Nightingale Housing: The story of an unprotected niche

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Summary: This paper investigates the Nightingale model of housing as a niche. Unlike typical niche development reported in the transitions literature, the Nightingale has been developed outside of a protected space by concerned stakeholders who were part of the existing regime, and provides a different narrative for niche development.

Introduction

The negative environmental impacts of the residential sector are well known. While buildings only account for 6% of global climate emissions, transport and heating and electricity produce 14% and 25% of emissions respectively, both of which are directly linked to buildings (IPCC 2014). The design and construction of housing influences the type and amount of energy used, and the location of housing influences transportation distances and mode choice. The need to deliver more environmentally and socially sustainable housing is critical if we are to transition to a low carbon and equitable future (Lovell 2004; United Nations 2015; Horne 2017). Many countries have responded to the challenge of delivering sustainable housing by introducing different policy and market-based approaches to improve the environmental performance of housing (Berry & Marker 2015). However, these attempts have mostly acted as stepping-stone rather than instigate wide-scale transformation (Smith 2007; Berry & Marker 2015). The housing sector (regime) remains entrenched in old ways of doing things and is often reluctant to change (Crabtree & Hes, 2009). We need to find ways to challenge the status quo.

Within sustainability transitions research, there has long been an emphasis on the role of niches and niche developments (Geels & Raven 2006), and many studies have traced the development of new regimes or systems to a particular niche (Geels 2005). This paper continues this tradition by investigating Nightingale Housing as a niche within the Australian housing industry. However, unlike typical niche developments reported in sustainability transitions literature, Nightingale Housing has been developed outside of a protected space by concerned stakeholders who were part of the existing regime (i.e. architects), and provides a different narrative for niche development (Smith & Raven 2012). These actors have managed to navigate a pathway through a number of challenges, and now accelerating towards a transition to support system change (Gorissen et al. 2017). We argue that Nightingale Housing has clear implications for housing and sustainability transitions, not only in Australia but globally.

In addressing this, the paper is situated within sustainability transitions literature on niches, with a focus on housing. Our investigation of Nightingale Housing uses existing literature on evaluating niches, which includes Smith and Raven's (2012) properties of niche protection, Gorissen et al.'s (2017) framework for examine the acceleration of urban transitions, and we draw on a number of authors' work to explore the different actors involved in Nightingale Housing (Fischer & Guy 2011; Fischer & Newig 2016; Martiskainena & Kivimaa 2018). The aim of this paper is to not only to present a thorough investigation of Nightingale Housing, but to contribute to the literature on evaluation and uptake of niches. We therefore end the paper with some reflections on the use of these forms of niche evaluation, and lessons from Nightingale Housing.

Nightingale Housing

The Nightingale Housing is a housing model that was developed by a group of concerned local architects in response to the worsening quality of higher density housing in Melbourne, Australia. Their goal was to provide housing which is more sustainable, affordable, liveable, and socially engaged than what is typically delivered (McLeod, 2015). The model began in 2007, when six of these architects purchased a block within an inner city municipality in metropolitan Melbourne. Their initial development, called The Commons, took some time, but was completed in 2013. The Commons contains 24 one and two bedroom apartments across five stories, in addition to ground floor retail and commercial space across a gross floor area of almost 3,500m^2 (Figure 1). The development is unique in its approach because the design team used a reductionist approach to remove things which typically add significant cost to a project (McLeod, 2015). For example, they removed all onsite car parking spaces (the site is located next to a train station), second bathrooms, and individual laundries (instead locating a shared laundry located on the roof). This design approach was used to not only save internal space in the apartments, but to reduce associated construction costs, and to help foster community by providing a place for residents to cross paths and engage with each other. The design also delivered significant improved sustainability outcomes, including a minimum building envelope thermal performance which was 40% better than minimum building code standards.

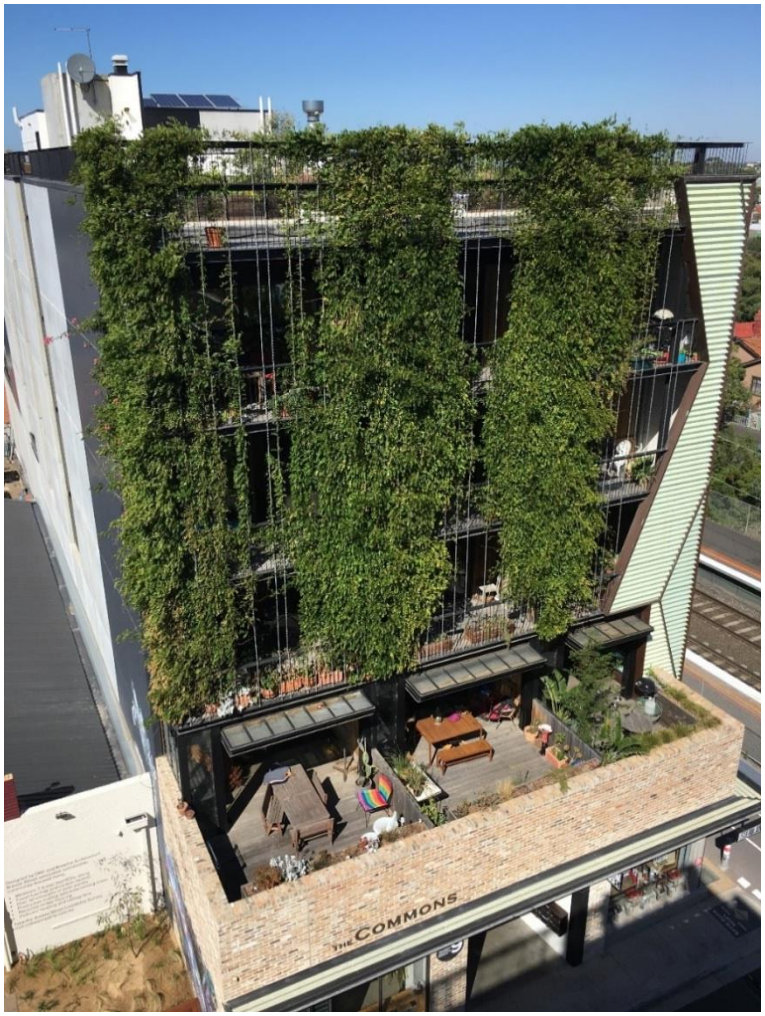

Figure 1 The Commons (author supplied)

The Commons has been widely praised by the building industry, policy makers, and sustainable/affordable housing researchers for being a leading exemplar of sustainable and affordable design, not just for Melbourne but across Australia. The development has also won several industry awards including international, national, and state multi-unit residential and sustainability awards. Following the success, and growing interesting in the model, the design team used what they had learnt from their first project to develop an improved way of providing higher density housing in Australia. This model is now referred to as the Nightingale Housing model due to the names giving the subsequent two developments: Nightingale 1 and Nightingale 2.

Figure 2 Nightingale 1 (Breathe Architecture)

Nightingale Housing builds upon what was achieved in The Commons, and sets out clearer parameters about what such developments need to achieve. It does so through setting guiding principles (Table 1) related to affordability, transparency, sustainability, deliberative design, and community contribution. These include building performance targets such as minimum thermal comfort performance above minimum building code requirements, as well as others broader comments about the process of delivering such developments e.g. deliberative design. The affordability principle also considers affordability beyond the completion of the development through the use of ethical investors (with profits capped at 15%), and the use of a covenant which restricts owners selling apartments for more than the average price rise of the neighbourhood.

Table 1 Nightingale Housing guiding principles (Nightingale Housing, 2018b)

<table>
<tr><th>Affordability</th><th>Transparency</th><th>Sustainability</th><th>Deliberative design</th><th>Community contribution</th></tr>
<tr><td>Project profits capped at 15%</td><td>Transparent project costs to investors and purchasers</td><td>100% fossil fuel free building operations, e.g. via an embedded energy network</td><td>Meaningful and informed participation from future home owners across the project, from design through to settlement</td><td rowspan="4">Contribution back to the local urban community through the creation of connected communities, active street frontages, fine-grain and tactile pedestrian experience for passers-by, and engagement with tenants who can provide ‘third’ spaces’</td></tr>
<tr><td>Designed to reduce operating and maintenance costs</td><td rowspan="3">Transparent governance and decision-making processes</td><td>Minimum 7.5 star NatHERS thermal rating</td><td rowspan="3">Purchasers given real cost information during the design process to support informed decisions</td></tr>
<tr><td>Removal of unnecessary inputs, e.g. marking activities and display suits</td><td>Water harvesting and productive gardens</td></tr>
<tr><td>Covenant on resale to ensure affordability is passed on</td><td></td></tr>
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Conceptual framework: sustainable housing as a niche

The conceptual framework for this research is situated within sustainability transitions and sustainable housing literature. In particular, we locate our work within the concept of niches in transitions and draw from strategic niche management. Then, we investigate housing within transitions literature, and conceptualise housing as a niche. Finally, we explore different ways niches are evaluated to examine the experience of Nightingale Housing as a niche.

Niches in transitions literature

There has long been an emphasis on niches in sustainability transitions to support systemic change (c.f Weber et al. 1999; Geels 2002, 2005; Smith 2007; etc.). The term niche is used to denoted protected spaces away from wilder environments or insulated from markets (Rip & Kemp 1998; Geels 2002), or the process where an organism alters a system for its improvement or to increase the chance of survival (Odling-Smee et al. 2003). More broadly, niches are used to refer to small-scale interventions or radical innovations, that when build up momentum, may lead to bottom-up change (Geels 2002; Smith 2007). Niches have also been conceptualised as a form of experimentation, where niche experiments are defined as experiments that support more radical regime change, often in protected “laboratory-like conditions” environments by “regime-outsiders” (Weber et al. 1999; Sengers et al. 2016).

Researchers have been attempting to understand how different niches develop, their relationship with regimes, and how to have them go from a niche to challenge the regime (Geels & Raven 2006; Geels 2005). “The idea of ‘protective space’ shielding niche innovations from unfriendly selection

environments in a fundamental concept" in sustainability transitions literature (Raven et al. 2016, p. 164). For example, strategic niche management (SNM) has been forwarded as an approach for providing protection to niches (Raven et al. 2010; Smith & Raven 2012; Coenen et al. 2010). This perspective emerged from awareness that many innovations never make it out of the laboratory or showroom (Raven et al. 2010). Protective spaces are meant to help niches develop rules, expectations, and stability to test and evaluate new alternatives, and to challenge the incumbent regime (Smith & Raven 2012; Geels 2011; Geels & Raven 2006; Rotmans et al. 2001).

There are increasing examples of where protected space is being provided to develop niche experiments in the built environment; and this protected space is typically provided by governments. Developing these protected experiments allows the existing regime to see what is possible by providing a 'living laboratory' where real world outcomes of innovation can be tested and evaluated (Brown & Vergragt, 2008; Geels & Raven, 2006). For example, one of the best known early sustainable housing developments, BedZED in the UK, was built on land that was sold to the developer by the local authority for below market value so that the project could be economically viable (Peabody, 2017). Similarly the City of Issaquah in Washington, USA, brokered a deal to transfer land to a developer who built zHome, a zero net energy development which incorporates affordable housing and aims to be a replicable model of sustainable urban development (Living Building Challenge, 2015). In Australia, the State Government of South Australia used a range of policies and planning requirements to establish Lochiel Park, a model green village to challenge energy and resource consumption boundaries of traditional construction and living (Berry, Whaley, Davidson, & Saman, 2014).

Housing in transitions literature and housing as a niche

Sustainable housing has been identified as a niche within the broader discussions of urban sustainability transitions (Berry, Davidson, & Saman, 2013; Laurentis, Eames, & Hunt, 2017; A. Smith, 2007). In part, this has emerged from an understanding that a transition to a low carbon housing future will require more than just a technical solution and in fact require deep structural changes to the way housing is provided and used (Svenfelt, Engström, & Svane, 2011). Over the past decade or so there has been an increasing focus across different countries on trying to understand sustainable housing within a 'transitions framing' (Bergman, Whitmarsh, & Köhler, 2008; Boyer, 2015; Foong, Mitchell, Wagstaff, Duncan, & McManus, 2017; Moore, Horne, & Morrissey, 2014; A. Smith, 2007). These researchers have examined different elements relating to specific sustainable housing niches (Gibbs & O'Neil 2018), as well as the relationship between sustainable housing as a niche and the existing regime.

For example, Smith (2007) contrasted the different socio-technical practices in sustainable and mainstream housing across seven key socio-technical dimensions, highlighting several challenges for sustainable housing uptake. Others have looked beyond the individual house scale. For example, Boyer (2015) investigated sustainable housing within ecovillages through grassroots innovation and finds that while there is some evidence of sustainable housing practices spreading beyond the boundary of the villages, that "that niche-to-regime translation occurs through projects that position themselves as part of two action domains at once" (p. 320). Berry et al. (2013) also evaluated a low energy housing development in Australia and found similar outcomes to Boyer; that is that while there is some evidence that such developments influence the broader building industry, there is substantial difficulty in engraining sustainable housing concepts into the regime.

Researchers such as Tambach et al. (2010) and Moore et al. (2014) have looked at sustainable housing transitions through analysis of current and future policy requirements. Bergman et al. (2008) assessed a transition to sustainable housing in the UK through the development of potential policy development pathways to 2050, finding that significant support must be given to protect

niche sustainable housing developments if they are to challenge the imbedded regime. Others such as Tambach et al. (2010) and Moore et al. (2014) have assessed existing housing and energy policies in jurisdictions such as Australia, Netherlands, UK, EU, USA and California against a socio-technical transitions frameworks. Both groups of researchers concluded that critical elements were missing from the current range of policies if a transition to a more sustainable, low-carbon housing and energy future was to be achieved. These included a lack of a long-term policy agenda, a lack of up-skilling industry, fragmented co-ordination with other related government policies (e.g. greenhouse gas emission reduction targets), and limited engagement with social elements of housing.

Evaluating niches

While there is a relatively substantive body of literature on niche innovation and experimentation within sustainability transitions, there is still a need for further conceptual and empirical work to better understand and evaluate the processes of change and uptake of niches and experiments (Luederitz et al. 2017). This includes examining the narratives of niches (Smith & Raven 2012), the actions of niche actors (Martiskainena & Kivimaa 2018), and the acceleration dynamics of niches (Gorissen et al. 2017).

Smith and others (Adrian Smith, Kern, Raven, & Verhees, 2014; Adrian Smith & Raven, 2012) have identified key elements for constructing strategic protected spaces. These authors discuss the important requirements of shielding, nurturing, empowering, and developing narratives. Shielding and nurturing provides a protected space for the niche to grow on a more level playing field, for example point of sale rebates for residential solar photovoltaics. Empowering focuses attention onto whether the niche either 'fits and conforms' with the existing regime (e.g. solar photovoltaic rebates, which when removed allow the technology to still compete in the open market) or 'stretches and transforms' where the niche protected space becomes institutionalized into a new regime. There are also challenges related to protected spaces such as how to get the right balance between protection and selection pressure, how to roll back protection measures and how to accelerate development to challenge the regime (Heiskanen, Nissilä, & Lovio, 2015; Hommels, Peters, & Bijker, 2007; Kemp, Schot, & Hoogma, 1998; Schot & Geels, 2008).

Central to Gorissen et al.'s (2017) paper is the question of whether transition initiatives (niches, experiments, etc.) actually contribute to accelerating sustainability transitions. While others such as Luederitz et al. (2017) and Schäpke et al. (2018) have developed schemes for evaluating and comparing urban experiments and living labs, Gorissen et al. (2017, p. 12) adopted "a governance and agency perspective to study acceleration mechanisms" which they are argue "provides a basis for the development of a more sophisticated view of how agents shape and are shaped by their governance contexts and environments". Their conceptual framework tries to understand the acceleration dynamics of transitions through five mechanisms: replicating (uptake), partnering, upscaling (growth), instrumentalism, and embedding. The five mechanisms are illustrated in s-curve to demonstrate the successive impact of the different mechanisms in accelerating urban sustainability transitions, see Figure 3.

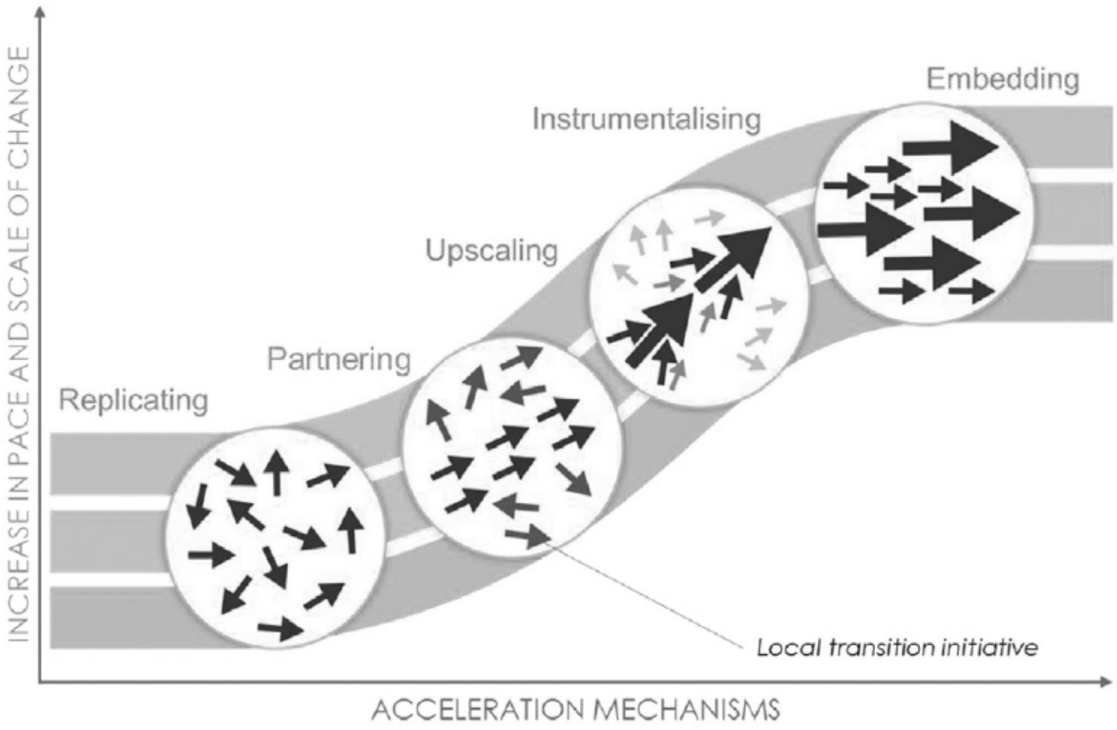

Figure 3 A conceptual visualisation of the five mechanisms for acceleration of urban transitions about how they can contribute to systemic change (Gorissen et al. 2017, p. 4)

Agency and power in transitions have long been under-conceptualised, however there is increasing attention being placed on the different actors involved, actor typologies, and the role of actors in transitions (c.f. Avelino & Wittmayer 2015; Schot et al. 2016; Whittmayer et al. 2017; de Haan & Rotmans 2018). The work of Martiskainena and Kivimaa (2018) is particularly relevant to our research, as they combine SNM literature with conceptualisations of intermediaries and champions (actors), and local building projects. Their framework is used to examine the role of particular sets of actors in the development of a niche from a single building project, to multiple projects, that may eventually impact the regime (see Figure 4.). The trajectory of the niche is tracked by investigating the kinds of actors that take on intermediary and championing roles, the activities they undertake at different phases of the building projects, and the connection to SNM. As this approach was developed within the context protected niches (Smith & Raven 2012), the emphasis is on actors that are not involved in the innovation process, but rather those that support the niche. Fischer and Newig (2016) offer additional definitions and roles of actors within transitions processes, including niche and civil society actors. These actors are diffusing innovative ideas and practices, pushing and encouraging regime change, and representing new landscape-level trends (Seyang et al. 2011; Fischer & Newig 2016).

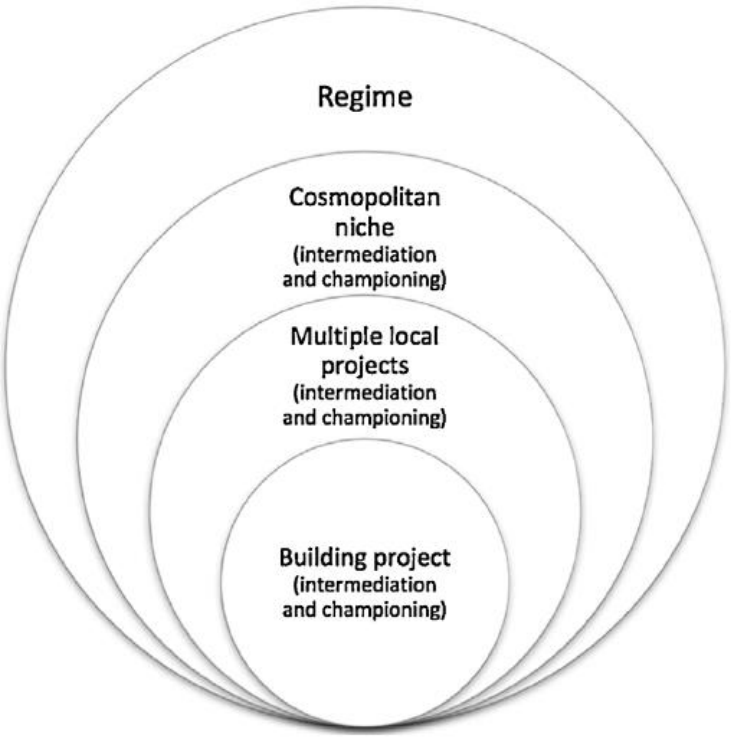

Figure 4 Layering of intermediation and championing from local building projects to the cosmopolitan niche (Martiskainena & Kivimaa 2018, p. 21)

Research design

To date, there has been limited academic research on Nightingale Housing. However, there has been significant amount of public discussion about the housing model in the media (print, online, and, radio) and other outlets (e.g. industry conferences). Public discussion, such as the one surround the Nightingale Housing, can play important role in the collection of data for case study research (Yin 2014). Nightingale Housing reports and project documentation were available through their website. Therefore, we relied significantly on these forms of documentation to collect data for this paper, and conducted a qualitative content analysis of the publically available information. The qualitative approached taken emphasizes the meanings and understandings of the content across a range of outputs, rather than the frequency of particular words, and relies on clearly defined categories for analysis (Julien 2008). While this approach depends on our interpretation of the context and meaning of the content, the use of different data sources (e.g. multiple interviews with the lead architect over time) can help address this. In addition, we participated in a building tour of Nightingale I led by a Nightingale Housing architect (who is also a resident of the building), as well as site tours of The Commons and the Nightingale Village.

A systematic search of the publically available documentation was undertaken. The search began with the main website and key documents and information collated about the Nightingale model. A general 'Google' search was then conducted using: 'The Commons', 'Nightingale', 'Nightingale housing', 'Nightingale model', in addition to the names of key stakeholders involved such as 'Breathe Architecture' and 'Jeremy McLeod' were used to identify other information relating to Nightingale Housing. This content analysis approached relied mostly on secondary data, and while there are drawbacks to this, one of the main benefits of this approach was the analysis of multiple documents and interviews across a period of almost 10 years. Primary data collection would have only provided information (and points of view) from a single moment in time.

Our analysis of Nightingale Housing is based on the literature on evaluating niches (see above), and is divided into three approaches. First, we use Smith and Raven's (2012) concepts of shielding (protection), nurturing (assistance/support), and empowerment (developing competitiveness) to argue that Nightingale Housing is a unique example of an unprotected niche. Second, we apply Gorissen et al.'s (2017) conceptual framework for acceleration of urban transitions to examine the acceleration dynamics of Nightingale Housing. We categorize the different activities and outcomes of Nightingale Housing against the five mechanisms (replicating, partnering, upscaling, instrumentalising, and embedding) to uncover how it is accelerating, and whether it is contributing to systemic change. Third, we explore the different actors involved in Nightingale Housing, focusing on niche actors (Smith & Raven 2012; Fischer & Newig 2016), and innovation intermediaries and champions (Martiskainena & Kivimaa 2018). The aim of our analysis is to present a thorough investigation of Nightingale Housing, as well as contribute to the literature on evaluation and uptake of niches.

Nightingale Housing as an unprotected niche

Unlike many of the other examples of niches in the transitions literature, Nightingale Housing has developed outside of a protected space. This is evident in both the initial building, The Commons, along with subsequent developments in the Nightingale Housing model that have not had the benefit of shielding and nurturing (McLeod, 2015). At each step of the planning, development, and construction of these apartments, the team have had to work within the constraints of the existing regime and has not had the benefit of protection, which creates a more level playing field as highlighted in the literature. For example, the land for all developments has been bought at market value. This is different to other sustainable housing examples in Australia and elsewhere which have often had assistance to acquire land (Berry, 2014; Living Building Challenge, 2015; Moore & Higgins, 2016; Peabody, 2017).

Furthermore, financing for The Commons was through traditional means i.e. obtaining a loan from a bank. There is no clearer evidence that there was no protection afforded to the development than the global financial crisis which occurred between buying the land and seeking financing. This meant that no bank was prepared to lend money to fund the development, despite the majority of the apartments having already been sold off the plan. The design team, who had hoped to fund the development themselves, turned to an ethical developer (Little Giants Developments) to deliver the development.

Perhaps the only element of potential shielding and nurturing is the support The Commons received by the council. Moreland City Council granted the project planning approval even though the development included features which were not typically found in Melbourne apartments at that time, such as the elimination of onsite car parking because the development is next to train stations and therefore well serviced by public transport. However, any quasi-protection provided by the council has been short lived with the next development, Nightingale 1, which was challenged by the existing regime and taken to a formal review processes. This has resulted in having to change their design and include 3 onsite car parks. The council's support was expected by the design team who chose early locations for development not only based on connections to public transport, local amenity and other requirements, but also targeted areas where local councils were known to have more support for sustainability.

In relation to empowering, key stakeholders involved in Nightingale Housing have been clear that they want to disrupt and challenge the existing regime. They want to 'stretch and transform' the housing industry; however they are doing this without protection. This, arguably, makes their

challenge of the regime even stronger as it is demonstrating that it can be done despite regime resistance. This is evidenced by the rapid uptake of developments (see below) and high numbers of people on a waiting list to buy into these developments. By developing outside of a protected space, the model has been robustly tested both by the niche supporters and stakeholders as well as the regime. In this way there is also no 'protection' which needs to be removed at any stage which has been identified as one of the major challenges for niches to challenge regimes.

Nightingale Housing niche acceleration

To better understand the acceleration dynamics of Nightingale Housing as a niche, we explore its trajectory through Gorissen et al (2017) conceptual framework. The first mechanism identified to support the acceleration of a niche is replication. This is defined as "the uptake of new ways of doing, thinking and organising (DTO) of one transition initiative by another transition initiative or different actors in order to spread out these new ways" (p. 3). To ensure the knowledge and learning around Nightingale Housing was shared with others in the industry, the team established Nightingale Housing Pty Ltd as a not-for-profit social enterprise in 2016 to help develop more Nightingale projects (Nightingale Housing, 2018c). Through this organisation, architects can apply for Nightingale licenses to developed similar projects. There are now more 20 licenced architects and 17 licensed projects under the Nightingale banner (see Table 2 and 3). The developments have spread outside of Victoria (VIC), and are now being developed in Tasmania (TAS), Western Australia (WA), Queensland (QLD), and New South Wales (NSW). As of early 2018, Nightingale Housing have begun a new type of development called Nightingale Baugruppen (after the housing model developed in Germany which translates as 'building group' and stands for a self-initiated, community-oriented approach to building multi-unit developments) (Nightingale Housing, 2018a). This approach will be used to build the Nightingale Village, a collection of seven buildings on one block in Moreland City Council, Melbourne.

Table 2 Nightingale Housing projects (completed and underdevelopment)

Lead	Project	Status	Location	Year
Breath Architecture	The Commons (precursor to Nightingale)	Completed	Brunswick (VIC)	2007-2013
Breath Architecture	Nightingale I	Completed	Brunswick (VIC)	2014-2017
Six Degrees Architects	Nightingale II	Under construction	Fairfield (VIC)	2017-
Austin Maynard Architects	Nightingale III	Planning	Brunswick (VIC)	2017-
ClarkeHopkinsClarke & Breath Architecture	Nightingale Brunswick East	Under construction	Brunswick East (VIC)	2017-2019
EHDO Architecture	EHDO Nightingale Fremantle	Planning	Fremantle (WA)	2017-2019
Core Collective	The Commons Hobart	Planning	Hobart (TAS)	2017-
Architecture Architecture, Austin Maynard Architects, Breathe Architecture, Clare Cousins Architects, Hayball, Kennedy Nolan, WOWOWA Architecture	Nightingale Village (seven separate buildings)	Land purchased, pre-planning	Brunswick (VIC)	2017-

Table 3 Nightingale Housing projects (licensed)

Lead	Status	Location	Year
Clare Cousins Architects	Land acquisition	Inner Melbourne (VIC)	2017-
Kennedy Nolan	Project establishment	Inner Melbourne (VIC)	2017-
Hayball	Equity raising	Inner Melbourne (VIC)	2016-
Coy Yiontis Architects	Project establishment	Brighton (VIC)	
Architecture Architecture, Breath Architecture, Urban Coup (co-housing group)	Land acquisition	Melbourne (VIC)	2017-
James Davidson Architect, Austin Maynard Architects	Land acquisition	Brisbane (QLD)	2017

The second mechanism for niche acceleration is partnering, which is “the pooling and/or complementing of resources, competences, and capacities in order to exploit synergies to support and ensure the continuity of thee ways of DTO” (Gorissen et al. 2017, p. 3). Nightingale Housing Pty Ltd was established to formalise the approach and to help deliver the knowledge of developments to other interested designers, developers, and the public. Nightingale Housing licenses are granted to interested and appropriate architects for a fee through Nightingale Housing Pty Ltd. Once licensed, the architect is provided with intellectual property of the housing model and other developments (completed, underdevelopment, and in the planning stage). Licensees get help with obtaining funding to finance their development. Finally, they also receive access to the wait list of individuals who want to become residents of a Nightingale development. As the number of licensed architects rises, the more information becomes available to those licensees, which helps to build an increasing community of practice.

Nightingale Housing is based on a guiding principle of transparency, so that the model can learn and improved by partnering with others. Information shared amongst the different licensed architects and projects include: knowledge on how to deliver such a project, performance of the completed buildings, residents’ experiences, design principles, and use of technology. This means the model does not require placing any developments or performance-outcomes at risk by requiring untested materials, technologies, or designs (McLeod, 2015). This also supports the delivery of high quality, affordable, and sustainable housing. While there have some challenges throughout the design and development of initial buildings (particularly with planning approvals), the open source and collaborative approach between different design teams supports learning-by-doing environment. This way, they address faults as they arise, which then feed into future developments.

Upscaling is the third nice acceleration mechanism. Upscaling is “the growth of members, supporters or users of a single transition initiative in order to spread the new ways of DTO” (Gorissen et al. 2017, p. 3). There are four formal ways individuals are supporting the upscaling of Nightingale Housing. This first is through purchasing a unit in one of the developments. There are currently over 5,000 people on the wait list to become residents (Perinotto 2018). To join the waitlist, perspective buyers complete a short survey about that interest in buying a unit, and are then contacted when units become available. The second method is to become an investor. Nightingale Model uses angel investors to build the equity investment for their projects. “The first Nightingale project, Nightingale 1, was only happened because a group of like-minded architects and community members put up the equity to fund the development of [the] building” (Nightingale Housing 2018d). Another supporter group is property owners. Property owners can partner with Nightingale projects to develop their land. This approach was used to develop Nightingale 3. A property owner sold the land to Austin Maynard Architects (the project lead) at a fair market rate; with the proviso that he would get to live in the building and that his shop would occupy one of the commercial spaces (Nightingale Housing 2018e). The fourth way to support the upscaling, has been mentioned previously, is through architects becoming licensed through Nightingale Housing Pty Ltd.

Nightingale Housing has also received a tremendous amount of attention and publicity through the media. A simple Google search of ‘Nightingale Housing’ produces “about 5,240,000 results”. From national newspapers and national radio, to housing and design magazines, to local blogs, as well as media outlets like The Conservation, Nightingale Housing is spreading (Byrne, 2016; Hinchy, 2015; Perinotto, 2016, 2017; Strickland, 2016). Jeremy McLeod, the initiator of The Commons and Nightingale Housing, has been asked to speak at different industry and university events, he has been interviewed on radio shows, and even his own his TEDX Talk (Aislabie & Bradburn, 2015;

McLeod, 2015). In addition, the initial development, The Commons also won numerous awards[1], and has been recognised across the industry for being a leading exemplar of sustainable and affordable design across Australia.

The fourth mechanism for niche acceleration is instrumentalism, this means "tapping into and capitalizing on opportunities provided by the multi-level governance context of the city-region in order to strengthen new ways of DTO locally" (Gorissen et al. 2017, p. 3). This mechanism is about the niche's ability to capitalize on opportunities and to acquire resources, as well as being in environments open to change with opportunities for empowerment. The team certainly did not have access to the resources they required to develop their initial development on their own. However, an opportunity presented itself to work with a like-minded developer, and The Commons was born (McLeod, 2015). After the success of the building, and the development of Nightingale Housing Pty Ltd, they would able to attract financing through angle investors, which allowed them to be become self-funded and self-sustaining (Nightingale Housing, 2018a).

Then, in February 2018, the Victorian State Government awarded a $100,000 (AUD) grant to Nightingale Housing "for demonstrating that it is a not-for-profit social enterprise delivering positive environmental and social projects" (Government of Victoria 2018). The funding will support the implementation and improvements from Nightingale 1 into the Nightingale Village. It should be noted that this is the first financial government support Nightingale Housing has received. Just over a month later, Nightingale Housing announced that along with Social Enterprise Finance Australia (SEFA), the National Australia Bank, and Brightlight, they are putting together a new fund that promises around $300 million in finance for future Nightingale projects (Perinotto 2018). This recognition from the financial sector is significant, and demonstrates the interest and trust people have in this approach. This injection of funding could see a rapid uptake of the Nightingale Housing model around Australia, as a large part of the challenge in delivering such a development, is the initial capital, which is now secured.

The fifth, and final mechanism, is embedding, which is "the alignment of old and new ways of DTO in order to integrate them into city-regional governance patterns" (Gorissen et al. 2017, p. 3). This level or scale of change is the equivalent to challenging the system and initiating a new regime. Nightingale Housing has not (yet) achieved this, however it has demonstrated that it has begun to stretch and transform' the local housing industry.

Nightingale Housing actors, intermediaries, and champions

While there is often a greater focus on more technical aspects of niches, or transitions more generally, there are a variety of different actors involved in these processes (Wittmayer et al. 2017). Niche actors "create a starting point for systemic change" (Fischer & Newig 2016, p. 6). From an institutional reform perspective niche actors are trying to "convince the wider social world that the rules of the game need to be changed" (Smith & Raven 2012, p. 1033). Nightingale Housing was pioneered by architect Jeremy McLeod (founding director of Breathe Architecture), in conjunction with a collection of local architects who shared a similar goal: to create better housing (McLeod,

[1] 2014 RRR The Architects International Building of the Year * 2014 National AIA awards, Frederick Romberg award for Residential Architecture: Multiple Housing * 2014 National AIA awards, David Oppenheim award for Sustainable Architecture * 2014 Victorian AIA awards, Allan & Beth Coldicutt Award Sustainable Architecture * 2014 Victorian AIA awards, Best Overend Award Residential Architecture – Multiple Housing * 2014 BPN Sustainability Awards, Best of the Best; 2014 BPN Sustainability Awards, Multi-density Residential * 2014 Victorian Premier's Design Awards, Overall Winner * 2014 Intergrain Timber Vision Award, Commercial Exterior * 2014 Houses Award - Sustainability Award; 2014 Timber Design Awards, Timber Cladding * 2014 Interior Design Excellence Awards, Residential Multi * 2014 Interior Design Excellence Awards, Sustainability

2015). McLeod argues that “our housing system is absolutely broken and we’ve just been incredibly frustrated with the development market for the last 10 years. So we want to be part of that solution, which is why we are pushing for Nightingale” (Aislabie & Bradburn 2015). These niche actors believed in creating a new model of housing so much, that they purchased a piece of land (with their own money) to develop it themselves.

Nightingale licensed architects, according to McLeod, “are really interested in… sustainable urbanization and how can we make that happen” (Nightingale Housing 2018f). As mentioned previously, transparency and sharing are really important to this approach. There is a strong belief in learning-by-doing and learning from others so that the newer Nightingale developments push boundaries even further than its predecessors. “If you are generous with your IP – it forces you to go and find new solutions, it encourages you not to rest on your laurels, but to know that there’s some other better way to do it. It also encourages generosity with our colleagues – people return the favour… the best way we can have that impact is to make it as easy as possible for other architects to be able to take what we know and improve on that” (Strickland 2016). The architects involved in Nightingale Housing recognize the potential influence their developments have on others. As a stakeholder involved in the Hobart development says “If we build this building well and people live in it and enjoy it, the next time someone plans a building, even if we’re not involved, and they use our building as a measure for what can be achieved, then our project has been successful” (Perinotto 2017).

Martiskainena and Kivimaa (2018) highlight the importance of actors outside the niche to help it grow. In particular they focus on innovation intermediaries and champions, who are individuals that create spaces for innovations to occur, facilitate innovation processes, and act as knowledge brokers and networkers. They also try to find ways to overcome resistance to change, and address issues such as lack of resources, coordinator between actors, and niche opposition. Nightingale Housing Pty Ltd is supported by a number of outside actors, including a board of directors, advisors, and champions (Nightingale Housing 2018f). The board is made up of architects, as well as individuals with legal, business, tax, and government experience. While the advisors are even more diverse, their expertise includes areas such as health, affordable housing, social impact, urban planning, and creative urbanism. The champions are well-respect individuals within the sustainability and design industry in Australia, who support Nightingale Housing, but are not formally board members. There is little documented information on the relationship between these individuals and the core Nightingale Housing team. However, we found that most of the key activities Martiskainena and Kivimaa (2018) attribute to intermediaries and champions were actually performed by niche actors, or by outside actors that went on to become niche actors.

In the case of Nightingale Housing, perhaps the most appropriate use of the term intermediary is that put forward by Fischer and Guy (2011). They argue that architects are intermediaries, and define them as “an in-between agent[s] working deliberately towards achieving an objective” (p. 167). Architects as intermediaries work as facilitators between different stakeholders, as translators across different disciplines, as interpreters of policies and regulations, and as champions for improved design and performance outcomes (Fischer & Guy 2011). Nightingale Housing was developed by architects, and they believe “that architects, through collaboration, can drive real positive change in our changing cities” (Nightingale 2018f). From this perspective we can view the Nightingale actors as both niche actors and intermediaries working towards changing the way housing is design, built, and delivered in Australia.

Discussion

This research confirms, along with previous studies, that sustainable housing is both a niche within the built environment, as well as a series of niches within the housing sector (Gibbs & O'Neil 2018). There is also evidence that niche developments and demonstration projects are influencing urban development, and leading organisations to embrace new tools, construction practices, technologies, standards, and policies (Berry et al. 2013; Moore & Higgins 2016). We are also seeing a shift occuring in this space in regards to the socio-technical practices of sustainable housing, not only in Australia but internationally. For example Smith (2007) writes about eco-housing being developed as one-off bespoke developments, often at a premium. Whereas, Nightingale Housing goes beyond one building and is creating and promoting a new housing movement to radically transform the delivery of housing from an environmental and financial perspective, and at a larger scale than has been seen previously. Part of this is about helping to better define what sustainable housing is. Such housing within the literature and policy discussions represents a range of different performance outcomes, from going just beyond minimum building requirements, to achieve zero (or even positive) energy buildings. Therefore, it has been hard to define sustainable housing as a niche or a series of niches, and this makes sustainable housing transition research and policy development a little messy, as definitions and end points keep shifting. Especially as new developments such as Nightingale Housing and others around the world (e.g. zHomes in the US and BedZED in the UK) demonstrate the practicalities of delivering and experiencing such housing.

What we do know, is that there are increasing cases like Nightingale Housing which are not offering an incremental stepping stone approach to changing housing provision, but are providing a significantly different outcome across a range of metrics. Nightingale Housing has re-evaluated what the home is and what it means, as many of the more innovative developments have been doing elsewhere. Such developments are forcing people to question what they need and want from a home, not only in the context of the specific locality and socio-economic situations, but also in the context of a changing future due to climate change, increasing population, and the ongoing challenge of equity. We believe Nightingale Housing will continue to evolve due to innovations in building practices, materials, and technologies, but also due to changing housing trends and their ability to be agile within the Australian housing industry. There is already evidence within the dwellings under the Nightingale Model of evolution with recently announced developments targeting even greater outcomes such as carbon neutral status. In addition, part of the allure of Nightingale Housing is the consideration of affordability in a market which is increasingly seen as unaffordable; a challenge being faced in many cities around the world.

In the case of Nightingale Housing, they have done this by drawing on international good practice design principles and engaging with locally-based potential residents to develop a model of housing that supports an ongoing changing of needs and within a transitioning housing context (e.g. Melbourne is requiring a shift to higher density housing to accommodate a rapidly increasing population). One such example is the removal of individual laundry in each unit, and replacing them with a common laundry facility on the rooftop. This was done partly to save money and internal apartment space, but also to help create community. As McLeod has stated, “when you are doing your washing on the rooftop you quickly meet all your neighbours. Meeting people over washing laundry is a good way to break down barriers pretty fast. After that happens a few times, there are no awkward silences!” (Hinchy 2015). This concept of community within a dwelling is not common in Australia and may help to address elements of increasing isolation as we shift to higher density living.

As stated previously, there has been much focus within sustainability transitions literature on the need to create protective spaces to support the development of niches. While this paper does not

dispute that, it is evident from the case of Nightingale Housing that niches can in fact develop and grow without protective space. We see this as an opportunity for transitions researcher and policy-makers to consider different approaches to niche acceleration, and develop new or different ways to support these unprotected niches. SNM has not experienced a strong uptake as a policy tool (Schot & Geels 2008). It has been criticised in terms of niche empowerment and how 'winners' are selected, as well knowing when to remove support or protection (Smith & Raven 2012). While, there is not enough evidence to claim that niches that have been developed without protection are stronger and less reliant on variables in the market or policy domain in the long run, our findings from Nightingale Housing suggest that this warrants more and continued research. While we argue that unprotected niches are important for helping to challenge the regime and help shape policy and practice into the future we also acknowledge that some niches would not be able to be developed if no protection was provided. Perhaps what is needed is a better of understanding of both types of niches, as well as different approaches or interventions.

In our investigation the acceleration dynamics of Nightingale Housing, we found certain mechanisms to be more powerful than others, although for research would be needed to confirm our initial findings. Like Gorissen et al. (2017), we found partnering to the biggest factor in the uptake of the niche. "Partnering and embedding promote diffusion to the wider public. Partnering also appears to be a requisite for instrumentalisation and embedding" (Gorissen et al. 2017, p. 12). For Nightingale Housing, partnering means that architects do not have to re-invent the wheel for each building. In fact, partnering allows for transparency and peer-learning among the licensed architects, as well as improved design and performance outcomes. "Instrumentalising helps to promote the survival of initiatives, but is also conducive for upscaling, replicating, and partnering" (Gorissen et al. 2017, p. 12). The financial boosts Nightingale Housing has received in 2018 (from the state government and the investment fund) has enabled them to increase their number of projects, but has also provided them with more certainty to continue their work to embed this niche model of housing into the housing industry.

Our investigation of Nightingale Housing also highlighted the role of different actors involved in niche development and acceleration. What became evident with Nightingale Housing is that from an unprotected niche perspective, actors are critical to the ongoing survival and growth of the niche. The initial Nightingale Housing actors have been working on developing this new model of housing for over ten years. They purchased the land to build The Commons in 2007, which was finally completed in 2013. But since that time, there has been an uptake in the model with more architects coming on board and more projects in development. While this might be unique to Nightingale Housing, we found a much stronger emphasis on niche actors, compared to studies investigating protected niches that have a stronger focus on external actors (c.f. Martiskainena & Kivimaa 2018). More research on other unprotected niches would need to be done to verify our findings. Finally, we found that a lot of the research on actors, roles or actors, and actor agency tends to have nice, neat categories, which did not really fit with our analysis on an in-progress niche such as Nightingale Housing.

Conclusion

This paper has explored Nightingale Housing, an alternative model of housing in Australia as a sustainable housing niche. This particular niche was developed outside of, or without, a protected space, unlike typical niche development reported in the transitions literature. While the establishment of the model (and the initial development) took several years to develop and then deliver, and faced a range of challenges, it is now seeing increasing upscaling and embedding. The aim of this paper was to investigate both of these elements: Nightingale Housing as an unprotected niche, and the acceleration dynamics of this niche.

Nightingale Housing is demonstrating what innovative, sustainable, and affordable high quality higher density housing can be in Australia. It is challenging the current regime by showing that such housing can be delivered without the need of protection (e.g. rebates, government assistance, etc.) and is increasing in popularity within the industry and with consumers, as evidence by not only the number of new developments emerging following this model, but the spread in geographic locations for new development sites around Australia and even internationally. While most of the elements from Nightingale Housing would not be considered overly innovative or unique in some more progressive international locations, this case presents lessons about how to develop sustainable housing niches by leveraging key actors and shared visions.

Furthermore, without being in a protected space with external support, Nightingale Housing has had a less clear trajectory for upscaling and challenging the regime. At the start it was about delivering one development with no firm goal or ability to deliver more. Then due to the success of the initial development, The Commons, the Nightingale Housing model emerged and now has 20 licenced developments in the works. This does not include those other developments that are not formally part of the network that have been influenced by Nightingale Model. While there is no documented evidence of how broad that influence might be, there are suggestions of developments near Nightingale Housing locations which are incorporating elements from Nightingale Housing.

Our analysis of the trajectory of Nightingale Housing highlighted the importance of partnering, and the transparency that goes along with this, to the development of and growth of this niche. The case of Nightingale Housing also stresses the significance of having committed stakeholders who were willing to take on significant risk to demonstrate what can be achieved. Finally, something that was not picked up by the evaluative frameworks we employed, but still relevant is the strategic choice of location for the first development. By selecting a land within a local government that has strong 'green' political ties which aligned with what the building was trying to achieve – helping to provide a more supportive community for the development.

References

Avelino, F. and Wittmayer, J. M. (2015). Shifting Power Relations in Sustainability Transitions: A Multi-Actor Perspective. *Journal of Environmental Policy and Planning*, 17(5), pp. 1-23.

Aislabie, S., & Bradburn, N. (2015). Jeremy McLeod of Breathe Architecture. Retrieved from http://architecturenow.co.nz/articles/jeremy-mcleod-breathe-architecture/

Bergman, N., Whitmarsh, L., & Köhler, J. (2008). *Transition to sustainable development in the UK housing sector: from case study to model implementation. Working Paper 120.* Retrieved from Norwich:

Berry, S. (2014). *The technical and economic feasibility of applying a net zero carbon standard for new housing.* University of South Australia, Adelaide.

Berry, S., Davidson, K., & Saman, W. (2013). The impact of niche green developments in transforming the building sector: The case study of Lochiel Park. *Energy Policy*, *62*, 646-655. doi:http://dx.doi.org/10.1016/j.enpol.2013.07.067

Berry, S., Whaley, D., Davidson, K., & Saman, W. (2014). Do the numbers stack up? Lessons from a zero carbon housing estate. *Renewable Energy*, *67*, 80-89. doi:http://dx.doi.org/10.1016/j.renene.2013.11.031

Boyer, R. (2015). Grassroots Innovation for Urban Sustainability: Comparing the Diffusion Pathways of Three Ecovillage Projects. *Environment and Planning A: Economy and Space*, *47*(2), 320-337. doi:10.1068/a140250p

Brown, H. S., & Vergragt, P. J. (2008). Bounded socio-technical experiments as agents of systemic change: The case of a zero-energy residential building. *Technological Forecasting and Social Change*, *75*(1), 107-130. doi:http://dx.doi.org/10.1016/j.techfore.2006.05.014

Byrne, J. (2016). *Desnsity X Design: The Commons. Interview with Jeremy McLeod.* Retrieved from Fremantle: https://densitybydesign.com.au/wp-content/uploads/2017/04/170331-Jeremy-Mcleod-Interview-The-Commons.pdf

Crabtree, L., & Hes, D. (2009). Sustainability uptake on housing in metropolitan Australia: An institutional problem, not a technological one. *Housing Studies, 24*(2), 203-224. doi:10.1080/02673030802704337

Foong, D., Mitchell, P., Wagstaff, N., Duncan, E., & McManus, P. (2017). Transitioning to a more sustainable residential built environment in Sydney? *Geo: Geography and Environment, 4*(1), e00033-n/a. doi:10.1002/geo2.33

Geels, F., & Raven, R. (2006). Non-linearity and Expectations in Niche-Development Trajectories: Ups and Downs in Dutch Biogas Development (1973–2003). *Technology Analysis & Strategic Management, 18*(3-4), 375-392. doi:10.1080/09537320600777143

Gibbs, D., & O'Neill, K. (2015). Building a green economy? Sustainability transitions in the UK building sector. *Geoforum, 59*, 133-141. doi:https://doi.org/10.1016/j.geoforum.2014.12.004

Heiskanen, E., Nissilä, H., & Lovio, R. (2015). Demonstration buildings as protected spaces for clean energy solutions – the case of solar building integration in Finland. *Journal of Cleaner Production, 109*, 347-356. doi:http://dx.doi.org/10.1016/j.jclepro.2015.04.090

Hinchy, M. (2015). Building community: Property development with a social conscious. Retrieved from https://www.australianethical.com.au/news/building-community-property-development-social-conscious/

Hommels, A., Peters, P., & Bijker, W. E. (2007). Reply to Geels and Schot. *Research policy, 36*(7), 1102-1103.

Kemp, R., Schot, J., & Hoogma, R. (1998). Regime shifts to sustainability through processes of niche formation: The approach of strategic niche management. *Technology Analysis & Strategic Management, 10*(2), 175-198. doi:10.1080/09537329808524310

Laurentis, C. D., Eames, M., & Hunt, M. (2017). Retrofitting the built environment 'to save' energy: Arbed, the emergence of a distinctive sustainability transition pathway in Wales. *Environment and Planning C: Government and Policy, 0*(0), 0263774X16648332. doi:doi:10.1177/0263774X16648332

Living Building Challenge. (2015). zHome, Issaquah, Washington. Retrieved from http://living-future.org/case-study/zhome

McLeod, J. (2015). *Sustainable Apartments – A New Model for the Future*. Paper presented at the TEDxStKilda, St Kilda. https://www.youtube.com/watch?v=AFJj1v3jmYU

Moore, T., & Higgins, D. (2016). Influencing urban development through government demonstration projects. *Cities, 56*, 9-15. doi:http://doi.org/10.1016/j.cities.2016.02.010

Moore, T., Horne, R., & Morrissey, J. (2014). Zero emission housing: Policy development in Australia and comparisons with the EU, UK, USA and California. *Environmental Innovation and Societal Transitions, 11*, 25-45. doi:10.1016/j.eist.2013.12.003

Nightingale Housing. (2018a). Nightingale Baugruppen. Retrieved from http://nightingalehousing.org/nightingale-baugruppen/

Nightingale Housing. (2018b). What is the Nightingale model. Retrieved from http://nightingalehousing.org/model/

Nightingale Housing. (2018c). Why do we need the Nightingale model? Retrieved from http://nightingalehousing.org/why/

Peabody. (2017). BedZED. Retrieved from http://www.peabody.org.uk/media-centre/case-studies/bedzed.aspx

Perinotto, T. (2016). Nightingale spreads its wings & heads north to Sydney. Retrieved from https://www.thefifthestate.com.au/innovation/nightingale-spreads-its-wings-heads-north

Perinotto, T. (2017). The Commons Hobart spreads the word on better development. Retrieved from https://www.thefifthestate.com.au/innovation/residential-2/the-commons-hobart-spreads-the-word-on-better-development/96376

Schot, J., & Geels, F. W. (2008). Strategic niche management and sustainable innovation journeys: theory, findings, research agenda, and policy. *Technology Analysis & Strategic Management, 20*(5), 537 - 554.

Smith, A. (2007). Translating Sustainabilities between Green Niches and Socio-Technical Regimes. *Technology Analysis & Strategic Management, 19*(4), 427 - 450. doi:10.1080/09537320701403334

Smith, A., Kern, F., Raven, R., & Verhees, B. (2014). Spaces for sustainable innovation: Solar photovoltaic electricity in the UK. *Technological Forecasting and Social Change, 81*, 115-130. doi:http://dx.doi.org/10.1016/j.techfore.2013.02.001

Smith, A., & Raven, R. (2012). What is protective space? Reconsidering niches in transitions to sustainability. *Research policy, 41*(6), 1025-1036. doi:http://dx.doi.org/10.1016/j.respol.2011.12.012

Strickland, B. (2016). EDG May 2016 feature. Australian Achievement in Architecture Awards (AAAAs) Leadership in Sustainability Prize 2016. Interview with Jeremy McLeod. Retrieved from http://wp.architecture.com.au/news-media/edg-may-2016-feature/

Svenfelt, Å., Engström, R., & Svane, Ö. (2011). Decreasing energy use in buildings by 50% by 2050 - A backcasting study using stakeholder groups. *Technological Forecasting and Social Change, 78*(5), 785-796. doi:10.1016/j.techfore.2010.09.005

Tambach, M., Hasselaar, E., & Itard, L. (2010). Assessment of current Dutch energy transition policy instruments for the existing housing stock. *Energy Policy, 38*(2), 981-996. doi:10.1016/j.enpol.2009.10.050