements), then in subsequent Divisions (for specific design components) provide specific requirements on the standard or certification to which a specified product or material must adhere.²⁹⁹ The submittal process then acts as a back-check to ensure that the material meets the specification.³⁰⁰

5. *Marketplace Shifts*

Both the Bertschi School Science Wing team and the Bullitt Center team have, because of their work, created tangible change in the marketplace. For example, as a result of inquiries by the Bertschi School Science Wing team, two products previously manufactured with PVC were modified.³⁰¹ CrystaLite, Inc. removed PVC from their skylight system, and FlotenderTM removed PVC from their greywater treatment

297. Telephone Interview with Chris Hellstern, *supra* note 66.

298. Telephone Interview with Stan Richardson, *supra* note 62.

299. E-mail from Chris Edlin, Project Assoc., O'Brien & Co., to Kathleen O'Brien, Founder, O'Brien & Co. (Jun. 25, 2013, 13:47 PDT) (on file with author K. O'Brien).

300. *Id.*

301. Telephone Interview with Chris Hellstern, *supra* note 66.

system.³⁰²

Mr. David also reported a successful marketplace shift regarding a building wrap used on the Bullitt Center. He notes, the “product is absolutely critical to high energy performing buildings, but the product ingredient list included several proprietary chemicals.”³⁰³ When pressed, the manufacturer “admitted to phalate, stressing that the chemical was integral to product performance.”³⁰⁴ Mr. David informed the manufacturer, Prosoco, that due to the presence of phalate, the Bullitt Center would not be using, their product.³⁰⁵ After some time, the product representative called Mr. David, made a tentative commitment to reformulate the product, ultimately did, , and the reformulated product was installed at the Bullitt Center.³⁰⁶ After inspecting the product on site, the manufacturers decided to completely eliminate phalate from their product.³⁰⁷

VIII.RECOMMENDATIONS

Deep green buildings attempt to push the envelope, while codes and regulations are, for the most part, intended to provide a baseline standard and to address health and safety concerns. In addition, even when regulations are intended to drive progressive change (though they are more frequently reactive) they generally address distinct and fragmented aspects of design, construction, or operations, rather than the building as a system.³⁰⁸ The unsurprising result is that deep green buildings will often conflict with these codes.³⁰⁹ This dual proactive/reactive nature of regulation impacts green building projects in both positive and negative ways: it can push performance through the development of more

302. *Id.*

303. Telephone Interview with Joe David, *supra* note 62.

304. *Id.*

305. *Id.*

306. *Id.*

307. *Id.*

308. See A-P Hurd and Al Hurd, *The Carbon Efficient City* 41 – 52 (2012) (Chapter 3, Regulatory Roadblocks); see also, David Eisenberg, et. al, *Code, Regulatory and Systemic Barriers Affecting Living Building Projects*, 16 (Jul. 29, 2009), available at <https://ilbi.org/education/reports/codestudy3>. (“The third pattern is that risks are addressed independently – as if they exist in isolation rather than in the context of the whole systems from which they emerge – giving the entire regulatory sphere an ad hoc and fragmented nature. The existence of regulatory silos and boundaries that do not match the interconnected reality of the risks they are supposed to address leads to gaps and overlaps in authority, both of which are problematic.”).

309. *Id.*

stringent or performance oriented codes³¹⁰ but it can also prevent innovative solutions, or require practices or products that have unforeseen and undesirable consequences.

The case studies described in this article identified several best practices that project teams can employ to navigate the various legal challenges they face when working on deep green projects. Both case studies reveal the importance of process. In many ways, as at least one of the case study projects has proven, it is largely technically possible to attain Living Building certification; process is perhaps even more important than technology. This is especially true if the intent is to achieve deep green goals cost effectively, and as a data-gathering tool to support a financial analysis for future projects.

As exemplified in the case studies discussed in this article, there are three sets of best practices that project teams should seek to employ. The first has to do with project management, and includes documenting green building goals, using an integrated process, and leveraging (or finding creative ways to use) existing regulations to allow for innovations on specific projects. The second has to do with resolving conflicts between the regulatory landscape and the goals of a high performance building, and includes advocating for temporary (as in the case of Seattle's demonstration/pilot project ordinance) and/or permanent changes in regulations that further advance deep green, high performance design and construction. The third set has to do with creating change at other points in the system, and includes incentivizing transparency on the part of suppliers regarding product ingredients as well as asking them to replace problem ingredients with benign ones, especially when the product meets a critical need for a particular construction type. It also includes conscious conservation on the part of building occupants and visitors in the case of public or commercial buildings. Finally (but probably not lastly), it includes working closely with both the ILFI and the USGBC to ensure dialogue continues to identify misalignments between the standards promoting deep green, high performing buildings, policies regulating all buildings, and the realities in the field.

Perhaps most importantly, communication is crucial. Engaging regulatory agencies in a dialogue about the project as early as possible is critical to a high performing project's success. The importance of early

310. For example, the additional requirements and performance pathways in the Washington State 2012 Energy code. *See e.g.*, State Building Code Adoption and Amendment of the 2012 Edition of the International Energy Conservation Code, Commercial, Wash. Admin. Code § 51-11C, *available at* <http://apps.leg.wa.gov/wac/default.aspx?cite=51-11C>.

and frequent communication was highlighted in both case study projects. If regulatory agencies are engaged early in the process, solutions can be part of the design process, rather than incurring a change order later on. Early engagement can also allow time for multiple regulatory agencies' involvement, if necessary. Even if a project is developed in a jurisdiction that encourages innovative buildings, project teams should vet the design with agency staff in advance of submitting permits, particularly for systems requiring approval from multiple agencies or jurisdictions. As demonstrated by the case study projects, many of the regulatory bodies were enthusiastic about finding ways to allow the projects to move forward, and were eager to promote the project's goals, but needed more information about specific innovations being considered.

We should emphasize that the building projects described herein are unique, with extremely dedicated owners and industry professionals, and a municipality which supports at the executive level the direction taken by these projects. Although the project teams explicitly intend to mark the beginning of a trend, the fact is that, as of the date of this article, their projects represent a minority in their achievements. Similarly it is important to avoid assuming that, even in a progressive city like Seattle, the actions allowed by the demonstration ordinance are now embedded in code. If certain aspects of projects do not conform to existing regulations or are difficult, presenting them as educational opportunities may help justify policy changes necessary to support deep green projects. Many permitting and regulatory bodies can make exceptions and allowances for demonstration or pilot projects. It is critical to build on these examples, but not to assume that because they exist, the problems, in particular the legal hurdles, have been solved.

At this juncture, the authors, as primarily green building practitioners, ask: *“What can those in the field of law and policy do to lower the barriers that project managers face when trying to follow the examples provided in this article?”*

As a final offering, we gleaned recommendations from professionals with expertise in this regard — that is, those who work in law and policy. You will notice, as we do, that, just as the best practices for design and building practitioners revolve around the themes of communication and integration, so do the recommendations that are aimed at reducing the barriers to achieving deep green, high performing buildings.

Recommendations have been provided for three types of professionals: (1) policy planners, (2) lawyers working in construction, and (3) leasing and operations professionals. We do not present this list as exhaustive, but anticipate that these recommendations will act as a good starting point for those hoping to grease the wheels of progress.

A. *Policy Planners*

1. *Align Code and Goals*

Work to align codes and policies with deep green, high performing goals. The first step is to assess how green building contributes to realizing a municipality's other goals and priorities in areas such as affordable housing, disaster prevention, community health, reducing congestion, stormwater management and water quality, waste management, and controlling government operating costs. Once the understanding of this link is solidified, government entities can utilize third party standards as a starting point and layer other requirements that are of particular importance over these baselines. For example, in Seattle, energy, water, waste, and transportation are key issues. As a result, the City requires certain municipal buildings to achieve a third party standard in addition to key performance overlays specifically aligned with the City's goals.³¹¹

2. *Integrate Green Codes*

Specific performance requirements or desired practices, for example, energy efficiency, or species protection can be further integrated by taking elements of "green" codes or standards and incorporating them directly into standard codes (as opposed to a stand-alone code or ordinance) so that these specific goals are not separate, but part of the minimum standard. Even if not adopting a specific standard, for a municipality setting a preference for progress in a specific area of sustainable practice, review of existing building codes and land use policy to identify conflicts with this overall preference, which are possibly inhibiting or discouraging progress, is critical. For example, in 2010 the City of Ellensburg used an Energy Block Grant provided through the Washington State Department of Commerce to do just this, aiming to foster energy efficiency within the City's limits. It was timely, in that the City's Comprehensive Plan had just been updated, and a review of the City's land use policy was in order.

3. *Lead by Example*

It makes sense for government entities to meet or even exceed the expectations they hold for private business entities. Green public

311. See City of Seattle, *City Green Building—City Projects*, SEATTLE.GOV, (Oct. 7, 2013) <http://www.seattle.gov/dpd/GreenBuilding/CapitalProjects/default.asp> (more information about Seattle's green building goals).

buildings serve as examples and also educate the public, as these facilities are by and large buildings open to the public or serving a public purpose (such as libraries). Green public projects can also be a way for local architects and builders to gain experience and expertise, and encourage the private market. Interestingly, there are, as of this writing, no complete, public, Living Building projects, though many states and cities have required LEED certification of public buildings for a decade or more.³¹²

4. *Leverage Existing Regulations*

Look for existing regulations that can be leveraged to address new issues, such as the Bullitt center's creative adaptation of legislation intended to address sky bridges to accommodate the necessary amount of solar panels to provide sufficient energy for the building. Be aware that some experimental solutions work within existing codes and that there may even be built precedents in the region. Regulators may need to be introduced to successful installed examples of a proposed solution and talk through perceived risks, such as happened on the Bertschi project with the Living Wall. Work with innovative projects to identify instances where existing policy can be used to create further momentum.

To the extent possible, work with project teams to help ensure they understand the regulations that will apply to their projects. For example, project teams may not fully understand that different aspects of a project are governed by different entities. One aspect of a project (departure from the land use code) is governed by a city planning department (such as the Department of Planning and Development), while another aspect (such as potable water standards) is governed by a public health agency, over whom the City has no control, despite both of these aspects relating to a single project.

5. *Develop Demonstration Ordinances*

Use Seattle's example to plan or advocate for a demonstration ordinance in other jurisdictions. Encourage project teams participating in the demonstration ordinance to do more than just try to get their project approved. Encourage them to also act as partners in redesigning regulations and policy in practical ways that can also benefit subsequent projects.

312. See Int'l Living Future Inst., *Certified Projects*, LIVING BUILDING CHALLENGE, (2013), <http://living-future.org/living-building-challenge/case-studies/certified-projects> (list of certified Living Building projects. All are private or non-profit.).

Include data gathering on building performance in policy initiatives to document the benefits of progressive building practice and support wide spread adoption of industry best practice. If an aggressive, high-performing building ordinance or policy is not initially possible, collecting such information and sharing it publicly can build support for one in the future and create market forces driving efficiency.³¹³

B. *Construction Lawyers*

1. *Assign Risk Reasonably*

When assigning contractual responsibility, assign to the party that can reasonably manage that risk. Consider using contractual mechanisms that share risk and reward among the parties necessary to achieve project goals, such as the Integrated Project Delivery approach provided by the AIA's Integrated Project Delivery mechanisms. This may result in the owner taking some design and construction risk, because designers and contractors can only reasonably take on the risks they can control. For example, if a designer utilizes a new product in a high performing building, by the product's very nature (that is to say, new) the designer cannot know how it will perform and the contractor cannot know what it will take for an appropriate installation. All project team members will have to take some of the risk of innovation into account and have the opportunity to benefit from successful innovations.

2. *Understand Appropriate Responsibilities Within Rating Systems*

When assessing the risk of failing to achieve certification, keep the above principle in mind and assign risk accordingly. For example, the architect can control the design, but is limited by the relevant codes. The architect can commit to designing the project to achieve the specified standard and to work with the owner in good faith to meet this mutual goal. Similarly, a contractor can commit to using the specified materials and installing them properly and in a workmanlike manner. If both the architect and contractor fulfill these commitments, they should not be liable if the project fails to be certified by a third party or if the owner fails to meet their responsibilities related to certification. Ultimately, the

313. As mentioned in the introduction, the City of Seattle is one of seven cities and two states which requires certain buildings to collect and share building energy performance. See, City of Seattle, *Energy Benchmarking and Reporting* (2013), available at <http://www.seattle.gov/environment/benchmarking.htm>.

owner may be responsible for unforeseen conditions or circumstances that occur and may stand in the way of the team's goals. For example, the Group Health Puyallup project contracts included requirements to complete all certification documentation by certain dates and put in place rewards for team members if the project meets performance targets.

When there are items or sections of work with risks that are difficult to assess or performance expectations that are hard to quantify, exculpatory language may be needed to protect the parties delivering the project. For example, "project is seeking a specified level of certification and the owner understands that this goal comes with design, construction and operational risks that may be unforeseen, therefore the owner recognizes no party guarantees the goal or certain performance levels will be achieved."

3. *Encourage IP and IPD*

Encourage the use of an integrated process with development clients. As described above, IP is a critical factor in the success of high performing projects that face the challenges outlined in this article. Attorneys new to IP can think of this process as a spectrum. At one end of the spectrum is a process where all parties are involved slightly earlier in the process than a "traditional" approach. At the other end of the spectrum, all parties (and even eventual occupants for projects such as healthcare facilities) are at the table from the beginning and a formal IPD agreement, which incorporates risk and reward sharing, is utilized. Project teams and their counsel can work within the spectrum where they are most comfortable until they gain additional experience.

IPD is not necessarily an inherently green contracting mechanism, but can be used for projects where the end goal is a high-performing building.³¹⁴ It is important to recognize that an integrative process can be used without using any specific contractual method. Contract documents can reference the ANSI IP Standard, or utilize one of the available standard Integrated Project Delivery contract forms. Another option, as demonstrated by the Bertschi case study, is to take a more widely recognized standard contract form, that the parties and their counsel may be more comfortable using, and add a "green" addendum that outlines specific objectives, responsibilities, and processes.

Regardless of the contracting method used, clearly delineating

314. See Am. Inst. of Architects, *Integrated Project Delivery: A Guide* (2013) available at <http://www.aia.org/contractdocs/aiaas077630>.

responsibility for all aspects of the work with clear and specific language, while also anticipating revisions or later versions of third party systems (such as the transition from Living Building Challenge v. 2.0 or 2.1 or LEED 2009 to LEED v 4.0), is essential.³¹⁵ Care should be taken to express green aspects in frameworks consistent with and familiar to members of the design and construction industry. Similarly, aspirational and multi-dimensional goals should be clearly distinguished from contractual requirements which are quantifiable performance targets.³¹⁶

C. *Leasing and Operations Professionals*

1. *Encourage Green Leasing*

Encourage the use of green leases as a way to, among other things, increase energy performance. Work with owners to understand what types of incentives would be meaningful to prospective tenants and construct leases that utilize these factors. Practitioners should be aware of a few of the key legal issues associated with green leases including the use of new or untested green products, responsibility for obtaining third party certification, and impacts to insurance and casualty lease provisions.³¹⁷ Consult the green lease resources mentioned earlier in this article for guidance.³¹⁸

315. See J. Cullen Howe et al., *The Law of Green Buildings: Regulatory and Legal Issues in Design, Construction, Operations, and Financing*, 238-41, 369-71 (J. Cullen Howe & Michael B. Gerrard eds., 2010); see also, Dale E. Ahearn and Geoffrey M. White, *Understanding and Mitigating the Legal Risks of Green Building*, 2009 WL 13339225, *10 (2009) (“Owners, design professionals, and contractors are each best served by contracts that clearly specify their agreed-upon responsibilities and duties, including using clearly defined definitions of the intended green goals and which parties are responsible for achieving those goals.”).

316. *Id.*

317. See, *Id.* at 28–32, 29 (“This section briefly considers four common issues and considerations in connection with a green lease: (1) the perception that green building is generally more costly and its construction processes might take longer than standard construction; (2) the fact that new green building products should be used with care; (3) the responsibility for obtaining the necessary LEED certification level; and (4) how the use of green building products and materials impact the insurance/casualty provisions within a lease.”).

318. See e.g., Real Prop. Assoc. of Can., *Green Lease Guide for Commercial Tenants* (Jan. 2010), available at <http://c.ymcdn.com/sites/www.realpac.ca/resource/resmgr/leases/greenleaseguidefinal05feb10.pdf>; Real Prop. Assoc. of Can., *National Standard “Green” Office Lease for Single Building Projects* (Jan. 2010), available at <http://c.ymcdn.com/sites/www.realpac.ca/resource/resmgr/leases/nsgolsinglev1-03cleanrelease.pdf>; see also Cal. Sustainability Alliance, *Built Environment Green Lease Library* (Jul. 2013), available at http://sustainca.org/blog/built_environment/green_lease_library; J. Cullen Howe et al., *The Law of Green Buildings: Regulatory and Legal Issues in Design, Construction,*

Work to address challenges associated with implementing green leases in an existing building with multiple tenants. Consider leveraging the cost savings of increased energy performance and / or implementing “light green” requirements into leases first, before implementing wholesale changes. The LEED for Existing Buildings: Operations & Maintenance system is a good reference for appropriate standards and practices to include in green leases.

2. *Collect Data on Performance*

To the extent possible, gather building performance data and make it accessible to building operators and occupants. Even if green building operations practices are not immediately implemented, establishing a baseline is a key first step, a way to educate clients, and may provide the knowledge to construct deep green leases in the future. Use of the Energy Star Portfolio program is a useful tool for collecting data, establishing baselines, and monitoring performance. In addition, the program can be linked to building performance dashboards or web sites. Where multiple tenants occupy a building, encourage sub-metering within a building. The City of Seattle’s new energy code requires floor

wide tenant improvement projects to provide a dashboard for tenants to use in monitoring their electrical use (Section C409.3.6).³¹⁹

IX. CONCLUSION

This article provides background on the green building movement and the market shift towards deep green building, setting the stage for our exploration of the technical and legal hurdles an owner or project team may face. We use a case study approach of Living Building Challenge projects to identify those hurdles, with the understanding that this approach might not identify all of them, but certainly the most significant.

We approached the subject from two vantage points: the process of achieving a deep green, high performing project, and the technology that might be employed to achieve it. For process, we identified three aspects

Operations, and Financing, 28–32 (J. Cullen Howe & Michael B. Gerrard eds., 2010). All of the above mentioned sources, in addition to those mentioned earlier in this article can provide guidance and more information to those interested.

319. Seattle Energy Code, Seattle Mun. Code § 22.700.010 (Jan. 16, 2013), as amended by Ord. 124284 (Sep. 16, 2013), *available at* http://clerk.seattle.gov/~archives/ord_124284.pdf.

of attaining a deep green, high performing project: (1) documenting green building goals, (2) integrating the process, and (3) promoting green building operations. For technology, we looked at the specific legal hurdles that the case study project teams faced when attempting to meet specific Living Building Challenge imperatives. What we found most interesting is that in general even technical challenges can be resolved or mitigated through process. As such, our recommendations focus on process improvements that could be executed by policy planners, construction lawyers, and leasing and operations professionals.

As stated at the start, the most significant risk for project teams working on deep green buildings, and the greater communities these buildings serve, is the possibility that they will not be able to achieve their environmental goals cost-effectively, if at all. If they do not, the environmental and financial costs can be significant, and correspondingly significant societal benefits are lost. One reviewer asked us if progress had been made since the case study projects, or since the two to three-year-old studies cited herein. While some progress surely has been made in some areas, including the progress in the Seattle area resulting from these two case study projects, we are far from achieving sufficient progress. As stated in one of the key studies we cite, “a good measure of progress will be when projects contributing the most to large scale environmental crises have as difficult a time navigating through the regulatory system as those projects that contribute the most to the solutions do today.”³²⁰

The Living Building Challenge is exactly what the name implies, a challenge to achieve an audacious goal. As with all challenges, there are hurdles that stand in the way of achieving the goal, but also brave individuals willing to try. The project teams, organizations, and government officials involved with the projects highlighted in this article saw the benefits of deep green buildings (and conversely, the significant negative impacts of traditional buildings), and took extraordinary steps to turn their aspirations into brick and mortar. Their contributions to our human and natural communities are evident. The authors hope the efforts and experiences of these teams, highlighted in this article, will benefit other projects and inspire the legal and sustainability communities to work together to remove legal barriers to deep green buildings, and to create even greener, healthier buildings that enrich the well-being of generations to come.

320. David Eisenberg et. al, *Code, Regulatory and Systemic Barriers Affecting Living Building Projects*, 16 (Jul. 29, 2009), available at <https://ilbi.org/education/reports/codestudy3>.