Environmental Rating Tools and Residential Land Development in Australia

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Abstract

Numerous environmental rating tools have developed around the world over the past decade or so, in an attempt to increase awareness of the impact buildings have on the environment. Whilst many of these tools can be applied across a variety of building types, the majority focus mainly on the commercial building sector. Only recently have some of the better known environmental rating tools become adaptable to the land development sector, where arguably the most visible environmental impacts are made. EnviroDevelopment is one such tool that enables rating of residential land development in Australia. This paper seeks to quantify the environmental benefits achieved by the environmental rating tool EnviroDevelopment, using data from its certified residential projects across Australia. This research will identify the environmental gains achieved in the residential land development sector that can be attributed to developers aspiring to gain certification under this rating tool.

Key words: Residential land development, sustainability, environmental rating tool

1. Introduction

The purpose of this research is to identify the environmental gains that have been achieved in the residential land development sector attributable to sector specific rating tools. The need for sustainable urban growth has been acknowledged since the 1970's (Bryant and Eves, 2012, Xiaoping et al., 2009), with momentum increasing dramatically just in the last decade. Most developed countries have now introduced sustainability elements into their construction legislation and industry has developed a number of sustainability assessment and rating tools, such as LEED (Leadership in Energy and Environmental Design) in the United States, BREEAM (Building Research Establishment Environmental Assessment Method) in the United Kingdom, SBTool (Sustainable Building Tool) in Canada, CASBEE (Comprehensive Assessment System for Built Environment Efficiency) in Japan, ESGB (Evaluation Standard for Green Building) in China, BCA-GM (Building and Construction Authority – Green Mark) in Singapore and Green Star and NABERS (National Australian Built Environment Rating System) in Australia just to name a few (Ding, 2007, Reed et al., 2011, Xiaoping et al., 2009)[i]. As an indication of the explosion in the green building movement, the World Green Building Council lists 92 member countries (World Green Building Council, 2012).

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However the focus of much of this work has been on buildings, and particularly commercial buildings, given their large environmental footprint and high energy consumption due to their reliance on air conditioning and heating (Reed et al., 2009). Building impacts on the environment are reported to include 55 per cent of timber consumption, 27 per cent of plastics use, 12 per cent of iron and steel applications, 30 per cent of raw material consumption, 40 per cent of atmospheric pollution, 25 per cent of solid waste, 24 per cent of all water use, 20 per cent of effluent, substantial indoor air quality issues, 37 per cent of all energy, and 68 per cent of all electricity use (Bryant and Eves, 2012).

Whilst the statistics for buildings are alarming, the impacts of land clearing for development and the exacerbation of urban sprawl has not gained the same level of industry attention and self regulation. Development approval authorities administer the relevant Local, State and Federal environmental legislation, with little incentive for developers to outperform these minimum standards.

As indicated previously, there is a plethora of sustainability rating tools, and associated organisations promoting them. Xiaoping (2009) identifies three main purposes of environmental rating tools: *"(1) assessing the performance of the outcomes of the sustainable construction, (2) guiding the entire process of the sustainable construction to reach the three pillars of sustainability (economic growth, ecological balance, social progress and equity), (3) accelerating the evolution and transformation of the traditional construction industry."* (Xiaoping et al., 2009) Other objectives of green rating tools include: establishment of a common language; setting of a standard of measurement for green buildings; promotion of integrated, whole of building design; recognition of environmental leadership; identification of building life-cycle impacts; and the raising of awareness of green building benefits (Green Building Council of Australia (GBCA), 2012).

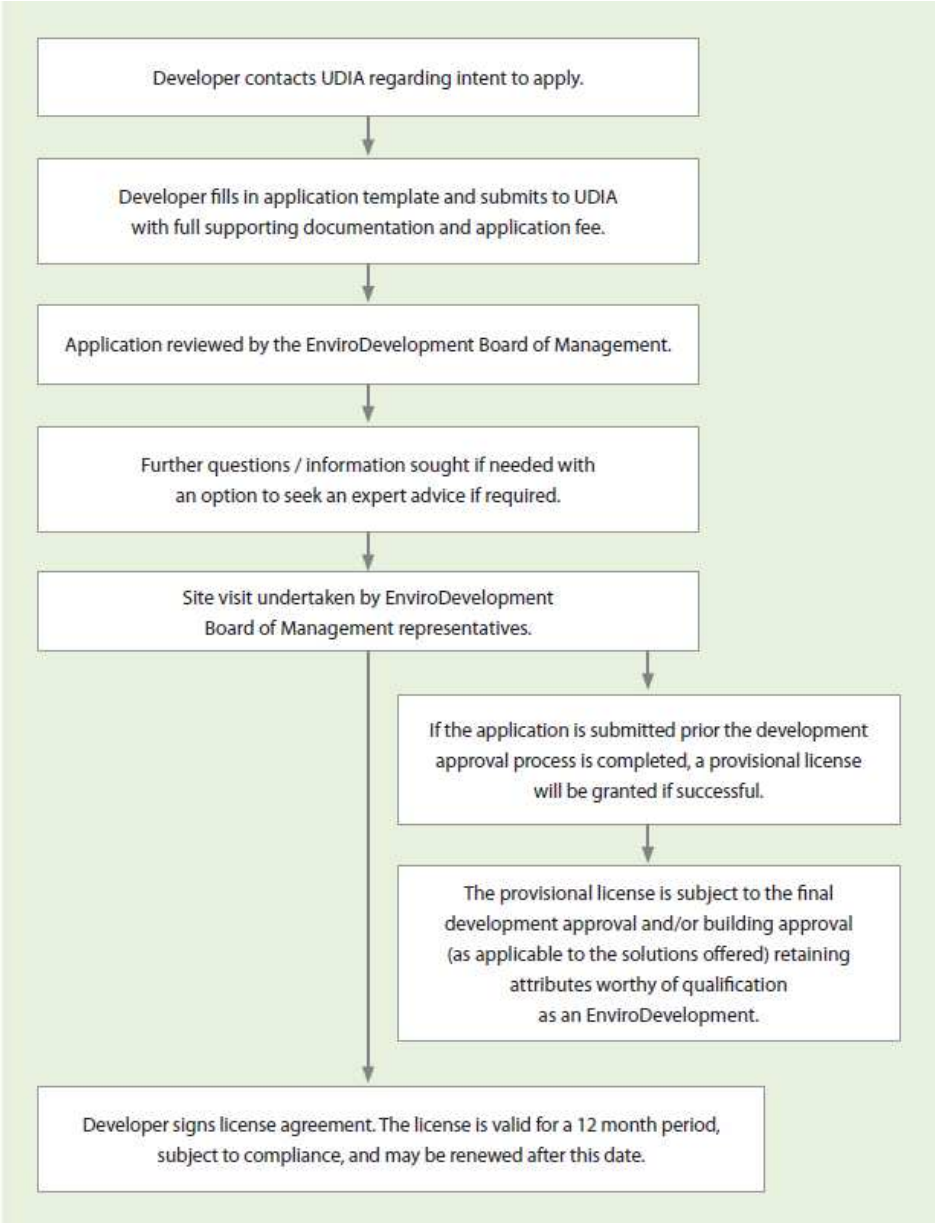
The purpose of this research is to identify if rating tools have a positive effect in achieving environmental outcomes, quantify the environmental benefits achieved by the environmental, using data from rating tool "EnviroDevelopment" and its first 50 certified projects across Australia. This research will identify the environmental gains achieved in the residential land development sector that can be attributed to developers aspiring to gain certification under this rating tool.

1.1 What is EnviroDevelopment

EnviroDevelopment is an industry generated, independent, national, sustainability accreditation scheme. Its purpose is to provide an incentive and recognition for an increase in the sustainability of property developments in excess of regulation, across a range of environmental and community aspects (EnviroDevelopment, 2011). The sustainability of a project is assessed across six elements: Water, Energy, Ecosystems, Community, Materials and Waste (Musgrave, 2010, EnviroDevelopment, 2012). For a project to obtain accreditation it must comply with the EnviroDevelopment Technical Standards National Version 1.0 which set sustainability criteria in each element that exceed minimum regulatory standards, as well as all Federal, State and Local legislative and regulatory requirements (EnviroDevelopment, 2011).

EnviroDevelopment's national standards can be applied across a range of property sectors including: commercial, industrial, retail, low and medium density residential and mixed use (EnviroDevelopment, 2012). Since its inception in 2006, EnviroDevelopment has accredited over 50 projects across a range of development types. The focus of this research is on the residential development sector.

The process by which developers apply for this rating tool is indicated in Figure 1 below.



Source: EnviroDevelopment National Technical Standards

Figure 1: EnviroDevelopment Certification Process Guidelines

It is appropriate to note that Green Star released a pilot Communities rating tool in Australia on 14 June 2012 (Green Building Council of Australia (GBCA), 2012). This rating tool assesses the sustainability performance of a project's planning, design and construction outcomes against six categories: governance, design, liveability, economic prosperity,

environment, and innovation. As at the time of writing, no accreditations have been made under the Green Star Communities rating tool.

1.2 Structure

This paper is arranged in the following sequence: this initial section has presented the background to the research problem and the EnviroDevelopment rating tool. The following section outlines the relevant literature associated with sustainable development. The third and fourth sections detail the methodology and findings respectively. The final section concludes and provides recommendations for future research.

2. Literature

The proliferation of rating tools, both internationally and domestically and the variances in metrics used, has lead to significant confusion in this crowded market (Warren, 2009, Reed et al., 2011). In recent years, a number of comparative studies have been undertaken to compare and contrast the leading brand name environmental assessment and rating tools. Ding (2007) in her paper on sustainable construction compared some 20 different international and domestic environmental building performance assessment methods. She argues that the available tools do little to encourage more sustainable designs during the project inception stage. She proposes an alternative sustainability index approach to address the "inflexibility, complexity and lack of consideration of a weighting system" (Ding, 2007, p463) which incorporates multiple criteria decision making processes.

Xiaping et al. (2009) identify the similarities and differences in six international green rating tools in the context of comparison with the emerging Chinese rating tool ESGB. These authors note that many of the leading rating tool brands focus primarily on the environmental criteria of sustainability's "triple bottom line" however more could be done to enhance the economic sustainability (growth) and social sustainability (progress and equity) aspects of such rating tools. Each of the tools identified list Residential within their scope, however it is unclear if this refers to low or higher density built form housing, or the actual residential land development activity itself.

Reed et al. (2009) provide an international comparison of eleven country's rating tools against fifteen sustainability criteria for commercial buildings. They noted a lack of consistency and transparency with the tools that limited the ability for meaningful comparisons to be made between buildings in different countries. It was recommended that a set of common metrics be developed for all building types, however allowing for regional (climatic) variations.

Reed et al. (2011) provide an update of their earlier 2009 works, acknowledging the rapidly changing market in both available tools and buildings seeking (and achieving) accreditations. A comparison between the take up of BREEAM in Europe and Green Star in Australia is made, concluding that the Australian market rates highly in the delivery of sustainable buildings, albeit off a lower set of benchmarks.

Hurley and Horne (2006) provide an initial framework for the assessment of sustainability rating tools for the built environment, arguing that whilst a building is a neat unit of activity for owners and developers to rate the performance of, the broader urban form also extends to the spaces between buildings, trunk infrastructure services and transport networks. This paper is unique in that it provides an overview of emerging sustainability assessment tools that address the suburb or precinct scale, rather than at a building scale as per the previously discussed works.

Hurley (2009) moves closer again to the issue at hand in this research, addressing the sustainability assessment of urban fringe residential estates, acknowledging the dominance of this form of development in the Australian residential sector. He specifically compares VicUrban's Sustainable Community Rating Tool and EnviroDevelopment as the primary tools available in this sector. He concludes that more rigour is required in the assessment of such tools to ensure they achieve more than "sustainability rhetoric".

Given the focus of this research is residential development, Hurley's (2009) critique is the most relevant. A number of positive and negative features of these tools are identified. The positives include:

- A strong focus on the sustainability issues associated with residential development
- An encouraging level of engagement from a peak industry body (being the Urban Development Institute of Australia (Qld))
- Capacity building within industry
- Facilitation of "best practice" urban development
- Improved understanding of sustainability in the community with potential flow on positive effects to increases in "green demand" and
- Potential to become the basis for future mandatory tools (Hurley, 2009).

Despite these positive attributes, Hurley dismissed these tools as little more than sustainability rhetoric "doing little more than dressing up the status-quo" (Hurley, 2009, p20) to divert attention away from the true underlying sustainability issues. The weaknesses identified include: a lack of rigour in defining what context "sustainability" was being addressed, little transparency in the interpretation of sustainability and limited accountability of the overseeing body. Hurley's view is that these tools are generally applied by only a few high-end developers that already target the green dollar, with no real impact on the majority of new housing stock. His view is that for such tools to have any real value (and therefore attraction for developers to use), sustainability rating tools need to provide significant incentives such as: a marketing advantage, planning/approval short-cuts and/or tradeoffs or else the introduction of a mandatory use system.

The purpose of this research is to challenge these findings and attempt to demonstrate that rating tools such as EnviroDevelopment are more than just a marketing ploy in a crowded market (Warren, 2009). This research seeks to quantify the sustainability gains achieved via the rating tool EnviroDevelopment since its inception in 2006.

3. Methodology

Data for this research was gathered primarily from documents submitted by developers seeking to attain EnviroDevelopment accreditation as well as from annual re-accreditation submissions. The author would like to thank EnviroDevelopment for access to this documentation. Data relating to the individual projects was obtained from the EnviroDevelopment web site (www.envirodevelopment.com.au) as well as individual project or developer web sites.

Given this research is specifically addressing residential developments only, submissions for EnviroDevelopment categories C1 and C2 only were examined where:

- Category 1 Development (C1): a development where the primary use is residential with a density of up to 30 dwellings per hectare (Low to Medium density); and

- Category 2 Development (C2): a development where the primary use is residential with a density of equal to or more than 30 dwellings per hectare (High density).

4. Data and Findings

This research seeks to identify the environmental gains achieved in the residential land development sector, over and above minimum statutory requirements as measured by the EnviroDevelopment rating tool. The data from this research is presented below in Tables 1 and 2 for C1 (low to medium density residential) and C2 (high density residential) development respectively. The data captured indicates the percentage above minimum regulatory development standards that the certified projects have achieved.

Preliminary analysis of the EnviroDevelopment certification data reveals that since inception in 2006, EnviroDevelopment has certified 46 residential developments across all Australian States and Territories excluding only the Northern Territory and Tasmania. Certified developers range from large publicly listed entities such as Delfin Lend Lease, Mirvac and Stockland, to government agencies such as the Urban Land Development Authority (Queensland) and affordable housing providers such as Horizon and Brisbane Housing Corporation (Queensland).

In relation to environmental gains achieved from this certification activity, Table 1 overleaf indicates the gains achieved over minimum government environmental regulations in EnviroDevelopment certified low to medium density developments since 2006. As indicated, significant gains across a range of environmental categories can be demonstrated in the low to medium density residential category. This category typically represents larger scale Greenfield developments where a change of use from lower intensity land uses to residential land uses is involved.

Table 2: Environmental Gains Achieved Over Regulatory Obligations (Category C1)

Item (n=49) / Element	Low %	High %	Median %	Mean %
Water	20	43.5	20	26.4
Ecosystems	4	25	9.6	10.45
Energy	20	27.5	20	21.8
Materials*	100	100	100	100
Waste*	100	100	100	100
Community	**	**	**	**

* There are no minimum regulatory requirements in these elements.

** The "Community" element is more qualitative in its measures than the other elements.

This research has found that in the areas of Water, Ecosystems and Energy, this rating tool has achieved average savings over and above minimum legislative standards of an additional 26.4% for Water, 10.45% for Ecosystems and 21.8% for Energy across a range of low to medium density residential developments throughout Australia. Given there are no minimum environmental regulations in relation to Materials or Waste for residential development, by meeting the certification standards, developers are providing significantly greater environmental benefits than required to by government. Developers may be utilising this rating tool particularly for these elements to gain third party recognition of its efforts in the absence any minimum regulatory standards.

Table 2 below indicates the same metrics for high density residential developments that have obtained EnviroDevelopment certification since 2006. This category typically represents infill or brownfield development where a change of use from non-residential land uses to high density residential is involved.

Table 2: Environmental Gains Achieved Over Regulatory Obligations (Category C2)

Item (n=5) / Element	Low %	High %	Median %	Mean %
Water	20	80	25	35.4
Ecosystems	4	25	9.6	10.45
Energy	20	75	37	41.2
Materials*	100	100	100	100
Waste*	100	100	100	100
Community	**	**	**	**

* There are no minimum regulatory requirements in these elements.

** The "Community" element is more qualitative in its measures than the other elements.

Again, this research is able to identify significant environmental gains achieved by developers aspiring to obtain certification under this rating tool. In the areas of Water, Ecosystems and Energy, this rating tool has achieved average savings over and above

minimum legislative standards of an additional 35.4% for Water, 10.45% for Ecosystems and 41.2% for Energy across a range of high density residential developments throughout Australia.

This research indicates that for high density development, even greater gains are achieved for Water and Energy as compared to low to medium density developments, being 36% higher for Water and 95% higher for Energy with high density compared to low/medium density projects. This finding may be due to nature of high density developments (apartment projects) which also comprise the construction element with the actual building of the apartment tower, whilst low to medium density developments (land subdivisions) typically comprise only the civil engineering and landscaping component, with individual lot purchasers building their homes thereupon. However, given the high density data is obtained from only 5 projects, whilst the low/medium density data is sourced from 49 projects, this finding may require further validation over the longer term.

1.3 Discussion

The data from this research challenges earlier claims that environmental rating tools are little more than sustainability rhetoric. It has been demonstrated that significant environmental gains over and above minimum planning requirements can be obtained through the application of such tools in a residential environment. The question then begs to be asked: why are residential developers are willingly providing green solutions over and above minimum requirements? As stated earlier, Hurley (2009) suggests that sustainability rating tools need to provide significant incentives such as: a marketing advantage; planning/approval short-cuts and/or tradeoffs; or else the introduction of a mandatory use system. Whilst a marketing advantage is likely to be a key driver of developer engagement with sustainability rating tools (EnviroDevelopment, 2011), in the absence of further evidence one could claim it is the only motivator, with neither access to planning credits nor mandatory disclosure currently in effect to motivate residential developers. The literature provides some insight into other possible motivators. Warren et al. (2009) have identified that larger corporate developers are using rating tools in order to obtain independent third party ratification of having met their environmental responsibilities. This may apply to the large publicly listed residential developers such as Delfin Lend Lease, Mirvac and Stockland, as well as government agency developers such as LandCorp and the Urban Land Development Authority that have sought this accreditation.

There is also the potential motivation of whether consumers are willing to pay more for greener projects. The literature to support findings on how a sustainability rating can contribute to the value of residential developments is sparse, however some parallels can be drawn from the commercial building sector rating tool literature. Earlier research identified the lack of transparency and inconsistency in rating tools as a key hurdle to the impact of sustainability features on the value of commercial properties is being recognised by the valuation profession (Warren et al., 2009) (Royal Institute of Chartered Surveyors (RICS), 2012). However, after many years of debate, it is now recognised that sustainable buildings benefit from increased demand as tenants prefer a sustainable building over a less sustainable alternative (Royal Institute of Chartered Surveyors (RICS), 2012). This is

now reportedly leading to greater evidence of capital value shifts associated with a building's sustainability features. This effect has been particularly observable since the introduction of the federal Building Energy Efficiency Disclosure Act 2010ii which introduced mandatory disclosure upon sale or lease of commercial offices from November 2011 (Australian Government, 2012a). This new level of consistency and transparency has now allowed both tenants and investors to readily understand and compare the sustainability features of buildings off a common index. If these findings can be transferred to other sectors, then it is not unreasonable to conclude that in time, and with greater understanding of the benefits of investing in accredited sustainable residential developments, capital value benefits may accrue to residential developers and home owners alike as demand for more sustainable residential properties increases.

5. Conclusion

There are a plethora of sustainability rating tools available around the world, however the vast majority are designed to rate the design and/or operation of single buildings, and most specifically commercial buildings, rather than the perhaps more visible ecological impacts associated with large scale residential development. EnviroDevelopment is one such rating tool that fills this gap in Australia.

Whilst criticised in some literature as providing little more than green rhetoric, this research confirms that environmental rating tools that require residential developers to perform in excess of minimum legislative requirements can have significant positive sustainability impacts. This research has found that in the areas of Water, Ecosystems and Energy, this rating tool has achieved savings of an additional 26-36% for Water, 10.45% for Ecosystems and 21.8 – 41.2% for Energy across a range of residential developments throughout Australia.

This research also dispels the view of earlier literature that only developers of high-end residential product (where prices may be more elastic) can afford to incorporate sustainability features in their developments. Accreditation has been sought and achieved by a number of government agencies and affordable housing providers.

Future research on this topic will examine the motivations behind developer engagement with sustainability rating tools in the residential sector, with a view to building on the body of knowledge on this emerging field.

6. References

AUSTRALIAN GOVERNMENT. 2012a. *Commercial Building Disclosure: A National Energy Efficiency Program* [Online]. Available: http://www.cbd.gov.au/default.aspx [Accessed 27 November 2012.

AUSTRALIAN GOVERNMENT. 2012b. *Department of Climate Change and Energy Efficiency* [Online]. Available: http://www.climatechange.gov.au/en/what-you-need-to-know/buildings.aspx [Accessed 27 November 2011.

BRYANT, L. E. & EVES, C. 2012. Home Sustainability policy and mandatory disclosure: A survey of buyer and seller participation and awareness in Qld. *Property Management,* 30.

DING, G. K. C. 2007. Sustainable Construction - The role of environmental assessment tools. *Journal of Environmental Management,* 86**,** 451-464.

ENVIRODEVELOPMENT 2011. EnviroDevelopment Technical Standards, National Version 1.0. Brisbane: Urban Development Institute of Australia.

ENVIRODEVELOPMENT. 2012. *Living for the future, today* [Online]. Available: http://www.envirodevelopment.com.au/ [Accessed 26 November 2012.

GREEN BUILDING COUNCIL OF AUSTRALIA (GBCA). 2012. *Green Star – Communities Rating Tool* [Online]. Available: http://www.gbca.org.au/green-star/green-star-communities/rating-tool/ [Accessed 26 November 2012.

HURLEY, J. 2009. Sustainable or Status-quo: investigating sustainability assessment of residential estate development. *State of Australian Cities National Conference 2009.*

HURLEY, J. & HORNE, R. 2006. Review and Analysis of Tools and Assessment of Sustainable Urban Development.

MUSGRAVE, M. 2010. EnviroDevelopment: Sustainability Accreditation from the Development Industry [online]. *Planning News,* 36.

REED, R., BILOS, A., WILKINSON, S. & SCHULTE, K.-W. 2009. International Comparison of Sustainable Rating Tools. *Journal of Sustainable Real Estate***,** 1.

REED, R., BILOS, A., WILKINSON, S. & SCHULTE, K.-W. 2011. A Comparison of International Sustainable Rating Tools - An Update. *17th Annual Pacific Rim Real Estate Society Conference.* Gold Coast, Queensland.

ROYAL INSTITUTE OF CHARTERED SURVEYORS (RICS) 2012. Sustainability and the valuation of commercial property (Australia).

WARREN, C. M. J. 2009. Who needa a Green Star? *15th Annual Pacific Rim Real Estate Conference.* Sydney.

WARREN, C. M. J., BIENERT, S. & WARREN-MYERS, G. 2009. Valuation and Sustainability are Rating Tools Enough? *European Real Estate Society Conference.* Stockholm, Sweden.

WORLD GREEN BUILDING COUNCIL. 2012. *Green Building Accelerates Globally through Economic Downturn* [Online]. Available: http://www.worldgbc.org/current-activities/global-gb-trends-report/ [Accessed 27 November 2012.

XIAOPING, M., HUIMIN, L. & QIMING, L. 2009. A Comparison Study of Mainstream Sustainable/Green Building Rating Tools in the World *International Conference on Management and Service Science.*

[i] For a comparison of these rating tools, refer to Reed et al 2009 and 2011, Xiaoping et al 2009 and Ding 2007.

[ii] In July 2009, the Council of Australian Governments (COAG) agreed to a 10-year national strategy on energy efficiency. The purpose of this strategy was to accelerate energy efficiency improvements and deliver cost-effective energy efficiency gains across all sectors of the Australian economy AUSTRALIAN GOVERNMENT. 2012b. *Department of Climate Change and Energy Efficiency* [Online]. Available: http://www.climatechange.gov.au/en/what-you-need-to-know/buildings.aspx [Accessed 27 November 2011.