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Reward and compensation incentives for enhancing green building construction

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ABSTRACT

Governments provide incentives to promote green building practices in the construction sector. Compared with rigid-regulatory incentives, the reward and compensation are voluntary incentives because construction stakeholders can choose whether to uptake them or otherwise. The problem is that an explicit list of the forms of reward and compensation that construction stakeholders may decide to uptake to design and construct green buildings is not available to them. This paper employs a narrative review of academic and practitioner publications obtained in a quasi-systematic manner to reveal the forms of reward and compensation for enhancing green building construction. The findings reveal nine forms of reward and compensation designed by the government as voluntary incentives for construction stakeholders. The new insight from this paper concerns scaling incentives by the government. The scaling in the forms of reward and compensation is low because of the voluntariness in the designing. However, in contrast to the rigid-regulatory incentives, this does not affect their uptake among construction stakeholders. Finally, since the scaling of government initiatives for sustainable development is the norm, this paper proposes that scaling the forms of reward and compensation can be done on the bases of the phases of green building construction.

1. Introduction

There are countless global problems the world has faced, and currently facing. The current one being the coronavirus pandemic. It has ravaged many countries, especially China, Italy, South Korea, India, United States, South Africa and the United Kingdom. The effects include human death, sickness, flight cancellations, plug on trade relations and academic disruptions. Before now, the world faced multiple socio-economic problems, such as high impoverishment, social disproportion, lack of jobs for young people and bleak future for children (Hopwood, Mellor and O'Brien, 2005). These problems are still ravaging to date, especially in developing countries. The global response to these problems is sustainable development. It started in the 1970s (Berardi, 2013) but was not accepted widely until the Brundtland report in the late 1980s (Brundtland, 1987). It simply means to take into consideration the needs in future while providing for the current needs. In the context of development, it means to carry out development with considerations for future developmental attempts. According to Hopwood et al. (2005), the emphasis is the sustenance of the environment for humanity, developed or less developed society regardless.

Sustainable development operates in three broad dimensions. They are socially, economically and environmentally inclined dimensions. The social dimension operates to achieve equity and justice, access to social amenities such as clean water and energy supply, gender equality, transparency, accountability and participation in political governance (Harris, 2000). The economic dimension operates to enable fairness in resource sharing, especially ecologically-proof living spaces, and ethically sound businesses and industrialisation (Du Plessis, 2002; Keiner, 2005). The goal is to ensure widespread prosperity, rather than prosperity for only the privileged, within the frame of fundamental human rights (Du Plessis, 2002). Within this dimension, it is critical to strike a balance between increases in the quality of human welfare and increases

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in goods and services consumption (Keiner, 2005; Munasinghe, 2003). The environmentally inclined dimension operates to protect ecosystem integrity and resilience (Munasinghe, 2003) to ensure continued support of the earth for human, animal and plant lives at a high quality (Du Plessis, 2002).

There are many forms of physical development like power projects, manufacturing projects, oil and gas projects and construction projects. For all the forms of development, construction projects are critical to them. For instance, many infrastructure facilities in the built environment (Jiang and Wong, 2016) like residential houses, school and hospital buildings, access roads, irrigation dams, tourist centres, railways and airports are products of construction (Nyanchoka, 2011). Therefore, construction and its products can enhance (or not) the quality of living of human beings in terms of health, economy, socio-cultural lifestyles (Nyanchoka, 2011; Xiong et al., 2016). The sustenance of animal and plant life is also affected by construction activities. Therefore, there is a link between construction and sustainable development (Anigbogu, 2015). In other words, and to stay on the positive side of events, construction can be used to enhance sustainable development. According to Sev (2009), this happens by emphasising on resource management, whole-lifecycle design and design for human and environment in construction. Resource management is to reduce, reuse and recycle construction inputs to avoid wastes, pollution and cost overruns. Whole-lifecycle design is to maintain a balance between environmental concerns and traditional requirements in construction in the design, construction and occupation stages in construction project delivery. The design for the human environment is to reinforce human satisfaction in and around the constructed products within the context of the environment and ecosystem realities. The above summarises sustainable construction, and the goal is to sustain harmony between nature and built environment in the process of physical development in construction (Du Plessis, 2002).

To increase sustainable development in the construction sector, the government promotes sustainable design and construction by providing reward and compensation for the design and construction of green buildings. For instance, the government, at different levels provide incentives for green building promotion in the Australian construction sector (Steinfeld et al., 2011). According to Olanipekun (2017), the reward and compensation serve as motivation for construction stakeholders such as designers, contractors, consultants and private developers to construct green building projects. Creating public awareness through marketing and informative measures increases the attraction of clients to green building projects in practice (Fan and Hui, 2020). When this is combined with financial support, Gou (2020) suggested that it could produce long-lasting green building construction efforts in China. Voluntariness is a key aspect of the design reward and compensation by the government. The design of reward and compensation for green building construction by the government can be carried out either by making a law in the parliament or an outright executive order by the head of a government (Shapiro, 2011; Wang et al., 2014). By voluntariness, it means no compulsion to either subscribe or carryout actions warranting subscription to the reward and compensation provided by the government. Therefore, in construction, construction stakeholders are only required to subscribe to the reward and compensation provided by the government out of volition to design and construct green building projects (Olanipekun et al., 2017). The seminal study of (Olanipekun, 2017) in the Australian construction sector revealed that the voluntary approach to promoting green building development is more effective than compulsion-based approaches.

Meanwhile, not only that the forms of reward and compensation are voluntary in operation, they are in multiple forms. For construction stakeholders, the first step in voluntarily subscribing to the reward and compensation designed by the government is to identify the various forms. Subsequently, the construction stakeholders can increase their understanding of the various forms and decide how to subscribe to them to design and construction green buildings or otherwise. However, an explicit list of the forms of reward and compensation designed by governments is not available for the use of construction stakeholders. There is yet to be a study dedicated to identifying the forms of reward and compensation. Previous studies such as Olubunmi et al. (2016) only provides a theoretical grounding for explaining the voluntariness of intrinsic incentives for green building construction. There was no explicit identification of the forms of incentives. Consequently, many construction stakeholders struggle to understand the operations of existing reward and compensation in practice, such as not knowing the direct beneficiaries of individual forms of reward and compensation and the conditions for assessing them (Fan and Hui, 2020). According to Van der Heijden (2015), voluntary government incentive programs such as Green door lack patronage from developers in the construction sector in Australia. In Australia, the Green door is a Queensland Government program to fast track planning decisions for the most sustainable development proposals that encourage leadership and innovation in the State. Green Door encourages leadership and innovation (Hargroves, 2014). Therefore, this study aims to identify and describe the forms of reward and compensation for promoting the design and construction of green buildings in the construction sector. By doing so, this study emphasises voluntariness in the adoption of incentives enhancing green building construction. Consequently, it promotes voluntary green building design and construction in the construction sector.

2. Literature review

2.1. Brief description of green building project delivery

The design and construction of a green building is process task whereby one step of the task leads to another task (Korkmaz et al., 2010), and as a result, it occurs in phases. The first phase is preconstruction, where the design and construction team involved consider and analyze sustainable alternatives, carryout the lifecycle cost analysis and the planning of building commissioning (Al-Yami and Price, 2006; Gunhan and Hatipkarasulu, 2012). The second phase is the criteria design, whereby the design and construction team develop the initial system schemes, while they also analyze potential solutions, both quantitatively and qualitatively (Lee et al., 2012). The third phase is a detailed design phase, whereby the design and construction team analyze and simulate the integration of component designs and delivered to the owner for preliminary documentation. The fourth phase is preparing the documents for the actual project implementation. For each of the component designs, the team produces the final drawings and specifications. The team also carry out document reviews before delivery the owner or his representatives to proceed on design approval. Subsequently, the post-design activities, including construction and use and maintenance of facility follow (Enache-Pommer and Horman, 2009).

According to Klotz and Horman (2010), the delivery of green buildings is very challenging for design and construction team members, especially when compared with the conventional mode of project delivery. For instance, design companies most often work independently on the designs (schematics) of conventional building projects. It is different in green building projects, especially to design to achieve maximum energy performance. It requires a coordinated design effort among multiple green building project team members such as facility managers and service engineers to produce schematics designs that can achieve energy efficiency (Klotz and Horman, 2010; Palanisamy and Klotz, 2011).

Hence, it requires the input of different professional disciplines at the same time (Wu and Low, 2010). It is possible that the professionals involved in green building delivery may not have worked together in the past and may have different professional views and goals. It is often the case in construction, and when it happens, there is a lack of team effort for the successful delivery of green buildings.

Table 1
Summary of the forms of rewards and compensation and their sources.

Forms/Number of Publications	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15	P16	P17	P18	P19	P20	P21	P22	P23	P24	P25	P26	P27	P28	P29	Total
Rebates/fee reduction	1	1																	1											**3**
Special loans	1		1	1															1	1										**5**
Direct grants					1	1	1														1									**4**
Technical assistance		1						1						1			1					1								**5**
Eco-labelling										1	1										1		1	1	1					**5**
Density bonus	1	1						1				1														1				**5**
Government awards		1			1								1														1			**4**
Expedited permitting	1	1							1					1														1		**5**
Demonstration projects															1	1	1	1											1	**5**
Total	**4**	**5**	**1**	**1**	**2**	**1**	**1**	**2**	**1**	**1**	**1**	**1**	**1**	**2**	**1**	**1**	**2**	**1**	**2**	**1**	**2**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	
Type of publications																														
Journal (J)			1	1	1	1	1	1			1		1	1	1	1		1	1	1		1	1	1	1	1	1			**20**
Conference '(C)										1		1									1								1	**4**
Book (B)																												1		**1**
Report R	1	1							1								1													**4**

Rainwater (2008) - P1; Pippin (2009) - P2; Steinfeld et al. (2011) - P3; Ghodrati et al. (2012) - P4; Cotten (2012) - P5; Van der Heijden (2018) - P6; Carter and Fowler (2008) - P7; Choi (2009) - P8; Perkins (2010) - P9; Yang and Zhou (2010) - P10; Fuerst et al. (2014) - P11; Fan et al. (2016) -P12; Li et al. (2013) - P13; Choi (2010) - P14; Theaker and Cole (2001) - P15; Mason et al. (2011) - P16; Perkins and McDonagh (2012) - P17; Yunna and Ruhang (2013) - P18; Onuoha et al. (2018) - P19; Portnov et al. (2018) - P20; Nguyen et al. (2017) - P21; Liu et al. (2019) - P22; Li et al. (2018) - P23; Balaban and de Oliveira (2017) - P24; Jang et al. (2018) - P25; Qian et al. (2016) - P26; Iwan et al. (2018) - P27; Walker et al. (2018) - P28; Chan and Ma (2016) - P29.

2.2. *Government and the design of green building incentives*

Globally, the critical effort towards the development of green building involves the provision of incentives by the government. According to Mulligan et al. (2014), the incentives that the government increase the implementation of green building strategies, technologies and projects. Locally, the government in different jurisdictions, comprising federal, state and local government levels, takes the responsibility of providing incentives to promote the design and construction of green buildings. An example is the United States, where the provision of incentives for promoting green building practices is jurisdictional. It is an act of the federal, states and local governments, respectively (Butler, 2008; Cotten, 2012). As expected, the federal government leads this act (Webert, 2010). However, providing incentives at the local level is better because they are designed to suit local needs (Choi, 2009).

There are three common modes of the design of the incentives by the government. According to Choi (2009), the design of government incentives for promoting green building development is by law, executive directives and reward and compensation.

Incentives designed by law: This means incentives designed by following a legislation process. Within a government jurisdiction, the legislators make the incentives designed by the government law or legal requirement. According to Wang et al. (2014), the laws specify the lowest allowable performance in green building projects. For instance, the Commercial Building Disclosure Act 2010 specifies that energy use and efficiency information be made explicit in the process of selling or leasing commercial office spaces greater than or equal to 1000 square metres in Australia. However, because it involves legislation process, majority support is required. The level of support needed is not guaranteed, making this mode of design of government incentives for green building practices very challenging (Choi, 2010). Also, the extent of public scrutiny often extends the duration of the legislative process. When passed into law, compliance is a must to avoid breaking the law (Choi, 2010). As a law, the influence of change in administration is limited (DuBose et al., 2007). The incentive for compliance among construction stakeholders is not to break the law or getting punished. And because of the process of law-making, there is a wider support for government incentives designed in this mode. When implemented, government incentives designed in this mode lead to higher design and construction of green buildings (DuBose et al., 2007).

Incentives designed by executive orders: It follows an executive order by the head of a government jurisdiction advocating and compelling green building practices. Therefore, it operates like the conventional commanding-and-controlling type of environmental governance (Shapiro, 2011). Compared to the incentives designed by law, it is less permanent because there is no legislation backing. The subsequent heads of government in a jurisdiction can rescind the incentives designed in this mode by the previous government (DuBose et al., 2007). According to Cotten (2012), incentives designed by executive orders are merely soft laws that create expectations without mechanisms in place for enforcement. Consequently, it births future goals, programs and guidelines rather than actual duties, prescriptions and obligations, respectively. Nevertheless, the implementation is quicker, which has merits to promote the construction of green building projects (Choi, 2010).

Reward and Compensation: In practice, the operation of government incentives designed through provisions of law and executive order involves elements of compulsion. There is no freedom of choice in either of them. As a result, there is often very little demarcation between both. At times, incentives through executive orders are a precursor to those designed through provisions of law (Sentman et al., 2008). However, this may not be the case to promote voluntary environmental governance. The government may not proceed directly to legislation. Instead, the government incentivize green building practices by offering rewards and compensation to beneficiaries (Sentman et al., 2008). Reward and compensation is, therefore, the third mode through government designs

Table 2
Forms of reward and compensation in phases of green building construction.

Phases of green building construction	Forms of reward and compensation	Level of effectiveness	Stakeholder beneficiaries
Planning phase: where sustainability requirements specified and organised relative to the time	**Technical assistance:** to define the sustainability requirements and identify the sustainability permitting process	Technical assistance was considered to be highly effective in the early 2000s when the concept of green building emerged, and was often provided by governments to simply green building licencing and certification for building clients, constructors, developers and occupiers in the planning phase, and enhancing the uptake of green building projects as a result (Berawi et al., 2020). However, after more than two decades of green building development, there is ample information about green building licencing and certification in practice and these stakeholders only consider technical assistance by governments to be acceptable but not highly effective incentive for green building construction (Gou et al., 2013; Choi, 2010). **VERDICT:** Less effective	Clients; Consultants (Designers; Mechanical & Electrical Engineers; Sustainability Consultants)
Design phase: modelling plans; seeking approval; determining financial implication;	**Special loans:** to loans lessens the financial burden for the clients to construct green buildings. **Expedited permitting:** of design proposals to enable timely commencement of project delivery	Commercial building developers prefer special loans with flexible repayment with zero interest over a long period than corporate loans that are granted at high interest rates for green building construction (Onuoha et al., 2018). Consequently, the commercial building developers and other stakeholders that utilise the special loan arrangement can embark on aggressive design and construction of green building projects in practice (Choi, 2010) **VERDICT:** Highly effective Building regulations are very rigorous and it is often elevated for green building construction to achieve sustainability requirements, particularly in developed countries like the USA and European countries. Therefore, stakeholders, especially developers do keenly subscribe to the expedited permitting incentive of governments to accelerate construction permitting and thereby reducing costs that may accrue at the design phase (Berawi et al., 2020; Adekanye et al., 2020)	Main Contractors; Clients
Procurement phase: outsourcing green building elements, components, features and the service providers	**Rebates:** rebates on energy efficiency features and small grants for buying renewable energy technologies support the successful procurement of green building projects	**Verdict:** Highly effective Rebate incentives are provided to stakeholders to offset the costs of procuring installable sustainable building features like solar panels (Rana et al., 2021). Therefore, rebates are very popular among retrofitters who subscribe comprehensively to rebates throughout the life of their buildings to retain or increase the greenness level (Adekanye et al., 2020). For stakeholders engaging in new-green building construction, especially developers, they subscribe to rebates to the extent of duration of project completion before handing over competed projects. **Verdict:** Moderately effective	Main Contractors; Sub-Contractors; Specialist Trades
Construction phase: construction of building elements; installation of sustainability features	**Density bonus:** to increase built space. Demonstration projects: to guide contractors and specialist vendors in the construction	Density bonus incentive is considered highly effective incentive that permits developers and constructors in high density cities like Hong Kong and Singapore to claim more building spaces for sustainable practices (Gou et al., 2013). Also, through density bonus, developers and homeowners in countries that have green building regulations like USA can claim more built spaces when they achieve high green building ratings at the construction phase (Adekanye et al., 2020)	Main Contractors; Specialist Trades
Operation phase: the occupation of green building	**Eco-labelling & Government award:** to increase the pro-sustainability reputation of clients and users.	**Verdict:** Highly effective Eco-labelling often facilitated by market operators notably as National Green Building Councils and supported by the government to symbolize green building products, their producers and users (Rochikashvili and Bongaerts, 2018). Therefore, eco-labelling offers the prestige of pro-environmentalism but has been ranked lowly as an effective incentive for green building construction in many studies (e.g. Gou et al., 2013; Yau, 2012). **Verdict:** Less effective	Client, Contractors; End-Users

incentives to promote green building practices (Wang et al., 2014). In practice, beneficiaries only need to voluntarily tick certain boxes that serve as a benchmark for benefiting (DeLaPaz, 2013). An example of such benchmark used in countries such as the United States of America and Australia is the green building assessment systems Therefore, in contradiction to government incentives designed according to provisions or the law and executive order, reward and compensation are voluntary for the beneficiaries who retain the volition to participate in them (Qian et al., 2012).

2.3. Research strategy

The aim is to identify and describe the forms of reward and compensation for enhancing green building construction in this study. According to the Sustainable Development Goals (SDGs) report in 2019, the contributions of government in different countries were very critical, leading to progress in the global sustainable development agenda (Guterres, 2018). In the construction sector, the government commonly provides incentives to promote green building practices in the construction sector. An example in Canada is the "renovation Quebec program" which offers a grant of $2500 for LEED-certified homes (https://www.ecohome.net/guides/2301/green-building-financial-incentives/). At the same time, academic and practice level publications stemming from research about the incentives for promoting green building practices have increased (E.g. (Lossin et al., 2016; Olubunmi et al., 2016)). The research strategy is drawing on the academic and practice level publications in a quasi-systematic manner. It means to describe only pieces of information within a context with no synthesis of evidence nor sourcing data or information from a structured source (Popay et al., 2006). The choice of this strategy is to be purposely broad and be able to draw on practical examples to complement the descriptions of the forms of reward and compensation. The alternative is the systematic literature review strategy. However, unlike the systematic strategy, the quasi-systematic strategy is not limited to restrictions imposed by keywords and rigid source for evidence (Egger et al., 2001). Table 1 contains a summary of the publications used. There is a twenty-nine-total number of publications, including 20 journals, four conference publications and a book. Also, there are four practice level publications, mainly government and industry reports.

Meanwhile, because the narrative review of information method uses textual information, ensuring transparency in the research strategy process to increase the trustworthiness of findings is important. In line with (Popay et al., 2006), steps taken include grouping, tabulation, and counting to ensure the transparency in the research process. Grouping is the organization of the publications used in smaller groups to ensure easier identification of the forms of reward and compensation. Table 1 reveals the academic and practice publications separately. The academic publications comprise of journals and conference publications. Dividing the publications helps to appreciate the variations among the publications used transparently. Also, Table 2 provides a guideline for designing the forms of reward and compensation according to the phases in green building project construction. Counting is the enumeration of the publications used. As shown in Table 1, the frequency of the publications is in the columns. Similarly, that of forms of reward and compensation are in the rows.

2.4. Findings: forms of reward and compensation

The forms of reward and compensation are presented in this section. Characteristically, they are designed by the government to promote the design and construction of green buildings. They are also voluntary for construction stakeholders. That is, there is no compulsion to adopt them.

Rebates: This is a form of reward and compensation that the government uses to promote green building practices (Onuoha et al., 2018). In practice, there are two variants. Firstly, the government procure much green sustainability (or energy) efficient features and give out to beneficiaries at reduced prices in its jurisdiction (Rainwater, 2008b). This variant mainly applies to water and energy conservation features (Rainwater, 2008b). Secondly, the government reduces the fees, or make refunds to beneficiaries for legitimate purchases that meet specified sustainability standards (Pippin, 2009). An example the City of Charlottesville "green roof building permit fee reduction." There is a 50 % reduction to the building permit fee applicable to the construction of a green roof in commercial, residential and non-residential buildings in the City.

Special loans: It involves loan availability to beneficiaries for green-building related improvements (Onuoha et al., 2018) to encourage environmental performance in buildings (Steinfeld et al., 2011). In construction procurement, the government use innovative contracting methods to incentivize green building practices. For instance, loans at reduced interest rates are granted to developers and contractors who willingly build to set green building standards. It is on performance contracting basis whereby the set standard is achieved before the loan benefit. However, there is a need to pay back the loan. Therefore it is more beneficial to commercial green building owners who can payback from the profits accruable from sales (Rainwater, 2008b). In Malaysia, loans provided by the government is very attractive to young homebuyers of green building projects (Ghodrati et al., 2012). However, loans result in reduced, rather than increased desire to pay for green building projects among homebuyers in Israel (Portnov et al., 2018).

Direct grants: Grants are the sum of money, offered one-time by the government to beneficiaries to cushion the cost of purchase of green building features, particularly the renewable energy features in building projects (Cotten, 2012). An example is the building innovation fund which is granted to developers of office buildings, hospitality buildings and shopping malls to support innovative and cutting edge ideas that reduce energy use and greenhouse gas emissions significantly in Australia (Van der Heijden, 2018). Direct grant is a way of subsidizing costs of green building features. Therefore, it compensates for the high initial costs that often prevents the installation of green roofs in buildings (Carter and Fowler, 2008; Nguyen et al., 2017). This form of reward and compensation is very common in European countries such as Germany. 50 % of the cities in this country offer direct grants to beneficiaries to install green roofs in their buildings (Carter and Fowler, 2008). Also, in Toronto, Canada, the Green Roof Incentive Program was piloted many years back. There is an offer of the grant up to $10 Cdn/$m^2$ for green roof installation (http://www.toronto.ca) (Carter and Fowler, 2008).

Technical assistance: The technical assistance is to support the actual construction of green building projects. The government dedicates one or more staffs to support potential owners and developers at the commencement of green building project delivery (Choi, 2009). For instance, the staffers help the potential owners and developers with permitting by identifying the information required for application for development as well as helping to identify the incentives that may be available (Choi, 2009). Apart from getting assistance from the government, the owners and developers get educated and familiar with the process of green building development (Choi, 2010; Pippin, 2009). Sustainable building design practices can be a paradox; active designs require new technological solutions, while passive designs are relatively old. The government uses the attempt to expose the owners and developers to innovative sustainable building solutions (Perkins, 2010). However, the government prefers the technical assistance at the expense of the social, economic, and management supports for green building construction (Liu et al., 2019).

Eco-labelling: The function of eco-labelling is to provide accurate information about the environmental functionality of green building projects and features. Not only the information but the right type and quantity that generates valued premiums for green building products (Li et al., 2018). Therefore, according to Fuerst et al. (2014), eco-labels give credence and validation about the greenness of a product and the production system. Environmental Choice New Zealand is an eco-label for

different products in New Zealand. Often, the government and private sector players jointly provide eco-labelling functions for built products (Fuerst et al., 2014). However, many developing countries, like the Vietnamese government, need to do more to label green buildings (Nguyen et al., 2017). The labelling should combine the environmental, health and economic criteria (Balaban and de Oliveira, 2017). The incentiveness of eco-labelling is by increasing the market brand of the owners and producers of green building projects and features (Yang and Zhou, 2010). Economically, eco-labelling increases the willingness to pay for green building projects (Jang et al., 2018), but this is dependent on the market share of the green product (T. Li et al., 2018).

Density bonus: This form of reward and compensation is also construction related. It offers opportunities to increase or expand constructed space beyond stipulated for engaging in green building practices. There are many examples in different countries, but the common ones are height bonuses, reduced landscaping requirements and floor/area ratio (FAR) (Rainwater, 2008b). According to Pippin (2009), the density bonus is the Floor Area Ratio (FAR), where FAR is the total floor area of a building divided by the size of the total space allotted for physical development in its location. The attraction mainly is in geographical locations with built-capacity limitations (Rainwater, 2008b). Therefore, building owners and developers are the primary beneficiaries. Also, this form is used by the government to create social good. The density bonus program in Hong Kong allows developers to acquire additional gross floor area from the government by providing social amenities. In turn, the government saves money for more public service provision (Fan et al., 2016; Qian et al., 2016). Also, in terms of economic benefits, the density bonus allows project owners and developers to increase the floor space of building projects and increase profits (C. Choi, 2009; Pippin, 2009).

Government awards: In this form of reward and compensation, the government incentivizes through recognition and awards for those beneficiaries who have demonstrated exemplary green building practices. Therefore, it is public prestige for beneficiaries and enhances their reputation (Li et al., 2013). For example, a government leader may appear at building commissioning stage or later to give out an award for a building that has achieved a high level of sustainability design (Cotten, 2012). The city of Gainsville, Florida, is a good example. It was a practice to confer "green building award on an annual basis to different building development subgroups, including residential and office construction (Pippin, 2009). Awards also stimulate researchers attention to green building projects, especially in the USA and Hong Kong (Iwan et al., 2018).

Expedited permitting: Expedited permitting promotes timely green building development. The permitting and plan reviews of building project proposals often take a large portion of the development process, especially for green building projects. According to Choi (2009), when owners and developers integrate sustainability features in green building designs, the government allows such proposals to bypass the normal design approval process. Therefore, green building design approval is faster. In the case of denial, corrections can be made quickly, and the design resubmitted for approval. The expedited permitting incentive may be based on sustainability criteria, but this varies across jurisdictions (Pippin, 2009). By offering expedited permitting, the benefits to the beneficiaries are faster development and early profits (E. Choi, 2010; Rainwater, 2008a, 2008b). An example of an expedited permitting incentive is the *Green Door* program for accelerating planning decisions for sustainable development proposals in Queensland, Australia. According to (Walker et al., 2018), streamlining the process of approvals and reducing review period is very influential in promoting green building construction, it has a direct impact on the developers' bottom line.

Demonstration projects: Similar to technical assistance, this form of reward and compensation addresses the sophistication involved in green building such as the strategic selection of materials and the use of advanced construction methods (Perkins and McDonagh, 2012). As mentioned previously, this sophistication presents a challenge to construction stakeholders. As a result, the government develops a prototype project mainly to illustrate and demonstrate the green building concept. It is of an educative advantage to different construction stakeholders. The project owners and developers identify the right experts for green building construction; the designers learn how to integrate design solutions across project phases, and the contractors learn the right building and procurement process (Theaker and Cole, 2001). For instance, in China, the government installed heat pumps in selected buildings for demonstration purpose (Yunna and Ruhang, 2013). This action of the government led to more installation of heat pumps in buildings in the area (Yunna and Ruhang, 2013). By using demonstration projects, the government creates increased public acceptance for green building practices (Theaker and Cole, 2001). Also, in Australia, the Lochiel Park Sustainability Center is a demonstration project about efficient use of energy and water in Adelaide, Australia (Chan and Ma, 2016). For the government, it is an indication of leadership commitment to promoting green building construction (Mason et al., 2011).

3. Discussion

The government promotes sustainable development in the construction sector by providing incentives for the design and construction of green buildings. As one of the modes of design of government incentives, this paper identifies and describes the forms of reward and compensation for green building construction. "Form" in this study suggests how reward and compensation operate as incentives to promote the design and construction of green buildings. The operation of the forms of reward and compensation enable construction stakeholders' freedom of choice to adopt them out of volition. The contrast is the incentives designed by the government by law and executive orders. The ones designed by laws and executive orders have been extensively covered in the literature and in practice, construction stakeholders need to adopt them by compulsion (Gou, 2020; Adekanye et al., 2020). This study departed from the current knowledge and the forms of reward and compensation are identified to include rebates/fee reduction, special loans, direct grants/subsidies, technical assistance/support and eco-labelling. Others are density bonus, government awards and demonstration projects. Liberalesso et al. (2020) stated that regardless of the type of incentives used to promote green building development, the effectiveness of the incentive is the most important. How the effectiveness of the forms of reward and compensation can be achieved without removing their voluntariness element will be discussed.Scalability is an increasingly important consideration in the discourse and practical implementation of the incentives for promoting the sustainability agenda globally. Government considers scaling very key to designing incentives (Li and Colombier, 2011). Scaling means having a guided and/or structured process for designing incentives to exert control over stakeholders' adoption of the incentives. This corresponds to an interaction between the government as incentive providers and regulators, and construction stakeholders as adopters (Fan and Hui, 2020). However, although the government scales the forms of reward and compensation by setting objectives, targets and duration, exerting control is very limited because the target beneficiaries (e.g. construction stakeholders) maintain the freedom to adopt them (or otherwise). Construction stakeholders may choose not to adopt the forms of reward and compensation to design and construct green buildings without any form of compulsion. Freedom of choice by target beneficiaries is not permissible in the operation of the incentives designed by the government by law and executive orders (Wang et al., 2014; Shapiro, 2011). By implication, scaling in the incentives designed through laws and executive orders is higher than in the forms of reward and compensation. The revelation is that incentives designed by law and executive orders, and forms of reward and compensation differ by their levels of scale design.

Being a regulator, the temptation for the government to scale the forms of reward and compensation using either law or executive order is

possible, especially because scaling increases the adoption of incentives (Van Doren et al., 2016) leading to increased green building practices in the construction sector (Kibert, 2001). If this happens, it removes voluntariness – which is the fundamental element of the forms of reward and compensation. It is not advisable as Van der Heijden (2015) demonstrates that the stakeholder adoption of voluntary incentives by Australian governments for green building practices is less about voluntariness. Also, in Australia, designers increase the level of climate-sensitive and passive design strategies in building design proposals in Brisbane after the introduction of the Buildings that Breathe (BtB) non-binding policy of the government (Bhoge et al., 2019). Therefore, scaling might enhance the uptake of incentives among stakeholders; it is so not a requirement for the adoption of the forms of reward and compensation. This finding reinforces the design of the forms of reward and compensation as voluntary incentives by the government. It also means that voluntariness is necessary to ensure that construction stakeholders' adoption the forms of reward and compensation designed by the government to enhance green building practices. With the efficacy of scaling and voluntariness to the adoption of green building incentives, the government should sustain the dual options for designing incentives that enhance green building practices. According to Meng et al. (2021), doing so helps the government to be dynamic in the provision of incentives for green building practices, for instance, combining a dynamic reward and punishment policy as a strategy. This approach was found to help the government lessen the unstable behaviour of contractors involved in green building construction process (Meng et al., 2021). Based on this study's findings, the government can either design incentives rigidly using legislations and executive orders or voluntarily in the forms of reward and compensations. This is already in place in many green building developed countries like the USA, UK and Australia. Alternatively, both options can be put in place and deploy them in synergy. The shortcomings, such as high institutional costs and lack of voluntariness in either option, are eliminated by combining them (Lee and Yik, 2004; Fan and Hui, 2020; Liberalesso et al., 2020).

The green building construction is a phased process. From the account of green building processes in China, structuring the implementation of green building incentives, particularly in terms of when, where and how they should be implemented was found to be very effective towards green building construction in the country (Gou, 2020). Therefore, as illustrated in Table 2, the government can design the forms of reward and compensation for specific phases in green building construction. In this way, the design is less arbitrary, but more construction process-focused and guided.

It is a way of introducing scaling in the design of the forms of reward and compensation without removing the voluntariness of construction stakeholders to adopt them. In the planning stage, the technical assistance/support form of reward and compensation is useful for the client and team of consultants to define the sustainability requirements and identify the sustainability permitting process. High initial costs discourage clients from green building construction (Hwang et al., 2017). At the design stage, access to loans lessens the financial burden for the clients to construct green buildings (Olubunmi et al., 2016). Expedited permitting of green building proposals will enable clients to commence and complete green building projects timelier. In the past, the procurement of green building features was very challenging due to non-availability, high sophistication and lack of conformity with local standards (Love et al., 2012). Government intervention through rebates on energy efficiency features and small grants for buying renewable energy technologies support the successful procurement of green building projects. At the construction phase, density bonus enables clients to increase built-space, especially in high-density areas like Hong Kong (Fan et al., 2016), while demonstration projects provide living examples to guide contractors and specialist vendors in the construction of green building projects. Lastly, eco-labelling, as well as government and professional organization awards for completed green buildings, increase the pro-sustainability reputation of clients. It also increases the (sale and rental) value of green building projects (Jang et al., 2018; Onuoha et al., 2018). In Table 2, the forms of reward and compensation prescribed in a phase of green building construction may be applicable in other phases. For instance, the government can provide technical assistance in the design and construction phases. Therefore, the guideline in Table 2 is not a rigid rule but serve as guidance for designing the forms of reward and compensation without removing the voluntariness of construction stakeholders to adopt them. More research is necessary to evaluate the fit of the forms of reward and compensation to respective phases in green building construction from the perspectives of the stakeholders.

4. Conclusion

The increasing emphasis on sustainable development in the construction sector stimulates the government to provide incentives to promote green building practices among construction stakeholders. The government can use legislative instruments to design rigid-regulatory incentives in which case would require compulsory participation of construction stakeholders in the operation of the incentives. The government can also design voluntary incentives whereby construction stakeholders can choose to participate in the incentives or otherwise. Evidence suggests that incentives designed to be voluntary in operation are very effective, even more, effective than the rigid-regulatory ones in promoting green building practices (Olanipekun et al., 2018). Reward and compensation are voluntary incentives. This paper identifies and describes the forms of reward and compensation. They are rebates/fee reduction, special loans, direct grants/subsidies, technical assistance/-support and eco-labelling. Others are density bonus, government awards and demonstration projects. Henceforth, construction stakeholders can, therefore, voluntarily choose to subscribe to them to design and construct green buildings. Also, the forms of reward and compensation exemplify the roles that government plays in ensuring voluntary green building construction in the construction sector. Meanwhile, based on the findings, these are the conclusions.

- Scaling enables the government to control the operation of incentives that promote green building practices, for instance, in terms of scope and objectives, and to influence the participation of the targeted beneficiaries in the incentives (Impact). The voluntariness of the forms of reward and compensation lowers the scalability on the part of the government. The low scaling of the forms of reward and compensation is another way of differentiating them from the rigid-regulatory incentives.
- Scaling enhances the adoption of incentives among beneficiaries, such as construction stakeholders. However, this applies to incentives that are regulation-based. It does not apply to the forms of reward and compensation because they are voluntary incentives.
- The scaling of the forms of reward and compensation without removing the voluntariness of construction stakeholders to adopt them is doable within the phases of green building project construction. This study provides a guideline in this respect for the government and construction stakeholders.

Government initiatives to support sustainable development are mainly about the types of initiatives and their effectiveness in the construction sector. Over the years, these contexts consistently inform the contributions of the government on how to provide incentives for promoting green building practices in the construction sector. Commonly, the government provides incentives that are rigid-regulatory using legislative instruments and the voluntary ones. This paper adds the dimension of scaling to the existing discourse. The scaling option will enable the government to control the uptake of the incentives among construction stakeholders and maximize the impact on green building practices. There is no need for scaling in the design of voluntary incentives. Therefore, to enhance green building construction, the

government should concentrate more on providing voluntary incentives, especially the forms of reward and compensation. Additionally, scaling the forms of reward and compensation can be done on the bases of the phases of green building construction. This paper draws on both the operations of government incentives for promoting green building practices in different countries and the research about them to obtain the findings. However, not all countries and body of evidence are covered. However, new insights obtained about government incentives (Scalability) can be verified using a larger number of countries and the body of evidence.

Based on the conclusions and implication, recommendations are as follows.

- The government can design one or more of the forms of reward and compensation to enhance green building construction. Alternatively, the government can follow the guideline developed to design the forms of reward and compensation for respective phases in green building construction. It removes arbitrariness and some level of scaling in the design of the forms of reward and compensation but not the voluntariness. Multiple construction stakeholders can use the guideline as well. The guideline enables them to individually identify the forms of reward and compensation that support their actions in different phases of green building construction. Linking the forms of reward and compensation to the phases in green building construction is perhaps a game-changer in the provision of incentives for enhancing green building construction. More research is necessary to confirm the links prescribed, especially from the perspectives of construction stakeholders. The government may also need to evaluate their preferences of the forms of reward and compensation relative to time, resources and projects.

This study roots for a voluntary approach in the overall pursuit of sustainable development in the construction sector through the design and construction of green buildings. The study opens an avenue for the government to promote voluntary green building construction. Therefore, the government has choices; whether to use rigid laws and executive orders or use the forms of reward and compensation to enhance green building construction. The government can also use both to complement one another.

Conflict of interest

The authors declare no conflict of interest.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

Adekanye, O.G., Davis, A., Azevedo, I.L., 2020. Federal policy, local policy, and green building certifications in the US. Energy Build. 209, 109700.

Al-Yami, A.M., Price, A.D., 2006. A Framework for Implementing Sustainable Construction in Building Briefing Project.

Anigbogu, N.A., 2015. Determinants of Successful Sustainable Building Practices in Nigeria. Retrieved from Researchgate. http://www.researchgate.net/profile/Natalia_Anigbogu2.

Balaban, O., de Oliveira, J.A.P., 2017. Sustainable buildings for healthier cities: assessing the co-benefits of green buildings in Japan. J. Clean. Prod. 163, S68–S78.

Berardi, U., 2013. Clarifying the new interpretations of the concept of sustainable building. Sustainable Cities and Society 8, 72–78.

February Berawi, M.A., Basten, V., Latief, Y., Crévits, I., 2020. Role of green building developer and owner in sustainability construction: investigating the relationships between green building key success factors and incentives, 1. In: IOP Conference Series: Earth and Environmental Science, 426, 012061.

Bhoge, R., Nolan, H., Pojani, D., 2019. Designing the subtropical city: an evaluation of climate-sensitive policy effects in Brisbane, Australia. J. Environ. Plann. Manag. 1–22.

Brundtland, G.H., 1987. What is sustainable development. Our common future 8 (9).

Butler, J., 2008. The compelling "hard case" for "green" hotel development. Cornell hospitality quarterly 49 (3), 234–244.

Carter, T., Fowler, L., 2008. Establishing green roof infrastructure through environmental policy instruments. Environ. Manag. 42 (1), 151–164.

Chan, C., Ma, T., 2016. Energy efficiency housing in South Australia–a gap analysis between the expected and actual benefits. Procedia engineering 164, 446–452.

Choi, C., 2009. Removing market barriers to green development: principles and action projects to promote widespread adoption of green development practices. Journal of Sustainable Real Estate 1 (1), 107–138.

Choi, E., 2010. Green on buildings: the effects of municipal policy on green building designations in America's central cities. Journal of Sustainable Real Estate 2 (1), 1–21.

Cotten, M.N., 2012. The wisdom of LEED's role in green building mandates. Cornell Real Estate Review 10 (1), 6.

DeLaPaz, A., 2013. LEED Locally: Hoe Local Governments Can Effectively Mandate Green Building Standards. U. Ill. L. Rev., p. 1211

Du Plessis, C., 2002. Agenda 21 for Sustainable Construction in Developing Countries. CSIR Report BOU E, p. *204*.

DuBose, J.R., Bosch, S.J., Pearce, A.R., 2007. Analysis of state-wide green building policies. Journal of Green Building 2 (2), 161–177.

Egger, M., Dickersin, K., Smith, G.D., 2001. Problems and limitations in conducting systematic reviews. Systematic reviews in health care: Meta-analysis in context 43–68.

Enache-Pommer, E., Horman, M., 2009. Key processes in the building delivery of green hospitals. In: Paper Presented at the Construction Research Congress 2009: Building a Sustainable Future.

Fan, K., Hui, E.C., 2020. Evolutionary game theory analysis for understanding the decision-making mechanisms of governments and developers on green building incentives. Build. Environ. 179, 106972.

Fan, K., Qian, Q.K., Chan, E.H., 2016. Transaction costs (tcs) in building regulations and control for green buildings: case study of Hong Kong. Creating built environments of new opportunities 1, 818.

Fuerst, F., Kontokosta, C., McAllister, P., 2014. Determinants of green building adoption. Environ. Plann. Plann. Des. 41 (3), 551–570.

Ghodrati, N., Samari, M., Shafiei, M., 2012. Investigation on government financial incentives to simulate green homes purchase. World Appl. Sci. J. 20 (6), 832–841.

Gou, Z., 2020. The shift of green building development in China from a voluntary to mandatory approach. In: Green Building in Developing Countries. Springer, Cham, pp. 1–21.

Gou, Z., Lau, S.S.Y., Prasad, D., 2013. Market readiness and policy implications for green buildings: case study from Hong Kong. Journal of Green Building 8 (2), 162–173.

Gunhan, S., Hatipkarasulu, Y., 2012. Scope of preconstruction services in green building projects. In: Paper Presented at the American Society for Engineering Education.

Guterres, A., 2018. The sustainable development goals report. July 6, 2019.

Hargroves, C., 2014. Chapter one engaging decision makers in the business case for biophilic urbanism Edited. In: Baghdadi, Omniya el, Desha, Cheryl (Eds.), Human-Environmental Interactions in Cities: Challenges and Opportunities of Urban Land Use Planning and Green Infrastructure,, 12.

Harris, J.M., 2000. Basic principles of sustainable development.

Hopwood, B., Mellor, M., O'Brien, G., 2005. Sustainable development: mapping different approaches. Sustain. Dev. 13 (1), 38–52.

Hwang, B.-G., Zhu, L., Wang, Y., Cheong, X., 2017. Green building construction projects in Singapore: cost premiums and cost performance. Proj. Manag. J. 48 (4), 67–79.

Iwan, A., Rao, N., Poon, K.K., 2018. Characteristics of green schools: observations of award-winning green preschools in bali, berkeley and Hong Kong. Journal of Education for Sustainable Development 12 (2), 140–159.

Jang, D.-C., Kim, B., Kim, S.H., 2018. The effect of green building certification on potential tenants' willingness to rent space in a building. J. Clean. Prod. 194, 645–655.

Jiang, W., Wong, J.K., 2016. Key activity areas of corporate social responsibility (CSR) in the construction industry: a study of China. J. Clean. Prod. 113, 850–860.

Keiner, M., 2005. History, Definition (S) and Models of Sustainable Development.

Kibert, C.J., 2001. Policy instruments for sustainable built environment. J. Land Use Environ. Law 17, 379.

Klotz, L., Horman, M., 2010. Counterfactual analysis of sustainable project delivery processes. J. Construct. Eng. Manag. 136 (5), 595–605.

Korkmaz, S., Riley, D., Horman, M., 2010. Piloting evaluation metrics for sustainable high-performance building project delivery. J. Construct. Eng. Manag. 136 (8), 877–885.

Lee, S., Liu, Y., Chunduri, S., Solnosky, R.L., Messner, J.I., Leicht, R.M., Anumba, C.J., 2012. Development of a process model to support integrated design for energy efficient buildings. In: Paper Presented at the the Proceedings of the ASCE International Conference on Computing in Civil Engineering, June.

Lee, W., Yik, F., 2004. Regulatory and voluntary approaches for enhancing building energy efficiency. Prog. Energy Combust. Sci. 30 (5), 477–499.

Li, J., Colombier, M., 2011. Economic instruments for mitigating carbon emissions: scaling up carbon finance in China's buildings sector. Climatic Change 107 (3–4), 567–591.

Li, T., Kecinski, M., Messer, K.D., 2018. Behavioural responses to science-based eco-labelling: gold, silver, or bronze. Appl. Econ. 50 (39), 4250–4263.

Li, X., Strezov, V., Amati, M., 2013. A qualitative study of motivation and influences for academic green building developments in Australian universities. Journal of Green Building 8 (3), 166–183.

Liberalesso, T., Cruz, C.O., Silva, C.M., Manso, M., 2020. Green infrastructure and public policies: an international review of green roofs and green walls incentives. Land Use Pol. 96, 104693.
Liu, Y., Lu, Y., Hong, Z., Nian, V., Loi, T.S.A., 2019. The "START" framework to evaluate national progress in green buildings and its application in cases of Singapore and China. Environ. Impact Assess. Rev. 75, 67–78.
Lossin, F., Kozlovskiy, I., Sodenkamp, M., Staake, T., 2016. Incentives to Go Green: an Empirical Investigation of Monetary and Symbolic Rewards to Mo-Tivate Energy Savings.
Love, P.E., Niedzweicki, M., Bullen, P.A., Edwards, D.J., 2012. Achieving the green building council of Australia's world leadership rating in an office building in Perth. J. Construct. Eng. Manag. 138 (5), 652–660.
Mason, S.G., Marker, T., Mirsky, R., 2011. Primary factors influencing green building in cities in the Pacific Northwest. Publ. Works Manag. Pol. 16 (2), 157–185.
Meng, Q., Liu, Y., Li, Z., Wu, C., 2021. Dynamic reward and penalty strategies of green building construction incentive: an evolutionary game theory-based analysis. Environ. Sci. Pollut. Control Ser. 1–14.
Mulligan, T.D., Mollaoğlu-Korkmaz, S., Cotner, R., Goldsberry, A.D., 2014. Public policy and impacts on adoption of sustainable built environments: learning from the constuction industry playmakers. Journal of Green Building 9 (2), 182–202.
Munasinghe, M., 2003. Analysing the Nexus of Sustainable Development and Climate Change: an Overview. Munasinghe Institute for Development, Sri Lanka (MIND). [Online] Available at:,. http://www1.oecd.org/environment/climatechange/2510070.pdf (Accessed: 20th September 2012).
Nguyen, H.-T., Olanipekun, A.O., Skitmore, M., Tyvimaa, T., 2017. Motivations for green building development in Vietnam. In: Paper Presented at the Proceedings of 22nd International Conference on Advancement of Construction.
Nyanchoka, A.O., 2011. An outline of construction law in Kenya. Available at: SSRN 1787820.
Olanipekun, A.O., 2017. Motivating Project Owners to Increase Their Commitment towards Improving the Delivery Performance of Green Building Projects. Queensland University of Technology.
Olanipekun, A.O., Xia, B., Hon, C., Darko, A., 2018. Effect of motivation and owner commitment on the delivery performance of green building projects. J. Manag. Eng. 34 (1), 04017039.
Olanipekun, A.O., Xia, B., Hon, C., Hu, Y., 2017. Project owners' motivation for delivering green building projects. J. Construct. Eng. Manag. 143 (9), 04017068.
Olubunmi, O.A., Xia, P.B., Skitmore, M., 2016. Green building incentives: a review. Renew. Sustain. Energy Rev. 59, 1611–1621.
Onuoha, I.J., Aliagha, G.U., Rahman, M.S.A., 2018. Modelling the effects of green building incentives and green building skills on supply factors affecting green commercial property investment. Renew. Sustain. Energy Rev. 90, 814–823.
Palanisamy, P., Klotz, L., 2011. Delivery Process Attributes, Common to India and the US, For More Sustainable Buildings, 4, 6. College Publishing, pp. 146–157.
Perkins, M., McDonagh, J., 2012. New Zealand Local Government Initiatives and Incentives for Sustainable Design in Commercial Buildings.
Perkins, M.A., 2010. Local and Regional Government Initiatives and Incentives for Sustainable Design in the Commercial Built Environment of New Zealand (Master Degree thesis). Lincoln University, New Zealand (New Zealand).
Pippin, A.M., 2009. Survey of Local Government Green Building Incentive Programs for Private Development.
Popay, J., Roberts, H., Sowden, A., Petticrew, M., Arai, L., Rodgers, M., Duffy, S., 2006. Guidance on the conduct of narrative synthesis in systematic reviews. A product from the ESRC methods programme Version 1, b92.
Portnov, B.A., Trop, T., Svechkina, A., Ofek, S., Akron, S., Ghermandi, A., 2018. Factors affecting homebuyers' willingness to pay green building price premium: evidence from a nationwide survey in Israel. Build. Environ. 137, 280–291.
Qian, Q.K., Chan, E.H., Choy, L.H., 2012. Real estate DEVELOPERS'CONCERNS about uncertainty IN building energy efficiency (bee) investment—a transaction costs (TCS) perspective. Journal of Green Building 7 (4), 116–129.
Qian, Q.K., Fan, K., Chan, E.H., 2016. Regulatory incentives for green buildings: gross floor area concessions. Build. Res. Inf. 44 (5–6), 675–693.
Rainwater, B., 2008a. Local Leaders in Sustainability: A Study of Green Building Programs in Our Nation's Communities. American Institute of Architects, Washington, DC.
Rainwater, B., 2008b. Local Leaders in Sustainability: a Study of Green Building Programs in Our Nation's Communities. American Institute of Architects.
Rana, A., Sadiq, R., Alam, M.S., Karunathilake, H., Hewage, K., 2021. Evaluation of financial incentives for green buildings in Canadian landscape. Renew. Sustain. Energy Rev. 135, 110199.
Rochikashvili, M., Bongaerts, J.C., 2018. How eco-labelling influences environmentally conscious consumption of construction products. Sustainability 10 (2), 351.
Sentman, S.D., Del Percio, S.T., Koerner, P., 2008. A climate for change: green building policies, programs, and incentives. Journal of Green Building 3 (2), 46–63.
Sev, A., 2009. How can the construction industry contribute to sustainable development? A conceptual framework. Sustain. Dev. 17 (3), 161–173.
Shapiro, S., 2011. Code green: is" greening" the building code the best approach to create a sustainable built environment? Plann. Environ. Law 63 (6), 3–12.
Steinfeld, J., Bruce, A., Watt, M., 2011. Peak load characteristics of Sydney office buildings and policy recommendations for peak load reduction. Energy Build. 43 (9), 2179–2187.
Theaker, I.G., Cole, R.J., 2001. The role of local governments in fostering 'green'buildings: a case study. Build. Res. Inf. 29 (5), 394–408.
Van der Heijden, J., 2015. What roles are there for government in voluntary environmental programmes? Environmental Policy and Governance 25 (5), 303–315.
Van der Heijden, J., 2018. From leaders to majority: a frontrunner paradox in built-environment climate governance experimentation. J. Environ. Plann. Manag. 61 (8), 1383–1401.
Van Doren, D., Giezen, M., Driessen, P., Runhaar, H., 2016. Scaling-up energy conservation initiatives: barriers and local strategies. Sustainable Cities and Society 26, 227–239.
Walker, T., Krosinsky, C., Hasan, L.N., Kibsey, S.D., 2018. Sustainable Real Estate: Multidisciplinary Approaches to an Evolving System. Springer.
Wang, L., Toppinen, A., Juslin, H., 2014. Use of wood in green building: a study of expert perspectives from the UK. J. Clean. Prod. 65, 350–361.
Webert, J.S., 2010. Regulating Green Buildings.
Wu, P., Low, S.P., 2010. Project management and green buildings: lessons from the rating systems. J. Prof. Issues Eng. Educ. Pract. 136 (2), 64–70.
Xiong, B., Lu, W., Skitmore, M., Chau, K., Ye, M., 2016. Virtuous nexus between corporate social performance and financial performance: a study of construction enterprises in China. J. Clean. Prod. 129, 223–233.
Yang, G., Zhou, Y., 2010. Research on the government incentive of green buildings in China. In: Paper Presented at the 2010 International Conference on Management and Service Science.
Yau, Y., 2012. Eco-labels and willingness-to-pay: a Hong Kong study. Smart Sustain. Built Environ 1 (3), 277e290.
Yunna, W., Ruhang, X., 2013. Current status, future potentials and challenges of renewable energy development in Gansu province (Northwest China). Renew. Sustain. Energy Rev. 18, 73–86.