

1-1-2021

## **The carrot and the stick: Policy pathways to an environmentally sustainable rental housing sector**

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### Abstract

As the impacts from climate change are progressively being felt around the globe, there is an increasing urgency in the need for policymakers to find ways to reduce greenhouse gas emissions. The rental housing sector offers one such clear opportunity to reduce CO2 emissions. However, there has been a lack of consensus regarding the policies that would best deliver a sustainable rental sector. Building on calls in the literature to examine policy mix solutions for this conundrum, a Policy Delphi methodology, using both qualitative and quantitative techniques, identified seven key policy areas. These were divided into carrot policies (tax incentives, rebates and grants); cusp policies, that are neither clearly carrot nor stick, but often have a leaning towards one or other (loans, energy arrangements, improved rental rights); and stick policies (minimum standards, mandatory disclosure). Minimum performance standards, rebates and tax incentives were identified as the most effective policy solutions by the expert panel. Findings suggest that any policy mix should include both carrot and stick policies. When integrated with the existing 'enabling forces' literature, a model emerges that highlights the policy pathways to an environmentally sustainable rental housing sector.

### Publication Details

Heffernan, T. William., Daly, M., Heffernan, E. Elizabeth. & Reynolds, N. (2021). The carrot and the stick: Policy pathways to an environmentally sustainable rental housing sector. *Energy Policy*, 148 Part A 111939-1-111939-14.

*Pre-print of manuscript accepted for publication in Energy Policy*

Heffernan, T. W., Daly, M., Heffernan, E. E. and Reynolds, N. (2021) 'The carrot and the stick: Policy pathways to an environmentally sustainable rental housing sector'. *Energy Policy*. Vol. 148.

Paper ID: 111939

## Abstract

As the impacts from climate change are progressively being felt around the globe, there is an increasing urgency in the need for policymakers to find ways to reduce greenhouse gas emissions. The rental housing sector offers one such clear opportunity to reduce CO2 emissions. However, there has been a lack of consensus regarding the policies that would best deliver a sustainable rental sector. Building on calls in the literature to examine policy mix solutions for this conundrum, a Policy Delphi methodology, using both qualitative and quantitative techniques, identified seven key policy areas. These were divided into carrot policies (tax incentives, rebates and grants); cusp policies, that are neither clearly carrot nor stick, but often have a leaning towards one or other (loans, energy arrangements, improved rental rights); and stick policies (minimum standards, mandatory disclosure). Minimum performance standards, rebates and tax incentives were identified as the most effective policy solutions by the expert panel. Findings suggest that any policy mix should include both carrot and stick policies. When integrated with the existing ‘enabling forces’ literature, a model emerges that highlights the policy pathways to an environmentally sustainable rental housing sector.

## Keywords

Rental sector; climate change; policy mix; sustainable housing; carrot or stick; Policy Delphi

## Highlights

- Rental properties offer significant opportunities to decrease CO2 emissions
- Seven policy areas for an environmentally sustainable rental sector are identified
- A combination of carrot and stick policies are needed in the policy mix
- Minimum performance standards and rebates are the preferred combination
- Education, communication and ease are critical to support policy implementation

# 1 Introduction

There is a growing awareness of, and sense of urgency in the need to address, the causes and effects of climate change. The buildings sector has been identified as having the greatest potential for effective low-cost climate change mitigation (Ghaffarianhoseini *et al.*, 2013). Globally, the buildings sector was responsible for approximately 28% of greenhouse gas (GHG) emissions in 2015 (International Energy Agency, 2017). In Australia, buildings are responsible for 23% of GHG emissions (ASBEC, 2016), and the residential sector is responsible for approximately half of these (11.4%) (Australian Government Department of the Environment and Energy, 2018). The rental sector makes up around one third of the residential sector in Australia (Martinelli, 2017). At both the international and national level, these figures focus on emissions from the consumption of energy in buildings, and not on emissions from their construction. If the annual emissions from construction activities are also accounted for, the global figure increases from 28% to 39% (International Energy Agency, 2017). Buildings, therefore, clearly have an environmental impact beyond their operational energy consumption, and there is growing awareness of these embodied emissions. When considering the improvement of the building stock, previous research has highlighted the reduced embodied emissions from the refurbishment of existing buildings compared with demolition and new build (e.g. Gaspar and Santos, 2015; Pullen, 2010).

Australia is the sixth largest country in the world by area, and this vast geographical nature results in a highly varied climate. Whilst significant areas of the country are subject to a cooling-dominant climate, the most populous areas of Greater Sydney and Greater Melbourne are located in a heating-dominant climate (Australian Building Codes Board, 2019; NSW Department of Planning and Environment, 2017). However, with a warming climate, global energy demand for cooling doubled between 2000 and 2017 (International Energy Agency, 2019). In the Australian context, average temperatures are rising year-on-year (Bureau of

Meteorology, 2019). For example, over the five-year period to 2019, the annual national mean temperature increased every year from 0.95 °C above average in 2015 to 1.52 °C above average in 2019 (Bureau of Meteorology, 2019). These consistent increases create the potential to tip the balance of the demand in buildings from heating to cooling dominance.

Private rental sector properties have been shown to be less energy efficient in-use than owner-occupied housing in both the USA and Australia (Bird and Hernández, 2012; Pitt & Sherry, 2014; Liu & Judd, 2019), with tenants using more energy than owner-occupiers to maintain comparable comfort levels (Melvin, 2018). In Australia, 84.5% of owner-occupied homes and only 38.5% of rented homes feature insulation (Australian Bureau of Statistics, 2013). Australian renters have traditionally been from low-income groups (Australian Council of Social Service et al., 2017; Hulse et al., 2012), and those renting privately were the largest group among those unable to heat their home or pay their bills on time (Azpitarte et al., 2015). Therefore, both social and environmental imperatives exist for the reduction of GHG emissions through the retrofitting of the rental housing sector, with upgrades such as building fabric efficiency measures (insulation, double glazing etc.) or renewable energy generation technologies (e.g. solar photovoltaics).

Previous research has identified multiple barriers to improving the environmental sustainability of private rental housing in both Australia and the UK (Heffernan et al., 2020; Hope and Booth, 2014). These barriers include: initial financial barriers, such as the capital cost of retrofits; lack of return on investment, as a result of the principle-agent problem; lack of awareness and information regarding the benefits of retrofits; lack of regulations for minimum energy efficiency; and the dominance of the landlord within the rental market. At the time of writing, there has been limited policy and market attention focused on reducing the environmental impact of the existing private rental housing stock. A key reason for this is the principle-agent problem (or split incentives) (Bird and Hernández, 2012), where the costs and benefits of

investments in retrofits to rental properties are not equally shared between parties. The landlord typically pays for the retrofit, and the tenant benefits from that investment with savings in running costs. Therefore, it is important for any policy solutions identified to address the needs of both landlord and tenant (Heffernan et al., 2020).

Whilst governments in many jurisdictions have implemented a number of policies and trials, these have typically been neither consistent nor enduring (Gabriel et al., 2010a). In the Australian context, Wrigley and Crawford (2017) explored specific policy solutions, derived from the literature, for improving the energy efficiency of rental properties. It has been suggested that a multi-faceted policy approach is required, which brings together complementary policy solutions in combination (Burfurd et al., 2012; de T'Serclaes and Jollands, 2007; Wrigley and Crawford, 2017). Hence, it is necessary to understand the strengths and weaknesses of the various policy options, and how these policies can be grouped for multiplied effect. Current inequities between the performance of rental and owner-occupied properties evidence a need for political action to make rental properties more environmentally sustainable. Therefore, a Policy Delphi methodology (an iterative, multi-stage research method utilising both qualitative and quantitative techniques) is adopted, with the aim of understanding the policy options, and identifying the most feasible and effective policy mix for this critical sector.

To achieve this aim, the paper is divided into four further sections. Firstly, the international literature relating to seven key policy options for the improvement of environmental sustainability of the private rental sector is presented. This section concludes with a discussion on the need for a policy mix. Next, the adopted methodology is introduced, before the findings are presented and discussed. Finally, the Conclusions and Policy Implications section highlights a way forward.



## **2 Background: Policy measures for improving the environmental performance of rental properties**

The literature reveals a range of existing policies used to bring about improved energy efficiency of rental properties. These are categorised into seven areas (Table 1). These policies work by disclosing/mandating the performance of the rental property (1-2), directly facilitating landlords to make capital investments in their properties (4-5), reducing the ongoing costs of financing environmental improvements (6-7), or attempting to redress the balance of power between landlord and tenant (3). These policies hold varying psychological appeal for landlords, as they activate the landlord's approach and/or avoidance motivations in differing ways (Scholer, Cornwell and Higgins, 2019).

Table 1: Summary of the seven areas of policy intervention identified in the literature, with examples and impacts

Category	Description	Examples	Evidence/Impact/Uptake	Reference
1. Energy/ Environmental performance disclosure	Voluntary or mandatory disclosure of energy, water efficiency and thermal performance of a dwelling, including potential running costs, available to tenants and the broader public.	AU (ACT): quasi mandatory; NatHERS; since 1999 EU: mandatory; EPC; since 2010 USA: voluntary; ENERGY-STAR Singapore: voluntary; Green Mark	Europe: Higher EPC = higher rental prices of up to 4.4%, and discounts of up to 3.2% for lowest bands. AU (ACT): relative to average 3* property, higher * rating = higher rental prices up to 3.6% and lower * rating = discount up to 2.8%.	(Burfurd et al., 2012; De Ayala et al., 2016; Dressler and Cornago, 2017; Fuerst et al., 2015; Fuerst and Warren-Myers, 2018; Hyland et al., 2013; Lang, 2016)
2. Minimum environmental standards	Legislated and enforced minimum sustainability/energy efficiency standards for rental properties	UK: lowest EPC rated properties (Bands F and G) cannot be leased until upgraded to Band E. NZ: Healthy Homes standard sets minimum requirements for insulation levels, heating, ventilation, moisture ingress and drainage, and draught-stopping in rental properties.	UK: Annual net cash benefits for tenants based on modelled rent increases and energy cost savings for all house types. NZ: Benefit-cost ratio 2.1:1 for minimum insulation standards for ceilings and floors over a 20 year period.	(Burfurd et al., 2012; Charlier, 2015; Frontier Economics, 2017; Gabriel et al., 2010a; Laquatra, 1987; Ministry of Business Innovation and Employment, 2015; The Senate Environment and Communications Legislation Committee, 2019; Victoria State Government, 2016; Wrigley and Crawford, 2017)
3. Improved rental rights	Provide longer-term lease periods and greater rights for tenants to improve their rental property.	UK: The Energy Efficiency (Private Rented Property) Regulations 2019.	UK: Equity weighted CBA, Benefit: Cost ratio 3.5:1 excluding monetised health impacts.	(DBEIS, 2018; Easthope, 2014; Nelson et al., 2019; Wrigley and Crawford, 2017)
4. Tax incentives	Tax-based incentives, including offsets, deductions and feebate schemes, to reduce cost of installing environmentally sustainable retrofits in rental properties.	AU: Proposed tax offsets of \$2,000 per year for energy efficiency upgrades in low-rent properties. UK: LESA, 2004-2015, £1,500 tax deduction for energy saving expenditure.	AU: Not enacted. UK: LESA had low uptake in isolation.	(Charlier, 2015; National Energy Action, 2018; Parliament of Australia, 2018; Williams, 2008; Wrigley and Crawford, 2017)
5. Grants, subsidies and rebates	Rebates, subsidies and grants available to landlords to encourage the installing of environmentally sustainable retrofits in rental properties.	NZ: Warm Up New Zealand, 2009-2018, Government subsidies for ceiling and floor insulation installations for homes built before 2000. UK: Warm Front, 2000-2013, grant funding for installation of insulation, draught-proofing, and efficient building services.	NZ: >300,000 homes received subsidies for insulation retrofits. UK: 2.3 million households received energy efficiency upgrades. Revised in 2011 to target low EPC rated properties and households in fuel poverty.	(EECA, 2016; Gabriel et al., 2010a; Hamilton, 2010; Hope and Booth, 2014; UK Department of Energy & Climate Change, 2013; Williams, 2008)
6. Energy efficiency loans	Low-interest or interest-free loans for environmentally sustainable retrofits.	AU: Green Loans, 2009-2010. AU (VIC): Solar for rental properties – rebate plus interest-free loan over four years.	AU: High level of interest in scheme. Abandoned after one year due to poor administration.	(Australian National Audit Office, 2010; Solar Victoria, 2019; Sustainable Living Tasmania, 2020)
7. Innovative financial arrangement	Schemes that allow landlords or a third-party investor to ‘sell-on’ energy savings from the environmentally sustainable retrofit to tenants.	UK: Green Deal, UK Government funded 2013-2015.	Limited uptake due to program complexity. 6,000 retrofits per annum as opposed to anticipated 2,000,000 retrofits per annum.	(Bird and Hernández, 2012; Burfurd et al., 2012; Charlier, 2015; Daly et al., 2014; Khanal, 2019; Rosenow and Eyre, 2016; Williams, 2008)

NOTES: ACT(Australian Capital Territory); AU (Australia); EU (European Union); NZ (New Zealand); UK (United Kingdom); USA (Unites States of America)

## 2.1 Energy/environmental performance disclosure

Mandatory or voluntary disclosure policies require a system for rating the energy and/or environmental performance of a dwelling so that this can be communicated to potential tenants/buyers. Previous studies have identified correlations between rental price and building energy performance within the rental sector (BioIntelligence Service et al., 2013; Burfurd et al., 2012; Fuerst and Warren-Myers, 2018; Hyland et al., 2013).

Disclosure of building energy performance has been mandatory at the point of both sale and lease in the EU since 2010 (European Union, 2010). In the Australian Capital Territory (ACT), disclosure of building energy performance has been mandatory since 1999 (Australian Capital Territory, 2019), but in rental properties, landlords are only required to disclose the performance of the home to tenants if a rating already exists – they are not required to obtain one. Because of this, there is less transparency in terms of energy performance in the rental market, and therefore less motivation to improve the performance of rental homes. It has been suggested that there should be a national mandatory requirement in Australia to obtain and disclose a valid energy efficiency rating to the rental market (Fuerst and Warren-Myers, 2018).

Previous Australian research has found that enabling landlords to advertise the energy efficiency of their properties can increase investment in energy efficiency (Burfurd et al., 2012). Whilst in some contexts, voluntary disclosure of information has achieved performance levels comparable to those under a mandatory programme (Burfurd et al., 2012), in the Australian context, investment in energy efficiency by landlords has been shown to be significantly below that of homeowners (Fuerst and Warren-Myers, 2018). Furthermore, because the evidence suggests that mandatory disclosure policies enable price differentiation based on energy performance (Fuerst and Warren-Myers, 2018), this policy potentially benefits renters who can afford to pay extra for superior performing properties (Lang, 2016) rather than

those experiencing fuel poverty. However, results from Ireland indicate that rental prices may decrease for lower performing properties (Hyland et al., 2013), suggesting disclosure policies may also provide benefits for tenants at the lower end of the rental market.

## 2.2 Minimum environmental performance standards

With the primary aim of raising the quality of the worst performing housing (Victoria State Government, 2016), minimum standards for the environmental performance of rental properties are beginning to be implemented in some regions globally (e.g. England & Wales (HM Government, 2019)). The regulations introduced in England and Wales (HM Government, 2019) rely on the framework provided through the earlier introduction of mandatory disclosure of the energy performance of rental properties (European Union, 2010). By first introducing a rating framework in which homes are rated from A (high-performing) to G (low-performing) it has been possible for the UK Government to later introduce legislation preventing homes rated F or G from being leased (HM Government, 2019), thus incentivising their improvement. In New Zealand, minimum insulation levels are mandated through the Healthy Rental Homes Standard (Twyford, 2019). Whilst minimum energy performance standards apply to new build properties in Australia nationally through the National Construction Code (since 2003) and through BASIX in NSW (since 2005) (ABCB, 2019), there are currently no minimum energy performance standards for existing rental houses in Australia.

The legislation of minimum standards is widely seen as an effective policy mechanism that would lead to a significant improvement in the energy efficiency of rental properties (Burfurd et al., 2012; The Senate Environment and Communications Legislation Committee, 2019). Australian-based modelling found that implementing minimum energy efficiency requirements for rental homes would, in NSW alone and over a period of 30 years to 2050, deliver \$987

million in bill savings for tenants and reduce energy consumption by more than 3 Terawatt hours (Office of Environment and Heritage, 2016). The introduction of minimum standards places the burden on the landlord to comply, rather than the tenant to request upgrades and maintenance (Lang, 2016; Williams, 2008). Key concerns with this policy are that increased regulatory and compliance burden may reduce investment in property, thus reducing availability in the rental market (Bird and Hernández, 2012; Burfurd et al., 2012). Further, the additional cost of upgrades and reduced supply could lead to rental increases (Charlier, 2015; The Senate Environment and Communications Legislation Committee, 2019), affecting low-income households. The introduction of minimum standards requires legislative change and therefore relies on political will (Wrigley and Crawford, 2017) which would appear to be lacking in the Australian context, given the policy discontinuity evident in relation to national climate change policy (Simshauser and Tiernan, 2019).

### 2.3 Improved rental rights

Improvements in rental rights aim to increase the incentive for tenants to invest their own money into upgrading their rental properties. Two key aspects of this type of policy intervention are giving tenants greater ability to make minor changes to a property without jeopardising their tenancy, and greater security and length of tenure to improve the economic rationale for tenants to invest in upgrades, such as insulation, solar PV and efficient hot water systems (Nelson et al., 2019). Improving tenant rights in both of these ways could enable and incentivise tenants to undertake sustainable retrofits themselves (Easthope, 2014), with the potential for them to contribute to grass roots action such as being part of a 'Clean Energy Community' (Gui and MacGill, 2018). Lang (2016) suggests tenants should be able to make certain improvements without landlord permission, including: water saving showerheads, curtains, ceiling insulation and draught-sealing. However, any changes that are made to the

balance of power will have implications for the housing system at a wider scale, and so may be difficult to implement.

## 2.4 Tax incentives

Tax-based incentives to reduce the long- and/or short-term costs of installing environmentally sustainable retrofits in rental houses range from tax offsets and deductions, to more complex feebate schemes (a system of charges and rebates to encourage energy efficiency). In Australia in 2018, a proposal existed for the provision of tax offsets of up to AU\$2,000 a year for energy efficiency measures in houses rented at AU\$300 a week or less (Parliament of Australia, 2018). However, this legislation was not supported through parliament. The UK Government implemented the Landlords Energy Savings Allowance (LESA) from 2004 to 2015 (National Energy Action, 2018). LESA allowed tax deductions of up to £1,500 for energy saving expenditure. This long-running scheme had limited uptake, and it has been suggested this was because it ran prior to the introduction of minimum performance standards (National Energy Action, 2018). Previous research in the Australian context (Wrigley and Crawford, 2017) suggested that energy efficiency improvements be classified under ‘repairs’ to rental properties in terms of tax, to enable them to be tax deductible. However, it has been asserted that tax credits are not effective at tackling split incentives (Charlier, 2015). Williams (2008) proposed a feebate scheme in which rate levels for rental properties would be determined based on efficiency. As demonstrated by the recent proposed legislation in Australia, this policy is reliant on political willpower, which is currently lacking (Charlier, 2015; The Senate Environment and Communications Legislation Committee, 2019; Wrigley and Crawford, 2017).

## 2.5 Grants, subsidies and rebates

This policy option refers to various rebates, subsidies and grants made available to landlords to encourage them to implement environmentally sustainable retrofits to rental properties. The

financial value may cover all or a portion of the cost incurred, thereby removing or reducing financial barriers of high upfront cost and access to capital (Williams, 2008).

There are many examples of household energy efficiency rebate programs that have been made available to tenants, landlords, and owner-occupiers. Australian examples include the Energy Efficient Homes Package home insulation scheme providing up to AU\$1,200 to install ceiling insulation, and rebates for solar and heat pump hot water system upgrades (Gabriel et al., 2010a). Internationally, the Warm Front Initiative (UK), CO<sub>2</sub> Building Rehabilitation Program (Germany) and Weatherisation and Low-Income Home Energy Assistance Programs (USA) all provided direct financial assistance to improve household energy efficiency (Hope and Booth, 2014; UK Department of Energy & Climate Change, 2013). Under the Warm Front initiative, it was estimated that only 12% of participants were renters, where 35% of homes in the UK are within the rental sector (Hope and Booth, 2014). This indicates that uptake was relatively low within the rental sector. Some programs have explicitly targeted the rental sector. For example, Efficiency Vermont offers rebates for the installation of energy efficient equipment in rental properties (Efficiency Vermont, 2020). Similarly, Warm Up New Zealand was a major residential insulation retrofit program which provided a 30% rebate for owner-occupiers, but a 60% rebate to landlords with low-income tenants (Gabriel et al., 2010a).

Previous research has found that the effectiveness of incentives in stimulating action to improve housing energy efficiency is highly variable (Williams 2008), with a particularly low uptake from landlords (Telfar-Barnard et al., 2017). Subsidy rates of around one third of the cost of the measure have been found to generate sufficient owner-occupier interest (Hamilton, 2010), whilst for landlords, rebates of 80% of the cost were needed to reach a 50% participation rate (Nexus Market Research 2007, cited by Williams 2008). There is a large variance in the participation rate for rebate programs, even with similar financial value, suggesting that non-financial factors are critical to determining policy success (Williams 2008).

## 2.6 Energy efficiency loans

Low-interest or interest-free loans for environmentally sustainable retrofitting aim to assist property owners to implement energy efficiency upgrades by reducing or removing the need to access the full capital cost upfront. In the USA, various agencies, including utilities, energy service companies, and local and state governments, offer loans specifically for energy efficient installations which can be used for investment properties (Energy Sage, 2019). In Australia, Victoria currently operates a solar for renters program (Solar Victoria, 2019), which provides rebates for solar installations provided the tenant household income is below a maximum threshold. Under the scheme, the Victorian Government will provide a rebate of up to AU\$1,888, the landlord can also apply for an interest-free loan to the same value. With a target of low-income households, including renters, subsidies and no-interest loans are available from the NILS Network of Tasmania for energy efficient installations and products such as heat pumps, home insulation, fridges and washing machines (Sustainable Living Tasmania, 2020).

Low-interest loans remove the upfront costs to property owners, thus overcoming an important barrier (access to capital). However, on their own, loan programs fail to overcome the split incentive issue, as the property owner does not receive the running cost benefits of the upgrade. Loan programs also face limitations as debt-averse individuals tend not to participate regardless of income (Williams, 2008)

## 2.7 Innovative financial arrangements

This policy approach covers a variety of schemes that allow landlords or third-party investors to sell-on energy savings from an environmentally sustainable retrofit to tenants. The aim is to allow the funder of the upgrades to receive recompense for the benefit provided. Examples include Green Leasing (Australia), Environmental Upgrade Agreements (EUAs) (Australia), and Pay-As-You-Save (PAYS) schemes (sometimes referred to as on-bill financing, e.g. Green



Deal, UK). PAYS schemes use savings from energy efficiency actions to pay off the initial investment. Neither homeowner nor tenant pays out of pocket, instead they pay a service charge attached to the electricity meter which is directed to the financier (Bird & Hernández, 2012; J. Williams, 2008). The key innovation is linking the service charge to the meter, so that if the tenant changes, the new tenant (who assumes the energy savings benefit) pays the charge (Williams, 2008; Wrigley & Crawford, 2017). The UK Green Deal was one such PAYS scheme. The annual repayments on the loan were set at no more than the anticipated energy bill savings, and the payback period was no longer than the expected lifetime of the installed technologies (Rosenow and Eyre, 2016). Uptake of the Green Deal was significantly below expectations, with only 6,000 homes retrofitted per year as opposed to the anticipated 2 million homes per year between 2013 and 2015 (Rosenow and Eyre, 2016). As of 2014, only 13% of participating homes were from the private rental sector (Hope and Booth, 2014), indicating a disproportionately low representation of rental homes.

A green or energy efficient lease includes a clause or agreement between landlord and tenant detailing agreed rent increases for a fixed period, in exchange for energy efficiency upgrades (Williams, 2008; Wrigley & Crawford, 2017). These are designed to cap rental increases below projected savings from upgrades. The use of independent third-party auditing is key to the integrity of the system. EUAs work with a finance provider that lends funds to a building owner for water, energy and other environmental upgrades, and this low-risk loan is repaid through a local council charge on the property (Daly et al., 2014).

These schemes can be designed to cap charges below the rate of savings gained, ensuring no out-of-pocket expenses for the tenant (Bird and Hernández, 2012; Williams, 2008). In these approaches, risks are typically borne by the tenant, as predicted savings are based on assumptions of typical habits (Williams 2008).

## 2.8 Policy packages

Previous research has identified and explored policy solutions for moving towards an environmentally sustainable private rental sector, and has found that *'a greater uptake of energy efficiency improvements in rental properties will most likely result from a multi-faceted approach.'* (Wrigley and Crawford, 2017, p 377) and that *'the solution lies in carefully designed policy packages'* (de T'Serclaes, 2007, p 6). Therefore, a gap remains in terms of understanding the optimal policy mix for this critical sector. To achieve this, the characteristics of the individual policy options need to be considered. The seven areas of policy interventions outlined above can be categorised as carrots, sticks or cusp policies. Carrots are policies which incentivise action towards the goal of improving the environmental performance of the private rental sector (tax incentives, grants and subsidies), although this encouragement often works by allowing landlords to offset or reduce capital investment costs rather than avoid them. In contrast, sticks are policies which legislate towards the goal (minimum standards, mandatory disclosure), either by providing landlords with a target to approach, or by presenting landlords with penalties to be avoided. Whereas cusp policies fall between the categories of carrots and sticks, potentially with some elements of both incentivisation and regulation (e.g. loans, energy arrangements, improved rental rights).

It is clear from the review of existing policy examples that some policies have failed when implemented in isolation, or have relied on working in combination with other policies (HM Government, 2019; National Energy Action, 2018). For example, the case from the UK presented in Section 2.4 illustrates that the limited uptake of interest-free loans (the LESA scheme), in advance of the potentially complementary minimum performance standards, failed to induce action from landlords – a carrot with no stick. Conversely, the case presented in Section 2.2 illustrates that increased building energy performance in UK rental properties has been possible due to the initial introduction of mandatory disclosure of performance, which

allowed the later introduction of minimum standards – a double stick. Indeed, in their review of the ACT rental market policy options, Pitt and Sherry (2014, p. 28) make the case for a *‘package of measures designed to improve the ability of tenants to discern and demand greater energy efficiency’*, and state the need for a regulatory element in the policy mix.

Three key enabling forces emerge from the literature to support the introduction of the appropriate policy packages for improving the environmental performance of rental properties. These are: communication, education, and ease of use (Heffernan et al., 2020). When these are applied correctly, they will enhance the chance of successful implementation of the policy mix. There is broad consensus within the literature that education and information are a fundamental requirement in improving the environmental performance of rental properties (Ambrose, 2015; Fuerst and Warren-Myers, 2018; Gabriel et al., 2010b; Phillips, 2012; Wrigley and Crawford, 2017). Indeed, UK-based research which profiled private landlords found that those who had implemented retrofit measures had higher levels of energy literacy than those who had not (Miu and Hawkes, 2020). Further, ease of implementation, or ease of use by the intended stakeholders, is seen as critical in generating uptake of the policy initiatives (Heffernan et al., 2020).

This review of the literature provides a foundation in terms of knowledge of the strengths and weaknesses of the various policy options. The literature has also demonstrated a need for a synergistic mix of policies to bring about change in the rental sector. However, it remains to test these policies, and explore how they can be grouped for amplified effect.

### **3 Methodology**

#### **3.1 Policy Delphi study**

The review of the literature reveals the complexity, competing agendas and multiple policy options present in the move towards a more environmentally sustainable rental sector. Thus, a research design was needed which embraced multiple views from varied experts and which allowed divergent voices to be heard. Consequently, the Policy Delphi method (Turoff, 1970) was utilised for this study, with the aim of identifying potential policy solutions based on the views of a range of experts (Needham & De Loe, 1990). A subset of the classical Delphi method, Policy Delphi uses a panel of experts to generate defined group opinions on the interpretation of a reality (Rauch, 1979). Three iterative rounds of data collection were conducted for this study. At each stage, the findings of the previous round are presented back to the panel, and these build upon the analysis of the previous rounds. A three-round format is typical of Policy Delphi studies, as identified in a systematic review of the method (de Loe et al., 2016) where 33% of 63 studies undertook two rounds and 57% undertook three. Within this study, as in others previously (Powell, 2002), a fourth round of in-depth interviews with a selection of experts was used to validate and better understand key themes that emerged from the three rounds of Policy Delphi. Interviews were unstructured and started with an explanation of the findings of the study to date. Interviews ranged from 40 minutes to 2 hours. The process followed is identified in Figure 1.

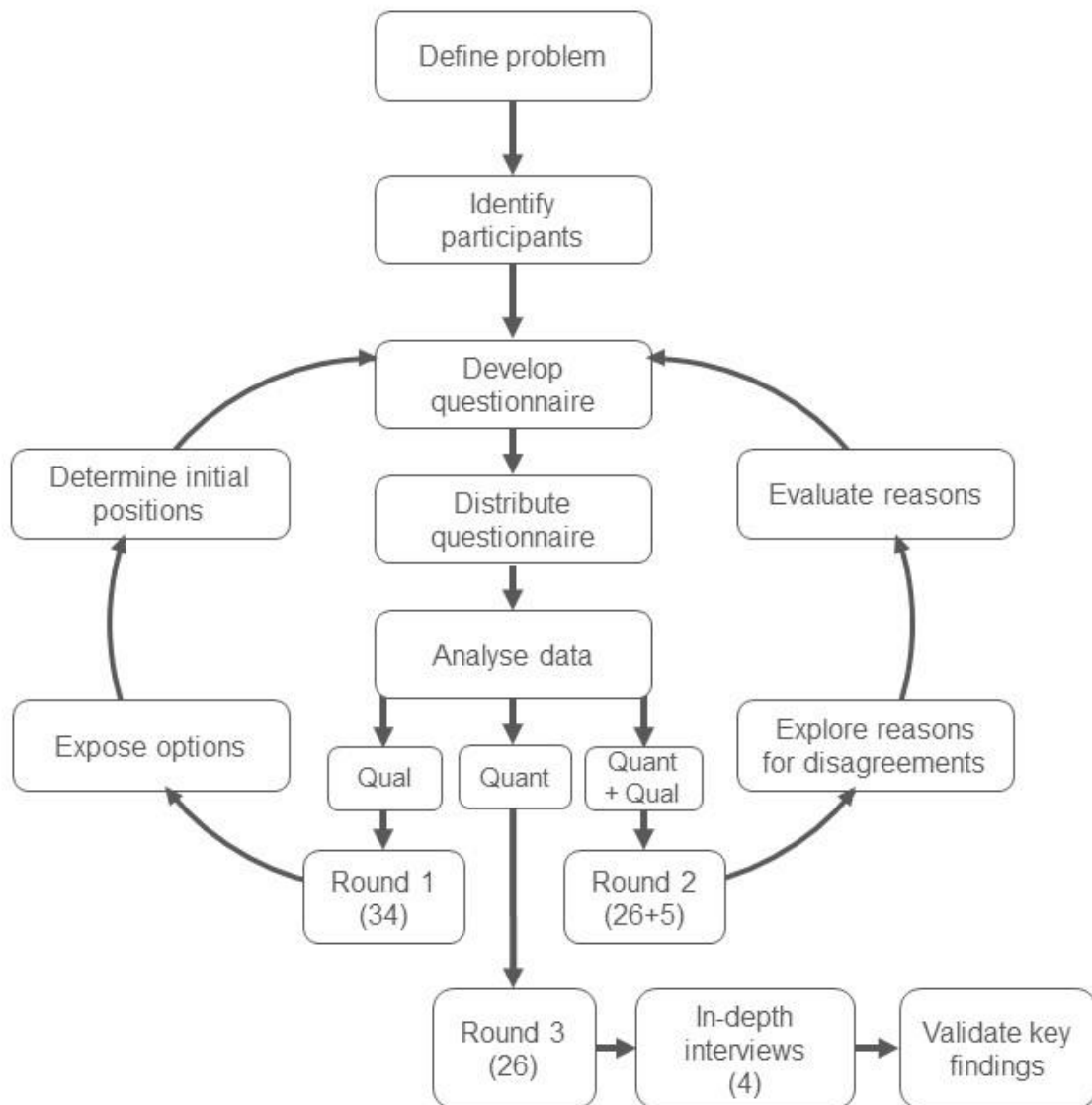


Figure 1: Schematic representation of the Policy Delphi methodology undertaken in this study (number of participants indicated in parentheses)

### 3.2 Expert panel

Achieving heterogeneity within the expert panel is a key requirement of Policy Delphi (Paraskevas & Saunders, 2012) as this generates varied insights and rich debate (Rubin & Rubin, 2005). Thus, stakeholders from a broad range of backgrounds were recruited, as shown in Table 2. The experts, or ‘informed advocates’ (Paraskevas & Saunders, 2012), were not expected to have a full understanding of all facets of the policy-related problems.

Table 2: Self-identified roles of Policy Delphi participants

<b>Expert Role(s) (multiple roles possible)</b>	<b>Number*</b>
Landlord	12
Tenants	2
Property Managers	9
Consultant/Researchers (Housing)	7
Consultant/Researchers (Environment)	7
Advocacy Groups/Industry Associations	3
Government (Policy)	6
Builder/Tradespeople	2
Finance Industry (Housing)	4

\*Note: Respondents were able to self-identify in multiple categories

Using a purposive sampling strategy (Teddlie & Yu, 2007), maximum variation sampling (Tracy, 2013) was undertaken. Potential panel members were approached based on their experience, standing and/or research in the field. As shown in Table 3, retention of participants between rounds was good, and response rates were above 60%. 21 experts completed all three rounds of the Policy Delphi. Whilst no evidence was gathered regarding the reasons for the 5 experts dropping out between Rounds 1 and 2, and 8 experts between Rounds 2 and 3, this drop-out rate was consistent with previous studies utilising the Policy Delph technique (de Loe et al., 2016). The sample size achieved was within or slightly above that identified in the literature (i.e. Turoff (1970) 10 to 50 participants and Rayens and Hahn (2000) 10 to 30 participants).

Table 3. Respondents per round and response rate

<b>Respondents Per Round:</b>	<b>Invited</b>	<b>Responded</b>	<b>Response Rate</b>
Round 1	56	34	61%
Round 2	39*	34	87%
Round 3	34	26	76%
Round 4 (In-depth interviews)	6	6	100%

\*Note: Five experts that did not complete Round 1 were involved in Rounds 2 and 3.

In Round 3 of the Policy Delphi, experts identified their philosophical orientation towards the environmentally sustainable retrofitting of rental properties, for the purpose of categorisation as either environment orientated or investment orientated. This orientation is used to

understand different perspectives during the analysis phase for the research. The 26 experts participating in Round 3 responded to the following statements, selecting the statement which most closely matched their attitude:

*The rental house is a significant investment for the landlord and any changes to increase the environmental sustainability of the property should not impact negatively on this investment (Investment orientation n=16)*

*The need to increase the environmental sustainability of the rental housing stock in Australia overrides the ROI (return on investment) concerns of landlords (Sustainability orientation n=10)*

There was a slight dominance of investment orientation within the Round 3 expert panel (62% of participants). This points to the belief that landlords are likely to have avoidance motivations related to costs, rather than approach motivations related to environmental sustainability, when considering environmentally sustainable retrofitting of their rental properties.

### 3.3 Analysis techniques

A two-stage process of pre-testing the questionnaire survey, conducted using the Qualtrics online survey platform, was undertaken for each of the three rounds of the Policy Delphi study. Stage 1 of the pre-test was conducted internally within the research team, and Stage 2 was undertaken by six experts with experience in either the methodology or topic area.

In Round 1 of the Policy Delphi study, open qualitative questions were asked (e.g. Question 3: What are the potential, or existing, policy initiatives that could enhance the uptake of environmentally sustainable retrofitting of rental premises?). Thematic analysis was undertaken to identify emergent themes (Creswell, 2014), as is common for the analysis of first

round Delphi data (Bailey et al., 2012). NVivo 12, qualitative data analysis software, was utilised to aid in the analysis of data from all rounds of this research.

Based on the findings in Round 1, in Round 2, participants responded to both qualitative and quantitative questions. Experts were asked to rate several policy alternatives (which emerged from Round 1). For example: *“The final group of questions relate to broad policy and industry initiatives identified by you (the Expert Panel) in the first round...how desirable (attractive) is each initiative for improving the environmental sustainability of existing rental properties? And, how feasible (achievable or realistic) would it be to implement this initiative for the rental property sector in Australia. Please click on the scales (out of 100) corresponding to your belief of the desirability and feasibility of each initiative”*. Respondents were then asked to follow up with a qualitative explanation as to why they answered as they did. All quantitative data were analysed using SPSS 23 for both Rounds 2 and 3. Due to the small number of participants only descriptive statistics have been used.

In Round 3, questions probed the importance of the policy areas that emerged through the previous two rounds. Questions were asked regarding the implementation and effectiveness of the policies. For example: *“Please rank the initiatives/policies in order of the chances of successful implementation in the Australian housing rental market over the next three years (1=most likely to be successfully implemented: 7=least likely to be successfully implemented)”*. Each policy area was then rank ordered, overall, and for each philosophical orientation.



## 4 Findings and discussions

### 4.1 Key policy areas for moving towards an environmentally sustainable rental sector

Expert opinion regarding the seven different policy measures for improving the environmental performance of rental properties is summarised and discussed below. Quotes from the panel are used extensively in this section to allow the voice of the experts to emerge. Quotes were chosen based on the clarity of explanation on the topic being explored. An identifier after each expert quote indicates which round of the Policy Delphi it came from [R1, R2, R3, IDI (in-depth interview)].

#### 4.1.1 Minimum environmental performance standards

Many saw this as an essential policy response, and the only means of achieving improvements across the whole rental stock. This reinforces the findings from the literature that minimum standards represent an effective policy mechanism (Burford et al., 2012).

*Creating a minimum standard is sometimes the only real way of effecting change [R2]*

*As much as government don't like the legislation and regulatory component, I think it is the only way we are going to see broad scale change across the industry. [R3]*

*There needs to be minimum standards of energy efficiency for rental properties. Often vulnerable households at the lower end of the rental market are left with no choice but to live in a home which has poor thermal performance and older/cheaper expensive to run appliances. This means*

*that they have to make an unacceptable trade-off between comfort and health, and cost. [R1]*

Minimum standards would be a major undertaking politically, as the far-reaching nature would require action by many landlords. However, there are many precedents such as minimum standards for water efficiency and fire safety standards, which demonstrate feasibility. The level at which the ‘minimum’ should be was contentious. Some respondents suggested feature-based minimums e.g. a certain level of insulation. However, overall performance levels were most commonly suggested. Performance levels suggested by respondents included just below 6-star<sup>1</sup> (current minimum for new house construction in most jurisdictions) or 3-star (about the average of existing stock). However, existing UK based policy only excluded the lowest performing buildings from being eligible for leasing (on a high to low scale of A to G, F- and G-rated buildings could not be leased) (HM Government, 2019). This suggests that setting the minimum at the current average of the building stock (3-star) could be too burdensome, and a minimum level that only affected the worst performing of the housing stock may be most feasible initially. Interestingly, research by Wrigley and Crawford (2017) found a high degree of support for rental property minimum standards amongst both tenants (90% in support) and landlords (70%).

#### 4.1.2 Environmental performance disclosure

Environmental performance disclosure (EPD) was strongly supported as a policy tool by several respondents, with mandatory rather than voluntary disclosure seen as the preferable option. EPD was generally seen as a policy response that was both desirable and feasible.

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<sup>1</sup> The star rating refers to the NatHERS energy rating for new buildings, so is used as a proxy for performance of existing buildings in the responses. There is no standard method for rating environmental performance of existing residential buildings in Australia.

*I think this is a must... and it has to be mandatory [R2]*

*YES YES YES! ... I believe this is necessary [R2]*

The successful implementation of disclosure programs in the ACT (Australia), European Union, and for commercial buildings, were highlighted as demonstrating the feasibility of this measure. It is seen as a desirable means of empowering tenants to choose homes with better environmental performance through providing such information. This would provide a market signal to which landlords could respond, and also aligns with UK research in which the majority of landlords believed that a good performance rating is important for their investment (Miu and Hawkes, 2020).

A number of respondents had concerns about whether disclosure of environmental performance would alter the decision-making of tenants, and emphasised the need for public education campaigns to improve effectiveness.

*I do not see energy performance as a big decision maker when choosing a rental [R2]*

Disclosure was perhaps seen as being most effective in conjunction with other policies, such as financial incentives to perform upgrades, or as an effective precursor to the introduction of minimum standards in rental properties.

*...national mandatory disclosure for all building at sale or rental under the same scheme - be it existing NatHERS (at least to begin with even with its faults); then in three years time, move to minimum requirements in which they have a 3 - 5 year period in which to meet minimum requirements, e.g. three star [R3]*

Whilst the introduction of a disclosure program would require ongoing government oversight to ensure trust in the scheme, some respondents noted a whole industry would be created around the assessment and reporting of building performance.

*To set standards, benchmark & provide data it would be difficult and potentially costly [R2]*

*This does create a whole industry around the assessment and reporting of performance. [R2]*

The potential consequence of such a policy leading to raising of rents was noted

*There are concerns that implementing energy efficiency measures could raise rents (even if they lower the ongoing running costs) and/or that any costs of implementing mandatory disclosure and minimum standards would be passed on to tenants [R1]*

However, the existing literature suggests that while rents may increase for better performing properties (Lang, 2016), it may also lead to price decreases for lower performing properties (BioIntelligence Service et al., 2013).

#### 4.1.3 Grants, subsidies, and rebates

Rental properties are viewed through the prism of investments. Therefore, any money spent must make financial sense for the landlord. Rebates and subsidies can improve the economic justification for landlords who may have capital available to improve energy efficiency (EE), and can also make EE upgrades viable for the many landlords who do not have access to sufficient capital for upgrades.

*Most private landlords would have financial returns in mind, so unless there are financial incentives - whether that comes from the government as a subsidy, or in the form of increased rental returns - I would say there would not be much else that would encourage sustainable retrofits. [R1]*

Respondents discussed rebates and subsidies in two categories: subsidies that encourage EE in a necessary purchase (e.g. replace hot water system), and subsidies that stimulate retrofits that would not be occurring otherwise. A key benefit of rebates is that they were seen as a type of policy that government has experience in administering. They were also discussed as being a useful complement to other policies such as minimum standards or mandatory disclosure. Experts believed that, in isolation, subsidy or rebate is insufficient to stimulate EE upgrades.

*Subsidies such as this will encourage a subsection of landlords to engage in retrofitting. Our experience of similar programs suggests it will not move the majority of landlords. [R2]*

This reflects findings from the literature, which evidenced high rebates or subsidies being required to stimulate uptake, and which highlighted the importance on non-financial factors, including complementary policies (Hamilton, 2010; Williams, 2008)

Concern was expressed that rebates can lead to increased prices in some instances. Finally, an issue relevant for many policy options, is the political difficulty of offering financial advantages to landlords who are already perceived as being in a financially good position as owners of investment property.

#### 4.1.4 Taxation policy

Respondents suggested several changes to taxation policy that could be implemented to encourage landlords to improve the energy efficiency of properties. A key suggestion was

allowing energy efficiency improvements or retrofits to be claimed as tax deductions (the current system only allows deductions for like-for-like replacement, rather than improvement). This policy option was found to be the most popular by Wrigley and Crawford (2017), supported by 90% of both landlords and renters.

A number of respondents suggested links between EE taxation changes and negative gearing (when returns in rent payments and other associated costs are less than loan interest payments, the landlord can claim the difference on their personal income tax). Experts suggested either limiting negative gearing to properties that met minimum EE standards, or replacing negative gearing with new EE-focused taxation policy. This again supported the need for a suite of complementary policies.

*Generous tax concessions have shaped today's property market and it is important that as a society we agree on a minimum viable product (housing standard) and only those houses that meet the product standard can continue to receive this tax concession (negative gearing). [R3]*

This linking of EE minimum standards to broader tax concessions was something not widely discussed in the literature, which tended to focus on more specific taxation policies (Williams, 2008).

Some respondents suggested taxation changes that penalise vacant properties to increase the number of rental properties on the market and stimulate competition, or taxation policies that would shift property values for landlords from being asset-based to being use-based.

#### 4.1.5 Improved rental rights

Less than a quarter of respondents considered this policy important. Increasing the prevalence of longer-term leases in the rental market, from the current 6-12 month leases to 5-10 years, or

even 25-year leases, was identified as a way of allowing tenants to upgrade the property themselves and reap the rewards:

*In our experience tenants generally would be open to the possibility (depending on their capacity to afford the upfront costs) of carrying out retrofitting where they can be assured of the long-term use of the improvement. [R1]*

To have an impact on energy efficiency upgrades, tenant rights to make changes to the property (e.g. the building fabric) would also need to exist. Some respondents thought that the key factor was not increasing standard lease terms, but giving renters greater security of tenure by making it harder for a lease to be terminated without cause. This would both allow tenants to consider their own upgrades, but also in many cases to request basic repairs to the property.

*Tenants in these situations are very disempowered, and often do not ask for even the most basic repairs for fear of being evicted. [R1]*

*Tenants don't have security of tenure which means that it does not make sense to pay to improve the energy efficiency of a dwelling themselves when they don't know how long they will be able to remain living in the home.*

[R1]

Experts also identified the incentive effect that long-term leases may have on landlords, as the additional certainty of income and lower changeover costs may encourage greater investment from the landlord.

Respondents thought that appropriate changes to tenancy conditions could provide additional certainty that may encourage some upgrades of rental properties, supporting assertions in previous research (Nelson et al., 2019). However, the magnitude of impact is likely to be

minimal given that the proportion of tenants wanting long-term leases that would also pursue environmental upgrades is potentially quite small.

#### 4.1.6 Energy Efficiency Loans

Specific low-interest or interest-free loans for environmentally sustainable retrofits were the least commonly discussed policy approach amongst respondents. This is somewhat surprising, given the multiple existing examples of this kind of incentive covered in the literature (e.g. Energy Sage, 2019; Solar Victoria, 2019; Sustainable Living Tasmania, 2020). Respondents identified the key aspect of this kind of loan is to *'spread the capital cost over a longer term and match cash outflow with savings'*, thereby removing the upfront capital barrier. Respondents who mentioned this policy generally suggested a mechanism to allow additional draw on existing mortgage loans to finance energy efficiency retrofits (low-interest loans), with direct government interest-free loans also mentioned.

*Obtaining finance should be no more complicated than a top up of an existing home loan as long as there is sufficient security and income to support the loan repayments [R3]*

#### 4.1.7 Innovative financial arrangements

A range of mechanisms which allow the funder (e.g. landlord) of an energy efficiency upgrade to also receive a portion of the benefit provided by reduced energy costs could be made available. Arrangements that were discussed included:

*Shifting responsibility for energy supply of a rental property from tenant to owner [IDI]*

*A form of the existing 3-star water saving initiative...whereby landlords could only require tenants to pay for electricity if the house met a certain*



*standard (e.g. all appliances 5-star, or met a certain building performance level) [R1]*

*Forms of power purchase agreements (PPA) between tenants, landlords and a 3<sup>rd</sup> party for rooftop solar PV. e.g. Darebin Council has a project that collects payment for rooftop PV over time through the council rates.*

[R1]

Such arrangements could provide investment certainty, rather than relying on expectations of future rent increases or capital gains that are subject to market forces. However, these financial arrangements do not overcome the requirement for upfront cost investments which can be a major deterrent for non-essential upgrades. Tenant enthusiasm for and acceptance of these kinds of arrangement are uncertain, as this model could be perceived as locking in a fixed cost where tenants are accustomed to some level of control (power and water bills). These types of financial arrangements were often covered in the literature (Bird and Hernández, 2012; Hope and Booth, 2014; Williams, 2008; Wrigley and Crawford, 2017), and by the research respondents. As highlighted in previous research, the use of independent third-party auditing is key for system integrity and trust (Daly et al., 2014); local government was the only trusted third party mentioned in responses.

## 4.2 Voluntary or mandatory policy initiatives

Of the experts that answered the questions on voluntary or mandatory policy initiatives ( $n=32$ ), 81.3% preferred mandatory minimum environmental performance standards, and ( $n=31$ ) 77.4% preferred mandatory energy disclosure. This strong level of support for mandatory regulations was present for both investment orientated and environment orientated experts. Mandatory minimum environmental standards (Table 4a), and mandatory energy disclosure

were, respectively, desired by 11 or 73% (Table 4a) and 10 or 67% (Table 4b) of investment orientated experts.

*Table 4a: Cross tabulation of minimum environmental standards*

	Orientation		
	Investment	Environment	Total
Mandatory	11	9	20
Voluntary	4	0	4
Total	15	9	24

*Table 4b: Cross tabulation of energy disclosure*

	Orientation		
	Investment	Environment	Total
Mandatory	10	9	19
Voluntary	5	0	5
Total	15	9	24

This emphasis on mandatory over voluntary is evidenced in the following quotes from the experts, which highlight the need for mandatory, or ‘stick’, policies in the development of an effective policy mix for moving to a more environmentally sustainable rental sector:

*I don't think there is any point in setting voluntary minimum standards, especially when there is not a clear immediate gain for the landlords in implementing. [R2]*

There is not a consensus in the literature about whether policies on disclosure and minimum standards are best implemented as voluntary or mandatory (Wrigley and Crawford, 2017). Burfurd et al. (2012) found that, in most areas, voluntary disclosure programs will be just as effective as mandatory ones, however voluntary disclosure may lead to lower levels of tenant participation. There is, however, a strong argument that mandatory schemes are better suited to delivering improvements at the lower end of the rental market (Telfar-Barnard et al., 2017). Fuerst et al. (2018) found that a ‘lemons’ market was evident for rental properties in the context of energy efficiency ratings in the ACT which was ‘de-facto voluntary’ for rental properties. There was no incentive for owners to disclose ratings for poorly performing properties. They concluded that it was preferable to make disclosure mandatory to prevent these issues. Australian-based survey research found there is clear support from both tenants and landlords

for mandatory minimum standards for rental properties (Wrigley and Crawford, 2017). The findings of the current study support this outcome, indicating strong support across different stakeholders for implementation of mandatory policies. Another possibility is a combination of voluntary and mandatory (Lee and Yik, 2004), or a staged approach in policy implementation (COAG Energy Council, 2019). Recent Australian work considering options to improve existing residential buildings, which included consultation with over 600 stakeholders, modelled a staged approach to implementing disclosure (COAG Energy Council, 2019). This suggested a practical policy pathway which implemented voluntary disclosure for a 3-year period before the policy became mandatory.

### 4.3 Feasibility and effectiveness of the policy areas

To further understand the appropriateness of the different policy options, the expert panel were asked to rank policy initiatives according to their perceived ease of implementation and the perceived likelihood that the initiative would result in a reduction of CO<sub>2</sub>. Across the whole sample, the highest ranked policy for reducing CO<sub>2</sub> was minimum energy standards, with tax incentives being second, and environmental/energy performance disclosure third. Minimum energy standards and tax incentives were also ranked highly in terms of ease of implementation (2<sup>nd</sup> and 3<sup>rd</sup> respectively). Participants with an investment orientation considered financial measures (rebates and grants, loans and tax incentives) as the easiest to implement, followed by minimum energy standards. However, these participants considered minimum energy standards as most effective at reducing CO<sub>2</sub>. In contrast, participants with an environmental orientation ranked minimum energy standards and environmental/energy performance disclosure as both the easiest to implement and the most effective at CO<sub>2</sub> reduction, these were followed by tax incentives.

As a policy initiative is unlikely to achieve its objectives if it cannot be implemented, we combined the ranks for ease of policy implementation with effectiveness at reducing CO<sub>2</sub> to provide an overall score that was then ranked (Table 5). This was calculated for the sample overall and within each philosophical orientation. These combined scores reveal that across the whole sample, minimum environmental standards are the policy measure considered most likely to have an impact. Regardless of orientation, both carrot and stick policies are included in the top three most effective policies. This highlights an emerging trend from the data (expanded on in the following section) of a need for both carrot and stick policies in a coherent policy mix.

*Table 5: Ranking the effectiveness of the different policies*

		Carrot Policies		Cusp Policies			Stick Policies	
		Tax incentives	Rebates and grants	Energy efficiency loans	Innovative financial arrangement	Improved rental rights	Minimum environmental standards	Energy/ Environmental performance disclosure
Total sample	Combined rank (Ease & CO <sub>2</sub> reduction)	<b>3</b>	<b>2</b>	5	6	6	<b>1</b>	4
Investment orientation	Combined rank (Ease & CO <sub>2</sub> reduction)	4	<b>1</b>	<b>3</b>	5	7	<b>2</b>	5
Environmental orientation	Combined rank (Ease & CO <sub>2</sub> reduction)	<b>3</b>	6	4	7	4	<b>1</b>	<b>2</b>

*Note: 1 represents the highest combined rank and 6/7 represents the lowest combined rank*

#### 4.4 The policy mix

Many experts identified a need for policies to be implemented in combination in order for them to be effective, and this is supported in the literature (Burfurd et al., 2012; de T'Serclaes and Jollands, 2007; Wrigley and Crawford, 2017). There was a clear preference from the experts to include both incentive-based policies and mandatory legislative policies, or as we refer to them, carrots and sticks:

*An effective balance between incentives and minimum standards are most likely to have a positive influence on landlords improving the environmental sustainability of their premises. [R1]*

*Minimum household standard (stick) with floating rates (or taxes, etc), combined with various incentives (carrot). [R2]*

*There is no single solution, it is a combination of mandatory standards, mandatory disclosure of performance, education (owners and renters), security of tenure and capacity for renters to implement some retrofits.*

[R2]

*Minimum standards coupled with incentives would motivate an upgrade of the entire housing stock. [R2]*

Further, the need for a policy mix was identified in a content analysis of the qualitative responses from the experts over the three rounds of the Policy Delphi study. Table 6 shows a summary of the number of experts who referred to the policy option being needed to improve the environmental sustainability of the rental houses sector. Appendix 1 provides a breakdown of the content analysis by each individual expert on the panel to highlight the range of policy options presented. The four policy options that received the greatest number of positive mentions were the two carrots (rebates and grants (14) and tax incentives (12)) and the two sticks (minimum environmental standards (12) and energy performance disclosure (8)). Overall, experts suggested, on average, 2.31 policies, with investment orientated experts identifying, on average, 2.38 policies, and environmentally orientated experts 2.20 policies. Ten of the 26 experts included at least one stick and one carrot in their narrative. Interestingly, nine investment-orientated experts identified a need to have at least one stick policy. When this finding is coupled with the previous findings, on the need to have mandatory rather than

voluntary policies, there is a line of reasoning emerging that stakeholders want government action on this agenda, they are looking for leadership, and to be directed to comply.

Table 6: Summary of policies favoured by participants

No:	Philosophical Orientation	Carrot Policies		Cusp Policies			Stick Policies	
		Tax Incentives	Rebates and incentives	Energy efficiency loans	Innovative financial arrangement	Improved rental rights	Minimum Standards	Energy Performance Disclosure
16	<b>Investment Orientation</b>	9	11	2	3	3	5	5
10	<b>Environmental Orientation</b>	3	3	1	2	3	7	3
26	<b>Total</b>	12	14	3	5	6	12	8

Further evidence suggesting a need for a policy mix that includes both carrot and stick policies is presented in Table 7. This table shows the findings from a quantitative question in Round 2 of the Policy Delphi, where respondents rated out of 100 their corresponding belief of the desirability and feasibility of the policy initiatives. Remarkably, all mean scores were over 50 (100 being the highest), with the exception of the investment-orientated mean for the feasibility of minimum standards, which was 49.4. As expected, the desirability of the stick policies was above 80 for the environment-orientated experts, similar to the carrot policies as ranked by the investment-orientated experts, with scores over 80. However, investment orientated experts still rated the desirability of stick policies highly (Minimum Environmental Standards 67.9: Energy Performance Disclosure 74.9). This is the same for environment-orientated experts, in relation to carrot policies (Rebates and Grants 61.7: Tax Incentives 71.3). This suggests that within the expert panel there was no strong pushback against any policy area, whether a carrot or stick policy.

Table 7: Desirability and feasibility of carrot and stick policies

	n	Total Sample Means	n	Investment Orientated Mean	n	Environment Orientated Mean
<b>Carrot-Rebates and Grants</b>						
Desirable	32	76.0	15	80.0	9	61.7
Feasible	32	64.9	15	67.7	9	62.0
<b>Carrot-Tax Incentives</b>						
Desirable	32	77.8	15	80.9	9	71.3
Feasible	32	65.2	15	64.6	9	71.3
<b>Stick-Minimum Environmental Standards</b>						
Desirable	32	70.0	15	67.9	9	85.0
Feasible	32	55.9	15	49.4	9	64.2
<b>Stick-Energy Performance Disclosure</b>						
Desirable	31	75.7	15	74.9	9	81.0
Feasible	31	60.0	15	56.5	9	64.8
<b>Average of:</b>						
Desirable Means		74.9		75.9		74.8
Feasible Means		61.5		59.6		65.6

In summary, the findings presented from this Policy Delphi study speak to the need to engage a policy mix which includes both carrot and stick policies, to achieve feasible and effective movement towards a more environmentally sustainable rental housing sector.

## 5 Conclusions and Policy implications

Seven policy areas for moving towards a more environmentally sustainable rental sector have been identified both in this research and from the literature (Table 1). These policy areas have been categorised as carrot-based policies, stick-based policies, or cusp policies. Building upon calls in the literature to develop policy mix solutions to solve this critical problem (Burfurd et al., 2012; de T'Serclaes and Jollands, 2007; Wrigley and Crawford, 2017), this research identifies the key policies to be included in a policy mix. It highlights the need to include both carrot and stick policies, activating both approach and avoidance motivations.

What does this research indicate as the optimal mix of policies? Data gained in Round 3 of the Policy Delphi study (Table 5) is graphically represented in Figure 1. This presents a cross continuum indicating where the experts positioned each of the seven policies in terms of ease of implementation and impact on CO<sub>2</sub> emissions. Ideally, policy initiatives that are both effective at reducing CO<sub>2</sub> and easy to implement should be prioritised. Policy initiatives that fulfil both criteria are in a 'green zone'. These policy initiatives are rebates and grants, tax incentives and minimum energy standards, while favourable loans and disclosure are close to that zone. Therefore, the key policies needed in the mix, as seen by the panel experts, include minimum standards (stick), tax incentives (carrot) and rebates and grants (carrot). However, the inclusion of policies for the disclosure of environmental performance (stick) should be considered for two reasons. Firstly, implementing minimum standards requires some form of assessment framework, whether star-rating or feature-based (Telfar-Barnard et al., 2017), which would also be central to the process of disclosure. Secondly, disclosure rated highly, particularly with the environment-orientated experts, in all other analysis techniques used on the data.



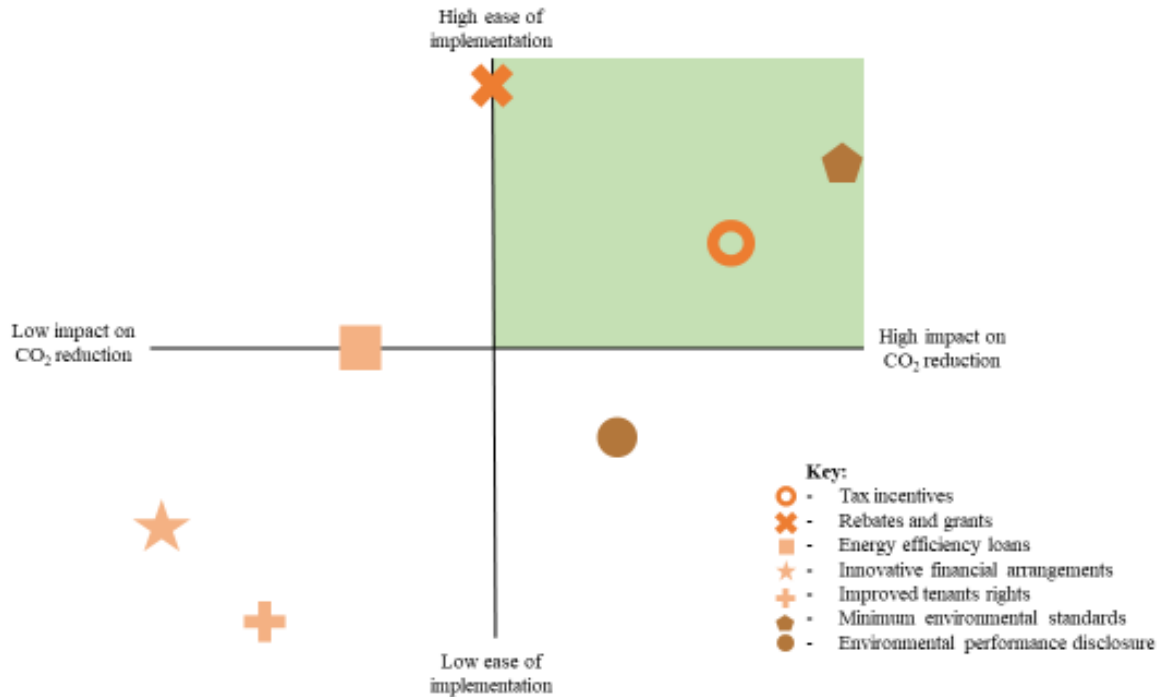


Figure 2: Cross continuum of the seven policies in terms of ease of implementation and impact on CO<sub>2</sub> emissions.

Note: Colour of symbol is in reference to the policy being either carrot, stick or cusp.

Embedding the extant literature with the findings from this research, a model emerges that incorporates the development of the policy mix, with the established enabling forces of communication, education and ease of use, to present a more coherent policy package. Figure 2 presents this three-phase model for developing and implementing a successful policy mix for the rental housing sector. As has become evident in this research, the first phase of this model involves the selection of multiple policy options. Within this selection it is advised that at least one carrot and one stick policy be included. Once the policy mix has been determined, the next phase of effective implementation is to blend the key enabling forces of education, communication, and ease of use into a policy package (Heffernan et al., 2020). Policymakers need to consider how the policy mix is communicated to key stakeholder groups, what level of information is needed to effectively educate stakeholders about the policy mix, and finally structuring the policies to enable ease of use by the intended stakeholders. The final phase of the model involves the launch and implementation of the policy mix utilising the correct

education, communication and ease of use strategies. As can be seen in Figure 2, the social, political and environmental context, specific to the location and time where the policy package is being introduced, will impact the three phases of this model.

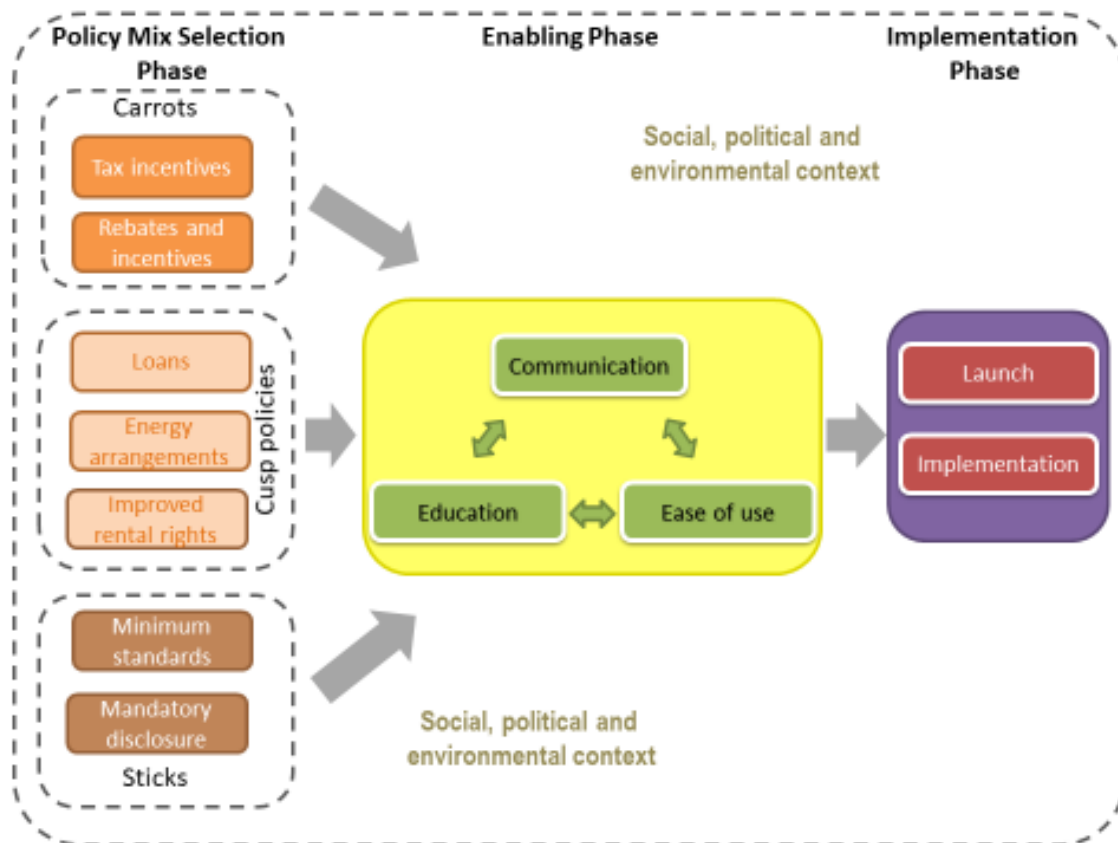


Figure 3: Model for moving towards a more environmentally sustainable rental sector

This study builds upon a strong foundation of international research which identifies various policy options for making rental houses more environmentally sustainable. Further, based on the opinions of a diverse range of experts, this study has moved towards identifying the parameters and components of an effective policy mix, thus helping to fill an important gap in the literature. In addition, when the findings of this research are coupled with the existing understanding regarding the enabling forces of education, communication and ease of use, a model emerges that can signpost policymakers towards effectively tackling this agenda.

There are, however, limitations to this study. While the Policy Delphi methodology was deemed the most appropriate for the research aim, the reliability and validity of the findings could be enhanced by extending this research using different methodological techniques. Increased reliability would be gained by undertaking the same study with experts in a different geographic region. Further research could also explore the success of different policy mixes for environmentally sustainable rental housing from around the world. Thus, identifying the specific policies used in the mix and garnering feedback on their successes and failures.

The impacts of climate change are being felt around the world (e.g. the extensive bushfires in Australia in 2019-20). To slow this threat to human existence, all sectors of the economy are going to have to identify and enact changes to reduce CO<sub>2</sub> emissions. The rental housing sector is one such area where, with political will, significant CO<sub>2</sub> emissions reduction can be achieved. This comes with an additional by-product of increasing the comfort and health of tenants. This can be achieved if policymakers select and implement the most appropriate policy mix. Building upon previous research, this paper has achieved its aim of enhancing policymakers' understanding of the available policy options and the appropriate combinations of these options to help move the rental housing sector towards a more environmentally sustainable model.

## **Acknowledgements**

The research upon which this paper is based was funded under The University of Wollongong, Faculty of Business 2017 Seed Grant program. The authors would like to thank the research participants for their time and insights, and the reviewers for their constructive comments, which have improved the quality of this paper.

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## Appendix 1

Policies identified to enhance the environmental sustainability of the rental houses sector, through content analysis of the qualitative data from the expert panel. A (1) in the policy columns indicate that the policy was identified by that panel member as important in enhancing the environmental sustainability of the rental sector.

No:	Philosophical Orientation	Carrot Policies		Cusp Policies			Stick Policies		Total per Expert
		Tax Incentives	Rebates and incentives	Energy efficiency loans	Innovative financial arrangement	Improved rental rights	Minimum Standards	Energy Performance Disclosure	
1	Investment	1	1						2
2	Investment	1	1			1			3
3	Investment	1	1	1		1			4
4	Investment	1							1
5	Investment							1	1
6	Investment	1	1				1		3
7	Investment								0
8	Investment	1	1		1				3
9	Investment		1				1	1	3
10	Investment		1					1	2
11	Investment		1		1	1		1	4
12	Investment						1		1
13	Investment		1		1				2
14	Investment	1		1					2
15	Investment	1	1				1	1	4
16	Investment	1	1				1		3
17	Environmental		1				1		2
18	Environmental		1		1	1	1		4
19	Environmental						1		1
20	Environmental							1	1
21	Environmental	1			1				2
22	Environmental		1				1	1	3
23	Environmental					1	1	1	3
24	Environmental	1		1					2
25	Environmental					1	1		2
26	Environmental	1					1		2
		12	14	3	5	6	12	8	60
No:	Philosophical Orientation	Carrot Policies		Cusp Policies			Stick Policies		Total Per Philosophical Orientation Grouping
		Tax Incentives	Rebates and Grants	Energy efficiency Loans	Innovative Financial Arrangement	Improved Rental Rights	Minimum Standards	Energy Performance Disclosure	
16	<b>Investment Orientation</b>	9	11	2	3	3	5	5	38
10	<b>Environmental Orientation</b>	3	3	1	2	3	7	3	22
26	<b>Total</b>	12	14	3	5	6	12	8	60