

Innovation, agency, and structure: Creating a tool to make the Australian building industry more sustainable.

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Abstract: VicUrban, the Victorian state government urban land development agency, is showcasing its sustainability credentials in their new 8000 home Aurora Estate. Aurora will have environmental features which, amongst other initiatives, require the use of materials that are more environmentally sustainable. The EcoSelector was designed to guide the builders in their selection of materials. More or less points are allocated depending on the materials used for the floor structure, framing, wall cladding, roof cladding, fittings and finishes, and landscaping. The builders are required to meet a minimum overall score for a proposed house before it can be approved by VicUrban.

The relationship between VicUrban and the builders is critical for VicUrban to succeed in delivering environmental sustainable design (ESD). Cost pressures play a significant role and the people on the ground, often sub-contractors, have little incentive to do any research or development into issues like sustainability.

Against this background, the development of the EcoSelector can be seen as an innovation grappling with the market driven limitations of the industry whilst promoting ESD. VicUrban hopes to transform the building industry via demonstration.

This paper examines how the relationships between the participants affected the development of the EcoSelector and how this has affected the building industry. As a part of work in progress, a new model is suggested for understanding the relationship between innovation, agency, and structure that ranges across 'silos', drawing on Vygotsky's (1978) developmental psychology, Wittgenstein's (1958) philosophical insights, Bourdieu's (1977) concept of habitus, and evolutionary theory.

Introduction

The EcoSelector¹ is a building and landscaping materials selection tool that was developed specifically by the Victorian State Government's land development agency, VicUrban, for their Aurora Estate. Aurora is a staged development, due for completion in 2023, which on completion will comprise 8000 houses. Aurora is VicUrban's sustainability 'showcase'. They define sustainability broadly, having adopted and developed a triple bottom line policy framework. This framework is articulated through VicUrban's Sustainability Charter (VicUrban 2006) which is used to evaluate proposals, design projects, and measure the performance of their developments. The EcoSelector dovetails with the Sustainability Charter addressing the specific issue of the impact of building materials on the environment.

The EcoSelector was designed specifically for the Aurora project to provide the builders with information about; the environmental benefits of more sustainable building materials, where to source them, and whether there was a cost difference. The EcoSelector can be seen to address two related phenomena; the way builders think about sustainability and, how they do it, that is the acts and practices of building. Indeed, it is evident in the story of the development of the EcoSelector, described in this paper, that the resolution of these two purposes of the tool, as a means of consciousness raising and/or as a means of changing practice, helped shape how the tool was intended to be used and the manner in which the builders have had to comply to it.

The issue concerning the purpose of the EcoSelector, as were other issues discussed by its developers, took place within a particular context that afforded particular constraints and opportunities. These resistances and encouragements define both the 'problems' that the EcoSelector designers sought to address as well as the scope or level of innovation that could be achieved. The constraints included dealing with an industry that is driven by neo-liberal assumptions regarding the operation of markets and consumer choice, as well as being defined by economic pressures that are resolved through Fordist manufacturing and assembling processes. Furthermore, sub-contractual relations

¹ A synopsis of the EcoSelector can be found at <http://www.vicurban.com/cs/Satellite?c=VPage&cid=1171606213246&pagename=VicUrban%2FLayout&oid=1163385910773>, retrieved 15/06/07

define the way the industry operates; from the professionals that design and engineer the estates and houses through to the tradespeople who assemble them. The land development industry is highly stratified (Charter Keck Cramer 2006). VicUrban, and its predecessors, manage their work by contracting in the required expertise to do the specific tasks that they require. The opportunities for the EcoSelector included the growing community awareness of unsustainability, in part driven by local experiences, including the drought and bushfires, and global ones, such as the growing recognition and acceptance of climate change. These changes in the *Zeitgeist*² have contributed to the issue of unsustainability being taken up by government and professionals.

This paper explores the relationships of the stakeholders involved in the development of the EcoSelector and how these were played out in the design of the tool. These include VicUrban, the designers of the EcoSelector – RMIT's Centre for Design (CfD), the builders, the materials supply and manufacturing industries, and government. A series of resistances and opportunities are identified, not at a 'theoretical' level, risking potential reification, but at the level of the actors – examining how this innovative tool was actually designed. This grounded approach suggests a model of innovation that potentially resolves the social sciences' 'problem' of agency and structure (e.g., Caldwell 2006).

This paper first details some of the defining stories of the development of the EcoSelector, from the perspective of the people responsible for its conception and design. It then examines some of the dynamic forces that affected their decisions. In conclusion, a theoretical model is suggested that locates innovation, in this case the EcoSelector, within the context of the agency-structure debate posed by the social sciences.

'All systems are go.'

Where does an idea originate? In this paper it is argued that there was no eureka moment, no bringing down from the mount, no stroke of genius that led to the EcoSelector. However, having said that, it must be acknowledged that each of the people telling their story about the EcoSelector did have 'eureka, I've got it' experiences of their own and about other peoples activities. The genesis of the EcoSelector can be seen as a moment when a confluence of forces, embodied in the actors, came together in a particular place that afforded a particular opportunity. This place was the Urban and Regional Land Council (URLC), one of two government statutory authorities that would later be amalgamated to form VicUrban in 2004. (The other organisation amalgamated to create VicUrban was The Docklands Authority.)

Hence, the URLC's Aurora project provided the *raison d'être* for the EcoSelector. But Aurora has its own genesis, as did the URLC (eg., Troy 1978). Aurora is sited some 20 kilometres, as the crow flies, north of Melbourne's CBD. The URLC was able to purchase the land cheaply as there were significant problems associated with developing the site, due to the difficulty with providing connections to Melbourne's existing sewage and stormwater infrastructure. It was the decision to invest in on-site facilities to manage water and waste that led a small team, with the support of the CEO, to be encouraged to 'push the boundaries' regarding what might be achievable for a sustainable master-planned community (MPC). There had been a shift in the practice of dealing with storm-water with many recent MPC's having significant stormwater retention systems. Thus, the idea of having local sewage treatment, and as it transpired, reuse, as a part of a more holistic approach to water management, can be seen as a 'logical' progression. Pursuing sustainability built on the sewage and water problems.

A place for change

The URLC's Aurora project management group (APMG) worked with a team of about 25 consultants who set out to rewrite what a MPC could be. The benchmarks that were adopted included six-star energy efficiency (the then, and current, State mandate is five-star³), smaller correctly oriented lots for passive solar design, extensive on site water management and reuse, and sustainable materials. All of this was to be done within the paradigm of a typical privately funded, designed, and built, MPC.

At the same time, other government agencies and private companies were working on related issues. For this story, an important example of this activity was the EcoHome project, supported by, the URLC

² For example it was reported in the Courier Mail <http://www.news.com.au/couriermail/story/0,23739,21624334-3102,00.html> on April 26, 2007 that a CSIRO survey found 90% of 1800 Queenslanders surveyed believed climate change is an issue vital to the nation's future. Similarly an international poll found that 69% of Australians said that climate change is a serious problem requiring urgent action even if this is costly and, a further 23% said that it's a gradual problem requiring gradual steps that are low in cost. Only 8% were unsure about whether climate change is a problem, as such no steps should be taken that would have a cost.

³ <http://www.sustainability.vic.gov.au/buildings/5starhousing/index.asp> accessed 02/07/07

(and its successor, VicUrban), Metricon Homes, the Building Commission, Origin Energy, City West Water, Melbourne Water, Sustainable Energy Authority of Victoria (SEAV), Hassell Architects, and RMIT's Centre for Design (CfD). This project examined the implementation of sustainable urban design principles into a conventional suburban 'spec' home. The house was designed and built, and continues to be evaluated.

Dr. Dominique Hes, then at the CfD, presented the EcoHome project to the Aurora project team at the URLC. Barton Williams, another key figure in the EcoSelector story, who was with the SEAV at the time, was advising the URLC on getting the Aurora houses to a six-star energy rating, was also present. Barton's work at the SEAV was primarily concerned with energy consumption, but he, as did many of the other people involved in the Aurora project, had a greater vision. Jill Lim, a member of the APMG, said that the consultants were actually excited by the project, with many senior staff attending meetings that would normally be attended by more junior personnel.

It is at this stage in the development of the EcoSelector that key people have different interpretations of whose idea it was. The two key interpretations are (1) 'in fact' that following discussions after the presentation of the EcoHome, an outline for an Aurora materials selection guide was developed, and (2) it was it Barton's. The interviewees differ in their recollection of the events, Barton claiming the conceptual framework as his own, developed while he was at the SEAV, managing the Energy Smart Building program, while other interviewees reporting key parameters being decided in other venues, such as the URLC and the CfD.

There are several possible reasons for there being different views at this point. However, for the purposes of this paper, these do not matter. Nothing was 'at stake' for these people. They all had a sense that what they were doing was needed and appropriate. This is a feature of the relationships between the people and organisations involved at this point. These relationships can be described as a coming together of like-minded individuals, supported by their respective organisations, to tackle the issue of sustainable building materials. This is not to say that there were no disagreements. One such disagreement is embodied in the contradictions that existed in the brief for the materials selector project. In late 2002 the agenda for the meeting between the SEAV and the URLC titled:

Development of an Embodied Energy and LCA⁴ framework
included the following guidelines:

'To provide guidance to the builders'.

But also,

'Builders that participate in this housing project will be required to adhere to a strict set of sustainable building design guidelines.'

Here, then, are potentially two different purposes for the tool: to provide guidance (advice) or to provide a strict set of guidelines (rules). Before Barton Williams moved to VicUrban, the view of the APMG and the CfD was that its primary function would be to educate the builders and, as a result, would be consistent with the 'provide guidance' ideal. They saw the tool as a resource that builders could use to select materials that were more sustainable than the products that they would normally use. The 'provide guidance' idea helped inform the initial design for the EcoSelector – the flip-chart. The idea of 'rules' would eventually transform the EcoSelector into the scoring assessment tool that it became.

The CfD's design process was profoundly shaped by two phenomena. First was the budget for the project, a modest \$10,000. However, the way the project was envisioned by the CfD, this was a more than adequate:

We propose a \$10,000 retainer program where we will invoice every 3 month based on the hours spent talking to builders,⁵ organising further workshops, and developing the guide. This could be settled by an MOU⁵ or an exchange of letters. We do not envisage that all the \$10,000 will be required but this will allow a structured resourced framework to develop the project.

Tasks that will be carried out as needed:

- talking to builders - hotline
- adding and updating the guide
- answering questions
- working with the government stakeholders on the toxicity and biodiversity issues

⁴ Life-Cycle Assessment

⁵ Memorandum of Understanding

- working with manufacturers
- workshops as needed
- developing and maintaining the website⁶

It is clear that the CfD saw their task as information-gathering, sharing, and facilitating better communication between the builders, architects, and the building product manufacturers. To this end, workshops were organised where manufacturers could showcase their products to the Aurora builders. Dr Hes saw these workshops as a highlight of the project, although she thinks that the workshops could have been more successful, had the building company's product specifiers been present too, not just the company Principals.

The second phenomena that profoundly shaped the EcoSelector were the commitment of the people involved. It is a feature of the development of the tool that the personnel and the organisations involved had a commitment to the overarching concept. From the presentation to the URLC and the SEAV, through to the expert panel drawn together to design the EcoSelector, all were, at the very least, sympathetic to the idea if not out right acolytes.

This idea of information sharing informed the overall methodology that the CfD used to develop the EcoSelector. A group of experts were called in to 'workshop' the idea. It was this group that came up with the basic structure of the EcoSelector which was to breakdown a house into its main assemblies, for example, floor, framing, roof, etc., and to then identify the main materials and products that might be specified for that assembly. Substitute products were then identified that would be more sustainable. In keeping with the idea that providing choice was the critical role for the tool, information was provided regarding any cost differences, the reason that the preferred product was better, and where it could be sourced. The products were assessed against one or more of four unsustainability criteria; embodied energy, resource consumption, toxicity, and biodiversity, depending on which were considered the most relevant for the specific product. For example, embodied energy was not considered when rating paints, but toxicity was. Similarly, biodiversity was the key criteria used to consider timber.

The flip-chart design embodied the idea of easy-use with features like having the most sustainable produces printed against a green background to make their identification easy. A builder could flip to the relevant section, have their eye drawn to the preferred product, and immediately see the environmental rationale for it, get an approximate cost variation, and be provided with the name and phone number of the supplier. However, the EcoSelector would significantly change.

With the amalgamation of the URLC and the Docklands Authority into VicUrban in August 2003, many of the URLC people left, possibly as a result of a change in the management style of the new organisation, which was more command oriented. For example, the idea 'if I can measure it, I can manage it' became prevalent. Although a reliance on measurement can be criticised because of the 'rubbery' nature of the numbers and problems associated with objectification, what is important here is that this idea became part of the organisational culture and was to be embodied in the EcoSelector. This meant the EcoSelector gained a scoring mechanism where points were allocated to each product and that these points were a function of the assessment of the product's sustainability credentials. This radically changed the orientation of the EcoSelector from being a quasi-educational tool to being a hurdle requirement which had to be 'passed' for builders to get approval for a proposed house. As a result, planning approval for each house at Aurora currently requires a report, based on the EcoSelector, which shows that the proposed house meets a minimum score of 100 points⁷. Each of the six main divisions within the EcoSelector have a minimum score that is based on the selection of materials and the amounts of each used in that house.

While the EcoSelector was being developed, the builders, whose behaviour was targeted for changed by it, were either comfortable with its scope, or were focusing on other issues, like the necessity of ensuring the required six star energy rating, passive solar design, or the aesthetics of Aurora. The implications of the EcoSelector appear not to have become apparent to the builders until the implementation phase, discussed below.

Thus, there seemed to be an acceptance by the builders of the ideal of using more sustainable materials, Indeed, a review of the EcoSelector in 2006⁸ found that the builders were, generally

⁶ Outcomes from the workshop_final.doc

⁷ In 2007 the minimum score went up from 80 to 100 points.

⁸ Independent review conducted on behalf of VicUrban by Deni Green Consulting Services

speaking, happy with this new requirement and wanted time for the new system to 'bed down' before considering further changes to the selector, like increased targets, significant additions, or revisions. Perhaps, in keeping with the pedagogical aspirations of the CfD, but certainly having regard for the high turnover of staff within the building industry, the builders identified training as an important issue that would need to be addressed.

(Changing) Values

Clearly the initial designers of the EcoSelector, the APMG and the CfD saw the issue of materials selection as being primarily educational. The values that underpin this ideal are that of rational choice (eg., Arrow 1970). According to rational choice, change, for example, sustainability, can be achieved through actors, in this case builders, being given sufficient information to rationally choose between materials that are better or worse according to how sustainable (i.e., good) they might be.

The URLC's Jill Lim said that her expectations for the EcoSelector was that it would be educational and that the issue of materials, whilst being identified, did not require much attention early on; the team being consumed by the more pressing challenges of six-star energy rating, the requirement for contemporary aesthetics and design, orientation for solar access, and shifting the URLC from selling land to land and house packages. Thus, the CfD was free to develop the EcoSelector with little need for negotiations with other stakeholders.

However, as noted above, there was a significant shift in the orientation of the EcoSelector, from educational, to requirement, arising from a change in the way the VicUrban was managed. John Tabart, the first CEO of VicUrban, while setting definite agendas and targets for the organisation, nevertheless provided latitude within them for people to work. One can speculate as to why, but after the creation of VicUrban, many staff of the URLC left. One of the effects of this shift was a shortage of skills within the new organisation. This was compounded by the fact that VicUrban was moving towards working in areas that hitherto, neither the URLC nor the Docklands Authority had experience in – designing a MPC that featured sustainable urban design. Barton Williams, working for the SEAV and consulting on the six-star energy aspect of the Aurora project was directly employed, bringing his skills into the organisation. He assumed responsibility for Sustainability within, what was now, VicUrban and readily adapted to its management style, being comfortable with rigid constraints, but allowed a free hand within those, to develop what he perceived to be appropriate tools.

Barton saw the need to, and agreed with the idea of, making the EcoSelector more of a requirement. Thus, he would have been comfortable instructing the CfD to incorporate a scoring mechanism. In interview Barton said:

(T)he vision was that it would be a tool that was user-friendly, particularly to the volume building industry, clearly identifying environmentally friendly materials with direction as to where they could get those materials from and based upon a minimum standard.

The idea of 'a minimum standard' is a critical reorientation of the EcoSelector from educative to requirement, and it is this shift that opened the door to criticism from industry sectors that felt threatened by, what they perceived as, unwarranted regulatory discrimination against their products.

As a guide, the flip-chart was indicative rather than absolute. However, the flip-chart was at best indifferent to Australian native hardwood timbers, having the 'green' flooring option being concrete with recycled aggregate and using waffle pods⁹. Furthermore, while the flip-chart did identify FSC¹⁰ certified timber as being alright to use, no non-plantation sources were or are available in Australia and even plantation sources are limited. Thus, all Australian native hardwoods logged from forests did not make it into the flip-chart. It is not the role of this analysis to determine the relative merits of this situation. What is important is that with the shift of the EcoSelector from guide to requirement, the timber industry saw the EcoSelector as a threat to its market, despite, what they argued are sustainable government-regulated forestry management practices.

The timber industry was particularly troubled by what they perceived as a bias in the EcoSelector against the use of Victorian native hardwood timbers. This debate raged, embroiling the Victorian Association Forestry Industries (VAFI), VicForests, and the Timber Promotion Council in a protracted dispute with VicUrban and the CfD. Also involved were the Department of Primary Industries,

⁹ Waffle pods are polystyrene blocks that create voids in the slab, reducing the volume of concrete.

¹⁰ Forest Stewardship Council

Department of Sustainability and Environment, Sustainability Victoria, the Building Commission, and the Minister for Major Projects.

The pursuant imbroglia saw criticism of; the methodology used by the CfD, the sustainability of the State governments' hardwood harvesting policies and practices, a scrutinising of the relative merits of two different timber certification schemes, and accusations regarding restrictive trade practices¹¹. This issue is now resolved through the recognition of certified timbers (Wallis & et al. 1997) by the EcoSelector, although it is interesting to note that while FSC timbers are specified, AFS timbers are 'allowed'. but not, yet¹², specified. In an interesting return to the original brief for the Aurora Materials Selector, the idea of life-cycle assessment is now firmly back on the table,¹³ with a working group looking at the issue from an industry-wide perspective, not just that of one project.

There is a discernable interplay between competing agendas in this story. There was the early didacticism preferred by the CfD. There was the new managerialism at VicUrban exemplified by the 'if I can measure it, I can manage it' attitude. The outcome of this relationship opened the door to other forces like the timber industry which, in turn embroiled other governmental bodies. All of this took place against a growing consciousness regarding unsustainability within the community, professionals, and government.

This interplay of forces saw the EcoSelector go from being an easy to use guide to a hurdle requirement for the builders. These forces were also responsible for changing the way in which the EcoSelector would be used. For example, early prohibitions of the use of rainforest timbers at Aurora have been dropped although they are still discouraged. Other fine tuning has also occurred. Up until recently the minimum score for the flooring could not be met by a timber floor, even if the timber specified was not harvested from forests, this has now been changed. So, what we have is a series of often unforeseen interactions coming about through the actions of various people on behalf of various interests. This had led to the EcoSelector, not only changing, but being a catalyst for further industry wide investigation and the possibility of change.

Interestingly, some of the outcomes stemming from the development of the EcoSelector were probably unforeseen, or at least covert. For example, prior to the advent of the EcoSelector there were no entry doors on the market that did not contain rainforest timbers. Now, as a direct response to the demand created by the EcoSelector, Corinthian Doors has created a new range of doors that are rainforest timber free.

Also, unforeseen users of the EcoSelector have occurred. The fact that the EcoSelector was specifically designed to be used for Aurora has not stopped some Architects picking it up, and even using it to score their projects.

Theorising Innovation

It is a feature of research that a 'making sense' of data has to happen. Seventeen of the people involved with the development of the EcoSelector have been interviewed and asked a series of open-ended questions designed to allow the interviewees to tell the story of their involvement. These stories were then interpreted and arranged, augmented by an examination of relevant documents so that the data might answer the question 'how relationships affect outcomes' and, more specifically in this case, innovation around the issue of sustainability. It is likely that a different question and or a different researcher would tell a different story (Buchanan & Bryman 2007). However, perhaps more telling, is the idea that had I¹⁴ not had my particular intellectual odyssey, that the theoretical framework, herein, would have been quite different. Given my history; it might have been Marxist or Foucauldian. However, what I have come up with is a pastiche of ideas drawn from psychology, philosophy, ecology, and the social sciences, using a dialectical framework to consider the physical and socio-cultural relationships between the environment and humans and how these are played out by agentive people. In doing this, I am engaging with the structure-agency debated within the social sciences, a debate that tries to come to terms with the fact that people are not automatons. Rather, we all operate within a particular context, not of our choosing, that affords us constraints and opportunities that we may or may not see, or use.

¹¹ The threat of legal action is a weapon that is being used regularly against environmental groups, even when a case may have little or no merit. See (Walters 2003)

¹² Manufacturers can apply to have their products included in the EcoSelector

¹³ It is fascinating that LCA was foregrounded in early discussions during 2002 but was not actively pursued, but now, after the intervention of VAFI and others, is now likely to be the preferred methodology for future work in the area of materials selection.

¹⁴ I write in the first person here as a way of locating myself within specific cultural and historical that affords me the opportunity to do this particular work and develop this particular theoretical framework.

The core of the theory is based on Vygotsky's socio-cultural model of development (Vygotsky & Cole 1978). This model proposes that humans develop through a dialectic relationship with others. Language and meaning are acquired and built upon by the individual in a hierarchical manner. Onto this is grafted Insights from Wittgenstein (Wittgenstein 1958) and Bourdieu (Bourdieu 1977) who between them suggest that habit, that which is already learned and embodied, provides us with a form of life, as persons inscribed with socio-culturally relevant tastes, values, practices, and repertoires of behaviour. Importantly, these habits are identity-defining and provide the basis on which we are able to act. These habits also delimit our appreciation of the affordances we encounter (Gibson 1979). For a Barton Williams, or other sustainability acolyte, the opportunity to promote a sustainability agenda must be both perceived and possible, and what is perceptible and possible is defined by both our enculturated-selves and the enculturated-environment that we inhabit. This niche, for example, which Barton occupied at VicUrban was one that afforded his actions, fostering the development of the EcoSelector. VicUrban too can be viewed as occupying a niche, one that afforded its adoption of sustainability as a policy but this, of course, had to be given effect by actors. To 'do' sustainability is to change unsustainable practice. VicUrban afforded Barton an opportunity which he was able to exploit. Importantly, Barton's actions fed back into VicUrban, re-defining the organisation and other people there. This meant that when the timber industry lobbied VicUrban, government departments, and the Minister, there was support within VicUrban to defend the EcoSelector. Importantly too, the relationship that VicUrban had with the CfD was such that the two organisations supported each other throughout the dispute. This is a function of the commonality of purpose, (i.e., shared values) of the people involved in developing the EcoSelector.

Change, in this case innovating for sustainability, takes place against a constant background of habit. Habits engender faith, the 'knowing' that accompanies 'but we've always done it this way'. Faith provides us with templates for action. A tradesperson has faith in their abilities to do a task. Through an apprenticeship they go from having no or little ability (nor faith that they can do a task), through a period of learning and doing that inscribes them with the practices of their trade. Once trained, the uncertainty (lack of faith) of the novice is replaced by a trust in one's own abilities to do. Faith, then, is the springboard from which we act. Just as a carpenter knows that a nail will fix a piece of timber in place so too does the teacher know that the lesson will teach the student. The fact that the timber might split or the student might be recalcitrant does not negate the faith of the carpenter or teacher in their abilities or rightness of their strategies. Dr. Hes's satisfaction with the workshops where the sustainable products were exhibited to the builders was a function of her faith in the overarching idea that providing an opportunity for the builders to learn about 'good' materials would lead to more sustainable outcomes. Dr. Hes's assessment that the workshops might have been more successful if the building companies' materials specifiers had been there, rather than the Principals, does not temper her faith in the overarching didacticism.

As well as providing a way to act, faith and habit can engender resistance to change because the repetition necessary to habituate a practice is time and resource intensive and, as such, has value. To change building practice is to shift the habitual practice of the builders, getting them to adapt to new conditions. A proposed change in habit incorporates a cost, be it in time or lost productivity. The level of resistance to, or acceptance of change, is a function of the perceived adaptiveness or value of the proposed change. Coming full circle, the perceived adaptiveness is measured against the tastes, values, and behaviours already embodied in the person or organisation concerned.

Thus, change can be sought or imposed depending on how the person or organisation's habits, values, and behaviours align with those of the proposed change agent. In pursuing sustainability, both the URLC/VicUrban and the CfD wanted change and sought it. Was it adaptive for VicUrban to develop the EcoSelector? Given their Government supplied mandate via statute and policy, yes it was. 'Sustainability' has the status of faith/practice/value within VicUrban. As such, the pursuit of sustainability (the EcoSelector being agentive) is perceived as right. Similarly, the timber industry has faith/value/practice in harvesting and selling timber. Hence, considering the timber industries tastes, values and behaviours, it is not surprising that they acted to defend what they perceived as a threat to their livelihood. The timber industry perceived the EcoSelector as a threat to their current practices/habits and resisted.

It is noteworthy that the builders themselves did not perceive the change in materials selection as being particularly problematic. For example, Burbank Homes' David Borg, while expressing some concern with the implementation of the EcoSelector, nevertheless saw the underlying concept as sound. Burbank can be seen to have good reasons for going along with VicUrban, the least of which is the fact that they are in the business of building houses. But it is worth considering that other

builders have pulled out of Aurora and that Burbank has started to address issues of sustainability beyond the Aurora estate. For example, they have recently started offering six-star energy compliant homes on other estates and have employed a sustainability expert to liaise with VicUrban and to advise Burbank themselves as they deliberately move towards being more sustainable. However, this movement is constrained. Each proposed shift towards being more sustainable is considered against its possible commercial effects. Cost plays a significant role in the volume building market and changes that can be made without a significant impact on actual practices are going to be the most readily taken up. To be engaged in commercial activity is to be particularly sensitive to existing faith/practice/habit, even if a business may not frame the problem of change in this manner.

None of the more innovative materials in the EcoSelector, like the Ortech compressed straw wall panel system¹⁵, have yet been used. Generally speaking the builders have specified materials that do not require a change in practice or suppliers. A further example of this resistance caused by existing practice is that while using old car tyres as void formers in concrete slabs is preferred to using polystyrene waffle pods, because tyres are not in the standard building supply chain, they have not been specified. Supplying and using old car tyres is too out of keeping with the habits of mass house building. Even with replacement products, there have been problems. In some cases there has been a mechanical implementation of a requirement that exhibits a lack of actual change in practice on the part of one or more of the people involved. For example, a concrete slab that was supposed to have fly-ash (an industrial by-product) added to it so that it would meet the specification of the EcoSelector was mixed and laid with no fly-ash. The concrete supplier refused to take responsibility for providing 'Aurora' mix's, being unwilling to change their practice of supplying via invoice, and the driver in this instance had trouble dealing with a variation on what he would normally ask for.

The supply chain within the industry has a further impact on change. The building companies tend to have substantial contracts with one or two suppliers to keep prices down. If the supplier does not have a preferred product, then the builder may not go elsewhere to source it, again evidence of practice being preferred over change. The current scoring flexibility in the EcoSelector means that the builders can 'cherry pick' what products they specify. As such, there is scope to put pressure on the supply chain via the EcoSelector should VicUrban continue to use the tool to push sustainability further by weighting the scores of preferred products and pushing the minimum total score per house higher. The Corinthian door example shows that the industry can respond. However, change that requires a change in practice on the part of the trades-people is dependant on training. If products like the Ortech panel system or using used-tyres for void formers in concrete slabs are to become apart of the mass house building industry, then the practices of the people on the ground who have to do the work, have to be changed.

VicUrban sees one of its roles in the land market as making the industry more sustainable. Generally this idea is couched in terms of marketing; by offering a better more sustainable product that consumers will prefer when considering the purchase of a new home. While the example of Burbank homes provides some support for this idea, it is evident that there are significant forces at play that have little to do with market forces. The fact that Burbank is taking on the values of sustainability while other builders have walked away from Aurora is indicative of these forces. Both individuals and organisations require a fit between existing faith/practice/values and that which is being proposed for change to take effect. Otherwise the proposal is ignored or met with resistance. The CfD included the reason for a product being more sustainable in the EcoSelector. This helped with the 'why' of the product, but does not address the 'how' of change. While the builders may have identified training in how to use the EcoSelector as being important, training to develop new practices is vital if sustainability is going to transform the 'Australian dream'.

In conclusion, it is argued that innovation can be conceived of as an adaptation to a perceived change in a relationship. However, these relationships are multitudinous and web like, being a function of the way that we inhabit our physical, social, and spiritual worlds, and self. These relationships define the habits, values, and behaviours from which we are able to act. The acts that we perform are likely to be defensive if we feel that another actor is working contrary to our habits, values and behaviours. However, if we perceive a prospective change as being aligned to our habits, values and behaviours we are likely to embrace that potential for change. We learn, create, and innovate, adapting to the proposed change and, once that change has been intergraded and habituated, it becomes a part of who we are.

¹⁵ <http://www.ortech.com.au/>

Because unsustainability affords change, by definition it is difficult. However, because of the growing awareness of unsustainability within the community at large, the conditions are more favourable now that they have ever been for getting people and organisations to adapt to our changing world. But, the key to actual change is practice. From this perspective, thinking about the competing styles for the EcoSelector, didactic or requirement, (and of course, in some regard it does both) it is evident that the regulatory aspect was vital. For a didactic approach to work the change would have to be aligned with the pre-existing habits, values, and behaviours of the builders, and importantly, the sub-contractors who use the materials. The building industry, traditionally, has been characterised as conservative, not particularly innovative, and responsible for trends that are unsustainable by marketing increases in house size and ignoring passive heating and cooling, and opting for energy consuming solutions to the problems of poor design. This too forms a part of the context that VicUrban is operating in; struggling with an 'Australian dream' that limits what might otherwise be imagined. The opportunity afforded by the growing acceptance of unsustainability within the wider community sets up a condition for change. The EcoSelector is a tool designed to forge that change. It has not radically changed the materials used at Aurora but forms a part of a growing movement towards more sustainable volume housing.

Aurora, in the conceptual phase, was built upon the material and conceptual conditions at the time, for example, the water-sensitive design practices being used in other MPC's. Aurora, as built, has the potential to help set the practices that will allow for other, more sustainable ideas and practices to be developed. The pace of this adaptation is contingent on how quickly the agents of sustainability can exploit the opportunities to affect practice; those habits/faiths/values that make-up the structures that afford agency, delimiting both the boundaries and opportunities of what is possible.

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