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PAPER

Social equity in sustainability certification systems for the built environment: understanding concepts, value, and practice implications

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Abstract

Sustainability certification systems play both an agenda-setting and practical role for a variety of architecture, planning, and engineering project types. The evolution of existing systems and the creation of new certification systems to address a broader set of social sustainability topics provide a unique opportunity to explore the different ways the industry is thinking about and applying social equity ideas to varied projects. We explore this diversity by conducting a content analysis of the guidance documents from eight sustainability certification systems to better understand how social equity is defined, the context in which the concept is applied, and how systems value the idea. The manner and degree to which systems engage with recognitional, procedural, and distributional aspects of social equity varies. Consequently, there is no guarantee that certification leads to real-world equitable outcomes. Moreover, sustainability professionals seeking to use certification systems to address unequal social impacts or benefits still need to bring a clear set of goals regarding equity of what and for whom, as well as ideas of how to measure and evaluate the distribution of social costs/benefits in order to put social equity into practice.

1. Background

It is widely recognized that the architecture, engineering, and construction (AEC) industry has substantial impacts on the natural and built environment. However, ascertaining whether a project has a positive or negative impact is challenging. This challenge spurred development of the first sustainable rating systems, with the earliest rating tools emerging in response to a need to verify claims of being sustainable or 'green' (Ade and Rehm 2020). This remains a core function of certification systems, in addition to promoting standards that may or may not be provisioned by regulations and codes. However, many of the certification systems have evolved, incorporated new sustainability ideas, adjusted weighting criteria over their lifetimes, or developed into new systems. For example, the U.S. Green Building Council (USGBC), which created the Leadership in Energy and Environmental Design (LEED) certification systems, recently updated its impact categories to include 'Enhance Community, Social Equity, Environmental Justice, and Quality of Life.' In addition, four LEED pilot credits—intended to test new requirements and allow projects to achieve credits for these requirements before they have been refined through formal project evaluations—focus on social equity, a goal that has emerged in recent years as a high priority in design of the built environment at a range of scales.

Present-day sustainability certification systems owe their lineage to such green building rating tools and, consequently, they vary in their degree of focus on social issues. Comparative analyses of several commonly used tools have shown that between 6 and 45% of rating systems address social issues such as affordable housing, inclusive communities, and overall community wellbeing (Sharifi and Murayama 2013, Marjaba and Chidiac 2016). Social issues, including mobility and accessibility, safety, identity and cohesion, and local development are frequently employed in multi-criteria sustainability assessments. However, one review of the social sustainability criteria in multi-criteria assessment of infrastructure suggests that equity is included in the assessment process only 15% of the time (Sierra *et al* 2018). Because many of the certification systems take a simple additive approach to project evaluation, whereby sustainability indicators are accumulated in order to reach an achievement threshold, they in practice may altogether neglect social and economic evaluations (Berardi 2012). The concern is that projects may be promoted as sustainable, implying that they confer social benefits or at least do no harm, but in reality, may be harmful, a concept referred to a 'social washing' (Stender and Walter 2019).

Stakeholders, however, are pushing for more diverse approaches (Poveda and Young 2015), and the assessment and certification market has responded with the creation of new systems. For example, the Living Building Challenge was created in 2006 to encourage architects, contractors, and building owners to pursue solutions for the built environment that are 'socially just, culturally rich, and ecologically restorative' (The International Living Future Institute 2019). Several other systems with a larger social sustainability dimension were created in the 2010s. This evolution occurred along with a shift in the corporate social responsibility (CSR) landscape (Latapí Agudelo *et al* 2019). AEC industry clients, the industry itself, and the accompanying certification systems, to varying degrees, have driven and responded to these changes.

Most of the existing comparative research on certification systems explores historically important systems such as LEED and the Building Research Establishment's Environmental Assessment Method (BREEAM), as well as regional equivalents such as the Deutsche Gesellschaft für Nachhaltiges Bauen (DGNB) in Germany and the Haute Qualité Environnementale (HQE) in France. More recent systems such as the Living Building Challenge and Living Community Challenge (established in 2006 and 2014 respectively), EcoDistricts (established in 2013), and Envision (established in 2012), with few exceptions, remain outside of the peer-reviewed comparative literature. This gap in literature coverage is problematic because the Living Building Challenge, Envision, and EcoDistricts systems directly address social equity, in some cases as a clear project imperative. Thus, while social and economic issues may be relatively underrepresented in some systems, there are others, not yet well studied, that attend to social equity.

The broader literature consists of a growing number of comparative assessments of sustainability certification systems, their general purpose (Retzlaff 2009), approach (Mattoni *et al* 2018), coverage of sustainability topics (Sharifi and Murayama 2013), process of verification (Doan *et al* 2017) and treatment of specific issues, including site planning (Huo *et al* 2017) and waste management (Wu *et al* 2016). Sharifi and Murayama's (2013) comparison of neighborhood-level assessment tools showed that LEED certification for neighborhood development (LEED-ND) (United States, Canada, and China), BREEAM (United Kingdom), the Comprehensive Assessment System for Built Environment Efficiency-Urban Development (CASBEE-UD) (Japan), Ecocity (Europe), and Sustainability and Climate Risk (SCR) (Australia) all had shortcomings with respect to coverage of social, economic, and institutional aspects of sustainability; ambiguities in their weighting and scoring of different sustainability themes; and limited mechanisms for local adaptability and participation. Mattoni *et al*'s (2018) analysis of BREEAM, Green Star, CASBEE, LEED, and Innovation and Transparency of Procurement and Environmental Compatibility (ITACA) (Italy) showed that most points are distributed among energy use, monitoring, and renewable production topics. They contended that certification tools need to do better to address environmental and seismic hazards, material life-cycle considerations, construction waste, and indoor environmental quality. While certification systems are evolving to address these issues, a key takeaway from this literature is that the various systems conceptualize and implement sustainability—including social sustainability topics such as equity—in different ways, reflecting larger debates about what sustainability means and how it can be achieved.

Sustainability is often described in terms of the triple bottom line, a framing that includes consideration of economic, environmental, and social costs and benefits, and to some extent their unequal distribution. Because sustainability certification systems are intended to improve and evaluate a project's triple-bottom-line impact, they can potentially help planning, design and development teams consider and manage the social implications of projects. It is worth noting that social sustainability has varied interpretations and may reference social equity—how costs/benefits are distributed—or social cohesion, referring to the quality of social relations, identification with the community, and an orientation towards a common good (Schiefer and van der Noll 2017). Stender and Walter's (2019) work looking at how the Deutsche Gesellschaft für Nachhaltiges Bauen (DGNB) assessment tool can further integrate different

aspects of social cohesion highlights the possibilities and challenges of deploying a dynamic, multi-dimensional concepts in certification systems.

The distributive aspect of social equity makes it somewhat more amenable to quantification, but it is also important to consider that social equity is not one idea. Moreover, it is transformed into a practical concept by addressing questions of ‘equity of what’ and ‘equity between whom’ (Leach *et al* 2018). These basic questions, which define concepts of social equity in context, are also fundamental for measurement of social equity (Ramjerdi 2006). Social equity has also been articulated in the form of a tripartite definition that treats distributional, recognition, and procedural equity as complementary, but distinct social dimensions (Leach *et al* 2018, Meerow *et al* 2019). Distributional equity describes how the costs and benefits of a project should be distributed between groups. Recognition equity refers to the identification and acknowledgement of inequities between groups. And, procedural equity refers the extent to which population groups are able to participate in, or otherwise influence, the decision-making process (Eizenberg and Jabareen 2017). The idea of distributional equity is not neutral. Rather, it can imply redistribution, or what Deakin (1999) described as compensatory action to address existing inequities. Although procedural equity clearly refers to participation, Eizenberg and Jabareen (2017) go further in arguing that it requires parity of participation and a degree of ‘meaningful’ involvement. This tripartite definition approaches social equity through an intragenerational lens—referring to the allocation of resources in the here and now.

Given the evolving landscape of sustainability certification systems referring to social equity, this paper investigates and provides needed clarity regarding current conceptions of social equity in the building industry. To do so, we build on the broader comparative sustainable certification systems literature (Fenner and Ryce 2008, Nguyen and Altan 2011, Bernardi *et al* 2017, Chethana *et al* 2017) by investigating the extent to which current, commonly used certification systems offer guidance on social equity issues, and the content of that guidance. The specific research questions addressed are as follows: (1) What do commonly used sustainability certification systems mean when they refer to social equity? (2) What is the context in which social equity is discussed in certification systems? and, (3) What relative value is assigned to social equity in certification systems?

2. Methods

Previous studies have developed quantitative methods to analyze the relative importance of sustainability issues, but this is possible only where a formal scoring system is used to establish certification thresholds. This is effective for systems such as LEED, Envision, and Greenroads, where point assignments can be interpreted as implied importance. However, for systems such as EcoDistricts and the Living Building and Living Community Challenges, only qualitative comparisons about the overall structure of the system are possible.

Therefore, we conducted a qualitative content analysis of the treatment of social equity in eight common sustainability certification systems that address building at the following scales:

- Building-scale projects—LEED v4.1 BD + C New Construction (U.S. Green Building Council 2019b) + LEED v4.1 Pilot Credits, Living Building Challenge v4.0 (The International Living Future Institute 2019)
- Infrastructure projects—Envision v3 (Institute for Sustainable Infrastructure 2018), Greenroads v2 (Greenroads International 2019), and LEED v4 BD + C for Transit Stations (U.S. Green Building Council 2019a)
- Community development projects—EcoDistricts v1.3 (EcoDistricts 2018), LEED v4 Neighborhood Development (U.S. Green Building Council 2014), and Living Community Challenge v1.2 (The International Living Future Institute 2017)

The certification systems included in our analysis are a sampling of those available internationally, based upon common use and representative of diversity in application to building-, infrastructure-, or community-scale projects. This diversity is intended to explore the ways complex, and potentially contested, concepts such as social equity are conceived and operationalized for practice.

A coding scheme (table 1), drawn on the conceptual literature—e.g. Eizenberg & Jabareen’s (2017) focused on the idea that equity includes three dimensions: redistributive, recognition and participation—was developed to guide the content analysis. For the sample of systems, three types of references to social equity” were coded: (Code 1) text that provides a definition of ‘social equity’; (Code 2) specific mentions of the terms ‘equity’, ‘equitable’, or ‘fair’ in any context; (Code 3) text that includes one dimension of the tripartite definition of equity (a. recognition, b. procedural, or c. distributional). It should be noted that we did not measure the frequency of any coding. Given the extensive cross-referencing of credit categories throughout

Table 1. Coding scheme for certification systems manuals.

Coding Category	Description
(1) Define social equity	Text providing a definition of ‘social equity’
(2) Use of equity-related terms	Use of the term (1) ‘equity’ or ‘equitable’; (2) ‘fair,’ (3) justice, (4) disparities, and/or (5) ‘disadvantage(d)’
(3) a. Recognitional equity	Text describing the process of recognition or that members of the public should be recognized as being impacted by historical injustices and/or present-day vulnerability arising from the project
b. Procedural equity	Text describing how the design, construction, and operations and maintenance processes (O&M) should engage recognized groups (e.g. stakeholder engagement)
c. Distributional equity	Text describing how costs and benefits of the project and potential social, environmental, and economic impacts should be distributed across recognized groups

the documents and the different approaches to writing guidance manuals, we felt it best to focus our analysis on instances where mentions were used in a substantive way to provide guidance to projects, rather than assess the relative frequency of codes.

To conduct the content analysis, we jointly coded all text described in table 1 using Atlas.ti Cloud and validated the choice of code through consensus discussion. Three members of the author team, all who have experience with certification systems, engaged in the initial coding of the guidance documents. The cloud version of Atlas.ti does not offer functionality for evaluating inter-coder agreement, so the three coders, seeking occasional feedback from other research team members, engaged in consensus-building team meetings where the choice and completeness of coding was discussed. Consensus agreement was required for the text to be coded. For Coding Category 1, introductory text, the core guidance, and any back matter were read to identify text that could be reasonably considered a definition. In this case, we included materials beyond the core guidance text because some systems provide glossaries defining specific concepts used elsewhere in the system. For Coding Category 2 and 3, we limited our analysis to the core guidance manual text, given that our primary concern was application of social equity within the context project certification.

Once coding for all categories noted in table 1 was complete, we conducted a second open coding of the identified text. This approach facilitated our understanding of the topical areas (e.g. economic opportunities, environmental health, stakeholder engagement, etc) where equity is discussed.

To answer the final question about relative valuation, we took two approaches corresponding to whether a certification system used numeric or qualitative scoring. For systems that use a numeric system for determining certification, we calculated the relative value of the social equity credits with the following equation: $RV = \sum SE_i / TP$, where SE_i represents the maximum points possible for the credit item i , and TP represents the total possible points in the system. This proportional approach has been used in a series of papers comparing the treatment of site planning (Huo *et al* 2017) and waste management (Lu *et al* 2019) in green building rating systems. For those systems without numeric scoring, we offer a qualitative discussion of the relative importance of social equity vis-à-vis other issue areas addressed in the system.

3. Results

3.1. Social equity definitions in sustainability certification systems

Although certification systems ostensibly have similar goals, the way in which sustainability topics are conceptualized and presented varies substantially across the systems (table 2 and supplementary table 1). In two cases, dictionary-like definitions (Direct) occur in credit category introductions describing the intent of a credit and in manual glossaries, respectively. Some semblances of an explicit definition can be found in the text for most of the systems we examined, but it is not offered as a single statement (Indirect). In these cases, nowhere does the text include a phrase akin to ‘social equity is,’ though the text may include an explanation of what achieving social equity might entail. It is also possible for no definition of social equity appear in the text (None). In such a case, the certification system may still address social equity, for example by encouraging engagement with historically underprivileged stakeholders, but without providing a working definition of social equity.

Table 2. Approaches to defining social equity.

Certification system	Direct	Indirect	None
Buildings			
LEED v4.1 BD + C New Construction 2019 (Beta 2020, USGBC)		x	
LEED v4.1 pilot credits (3 credits) (USGBC)		x	
Living Building Challenge v4.0 (ILFI)		x	
Communities			
EcoDistricts v1.3 (EcoDistricts)	x		
LEED Neighborhood Development v4 (USGBC)			x
Living Community Challenge v1.2 (ILFI)		x	
Infrastructure			
Envision v3 (ISI)	x		
Greenroads v2 (Greenroads Foundation)			x
LEED v4 BD + C for Transit Stations (USGBC)		x	

There is seemingly no relationship between the certification approach of the broader focus of the certification system and the approach taken to define social equity. Envision, with its focus broadly on infrastructure and planning, and EcoDistricts, focusing on community development and planning, both provide all-encompassing direct definitions of social equity. For example, the EcoDistricts states:

EQUITY. A state that is achieved when all people have full and equal access to opportunities that enable them to attain their full potential. The determinants of Equity include the social, economic, geographic, political, and built environment conditions in which people live and work that lead to the creation of a fair and just society.

The manual goes further to offer specific definitions for procedural equity, structural and distributional equity, and cross-generational equity. Notably, EcoDistricts refers to the concept broadly as ‘equity’ and Envision refers to the concept as ‘equity and social justice’. These small differences in terminology highlight the challenge of integrating multidimensional concepts into certification systems. While equity interventions suggest solutions to make the distribution of resources, opportunities, and outcomes more fair, social justice entails removing the barriers that lead to inequities in the first place.

The Living Building Challenge, concerned with building-level sustainability issues, includes an indirect definition under the heading ‘cultural and social equity.’ The guidance manual text states that the purpose of the Equity Imperative is to:

allow equitable access to, and protections from negative impacts resulting from the development of, Living Building projects [and] help create stable, safe, and high-paying job opportunities for people in the local community, and support local diverse businesses through hiring, purchasing, and workforce development practices.

Notably, the Equity Petal handbook includes a caveat that the concept of equity ‘is not easily encapsulated by a single definition’, that equity is not simply about equality of opportunity, but rather about equality of outcomes and experiences. This orientation is important because certification systems tend to place substantial focus on the participation of specific groups within project teams and through public engagement.

LEED offers an approach with a less direct definition. In each of the LEED systems, ‘social equity’ is presented as a concept in introductory text that refers to ‘strategies’ for addressing ‘community needs’ and ‘disparities.’ Within the Social Equity Pilot Credits, extensive discussion of the sorts of actions needed to achieve social equity are provided, such as creating fairer and healthier work environments, and promoting fair trade, as well as respecting human rights. Finally, Greenroads illustrates absence of a definition. Equity is used explicitly as a topic heading in the main system text, but no attempt is made to provide an overarching definition. As becomes clear in subsequent sections, the lack of a definition does not preclude engagement with different dimensions of the concept, but it does make it difficult to disentangle social equity from other concepts such as equality and universality.

3.2. Equity mentions in certification systems

Mentions of equity, and social equity-related concepts, occur in different contexts within sustainability certification systems. supplementary table 2 provides a complete description of the different credits where these mentions occur. While there is some minor variation in where equity related language is located in

certification system guidance documents, in general, equity is treated as a standalone issue, rather than being well integrated into some of the more explicitly environmental aspects of certification systems.

In LEED v4.1 BD + C, specific mentions of equity occur in the Location and Transportation category under the High Priority Site and Equitable Development credit. LEED v4 BD + C for Transit Stations also includes a discussion under the heading, 'Social Equity.' The language here is different from that in the other locations and similar in nature to the BD + C Pilot Credits for Social Equity within the Supply Chain, Community, and Project Team section. The Pilot Credits offer a much more wide-ranging discussion of social equity, stressing that the goal is to address disparities and improve disadvantaged communities.

Similarly, in Envision, equity mentions and social equity-related language are only slightly more widely distributed, occurring in QL3.1 Advancing Equity and Social Justice and LD1.3 Providing for Stakeholder Involvement, as well as QL1.2 Enhance Public Health and Safety and LD3.2 Develop Local Skills and Capabilities. The QL3.1 credit, which is dedicated to equity and justice, provides for a holistic approach to social equity concerns. Several related Envision credits, such as QL1.2 and LD3.2, have some implications for social equity, discussion is primarily in terms of fair treatment and meaningful engagement. Greenroads, by contrast, addresses social equity in the context of the Equity & Accessibility and Fair and Skilled Employment credits, and uses language such as 'fair' and 'equal' in the Procurement Integrity and Local Economic Development credits. Although the mentions are not extensive, there is a clear attempt to address different aspects of equity, especially with respect to economic benefits.

Neither EcoDistricts nor the Living Building and Living Community Challenges take formal scoring approaches. However, mandatory achievements are required for certification in all three systems. For EcoDistricts, the three Imperatives of Equity, Resilience, and Climate Protection, and the certification process are underpinned by an early commitment to 'embrace procedural, structural, distributional, and cross-generational equity in district activities.' In the Formation stage, a collaborative team is established to provide governance for the EcoDistricts. The certification system notes that this is 'a key stage in exercising a district's commitment to procedural and structural equity in engagement and decision-making.'

The Living Building and Living Community Challenges approach certification much in the same way that a formal scoring system does, but certification is achieved by being compliant with the imperatives, rather than accumulating points. In both systems, equity mentions and language occur primarily in the imperatives that fall under the so-called Equity Petal. These imperatives are Universal Access (with some discussion of both direct and facilitative access) and Inclusion, referring primarily to procedural equity through project team diversity. Both imperatives are Core Imperatives and must be achieved for certification. The Living Community Challenge includes a much more extensive set of imperatives under the Equity Petal, where social equity mentions and language occur. These areas include discussion about designing for human interaction (Human Scale and Human Place), giving members of the public access to nature and public spaces (Universal Access to Nature & Place), giving members of the public access to community services (Universal Access to Community Services), donations to charities (Equitable Investment), and project team diversity (Just Organizations). For certification as a Living Community, a community must attain all imperatives. As a consequence, social equity issues are an integral part of the certification systems.

3.3. Dimensions of social equity in guidance text

Our qualitative content analysis uncovered varied framings of social equity, largely consistent with the different dimensions discussed in the research literature. Despite substantial variations in definitions and approaches to assign value to social equity concepts, there were some common themes across systems.

3.3.1. *Recognitional Equity Themes in Certification Systems*

We documented two basic approaches to the way certification systems intersect with the idea of recognitional equity. First, in some instances, the certification system directly identifies disadvantaged groups or classes of individuals. An example of this direct identification approach can be found in the Living Community Challenge's Universal Access to Nature & Place Imperative:

All primary transportation, roads and non-building infrastructure must be equally accessible to all members of the public, regardless of background, age and socioeconomic class—including the homeless..

Of course, these are not community-specific groups, although the verbiage provides an answer to the question of 'equity for whom?' This approach tends to align closely with equality and universality language. Moreover, directly listing groups is potentially problematic in the sense that it is not community-specific and may miss important community conditions. The other important consideration is that by defining vulnerable groups by a single dimension a project may neglect how a combination of traits may lead to marginalization. For example, a bikeshare program that is deployed near affordable housing, but requires a

credit card or smartphone to ride may ultimately lead to exclusion (Brown 2022). Nevertheless, the system guidance encourages project leaders to think about the various ways disproportionate impacts may manifest.

The second approach to recognition equity is to encourage projects to identify relevant groups and/or provide guidance on a methodology for identifying groups. For example, to attain points within the Equity & Accessibility credit, Greenroads requires use of a quantitative economic analysis to understand the total costs and benefits of the project, and also to 'identify any communities disproportionately impacted by the Project.' Similarly, Envision asks for documentation 'demonstrating an understanding of the historic context of equity and social justice within the affected communities.' This approach overlaps neatly with environmental impact assessments required of many projects because it encourages identification of context-specific conditions.

Recognition equity goes hand in hand with identification of stakeholders, so it is worth pointing out that 'stakeholders' are defined in various ways across the systems, and sometimes even in multiple ways within one certification system. Stakeholders are sometimes defined broadly as the 'public' or 'community' and other times as a predefined group (e.g. customers) or a group defined related to project boundaries (e.g. neighbors, local). These variations may complicate clear or consistent identification of groups that are relevant, disadvantaged, or otherwise impacted by a particular project.

3.3.2. Procedural Equity Themes in Certification Systems

All certification systems encourage stakeholder engagement, which is recognized in a variety of issue areas. One takeaway from the previous section is that defining stakeholders and providing guidance for engagement may not necessarily result in equitable participation. Several certification systems explicitly state the need for stakeholder feedback to be considered for incorporation into project decision making, promoting a collaborative process versus disseminating information about the project without any means for input or feedback. There is also often a legal requirement for projects to engage with the public. Although sustainability certification systems generally encourage two-way stakeholder communication, they mostly operate under what might be described as a 'corporate social responsibility' model, rather than a free, prior and informed consent principle. The former describes engagement that creates opportunities for identifying and evaluating stakeholder needs, concerns and interests, while the latter refers to meeting an engagement standard that is *free* of coercion, occurs *prior* to any project development, is informed in the sense that there is full disclosure of potential social impacts, and is based on the right to consent, meaning that communities have real choice regarding a project and that consent is widespread (Rodhouse and Vanclay 2016). In the same vein, achieving procedural equity is contingent on whether disproportionately impacted or historically disadvantaged groups are *ex ante* identified, engaged, and allowed to truly influence decision making.

Envision's 'Advance Equity and Social Justice' credit asks: 'Does the stakeholder engagement process take into account the historic context of equity and social justice within affected communities?' and requires 'documentation of how the equity and social justice context *informed the stakeholder engagement process*' to earn the credit. With respect to meaningful engagement, LEED v4.1 BD + C's Social Equity pilot credit states that 'community members (particularly those who are vulnerable, disadvantaged and under-represented) must have a greater voice in decisions that impact them.' Not all certification systems are as explicit with respect to integrating social equity into the stakeholder process, but it is an important consideration as even well-meaning stakeholder engagement processes can be used to pursue narrow agendas rather than equitable outcomes.

It is also worth highlighting that procedural equity also includes project team processes, in addition to stakeholder processes. This takes on several forms, including guidance on project team composition, policies/programs related to procurement, and project team firms disclosing formal commitments to equity in their organizations. An example of this is exemplified by LEED's pilot credits for Social Equity, where one credit is focused specifically on 'the project team.' The intent of this credit includes ensuring 'fair and equitable pay and benefits' for construction workers, and promoting corporate social responsibility by the project owner, financier, architects/engineers, contractors, and product manufacturers. Envision also encourages that 'key members of the project team make institutional commitments to equity and social justice, including non-discrimination; diversity and inclusion; and pay equity.' Uniquely, both the Living Building and Living Community Challenges require project teams to have at least two member organizations with the JUST Label. The JUST label is a voluntary platform for organizations to disclose their performance on social justice and equity issues. The Living Building Challenge goes even further, requiring that:

20% of design contract and/or construction contracts, and 10% of maintenance contracts must be with JUST organizations that meet required levels for Diversity category, or are registered Minority, Woman, or Disadvantaged Business Enterprises organizations, or international equivalent.

While this sort of detailed requirement is typical of environmental and material credits in certification systems, it is unique with respect to concepts such as social equity.

3.3.3. *Distributional Equity in Certification Systems*

Many of the world's sustainability certification systems have diverse triple-bottom-line objectives. For the eight systems we explore here, references to distributional equity tend to occur around three related issues: (a) providing access, (b) contributing to community economic opportunities, and (c) mitigating environmental impacts. The idea of 'access,' typically universal or equal access, has two related meanings throughout the certification systems. On one hand, the term refers to direct access to project features themselves—in essence, the ability to access and take advantage of a project such as a public park. Concepts such as Universal design arise in this context, where disabilities may limit some residents from taking advantage of project features. In some instances, direct physical access for certain groups of residents may be mandated by law, but in other cases subtle features (e.g. placement of entrances that make low-income resident entry more difficult) may lead to inequitable access. It is unclear that certification systems provide adequate guidance with respect to the latter, but the importance of encouraging universal and equal access to project amenities is a fully developed theme throughout. For example, the LEED for Transit 'Universal Accessibility' credit intends to 'provide safe accessibility for a wide spectrum of people, regardless of age or ability.'

Access also refers to facilitative access; that is, a project's ability to provide access to external community amenities. The Living Community Challenge is a unique example in this regard. The 'Universal Access to Community Services' Imperative requires that residents 'must have access to [places to shop, places to congregate, places to work, places to learn] within 1/2 mile directly or 1/4 mile to a public transportation line that provides direct (without transferring) access within 2 miles to places to shop, meet, work and learn.' This imperative, situated within the broader Equity Petal, suggests the need to consider access for specific groups of people. As an alternative example, Envision has a credit for 'Improving Community Mobility and Access,' whose intent is to support the efficient movement of goods and people through mode choice and improved transportation services. While a credit such as this has implications for distributional equity, the guidance itself does not indicate how that access should be distributed and to whom.

The certification systems encourage projects to help achieve more equitable economic opportunities in their surrounding communities. Envision, for example, has credits to 'Stimulate Economic Prosperity and Development' and 'Develop Local Skills and Capabilities.' In this case, the two credits are concerned with job creation and training during project design, construction, and operation, with the highest number of points awarded to a project that stimulates economic development well beyond its immediate impact area geographically, and through the project's lifespan. Similarly, Greenroads' Local Development credit has the goal of stimulating 'economic development by providing equal opportunities for small businesses and local labor' and the Fair & Skilled Labor credit encourages 'fair labor practices and job training opportunities.' Likewise, the Living Building Challenge states clearly that the intent of the Inclusion Imperative is:

... to help create stable, safe, and high-paying job opportunities for people in the local community, and support local diverse businesses through hiring, purchasing, and workforce development practices.

In many systems, equitable economic opportunities are intertwined with procedural equity issues, and equity within project design and construction teams is the starting point for distributing project benefits.

Historically, however, concerns about the unequal distribution of benefits of infrastructure projects are about more temporally distant economic impacts. Accordingly, another way that economic opportunity, and by relation equity, arises in certification systems is through siting. For example, LEED BD + C's 'High-Priority Site and Equitable Development' encourages that locations for desirable projects be located in 'economically disadvantaged communities,' and the 'Regional Priority' credit awards projects that address 'specific environmental, social equity, and public health priorities.'

Finally, while most of the distributional equity text in certification systems is about benefits, the broader equity conversation is motivated by the unequal and disproportionate distribution of project costs and impacts. Certification systems address inequality in environmental and health impacts from projects in several ways. For example, most sustainability certification systems reward projects for brownfield remediation. EcoDistricts has as a priority goal that toxic environments be remediated and regenerated. Envision includes a credit focused on reclaiming brownfields that rewards projects for increasing levels of remediation. Implicit in these remediation efforts is the idea that environmental contamination has historically disproportionately impacted disadvantaged communities. LEED BD + C's 'Environmental Site Assessment' credit is direct about this linkage between vulnerable populations and environmental impacts, stating that the intent is:

To protect the health of vulnerable populations by ensuring that the site is assessed for environmental contamination and that any environmental contamination has been remediated.

As a matter of common cause, certification systems seek to minimize negative environmental impacts to individuals and communities. Environmental impacts are wide-ranging and include light, noise and air pollution; soil and water impacts; and the potentially adverse consequences of materials use, e.g. materials containing volatile organic compounds. While one might expect environmental justice concerns to be addressed directly in many of these areas, our analysis suggests that this is not necessarily the case. Minimization of negative impacts composes a large portion of certification system guidance, though this guidance does not consistently reference the needs of vulnerable populations, disadvantaged groups, and historical context. For certification systems that have prerequisites or minimum requirements, if equity is built into those core imperatives (e.g. EcoDistricts and the Living Building Challenge), it may be natural to integrate these two issues. In other cases, project teams must deliberately choose to focus on credits or priorities that support integrating such thinking into evaluation and mitigation of adverse project impacts.

A second issue that arises around protection from negative impacts is the distinction between reducing harm, and first, doing no harm. Both conceptions are identifiable in the different texts. For example, the Living Building Challenge introductory text speaks of an ideal world where there are ‘no negative impacts’ on humans or ecosystems from the built environment, and the guidance speaks about ‘protections from negative impacts’. On the other hand, Envision’s evaluation criteria and documentation guidance for the credit to ‘Advance Equity and Social Justice’ requires a project to demonstrate that it “does not overly burden one or more communities with risk or negative impacts.’ This is qualitatively different than no burden at all.

3.4. Social equity value in certification systems

Finally, we turn our attention to exploring how sustainability certification systems value equity in the overall context of the systems. Although these systems generally have a similar purpose, they approach certification, and therefore prioritization of sustainability issues, in different ways. This has implications for whether and how social equity translates from concept to practice.

Many older sustainability certification systems, including LEED, CASBEE, and BREEAM, have projects accumulate points related to different sustainability concepts. In these cases, there are often baseline prerequisites that must be met for points to be awarded in a particular category. For example, within the LEED Neighborhood Development system, 110 possible points are available across 47 credits in five major categories (Smart Location & Linkage, Neighborhood Pattern & Design, Green Infrastructure & Buildings, Innovation & Design Process, and Regional Priority Credits) with multiple prerequisites in the first three categories. The credits have values ranging from 1 to 10 points. The points are accumulated for individual sustainability issues, e.g. access to quality transit, optimizing building energy performance. The certification level is determined by the total achieved points—Certified: 40–49 points, Silver: 50–59 points, Gold: 60–79 points, Platinum: 80+ points. Among the systems analyzed in this paper, similar point scoring approaches are used by LEED, Envision, and Greenroads.

For LEED v4.1 BD + C, there are several additional pilot credits, including two pertaining to social equity, that a project may optionally pursue. Because these credits are applied as innovation credits, they do not impact the total possible points, but they do change the maximum social equity-related points possible. A project may receive a total of five innovation credits. There are currently no pilot credits for LEED ND and LEED v4.1 for Transit. For Envision and Greenroads, the equation is applied similarly to their point scoring systems.

Table 3 shows the relative valuation for five point-scoring systems. Social equity-related credits range from 4%–12% of system credits. We also provide the percentage of total credits needed for minimal certification and the percentage needed for achieving maximum award levels. From these percentages, one can see that certification even at the maximum award level is possible without achievement of any social equity credits. This is generally the case for individual credit items and is not an issue specific to social equity. It is theoretically possible, though much more difficult, to avoid credit categories altogether.

EcoDistricts and the Living Building and Living Community Challenges take a less quantitative, but not necessarily less rigorous, approach to project evaluation and certification. While the Living Building and Living Community Challenges are set up in a prerequisite plus option system, no points are awarded for achievement in specific categories. Rather, for the Living Building Challenge, compliance with a core set of ten imperatives is required for the lowest level of certification (CORE Green Building Certification); compliance with the core imperatives plus compliance with all imperatives in one of the Water, Energy, or Materials categories achieves Petal Certification; and compliance with all 20 imperatives is required to achieve full Living Building Certification. Social equity concepts (Universal Access and Inclusion) compose two of the ten core imperatives in the Living Building Challenge. For the Living Community Challenge, the

Table 3. Relative valuation for point-scoring systems.

Certification system	Social equity credit (max. points)	Maximum points possible for combined credits (SE)	Total system points (TP)	Percent points needed for min/max certification	Social equity relative value
LEED v4.1 BD + C new construction	Location and transportation (LT): high priority site and equitable development (3); regional priority (RP) credit (4)	7	110	36%/72%	6.3%
	Social equity pilot credits (5)	12	110		10.9%
LEED neighborhood development v4	Smart location and LinkaeCredit: preferred location option 3 (3 points); Housing types and affordability (7 points); regional priority (RP) credit (4 points)	14	110	36%/72%	12.7%
LEED v4 BD + C for transit stations	Location and transportation (LT): social equity (1); regional priority (RP) credit (4)	5	110	36%/72%	4.5%
Envision v3	Quality of life (QL) 3.1 advance equity and social justice (18); leadership (LD)1.3 providing for stakeholder involvement (18); QL1.2 enhance public health and safety (14); LD3.2 Develop local skills and capabilities (16)	66	1000	20%/50%	6.6%
Greenroads v2	Equity & accessibility (2); procurement integrity (2); fair and skilled employment (1); local economic development (2)	7	130	30%/61%	5.3%

highest level of certification requires that all 20 imperatives be met and that many capital projects (i.e. buildings) within the community have a Living Building Certification. The social equity issues compose five of the 20 imperatives. These include Human Scale and Humane Places (a reference to designing for pedestrians versus automobiles), Universal Access to Nature & Place, Universal Access to Community Services, Equitable Investment, and Just Organizations.

The EcoDistricts Protocol works in a similar fashion in which certification is earned through achievement of key Protocol requirements; however, no numeric points are awarded for achievement in specific areas. For this reason, we make only a qualitative assessment. This should not be viewed as a failure of EcoDistricts to adequately address equity, but simply a reflection of the variety of ways certification can be approached. In fact, EcoDistrict communities are expected to make a commitment to three key Imperatives and pursue six priorities containing 20 Objective Categories. At the Imperative level, equity is one of three

Imperatives and requires a commitment to procedural, structural, distributional, and cross-generational equity. The Objective Categories intersect with the Equity Imperative in varying ways, including Engagement + Inclusion with procedural equity; Access to Opportunity with procedural, structural, and distributional/cross-generational equity; and Health with structural and distributional/cross-generational equity. However, because the specific objectives within these categories are not fixed, but are instead defined by the community themselves as part of the process, it is not possible to formalize a relative valuation. Nevertheless, the EcoDistricts framework encourages integration of the imperatives across the priorities, so it is possible that in practice at least one-third of the system is concerned with social equity issues.

4. Discussion

Although some effort is made in the certification systems to address the differences between social equity, equity more broadly, and equality, there is a general tendency to conflate these concepts. For example, there are frequent references made to ‘net benefits’ and ‘all people’. Envision encourages that ‘all persons are treated *equally* and without prejudice.’ Greenroads encourages projects that provide ‘a net social benefit’ and ‘*universal* accessibility.’ The Living Community Challenge includes the Imperative of ‘Universal Access to Community Services’ that encourages incorporation of access to basic community services and amenities. We speculate that this is a legacy of engagement with ideas such as equal access and universal design, but the fact that it obfuscates true ‘equity’ solutions that may be intentionally unequal highlights the difficulty in putting social equity into practice.

Sustainability certification systems are a potential avenue for integrating social equity goals into building, community planning, and infrastructure projects. To our knowledge, this is the first comparative analysis of social equity in certification systems. We have framed much of our analysis around a tripartite definition of equity. Although some certification systems, such as EcoDistricts, use this terminology, it is not widely employed. It is also worth noting that there are additional dimensions of social equity that are not well represented in these systems. For example, intergenerational equity—referring to the distribution cost and benefits across generations—is an important aspect of climate change but it is not dealt with frequently or directly in the certification systems we reviewed. Also, equity tends to be conceptualized in relation to a single dimension, both in terms of group identities and what constitutes a cost/benefit, though there are often overlapping and intersecting determinants of marginalization. Overall, it is important that practitioners take a holistic view of equity, a view that considers equity of what and equity for whom, and the different ways that these things may intersect.

While social equity as a concept is included in some form in each of the sustainability certification systems we evaluated, it should be acknowledged that we did not assess whether or the extent to which certified projects are putting social equity ideas into practice. For projects certified by systems that issue awards based on an accumulation of points (e.g. LEED, Envision, Greenroads), the pursuit of social equity credits is not mandatory. Thus, the extent to which certified projects are addressing social equity concerns is a question for future research. In EcoDistricts and the Living Future systems (Living Community Challenge and Living Building Challenge), where equity is a mandatory requirement, we can assume that equity is addressed. Thus, case studies and comparative analyses of projects certified under these systems represent an important avenue for future research. Such research should provide insights as to what sorts of solutions are imagined and effective for achieving social equity from the standpoint of the project team, client, and community. To date, while there are critical reviews of certification systems, there is very limited analysis of actual projects beyond those certified by LEED.

Substantial differences in how social equity is conceived and applied in just these selected certification systems suggests that there are likely substantial differences in actual project conception and implementation. To this point, the reviewed certification systems use language encouraging projects toward behavior that could be beneficial for social equity, but this language is not always explicit about focusing on vulnerable or disadvantaged populations. This is particularly the case for credits and imperatives about stakeholder engagement and access. Extensive stakeholder engagement processes that poorly define stakeholders may lead to poor project outcomes under the guise of equitable inclusion. In such an instance, a project could meet all criteria for sustainable certification, while these equity-implied actions may have little or no impact on actual social equity outcomes.

It is also important to realize that sustainability certification systems are largely designed to influence projects after they have been conceived. While there are siting and location criteria for some of the systems, especially those focused on buildings and infrastructure, one consequence is that communities may or may not have adequate input into fundamental decisions such as what is built and where. Similarly, while sustainability certification systems are well-positioned to impact both the design and implementation of a project after conception, they offer limited guidance on how to subsequently evaluate equity outcomes. Even

where language such as triple-bottom-line impacts, social sustainability, community impacts, environmental justice, and social impacts is prevalent, it is unclear whether certified projects are achieving the social equity for whom it is intended.

Finally, the audience for sustainability certification systems are sustainability, and building and design, professionals working across a range of project types and at different points in their life cycles. Consequently, certification system guidance manuals, which are the basis of this analysis, cover a broad range of issues. Professionals are likely to bring their own perceptions, backgrounds, and intents to the text, impacting how the certification system criteria are translated into tactical actions by a project team.

5. Conclusion

Sustainability certification systems seek to improve projects' sustainable performance. The use of sustainability certification systems sets expectations and identifies key areas for project teams to address. While sustainability certification systems have been criticized in the past for poor coverage of social sustainability issues e.g. Sharifi and Murayama (2013), the systems reviewed in this paper attempt in varying ways to encourage social equity achievement.

Our qualitative content analysis shows that, across eight certification systems, three dimensions of social equity are addressed—recognition, procedural, and distributional—though few individual systems refer to these dimensions in a coherent framing of project accomplishments to achieve social equity goals. This is in part because certification systems are constantly evolving and developing iteratively over time, and in part because of the sheer breadth of issues covered by these systems. With respect to implementation and valuation, our analysis shows that, for systems built on cumulative achievements in individual sustainability areas, such as LEED, Envision, and Greenroads systems, references to social equity occurs in credits or criteria that are focused narrowly on social equity as an idea. And this idea is generally about some version of access or promoting economic opportunities for the local community. These credits/criteria also have a small range with respect to their potential contribution to certification and are not mandatory. For the Living Community Challenge and Living Building Challenge, equity as a concept is employed in a significant portion of the system and attaining the equity-related imperatives is a requirement of certification. EcoDistricts, which is a more flexible framework, has equity as a central guiding principle, composing as much as one-third of the system, but there is considerable leeway as to what equity would mean for a given community.

Because of this variation in conceptualization, implementation, and valuation of equity, we recommend that practitioners approach project development and certification with an open mind as to what social equity is and how equity can be achieved for each specific type of project and community. It is important for practitioners to understand that achieving a sustainability system certification does not equate to success in achieving social equity outcomes. Given that social equity is increasingly a focus in the AEC industry and in the broader societal realm, the market is responding to demand by creating new and evolving assessment and certification systems. The findings in this paper are intended to help interested parties better understand and navigate existing sustainability certification systems with respect to social equity goals.

Data availability statement

Any data that support the findings of this study are included within the article.

All data that support the findings of this study are included within the article (and any supplementary information files).

Author contributions

A Y designed the approach taken in the paper. A Y, J N, and K S conducted the primary text coding and qualitative content analysis, in consultation with J B, M W and F J. All authors contributed to writing the manuscript.

Conflict of interest

The authors have no competing interests to report.

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