The Productivity Commission

Inquiry into Energy Efficiency

Submission by

The Australian Glass & Glazing Association

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Inquiry into Energy Efficiency

AGGA Submission

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9th November, 2004

Energy Efficiency Inquiry
Productivity Commission
LB2 Collins Street East
MELBOURNE VIC 8003

Dear Sirs,

The Glass & Glazing Industry is a major element of the Australian Building Industry employing over 10,000 people and contributing in excess of $1bn to the Australian economy. The Australian Glass & Glazing Association represents this Industry, and in particular, glass manufacturers, glass importers, glass and window installers, glass processors, and numbers of window suppliers and machinery suppliers in each State.

However, the use of energy efficient products is severely hamstrung in that builders particularly want nothing more from the window than the lowest price, irrespective of performance. As a consequence, the energy performance of today's windows is little better than it was 100 years ago.

From an energy efficiency viewpoint, Australian windows are the worst in the developed world.

Of the heat entering a building, 85% does so through the windows. Of the heat lost from a building, 55% is lost through the windows. As a consequence, households and buildings throughout the country are using 60% more energy to heat and cool a building than is necessary.

Apart from the abysmal waste of energy, the production of that energy is creating unnecessary and unwanted greenhouse gas emissions (G.G.E.), equivalent to one tonne per annum per dwelling and substantially more for commercial buildings. For example, two homes were drawn from the Simmonds range of designs, the first being a medium sized home, rating 3.5 stars with ordinary glazing or 5 stars with energy efficient glazing. The second example was a larger sized residence rating 3 stars with ordinary glazing and 5 stars with energy efficient glazing. Initially, both these homes were simulated using gas for heating, electricity for cooling and using ordinary glazing. That result was matched with conditions changed through the fitting of energy efficient glazing. For the medium sized home, electricity usage was decreased by 273kWh and gas usage was reduced by 8590MJ. In addition, green house gas emissions were reduced by 863kg PA. For the larger house, electricity usage fell by 511kWh and gas by 34,500MK's. The reduction in green house gas emissions for this dwelling was 2685kg's.

The two homes were then simulated on the basis that heating as well as cooling was electric. The use of electricity for both heating and cooling is growing rapidly and is being driven by the rapid growth in the use of reverse cycle air conditioners. Under this scenario, reduction in energy usage for the medium sized home amounted to 2180kWh when energy efficient glazing was used and generated green house gas emissions savings of 2921kg's. For the larger house, annual energy savings were 8178kWh's and reduction in green house gas emissions were 10,960kg's. (see attachment 1.) Correct glazing to Australian homes would reduce G.G.E's by over 7 million tonnes per annum.

Furthermore, case studies show additional building costs to install energy efficient windows add as little as 1% to the first cost of a building. For example, the Bovis Lend Lease Tower currently being constructed at Victoria Harbour in the Melbourne Dockland's area was able to gain 5 stars for all apartments covering all orientations through the use of energy efficient glazing. In this instance, the additional cost of the glazing was equivalent to $10 per meter square of floor space as compared to the finished price of $5,000 per square metre of floor area (see attachment 2). As with the residences simulated above, these apartments will also generate reductions in energy usage and green house gas emissions of approximately 40% and this will continue for the life of the building.

Most developed countries, e.g. UK, USA, Europe, Japan and parts of China, have found it necessary to regulate energy efficiency standards in buildings in a similar way that regulations are required for structural integrity.

As an additional benefit for communities where regulations have been imposed, such as the USA, replacement and renovation markets have also embraced energy efficient glass and windows such that existing housing stock is also included, through building renovation and window replacement. Thus, energy savings (and resultant Greenhouse Gas Emission reductions) are also realised in existing buildings.

Unfortunately, this is not yet being realised in Australia. This is because there has been little regard for unnecessary energy usage, little regard for unnecessary production of G.G.E's and little regard for creating buildings with superior energy performance. This in turn occurs because, invariably, the builder is not the operator and has no responsibility for, or interest in, the on-going energy performance of the building. Therefore, and despite the availability of cost effective, energy efficient windows in the Australian building market for over 30 years, the volume market for houses, apartments and smaller commercial buildings has consistently demonstrated an unwillingness to install these products without regulation.

If left to market forces, this damaging situation will not change quickly. When evaluating the cost effectiveness of energy efficient glazing, the ABCB in its document "Development of Energy Provisions for Building Fabric in Air Conditioned Spaces" by Ernest Donnelly, calculated the pay back period for double glazing in each of the climatic zones and for each of the orientations within those climatic zones. It's findings showed that in the vast majority of cases, the payback period when taken into account the lower appliance size needed for a correctly glazed building was less than one year (see attachment 3). However, and in spite of this having been demonstrated continually over the last thirty years in better class commercial buildings, builders and developers (particularly where they will not be users of the building), pursue the lowest initial cost option. Whilst there is no social or legal pressure to the contrary, they will continue to install the cheapest (and poorest performing) glazing available. Of the current window industry, up to 95% supplies single glazed clear glass aluminium framed windows with a poor thermal performance. With every new building, renovation or extension, therefore, we are committing this country to an irresponsibly wasteful building stock and the unacceptable and totally unnecessary production of G.G.E's for the life of the building.

In addition, there are serious issues of peak energy supply - State Governments are struggling to maintain continuous energy supply and the rampant growth of air conditioning (greatly exacerbated by the need to compensate for the lack of window insulation) will only make that worse.

There are also social issues exemplified by the disadvantaged in our community being the least able to afford the increase in costs to heat and cool that will result from allowing the current situation to continue.

Through a body such as the ABCB, the Australian community has the opportunity to adopt existing scientifically based expertise to ensure that its building stock is appropriate and avoids the very worst practices which cost the community so dearly. For example, the designs of Blue Hills Cottages, a medium sized home builder showed three designs ranging from 1.5 to 3 stars. For each example, energy efficient glazing and improved insulation (to both the walls and ceilings) raised the energy rating of the design to 5 stars. As a consequence, in each instance, energy usage of the dwellings were dramatically reduced with the home denoted as Nirvana Close showing an energy reduction of 54.4% (see attachment 4).

Further, a body such as the ABCB is very important in driving a nationally unified approach to building regulation for a construction and building products industry that operates across state boundaries. It is very inefficient, difficult and costly, for a manufacturing industry to deal with fundamentally different state based approaches to energy efficiency, or any other regulation.

The Australian Glass and Glazing Association implores the Productivity Commission to recognise that market forces do not always lead to an outcome that is appropriate for a community. The building industry must have minimum standards to ensure that Australia's building practices keep pace with the developed world, and do not leave a legacy of waste and unnecessary over production of Greenhouse Gas Emissions.

Yours sincerely,

Roger Leeming
President
Australian Glass & Glazing Association

ATTACHMENT 1.

ENERGY AND CO2 SAVINGS RESULTING FROM ENERGY EFFICIENT GLAZING

The following are estimates of CO2-equivalent greenhouse gas emissions and approximate $ savings (based on 15c/kWh for electricity and 0.7c/MJ for gas) based on two of the Simonds range of homes, Glenwood and Toscana. The first run of data assumes electric cooling and gas heating. Only heating and cooling energy consumption was considered. Changing from natural gas to electric heating has a huge impact on the outcome in Victoria because heating energy demand is much greater than cooling energy demand.

Gas heating, electric cooling

Glenwood 2200
From 3.5 stars to 5 stars:
Annual Electric Energy Saving: 273 kWh
Annual Gas Energy Saving: 8590 MJ
Annual reduction in greenhouse gas emissions (CO2 equivalent): 863 kg
Annual $ savings: $100

Toscana 4000
From 3.0 stars to 5 stars:
Annual Electric Energy Saving: 511 kWh
Annual Gas Energy Saving: 34500 MJ
Annual reduction in greenhouse gas emissions (CO2 equivalent): 2685 kg
Annual $ savings: $318

All electric

Glenwood 2200
From 3.5 stars to 5 stars:
Annual Electric Energy Saving: 2180 kWh
Annual reduction in greenhouse gas emissions (CO2 equivalent): 2921 kg
Annual $ savings: $327

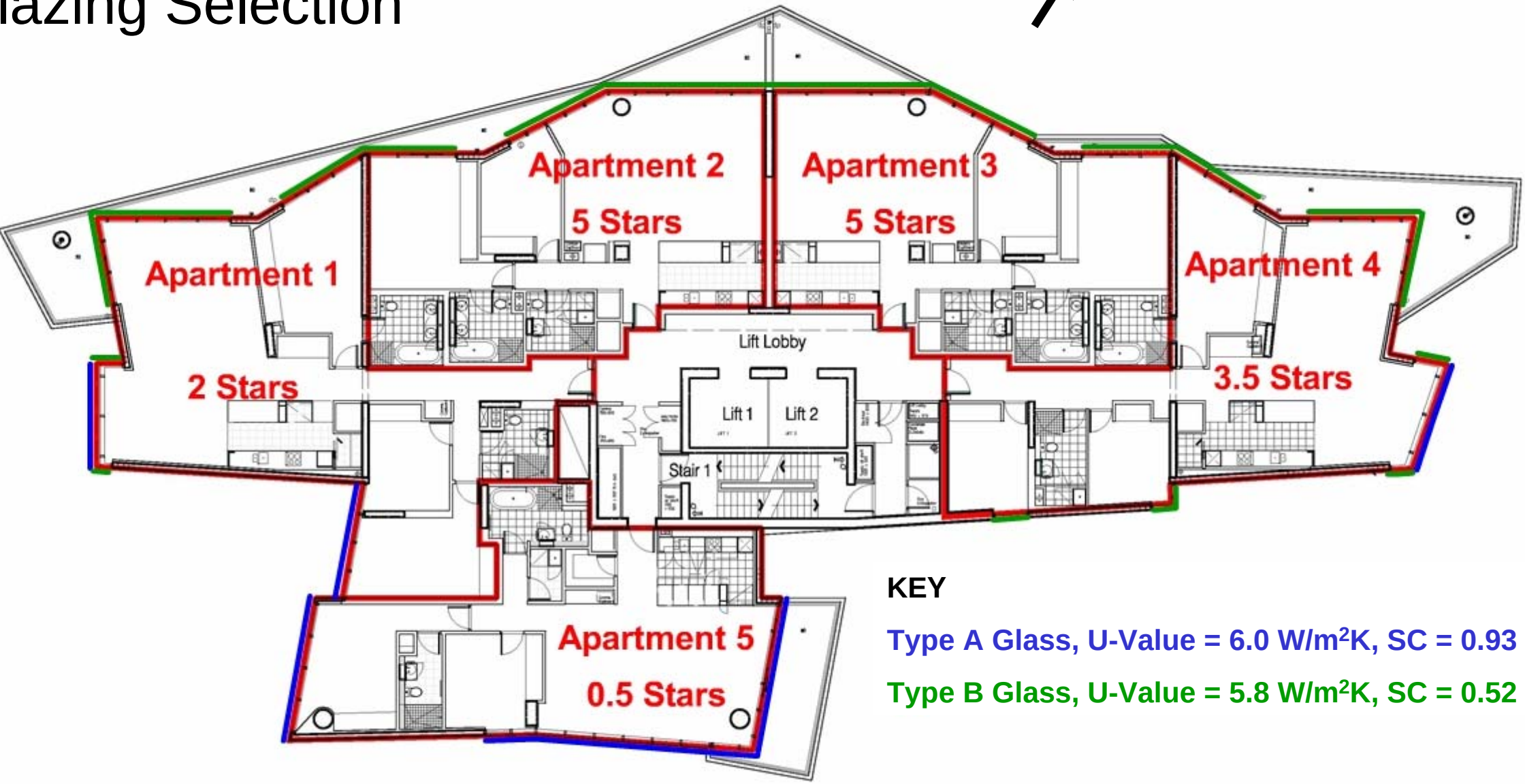
Toscana 4000
From 3.0 stars to 5 stars:
Annual Electric Energy Saving: 8178 kWh
Annual reduction in greenhouse gas emissions (CO2 equivalent): 10960 kg
Annual $ savings: $1226

Source
Arup Façade Engineering

Attachment 2

Raising the energy performance of Bovis Lend Lease building, Dock 5 (Victoria Harbour) from 0.5 stars to 5 stars and accompanying costs.

lazing Selection

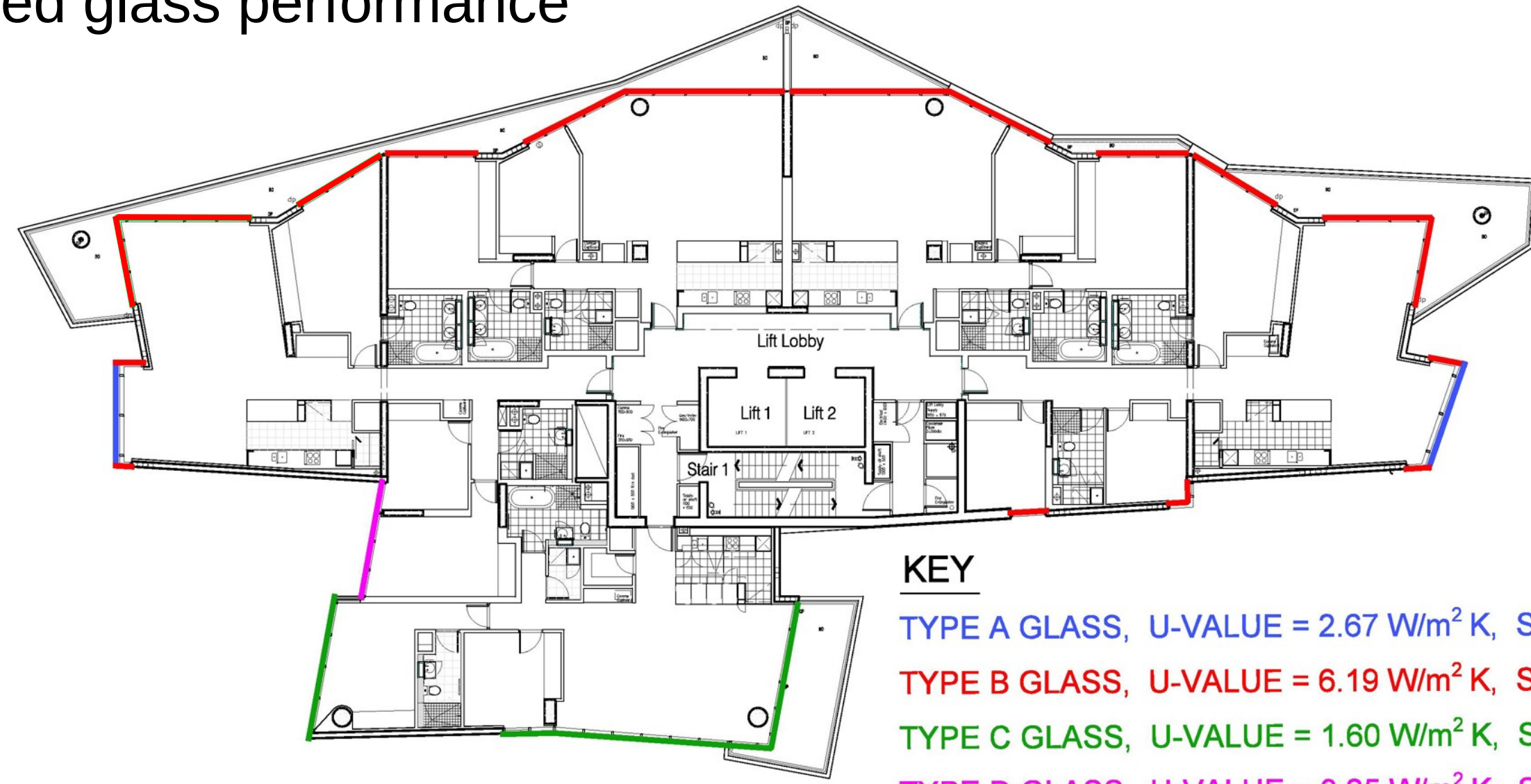


KEY

Type A Glass, U-Value = 6.0 W/m²K, SC = 0.93

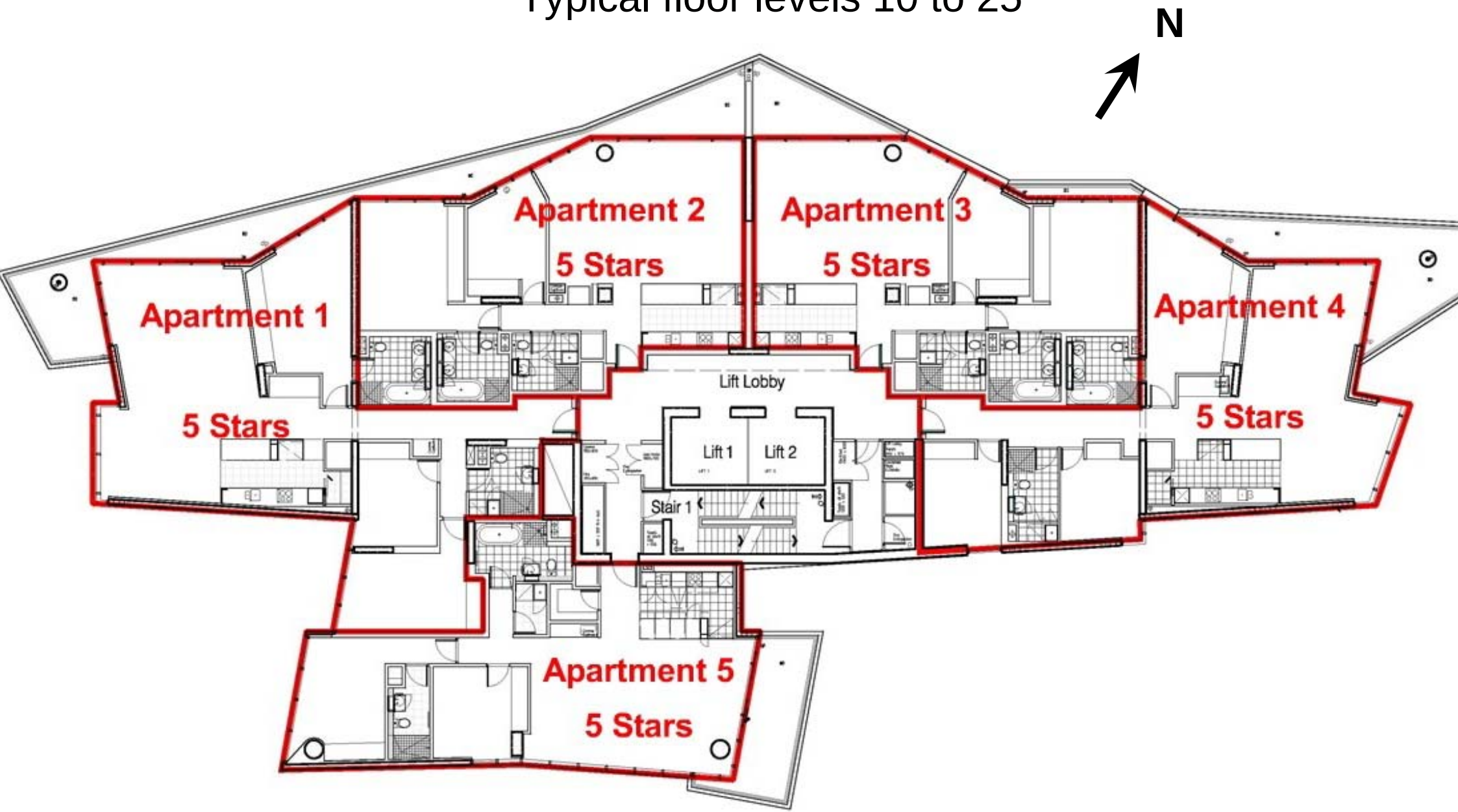
Type B Glass, U-Value = 5.8 W/m²K, SC = 0.52

ved glass performance



NatHERS star ratings with improved glazing performan

Typical floor levels 10 to 25



Cost and Marketing Implications

The additional Cost to the development is approximately $10/$m^2_{floor\ area}$ with apartment prices in the order of $5000/ $m^2_{floor\ area}$

Increased public awareness and concern about the environment

Superior Views

Superior thermal and visual comfort

ATTACHEMENT 3.

Energy Efficiency Project - Commercial Buildings

Payback Years for Double Glazing

The provision of double glazing with lower SHGC's than that for clear single glass provides lower zone heating and cooling plant sizes. When the savings on the size reductions in the cooling and heating plants are included in the NPV analyses the payback periods for double glazing are improved. The payback periods from the NPV analyses, based on the glazing industry costs (AGGA) and the HVAC savings, are shown in the following table, Table 18. In general, even with the higher cost of double glazing relative to single glazing, double glazing shows a short payback period based on the NPV analyses. This is clearly demonstrated with the payback periods for south glass in all zones with double glazing with SHGC as low as 0.34. Payback periods for south single glazing with SHGCs lower than 0.6 are longer than comparable payback periods for double glazing.

Climate Zone	Aspect	Solar Heat Gain Coefficient				
		0.70	**0.61**	**0.46**	**0.34**	**0.26**
1	N	0	0	0	0	0
	E	1	0	0	0	0
	S	0	0	0	0	0
	W	0	0	0	0	0
2	N	0	0	0	0	0
	E	4	0	0	0	0
	S	10	5	0	0	19
	W	0	0	0	0	0
3	N	0	0	0	0	0
	E	3	0	0	0	0
	S	2	1	0	0	8
	W	0	0	0	0	0
4	N	0	0	0	0	0
	E	1	0	0	0	0
	S	3	1	0	0	8
	W	0	0	0	0	0
5	N	0	0	0	0	0
	E	2	0	0	0	0
	S	7	4	0	0	19
	W	0	0	0	0	0
6	N	0	0	0	0	0
	E	5	0	0	0	0
	S	9	6	1	2	>25
	W	0	0	0	0	0
7	N	0	0	0	0	0
	E	3	0	0	0	0
	S	5	2	2	4	20
	W	0	0	0	0	0
8	N	10	0	0	0	0
	E	16	2	0	0	0
	S	4	6	6	12	>25
	W	6	0	0	0	0

Table 18 – Payback Years for Double Glazing SHGC (Industry Costs) with HVAC size benefits included in the NPV

Attachment 4

The impact of energy efficiency glazing on the energy performance of designs from Blue Hills Cottages.

Project Address	Base Case	Added Insulation and energy efficient glazing	Reduction in energy usage
24 Lily Road	1.5 Stars	5 Stars	41.8%
70 Wallace Rd	3 Stars	5 Stars	47.6%
Nirvana Close	2.5 Stars	5 Stars	54.4%

Specifications of energy efficient glazing is a fundamental step to achieving energy efficient building stock.

Continuation of ordinary glazing will result in highly inefficient stock with significant energy wastage for the life of the building.