State of Australian Cities Conference 2013

Sustainable Housing in Aged Care Facilities

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Abstract: Australia's aging population is increasingly in need of age and needs appropriate housing, in addition to the adaptions to the family home to accommodate aging in place. New aged care/retirement focused housing developments are becoming more prevalent, yet sustainability in their design and planning is yet to gain the significance it deserves. There is currently limited policy direction to encourage multi-housing/communal housing developments that focus on sustainability as a guiding principle, and even less example of them being created in Australia. The motivation to increase sustainability in the planning and development of aged care and retirement housing is embedded in the knowledge that energy and water prices will continue to rise along with the cost of living in most cities in the industrial world. Governments have a significant role in establishing the policy framework to guide the development of more sustainable housing for Australia's aging population. This paper seeks to establish an understanding of resource use in the aged care sector through an examination of a case study site, what capacity exists within the case study to reduce resource use and in particular energy and water, and ultimately add to the research in this important area. Using case study methodology and observational analysis, an aged care facility in Perth, WA has been investigated to understand the underlying environmental, social and economic sustainability of the site compared to what the literature suggests are the minimum requirements in the planning and development of multi-housing with regard to sustainability, and develop recommendations for future policy.

Keywords
Aging, aged care, sustainability in aged care.

1 Introduction

It is now well established that Australia's population is growing and ageing – this is a consequence of higher levels of migration, sustained low fertility levels and increasing life expectancy. Family and Services Division of the NSW Government (2012) identify "…population ageing as possibly the major demographic transition affecting Australian society in the coming decades" particularly impacting on social planning issues, funding and service delivery processes. Australia's population is projected to grow from 22 million people to almost 40 million by 2050, with the number of people aged 65-84 years more than doubling and those aged more than 85 years more than quadrupling (HSConline, nd).

With this aging population comes an increased pressure on resources and services, specifically on our health care systems and planning to allow for greater flexibility in accommodation requirements (Cubit and Meyer 2011). According to the Productivity Commission (2008) a third of those aged 65-74 years required assistance with everyday activities although most wanted to live independently. This preference for "independent living arrangements supported by community care" is provided by higher incomes and wealth in those over 65 years who can effectively leverage for those services (Productivity Commission 2008). Whether high levels of residential care is the approach or an emphasis on community-based settings (ageing in place) the increasing aged population numbers will require innovation and funding to provide appropriate care and support; this growth has implications for all aged care service providers (Family and Community Services – NSW Government, 2012).

The increase in the general health and wealth of Australia's aging population has also sparked significant growth in the development of retirement villages and various forms of assisted care for older people. Of particular note is in the 'lifestyle' category with opportunities for recreational facilities, social activities and differing offerings of integrated care allowing people to age in place within a well-established age-specific community-based environment (Productivity Commission 2008). These facilities are costly to provide and to run and generally incorporate little or no sustainable design or operational practices. This research has

investigated the current state of resource use and the presence and understanding of sustainability principles in an aged care facility in Perth, Western Australia.

1.1 Sustainability in Aged Care Accommodation

The aged care sector is one of high resource demand and usage, costly in delivery and varied in the types of services required. In 2009-10 financial year over a quarter of the government's budget was directed to age-related services including health care, aged care provision and aged-related pensions (Cashmore, 2013). The aged care industry is increasingly becoming interested in reducing costs and its environmental footprint to become more sustainable in its methods of service provision (Aged and Community Services, 2008). In the aged care sector issues surrounding sustainability are centred on energy efficiency, resource conservation and reuse, economic viability of accommodation facilities and more generally the principles of social inclusiveness, access and equity and ability to pay.

There is significant room in most aged care facilities for improving energy efficiency. The New South Wales (NSW) Office of Environment and Heritage conducted 15 energy audits on the State's residential aged care facilities and found that savings of 15 percent for electricity and 18 percent for gas could be achieved through introducing energy efficiency projects; including projects that could make savings of up to 80 percent on lighting and 90 percent on hot water production (New South Wales Government 2012).
Not only is it important to establish energy efficient practices within aged care facilities, but more so to build such accommodation as energy efficient and sustainable as possible from the outset. Adapting buildings and operations post-construction to embrace environmental sustainability is extremely expensive and these additional costs are not recognised in current aged care funding and program structures (Aged and Community Services, 2008).

1.2 Sustainability

The term sustainability has come to be defined as the ability or capacity of an item or activity to maintain or sustain itself indefinitely across the three pillars of economic, environmental and social sustainability, or the triple bottom Line (TBL) (Dresner 2002). The International Union for the Protection of Nature (IUCN) is credited with first formally using the term 'sustainable development' in its World Conservation Strategy of 1980, and later the Bruntland Commission Report 'Our Common Future' of 1987 (World Commission on Environment and Development 1987).

2 Methodology

This research has utilised three research methods including literature review, case study research and observational analysis. Case study methodology has enabled a more thorough examination of the issues surrounding sustainability principles and practices in the aged care sector, particularly one case the SwanCare Group Bentley Aged Care Facility. Yin (1984, 2003) describes case study methodology as particularly useful for when the research requires an in depth look into a smaller number of cases. In addition this research has used an adaption of Pope et al.'s (2004) 'assessment for sustainability' methodology to undertake the observational examination of the presence of sustainability principles and practices in an aged care facility, and the capacity of the facility to increase their sustainability more generally. Initially this research asked three questions to guide the exploration of the literature and data collection, and they were:

1. What is the resource use of an Aged Care facility in Perth, especially as it relates to energy efficiency in the built form?
2. Is there capacity within the Aged Care to make improvements to their resource use, in line with more general sustainability goals?
3. Can the Planning system support increased sustainability through reductions in resource use in the Aged Care Sector?

The aim of this research has been to assess the current resource costs the case study presently faces and what capacity exists to reduce resource use and in particular energy and water, using a comparison to other similar sites around Australia. The resource use data has been collected by the research team during the trans-seasonal period of autumn through to winter in 2013, using resource use and cost data SwanCare Group routinely collates for its own financial management.

3 Review of the Literature

With older people having less disposable income, and in many cases being asset rich but cash poor, it is important that the space they dwell in is energy efficient, provides for the full range of their abilities and growing frailty and has low ongoing maintenance costs (Productivity Commission 2008; Cubit and Meyer 2011). Carey (1999) identifies that population ageing creates a number of inter related problems but the most important economic implication of an aging population is the increase in the 'dependency ratio' – where there is a decline in numbers of workers relative to non-workers.

In 2002, there were more than five people of working age to support (through taxes and the like) every one person aged over 65 years. Through the growth in those aged over 65 years coupled with the decline of those of workforce age (projected to be zero within 40 years), it is estimated that by 2042, there will be only 2.5 people of working age supporting each person aged over 65 years (demographics.treasury.gov.au/content, nd). With a decline in the total fertility rate in Australia to 1.8 births per woman, coupled with a generalised aging of the population, there has been, and will continue to be, an increasing demand for care and support services for the aged in the wider community and in formal residential care (Australian Government 2008). To put this all in context; the increasing demand for services for the elderly at a time when the birth rate is dropping (aside from immigration), means that the government expenditure for aged care could increase from about 3% to 9% by 2050 when there will also be fewer tax payers to fund care (Australian Government 2008). A response by government to the implications of an aging population obviously goes across superannuation and retirement income support, workforce, housing, social inclusion and lifelong education, plus medical, health and aged care services (Australian Government 2008).

Moreover there is an understanding that the physical surroundings for the aged needs to also meet their needs, whether they continue to reside in their own home or in an aged care facility. Vine et al. (2012) have recently conducted a study into older Australian's experiences of the liveability and amenity of their neighbourhoods, in the context of sustainability, accessibility and ease of movement and found independence; aging in place advances the health and wellbeing of older people. In turn where neighbourhoods are designed to support aging in place a reduced economic burden through reduced demand for institutionalised care occurs (Vine, Buys, and Aird 2012).

In many industrialised and OECD countries expenditures for the long term care of older people is expected to rise significantly, and as a percentage of GDP the World Health Organisation is suggesting a rise of between 2 and 4% by 2050 (Fernanadez et al. 2009). Changes in the population aging, in the informal arrangements for family support, the rising costs of care, and the higher expectations of services that the 'Baby Boomers' have come to expect with their higher incomes and wealth, pose significant challenges to sustainability (Fernanadez et al. 2009). With the aged care sector alone consuming 7.8 million gigajoules of energy in Australia each year, there is a pressing need to reduce energy and resource demand among those people who are among the least likely to be able to cope with rising energy prices (New South Wales Government 2012).

3.2 The Practice of Sustainability Assessment

The question of how to appraise the sustainability of an action, event or project has captured the research focus and governmental attention world-wide since discussions of sustainability commenced (Ravetz 1999). Sustainability assessment has been defined by Devuyst (1999; 2001:9) as a "tool that can help decision-makers and policy-makers decide what actions they should take and should not take in an attempt to make society more sustainable". Sustainability assessment theory has emerged from the research and applications of environmental impact assessment (EIA) and the more current strategic environmental assessment (SEA) (Pope, Annandale, and Morrison-Saunders 2004).

3.2.1 Sustainability Criteria

In generating criteria that simultaneously achieves a 'series of environmental, social and economic goals or objectives' the presence or capacity for sustainability is implied. This assessment approach begins with the concept of sustainability as a state which society aspires to and then moves to define this in terms of sustainability criteria (Pope, Annandale, and Morrison-Saunders 2004:609). The most pressing issues in the Aged Care sector in most cases is the high cost of providing services, in particular those that require resources such as electricity and water (Hunter and Elkington 2005; Productivity Commission 2008;

Queensland Government 2012a). Clearly then introducing sustainability principles, in particular energy efficiency, will assist to bring such costs down and make aged care facilities more financially sustainable.

3.2.2 Establishing Sustainability in a 'Village' or House in Aged Care

There is abundant evidence that increasing sustainability in housing and subdivisions is not difficult, and there are more than enough technologies and information to assist this (Crabtree 2005, 2006; Crabtree and Hes 2009; Hakkinen and Belloni 2011). As Crabtree and Hes (2009) and Hakkinen and Belloni (2011) have found however, there is significant resistance to new technologies and ideas because it requires a re-organisation of procedures and processes that imply increased risk and cost in an industry that is highly risk averse and conservative. Essentially, according to Karol (2007:1) the qualities and criteria that establish sustainability through energy efficiency in a house include the following:

- "Building orientation to benefit internal room layout
- Window placement, sizing and shading to maximise solar control and manage heat transfer through the building envelope
- Use of insulation to manage heat transfer through the building envelope
- Ventilation to enable effective cross ventilation in summer
- Draught proofing to reduce uncontrolled heat gains and losses
- Use of heat absorbing building materials internally to stabilise indoor temperatures
- Landscaping to create appropriate micro climate"

For a subdivision or 'village' such as an aged care facility the qualities and criteria that establish sustainability are a little broader, and include:

- Open space and public parks
- Urban forestry
- Watershed management
- Environmentally conscious waste disposal and recycling
- Green buildings
- Mass transit/transport management
- Promoting accessibility instead of mobility
- Minimising waste
- Reducing latent heat
- Capturing and retaining water
- Reducing pollution
- Reusing and recycling everything possible (Wiland, Bell, and D'Agnese 2006).

What researchers such as Hakkinen and Belloni (2011), Crabtree and Hes (2009) and Williamson et al. (2010a) have discovered is that the lack of integration of sustainability into housing developments is not a technological issue rather it is an institutional problem emerging from inhibitive government red tape, and a range of government policies and practices that effectively negate efforts to improve energy efficiency and sustainability. In particular, Williamson et al. (2010a) have found that Australia's energy efficiency rating tool, within the Building Code of Australia (BCA), is enabling houses to be built that require mechanical air-conditioning as a necessity instead of encouraging passive-solar energy efficient development. This finding was confirmed much earlier, with Karol (2007) conducting an assessment of new project homes at a 'green' marketed housing estate that found that houses had been built with minimal solar orientation (despite the developer orienting much of the subdivision on a north/south axis) and climate controlling ventilation was almost non-existent. In many cases a simple flipping of the design could have improved the solar orientation of the house, and therefore energy efficiency, reducing overall power bills (Karol 2007).

3.3 The Planning Context

In WA, WAPC's Directions 2031, the strategic plan for the metropolitan area, stresses the need to provide for an ageing population and for aged appropriate and affordable housing (State of WA 2009, 2010). At the local planning level, a similar strategic vision for an ageing population is evident. Strategic housing plans at this level stress more readily the need for aged housing provision, the facilitation of ageing in place and additional services required to cater for this growing proportion of the population. Little however is enacted into statutory plans other than the classification of land for this use and the acceptance of the

provisions of residential controls (within the Residential Design Codes) which allow for an increased or bonus density for the development of aged dwellings, smaller minimum dwelling and lot sizes and a reduced number of car bays. Achievement of the provision of aged-specific housing is therefore left to the private and not-for-profit development industries. Little consideration of how urban areas will be adapted to the notion of ageing in place or adaptive design rests more generally on the notion of walk ability-but not necessarily that suited to the aged rather more to the abled bodied resident. According to the Australian Government (2008) the planning framework for services provided under the Aged Care Act aims to:

> "…achieve and maintain a national provision level of 113 operational residential places and community aged care places per 1,000 of the population, aged 70 years and over, by June 2011. Within this overall target provision ratio, 44 of the total 113 places per 1,000 should be residential high care places, 44 should be residential low care places, and 25 places should be community care places (of which four will be Extended Aged Care at Home or Extended Aged Care at Home-Dementia packages). The framework was designed to keep the growth in the number of Australian Government subsidised aged care places in line with growth in the aged population, and ensure a balance of services across Australia, including services for people with lower levels of need and those in rural and remote areas" (Australian Government 2008).

Over 30 different funding programs currently fund aged care with the criteria for eligibility wide ranging (The Myer Foundation, nd). The following table is identified by Kay (2012) and generally identifies the realm of planning involvement for each level of government into aged care.

Table 1 Policy Hierarchy

Level of Government	Policy Intention
National	Liveable neighbourhoods, accessibility, urban design
State	Whole of government ageing strategy
Local	Healthy ageing, home-based services, accessibility, walkability and wheelability, fall prevention, community safety

Source: Kay (2012).

At local government level, whilst involvement in aged care provision is limited and varied across states, the local government has a greater role in determining the location of suitably classified land for aged care facilities (Department of Regional Australia, Local Government, Arts and Sports, 2010). The shaping of the built environment has long been under the control of local government through strategic land use planning decisions, assessment of development and building approval processes (Australian Local Government Association, 2006). The Australian Local Government Association (2006) writes that, "…low density urban development; a characteristic of many communities is not particularly age-friendly. Features such as rapid suburbanisation, dispersed development patterns, the lack of footpaths, separation of land uses and automobile dependency all present significant obstacles to the independence of seniors".

3.3.1 Accreditation in Aged Care

Accreditation of aged care facilities is seen as a mechanism for quality improvement through the use of a regulatory framework (Department of Health and Ageing, nd). The standards for accreditation established under the 'Quality of Care Principles 1997', outline the expected standard of quality of care and of life (Aged Care Standards and Accreditation Agency Ltd, nd). Generally the standards support the day-to-day quality of life of residents and do not address sustainability components for the premises. Every aged care facility in Australia is assessed against these accreditation standards, and therefore the results of this assessment for sustainability can reasonably be assumed to be comparable to the majority of aged care facilities elsewhere in Australia.

4 THE CASE STUDY

The Bentley SwanCare site, run by SwanCare Group is a not-for-profit organisation located in the City of Victoria Park, south east of the city and within 10kms of the Perth CBD. The location is also home to

Curtin University, a technical college and numerous other minor educational institutions, and is therefore also a hub for public transport with Hayman Drive hosting a small busport. The area is classified within the Town of Victoria Park's local planning scheme as Special Use and the site covered by a Master Plan. There are 580 independent living units ranging in size from bedsits, 1 bedroom to 3 bedroom apartments and villas. In addition, there are 283 care beds, (147 in low care and 136 in high care facilities). Other facilities are provided on the site including medical services, supermarket, hair and beauty salon, meeting, social and recreational facilities. There are some 730 car parking bays on the site with the majority allocated to the exclusive use of the occupants of the independent living units.

The Bentley Park site is large (some 15 hectares in size) and extends across a great expanse of area, and caters to an increasing number of aging residents. The built form is mixed with buildings of three, four and eight storeys as well as villas of single storey low density across the majority of the site. The site has been used for aged care since the late 1960s which means a range of building ages and styles which reflect the architecture of the time, the changing fashions and changing government legislation, policies and regulations. The recent unit and apartment developments and the latest high-care facility are more modern in design. Generally all construction is double brick and tile, although new independent living units are double brick and zincalume roofing. These more recent constructions potentially have utilised more sustainable principles and practice in design. Ongoing requirements to maintain buildings and services in accordance with the accreditation standards in aged care, and the 'lease for life arrangements', mean that there is a constant requirement for upgrading of facilities.

Much of the site has been landscaped to enhance and beautify the physical environment; however there is little overall tree cover across the site. The fragmented space, divided into tiny pockets of private open space and communal landscaped surrounds means the opportunities for larger planting is somewhat limited. A greater focus on increasing the natural environment in the area would allow residents to have access to higher quality areas of vegetation for recreation, quiet time, and cooler temperature in the heat of the day.

Figure 1: Aerial View of Bentley Park site, source: (SwanCare Group nd).

Figure 2: New housing styles in Bentley Park, source: (SwanCare Group nd).

5 DISCUSSION

Essentially, with regard to energy use, the most important areas for consumption reduction in an aged care setting include:

- Introducing more innovative natural ventilation options
- Regularly maintain air-conditioners to improve efficiency and productivity
- Setting air-conditioning systems to efficient temperature (24 degrees in summer and 19 degrees in winter)
- Locate the air-conditioner in-take and motors in cool shady places
- Regularly check insulation and duct work for leaks
- Weather-strip all doors and windows
- Invest in heat-recovery systems
- Retrofit insulation
- Reduce high temperature settings on hot water systems
- Fit outside shutters
- Incorporate eaves
- Install motion sensors for lighting
- Invest in an energy efficient laundry system
- Reduce temperature of therapy pools
- Refrigeration at right temperature and in good condition
- Minimise cold air loss from cooling equipment
- Position cooling equipment away from ovens and heating equipment
- Insulate hot water pipes
- Replace old or faulty hot water systems
- Insulate the walls, floors and ceilings
- Install ceiling fans in rooms
- Turn off office equipment when not in use
- Install solar panels
- Consolidated heating units
- Strategic positioning of trees for shade (Queensland Government 2012b).

A number of these suggestions are low cost and easy to implement, but require commitment and buy in from upper management to be successful. The introduction of an energy efficiency program is largely dependent on other sustainability principles and practices being present in a strategic vision of the organisation and its management (Filho 2005; Edwards 2005; Bell and Morse 2005; Yanarella and Levine 2008; Tripoli 2008).

5.1 Assessment for Sustainability in Aged Care Facilities

In an analysis conducted by the NSW Government, 15 Aged Care Facilities were assessed through an energy audit (see Table 2) (New South Wales Government 2012). This study identified an average of energy and gas consumption annually across 15 facilities.

Table 2: Range of Audited Aged-Care Facilities in NSW

Site characteristics	Variation
Climate	4 different climate zones across NSW
Gross floor area	3100–11,764 m^2
Number of beds	40–180 beds
Occupancy	56–100%
Services provided	2 high-care, 4 low-care and 9 mixed-care sites
Age of facility	2–30 years
Proportional split between electricity and gas use	All facilities used both gas and electricity with 13 facilities using over 50% electricity and 2 facilities using over 50% gas
Annual electricity consumption	291–1482 Megawatt hours (MWh)
Annual gas consumption	66–3507 Gigajoules (GJ)

Source: (New South Wales Government 2012)

5.2 Sustainability Assessment of the Case Study

From the review of the literature criteria for energy efficiency and sustainability in the built and urban form have been identified and assessed by field observation in the case study (refer to Table 3):

Table 3: Assessment for Sustainability

Assessment Criteria	Yes	Somewhat	No
Building orientation to benefit internal room layout		✓	
Window placement, sizing and shading to maximise solar control and manage heat transfer through the building envelope		✓	
Use of insulation to manage heat transfer through the building envelope		✓	
Ventilation to enable effective cross ventilation in summer		✓	
Draught proofing to reduce uncontrolled heat gains and losses			✓
Use of heat absorbing building materials internally to stabilise indoor temperatures			✓
Landscaping to create appropriate micro climate;			✓
Open space and public parks,	✓		
Tree and bush retention,		✓	
Watershed management,		✓	
Environmentally conscious waste disposal and recycling,			✓
Green buildings,			✓
Connection/integration with public transport,	✓		
Promoting accessibility instead of mobility,		✓	
Minimising waste,			✓
Reducing latent heat,			✓
Reusing and recycling everything possible			✓

Source: adapted from (Wiland, Bell, and D'Agnese 2006; Karol 2007).

Other data that has been collected include:

- Electricity and water consumption
- Waste disposal
- Services provided in the village
- Car use

Table 4: Resource Consumption at Case Study Site

Service	Village	Care	Total

	Consumption			Consumption			Consumption		
	Units	$ per annum	Per head pa.	Units	$ per annum	Per head pa.	Units	$ per annum	Per head pa.
Electricity (MWh)	814,146	$237,099	$311.97	988,017	$287,735	$1,027.63	1,802,163	$524,834	$504.65
Gas (GJ)	212,542	$16,083	$21.16	619,614	$46,887	$167.45	832,156	$62,970	$60.55
Water (Ltrs)	53,667	$73,393	$96.57	39,973	$54,666	$195.24	93,640	$128,059	$123.13
Waste Disposal		$66,000	$86.84		$93,000	$332.14		$159,000	$152.88
Security		$306,000	$402.63		$48,000	$171.43		$354,000	$340.38
Grounds		$410,000	$539.47		$59,000	$210.71		$469,000	$450.96

Source: SwanCare Group Graham Francis CEO, personal communication 2013.

Table 5: Resident Numbers (& car ownership) at Case Study site

Number of ILU residents (est.)	760
Number of Care Residents	280
Total	1040
Approximate number of vehicles in the village: (75% of households have a vehicle)	413
Total # of ILU's	550

Source: SwanCare Group personal communication.

5.2.1 Analysis of the Case Study Data

What is initially apparent, from the resource consumption data (Table 4), is the difference in cost per head between the independent living units are and the high care. In addition, high care is also costly in the care element and service delivery. Within Bentley Park there is still a focus on the car as a priority in design rather than the pedestrian. There are areas set aside for public open space, physical activities, and generally socialising, but roadways transect the complex and the amount of hard stand area also adds to the heat island effect, which raises the local temperature, especially without the heat moderating effect of large trees and vegetation (Brunner and Cozens 2012).

Design and energy efficiency of housing units is regulated to an extent by the Building Code of Australia (BCA), but these minimum standards for energy efficiency result in little actual energy efficient design (Crabtree 2005, 2006; Crabtree and Hes 2009; Williamson, Soebarto, and Radford 2010b; Hakkinen and Belloni 2011). The design of the new units at SwanCare does incorporate some energy efficient elements (such as light colours on the roofing and building materials) but this is minimal at best. Housing (and window) orientation is poor, no eaves are present, space between buildings (to allow air flow) is restricted and the overall site for this stage of development is set in a cutaway section of the topography (requiring massive earthworks). While an analysis of the electrical goods being used in each building was beyond the remit of this research, it is likely that many energy efficiency savings could be achieved by the retrofit of these. As has been found in studies in NSW, and QLD such retrofits have the potential of creating savings in the order of $50,000 per annum (Hunter and Elkington 2005; Productivity Commission 2008; Sustaining Our Towns 2011; New South Wales Government 2012; Queensland Government 2012a).

5.2.2 Learning from elsewhere

A number of other case studies of aged care facilities provide examples of what can be done to achieve greater sustainability:

- **Manningham Centre Nursing Home, Melbourne, Victoria**

This project incorporated a number of Environmentally Sustainable Design features partly driven by the local council's (a stakeholder) own priorities. It included an additional 30 beds and 30 refurbished beds. Features included a gas boosted solar hot water system, storm water reuse in the WC cisterns, storm water retention to minimise overland flow, sun-shading and use of solar glass, the use of plantation timbers throughout, including the eco-cladding and the use of compact fluorescent lighting throughout (Queensland Government 2012a).

- **Legana Village Aged Care Facility, Launceston; Tasmania**

This 45 bed aged care building in Launceston used geothermal heat (obtained by drilling down into a rock heat sink 40 metres below the ground), for heating water for use in the hydronic heating system (Queensland Government 2012a).

- **Oak Towers Aged Care Facility, Oakleigh, Victoria**

This facility installed a new laundry system that enabled them to reduce their energy, water consumption and waste generation. It was important to reduce resource and energy use as the facility processes 3, 520 tonnes of textiles each week, and so there was significant motivation and room for improvement in costs. The new system has achieved the following improvements:

- 490GJ of gas energy
- 1,245kL of water
- 850 litres of chemicals
- Over 680 hours in productivity improvement
- $30,700 in savings
- 61 tonnes reduction in greenhouse gas emissions (Queensland Government 2012a).

6 CONCLUSION

Ultimately the choice to include sustainability principles and practices into a business or facility's strategic direction is motivated by social and cultural awareness for being a 'good' corporate citizen, the willingness of management and the push from government regulation that inevitably forces action (Dresner 2002; Bell and Morse 2005; Filho 2005; Tripoli 2008). Such changes are happening slowly in the aged care sector in Australia, particularly in WA, where the climate and drive for sustainability initiatives have fluctuated with ever changing policies of different governments and approaches. While the National Accreditation standards for Aged Care facilities continue to address care, facilities and services it fails to address sustainability. There is little or no incentive or motivation, or requirements for Aged Care providers to include such considerations in their governance structures and any that do generally take this pathway as a reflection of the organisation's own strategic vision.

It is clear that aged care provision is a costly venture and with the growth and ageing of the population the costs associated with this sector are likely to skyrocket. Sustainable design principles applied in practice generally, as we know, can reduce overall operational costs and produce savings and it is therefore timely that these be applied to implement in the aged care sector. Without a clear policy mandate within an established framework and hierarchy of control, approaches to sustainability are likely to be ad hoc and lacking in an overall strategic direction.

The SwanCare Group, are yet in any large way to embrace sustainability practices even though, it is obvious that savings can be made. Further, as the aged care sector has a national focus, through regulation, the funding model and national accreditation, savings attributed to adoption of sustainable practices are more readily enacted and enforced throughout Australia in a consistent manner. With rising energy prices inevitable, coupled with increasing demands for aged care services from an aging population, Australia is in the position to enable our elderly to age with dignity and support in locations desired – whether this be in the family home (to age in place) or within an aged care village. As this research has highlighted there are abundant opportunities for increasing the energy efficiency of aged care facilities through very simple initiatives that have the potential to provide significant cost savings with very little effort. Governments have a moral and ethical imperative to enable the growing aged care sector to assist the aged to enjoy their diminishing years in comfort and free from the stress of rising energy and resource costs.

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