Keywords: office buildings, sustainability, refurbishment, building adaptation, Australia.

Abstract

With acceptance of the relationship between energy consumption, greenhouse gas emissions and climate change, the built environment is a sector with high potential to lessen overall emissions. Given that the built environment emits around half of all greenhouse gas emissions; it could play a significant role in mitigating global warming. With around 2% of new buildings added to the total stock each year; the scope for reductions lies with adaptation of existing buildings.

Many cities aim for carbon neutrality with Melbourne leading the way. Successful adaptation demands that social, technological, environmental, economic and legislative criteria are addressed. Buildings have to meet user and community needs. City centres comprise a range of different type of office stock with regards to age, size, location, height, tenure and quality. All buildings present challenges and opportunities with regards to adaptation and sustainability, and integrating retrofit measures that reduce energy, water and resource consumption.

Using a selection of Premium grade office buildings to develop retrofit profiles, this paper addresses the questions; (a) what is the nature of adaptations in relation to Premium quality office building stock in the Central Business District (CBD) and, (b) what is the extent and scope for sustainable retrofits to Premium grade office buildings. Using the Melbourne CBD, adaptation events of Premium grade office buildings were analysed between 1998 and 2008 to identify the potential for integrating sustainability into retrofits projects.
Introduction

It is said that the ‘challenge of achieving sustainable development in the 21st century will be won or lost in the worlds urban areas’ (Newton & Bai 2008:4) and policy makers increasingly look to existing building retrofit as a means of delivering sustainability in the built environment. Australia needs to increase the rate of retrofit of existing office stock to reduce building related greenhouse gas emissions (Garnaut, 2007). This is recognised by the City of Melbourne which aims to bring about a carbon neutral city by 2020 with a goal of 1,200 building retrofits to deliver greenhouse gas reductions through sustainability measures (Lorenz et al, 2008). However within the stock there is a great variance in building quality and some properties may experience greater levels of retrofit and greater frequency of adaptation (Wilkinson & Remøy 2011). The questions this paper addresses are: (a) what is the nature of retrofits in relation to the Premium quality office building stock in the CBD and, (b) what is the extent and scope for sustainable retrofits to Premium quality office buildings.

Defining retrofit

The definition of retrofit is derived from Douglas’s (2006) definition of adaptation as: “any work to a building over and above maintenance to change its capacity, function or performance’ in other words, any intervention to adjust, reuse, or upgrade a building to suit new conditions or requirements”; it is a broad definition. Retrofit can occur to a whole building or to part of a building; for example, to one or more floors of high rise buildings. The definition includes within use and across use retrofits. The term ‘retrofit event’ covers all activity related to individual building permits on existing buildings. In the case of tenanted buildings, events can be referred to as alterations and extensions, upgrade, change of use and renovation; as such multi-tenanted buildings will experience multiple events in the one building. High rise buildings experience a greater number of retrofit events, though the value and scope of those events may be smaller.

There are a surfeit of terms used to cover retrofit such as adaptation, refurbishment, upgrade, conversion, renovation and they all often exist in a ‘state of happy confusion’ (Markus 1979, Mansfield 2002). This paper examines the lower quality office buildings, the need to retrofit existing stock and the scope for enhancing sustainability through retrofit. One reason buildings are retrofitted is to meet tenant and owner requirements and to accommodate changing user preferences if they are to compete with newer sustainable buildings.

Building quality and office stock in Melbourne

Office stock comprises a wide range of different attributes such as size, age, space plan, configuration and physical condition which are taken as measures of quality. In Australia office buildings are classified using the Property Council of Australia building quality matrix. The matrix uses different measures such as size of floor plate, number and speed of lifts; environmental rating under Green Star and or NABERS, quality of the entrance foyer and so on to determine the building’s rating level. Buildings are rated from Premium, the best quality, sequentially through A, B, C and D. The lowest levels of building quality measured in the matrix are C and D grade. Premium office buildings typically attract the highest rental levels with the highest capital values. However many office buildings do not have the Property Council of Australia rating and such buildings are likely to be owned by private
individuals and do not form part of property investment portfolios. Initial analysis of retrofit activity in Melbourne CBD showed that activity is largely focussed on the superior quality offices and that the C and D grade stock has the least activity (Wilkinson & Remøy, 2011). The Melbourne CBD office market contains 3,608,258 square metres of lettable space, of this, 55.6% is A Grade quality, with 26.4% of Grade B quality with the remaining 18% being Grade C and Grade D (Savills, 2010).

**Sustainable retrofit measures**

Sustainability is defined in the framework of the triple bottom line where economic, environmental and social sustainability are perceived as equally important. With buildings the emphasis is placed often on the environmental sustainability of the structure and fabric and the operational phase of occupation, with thought also to deconstruction and recycling opportunities at the end of the building lifecycle. Langston (2010) noted building retrofit can deliver economic, environmental and social benefits to society, which should be at the forefront of thinking about existing stock.

The key environmental sustainability measures that can be considered in the retrofit of office buildings are energy efficiency, water efficiency, the reduction of waste, recycling and waste management, specification of low environmental impact materials, and effective building operation and facility management (GBCA, 2010). Energy efficiency and reductions in building related greenhouse gas emissions may be improved by using high efficiency luminaires, high frequency ballasts and energy efficient lighting controls, and purchasing ‘green power’ (Arup, 2008). Tenancy sub-metering also enables the improved management of energy use. Depending on the individual building substantial improvements can be made with minimal costs through a housekeeping review, energy purchase, improved maintenance and re-commissioning building’s services (Arup, 2008). Furthermore reusing existing buildings allows owners to capture the embodied energy already invested in the existing structure and fabric of the building, rather than commit new resources.

Water economy measures include installation of waterless urinals and 3/6 litre dual flush toilets, water efficient fixtures and water tanks to collect rainwater to flush toilets (GBCA, 2010). Such measures can reduce the environmental impact of buildings and are recognised by their inclusion in the environmental assessment tools used to evaluate the sustainability achieved in green buildings such as Building Research Establishment Environmental Assessment Method and the World Green Building Council’s Green Star (Langston, 2010).

Other sustainability measures that may be adopted include reusing timber and using timber from renewable certified sources. Furthermore using carpets, paints, sealants, glues and adhesives with low volatile organic compounds incorporates sustainable materials into buildings (GBCA, 2010). In addition the provision of bicycle storage and shower facilities encourages the adoption of environmentally friendly transportation. Plainly there are a range of measures which may be adopted and the measures noted above are not exhaustive, however each building has to be considered on its merits to ascertain explicitly those parts which may be retrofitted with sustainability measures.

A dominant contention for economic sustainability is the notion that sustainable buildings are healthier and lead to less employee absenteeism and higher levels of productivity thereby boosting the overall profitability of business occupiers (Clements-Croome, 2006). Typically
businesses ascribe around 85% of all costs to employment and therefore it is a potent argument. Furthermore the lower operating costs of sustainable buildings are another driver and reason for implementing sustainability, even more so given increasing energy costs.

Social sustainability is a broader concept and relates to society, the community and/or individual people. The social sustainability of the building is considered by stakeholders and within environmental assessment tools. An example of social sustainability is the perception that sustainable buildings are healthier for occupants because the specification excludes materials that are detrimental to human health (Clements-Croome, 2006). Another illustration of social sustainability is the building aesthetics where buildings having pleasing aesthetic qualities enhance their environs and the well being of people using the area (Ohemeng 1996, Zunde 1989). Clearly there is a close and frequently overlapping connection between the three components of the triple bottom line.

It is possible, with a well planned retrofit, to increase the office quality grade and the rental and capital value of the building however previous studies concluded that this is largely dependent on the condition and location of the building (Boyd et al 1993, Sinclair, Isaacs (in Baird et al) 1996, Swallow 1997, Snyder 2005, Kersting 2006). One UK study showed that post retrofit office buildings typically had lower running costs and subsequent operating costs than prior to the retrofit even if the retrofit did not have sustainability as a priority (Kincaid, 2002). Kincaid (2002) confirmed Wilkinson’s earlier global study of thermal improvements in office refurbishments (Wilkinson, 1997). Lower running costs ensue due to the technological advances which occur in building services since the date the original installation was fitted. The decrease in operating costs is a positive economic outcome for whoever pays for the running costs, which can contribute to higher rental levels or higher capital values (Kincaid, 2002). The overall environmental impact of the building is lessened because lower running costs indicate less energy consumption and fewer greenhouse gas emissions. The potential for integrating a broad range of economic, environmental and social sustainability measures are explored in the context of the type and extent of retrofits that have been undertaken to premium grade buildings from 1998 to 2008 in the Melbourne CBD.

Building attributes in retrofit

Earlier work identified attributes which are important or affect retrofit (Kincaid 2002, Arge 2005). For a fuller discussion on building retrofit and building attributes readers are referred to Wilkinson et al (2009). This paper focuses on selected important attributes in the context of premium grade buildings, sustainability and retrofit: the number of retrofits overall, trends over time, age, location, building quality, aesthetics, plan shape and operating and energy costs. Some of these attributes are associated with sustainability such as building quality as defined by the Property Council of Australia and described above. Premium grade offices typically have the best quality services for example the fastest lifts and air conditioning which results in high operating costs per metre squared and consequently high greenhouse gas emissions. However it is also true to say that lower grade offices with older services installations can have higher running costs on a per metre squared basis (Property Council of Australia, 2008). Aesthetics are a measure of social sustainability in the context of this research.

Age has an important affect on retrofit; as buildings age they deteriorate and components need repair or replacement (Douglas, 2006). There is a correlation between time and building
obsolescence; as time passes retrofit is necessary to avert a decline which otherwise leads to
demolition (Barras & Clark 1996, Baum 1991). Previous studies regarded location as
important; with properties sited in favourable locations experiencing greater frequency and
probability of retrofit (Kincaid, 2002; Douglas, 2006; Highfield, 2000). Building location
within an area can be translated into zones, the Melbourne CBD has five zones from the best
location ‘Fringe’. The best location ‘Prime’ is where offices with the highest rental and
capital values are located. There is a perception that buildings sited in better locations
undergo more retrofit (Swallow 1997, Ball 2002). Building quality is measured in various
ways, it can be either provision of a greater number of amenity features, attributes and, or a
higher standard of services, features, fixtures and fittings.

Other important attributes include plan shape; some plan shapes such as deep plan were
easier to adapt than others such as irregular shaped ones (Kincaid, 2002; Povall & Eley in
Markus, 1979). Building height or the number of storeys in a building was found to effect
retrofit in studies conducted by Povall & Eley (in Markus 1979) and Gann & Barlow (1996).
Aesthetics was asserted to be an important attribute in determining whether or not a building
was adapted in a UK study of 400 building owners (Ohemeng, 1996).

Research Approach

An office building database was assembled to understand the nature of retrofit and the scope
for sustainable retrofit using several sources including the commercial database Cityscope,
and public databases such as PRISM (Victorian Government) and the Heritage database. In
addition data from the Property Council of Australia, Google Earth and Google Streetview
(www.google.com.au/maps) was used to gather building related data (Property Council of
Australia 2007). Information relating to retrofit events was derived from the records for
building permit applications. Visual inspections and photographic records of CBD office
buildings were carried out. The database contains records for 13222 retrofit events to
commercial buildings from 1998 to 2008 and allows the researchers to provide an overview
of what has happened on a CBD scale with retrofits to Premium grade buildings.

Given the objectives; to understand the nature of retrofits to premium grade office stock and
the extent and scope for sustainable retrofit, this stock only was extracted for analysis. The
criteria used to examine the scope and the potential for sustainability in the retrofit were
number of adaptations, location, building quality, aesthetics, plan shape and costs in use. As
this study determines the nature of and the scope and extent for adopting sustainability in
retrofits within the Melbourne CBD, details on the individual Attributes of the buildings are
not examined or discussed. The results are a uni-variate and a bi-variate analysis of the data.
The answer to question a); what is the nature of retrofits in relation to Premium quality office
building stock in the CBD, is given on the basis of a quantitative statistical analysis derived
from the database and reflects the empirical reality. The answer to the second question is
derived from the literature outlining different types of sustainable retrofit measures and their
impact on building performance.
Retrofit activity in a developed, mature commercial market was investigated. The Melbourne CBD is the most mature property market in Victoria with a diverse range of stock and was set out in 1834 (see figure 1).

**Results and discussion**

All retrofit events to Premium grade buildings were analysed to determine the level of retrofits undertaken. A total of 844 retrofit events occurred from 1998 to 2008. Minor retrofits accounted for 4.0% of works, alterations 11.4%, and alterations and extensions adaptations, the most extensive level 79.5%. New build and demolition work accounted for 5.1% of works and no change of use retrofit took place. This pattern closely maps figures for retrofits to all building grades and also for C and D grade offices (Wilkinson, 2011). The most frequent level of work undertaken was ‘alterations and extensions’ retrofits which indicates a strong levels of confidence in the market to recover the costs involved in the construction works and the loss of income during the works in order to achieve higher rental levels post retrofit. The median age of the building stock during the time period was 31 years which means that buildings are at an age where retrofits are required to upgrade them to meet market expectations (Jones Lang LaSalle 2005, Duffy in Brand 1994).

When all retrofits are examined by Property Council of Australia building quality grade, Premium quality stock accounted for 12.9% of the works, with A grade at 20.7% and B grade recording the highest level of activity at 27.3%; therefore 40.9% of the work is undertaken to the highest quality stock. Unclassified office buildings accounted for 24.2% of work, leaving work to the lowest quality stock the C and D grade stock accounting for 11.1% and 3.8% of retrofits respectively. Within the Melbourne market there are lower vacancy rates for highest quality office stock (Knight Frank, 2010) which implies that retrofit works result in higher levels of occupancy. Reviewing the retrofits to premium stock to ascertain what level of retrofits are undertaken, less work occurs to Premium stock compared to A and B stock and alterations and extensions retrofits are most popular type of adaptation.
Figure 2 Retrofit to Premium offices in Melbourne CBD by adaptation type.

Stock attributes

Overwhelmingly the Premium stock has a deep plan shape (90.63%), followed by irregular plan configurations at 9.13%, with the remaining 0.24% being of a wide frontage to the street. The buildings retrofitted were all purpose built for commercial usage.

The primary façade or envelope material for 96.56% of adaptations was curtain walling. Concrete cladding accounted for 0.23%, with stone cladding at 3.21%. Curtain walling has a very low thermal mass with little insulation which leads to high levels of heat gain during summer months and heat loss during the cooler winter months. Replacement of curtain walling to high rise and sky rise building is highly disruptive to occupants and time consuming and unlikely to fall within most owners’ budget constraints. Curtain walled buildings on the other hand, do present opportunities for improving energy efficiency with this stock. Typical retrofit measures might include shading to prevent heat gain and secondary glazing fitted internally to reduce heat loss. The application of glazing films or use of low emissivity glazing can also reduce heat loss and energy consumption.

When visually inspected the external envelope of all curtain walled buildings was in good or very good condition with only minor surface imperfections noted. There is little in the physical condition to drive these owners to undertake alterations externally that could provide an opportunity to improve thermal performance. Furthermore when building appearance is evaluated all Premium buildings were classified as aesthetically pleasing, reflecting the contemporary and modern appearance of the stock and current perceptions of what is aesthetically pleasing. The result confirms Ohemeng’s (1996) study that more attractive stock is retrofitted compared to less attractive buildings. Furthermore given that the stock is considered attractive and the condition is good, over-cladding or replacement of existing facades is unlikely to have much appeal with Premium stock owners.

ERES 2011 Premium Grade Adaptations
When the location of the vertical services core is considered, 65.25% of events occurred in buildings with centrally located services cores and 34.74% to those with multiple services cores. The pattern is the reverse of adaptations to C and D grade stock. This implies that the Premium buildings are more amenable to different configurations of space plan on individual floor levels, a finding supported by (Arge, 2005).

Retrofitted Premium stock is predominately single land use; that is 65.82% of events occurred to buildings classified solely as offices with a large minority of 34.18% classed as office and retail land use. Buildings without a mixed land use undergo more frequent levels of retrofit possibly because less negotiation is required with co-owners and other stakeholders however there are multiple tenants to consider though the level of negotiations differ.

Where regulatory requirements are concerned, 61.3% of retrofits occurred to buildings with no listing or heritage overlays. Given the age and type of stock, fewer buildings are listed and those that are, represent exemplars of modernist architectural styles and construction innovation within Melbourne or Australia. For example, ICI House, built in 1958, adopted the international style ‘modernism’ and was listed in March 1990 due to its architectural significance to Victoria. Until 1961, ICI House was the tallest building in Australia and at 84 metres high it exceeded the 40.2 metre Victorian height restriction and set new precedents in height controls in Melbourne. Its height and position on the eastern hill of the CBD, terminating the axis of Lonsdale Street, made the building a landmark. In terms of construction innovation, curtain walling had previously been used to a small degree on facades in Melbourne but its use on ICI House was important as the entire main building envelope is clad in this manner. Given that owners of non listed stock are more likely to undertake retrofit, the authorities need to consider programmes to incentivise heritage owners to retrofit.

As buildings age, they require retrofit (Barras & Clark 1996, Langston et al 2007). When the age of buildings undergoing retrofit was examined 88.52% of all events occurred to Premium buildings less than 25 years of age; the largest number. The remaining 11.48% of events occurred to buildings aged 26 to 50 years. No retrofits occurred to Premium buildings older than this, and this is a different profile to C and D grade stock where 31.6% of adaptations occurred to buildings aged 51 to 152 years. Clearly Premium grade stock undergoes much retrofit activity early in the life cycle. Owners of this grade stock prefer to maintain their position within the market place.

Arge (2005) found that the potential for lateral and vertical extension of a building greatly enhanced its desirability for retrofit. No Melbourne stock had potential for lateral extension because entire sites were built out. Scope for vertical extension was based on an analysis of the structural frame type and condition of the property but none were found to support a vertical extension which compared with 25.9% of C and D retrofit events which could support vertical extension, planning permission permitted. Depending on planning density requirements there is little scope to increase net lettable floor area of the Premium CBD offices.

Arge (2005) noted that the degree of attachment to other buildings was important in determining the level of disruption to tenants of adjoining properties during retrofits. Most Premium retrofits occurred to detached buildings (98.81%) followed by 1.20% to buildings attached on three sides and Arge’s (2005) finding is supported.
Access to the building was important in determining the ease of delivery of construction materials and retaining tenants in situ where necessary during retrofits (Arge 2005). Six Premium grade retrofits occurred to buildings with access on all sides whilst most occurred to buildings with access from the street, side and rear (78.55%), followed by street and side access (11.37%). Such practices confirm Arge’s (2005) findings. Finally 9.36% events occurred to buildings having access from the street and rear of the building.

Location is perceived as important in retrofit (Swallow, 1997). Most Premium retrofits (47.21%) occurred in the Prime location suggesting that owners are conscious of the benefits of the location and strive to keep up with retrofit activity in higher quality stock (figure 3). One street, Collins Street, accounted for 27.7% of all adaptations. In the Low Prime location 37.01% of Premium retrofits occurred. There is a fall in High Secondary location activity where 14.47% of events occurred and in Low Secondary locations 1.30% of retrofits took place. No activity occurs in the least desirable location, ‘Fringe’ where no Premium buildings are found. The implication for policy makers is that incentives should target improvements to Premium stock in the best locations where there is clear potential given the number of events occurring to improving building performance and reducing building related greenhouse gas emissions.

![Figure 3 Premium office building retrofits and CBD location](image)

On the basis of Property Council of Australia building quality grade, it is feasible to assess cost in use. The Property Council of Australia publishes data with regards to median gross income, and the costs of operating expenses, energy and water consumption based on grade (Property Council of Australia 2008). As expected gross income on a per metre squared basis is correlated to building quality with Premium grade stock in 2008 grossing $395.92 m² compared to and $300.95 per square metre for B grade stock and $274.01 per square metre for C grade stock (Property Council of Australia, 2008). No data is available for D grade buildings. Premium stock has the highest rental levels and owners have been willing to invest in retrofit to maintain market position.
When operating expenses are examined Premium stock costs $62.11 m² is expended, however C grade stock is more expensive to operate at $73.35 m², although B grade stock is lower at $54.17 m² (Property Council of Australia, 2008). Given the very high levels of services in Premium stock these buildings are running at comparably efficient rates. Even so there is scope to retrofit the buildings with energy efficiency measures to reduce high operating costs. It is clear that any retrofit replacing worn out services will result in significant energy saving simply because the quality of replacement fittings far exceeds that of existing fittings (Wilkinson, 1997; Kincaid, 2002).

The costs of electricity consumption is highest in C grade stock at $25.93 per square metre, compared to $21.70 per square metre for Premium and A grade buildings, and $19.72 per square metre for B grade stock. Premium owners can take some comfort that with the highest level of building services amenity, such as air conditioning and high speed lifts; the cost of electricity consumption is not the highest amongst the different grades. Owners should not rest of their laurels however as this is a likely to be result of the age, condition and efficiency of existing installations. Clearly there is further scope to reduce electricity consumption per metre squared (Property Council of Australia, 2008). A similar picture emerges where gas consumption is considered. The costs of consumption is highest in C grade stock at $3.33 per square metre, compared to $1.29 per square metre for Premium and A grade buildings and $1.55 per square metre for B grade stock. Retrofit aimed at improving efficiencies in the existing gas installations will lead to lower levels and costs of consumption. For water consumption a comparable situation exists; C Grade stock has the highest costs at $3.51 per metre squared, contrasted to Premium and A grade at $3.34 per metre squared and B grade at $2.49 per metre squared (Property Council of Australia, 2008).

Swallow (1997) stated building owner type was an important factor influencing retrofit. Only 9.59% of events occurred to Premium grade stock in private ownership, where the breadth and depth of professional advice offered to and taken up by owners is unknown. Institutionally owned stock is likely to be professionally managed and accounted for 89.94% of events, whereas in C and D grade stock only 37% of retrofits were conducted by private owners. Institutional owners are more likely to consider sustainable retrofit compared to private owners.

Premium stock had 20.84% of retrofits to buildings with NABERS ratings and 43.23% of retrofits to those with ABGR ratings, which is very encouraging and indicates this quality of stock is taking up market incentives and ratings to demonstrate sustainability credentials. There were no buildings retrofits within GreenStar ratings during this period and this is likely to change in future. In comparison, no C or D grade buildings in the database had NABERS, Green Star or ABGR environmental ratings highlighting the environmental quality gap in the stock. This gap needs to be addressed by policy makers to avoid encouraging the evolution of a two tier market of buildings perceived to be either sustainable or non sustainable.

Conclusions

The questions this paper addresses are: (a) what is the nature of retrofits in relation to Premium quality office building stock in the CBD and, (b) what is the extent and scope for sustainable retrofit to premium quality office buildings. There are some clear findings from this analysis;
a) Most retrofits are extensive; alterations and extensions adaptations,
b) A and B grade stock undergoes more adaptation than Premium stock,
c) Vacancy rates are lowest in Premium grade stock,
d) Most retrofits occur in Collins Street and Bourke Street.
e) Retrofits largely occurred to buildings with deep plan shapes, curtain walling and external envelopes in good condition, with central service core locations, classed as office land only, without heritage listing or overlay issues, aged less than 25 years, detached and in private ownership.

With the Premium grade stock there is scope to;

a) Replace or overclad envelopes, or retrofit secondary glazing to improve thermal performance, though given the good condition of stock overall building owners will need encouragement.
b) Reduce the operating costs, electricity and gas consumption costs through sustainable retrofit of heating, ventilation and air conditioning installations, replacement of outdated lifts with energy efficient smart vertical transportation, replacement of light fittings with T5 technology.
c) Decrease water consumption costs through sustainable retrofit.

Additional issues raised in this study are;

a) Owners of non listed stock are more likely to adapt owners of listed buildings and authorities need to consider programmes to incentivise this group.
b) Buildings with office land use only undergo more frequent adaptations. This has implications for the future as more mixed use buildings appear in city centres.

There are distinct differences in the patterns of retrofit based on building quality (see discussion of C and D grade retrofit potential in Wilkinson, 2011) yet there are some similarities, such as the level of retrofit and the locations in which work is undertaken. Sustainable retrofit measures have been identified on a CBD wide scale with specific stock attributes offering the best potential for retrofit affirmed. The attributes embody the facets of the economic, social and environmental aspects of the triple bottom line identified previously (Wilkinson et al, 2010). The results reveal evidence that an environmental quality gap is emerging between the Premium and the lower grade C and D stock. Premium Despite its higher quality and extent of building services, Premium stock is operating more efficiently on a per metre squared basis than its C and D grade counterparts. However there is a will within owners of this stock to pursue sustainability as part of their CSR aspirations which should lead to more efficiency and lower greenhouse gas emissions into the future. The rates of retrofit in Premium quality stock are comparatively high. The relatively frequent levels of retrofit of Premium stock could be deemed unsustainable, as relatively good quality plant and equipment is replaced with the latest sustainable technologies. There is perhaps an opportunity which is currently being missed, to recycle and reuse equipment from Premium stock in the C and D grade properties.
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