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Bridging Accessibility and Sustainability in Apartment Retrofit

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Abstract

Existing apartment buildings face increasing demands for both sustainability and accessibility improvements. These objectives are important for decarbonisation, ageing in place and inclusive housing, but they are addressed through different areas of policy and practice. This paper examines where accessibility and sustainability retrofit remain institutionally separate and where their implementation pathways converge within New South Wales (NSW) Australia strata housing. It draws on a rapid review of the Australian apartment-retrofit literature published between 2021 and 2026 and a policy case study of 30 NSW-specific and relevant national instruments. The rapid review identified 21 relevant works, of which 19 focused primarily on sustainability-related retrofit and 2 directly addressed accessibility-related retrofit. This distribution is specific to the bounded apartment-retrofit literature reviewed, with relevant accessibility research also found in adjacent fields. The policy analysis shows that accessibility and sustainability are supported through largely separate policy, funding and regulatory arrangements. However, where interventions affect existing strata buildings, both can encounter common governance arrangements involving common property, collective decision-making, costs, ownership and maintenance responsibilities. Drawing these findings together, the paper proposes that substantial repair, replacement, renovation or upgrading can provide decision points for the coordinated consideration of future accessibility and sustainability needs.

Keywords: apartment retrofit; accessibility; sustainability; strata governance; energy efficiency; thermal comfort; ageing in place; adaptable housing

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1. Introduction

People with disability and older people comprise substantial, and partly overlapping, groups within the Australian population. In 2022, 21.4% of Australians had a disability, while 17.1% were aged 65 years or over [1]. Most people with disability live in private dwellings, including strata and other forms of multi-owned housing [2]. Mainstream housing policy and design therefore have an important role in addressing accessibility alongside other housing objectives, including affordability and energy efficiency [3–5], with accessible housing also recognised as a human rights issue [6]. This is increasingly important as strata-titled housing accommodates a growing proportion of the Australian population [7].

Inaccessible housing can affect health, wellbeing and economic participation, and can limit the ability of older people and people with disability to live independently [8–12]. It is also associated with falls and their substantial social and economic costs [13]. Specialist Disability Accommodation funded through Australia's National Disability Insurance

Scheme (NDIS) is available only to a small proportion of eligible participants with very high support needs [14,15]. Most people with disability therefore rely on mainstream private and social housing [16]. Improving the accessibility of mainstream housing is consequently important for people with disability, for ageing in place, and for responding to changing needs across the life course.

Improving the environmental and energy performance of existing housing is also an important policy challenge. Global and Australian climate policies seek substantial reductions in greenhouse gas emissions [17–20], and residential buildings form an important part of this transition. Many Australian apartments have relatively poor energy and thermal performance and will remain part of the housing stock well beyond 2050 [4,21–24]. Demolition and rebuilding also involve embodied carbon and do not necessarily produce buildings performing substantially above minimum standards [25]. Retrofitting the existing apartment stock is therefore important to improving residential energy performance and contributing to decarbonisation.

Apartment retrofit, however, differs from upgrading a detached dwelling because ownership and decision-making are shared. Australian strata schemes combine individually owned lots with jointly owned common property, an owners corporation and strata by-laws [26]. Energy retrofit can be impeded by complex decision-making involving multiple stakeholders, financing constraints and uncertainty about appropriate interventions [27]. People with disability can also encounter difficulties when seeking approval for home modifications that affect common property [9], while inadequate building documentation can further complicate retrofit decisions [28,29]. Although accessibility and sustainability interventions are pursued for different purposes, these examples show that both can encounter common governance and implementation conditions within existing strata buildings.

The scope of the retrofit itself varies. The emerging 'Retrofit First' approach encourages the upgrading and continued use of existing buildings as an alternative to demolition [30]. Sustainability retrofit can include thermal upgrades, efficient appliances, electrification and renewable energy systems [20,24]. These interventions can reduce energy use and costs while improving thermal comfort and health [24]. Accessibility interventions have developed through a somewhat different set of approaches, ranging from specific home modifications to adaptable and universal design approaches that respond to changing needs across the life course. Universal design seeks to make housing usable by the widest possible range of people without the need for specialised adaptation [31], while adaptable housing anticipates later modification with less cost and inconvenience [32].

In this paper, accessible housing is understood using the broad definition adopted by the Australian Building Codes Board as housing incorporating features that enable use by people with disability or people transitioning through different life stages [33]. Accessibility is therefore treated as a mainstream housing issue rather than one confined to specialist disability accommodation. Sustainability retrofit in this study refers principally to improvements in the energy and thermal performance of existing apartment buildings. Although accessibility and sustainability cover different objectives, interventions in both areas can involve building constraints, financing and collective decision-making when they affect existing strata property [9,11,27,28,34].

The existing nascent apartment retrofit scholarship [18,30] and wider housing literature frames accessibility and sustainability as separate issues. The novelty of this research lies in bringing them together through a rapid review of the literature and in examining how institutional policies converge or diverge in governing apartment retrofit. The central questions addressed in this paper are as follows: Where do accessibility and sustainability retrofit remain institutionally separate, and where do their implementation pathways converge within NSW strata housing? New South Wales provides an important setting

for examining this question because around a quarter of the state's population (more than 2 million people) lives in strata properties [35].

The study examines approaches to apartment retrofit in Australia through a rapid review of the literature and uses NSW as a policy case study to examine how accessibility and sustainability are addressed within the institutional and regulatory setting for existing apartment buildings. The policy case study examines how the different treatment of accessibility and sustainability evident in the reviewed literature is reflected in policy, and where implementation of the two objectives encounters common strata governance and regulatory arrangements. Drawing on the literature review and policy case study, the paper identifies points of institutional separation and implementation convergence and develops a framework for considering how accessibility and sustainability needs might be coordinated at key points in the retrofit process.

2. Materials and Methods

2.1. Rapid Review of Literature

We conducted a rapid review of the Australian literature on apartment retrofit published between 2021 and 2026. The review was undertaken over one month during April and May 2026. Rapid reviews use streamlined methods to synthesise the literature within limited timeframes and are commonly used to address policy-relevant questions [36].

The search strategy combined terms relating to retrofit (retrofit*, modify* OR upgrade*) with terms for apartment housing (apartments, flats, "multi-owned properties" OR condominiums) and Australia across six search sources. Search results were screened by title and abstract. Simplified search combinations ("retrofit* AND apartments AND Australia" and "upgrades AND apartments AND Australia") were also used to identify potentially missed studies. These searches did not identify any additional eligible studies.

Studies were assessed against predefined inclusion criteria relating to the retrofit of existing Australian apartment housing. Eligible studies addressed sustainability-related interventions, including energy efficiency, solar PV installation and thermal comfort, or accessibility-related interventions, including accessible, adaptable and universal housing within mainstream or social housing settings. Purpose-built disability accommodation was excluded because the study focuses on mainstream housing. Peer-reviewed journal articles and peer-reviewed research reports were included, together with one conference proceeding identified through Google Scholar because of its direct relevance to apartment retrofit (Table 1).

Table 1. Literature searches and study selection.

Search Source	Studies Retrieved	Studies Excluded	Studies Included in Rapid Review
Google Scholar	22	13 non-Australian or not relevant	9 (peer-reviewed journal articles, research reports and one conference proceeding)
APO online	3	1 not relevant 1 duplicate record	1 peer reviewed journal article
Scopus (Elsevier)	9	3 focus on other dwelling types 4 duplicate records	2 peer reviewed journal articles
Academic Search Complete (EBSCO)	27	23 non-Australian, focused on other dwelling types, or technical studies of specific thermal improvements	2 peer reviewed journal articles

Table 1. *Cont.*

Search Source	Studies Retrieved	Studies Excluded	Studies Included in Rapid Review
ProQuest Central Premium	50	46 non-Australian, focused on other dwelling types, or technical studies of specific thermal improvements, 2 duplicate records	2 peer reviewed journal articles
Policy- Analysis and Policy Observatory Database	6	1 not relevant 2 duplicate records	3 peer reviewed journal articles
Google Scholar (additional accessibility search)	61	57 not relevant, non-Australian, PhD thesis or not mainstream housing. 2 duplicate records	1 peer reviewed journal article and 1 peer reviewed research report

Source: Authors, 2026.

To identify additional accessibility-related retrofit studies, the searches were repeated using the combination ("barrier free" OR universal OR inclusive OR disability OR adaptable OR accessible) AND (upgrades OR retrofit OR renovations OR modifications OR refurbishments) AND (apartments OR condominiums OR flats OR "multi-owned properties") AND Australia. This supplementary search identified two additional publications through Google Scholar, while the other search sources produced no additional eligible studies. Other publications were excluded because they focused on non-Australian contexts or other dwelling types, or because they were conference proceedings and did not otherwise meet the inclusion criteria.

Despite the supplementary accessibility search, the review remained focused on literature explicitly connected with apartment retrofit and mainstream housing in Australia. It was not designed as a comprehensive review of the wider disability, home-modification, ageing-in-place or universal-design studies. The review was restricted to publications from 2021 to 2026 to focus on recent Australian research relevant to contemporary apartment retrofit practices and policy settings. The 21 included studies represent the publications identified as eligible through the specified searches and screening criteria, rather than a predetermined sample size. The review was intended to identify recurring issues and implementation conditions within this bounded literature, rather than provide an exhaustive account of Australian housing accessibility or sustainability research. The relatively small number of accessibility-focused studies should therefore be interpreted within these review boundaries and not as evidence of an absence of relevant research in adjacent fields.

2.2. NSW Policy Case Study

NSW was used as a policy case study to examine how accessibility and sustainability retrofit are addressed within the institutional and regulatory setting applying to existing apartment buildings. The analysis included NSW-specific instruments as well as relevant national instruments that operate within, or materially shape, the NSW housing and retrofit context.

Governments pursue policy objectives through different types of policy instruments, including legislation, regulation, strategic and procedural instruments, voluntary or certification schemes, and financial incentives. Financial instruments can include grants, subsidies, loans, rebates and feed-in tariffs intended to encourage actions or investments [37]. For this study, the identified instruments were grouped into four broad categories: statu-

tory instruments, strategic instruments, regulatory standards and guidance, and financial instruments.

NSW policy instruments relevant to accessibility and sustainability retrofit were identified through the NSW Planning Portal and related NSW Government sources. Searches initially used broad accessibility and sustainability themes and were subsequently narrowed to instruments relevant to apartment housing. Relevant national instruments were included where they operate within, or materially influence, the NSW apartment retrofit context. These were identified through sources including the NDIS, My Aged Care, the National Construction Code, the Federal Register of Legislation and Standards Australia. Search terms included accessibility, disability, ageing, liveable housing design, adaptable housing, modifications, sustainability, net zero, energy, energy efficiency, energy grants and solar PV. The final policy corpus comprised 30 documents: eight statutory instruments, four strategic instruments, ten regulatory standards, guides or rating tools, and eight financial instruments.

The 30 documents were analysed using a coding framework focused on policy content rather than policy outcomes [38]. The analysis examined the objectives and target groups of each instrument, its legal or policy status, application to new or existing buildings, relevance to individual lots or common property, decision-making and approval arrangements, funding and cost responsibilities, ownership and maintenance responsibilities, and links to substantial building works or capital planning. Attention was given to identifying where accessibility and sustainability remained institutionally separate and where their implementation encountered common strata governance arrangements.

2.3. Methodological Limitations

This paper proposes an apartment retrofit framework informed by a rapid review of apartment retrofit scholarship and an analysis of institutional policies governing apartment retrofit. The two approaches are brought together through integrated accessibility and sustainability lens. However, the rapid review is limited to 21 recent Australian studies in an emerging field of research [18,30]. Only two of these studies directly address accessibility-related retrofit. The review does not comprehensively cover the wider literature on disability, home modifications, ageing in place or universal design. No formal methodological quality or risk-of-bias assessment of the selected studies was undertaken. This limits the conclusions that can be drawn about the strength of the evidence. The framework is also limited to New South Wales and remains conceptual rather than grounded in empirical case studies. Future research could test the framework through case studies of completed apartment retrofit projects and interviews with owners corporations, strata managers and residents.

3. Results

3.1. Rapid Literature Findings

The rapid review identified 21 relevant scholarly works published between 2021 and 2026. Nineteen focused primarily on sustainability-related retrofit and two directly addressed accessibility-related retrofit. Within this bounded Australian apartment-retrofit literature, sustainability-related research therefore predominated. The findings from the rapid review are organised into nine themes, summarised in Table 2. A narrative synthesis approach was used to bring together findings from the 21 included studies. The themes reflect recurring subjects in the reviewed literature, including the scope of retrofit, building and governance constraints, financial considerations, resident outcomes, and adaptability. Table 2 identifies the studies supporting the findings within each theme. Given the small

and methodologically diverse evidence base, the synthesis is descriptive and involves researcher judgement rather than a formal quantitative assessment.

Table 2. Findings from the rapid review of the literature.

Themes	Key Findings	Relevance to Apartment Retrofit
Defining Retrofitting	Modification of thermal elements, services and fittings leading to energy savings [18], cost, labour and ease of installation [21], practicality, cost and environmental benefits [39]	Retrofit is a broad term and varies in scope and depth. Deeper retrofit generally involves modification of building thermal elements as well as services and fittings.
Property Valuation and Personal Value	Increased property value for sustainable commercial properties [40], personal values based on wealth, principles and age impacting sustainability retrofit [41], co-design approach in retrofitting for accessibility and sustainability [42], Sustainability elements in high value suburbs and disconnect between developer-client expectations; sustainability retrofit in property value [34]	Finance, perceived value and stakeholder preferences can influence retrofit decisions.
Factors impacting sustainable apartment retrofit	Substandard documentation [34,43], complexity of strata decision making [34,44], cost of retrofit and government support [34,45–48], meeting regulatory requirements for apartment retrofit [44], building structural constraints [26,34,45], access and disruption to residents [34,39]	Building documentation, collective decision making, finance, regulation, structural constraints and resident disruption provides a set of implementation conditions.
Public health benefits of apartment retrofit	Energy retrofit can provide health benefits for social housing residents and homeowners [39]. Minimum rental standards can improve thermal comfort and energy efficiency [49], while housing improvements can contribute to liveability, health and wellbeing [11] and reduce pollution and household energy costs [48].	Thermal comfort, energy affordability, liveability and health outcomes connect building performance with resident wellbeing.
Energy Retrofit	Studies identified climate-specific approaches to energy conservation in older apartment buildings [50], energy justice concerns associated with developer-led long-term energy contracts [26], and questions about how energy benefits are distributed among apartment owners [51].	Energy retrofit involves technical, ownership and governance questions, including the distribution of costs and benefits within strata schemes.
Government Incentives	Energy retrofit can be triggered by government incentives, tenant requests or appliance breakdown rather than personal values alone [52]. Grants can support retrofit investment, increase awareness of building performance and encourage the development of suppliers of sustainable technologies [34].	Government incentives can trigger retrofit activity and influence awareness and the availability of retrofit services and technologies.
Building Age and Retrofit Feasibility	Many of the older apartment buildings have the capacity to facilitate retrofit [42] as opposed to new apartment buildings [34].	Building age, design and structural capacity affect retrofit feasibility.

Table 2. *Cont.*

Themes	Key Findings	Relevance to Apartment Retrofit
Refurbishment as an Alternative to Demolition and Rebuilding	Adaptive redesign can support environmental, social and economic objectives through improvement of existing buildings in high-density urban settings [53]. Retrofit has also been used to improve energy efficiency and accessibility while retaining existing dwellings with retrofit and infill enabling additional housing [54].	Refurbishment can provide an alternative to demolition and can accommodate multiple building performance objectives, where existing buildings are suitable for retention.
Adaptability and Flexible Internal Design	Adaptable housing can facilitate ageing in place by anticipating future modification and reducing the cost and disruption associated with later changes. Flexible approaches can also treat the dwelling as a shell within which the internal layout can respond to occupants' needs [11].	Adaptable housing anticipates changing household needs and can reduce the cost and disruption of later accessibility modifications.

Source: Rapid review (Authors, 2026).

3.1.1. Scope and Distribution of the Reviewed Literature

The reviewed literature was strongly weighted towards sustainability-related retrofit. The literature also used retrofit broadly, ranging from relatively limited changes to services and fittings to deeper interventions involving thermal elements and building systems [18,21,39]. Rather than imposing a single technical definition, this paper treats retrofit as a range of interventions to existing buildings that vary in scope, cost and intensity.

This breadth matters because opportunities and constraints can differ with the scale of intervention. Minor works may involve appliances, fittings or services, whereas deeper retrofit can involve windows, insulation, building services and other elements of the building fabric [18,21,39]. Retrofit can therefore occur incrementally or through more substantial building interventions rather than as a single type of project.

3.1.2. Building, Governance and Financial Conditions

Across the reviewed literature, several recurring conditions affect apartment retrofit. These include incomplete or inadequate building documentation [34,43], complex strata decision-making [34,44,46,47,51], cost and access to finance or government support [34,45–48], regulatory requirements [44], structural and infrastructure compatibility [26,34,39,44–46,51], and the need to coordinate access to individual lots while limiting disruption to residents [34,39]. These conditions are interrelated. Technical feasibility can depend on the quality of building information, while financial and governance arrangements influence whether technically feasible works can proceed.

Building information is a recurring concern. The literature identifies incomplete design and as-built documentation as a constraint because owners and strata bodies may have limited knowledge of existing building systems and construction [34,43]. Physical conditions can create further constraints. Existing roofs, switchboards, wiring, risers and other infrastructure may limit feasibility or increase the cost of energy upgrades [26,44–46,51], while access to individual apartments can require coordination with lot owners and cause disruption during works [34,39].

Governance and finance are equally important. Collective decision-making in strata schemes involves owners, owners corporations, strata committees and managers, whose

interests, knowledge and capacity may differ [34,44,46,47,51]. Cost is also a persistent barrier to retrofit [34,45–48]. The reviewed literature therefore presents apartment retrofit as an institutional and financial process as well as a technical one.

3.1.3. Resident Outcomes, Incentives and Value

The reviewed literature also identifies outcomes and incentives that shape retrofit decisions. Energy retrofit has been associated with improved thermal comfort, reduced household energy costs, liveability, health and wellbeing [39,48,49]. Evidence from social and rental housing indicates that residents may particularly value improvements in comfort and affordability [39,49]. These findings connect building performance with residents' everyday experience of the dwelling.

Perceived property value, personal values and financial incentives can also influence retrofit activity. Evidence from commercial property suggests that sustainability features can influence property value [40]. Personal values, wealth and age have also been associated with willingness to pursue sustainability improvements [41]. Government incentives can trigger retrofit activity, increase awareness and support the development of suppliers and services [34,52]. At the same time, arrangements for distributed energy resources and embedded networks raise questions about how costs, responsibilities and benefits are allocated within strata schemes [26,51].

3.1.4. Adaptability, Staged Retrofit and Future Change

Within the reviewed corpus, adaptable housing provides the clearest body of accessibility-related evidence. It is intended to allow later modification with less cost and disruption and can support ageing in place [32]. Examples include design provisions that anticipate future changes in mobility or household needs. The literature also considers more flexible internal arrangements and co-design approaches as ways of accommodating changing needs in existing housing [11,42].

International public housing case studies are also used as contextual examples of staged refurbishment rather than as part of the Australian rapid-review corpus. These studies show how major refurbishment can extend building life, improve energy performance and accessibility, and reduce displacement where residents can remain in place during works [53,54]. They also illustrate how retrofit can occur in stages and can form part of wider refurbishment or infill where building and site conditions permit.

Taken together, these findings suggest that substantial building interventions can provide an opportunity to consider future accessibility and sustainability needs. The review provides a basis for examining whether significant repair, replacement, renovation or upgrading could provide decision points at which both sets of needs are considered.

3.2. Findings from NSW Policy Analysis

The NSW policy case study identified 30 relevant instruments, comprising 14 national instruments operating in NSW and 16 NSW-specific instruments. Table 3 summarises the principal findings from the NSW policy analysis. The full inventory of 30 documents is provided in Appendix A Tables A1–A4. The policy material is grouped around strata governance, accessibility-related instruments, and sustainability and energy-related instruments.

Table 3. Findings from the NSW policy case study.

Policy/Instrument Group	Key Content	Relevance to Apartment Retrofit
Strata governance [55]	Strata Schemes Management Act 2015 (NSW) separately defines accessibility infrastructure (Section 132C) and sustainability infrastructure (Section 132B).	Both operate through owners corporation processes concerning approval and collective decision-making, and address matters including costs, ownership and maintenance responsibilities. This provides a clear point of convergence within strata governance.
Disability and Inclusion policy [56–60]	NSW disability inclusion and ageing strategies sit alongside Commonwealth anti-discrimination and access-to-premises requirements.	Establishes accessibility and inclusion objectives through policy arrangements that are largely separate from sustainability policy and are not specifically directed to apartment retrofit.
Liveable and adaptable housing standards [32,61,62]	Livable Housing Design Standards and AS 4299 adaptable housing provide mainstream accessibility approaches.	Adaptability is directly relevant to future retrofit because it anticipates later modification and ageing in place. The application of liveable and adaptable housing standards varies across NSW housing programmes and development pathways.
Housing strategies and design guidance [63–66]	Housing 2041, the Housing SEPP, NSW Pattern Book and Apartment Design Guide address accessibility and/or sustainability in housing design.	These instruments address aspects of accessibility and sustainability but are directed mainly to new housing rather than retrofit of existing apartment buildings.
Net zero and building sustainability [67–69]	NSW net zero legislation and BASIX/NCC related requirements establish energy and thermal performance objectives.	Provide regulatory requirements relevant to sustainability in new housing and qualifying alterations and additions to existing dwellings, but do not generally address accessibility objectives.
Energy and sustainability rating tools [70–73]	NatHERS, Green Star, home energy assessments and NABERS assess different aspects of thermal or operational performance.	These tools focus on energy or sustainability performance rather than accessibility.
Accessibility modification funding [74–76]	NDIS and aged-care programmes can fund eligible home modifications for people with disabilities and older people.	Supports individual accessibility modifications in mainstream housing, but eligibility and funding sit outside the sustainability retrofit system.
Household and strata energy incentives [77–81]	Loans, energy-efficiency incentives and solar grants support household and strata energy upgrades.	Finance can trigger retrofits and reduce upfront costs, but these programmes are primarily sustainability focused.
Social and community housing programmes [82,83]	Energy-performance programmes support upgrades to social and community housing.	Support larger-scale improvements to comfort and energy performance within existing social and community housing.

Source: Authors' analysis of policy instruments [32,55–83].

3.2.1. Separate Policy Streams and Shared Strata Governance

Under the *Strata* Schemes *Management Act 2015 (NSW)*, Section 132B provides sustainability infrastructure resolutions, while Section 132C addresses accessibility infrastructure. Both are subject to a modified special-resolution threshold under Section 5, whereby less than 50% of the value of votes cast, calculated by unit entitlement, must be against the resolution. Before approving either type of infrastructure resolution, the owners corporation must consider costs, including ongoing maintenance, ownership and maintenance responsibilities, and the extent to which the infrastructure will be available to different lots. Accessibility infrastructure resolutions additionally require consideration of the potential detriment to the person requesting the works if they are not undertaken, and whether the building can accommodate the proposed infrastructure. The provisions therefore establish comparable governance and decision-making arrangements while recognising the distinct purposes and requirements of accessibility and sustainability interventions.

Beyond this shared governance setting, accessibility and sustainability are largely organised through separate policy and support systems. The instruments, including the National Construction Code [61,67], Housing 2041 [63], the State Environmental Planning Policy (Housing) 2021 [64], the NSW Pattern Book [65] and the Apartment Design Guide [66], address aspects of both accessibility and sustainability. Although the strategic planning instruments [63–66] are primarily directed at new development, they also have implications for future apartment retrofit. The standards applying to new buildings influence the accessibility and energy performance of housing entering the existing stock. However, these requirements do not necessarily apply to retrofit works in the same way. Their application depends on the nature of the proposed works and the relevant approval requirements. In NSW, BASIX [69] provides a separate regulatory framework for residential sustainability, while national building standards [61,67] address accessibility and energy efficiency. These different regulatory arrangements highlight the need to consider the requirements applying specifically to existing apartment buildings when planning retrofit interventions.

3.2.2. Accessibility Policy, Standards and Modification Funding

Accessibility-related policy operates through a combination of disability legislation, housing and design standards, strategic policy and individual funding. The Disability Inclusion Act 2014 (NSW) [56] underpins the NSW Disability Inclusion Plan [57], while the Ageing Well in NSW strategy identifies accessible housing and ageing in place as important concerns [58]. Commonwealth disability legislation and the Disability (Access to Premises-Buildings) Standards 2010 provide broader access requirements [59,60]. Livable Housing Design Standards [61,62] and adaptable housing standards [32] provide design approaches relevant to mainstream housing, although their application varies across NSW housing programmes and development pathways. Funding for individual home modifications is available through the NDIS for eligible participants [74,75] and through aged-care programmes for eligible older people [76]. These instruments therefore support accessibility through rights, design requirements, strategic objectives and individual modification pathways, rather than through the energy and sustainability programmes discussed below.

3.2.3. Net Zero and Energy Efficiency Standards, Rating Tools and Financial Incentives

Sustainability-related policy combines statutory net zero commitments, building standards, rating tools and financial incentives. The Climate Change (Net Zero Future) Act 2023 (NSW) establishes the state's net zero direction [68], while the State Environmental Planning Policy (Sustainable Buildings) 2022 applies BASIX requirements to relevant residential development [69]. NatHERS, Green Star and NABERS provide different forms of energy or sustainability assessment [70–72]. The NSW Pattern Book and Apartment Design

Guide also incorporate sustainability measures for new development [65,66]. Financial incentives relevant to apartment or household energy upgrades include the Home Energy Saver Loan [77], Household Energy Savings Upgrade [78], Solar for Apartment Residents grants [79], and programmes targeting social and community housing [82,83]. These instruments provide a distinct set of policy and support mechanisms for improving energy and sustainability performance, with financial incentives and assessment tools that differ from the accessibility-related pathways described above.

4. Discussion

The rapid review and NSW policy analysis reveal a distinction between the institutional organisation of accessibility and sustainability, and the conditions encountered when interventions are implemented in existing strata housing. Within the bounded literature reviewed, sustainability-related retrofit predominated, while accessibility-related knowledge was more directly represented through adaptable housing and modification approaches [11,32,42]. The policy analysis showed a clearer institutional separation, with accessibility and sustainability supported through different combinations of legislation, standards, strategies, assessment systems and funding mechanisms [32,56–62,67–72,74–79,81–83]. Despite this separation, interventions arising from either agenda can encounter common building and strata governance conditions when applied to existing apartment buildings [55].

In this paper, substantial work refers to repair, replacement, renovation or upgrading that affects common property, shared building services, building fabric or major capital works. Such interventions can require collective decision-making and can affect the feasibility, cost or timing of subsequent accessibility or sustainability improvements.

The NSW policy case study makes this relationship particularly visible. Accessibility and sustainability are addressed through different policy and support arrangements, while interventions affecting existing strata buildings can encounter common governance arrangements. *The Strata Schemes Management Act 2015 (NSW)* [55] separately provides sustainability infrastructure under Section 132B and accessibility infrastructure under Section 132C, placing both within the broader strata governance system. Where works affect common property, decisions can involve approval requirements, costs, ownership and maintenance responsibilities. The important point is therefore that institutionally distinct objectives can encounter a shared governance setting in existing strata buildings.

The reviewed literature also shows that retrofit feasibility is shaped by technical, financial and governance conditions. Physical characteristics can constrain accessibility modifications [9,11] as well as sustainability interventions [34], although the specific requirements differ. Existing building systems and the availability of design and as-built documentation can affect the feasibility and cost of proposed works [26,28,34,39,43–45]. In multi-owned buildings, technical questions can also interact with collective governance, financing and the differing interests of owners, investors and residents [34,46,47,51].

Cost, incentives and perceived value can influence retrofit decisions. The sustainability literature identifies financial considerations, perceived value and government incentives as factors affecting retrofit activity [34,41,52]. Adaptable housing offers a different perspective by anticipating changing needs across the life course and enabling later modifications with less disruption and cost [32]. Accessibility is therefore relevant not only to immediate disability-related needs but also to ageing in place and changing household needs over time.

Resident outcomes nevertheless provide an important reason to look beyond narrowly technical definitions of retrofit. Sustainability improvements can increase thermal comfort, reduce energy costs and contribute to health and wellbeing [39,48,49], while accessibility interventions can support independent living, ageing in place and adaptation to changing

needs [9,11,32]. These outcomes are different, but both concern how existing housing performs for its occupants over time.

The contrast within the reviewed corpus should therefore be interpreted cautiously. The policy analysis provides stronger evidence of institutional differentiation, showing different policy and funding arrangements alongside common strata governance arrangements where interventions affect existing multi-owned buildings.

These findings support coordinated consideration rather than a requirement to physically integrate accessibility and sustainability works. When substantial repair, replacement, renovation or upgrading is planned, there may be value in considering whether the intervention affects future accessibility or sustainability needs. Depending on the building, its residents, available finance and the nature of the proposed work, improvements may be undertaken together, separately or in stages. Considering both objectives at substantial-work decision points may help avoid works that unnecessarily increase the cost or difficulty of subsequent improvements.

The resulting framework, depicted in Figure 1, has three elements. First, accessibility and sustainability remain institutionally differentiated through their policy objectives, standards, funding arrangements and support systems. Second, when interventions affect existing strata buildings, their implementation can encounter shared governance arrangements, particularly where common property and collective decisions are involved. Third, substantial repair, replacement, renovation or upgrading can provide decision points for the coordinated consideration of future accessibility and sustainability needs. Sustainability and accessibility interventions may be undertaken together, separately or in stages, according to building conditions, resident needs, governance requirements and available resources. Developed from the Australian literature and NSW policy case study, the framework provides propositions that could be examined in other Australian jurisdictions and comparable multi-owned housing contexts.

The three retrofit scenarios in Table 4 build on the framework presented in Figure 1. They are illustrative examples intended to demonstrate its potential practical application, rather than empirical case studies.

Table 4. Illustrative retrofit scenarios.

Proposed Work	Accessibility Considerations	Sustainability Considerations	Strata Decision Making and Approvals	Genuine Synergy or Just a Collective Approval
Building Façade improvement with new lift	New lift	Glazed gallery	Joint infrastructure Resolution	Genuine synergy Staged approach
Common Property Entrance Door Installation	Automatic sliding doors	Airtight doors	Joint Infrastructure Resolution	Genuine synergy Undertaken together
Common Area Upgrades-Ramped transition and LED lighting	Ramped transition to apartment entrance door	Common area lighting upgrades	Separate infrastructure resolution	Collective approval Separate retrofit

Source: Authors, 2026.

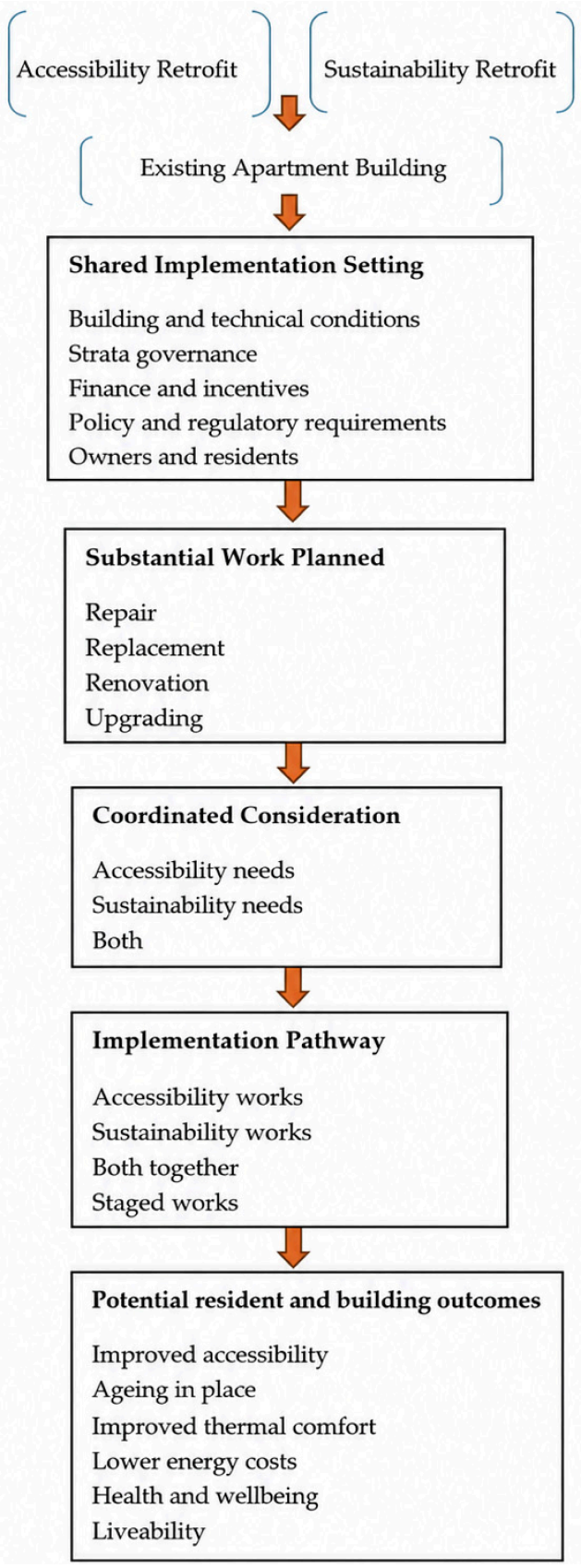


Figure 1. Framework for coordinated consideration of accessibility and sustainability in apartment retrofit. Authors: Sajan and Piracha, 2026.

The first scenario considers a substantial façade refurbishment incorporating glazed galleries and the installation of a lift to improve accessibility [84]. These interventions may offer opportunities to coordinate building works, construction access and associated approvals. Their technical compatibility and potential cost efficiencies would depend on the existing building configuration, structural capacity and project design. The works could be undertaken together or in stages, depending on feasibility, funding and residents' needs. Comparable refurbishment approaches involving glazed galleries, balconies and lifts in older residential buildings have been discussed elsewhere [42,53,54]. The principal decision considerations include building typology, structural constraints, costs, ongoing maintenance and benefits to residents [55].

The second scenario considers replacing an existing entrance door with an automatic sliding door designed to provide accessible entry and improved airtightness. An appropriately designed automatic door may improve access for residents with mobility limitations by reducing the need to operate a heavy manual door [85]. Where suitable sealing and operating mechanisms are incorporated, it may also reduce air infiltration and associated energy losses [86,87]. These potential benefits depend on the existing entrance configuration, technical specifications and installation quality. The intervention therefore illustrates a possible technical synergy between accessibility and sustainability, subject to considerations of costs, maintenance requirements and benefits to residents [55].

In the final proposed intervention, a ramped threshold is retrofitted to the apartment entrance door, and LED lightings are installed to improve energy efficiency. Many older apartment blocks constructed prior to Commonwealth Disability (Access to Premises-Buildings) Standards 2010 [60] lack level thresholds leading to the apartment entrance door in lieu of most updated National Construction Code accessibility standards [61]. Retrofitting LED lighting in common areas reduces energy costs [34,50]. These interventions may be considered through separate approval processes and undertaken concurrently or in stages, depending on their scope and the applicable strata requirements. Once again, cost–benefit for residents, building structural limits, and ongoing maintenance is considered.

The three retrofit illustrations indicate that either staged, separate or simultaneous implementation pathways are likely to deliver health benefits to residents and improve building outcomes, as outlined in Figure 1. The illustrative interventions, such as the installation of new lifts, automatic sliding doors and a ramped transition to the apartment entrance door improve accessibility and facilitate ageing in place. Similarly, measures like implementing a glazed gallery on the building façade, installing airtight doors and LED lighting upgrades improve thermal comfort and lower energy costs. Collectively, these illustrative interventions can improve the health and wellbeing of the residents and enhance liveability in apartment buildings. The central argument is not that accessibility and sustainability works must always be integrated, but that significant building interventions provide opportunities to consider both objectives before decisions are finalised.

We posit NSW strata governance within an international context by comparing its approach to accessibility and sustainability infrastructure resolutions with comparable governance frameworks in the UK, and Spain, which has the highest number of condominium residents in Europe [88], to illustrate wider applicability within apartment retrofit context, noting increasing housing affordability pressures and growing need for retrofit due to ageing population and proportionate increase in people with accessibility issues. The UK commonhold has comparable forms of collective ownership to Australia's strata governance model that require collective decision making among owners through their commonhold association over costs and building improvements. Unlike Australian strata regulations, the UK commonhold model does not have specific sustainability or accessibility resolutions and associated regulatory provisions with the reduced voting threshold,

but they sit within the wider decision-making process of the commonhold association [89]. In Spain, there are two pathways for accessibility modifications. The owner-initiated approach, grounded within Article 10 of Horizontal Property Law, mandates the execution of works that guarantee basic universal accessibility like ramps, lifts, mechanical and electronic devices in common property. They do not require prior permission from the board of owners, the equivalent body of the owners corporation in NSW and commonhold association in UK, provided the applicant is ready to bear the excess cost beyond available funding. Anchored in Article 17, the board of owners can initiate both accessibility and sustainability modifications and are funded by them, subject to legal participant quota threshold requirements for specific modification [90].

5. Policy and Research Implications

First, accessibility could be given greater consideration within mainstream apartment retrofit policy. The NSW policy analysis shows that accessibility and sustainability are supported through largely separate policy, funding and professional systems, while the rapid review identified a strong sustainability orientation within the bounded Australian apartment-retrofit literature. Relevant accessibility knowledge also exists in adjacent fields concerned with adaptable housing, home modification, disability and ageing in place. This points to a gap between the wider body of accessibility research, and the Australian apartment retrofit literature examined in this study. The evidence outside the included literature notes that policy fragmentation limits retrofit opportunities for accessibility, while ageing population increases apartment retrofit need [91]. Existing adaptable apartments may offer opportunities for future modification, but their potential depends partly on adequate building records and recognition of accessibility features [32,34,65,66]. Better information about the accessibility characteristics of existing apartments could help identify where future modifications may be feasible.

Second, retrofit policy needs to recognise the institutional conditions of strata housing. Accessibility and sustainability interventions can both encounter collective decision-making, financing, ownership and maintenance responsibilities, technical information requirements and constraints arising from the existing building. The NSW policy case study shows that accessibility and sustainability infrastructure can both engage strata governance arrangements [55]. Financial assistance and technical guidance may therefore be more effective if they recognise the decision-making and implementation requirements of owners corporations rather than treating retrofit solely as a technical intervention at the dwelling or building level.

Third, substantial building works can provide decision points for the coordinated consideration of accessibility and sustainability needs. The three illustrative retrofit scenarios show different ways in which accessibility and sustainability interventions might be considered and implemented. Façade refurbishment and lift installation may offer opportunities to coordinate construction works, while an appropriately designed automatic sliding door may provide both accessibility and energy-efficiency benefits. By contrast, installing a ramped entrance threshold and upgrading LED lighting involve different technical interventions that may be considered through the same strata governance arrangements but implemented separately. The international refurbishment case studies discussed in this paper show that staged refurbishment can improve building performance while allowing residents to remain in place [53,54]. This does not mean that accessibility and sustainability works should always occur together. Rather, substantial repair, replacement, renovation or upgrading can provide an opportunity to consider whether either or both objectives could reasonably be addressed, either at the same time or in stages. Further research could examine how this approach operates across different apartment types, own-

ership structures and resident populations, including its costs, governance requirements and distributional effects through examining completed retrofit projects and primary data collection approaches with owners corporations, strata managing professionals and other built environment professionals.

6. Conclusions

This study identified a distinction between the institutional organisation of accessibility and sustainability, and the conditions encountered when interventions are implemented in existing strata housing. Within the bounded Australian apartment-retrofit literature reviewed, sustainability-related research predominated, while the NSW policy analysis showed that accessibility and sustainability are supported through largely separate policy, funding and regulatory arrangements. When interventions affect existing apartment buildings, however, they can encounter shared implementation conditions, particularly those associated with common property, strata governance, collective decision-making, finance and the characteristics of the existing building. The NSW case makes this relationship particularly visible because accessibility and sustainability infrastructure are separately provided for within the same strata governance system [55].

Rather than proposing that accessibility and sustainability retrofit should be integrated in every project, the findings support their coordinated consideration at key points in the life of an existing apartment building. Substantial repair, replacement, renovation or upgrading can provide decision points at which future accessibility and sustainability needs are considered together. Depending on the building, its residents, governance requirements and available resources, resulting works may address accessibility, sustainability or both, either concurrently or in stages.

The framework developed in this paper draws on a bounded rapid review of Australian apartment-retrofit literature and an NSW policy case study incorporating NSW-specific and relevant national instruments. The proposed framework should currently be viewed as a conceptual and policy synthesis rather than a confirmation that the coordinated consideration of accessibility and sustainability necessarily leads to better reconstruction outcomes. Further research is needed to examine the framework across different apartment types, ownership structures, resident populations and governance contexts, including its costs and distributional implications, through practice based retrofit projects and in consultations with owners corporation, strata professionals and built environment practitioners.

Bringing accessibility into consideration alongside sustainability at significant retrofit decision points could help existing apartment buildings respond more effectively to changing environmental conditions and the changing needs of their residents.

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Abbreviations

The following abbreviations are used in this manuscript:

NSW	New South Wales
NDIS	National Disability Insurance Scheme
ABCB	Australian Building Codes Board
NCC	National Construction Code
ABS	Australian Bureau of Statistics

Appendix A. Inventory of NSW Policy Analysis Documents

The Tables A1–A4 reproduce the full policy inventory used in the manuscript. The main paper contains a condensed synthesis of the policy analysis.

Table A1. Inventory of Statutory Policies.

Policy	Themes	Research Implications
Strata Schemes Management Act 2015 (NSW) [55]	Provide for the management of strata schemes and dispute resolution. Accessibility infrastructure (s132C) refers to any modifications made to the common property to facilitate a person with a disability having access to the common property and the lot in the strata scheme in which the person resides. Accessibility infrastructure resolution is a resolution specifically to finance accessibility infrastructure, to make changes to common property for installing infrastructure and to change the strata by-laws for installation and/or use of accessibility infrastructure. Before approving an accessibility infrastructure, the owner's corporation must carefully consider the cost, maintenance and benefit and whether building can support the installation of accessibility infrastructure. Sustainability infrastructure (s132B) means changes made to the common property to reduce energy or water consumption or pollution or reduce landfill waste or to reduce greenhouse gas emissions, increase recycling and facilitate the use of sustainable transport. Sustainability infrastructure resolution is a resolution specifically to finance sustainability infrastructure, to make changes to common property for installing infrastructure and to change the strata by-laws for installation and/or use of sustainability infrastructure. The owner's corporation must consider cost of the infrastructure, its maintenance, ownership, benefit of the sustainability infrastructure before it is approved. In a special resolution, both accessibility and sustainability infrastructure requires only 50% majority of the votes cast.	50% voting threshold for both accessibility and sustainability infrastructure installation approval. Both need to be passed at a special resolution, where the owners corporation considers the cost, ownership of the infrastructure, ongoing maintenance and benefit of installation. The strata by-laws are changed to enable the installation of both accessibility and sustainability infrastructure. This shows the common governance process that guides both infrastructure installation.

Table A1. *Cont.*

Policy	Themes	Research Implications
Disability Inclusion Act 2014 No 41 (NSW) s. 10 [56]	Mandates a State Disability Inclusion Plan to set out the government goals that support the inclusion in the community of people with disability.	Accessible housing is fundamental to creating disability inclusive communities
Disability Discrimination Act 1992 (Cth) [59]	Section 23 Access to Premises: makes it unlawful to discriminate against a person of disability by refusing them access to the use of any premises open to the public. Section 31(1) sets out disability standards for public space.	Mandates standards for access to premises or common property access within apartments.
Disability (Access to Premises—Buildings) Standards 2010 (Cth) [60]	Disability (Access to Premises—Buildings) Standards 2010 s 2.1 sets out the scope of disability standards for access in the common premises	
National Disability Insurance Scheme Act 2013 (Cth) [74]	Provide the National Disability Insurance Scheme in Australia; support the independence and social and economic participation of people with disability.	NDIS funds home modifications for people under 65 years of age.
State Environmental Planning Policy (Housing) 2021 (NSW) [64]	Principle 3b encourages the development of housing that will meet the needs of more vulnerable members of the community, including very low to moderate income households, seniors and people with a disability	The provisions focus on targeted housing for seniors or people with disability, different to mainstream housing provision.
Climate Change (Net Zero Future) Act 2023 (NSW) [68]	Commitment to Paris agreement to pursue efforts to limit the temperature increase to 1.5 C above pre-industrial levels, to set targets for reduction in greenhouse gas emissions until 2050 and to establish net zero commission	They also call for climate resilient housing, with a focus on new housing. Strong commitment to achieve net zero 2050
State Environmental Planning Policy (Sustainable Buildings) 2022 (NSW) [69]	Policy aims the design and delivery of sustainable buildings, monitors embodied carbon emissions used in building construction, minimises energy consumption, reduce greenhouse gas emissions and ensures good thermal performance of buildings.	BASIX standards are lower than NCC. BASIX high thermal performance standards of 7-stars is lower by international standards.

Table A1. *Cont.*

Policy	Themes	Research Implications
	Aligning BASIX with NCC and working towards achieving net zero 2050. BASIX applies to new builds and renovations over $50,000. The higher BASIX thermal performance standards are at least 7 stars NatHERS	

Source: Authors (Compiled from multiple sources).

Table A2. Inventory of NSW Strategic Planning Policies.

Policy	Themes	Research Implications
NSW Disability Inclusion Plan 2 026–2029 [57]	Disability Inclusion Act (NSW) mandates the preparation of disability inclusion plan. Adopt a minimum of 10% of mid-rise apartments in the NSW Housing Pattern Book to be designed to meet the Australian Standard for Adaptable Housing, with the remaining to meet the ABCB Livable Housing Design Standard	10% of adaptable apartment units in mid-rise developments
Ageing Well in NSW: Seniors Strategy 2021–2031 [58]	One of their 5 guiding principles is 'enabling people to live in their home and community' that means ability to age in place or live in an environment, allow independence and live in the community of choice. One of their key focus area is 'living in age-friendly environments' catering for more housing options closer to transport and other services	Well located accessible homes, ageing in place and maintaining community connections are important.
Housing 2041: NSW Housing Strategy [63]	Homes in NSW are accessible and suitable for different stages of life or changing circumstances. Providing energy efficient homes in NSW are vital to meet 2050 net zero goals as housing sector accounts for 26% of the carbon emissions. Energy efficient design suggestions include double glazing, ventilation, high efficiency heating and cooling, solar PV systems.	Vision for accessible and energy efficient homes
Net Zero Plan Stage 1: 2020–2030 [81]	Establish Energy Security Safeguard to ensure NSW has cheaper and reliable electricity and this will extend and expand the Energy Savings Scheme, which supported the growth of energy efficiency market. They encourage the installation of roof top solar and amending BASIX to ensure new buildings are electric vehicle ready.	Improve energy efficiency, installation of rooftop PV cells and apartment buildings with EV charging provision

Source: Authors (Compiled from multiple sources).

Table A3. Inventory of Regulatory Standards, Guides and Rating Tools.

Policy	Themes	Research Implications
Livable Housing Design Standards [61] Beyond Minimum Voluntary Standards [62]	At least one level and step-free entrance door into the sole-occupancy unit from an accessible part of the floor on which it is located; internal doors and corridors that facilitate unimpeded movement between spaces; sanitary component that facilitates independent access and use, located on the entry level of the sole-occupancy unit; shower that facilitates independent access and use; walls of the sanitary component constructed so as to facilitate the future installation of grab rails. Step free access to the dwelling entry door- covered by disability access to premises.	NSW and WA have not mandated Livable Housing Design minimum standards, so it operates on a voluntary basis in NSW
Adaptable Housing Standards [32] There is no updated version yet.	It allows retrofitting with minimum cost and inconvenience to the occupant. Encourages ageing in place and helps maintain community connections. The existing AS 4299 adaptable housing standards is classified into three levels (A–C), with A representing the most advanced and includes all the essential and desirable elements for easy wheelchair adaptability.	Adaptable housing allows retrofit later at minimum cost and encourages ageing in place.
Energy Efficiency Standards [67]	National Standards. J1F1 must reduce energy consumption and energy peak demand of key energy using equipment, reduce the greenhouse gas emissions that occur as a result of a building's energy consumption and energy source; be able to accommodate installation of the distributed energy resources.	NSW adopts BASIX instead of NCC
	But in NSW, instead they adopt BASIX (Building Sustainability Index). BASIX is the web-based planning tool designed to assess the potential performance of certain residential buildings against a range of sustainability indices including thermal comfort and energy. Commitments made under BASIX become a condition of the relevant development consent or complying development certificate.	
National Home Energy Rating System (NatHERS) [70]	NatHERS- they are for single dwellings and apartments. NatHERS assessments is a modelling tool that considers the design of a home's thermal envelope and appliances.	It is a modelling tool that consider a home's thermal envelope and appliances
Green Star Buildings [71]	Green Star Certified, with three levels of recognition—4 Star, 5 Star, and 6 Star, representing Best Practice, Australian Excellence and World Leadership. The Green star buildings apartments pathway provides guided tools and independent level unit-level certification	There is potentially some cost involved in certification process, but individual units can demonstrate sustainability

Table A3. *Cont.*

Policy	Themes	Research Implications
Home energy assessments [73]	Government gives a discount of $330 for National Home Energy Rating System (NatHERS) home energy assessment. It issues a Home Energy Rating Certificate. It has two ratings.	NatHERS rating shows the year-round thermal comfort of the home as well as the efficiency of the energy consuming appliances.
	Star ratings is a rating between 0 and 10 stars and shows the amount of heating and cooling required to stay comfortable year-round. It considers design, materials and construction, including floors, roofs, walls and windows and the local climate. Home energy rating between 0 and 100. This is a broader rating and shows overall energy use. It considers fixed appliances like air conditioners, hot water heating, solar and batteries.	
National Australian Built Environment Rating System (NABERS) [70,72]	NABERS ratings apply to apartment base buildings. It is an operational tool that calculates actual emissions of the energy use of the common property area and shared services. It also displays the proportion of building's energy that comes from renewable energy source. It can be used to measure a building's efficiency across energy, water, waste and indoor environment and a rating from one to six stars is given. NABERS 4-stars is good, 5-stars is excellent and 6-stars in market leading.	NABERS calculation applies to common areas in apartments and shows the energy efficiency across energy, water, waste and indoor environment.
NSW Pattern book [65]	Increase accessible housing choice in the form of mid-rise apartments in areas with good amenities and must meet the requirements of liveable homes. All apartments in mid-rise patterns have been designed to meet either the Standard or Voluntary Standard (also called Beyond Minimum) as set out by the Australian Building Codes Board (ABCB). Mid-rise patterns also provide designs for adaptable apartments with layouts that can be adjusted to meet accessibility requirements.	Accessible and sustainable housing. Patterns are endorsed and there is fast track approval process.
	The pattern book embeds sustainable design principles through passive design techniques such as orientation, strategic shading and planting. They are intended to minimise overall footprint. They are designed to achieve 7-star NatHERS rating for water and energy usage and thermal performance. Optional additions include solar panels and rainwater tanks.	But they are voluntary in nature. NatHERS- 7-star average or 6-star minimum.
	Green star rating- 5 Star average, 4 Star minimum for Credit Achievement (7.5 NatHERS equivalent)	Green-star rating -buildings are either achieving 4-star best practice of 5-star Australian excellence

Table A3. *Cont.*

Policy	Themes	Research Implications
Apartment Design Guide [66]	Developments achieve a benchmark of 20% of the total apartments incorporating the Livable Housing Guideline's silver level universal design features. Adaptable housing should be provided in accordance with the relevant council policy. Development incorporates passive solar design to optimise heat storage in winter and reduce heat transfer in summer to improve energy efficiency	This is not for retrofitting, but for new constructions.

Source: Authors (Compiled from multiple sources).

Table A4. Inventory of Economic Incentives, Rebates, Grants.

Policy	Themes	Research Implications
NDIS Home Modifications [75]	NDIS home modifications for those under 65 years of age. Simple home adaptations up to $1500 each and funded as low-cost assistive technology- this includes installation of grab rail for example. Minor home modifications can fund up to $25,000 and includes non-structural modifications like installation of ramps or widening doors. Complex home modifications cost more than $25,000 and includes structural changes to home and require building approvals.	The NDIS supports the independence and social and economic participation of people with disabilities. Funding for accessibility home modifications for mainstream housing for those aged under 65 years They also fund specialised Disability Accommodation (SDA), but they are specialised housing that cater to a very niche group of people with disability with extreme functional impairment and needs support.
My Aged Care funding for home modifications [76]	They fund home modifications to 65 years and over- Includes things like grab rails in the shower or bathroom, ramps and stair lifts. They have 3 funding tiers with amounts of up to $500, up to $2000 and up to $15,000.	Funding for accessibility home modifications for mainstream housing for those aged 65 years and over.
Home Energy Saver Loan [77]	Provides a discount of up to $4000 or a zero-interest loan of up to $15,000 to make your house or apartment cheaper to run and more comfortable to live in. There is a threshold limit of $210,000 on annual household income. It can fund a range of energy efficiency upgrades like rooftop solar system, double glazing, ceiling insulation, heat pump water heater, solar water heater, induction cooktops, draught-proofing, reverse air conditioner, switchboard upgrades, etc.	Home energy saver loan funds for thermal upgrades, electrification and rooftop solar in apartments, but there is income threshold limit.

Table A4. *Cont.*

Policy	Themes	Research Implications
Energy Savings Scheme [80]	The Energy Savings Scheme deliver cost-effective energy savings for NSW households and businesses by providing financial incentives to install energy efficient equipment and appliances. The Energy Savings Scheme is NSW's largest energy-efficiency programme and is one of the key programmes for NSW to achieve net zero emissions by 2050. There are three major incentives under ESS scheme. The virtual power plant (VPP) allows consumers to sell stored energy to the grid. The air conditioner and hot water upgrade incentive gives discount for installing new energy efficient air conditioner or water heater and or replacing old one with an energy efficient one. The NSW residents can also access Australian Government's Cheaper Home Batteries Program.	NSW residents can also access Australian Government's Cheaper Home Batteries Program.
Solar for Apartment Residents Grant and Boost grant [79]	Solar for Apartment Residents Grant- Owners corporation and strata managing agents can apply. NSW Government delivers this federal funding initiative. Up to $150,000 grants is available or up to 50% of eligible products and installation costs. Should have a minimum of 3 residential lots and no more than 55 residential lots. Solar for Apartment Residents Boost grant- restricted to certain suburbs. NSW Government delivers this federal funding initiative. Up to $200,000 grants is available or up to 80% of eligible products and installation costs. All the conditions remain the same as above.	Owners' corporation and strata managing agent can apply for solar apartment residents grant can receive funding up to 50% or 80% of the product cost or installation cost, but it is restricted for developments up to 55 residential lots.
NSW Social Housing Energy Performance Initiative (SHEPI) [82]	All types of housing including apartments are eligible for energy retrofit. The residents cannot apply, but the social housing providers must apply. It helps to reduce energy bills and maintain thermal comfort of the buildings. The energy efficiency upgrades could include solar systems, reverse-cycle air conditioners, heat pump hot water systems, LED lighting, ceiling fans, window shading, insulation and draught proofing. Majority of the social housing was built before the minimum energy standards were introduced more than 20 years ago	Grants for social housing providers to upgrade properties for energy efficiency

Table A4. *Cont.*

Policy	Themes	Research Implications
Community Housing Energy Performance Grant [83]	CHPs can choose the type of properties they upgrade. Priority given to homes built before the introduction of Building sustainability Index (BASIX) in 2004.	Grants for community housing providers to upgrade properties for energy efficiency

Source: Authors (Compiled from multiple sources).

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