

Bond University
Research Repository



Comparison of sustainable community rating tools in Australia

Xia, Bo; Chen, Qing; Skitmore, Martin; Zuo, Jian; Li, Mei

Published in:
Journal of Cleaner Production

DOI:
[10.1016/j.jclepro.2015.08.016](https://doi.org/10.1016/j.jclepro.2015.08.016)

Licence:
CC BY-NC-ND

[Link to output in Bond University research repository.](#)

Recommended citation(APA):
Xia, B., Chen, Q., Skitmore, M., Zuo, J., & Li, M. (2015). Comparison of sustainable community rating tools in Australia. *Journal of Cleaner Production*, 109, 84-91. <https://doi.org/10.1016/j.jclepro.2015.08.016>

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

For more information, or if you believe that this document breaches copyright, please contact the Bond University research repository coordinator.

Comparison of sustainable community rating tools in Australia

Abstract

The community is the basic unit of urban development, and appropriate assessment tools are needed for communities to evaluate and facilitate decision making concerning sustainable community development and reduce the detrimental effects of urban community actions on the environment. Existing research into sustainable community rating tools focuses primarily on those that are internationally recognized to describe their advantages and future challenges. However, the differences between rating tools due to different regional conditions, situations and characteristics have yet to be addressed. In doing this, this paper examines three sustainable community rating tools in Australia, namely Green Star-Communities PILOT, EnviroDevelopment and VicUrban Sustainability Charter (Master Planned Community Assessment Tool). In order to identify their similarities, differences and advantages these are compared in terms of sustainability coverage, prerequisites, adaptation to locality, scoring and weighting, participation, presentation of results, and application process.

These results provide the stakeholders of sustainable community development projects with a better understanding of the available rating tools in Australia and assist with evaluation and decision making.

Key words: sustainable community; rating tool; assessment; comparison

1 Introduction

Sustainability aims to meet the needs of the world's current population without compromising the needs of future generations (WCED, 1987) and has gained momentum since the World Commission on Environment and Development (WCED) in 1987. Since the Rio Earth Summit of 1992, the concept of sustainability has been very much concerned with the public agenda in pursuing less pollution, resource efficiency, a more inclusive society, increased prosperity and better share of the economy (London Department of the Environment, 2000).

Many practical actions concerning sustainability occur at the community level, with overarching elements of economic, social and environmental considerations (Newman and Dale, 2005). The community is the basic unit of urban development as well as the unit of sustainability measurement. Sustainability development needs to be undertaken at the community level where the needs, understanding, awareness and aspirations of the local people and authorities in relation to sustainable development have to be considered and implemented (Yuan et al., 2003). In addition to the improvement of physical hardware in community construction, sustainable community development should also revitalize communities because of cultural, geographical and local product issues. A sustainable community also coordinates the economic factors and other elements of the natural environment and humanity issues such as housing, education, health, accessibility and arts (Hsueh and Yan, 2011).

Similar to the popular sustainable building rating tools, appropriate assessment tools are also needed for communities to evaluate sustainability, facilitate decision making concerning community development, and reduce the detrimental effects of urban communities on the environment (Jaeger et al., 2010). There is a diverse range of tools to assess building sustainability, including rating systems, LCA based tools, technical guidelines, assessment frameworks, checklists and certificates (Haapio, 2008; Khasreen et al., 2009; Haapio, 2012). But for sustainable community assessment, the current focus is only on developing assessment frameworks and tools (Haapio, 2010). These evaluate and rate the sustainability of a community against a set of themes, indicators and criteria, in order to identify the status of the community in approaching sustainability goals.

Some research has reviewed and compared internationally recognized sustainable community rating tools to clarify their advantages and future challenges. Haapio (2012), for example, compares BREEAM Communities, CASBEE for Urban Development and LEED for Neighbourhood Development. Sharifi and Murayama (2013) target including LEED-ND, EarthCraft Communities (ECC), BREEAM Communities, CASBEE-UD, HQE²R, Ecocity and SCR. It has been discovered that assessment tools with a broader planning perspective generally are better than others. This is because plan-embedded tools are more advantageous when focusing on specific objectives of assessment and coordinating the linkages between

the assessment system and various geographical contexts (Sharifi and Murayama, 2013). However, these studies do not cover sustainable community rating tools in Australia. In addition, existing research primarily focuses on the comparison of assessment tools of different countries. Rating tools at local levels have not been studied by previous researchers. As significant differences exist between regions in terms of urban conditions, quality of life, traditions, cultural heritage, attitudes, standards, and regulations, etc. (Diamantini and Zanon, 2000; Zhu and Lin, 2004), adaptation to the locality is also important for existing sustainable community rating tools to suit different local settings (Haapio, 2012; Sharifi and Murayama, 2013). Therefore, the examination of local sustainable community assessment tools in a particular country or region better supports stakeholders in decision-making and promotes sustainable development.

Therefore, this paper aims to review and compare the sustainable community rating tools used in Australia. After an extensive review of existing research relating to sustainable communities, it introduces a framework of analysis for comparing different rating tools. An outline of three Australian sustainable community-rating tools is then presented, followed by the results of the analysis and subsequent discussion. The paper concludes with its key findings and contribution to knowledge and practice.

2 Literature review

Sustainable community development aims to coordinate and integrate the economic, environmental, social and humanity elements of a community (Rogers and Ryan, 2001; Hamstead and Quinn, 2005; Hsueh and Yan, 2011). While different definitions of sustainable communities are available in government documents and academic research, the definition in the Communities Plan by the UK Government in 2003 is mostly quoted by researchers and practitioners. The Plan named *Sustainable Communities: Building for the future* defined sustainable communities as “*places where people want to live and work, now and in the future. They meet the diverse needs of existing and future residents, are sensitive to their environment, and contribute to a high quality of life. They are safe and inclusive, well planned, built and run and offer equality of opportunity and good services for all*” (ODPM, 2003). It indicates that sustainable community development is a participatory, holistic and inclusive process which considers economic vitality, ecological integrity, social equity and civic democracy (Rogers and Ryan, 2001; Hamstead and Quinn, 2005; Hsueh and Yan, 2011) (Kline, 1995; Hempel, 1999; Agyeman, 2005).

Existing studies of sustainable communities mainly focus on the outcomes of planning, design and construction. Energy efficiency is one of the most discussed topics, such as the design of energy programs for the academic and local community (Clark and Eisenberg, 2008); development of autonomous energy (Rae and Bradley, 2012); evaluation of low-carbon sustainable communities (Hsueh and Yan, 2011); public-private partnerships for clean and renewable energy system development (Clark and Woodrow, 2007); and technological applications for sustainable energy development (Mala et al., 2008; Schut et al., 2011). In

addition to local housing communities, there are also studies of the development of sustainable campuses by modifying and adapting existing sustainable community indicators (Saadatian et al., 2012).

Technological solutions have been to facilitate the physical processes of sustainable community development (Churchill and Baetz, 1999). However, it has been argued that these are dependent on the psychological response of the end-users (Schweizer-Ries, 2008). A participatory approach therefore has been carried out for sustainable community regeneration and development (Greig et al., 2004; Valencia-Sandoval et al., 2010; Deakin, 2012). The social context, which is equally challenging in sustainable community development, is believed to play a critical role in resident interactions and mutual support (Cheung and Leung, 2011), but this has been largely overlooked to date and more research is needed in this respect (Newton et al., 2012; Zuo et al., 2012).

Existing research in sustainable communities has been mostly driven by government policies, with the decision-making process of the government for community sustainability being studied in terms of police-making (Ko et al., 2012), land purchase (Pillai, 2010), historic housing neighbourhood development (Akkar Ercan, 2011), sustainable low-income and less-developed communities (Rogers and Ryan, 2001; Ha, 2007, 2008). Sustainable community development is also driven and assessed by various rating tools in different countries and regions around the world. These include BREEAM and CEEQUAL in the UK, LEED in the USA, India, Chile and Emirates, and GBI in Malaysia (Sinclair Knight Merz, 2011). These are well-known rating tools for sustainable communities around the world. They may also be developed locally to suit specific situations in certain countries or regions. In Australia, several sustainable community rating tools, such as Green Star-Communities PILOT, EnviroDevelopment and VicUrban Sustainability Charter, are also available nationwide or at the state level. However, there has been little research investigating and comparing different rating tools in individual countries or regions.

Existing research has placed considerable emphasis on sustainable community delivery. However, there is a lack of knowledge concerning the sustainable community rating tools that are used to evaluate real life practices and assist stakeholders in their decision-making. Considering the importance of sustainable community development and emerging local sustainable community assessment tools, this paper reports a study that reviews and compares existing rating tools in Australia.

3 Research method

The aim is to investigate and compare selected sustainable community rating tools in Australia, including Green Star-Communities PILOT, EnviroDevelopment and VicUrban Sustainability Charter. A content analysis of relevant documents, such as manuals, instructions and guidelines of each tool, was employed to review how existing rating tools evaluate sustainable communities in Australia. Content analysis is an observational research method, which helps code unstructured data into different themes in a systematic way (Kolbe and Burnett, 1991; Fellows and Liu, 2008; Nayak and Taylor, 2009; Krippendorff, 2012).

In Sharifi and Murayama's (2013) study, a framework of analysis concerning sustainability coverage, inclusion of pre-requisites, adaptation to locality, scoring and weighting, participation, presentation of results, and applicability was applied to investigate seven internationally well-known neighbourhood sustainability assessment tools and measure their success in rating sustainable development. A similar analysis framework was used in this research. The application process instead of applicability was used for comparison as this is the usual approach by practitioners. This involves:

- Sustainability coverage: What are the major themes covered in the tools in assessing the sustainability of communities?
- Prerequisites: Are there any prerequisites specified by the tools for potential projects to be assessed?
- Adaptation to locality: Do the tools consider local backgrounds, situations, needs and priorities in their assessments?
- Scoring and weighting: How do the tools score and weigh different criteria in their assessments?
- Participation: How are different stakeholders involved during the development and operation of the tools?
- Presentation of results: How do the tools present the results of the assessments?
- Application process: What are the application processes involved in certification by the tools?

4 Outline of sustainable community rating tools in Australia

4.1 Green Star-Communities PILOT

The Green Building Council of Australia (GBCA) aims to drive green building practices and develop a sustainable property industry in Australia. A variety of rating tools for building projects (e.g. office, residential, industrial, etc.) have been developed by the GBCA to promote sustainability within Australia's built environment. They evaluate the environmental design and construction of buildings in terms of Management, Indoor Environment Quality, Energy, Transport, Water, Materials, Land Use and Ecology, Emissions and Innovation.

Released as the pilot version in June 2012 by the GBCA, the Green Star-Communities rating tool is one of the world's first independent national schemes to evaluate and certify the sustainability of community development projects. It is a voluntary rating tool that provides best practice benchmarks and aims at creating more sustainable and liveable communities. The tool was developed in collaboration with the government, public and private sector developers, professional services organizations, manufacturers and academia. In contrast with the nine categories of criteria used in the various Green Star-Design and Green Star-As Built rating tools, the Green Star-Communities rating tool focuses on five themes (see Table 1), which prioritize environmental sustainability including minimization of energy and water consumption and reduction of dependence on motor vehicles. Broader issues relating to economic and social sustainability, such as economic prosperity, liveability and community health and wellbeing, are also assessed.

4.2 EnviroDevelopment

EnviroDevelopment was launched in public in October 2006. It aims at improving sustainability throughout the project development process and across all development types including residential, retail, commercial, industrial, and mixed-use developments. It is a branding system designed for purchasers to better recognize and select more environmentally sustainable properties and lifestyles. It has also enabled developers, industry professionals and government to better understand sustainable development and pursue sustainability credentials of a development. A broad spectrum of environmental and sustainability elements, including ecosystems, waste, energy, materials, water and community are covered by the rating tool. As one of the assessment issues, the community element focuses on the social aspect of sustainability, which encourages promotion of social capital and community spirit, provision of sustainable local facilities, reduction of private motor vehicle usage and improved community design to meet people’s diversified and changing needs with an increased sense of safety, security and flexibility.

4.3 VicUrban Sustainability Charter (Master Planned Community Assessment Tool)

VicUrban is the Victorian Government’s sustainable urban development agency. The VicUrban Sustainability Charter was created by VicUrban in 2004 to guide its approach in sustainable design and retrofit of precincts and communities in Victoria. It involves key stakeholders from the government, industry and peak bodies to review, comment and refine the performance measures of the sustainable community rating tool. Edition 1 of the VicUrban Sustainability Charter was launched in February 2007 and it has evolved to the Master Planned Communities assessment tool after being road tested by VicUrban and industry. Another two tools, including the Urban Renewal and Provincial Community assessment tools, are currently being tested.

Basic information of the three sustainable community rating tools is summarized in Table 1.

Table 1: Summary of the sustainable community rating tools

| Tools | Green Star-Communities PILOT | EnviroDevelopment | VicUrban Sustainability Charter (Master Planned Community Assessment Tool) |
|------------------|---|--|--|
| Development date | June 2012 | October 2006 | February 2007 |
| Level | National level | National and State level | State level |
| Themes | <ul style="list-style-type: none"> • Governance • Design • Liveability • Economic prosperity • Environment • Innovation | <ul style="list-style-type: none"> • Essential actions • Community consultation, planning and development • On-going community engagement and governance • Transport • Place making • Community prosperity | <ul style="list-style-type: none"> • Commercial success • Housing affordability • Urban design excellence • Community well-being • Environmental leadership |

| | | | |
|---------|---|--|--|
| | | <ul style="list-style-type: none"> • Local facilities • Safe and accessible communities • Indoor environment quality | |
| Ratings | <ul style="list-style-type: none"> • 4 Star (45-59) Best Practice • 5 Star (60-74) Australian Excellence • 6 Star (75+) World Leadership | A certification logo for a development meeting the standards for all or any combination of the six key elements, namely ecosystems, waste, energy, materials, water and community. | A minimum score of 60 points is the target to be achieved for each assessment theme. |

5 Results

5.1 Sustainability coverage

The sustainability coverage of the rating tools indicates the emphasis of each tool in measuring sustainable community development. Table 2 lists the themes of measurement addressed by the tools and the percentages of the indicators under each theme. Because of the maximum points available as weighting coefficients for the indicators, the percentage distributions of the indicators are presented not only in terms of frequency, but also maximum points achievable.

Except for the VicUrban Sustainability Charter which assigns equal points to each theme, the other two rating tools are both consistent in the ranking of percentages of frequency and maximum achievable points. However, the three tools attach importance to different aspects of sustainability. For example, 29% of the total number of indicators of Green Star-Communities PILOT is allocated for “Environment”, which also dominates 24% of the maximum achievable points. For EnviroDevelopment, “Transport” and “Local facilities” occupy 50% of the total maximum achievable points and 45% of the indicators are related to the two themes. Although the five themes of VicUrban Sustainability Charter receive equal achievable points, “Urban design excellence” is assigned 31% of the total number of indicators, higher than any other themes in the rating tool.

Table 2: Frequency of indicators and maximum points achievable for each theme in each sustainable community rating tool

| Tools | Percentage of the frequency of indicators in each theme | Percentage of the maximum points achievable for each theme |
|------------------------------|--|---|
| Green Star-Communities PILOT | Governance: 18% Design: 11% Liveability: 18% Economic prosperity: 21% Environment: 29% Innovation: 3% | Governance: 19% Design: 10% Liveability: 21% Economic prosperity: 17% Environment: 24% Innovation: 9% |
| EnviroDevelopment | Essential actions: 9% Community consultation, planning and development: 4% On-going community engagement and governance: 10% Transport: 22% | Essential actions: 10% Community consultation, planning and development: 4% On-going community engagement and governance: 11% Transport: 25% |

| | | |
|--|---|---|
| | Place making: 19% Community prosperity: 1% Local facilities: 23% Safe and accessible communities: 4% Indoor environment quality: 8% | Place making: 15% Community prosperity: 1% Local facilities: 25% Safe and accessible communities: 3% Indoor environment quality: 6% |
| VicUrban Sustainability Charter (Master Planned Community Assessment Tool) | Commercial success: 12.5% Housing affordability: 12.5% Urban design excellence: 31% Community well-being: 19% Environmental leadership: 25% | Commercial success: 20% Housing affordability: 20% Urban design excellence: 20% Community well-being: 20% Environmental leadership: 20% |

5.2 Prerequisites

With the criteria in place to assess sustainable community, there are also prerequisites needed for the rating tools to evaluate a certain community development project, in order to ensure that the minimum sustainability requirements are satisfied.

Mandatory requirements need to be met and a minimum total points have to be acquired if a community development project is to receive a certified rating through Green Star-Communities PILOT. A minimum of 15%, 25% or 35% of the available points in each theme (excluding Innovation) must be achieved when seeking a 4, 5, or 6 Green Star rating respectively. A minimum total of 45 points also has to be achieved for certification. Projects with an overall score of less than 45 points can only obtain 1, 2 or 3 Stars, which are not eligible for certified ratings.

For EnviroDevelopment, there is a technical standard outlining assessment criteria with the requirement for achieving a minimum number of indicators for certain criteria. In addition, projects are categorized into five types as follows:

- Category 1 Development (C1): a development where the primary use is residential with a density of less than 30 dwellings per hectare;
- Category 2 Development (C2): a development where the primary use is residential with a density of at least 30 dwellings per hectare;
- Category 3 Development (C3): a mixed use development;
- Category 4 Development (C4): a development where the primary use is commercial or retail;
- Category 5 Development (C5): a development where the primary use is industrial.

Specific requirements for each development type are outlined in the assessment indicators. EnviroDevelopment investigates six sustainability elements including ecosystems, waste, energy, materials, water and community. If a development is applying for certification for less than six elements, a developer must also meet a list of essential requirements and provide sufficient supporting documentation as shown in Table 3.

Table 3: Essential requirements for a project applying for less than six sustainability elements of EnviroDevelopment (Urban Development Institute of Australia, 2014)

| Criteria | Supporting documentation requirement |
|----------|--------------------------------------|
|----------|--------------------------------------|

| | |
|---|---|
| <p>(a) Conduct a thorough <i>Ecological Assessment</i> and site analysis, prior to planning and design phase using an <i>appropriately qualified professional</i> to identify areas of prime significance for conservation and to identify areas where clearing and/or major earthworks should specifically not occur. The <i>development</i> must adequately consider and preserve significant areas based on the advice of this report.</p> | <p>Evidence of Ecological Assessment and site analysis e.g. a report and statement from developer. A landscape plan to demonstrate that a landscaping strategy is sympathetic to the site and development type.</p> |
| <p>(b) Install effective sediment and erosion control measures during construction and operation. As a minimum, these should comply with all Federal, State and Local legislative and regulatory requirements.</p> | <p>Evidence of appropriate sediment control and storm water management plans during and after construction e.g. erosion and sediment control plan.</p> |
| <p>(c) Recycle and reuse all vegetative debris on site (e.g. for landscaping or composting purposes) to the greatest extent possible. If not feasible, arrangements should be made for vegetative debris to be transported for reuse or disposal at a fully licensed recycler or reprocessor. There should be no pit burning of green waste on site.</p> | <p><i>Statement of Compliance</i> from developer. If transporting offsite for reuse or disposal, details of the licensed recycler or reprocessor should be provided.</p> |
| <p>(d) Demonstrate assessment of solar orientation of lots/buildings options to provide best practice solar access opportunities.</p> | <p>Provide evidence that lot layouts and building orientations are providing optimal solar orientation within the constraints of the site.</p> |
| <p>(e) Demonstrate how the <i>development</i> will reduce greenhouse gas production beyond regulatory requirements.</p> | <p><i>Statement of Compliance</i> from the developer and architect and copy of <i>Design Guidelines</i>.</p> |
| <p>(f) Demonstrate use of local manufacturers and/or suppliers, or utilise the most economical method of transportation with regard to fossil fuels.</p> | <p><i>Statement of Compliance</i> from developer outlining how local materials and suppliers have been considered. Evidence should also be provided demonstrating that the developer has engaged local labour and/or subcontractors on a permanent basis.</p> |
| <p>(g) Demonstrate how the <i>development</i> will reduce irrigation and <i>potable water</i> consumption.</p> | <p>Irrigation plan and statement from landscape architect and developer regarding irrigation methods.</p> |
| <p>(h) Provide evidence that community consultation and feedback informs design.</p> | <p><i>Statement of Compliance</i> from the developer and evidence of consultation documents e.g. evidence of public meeting/s, evidence of letter drop, evidence of liaison with traditional owners.</p> |

The Master Planned Community Assessment Tool does not have any specific mandatory criteria. The only prerequisite is that the tool is used to measure planned sustainability for a community comprising more than 500 homes and some elements of mixed use.

5.3 Adaptation to locality

A comparison of the three sustainable community rating tools for adaptation to the locality can identify the differences of the tools in considering the situations and priorities of different local regions in assessing sustainability.

In Green Star-Communities PILOT, there are several indicators available for projects to acquire credits for addressing local needs and problems. For example, “Climate Adaptation” and “Community Resilience” evaluate the ability of the local community in adapting to changing climate and responding to disasters. “Local food production” assesses the community’s accessibility to local fresh food. “Adaptive re-use” investigates how the community reuses cultural heritage buildings for local purposes. “Minimum Requirement-Net Percentage Increase of Local Jobs” and “Local Area Employment” take into account the importance of local employment in sustainable communities. “Wireless local area network” focuses on the availability of wireless network in a local community. In addition to these indicators, there is also “Site Sensitivity” as a conditional requirement.

In EnviroDevelopment, assessment criteria are tailored to different community development categories as discussed in Section 5.2. Local adaptation is also demonstrated in the indicators for the community element. For example, “sponsor, facilitate and/or provide local community groups/ events”, “involve local trainees in construction activities”, “engage with local environmental groups/ catchment organizations for on-going community-based environmental restoration and maintenance activities”, and “local facilities”.

For the Master Planned Community Assessment Tool, adaptation to the locality can also be identified from its indicators, such as “plan for a mix of lots and housing types in response to local needs/ demands”, “proportion of land lots that are costed in the lowest quartile of the local market”, “demographic and needs analysis completed (regional and local)”, “plan for mixed use to maximize opportunities for local economic development”, “support specific local/ regional economic development initiatives, adding value by optimising local employment opportunities”, “connect to local employment opportunities through the planning and provision of cycle, pedestrian and public transport links”.

5.4 Scoring and weighting

Both the Green Star-Communities PILOT and Master Planned Community Assessment Tool develop target benchmarks for each assessment criterion, and points are awarded based on the comparison between actual project sustainability and targeted benchmarks. There is a maximum available score for each criterion, indicating differences in the weighting of different criteria. Both tools require a minimum score to qualify for a formal certification.

In contrast with these rating tools, EnviroDevelopment assigns one credit to each criterion unless otherwise specified. The criteria are provided in a descriptive way and points can be awarded once the requirements are met and supporting documents and evidence are provided. A project can be certified when all the criteria are satisfied.

5.5 Participation

The development of all three sustainable community rating tools has involved a broad range of stakeholders from industry, government and academia. They have contributed to drafting, reviewing and refining the measurement and criteria for sustainable community development.

5.6 Presentation of results

The Green Star-Communities PILOT provides the results of assessment in different rating categories according to the total score acquired. Projects scored between 45 and 59 can be rated as 4 Star (Best Practice). A project with a total score of 60-74 is rated as 5 Star (Australian Excellence). If a total score of 75 or over is awarded to a project, it can qualify for the 6 Star (World Leadership).

For EnviroDevelopment, a project meeting the requirements of all or any of the elements would be eligible for appropriate recognition as an EnviroDevelopment. A certified development can display the logo with icons in the “leaves” representing relevant certified elements.

The Master Planned Community Assessment Tool does not specify different categories of ratings. Instead, a minimum score of 60 points is expected to be achieved for each assessment theme, so that a project can be appropriately certified.

5.7 Application process

The “application process” is concerned with the processes involved in obtaining certification by the three rating tools. For the Green Star- Communities PILOT, a self-assessment is usually conducted first for a predicted rating. GBCA offers a formal certification process for ratings of 4 Stars and above. An independent third party review of points claimed is provided by GBCA to ensure that the achievement of all points can be made by supplying necessary documentary evidence.

Developers intending to have their projects certified by EnviroDevelopment need to submit their applications to the Urban Development Institute of Australia (UDIA). The applications will be reviewed by the EnviroDevelopment Board of Management. After further information and questions are sought and clarified, a site visit is undertaken by EnviroDevelopment Board of Management representatives. A developer satisfying all the necessary requirements signs a license agreement that is valid for 12 months and may be renewed afterwards. If the application is submitted prior the development approval process being completed, a provisional license is granted if successful. The provisional license is subject to the final development approval.

Similar to EnviroDevelopment, the certification by VicUrban Sustainability Charter is also depends on the decision made by the Project Review Panel (PRP).

6 Discussions

Currently, sustainable community rating tools are primarily developed and discussed at a global scale. It has been increasingly recognized that sustainability needs to be applied at the regional level in order to better achieve sustainability goals (Graymore et al., 2008). This paper reviews and compares three sustainable community rating tools in Australia in terms of their design, condition, content, development and application. The results are expected to provide industry stakeholders with a better understanding of the tools to assist with decision-making and encourage involvement in sustainable community development.

Although the three rating tools all evaluate the sustainability of community development projects, they focus on different aspects of sustainability measurement. The Green Star-Communities PILOT emphasizes environmental issues. EnviroDevelopment is concerned more with social themes such as transportation and local facilities. The Master Planned Community Assessment Tool prioritises the urban design theme for assessment. Unlike Green Star-Communities PILOT and EnviroDevelopment, which attach different importance to the assessment themes of both frequency of indicators and maximum achievable points, the Master Planned Community Assessment Tool assigns equal maximum points to each theme but with different numbers of indicators.

Mandatory prerequisites are required for both Green Star-Communities PILOT and EnviroDevelopment. Projects need to obtain at least 45 total points and a minimum of 15%, 25% or 35% of the available points in each theme (excluding Innovation) to be formally certified by Green Star. For EnviroDevelopment, projects need to achieve minimum points for each criterion as listed in the technical standard. Projects are also categorized into different types with specific requirements for each type. Essential requirements are also available for developers who do not apply for the certification of all six elements. The Master Planned Community Assessment Tool does not highlight any mandatory requirements before a project can be properly certified. It states that it is only used to measure the planned sustainability of a community comprising more than 500 homes and some elements of mixed use. This may result in an increased number of invalid applications. Relevant prerequisites are highlighted in a technical brochure to inform all potential applicants.

Adaptation to the locality is well demonstrated in all three rating tools. Provision of local services and facilities is a common involved in all the tools. In addition, local employment is evident in the indicators of both Green Star-Communities PILOT and Master Planned Community Assessment Tool.

Similar scoring methods are adopted for the Green Star-Communities PILOT and Master Planned Community Assessment Tool. Benchmarks are specified for each criterion with maximum available points provided. Actual project sustainability is compared with targeted benchmarks and points are awarded accordingly. In contrast with the two tools, EnviroDevelopment has descriptive requirements for each criterion without establishing benchmarks. Projects that meet the criteria and provide relevant documentary evidence are assessed as eligible for certification. It might be more advantageous for the rating tools to develop benchmarks for the criteria in order to enable potential community development projects to review and promote sustainability.

All three rating tools have performed well in engaging various stakeholders from industry, government and academia to draft, review and refine assessment criteria and measurement. As residents' satisfaction with community spaces, services and facilities significantly impact on overall community environment satisfaction and sustainability (Cho and Lee, 2011), their opinions concerning sustainable community development can also be taken into account in future updating of the rating tools.

The ways of presenting rating results are different across the three rating tools. Green Star-Communities PILOT recognizes three levels of certification namely 4 Star (Best Practice), 5 Star (Australian Excellence) and 6 Star (World Leadership), depending on the total number of points obtained. EnviroDevelopment authorizes the use of a logo with icons in the “leaves” representing relevant certified elements by eligible projects. The Master Planned Community Assessment Tool provides certification for projects that obtain at least 60 points on each assessment theme, but no categorized rating is specified. Compared to non-categorized rating, categorized rating can provide a more tangible way for a community project to identify the level sustainability and pursue appropriate certification based on a project’s actual situation and need.

The three rating tools all involve professional review panels to decide whether a project can be certified. In addition, the Green Star- Communities PILOT allows self-assessment before the formal certification process, which can increase the success rate of applications. An EnviroDevelopment certification is valid for 12 months after which it needs to be renewed. This approach encourages on-going monitoring and promotion of community sustainability.

An overall observation of the three rating tools indicates that they all are quite subjective, as the rating results largely depend on the opinions of assessors. This also applies in many internationally well-known sustainability rating tools. Industry standards with quantitative sustainability criteria are expected to be developed to serve as an important supplement to the current assessment framework or prerequisite for qualifying to be assessed. In addition, the method of obtaining an assessment result by adding up all points to get a total score lacks robustness. This is especially a problem with the Green Star-Communities PILOT and Master Planned Community Assessment Tool. It is difficult balance the sustainability of projects across various criteria as only the total score determines the final rating. In addition to having maximum achievable points for every criterion, minimum required points could also be introduced to ensure overall project sustainability.

7 Conclusions

This paper examines three Australian sustainable community rating tools, including Green Star-Communities PILOT, EnviroDevelopment and VicUrban Sustainability Charter (Master Planned Community Assessment Tool) for their assessment of sustainable community development projects. An overall review of sustainability coverage, prerequisites, adaptation to locality, scoring and weighting, participation, presentation of results and application process of the three rating tools was conducted, and comparisons made in terms of differences and advantages. The key findings are:

- Green Star-Communities PILOT, EnviroDevelopment and Master Planned Community Assessment Tool each emphasise different aspects in measuring sustainability. They focus on environmental issues, social issues and design issues respectively.
- Mandatory prerequisites are highlighted in both Green Star-Communities PILOT and EnviroDevelopment but not Master Planned Community Assessment Tool. It is

recommended that these prerequisites be clearly communicated to reduce the number of invalid applications.

- All three rating tools specify criteria regarding adaptation to the locality. Local services, facilities and employment are issues that are most investigated.
- In contrast with EnviroDevelopment, both the Green Star-Communities PILOT and Master Planned Community Assessment Tool establish benchmarks for the criteria and award points based on a comparison between actual project sustainability and benchmarks. This can facilitate potential certified projects to review and refine their sustainability.
- All three rating tools engage stakeholders from industry, government and academia in drafting, reviewing and refining assessment criteria and measurement for sustainable communities. It is suggested that residents' opinions are included in this process in the future.
- The three rating tools each present the assessment results differently. However, compared with non-categorized ratings, categorized ratings are generally more advantageous as they make it easier for developers to recognize project situations and sustainability levels and pursue appropriate certification.
- Professional review panels are engaged in all the three rating tools to decide on project certification. Self-assessment as practiced in Green Star-Communities PILOT can increase the success rate of applications. A certification with a limited valid period as is conducted in EnviroDevelopment is an effective way to encourage an on-going review and improvement in project sustainability.
- The three tools are all quite subjective. Industry standards with quantitative sustainability criteria are expected to be developed to supplement the current assessment framework or serve as prerequisites for being assessed.
- The method of obtaining an assessment result by summing all points to a total score can make it difficult to balance project sustainability across various criteria. A minimum number of required points for each assessment criterion could be introduced to ensure overall project sustainability.

This paper provides stakeholders of community development projects with an overview of the popular sustainable community rating tools in Australia. The findings will enable practitioners to identify and target the standards of rating tools that best suit their situation and needs. The results also provide an improved understanding of the different attributes of the rating tools that will enable each to learn from the others of the benefits involved and point towards possible future improvements in design and application.

References

- AGYEMAN, J. 2005. *Sustainable communities and the challenge of environmental justice*, New York University Press New York.
- AKKAR ERCAN, M. 2011. Challenges and conflicts in achieving sustainable communities in historic neighbourhoods of Istanbul. *Habitat International*, 35(2), 295-306.
- CHEUNG, C.-K. & LEUNG, K.-K. 2011. Neighborhood homogeneity and cohesion in sustainable community development. *Habitat International*, 35(4), 564-572.

- CHO, S. H. & LEE, T. K. 2011. A study on building sustainable communities in high-rise and high-density apartments—Focused on living program. *Building and Environment*, 46(7), 1428-1435.
- CHURCHILL, C. J. & BAETZ, B. W. 1999. Development of decision support system for sustainable community design. *Journal of Urban Planning and Development*, 125(1), 17-35.
- CLARK, I. & WOODROW, W. 2007. Partnerships in creating agile sustainable development communities. *Journal of Cleaner Production*, 15(3), 294-302.
- CLARK II, W. W. & EISENBERG, L. 2008. Agile sustainable communities: On-site renewable energy generation. *Utilities Policy*, 16(4), 262-274.
- DEAKIN, M. 2012. The case for socially inclusive visioning in the community-based approach to sustainable urban regeneration. *Sustainable Cities and Society*, 313-23.
- DIAMANTINI, C. & ZANON, B. 2000. Planning the urban sustainable development The case of the plan for the province of Trento, Italy. *Environmental impact assessment review*, 20(3), 299-310.
- FELLOWS, R. & LIU, A. 2008. *Research Methods for Construction (3rd ed.)*, Oxford, Malden, MA, Wiley-Blackwell.
- GRAYMORE, M. L. M., SIPE, N. G. & RICKSON, R. E. 2008. Regional sustainability: How useful are current tools of sustainability assessment at the regional scale? *Ecological Economics*, 67(3), 362-372.
- GREIG, S., PARRY, N. & RIMMINGTON, B. 2004. Promoting sustainable regeneration: learning from a case study in participatory HIA. *Environmental Impact Assessment Review*, 24(2), 255-267.
- HA, S.-K. 2007. Housing regeneration and building sustainable low-income communities in Korea. *Habitat International*, 31(1), 116-129.
- HA, S.-K. 2008. Social housing estates and sustainable community development in South Korea. *Habitat International*, 32(3), 349-363.
- HAAPIO, A. 2008. *Environmental assessment of buildings*, Helsinki, Teknillinen korkeakoulu.
- HAAPIO, A. The role of building environmental assessment tools. In: JORDAN, S., ed. ENBRI LCA Workshop. ZAG. 21st-22nd Jun 2010, 2010 Ljubljana, Slovenia. 5-10.
- HAAPIO, A. 2012. Towards sustainable urban communities. *Environmental Impact Assessment Review*, 32(1), 165-169.
- HAMSTEAD, M. P. & QUINN, M. S. 2005. Sustainable community development and ecological economics: theoretical convergence and practical implications. *Local Environment*, 10(2), 141-158.
- HEMPEL, L. C. 1999. Conceptual and analytical challenges in building sustainable communities. *Toward sustainable communities: Transition and transformations in environmental policy*, 43-74.
- HSUEH, S.-L. & YAN, M.-R. 2011. Enhancing Sustainable Community Developments A Multi-criteria Evaluation Model for Energy Efficient Project Selection. *Energy Procedia*, 5(0), 135-144.
- JAEGER, J. A., BERTILLER, R., SCHWICK, C. & KIENAST, F. 2010. Suitability criteria for measures of urban sprawl. *Ecological Indicators*, 10(2), 397-406.
- KHASREEN, M. M., BANFILL, P. F. & MENZIES, G. F. 2009. Life-cycle assessment and the environmental impact of buildings: a review. *Sustainability*, 1(3), 674-701.
- KLINE, E. 1995. Sustainable community indicators report. Medford, MA: Consortium for Regional Sustainability, Tufts University.
- KO, J.-Y., DAY, J. W., LANE, R. L., HUNTER, R., SABINS, D., PINTADO, K. L. & FRANKLIN, J. 2012. Policy adoption of ecosystem services for a sustainable community: A case study of wetland assimilation using natural wetlands in Breaux Bridge, Louisiana. *Ecological Engineering*, 38(1), 114-118.
- KOLBE, R. H. & BURNETT, M. S. 1991. Content-analysis research: an examination of applications with directives for improving research reliability and objectivity. *Journal of Consumer Research*, 243-250.

- KRIPPENDORFF, K. 2012. *Content analysis: An introduction to its methodology*, Sage, Thousand Oaks, Calif.
- LONDON DEPARTMENT OF THE ENVIRONMENT, T. A. T. R. 2000. Building a Better Quality of Life: A strategy for more Sustainable Construction. *In*: DEPARTMENT OF THE ENVIRONMENT, T. A. T. R. L. (ed.). London: DETR.
- MALA, K., SCHLÄPFER, A. & PRYOR, T. 2008. Solar photovoltaic (PV) on atolls: Sustainable development of rural and remote communities in Kiribati. *Renewable and Sustainable Energy Reviews*, 12(5), 1345-1363.
- NAYAK, N. V. & TAYLOR, J. E. 2009. Offshore outsourcing in global design networks. *Journal of Management in Engineering*, 25(4), 177-184.
- NEWMAN, L. & DALE, A. 2005. The role of agency in sustainable local community development. *Local Environment*, 10(5), 477-486.
- NEWTON, J., FRANKLIN, A., MIDDLETON, J. & MARSDEN, T. 2012. (Re-) negotiating access: The politics of researching skills and knowledge for 'sustainable communities'. *Geoforum*.
- ODPM 2003. Sustainable communities: building for the future. UK: The Office of the Deputy Prime Minister.
- PILLAI, A. 2010. Sustainable rural communities? A legal perspective on the community right to buy. *Land Use Policy*, 27(3), 898-905.
- RAE, C. & BRADLEY, F. 2012. Energy autonomy in sustainable communities—A review of key issues. *Renewable and Sustainable Energy Reviews*, 16(9), 6497-6506.
- ROGERS, M. & RYAN, R. 2001. The triple bottom line for sustainable community development. *Local Environment*, 6(3), 279-289.
- SAADATIAN, O., SOPIAN, K. B. & SALLEH, E. 2012. Adaptation of sustainability community indicators for Malaysian campuses as small cities. *Sustainable Cities and Society*.
- SCHUT, M., VAN PAASSEN, A., LEEUWIS, C., BOS, S., LEONARDO, W. & LERNER, A. 2011. Space for innovation for sustainable community-based biofuel production and use: lessons learned for policy from Nhambita community, Mozambique. *Energy Policy*, 39(9), 5116-5128.
- SCHWEIZER-RIES, P. 2008. Energy sustainable communities: Environmental psychological investigations. *Energy Policy*, 36(11), 4126-4135.
- SHARIFI, A. & MURAYAMA, A. 2013. A critical review of seven selected neighborhood sustainability assessment tools. *Environmental Impact Assessment Review*, 38, 73-87.
- SINCLAIR KNIGHT MERZ 2011. Guide to Sustainability Rating Tools for Buildings and Infrastructure. Sinclair Knight Merz.
- URBAN DEVELOPMENT INSTITUTE OF AUSTRALIA 2014. EnviroDevelopment Technical Standards-National Version 1.0.
- VALENCIA-SANDOVAL, C., FLANDERS, D. N. & KOZAK, R. A. 2010. Participatory landscape planning and sustainable community development: Methodological observations from a case study in rural Mexico. *Landscape and Urban Planning*, 94(1), 63-70.
- WCED 1987. *Our Common Future*, Oxford, Oxford University Press.
- YUAN, W., JAMES, P., HODGSON, K., HUTCHINSON, S. M. & SHI, C. 2003. Development of sustainability indicators by communities in China: a case study of Chongming County, Shanghai. *Journal of Environmental Management*, 68(3), 253-261.
- ZHU, Y. & LIN, B. 2004. Sustainable housing and urban construction in China. *Energy and Buildings*, 36(12), 1287-1297.
- ZUO, J., JIN, X. H. & FLYNN, L. 2012. Social sustainability in construction- an explorative study. *International Journal of Construction Management*, 12(2), 51-63.