Sustainability discourse, place and the green building

Abstract

The world's nations concede that sustainable development is an appropriate response to the threat of global ecological destruction caused by industrialization. The discourse of sustainable development, or 'sustainability', legitimizes attempts to rearrange society through reproduction of the threat that humanity will annihilate itself unless its practices are reformed.

This paper provides an analysis of sustainability discourses in the building industry and the ecological modernist storyline of 'green building'. It describes the application of Maarten Hajer's discourse analysis methods to representations by industry professionals and academics at a series of conferences on sustainable built environments held in Australia, Singapore and Vietnam. The research findings describe how policies are produced and legitimized through nationally-contextualised sustainability discourses; and the findings indicate constraints in the production of policies for mitigating global ecological threats from industrialization.

This paper examines representations of sustainability made at building industry conferences in Australia, Singapore and Vietnam. It describes how 'green building' operates as a discursive mechanism within conference speakers' representations of sustainability concepts as solutions to global ecological threats such as climate change, and it identifies several constraints in the production of sustainability policies. Before recounting the methods and findings of my research, this paper will describe the discourse of sustainable development produced in the wider public sphere and the discourse of ecological modernization produced in business and policy circles. These descriptions are necessary for understanding building industry sustainability discourse as a complex interaction of elements of these discourses. The research is important because buildings use substantial resources and account for approximately a third of all energy-related carbon dioxide emissions produced worldwide (United Nations Environment Programme and Central European University 2007, p. 72). The ecological impact of buildings has been discussed at international conferences for at least 25 years,[1] generating a wealth of textual material which can be subjected to analysis. Increasingly, actors in the building industry understand that their long-term survival and

[1] The International Union of Architects acknowledged the ecological damage caused by the built environment in its Declaration of Interdependence for a Sustainable Future drafted at the 1993 World Congress of Architects in Chicago, United States. (International Union of Architects n.d.)

business interests are linked to the concept of sustainable development. They argue in favour of reforming the building industry for the sake of sustainability and many promote green building[2] as the key reform concept.

Sustainable development, ecological modernization and discourse analysis

The idea of sustainable development has dominated environmental discourse since the 1980s. It contested the notion of modernization injuring nature, as argued, for instance, by Carson (1962, p. 153) in *Silent Spring*, and overcame the notion of Earth's limited capacity to sustain economic and population growth as described in the Club of Rome's report, *The Limits to Growth* (Meadows et al. 1972, p. 23). Sustainable development was put forward as an international, consensus-building, technocratic solution to development's environmental limits by the World Commission on Environment and Development in its 1987 report, *Our Common Future* – otherwise known as the Brundtland Report:

> The concept of sustainable development does imply limits – not absolute limits but limitations imposed by the present state of technology and social organization on environmental resources and by the ability of the biosphere to absorb the effects of human activities. But technology and social organization can be both managed and improved to make way for a new era of economic growth. (World Commission on Environment and Development n.d.)

Brundtland's concept of sustainable development promised to solve the problem of nature's limited capacity for providing resources and absorbing the effects of economic growth. The sustainable development concept was enshrined in *Agenda 21*, endorsed at the United Nations Conference on Environment and Development (UNCED) – The Earth Summit – in 1992. From the peaks of international diplomacy, the ideal of sustainable development has been mediated through the public sphere. We now have sustainability institutions, sustainability designs and even disciplinable non-sustainable activities. Dryzek (2005, p. 16), described sustainability as 'the axis around which discussions occur' in which representations about the Earth's natural limits had lost their force. Hajer (1995, p. 14) saw sustainable development functioning as a discursive resource within a contemporary environmental discourse of ecological modernization produced by policy circles for industrial regulation. Young (2000) argued that ecological modernization entailed governments integrating environmental and economic policies; companies, government and non-government

[2] The World Green Building Council (n.d.) argued that green building design and development is increasing rapidly, partly because of the success of green building councils which are being formed around the world.

organizations working together to overcome old grievances; companies adopting a longer time horizon so that a return on investment could be seen for the procurement of environmentally friendly technologies; technological solutions being put forward for environmental problems; rising private-sector influence over policy through trade associations; and a shift in economic growth from polluting industries to green industries. Ecological modernization could be seen either as a positive first step towards sustainable development or as a strategy for undermining environmental protection by legitimizing and sustaining the structures and systems responsible for environmental decline (Young, p. 30). Where Dryzek (2005, pp. 233-234) saw the possibility of sustainability discourse leading to radical ecological modernization causing reflexive institutional change in the direction of democratic experimentation, Harvey (1996, pp. 382-383) saw the danger of it helping big industry, big government and high-tech big science to gain even more domination of the world's resources. Discourse analysis can provide insight into the politics of environmental policy making. In researching discourses around acid rain, Hajer (1995, p. 252) found a 'complete mismatch between the generally avowed commitments for effective environmental management and the failure to come to effective problem closure'. Hajer suggested that discursive mechanisms explained the failure of institutional policies to live up to the goals described within the discourse. Christoff (2000, p. 214) confirmed that Hajer's methods were effective in examining ecological modernization as a discursive strategy of managing ecological dissent.

In the building industry, ecological modernization has been represented positively by large multinational corporations, small pioneering firms and their professional associations as an important step in the direction of sustainable development. This innovative concept, often represented by terms such as 'green building' or 'sustainable design', has taken centre stage at the industry's conferences, in its trade media and – through successful public relations – in mainstream media reporting of building industry events. While it is unclear how effective ecological modernization will be in reducing environmental damage caused by the building industry, the policies of ecological modernization have already become a reality for this industry. In Singapore, legislation was enacted in April 2008 making green building compulsory (Cheam, 2008). In other countries, the industry has been subject to new mandatory environmental requirements in building codes or in voluntary certification systems for green building. This shift towards ecological modernization has been reflected in texts produced by professional associations and government agencies regulating building. In the

world's largest building market, the American Institute of Architects celebrated its 150th birthday in 2007 at an annual convention entitled '*Growing Beyond Green*'. This convention featured keynote presentations by Zoologist David Suzuki on '*The Science of Sustainability'* and by Nobel-Prize winner Al Gore on '*The Challenge of Sustainability*'. Almost a third of the education programs carried sustainability or a green theme in their titles (*Growing Beyond Green*, 2007, pp. 8-90). The ability of experts legitimized by professional organizations – such as the American Institute of Architects and emerging green building councils – to create knowledge and influence policy through discourse should not be underestimated because discourses systematically form the objects which they articulate (Foucault, 1972, p. 44).

Discourse analysis can describe power effects working through institutions and networks dominating the production of knowledge in the environmental policy domain. In analysing discourse surrounding the issue of acid rain, Hajer (1995, pp. 280-282) attempted to add a discourse-theoretical dimension to Ulrich Beck's notion of 'reflexive modernization' to account for reflexivity in discursive practices, arguing that reflexivity was needed to challenge discursive avenues preventing institutional reform. Beck (1995, p. 143) had described the threat of ecological crisis stimulating reflexive modernization in which individuals within industry, government and non-governmental institutions became aware of the threats of ecological devastation then challenged the routines of industrialization and the institutional framework producing these threats; by learning and changing its ways modern society avoided self destruction. Beck's theory of reflexive modernization has been challenged by Chantal Mouffe (2005, pp. 54-55) for failing to acknowledge the role of economic power in restructuring a hegemonic order. Hajer's research has helped us to address this. Hajer (1995, p. 44) defined discourse as a 'specific ensemble of ideas, concepts, and categorizations that are produced, reproduced, and transformed in a particular set of practices and through which meaning is given to physical and social realities'. Hajer argued that a typical environmental issue involved discourses from many disciplines such as science, government, business, law and community. In identifying discursive mechanisms, Hajer (1995, p. 263) adapted Foucault's ideas to reveal the institutional dimension of discourse, considering where things were said and how perspectives were structured in society at the same time as they structured society. Hajer (1995, pp. 49-51) accepted Foucault's theory on the orders of discourse regulating practices through which objects are constituted, and overcame Foucault's ambivalence on the role of discoursing subjects by focusing on

discourse at a tactical personal level rather than at an aggregate institutional level. A similar approach has been taken by Fairclough (2003, pp. 206-207) in describing how dominant ways of making meaning can be challenged at a personal level within orders of discourse. From Bronwyn Davies, Rom Harré and other social-psychologists, Hajer (1995, p. 53) adopted *positioning* theory to describe how human interaction relates to discursive practices in which people are provided with subject positions. Hajer focused on argumentative interaction in discourse formation in which actors not only attemptted to make others see problems according to their own views but also sought to position other actors in specific ways. Hajer (p. 56) also focussed on understanding the way that conventions constituting social order had to be constantly reproduced and reconfirmed in speech, describing these *structured ways of arguing* as a discursive mechanism in which actors were constrained in webs of meaning. Hajer also examined how actors' routine reproductions of cognitive commitment stabilized discursive understanding in which the actors saw the world from their respective positions in terms of '*storylines*' of metaphor and imagery. Hajer (p. 62) described this discursive mechanism as the 'narratives on social reality' through which elements from many different domains were combined to provide actors with a set of symbolic references suggesting common understanding. Hajer (p. 56) argued that a *storyline*'s power stemmed from its ability to enable discursive closure for an otherwise bewildering variety of discursive components; from its effect on the *positioning* of subjects; and from an emerging *storyline*'s potential to alter discursive order and thereby cause policy change. Besides *positioning*, *structured ways of arguing* and *storylines*, Hajer identified seven other key discursive mechanisms operating in environmental discourse as described briefly in Table 1.

Table 1: Description of important discursive mechanisms identified by Hajer. (1995, pp. 268-275)

Discursive mechanism	Description
Positioning	Repositioning of actors through discursive exchanges
Creation of macro actors	Introduction and legitimization of institutions or professions
Structured ways of arguing	Established discursive formats (e.g. describing an issue in managerial language)
Symbolic politics	Discursive strategies using symbolism
Sensory power	Practical means of attempting to persuade an audience
Storylines	Narratives on social reality (metaphor, analogies, historical references & clichés)
Mutual functionalization	Storylines that benefit each other
Black boxing	Representation of things being fixed, natural or essential
Social construction of ignorance	Withholding relevant knowledge from an audience
Disjunction markers	Crises of representation revealed in texts where constructions fall apart

Analysing building industry sustainability discourse

Hajer analysed ecological modernization discourse in policy circles often hidden from public view,[3] whereas I applied his methods in the analysis of sustainability discourse in the more open domain of building industry conferences. Building industry sustainability discourse was sampled at conferences in Australia, Singapore and Vietnam to identify patterns of local variation and international transcendence. These three nationally-contextual discourses were sampled within weeks of each other in 2008 to capture current dynamics of building industry sustainability discourse. Case studies were applied to identify the discourses' internal generalizations and variations (Flick 2007, p. 105) and to capture the dynamics of process and theoretically interesting patterns (Deuten 2003, p. 81). The presentation texts for analysis in the three national case studies were drawn from FuturArc Forum 2008[4], a series of eight conferences on sustainable built environments held between February and April 2008. My involvement in these conferences was as managing director of their principal organizer, BCI Asia Construction Information Pte Ltd. I participated in conceptualizing the conferences, on the committee nominating speakers and as a facilitator during question-and-answer sessions. For this research, I acted as a participant observer of speakers' presentations and their responses during question time. The forum's speakers included architects, engineers, property developers, academics, representatives of green building councils, other professional associations, government agencies and building product or service providers. Within each case study, the oral and slide presentations of five speakers were selected to account for variation by profession and location of residence. The selected speakers' presentation texts were analysed in the form of partial transcriptions of audio recordings of presentations when presentation slides were made publicly available for download (FuturArc 2008b) and in the form of complete transcriptions of audio recordings of presentations when a presenters' slides were not made publicly available for download. Representations of sustainability in the case studies were examined for the operation of Hajer's discursive mechanisms. Once the operation of these discursive mechanisms in the representations had been identified, the key sites of tension within the sustainability discourse were described along with the discursive practices for producing knowledge and legitimizing policy or constraining the development

[3] Hajer (1995, p. 288) argued for institutional reform of policy making processes enabling citizens to play a role in policy discourse.

[4] FuturArc Forum 2008 was organized by BCI Asia, the Singapore-based publisher of the *FuturArc* architectural journal with approximately 4,000 participants (FuturArc, 2008a).

of alternative policies for the building industry. Recognition of these discursive practices enabled a more critically informed view of policies being developed in the building industry in response to threats of ecological destruction. The final stage of data analysis was a general assessment of the policies produced and legitimized through the discourse against Brundtland's promise of sustainable development solving nature's limited capacity to provide resources and absorb pollution from economic growth. Where reforms were not being enabled or legitimized through the discourse, the ways in which discursive practices created and constituted obstacles to reform were described to show how ecological problems were being made manageable for existing structures of the building industry.

The discourses in Australia, Singapore and Vietnam

The discursive mechanisms identified in the Singapore case study,[5] summarized in Table 2, indicated how discourse coalitions in the building industry promoted various *storylines* to shift sustainability discourse and the policy produced within it. The green building *storyline* relied on the creation and acceptance of rating tools or other performance criteria which became *black boxes* for achieving discursive closure. *Disjunction markers* occurred when the content or impact of rating tools was examined closely, revealing that Singapore's Green Mark rating tool could be more aggressive in preventing ecological damage caused by construction and building-material manufacture. The markers indicate that it could be more effective to reduce energy use by promoting a reduction in the consumptive culture of building occupants rather than by promoting the procurement of buildings with a green label. A Singapore government agency created the Green Mark green building rating label apparently with three goals in mind: to make the next generation of buildings more energy efficient in line with national energy security policy; to improve the marketability of Singapore's buildings; and to *position* Singapore as an environmentally friendly city. Green Mark, as a green building *storyline* and an exercise in *symbolic politics*, was used to show that action was being taken to make Singapore more environmentally friendly without addressing the physical impact on global ecology of Singapore's booming construction industry and its rapidly expanding built environment.

[5] Kerr (unpub.) described the findings of these case studies in detail and provided a comprehensive list of references. The transcripts and slides of the conference speakers' presentations, examined in the case studies, can be found in the appendices of Kerr's thesis.

Table 2: Summary of discursive mechanisms identified in the Singapore Case Study.

Speaker	Speaker A	Speaker B	Speaker C	Speaker D	Speaker E
Positioning	corporate concern for ecology, voluntary industry-governed certification as superior	Singapore as environmentally friendly city, public sector taking lead in green building	green-building legislation as future proofing Singapore	building industry actors as change agents & environmental problem solvers	architects & engineers as expert in efficient design
Creation of macro actors	World Green Building Council (WGBC) & national green building councils	Singapore government & its Building Construction Authority (BCA)	BCA	WGBC & national green building councils, other emerging non-governmental bodies	the architect as foremost expert on green building
Ways of arguing	managerial, marketing, social, consensual	managerial & political	legalistic & economic	ecological modernist, militaristic, economic, scientific	engineering, managerial, economic & social
Symbolic Politics	corporations & consumers ahead of technocrats	Singapore commits to environmentally friendly sustainable development, 'ride this green wave with us'	global cities have sustainable districts	war on climate change rhetoric, 'Al Gorian' rise in public sentiment cannot be ignored	architects and engineers reduce buildings' operational costs & resource usage
Sensory power	images for emotional attachment to cause	language of determination, resolve	laws must be obeyed	emotive language & images, dramatic call for change	graphs & charts
Storylines	climate change, green building	green building, green wave	climate change, resource scarcity and energy security	mass education, one planet , carbon balance, closed-loop systems, zero emissions	green building
Mutual functionalizing	green buildings mitigate climate change	green buildings reduce energy consumption & waste	green buildings reduce energy consumption & waste	building industry agents producing knowledge about green buildings generates demand	good architectural design is green building
Black boxing	green building, rating tools	Green Mark. Green building = environmental sustainability	high performance building is a green building	success of Leadership in Energy & Environmental Design (LEED)	sustainability determined by integrative design process
Social construction of ignorance	ignores energy consumed by construction sector by focussing on built structures	ignores extraordinary growth of construction sector	ignores energy for constructing buildings while emphasising energy for their operation	ignores voluntary certification allowing wiggle room for commercial interest over ecology	ignores relations between property developers and society
Disjunction markers	limiting construction activity could mitigate climate change	resolving corporate social responsibility and resource restraint with construction boom	Green Mark does not require 'construction practices and materials that are sustainable'	moving storylines forward ahead of physical reality shifts attention away from failure to achieve previous benchmarks	rating tools more useful for storyline than for reducing environmental impact. Occupants affect building performance

The Australia case study (Table 3) described competition in the discursive creation of *macro actors* between government and the Green Building Council of Australia (GBCA) as well as between their respective rating tools for *black boxing* green building. The council's representatives argued for a market-based solution to climate change through its Green Star rating tool for measuring the expected environmental performance of a building. On the other side of the debate, government planners *positioned* themselves as facilitators of urban sustainability. Experience in Germany, *positioned* as a global leader in sustainability, suggested that stricter building regulations and active workers unions could produce a more sustainable outcome than voluntary rating tools such as Green Star. Like Singapore's Green Mark rating tool, Australia's Green Star improved the marketability of high-performance buildings. Whereas Green Mark was mandatory and backed by significant government funding, Green Star was voluntary relying on certification income from property developers, membership fees from the building industry and the implied support of government agencies and large corporations leasing and purchasing Green Star properties. In this case study, the power of showcasing images of futuristic buildings became apparent in moving the green building *storyline* forward as did the power of reducing a building's complex description to a simple label.

Table 3: Summary of discursive mechanisms identified in the Australia Case Study.

Speaker	Speaker F	Speaker G	Speaker H	Speaker I	Speaker J
Positioning	urban planners as leaders facilitating sustainability	true believer in sustainable design, Comprehensive Assessment System for Building Environmental Efficiency (CASBEE) is holistic	his building (Space) as an efficient green building. Green Star as leading rating tool	Green Star as a holistic assessment of green building, developers as sustainability leaders	himself as critic, architect as force for excellence, international leadership of Germany
Creation of macro actors	government	government, Green Building Council of Australia (GBCA) and Japan Sustainable Building Council (JSBC)	GBCA & the architecture profession	GBCA & the property industry	National government, Green Party & Workers Unions in Germany
Ways of arguing	social & social-sustainability	ecological modernist, economic, engineering	scientific, managerial	economic, managerial	cultural, historical, political, managerial
Symbolic Politics	appeal for utopian society, balance between economy, environment & economy	himself as true believer in green building	Green Star to put a black box around green building	success of market based solutions, rising applications for Green Star	case studies, particularly the Reichstag renovation

Sensory power	social statistics	images of urban restoration	building information modelling graphics & statistics	Green Star labels (e.g. 'World Leadership') & building showcases	images of renovated heritage & future buildings
Storylines	urban design, social challenges	ecological modernization, market transformation, green building	green building, skill of the architect	green building	ecological modernization, green building
Mutual functionalizing	urban planning & design enabling sustainability, solving social problems	technology & ecology	building good for Sydney skyline, social inclusion and the environment	Green Star is good for property industry	technology & ecology
Black boxing	government planning capacity	green buildings becoming environmentally sustainable	Space as a green building	Green Star = green building	ecological modernization
Social construction of ignorance	ignores power of commercial interest affecting planning	ignores project failures	ignores potential failure of architectural modelling to predict future building performance	ignores building operational performance & weightings bias	trend towards exhaustion of Green Party influence in German policy processes
Disjunction markers	NSW Architects Office within commerce department, nature/ecology not an explicit environmental target	far-fetched green buildings driven by 'agendas' other than technology benefiting ecology	link disrupted between building modelling & performance	Tenants' impact on building performance, weighting of indoor environment 4 times > ecology	inherent need to give buildings some kind of label despite criticising the practice

Competition in the discursive creation of *macro actors* was more apparent in the Vietnam case study (Table 4) because no green building rating tool had yet dominated the discourse in this country. The Vietnamese government with its knowledge of sustainable traditions was *positioned* as the best regulator of green buildings as was the United States Green Building Council (USGBC) with its Leadership in Energy and Environmental Design (LEED) rating tool, the Japanese government through the Japan Sustainable Building Council (JSBC) with its holistic rating tool and the newly founded Vietnamese Green Building Council with its future rating tool to be adapted from LEED or from the United Kingdom. *Disjunction markers* clearly emerged in sustainability representations amid this contest. In a clear example, a speaker's representation of the value of positive relations with nature through cultural sustainability was disrupted as soon as the speaker switched to the dominant discursive practice of economic argument in representing market-based solutions. The natural environment had little intrinsic value when sustainability arguments were presented in economic, managerial or technocratic ways. Instead, value was seen in the capacity to

dominate the green building definition and therefore influence what was described as the ‘green market for a sustainable future’.

Table 4: Summary of discursive mechanisms identified in the Vietnam case study.

Speaker	Speaker K	Speaker L	Speaker M	Speaker N	Speaker O
Positioning	a leader of a new organization, from USA but ready to learn from Vietnam	his firm as green design expert, LEED as dominant internationally	Carrier as global leader, having major impact on society through invention of air conditioner	Vietnam building regulations as being equivalent to LEED certification	green building certification (ideally CASBEE) as social value transformer to sustainable future
Creation of macro actors	Vietnam Green Building Council (VGBC), United States Green Building Council (USGBC), Building Research Establishment	USGBC & its LEED system	USGBC & its LEED system	government as regulator of green buildings	JSBC under Japan's Ministry of Land, Infrastructure & Transport
Ways of arguing	apocalyptic, managerial	economic, scientific, ecological modernization	ecological modernist, managerial, economic	cultural, technocratic, economic	social, economic, cultural
Symbolic Politics	advocates a green building system appropriate for 'Vietnamese market'	expected performance improvements from models of future green buildings	industrial company repositioning itself as hero of sustainability with inevitable long-term sales growth	government enabling developers to realize economic, social, environmental advantages	uses CASBEE to argue for Japan's role in defining transformation to green market for sustainability
Sensory power	Al Gore type plea for change in face of apocalypse	images of performance models & renderings of futuristic buildings	performance statistics of technologies & their integration in United Technologies Corporation factory	metaphors about traditional sustainability & images of green buildings	flow charts of social, scientific & economic trends; photos of completed buildings
Storylines	climate change, green building, international effort	green building	Corporate Social Responsibility, industrial leadership in environmental sustainability	climate change, green building	climate change, green building, aging & declining Japanese population
Mutual functionalizing	sustainability mitigates climate change	green building benefits marketing/PR & premium property sales	air conditioner sales up, energy consumption up, energy prices up, demand for new technologies up	government and sustainability	green buildings and climate change
Black boxing	sustainability as the inevitable (& agreed upon) solution to climate change	green building as being inevitable	LEED certification as environmentally sustainable practice	climate change & governmental capacity for mitigating it	climate change & the sustainable future
Social construction of ignorance	unproven effectiveness of market-based solutions reducing building industry impact	ignores potential impact of tenants on building performance	ignores current levels of environmental damage caused by company through industrial production	ignores destructive dynamics of urbanization or reform of urban planning processes	ignores agents & practices dominating production of 'sustainable future'

Disjunction markers	we can't sustain this pace, but need market-based solution reproducing competition	absence of consultation with stakeholders other than the developer (against other presentations)	rising consumption & sustainability, unless production is decoupled from environmental damage	pollution originates in the way people think, but solution is properly driven environmental exploitation	CASBEE enables 'green market for a sustainable future' while big gaps remain in defining this future

The case studies demonstrated that the industry's green building rating tools – produced and legitimized through sustainability discourse – were used for symbolically labelling buildings with anticipated better-than-standard performance. Agents representing interest groups in the building industry or its regulating agencies competed for legitimacy in defining green buildings and, thereby, for influence in steering the industry's evolution. In framing sustainability discourse as a discussion of the performance of future buildings, representatives of engineering professions served their own interests in increasing the value of work done by their companies and peers. They *positioned* themselves as being concerned about climate change, ecology or environmental sustainability but the policies established through their discourse with representatives of property developers and regulators did not immediately address these concerns. Disruption between this self-*positioning* and the policy outcome is likely to have occurred because economy enjoyed a higher position in the discursive order than ecology. Besides the dominant economic or managerial *ways of arguing* in the discourse, more time was given to the question of the economic competitiveness of green building than the ecological impact of green building. Green buildings provided explicit benefits for property developers but only implicit benefits for ecology. Speaker A, who represented the World Green Building Council, referred to the 'global construction industry' as an employer of 100 million people and a contributor of 10% of the world's Gross Domestic Product but did not acknowledge its role as a polluter or exploiter of natural resources. Rather than enter into discussion about regulating the industry's pollution or natural-resource consumption, Speaker A argued that pollution and resource-usage efficiency could be dealt with by improving the performance of the world's future buildings. Other speakers, who represented the Building Construction Authority of Singapore, Green Building Council Australia and the Vietnam Green Building Council, also addressed the performance of future buildings rather than the present ecological impact of the construction industry. When natural environment was introduced into the discourse it tended to be as a victim within apocalyptic representations of the climate change *storyline*. When the natural environment served the green building *storyline,* it tended to be a resource within a building,

a decoration or an opportunity for technological mimicry. The natural environment makes way for construction, not the other way around. Within the Green Mark and Green Star certification schemes, ecological protection was a minor voluntary component. In the case studies, an argument was presented that rating tools evolved according to dominant *storylines* within sustainability discourse so that they might one day be more effective in reducing ecological destruction caused by the building industry. However, this moving target approach enabled *symbolic politics* in which the continual shift towards new benchmarks for future buildings moved sustainability discourse away from criticism of the environmental performance of existing buildings designed for previous benchmarks.

The green building *storyline* could only be effective in reducing ecological destruction if it served to decouple building production, operation and demolition from nature's capacity to absorb environmental harm or if it served to reduce demand for those functions. In the long run, society could only live sustainably within nature's limits if the ecological impact of those functions declined faster than their rates of consumption rose. With construction output rising 20% a year in Singapore at the time of this research, it became apparent that the environmental impact of a given unit of construction must decline radically for sustainable development to be achieved. The Singapore government's Green Mark rating tool was mandatory but the tool did not require the construction industry to reduce its environmental impact; therefore the link between the promise and policy of sustainability discourse was broken. Some manufacturers of building materials recognized the need to reduce environmental impact per construction unit, but solutions were challenging. United Technologies Corporation (2007) recognized the logic of reducing total environmental impact of building technology production and recently switched its internal sustainability policies from targets that enabled its ecological damage to rise with revenue – albeit at lower rates – to absolute reduction targets for greenhouse gas emissions and other environmental impacts. Chasing such targets was worthwhile for corporations, as argued by Young (2000), because it promoted market leadership and encouraged internal efficiency while discouraging wastage. However, there was an apparent absence of policies preventing the outsourcing of emissions back through the international supply chain.

Reducing consumption through sustainability discourse seemed to be an even harder proposition than decoupling ecological damage from construction output because the building industry would have to elevate ecology over economy in the discursive order for its policies

to stop promoting consumption. In the case study texts the green building *storyline* reproduced consumer culture through advertising and public relations activities encouraging a shift in consumer preferences from standard to high-performance buildings. The reproduction of consumer culture within sustainability discourse seemed inevitable within the current framework of intense economic competition, at least, while policy production was dominated by a tri-partite discourse coalition of building industry representatives, government regulators and academia. It seemed that the production of policies reducing ecological damage would require discursive participation by interests with the most to lose from damage generated by the building industry at sites of building construction, operation, destruction, material production and pollution. It also seemed that the emerging economic recession would be more effective in reducing the total environmental impact of the building industry than green building rating tools or the discourse legitimizing them. This situation could change in time through the constitutive nature of discourse, particularly by a change in the order of sustainability discourse. Yet, at the time of this research, it seemed Mouffe (2005) was correct in arguing that Beck's (1995) theory of reflexive modernization had failed to acknowledge the crucial role played by economic power in restructuring a hegemonic order.

Rating tools effectively *black boxed* green building *storylines* because they reinforced existing practices within the building industry within their respective locations. The Singapore government had acted swiftly and decisively in establishing Green Mark before the local industry created its own tool or before an overseas tool such as LEED gained ascendancy in the local market. By creating its own rating tool, the Singapore government had ensured that green buildings conformed to national interest. In Australia, property developers and building consultants through the Green Building Council Australia attempted to dominate sustainability discourse with the Green Star rating tool and ensure their *position* of influence. In Vietnam, a speaker from Hanoi University of Architecture called for stricter building regulations rather than the adoption of a green building rating tool. His was a lone representation at the Vietnam conference amid a flurry of calls for a rating tool to be developed by the Vietnam Green Building Council or applied from overseas. His argument was not without merit, however; a speaker at the Australian conference argued that Germany had become a world leader in improving the sustainability of buildings, not because of rating tools, but because of interests outside the building industry – namely the Green Party and workers unions affecting building industry practices. It was clearly indicated in the case studies that building rating tools conformed to the interests of agents producing them.

However, one speaker argued that rating tools would evolve to reduce ecological damage alongside emerging *storylines* in the sustainability discourse because the building-industry discourse coalitions producing the *storylines* would respond to shifts within wider public sustainability discourse. In other words, the green building *storyline* was a small step but by no means the last step in the direction of sustainable development.

This research indicated that critique of *storylines*, particularly their process of production, was an important practice within sustainability discourse. It also indicated that greater representation of the natural environment in sustainability discourse, by interests outside the building industry, would be required for this industry to develop critically reflective practices for reducing the rate by which the industry consumed natural resources and emitted pollution. The question of institutional arrangements promoting or suppressing this representation was therefore important in facilitating any shift towards practices that reduced the building industry's ecological impact: Are representations of the natural environment most effectively expressed through the structures of governmental institutions, through consumptive patterns around market-based solutions, through public submissions about specific building projects, through civil protest at sites of building production and pollution or through other means? The question of expressing the natural environment's intrinsic value within a discursive order dominated by economy and the question of raising ecology within the discursive order need to be addressed, as does the question of sustainable development being an appropriate environmental goal for society.

Hajer's method proved to be effective in identifying the discursive mechanisms in building industry sustainability discourse, leading to the conclusion that policies produced and legitimized through this discourse were unlikely to cause a reduction in global ecological damage. The dominant *storyline* of green building was *black boxed* by rating tools serving the immediate interests of their respective discourse coalitions and enabling practices which tended to shift possibilities for ecological damage reductions from the present into the future. This research indicated that market-based solutions to environmental problems in the form of green building rating tools could improve the performance of individual buildings, the value of engineering services and the marketability of premium buildings. However, their potential for reducing future ecological damage through higher efficiency might be compromised by their promotion of higher consumption. This research suggested that the order of sustainability discourse was enabling agents to produce symbols of sustainability without

addressing substantive structural reforms. It suggested that sustainability discourse, at least in its current form, did not promote institutional reforms capable of mitigating ecological threats to society caused by industrialization. Critically reflective practices among the institutions and social actors constituting the building policy domain were likely to be required for sustainability discourse to produce and legitimize policy reforms capable of addressing these ecological threats.

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