LOW CARBON LIVING CRC

Enhancing the Market for Energy Efficient Homes

Implementing a national voluntary disclosure system for the energy performance of existing homes

Australian Government
Department of Industry, Innovation and Science

Business
Cooperative Research
Centres Programme

COMMON CAPITAL

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Acknowledgments

Disclaimer

Foreword

This report is a deliverable for the Project RP3016: 'Enhancing the market for low-carbon homes at point of sale and lease' funded by the CRC for Low Carbon Living. This project is publicly known as the EnergyFit Homes Project: empowering consumers to recognise and value homes with better health, comfort and sustainability benefits and lower running costs.

The EnergyFit Homes Project seeks to develop a pathway for enhancing the market for energy efficient homes at point of sale and lease. The project takes a consumer-facing, end-user perspective to understand the most effective content, format, source and delivery of tools and other resources to engage the new and existing homebuyer and lessee market and drive a new value proposition in residential real estate. Using this information, the project will develop an Australian framework for a best practice voluntary rating system to measure and communicate energy efficient home performance at the point of sale and lease, and develop the business case and plan for implementation.

This report sets out the recommended implementation pathway and cost benefit analysis for a national voluntary disclosure system to measure, benchmark and effectively communicate information on the energy performance of existing homes, especially at the time of sale or lease. It draws on the eight earlier research streams from the project undertaken by CSIRO and Common Capital. These delivered original primary and secondary research into consumer, industry, policy and technical elements of residential energy performance measurement and communication. Detailed findings from these research streams are presented in the following CSIRO reports and Common Capital working papers:

Organisation	Research stream	Technical Report/Working paper
CSIRO	International literature review	Romanach LM, Jeanneret T, Hall N and Yip E (2014) *The EnergyFit Homes Project Working Paper 1: Literature review and gap analysis*, CSIRO, Australia.
	Consumer focus groups	Hall N, Jeanneret T, Romanach LM (2014) *The EnergyFit Homes Initiative Working Paper 2: Focus group results*, CSIRO, Australia.
	National consumer telephone survey	Romanach, LM., Jeanneret, T. and Hall, N. (2015), *The EnergyFit Homes Initiative Working Paper 3: National consumer survey results*, CSIRO, Brisbane.
	Building trades and professionals survey	Romanach, LM., Jeanneret, T. and Hall, N. (2015), *The EnergyFit Homes Initiative Working Papers 4 : Housing specialist and real estate industry survey results*, CSIRO, Australia.
	Real estate agent survey	
	On-line benefit framing message testing	Leviston, Z., Malkin, S., Green, M., & Gardner, J. (2015) *The EnergyFit Homes Initiative Working Paper 5: Message frame testing*, CSIRO, Australia
Common Capital	National energy information system benchmarking working paper	Clark, M., Potts, J. (2014) *The EnergyFit Homes Initiative Working Paper 6: Australian Information Systems for Household Energy Efficiency*, Common Capital. Australia.
	International rating tool benchmarking working paper	Clark, M., (2015) *The EnergyFit Homes Initiative Working Paper 7: International information Systems for Household Energy Efficiency,* Common Capital, Australia.
	Stakeholder mapping research working paper	Adams, H. Clark, M. (2015) *The EnergyFit Homes Initiative Working Paper 8: Home Energy Efficiency Stakeholder Map*, Common Capital, Australia.

This report provides recommendations on a detailed blueprint, budget, and implementation pathway for a national voluntary disclosure system and describes the public and private costs and benefits associated with its implementation.

These findings and recommendations are relevant to government, industry, research and community stakeholders interested in enhancing the value of low carbon homes at point of sale or rent through the establishment and operation of a national voluntary disclosure system

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Executive summary

This report presents a business case for establishing a national voluntary disclosure system to measure, benchmark and communicate information on the energy performance of existing homes, especially at the time of sale or lease, and provides recommendations on how to implement such a system.

It draws from the findings of eight research streams of the EnergyFit Homes project, which demonstrate a high level of consumer and industry demand and support for such a system, and describe the type of information consumers want disclosed.

Currently, homeowners and investor have little incentive to invest in energy efficiency because the value of this investment can not easily be conveyed to prospective purchasers or tenants. Similarly, these purchasers or tenants are unable to easily identify, at point of sale or rent, which homes will have low energy running costs or which improvements will be most cost effective for them to implement.

EnergyFit Homes research found that around 90% of housing consumers surveyed consider it important to have information on the energy efficiency of homes as part of sale and lease processes, with more than half willing to pay a modest amount for it. Consumers considered the best times to receive this information were as part of a building inspection report, at house inspections and in sale/rental advertising. Also, around 90% of building professionals and tradespeople support providing energy efficiency information at sale or lease.

These and other findings provide an evidence base to develop and implement a **national voluntary disclosure system**. They demonstrate that for the system to be effective, the ratings need to be low-cost, easy to use, and communicated as a star or bar rating complemented with tailored information on the benefits of energy efficiency delivered at point of sale or rent. The system should also enable consumers to conduct their own free "self-assessments to gain an understanding of the likely rating the home would receive ahead of the official accredited rating.

The analysis and business case presented in the report demonstrates that this approach can be achieved through (a) upfront investment in a rating system which focusses on user experience and rating repeatability, (b) following establishment administration, transitioning to a lean governance that capitalises on the many key stakeholders willing to invest in implementation, (c) delivering ratings through service providers such as building inspectors and rental property maintenance businesses, so they can be integrated into existing work practices and (d) a credible and effective audit and compliance system (f) tailored consumer awareness and engagement messages delivered at key moments.

The scope of the system is focused on the market for as built, existing homes. It could be applied to the 1.7% of homes that are newly built each year, which are already subject to regulatory minimum energy performance requirements. This also excludes medium to high-density multi-dwelling homes.

Our recommended design for a voluntary disclosure system would deliver a net public benefit of between $42 to $535 million, 158 GWh to 1,827 GWh in annual electricity savings and $63 million to $733 million in annual household bill savings, and $437 to $5,068 million for industry from additional investments in household energy efficiency. To realise these savings, the system requires a total seed investment of $6 to $7 million spread over the first five to eight years, after which time it will be self funding.

For a national voluntary disclosure system to succeed, it will need to unify stakeholders around a single ratings and information provision process. We found that there is strong support from stakeholders for this approach. Stakeholders were critical of past efforts that have seen the emergence of numerous rating system many of which lack the consumer focus that stakeholders are looking for.

Stakeholders believe the best way to progress this system is through a collaboration between government and industry. In particular, the system requires one or a small number of organisations to lead an open and fast moving process that others can sign on to as the system is implemented.

The EnergyFit Homes project is the result of $0.62 million investment by the CRC and project partners – a demonstration of the growing consensus for a national voluntary disclosure system. With the release of this report, the next steps are to present it to key stakeholders and to invite feedback. Through this engagement, interested parties will be invited to identify the level of involvement they wish to have in progressing this initiative.

Key findings and recommendations

This report presents a business case for establishing a national voluntary disclosure system to measure, benchmark and communicate information on the energy performance of existing homes, especially at the time of sale or lease, and provides recommendations on how to implementation such a system.

This business case is informed by eight research streams of the EnergyFit Homes project which:

- Demonstrate that housing consumers and industry support energy efficiency disclosure; and
- Describe the type of information consumers would like disclosed.

From this business case, the report recommends:

- The most appropriate system design and governance arrangements for a national voluntary disclosure system;
- The type of marketing needed to drive a critical mass of energy ratings, to ensure the system succeeds; and
- How to implement the national voluntary disclosure system, including the next steps to further develop the business case presented in this report.

Each of these points is expanded on below and described in detail in the body of the report.

Evidence that consumers and industry support energy information disclosure

The eight EnergyFit Homes Project research streams consistently found high consumer and industry demand for the disclosure of information on the energy efficiency performance of existing homes:

- 92% of housing consumers surveyed consider it important to have information on the energy efficiency of a home when buying or renting, with the best time to receive this being as part of a building inspection.
- There is also strong interest in receiving energy information at house inspections (83%) and home sale/rental advertising (72%).
- 89% reported that they would find a home more attractive to buy or rent if they were told that it was an energy efficient home
- 57% would be willing to pay for energy efficiency information (of those, 45% would pay up to $250)
- More than 90% would also like energy efficiency information during renovation planning with architects and builders and when browsing products
- Consumers considered homes with high energy efficiency ratings (as presented in online advertising) as significantly more valuable than equivalent homes with no information about energy efficiency ratings
- Consumers were more attracted to homes with high energy efficiency ratings (when these were presented as stars or bars and combined with Liveability Real Estate Framework[1] style benefits, tailored to likely values and lifestyle segment of the consumer) than equivalent homes *even when* the equivalent home contained additional non-energy related desired features.[2]
- 90% of building professionals and tradespeople agreed that 'information about the energy efficiency of a home should be provided at the time of sale or lease'.
- In European and American jurisdictions where energy efficiency performance is disclosed to buyers, the value of home increases with energy efficiency performance by between 3% and 14%
- None of the 22 existing Australian home energy efficiency information systems meet consumer and other stakeholder requirements for a national standard of disclosure, but many could be readily adapted to
- There is widespread support across stakeholders in government, industry, consumer groups, and research organisations for developing a new national voluntary disclosure system.

The type of information consumers want disclosed

EnergyFit research and consultation established that there is high consumer demand, and stakeholder support for a national voluntary disclosure system. Research findings on the content, timing, source and forms of information required to meet consumer need are summarised in Figure 1 and explained below.

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[1] The Liveability Real Estate Framework is a property marketing framework that allows the real estate industry to identify and integrate 17 liveability property features during a property sale or lease. It is an initiative of the Centre for Liveability Real Estate. See: http://www.liveability.com.au
[2] Refer p31 of Leviston, Z., Malkin, S., Green, M., & Gardner, J. (2015). The EnergyFit Homes Initiative: Message frame testing. CSIRO, Australia

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Key requirements for a voluntary disclosure system for home energy performance

| What information? | Base-building energy i effic ency | + | Reproducible & Comparable | + | Performance explanation | + | Action orientation | + | Tailored benefits framing |

| At what points? | Sale process | + | Leasing process | + | Broader property lifecycle |

| From what sources? | Authoritative endorsing body | + | Designed for building inspectors | + | Open to all building trades & professions | + | Engagement with Real-estate agents | + | Informal Self assessment |

| In what form? | Discrete star rating benchmarks | + | Low cost certification & free self assessment | + | Key performance features & actions | + | Facilitated delivery |

What information	• Objectively measure and benchmark base building energy efficiency:
	o energy performance fixtures (insulation, windows, lighting, fixed appliances, and onsite generation) which are readily improved through refurbishments;
	o their interaction with site characteristics (climate zone, orientation, building fabric, etc) which influence the relative importance of fixtures, and require more substantial renovations to improve;
	o excludes removable fittings (non-fixed appliances) which account for around 35% of energy use[3], but are not relevant for communication with third party buyers or tenants who will bring their own different appliances
	• Information needs to be reproducible – if different parties measure the same home, they should reach the same conclusion
	• Information need to allow consumers to compare the relative performance of one house with others of similar size and locations
	• Performance information needs to be supported with additional explanatory information that consumers can understand and verify (e.g. the key features that underlie a performance result)
	• Performance information should be supported with, tailored action oriented tips to improve performance for a specific house
	• Communicate broader, more subjective benefits (comfort, property value, bill savings, sustainability) framed in ways that are tailored to resonate with values and priorities of different market segments
	• Excludes high-rise apartments – base-building performance for this is best dealt with through a performance rating such as the National Australian Built Environment Rating System (NABERS)
At what points	• Information should be able to be provided and relevant throughout the sale and lease process (not just the end) and throughout the broader property lifecycle (incl. renovations, appliance purchasing, energy cost management)
From what sources	• Must be endorsed by an authoritative, national body (which may be a government body or a body with government and non-government stakeholder representation) and delivered by the broad cross section of property trades and professions who are involved across the above decision points.
In what form	• Formally certified ratings, date stamped with periods of validity
	• Packaged with layered supporting information on performance explanation and improvement actions
	• Online and physical form
	• Informal self-assessment/ratings estimates
	• Personally facilitated explanation of ratings benefits (tailored benefits framing)

Recommended governance for a voluntary disclosure system

The report recommends that government, industry, research and consumer groups work together to establish and operate a voluntary national voluntary disclosure system.

The proposed mission of this system is to provide authoritative, accessible and reliable consumer information that facilitates step transformations in the energy efficiency of Australia's existing homes.

To achieve this mission, the system must drive uptake of both energy efficiency ratings and energy saving actions. This requires governance to ensure the relevance, accessibility, integrity and reproducibility of information.

Governance of this system should involve an open, collaborative and authoritative governing board, an administrator, and the technology and marketing support to drive market delivery of ratings and information. The board would be responsible for setting system objectives and performance indicators. The administrator would be responsible for monitoring and ensuring that delivery partners achieve these objectives. Delivery partners would have authority and incentives to innovate to improve reliability, affordability and uptake of ratings.

The roles of the main actors in the proposes system are as follows:

Board

The governing board is the final decision making body for the endorsing body. It is responsible for setting and supervising the *strategic* direction of the system. Working groups will assist the board to establish and govern the system. We propose that the endorsing body initially establish three working groups with responsibility and membership

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[3] Commonwealth of Australia (2008) *ENERGY USE IN THE AUSTRALIAN RESIDENTIAL SECTOR 1986 – 2020; p25*

split across different areas of specialist expertise. These areas are (1) user experience and marketing; (2) technical building energy performance measurement and rating; and (3) system governance, policy and stakeholder management.

Administrator

The main roles of the administrator are secretarial support for the board and working groups, and providing operational control through contract management of third party delivery partners. The priorities for operational control are compliance, marketing and providing supporting technology, such as a website.

Delivery partners

There are three main sets of delivery partners: system operator, accredited ratings assessors and real estate agents. The system operator is contracted to the administrator to develop and manage the core rating system on a day-to-day basis. Accredited assessors are responsible for promoting and delivering certified ratings to individual housing consumers. Liveability Real Estate Specialists[4] are crucial intermediaries, who facilitate consumers understating of the value of homes and features.

Figure 2 below provides an overview of the main parties involved in the proposed system and their high-level relationships

Figure 3 below sets out the recommended competencies, accountability levels and responsibilities by actor.

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[4] Real Estate Agents trained in the Liveability Real Estate Framework. See: http://www.liveability.com.au/about

System governance and operating arrangements
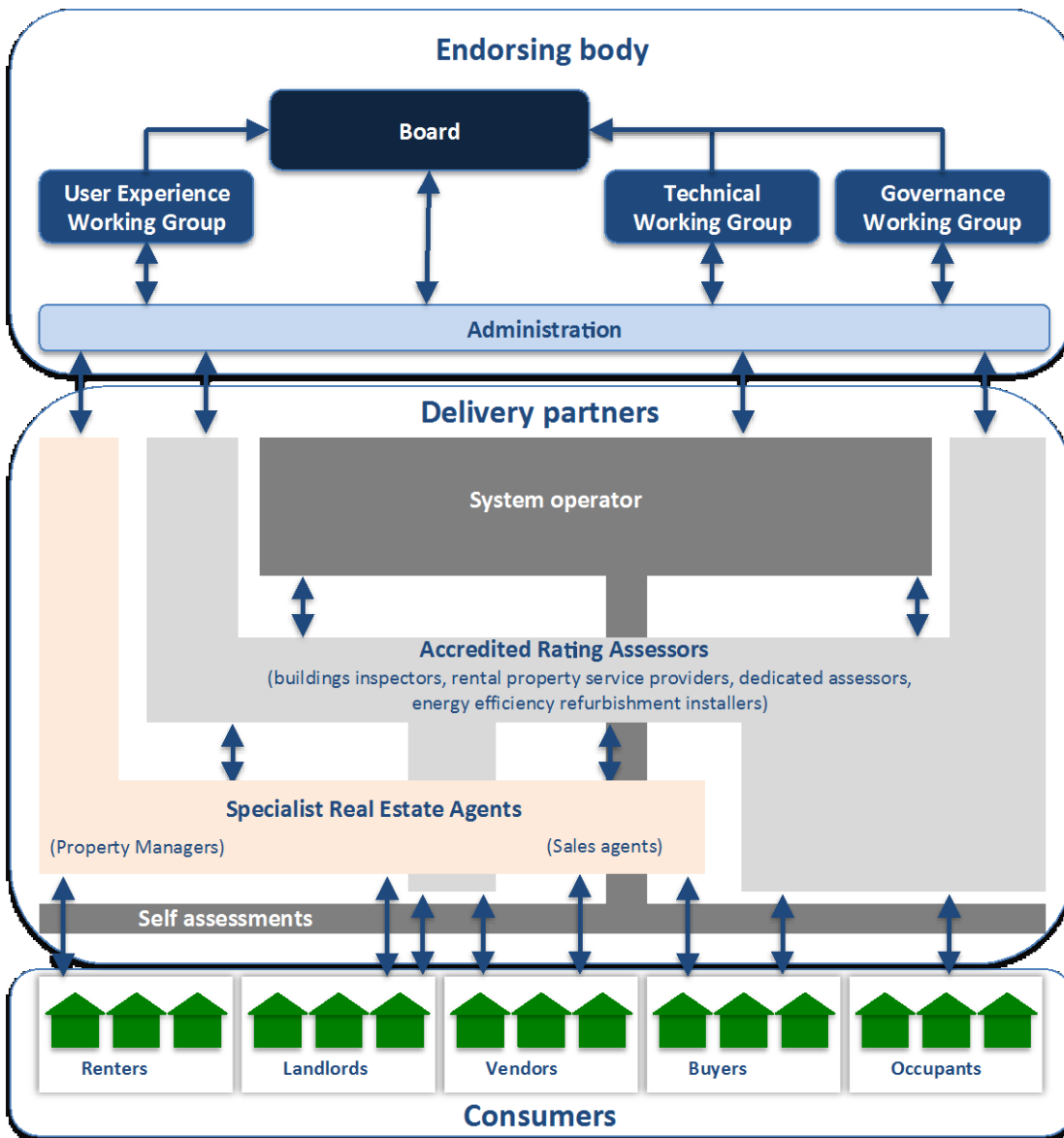
Figure 2 Recommended governance and operating arrangement

Figure 3 Component business model for recommended voluntary disclosure system

Figure 3 below illustrates our recommended allocation of roles and responsibilities using a component business model. This model has three levels of accountability:

Direct   Components at this level provide strategic direction and corporate policy to other components. They also facilitate collaboration with other components.

Control   These mid-tier components serve as checks and balances between the "direct" and "execute" levels. They monitor performance, manage exceptions and act as gatekeepers of assets and information.

Execute These "boots on the ground" components provide the business actions that drive value creation in the enterprise. They process assets and information for use by other components or the end customer.

Accountability level	System competencies			
	Demand generation	Information design and development	Information delivery	Information integrity
Direct	Marketing strategy	Rating system principles	User experience principles	Rating reproducibility principles
Control	Marketing and brand management Monitor and report demand	Functional specification for rating system Rating design Information product content Ensure rating relevance	Assessor accreditation Assessor training Data capture rules Assessor compliance Monitor and accessibility & experience	Rating assessor accreditation System level quality assurance Input data Evidentiary standards Rating level reproducibility Assessor level reproducibility
Execute	System promotion Customer priming Direct rating sales Web presence Demand tracking	Energy consumption model Rating benchmark calculations Rating tools & systems Information product development Model & benchmark updates	Conduct ratings assessments Certify ratings Self-assessment Information provisiony Value communication	Rating management system Assessor management system Input data validation Rating conversion tracking

Key:	Board	Administrator	Delivery Partners		
			System operator	Accredited assessors	Specialist Real estate agents and Property Managers

Recommended marketing to drive a critical mass of ratings

Stakeholder consultation and cost benefit analysis found that a well funded and executed marketing plan is essential for the system to reach the critical mass of consumer and industry adoption necessary to succeed. We recommend that the administrator and board develop such a plan, based on the following outline.

Target market and segments

The primary markets for this system are renters, landlords, vendors, buyers and occupants of existing freestanding, semi-detached and low-rise flat/unit homes across Australia. These segments can be further divided by consumer attributes (life stage, values, socioeconomic factors, etc.) and property type. The information priorities for consumers are also likely to vary depending on the touch point that triggers their interaction with the system. These variations in consumer sub-segments have implications for the required message framing, promotion and distribution of ratings and information products.

Home energy efficiency ratings and information products will be used to communicate information to third parties (e.g. from vendors/landlords to potential buyers/renters) and for first party use (e.g. owners and occupants). These parties are likely to cut across a wide range of the different consumer segments and sub segments. Ratings need to be designed in a way that they will be easily recognised and understood by a range of consumers with different needs, value and priorities.

Products and pricing

To address these needs we recommend two main products: (1) formal certified ratings with explanatory information and (2) informal ratings estimates. The price of formal ratings would be set by the market, but we estimate they would be in the order of $100-$200. Informal estimates would be free.

Table 1 Proposed products and price structure

Product	Features	Price Structure
Formal Certified Rating + Information products	Rating • Formal star rating scale • Benchmark base building energy efficiency relative to similar homes • Certified by endorsing body – real time certification through web portal • Non-transferable sticker and /or printed/emailed certificate with address • Include issue date, and period validity Information products Supporting information to provide context and evidence for ratings, e.g.: • Key features/lack of features behind rating • Actions to improve ratings • Explain rating basis (e.g. baseline energy, with accuracy range)	• Set by market. Research suggests likely range $100 to $200 • Of this, the ratings assessor pays the system administrator $13 to $39 in administrative fees • Recommended system design requirement seek to ensure ratings can be delivered in 30 minutes or less. • Potential for ratings to be bundled/discounted/waived as part of delivering related building products and services
Informal Ratings Estimate + Information products	• Estimate of number of stars that would be achieved in a formal rating • Self-assessment/informal assessor completion • System generated estimate without certificate • Unlimited scenario modelling per house • Information products as per formal rating	• Free • No administrative charge

To be effective, a rating will need to include three key components:

- a means of measuring the energy performance of a home in a reliable and repeatable way;
- a means of using the measurements to benchmark the performance of home relative to equivalent homes
- a means of communicating the energy performance and comfort potential of the home to third parties in a universally trusted way.

This is discussed further in Section 5.2

Also, a rating will need to be simple, so that (a) it can be easily completed by ratings assessors with minimal training, (b) it can easily be verified through quality assurance activities and (c) the costs of ratings can be kept to a minimum. Upfront investment in a rating system that has particular emphasis on usability and repeatability will be key to attaining this.

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Distribution and delivery

The proposed operating model involves a combination of direct and indirect distribution through industry delivery partners. Certified ratings would be delivered in person by on site ratings assessors, using web applications on tablets or laptops. Informal ratings estimates could be delivered in the same way, online, or by phone. The system operator would be responsible for developing and maintaining the rating system.

Consumer awareness and engagement strategies

An effective promotional strategy is critical to establishing the system as a nationally recognised standard for consumers and industry. The system will achieve this through awareness and adoption by a critical mass of consumers and building tradespeople and professionals. A significant, consistent and sustained promotional effort is required to reach this critical mass. We recommend three pillars to this campaign:

1. Broad-based advertising (Inc. TV, web, etc. and linkages with national conversation)
2. Real estate agent engagement and advocacy (through the real estate industry developed Liveability Real Estate Framework)
3. Direct assessor promotions (supported with centrally produced collateral & training)

Costs and benefits of the recommended implementation model

Part II of this report investigates the costs and benefits of implementing a national voluntary disclosure system through the recommended implementation model.

In summary, this modelling shows that a seed investment of between $6 million and $7 million over five to eight years can establish a system that:

- After this time, will be financially self-sustaining; and
- Deliver net public benefits of between $42 million and $535 million.

Key features of the modelled system are:

Ratings costs

- The rating system, training and quality assurance allow for quality ratings to be completed in 45 minutes, with a rating fee of around $159 and associated costs (i.e., householder opportunity cost and real estate agent/property manager cost) of around $41 per rating.

Upgrade costs and benefits

- With this cost per rating, a maximum of between 57,000 and 170,000 homes per year will be rated, based conservatively on the willingness of housing consumers to pay for ratings at this price.
- A low level of ratings will occur during the early adopter phase (first three years) growing to half of the maximum market take-up after six years and 80% within 10 years.
- Energy efficiency improvements will be made to between 7.5% and 30% of the homes rated, based conservatively on the experience of the ACT's mandatory scheme and international schemes.
- Those who undertake energy efficiency improvements will spend between $5,500 and $9,600, and gain first year energy bill savings of between $1,000 and $2,000 per year. Energy saving opportunities modelled included lighting improvements, insulation, draft proofing, solar PV and water heating upgrades.

Administrative costs

- Following establishment administration, transitioning to a lean administration, comprising of a voluntary board and working groups and a system administrator consisting of 2.5 full time paid staff.
- $0.2 million one-off costs to establish administrator governance.
- System operator costs of around $500,000 in the first year and $200,000 per year for the first five years, and $300,000 (indexed) thereafter. First year costs include $0.5 million for the development of the rating system. It is likely these costs will relate to adapting an existing system (given the many products that exist that could be adapted for this purpose).
- $0.2 million over the first two years for developing and providing training.
- Between $2.3 million and $4 million total over the first five years for promotion, with the higher expenditure expected to deliver a higher number of ratings.

Administrative revenue

- Total seed funding of between $6 million and $7 million is needed over the first five to eight years to cover the costs of the system for this period – while the system is being established and the number of ratings conducted

ramps up. The higher level of funding will result a shorter time to cost recovery due to higher scheme adoption rates. Seed funding is higher in the first two years (year one $1.3-2.2m and year two $1-1.9m). For years three to five it is around $600,000 per year. After year five the scheme costs can be recovered from rating participants under high adoption rate scenarios, and for lower adoption rates seed funding ramps down as administration fees received from ratings assessors fund a growing share of system costs.

Recommended implementation road map and next steps

We recommend that a national voluntary disclosure system be implemented through the following five stages:

1. **Engaging key stakeholders** by discussing this report's findings and recommendations. Based on the significant stakeholder commitment throughout the EnergyFit Homes project, we anticipate that the outcome of this stage will be the formation of a core group of government and non-government stakeholders committed to contributing to and resourcing further development of the system. The objective of this stage is to secure a host organisation to establish and provide secretariat support for an industry-government strategic advisory panel, and technical working groups.

2. **Consulting and market testing** of the implementation model presented in this report. The objective of this stage is to validate the findings of this report and develop them into a form where they can be implemented. This stage involves establishment of the host organisation, advisory panel and working groups on governance, user experience and ratings. This advisory panel and working groups could potentially transition to permanent governance structure, with fair and transparent re-appointment processes in stage 3.

   This stage involves three key tasks, led by the host organisation with support from the advisory panel and technical working groups. The first is to validate the Energyfit Homes project recommendations regarding:

   • System governance and strategic policy objectives

   • Consumer needs and user experience requirements for ratings and information

   • Technical specifications required to deliver policy and consumer requirements

   The outputs of this work will be a validated objectives, a proposed governance design and charter, as wells as technical specifications and objective assessment criteria for a formal expression of interest procurement process.

   The second task of this stage will be to formally market-test the interest, capacity, tool functionality, development and operating costs of prospective service providers required to develop different operational aspects of the system. This would be done through a formal expression of interest tender, using the technical specifications and assessment criteria.

   The results of this process would be assessed to support decision making of the host and other organisations on provision of seed funding to implement the system. The outcomes of the expression of interest would also be used to design the formal second stage procurement process for stage 3.

   In this stage the host organisation and other partners could potentially also commence early stage marketing plan activities, particularly with respect to engaging the real estate industry to developing knowledge and demand for information on home energy performance.

3. **Forming overarching governance and engaging system operator.** This stage involves formalising the high level governance structures, specifically the system board, its working groups and the system administrator. It is possible that those participating in the stakeholder advisory groups may participate in one of the working groups. A key task for the administrator will be engagement, through a competitive procurement process, of the system operator. The system operator will be responsible for developing the rating system, training and accreditation processes needed to commence the system.

4. **Commencing operation of the national voluntary disclosure system.** A critical goal for the early years of the system will be the building of a critical mass of ratings and associated energy efficiency improvements. All parties - the board, administrator, system operator, accredited assessors and specialist real estate sales agents/property managers - will have important roles to play to achieve this.

5. **Reviewing system performance.** This detailed review will document evidence of how the system is performing against its intended objectives. In particular, it will consider how effective the system has been at building a critical mass of voluntary energy ratings and energy efficiency improvements. The review will also consider the merit of transitioning to a mandatory system – given that there continues to be stakeholder support for this policy approach. The outcome of this stage will be system improvements and recommendations to governments on the merit of a mandatory system.

We anticipate that engagement, consultation and market testing of the first two stages will take 6 months each to complete and a further six months to establish governance and engage the system operator.

Following this, the system will be soft-launched over a one-year period followed by implementation ramping up over three years. This ramp up period allows for the establishment of consumer and industry awareness and trust, and an opportunity to test and improve system features and performance with early adopters. Through this establishment period, we expect the system will gradually increase its market reach and impact. The review will be conducted once the system is operating effectively at scale.

We estimate that over a five to eight year period a total of between $6 million and $7 million of seed funding is needed to implement the system. Beyond seed funding, administration fees, paid by ratings assessors for each accredited rating completed, will be the primary revenue stream.

The seed funding will primarily be used to support governance establishment, ratings methodology development and system promotion. In combination, these elements will drive the uptake of energy ratings towards the critical mass needed to sustain the system. We anticipate that this critical mass will be attained within eight-years, after which the system will be self-funding.

Quality, low-cost ratings, lean administration and effective promotion are the primary means of driving the critical mass of ratings needed to achieve a self-sustaining voluntary system. A mandatory system, should this be introduced, is expected to drive greater uptake of ratings, potentially allowing the system to be self-sustaining in a shorter period.

The financial modeling contained in this report of the recommended voluntary system shows that a seed investment of between $6 million and $7 million over 5 to 8 years will yield a significant net public benefit of between $42 million and $535 million and provide industry with $437 million to $5,068 million in revenue from home owners and renters investing in energy efficiency upgrades.

Next steps

With the release of this report, the next steps are to present it to key government, industry and consumer stakeholders and to invite feedback on the report findings and recommendations. Through this engagement process, interested parties will be invited to identify the level of involvement they wish to have in the consulting and market testing stage and the level of resourcing they are able to provide to support this work.

The EnergyFit Homes project has identified a broad range of stakeholders who would make a significant contribution to the development of a national voluntary disclosure system. These include government and non-government stakeholders who have the interest and capabilities to contribute to the governance of the system, those with expertise in ratings systems, user experience and promotion and those with the capacities to provide system operator services.

The breadth of this available interest, expertise and capability significantly enhances the prospects of successfully implementing a national voluntary disclosure system, especially with a continuation of the collaborative approach taken by stakeholders throughout this project.

1 Introduction

1.1 About this report

The EnergyFit Homes Project seeks to develop a pathway for enhancing the market for energy efficient homes at sale and lease. The project has taken a consumer-facing, end-user perspective to understand the most effective content, format, source and delivery of tools and other resources to engage the sale and lease market for new and existing homes. Using this information, the project has developed a framework for a best practice rating system to measure and communicate energy efficient home performance at the point of sale and lease, and develop the business case and plan for implementing it.

A 2011 survey by the Clean Energy Council[5] found that almost nine in ten Australian households wanted to take action to reduce their household energy consumption. Despite this interest, most home owners, homebuyers and lessees do not consider the carbon performance of their future home. The numerous devices and rating tools that have been developed to monitor and motivate buyers and lessees of energy efficient homes have not, for a number of reasons, resonated with the market.

This report presents a strong business case for establishing a national system to provide information on the energy performance of existing homes and provides recommendations on how to design and implementation such a system. It draws on the findings of eight research streams of the EnergyFit Homes project. This research, conducted by CSIRO and Common Capital, explores consumer, industry, policy and technical elements of residential energy performance measurement and communication.

This report is a deliverable for the Project RP3016: 'Enhancing the market for low-carbon homes at point of sale and lease' funded by the Cooperative Research Centre (CRC) for Low Carbon Living. This project is publicly known as the EnergyFit Homes Project. The EnergyFit Homes Project seeks to develop a pathway for enhancing the market for energy efficient homes at sale and lease. CSIRO and Common Capital have led the project, with funding and guidance from the CRC, industry and government project partners.

This report sets out the recommended implementation pathway and cost benefit analysis for a national voluntary disclosure system to measure, benchmark and communicate information on the energy performance of existing homes, especially at the time of sale or lease. Part I and II of this report provide the final Common Capital deliverables for the project, these are:

Part I	Business plan and implementation pathway report
Part II	Business case and market impact report

The eight earlier research streams, undertaken by CSIRO and Common Capital, delivered original primary and secondary research into consumer, industry, policy and technical elements of residential energy performance measurement and communication. Detailed findings from these research streams are presented in the following CSIRO reports and Common Capital working papers:

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	Consumer focus groups	Hall N, Jeanneret T, Romanach LM (2014) *The EnergyFit Homes Initiative Working Paper 2: Focus group results*, CSIRO, Australia.
	National consumer telephone survey	Romanach, LM., Jeanneret, T. and Hall, N. (2015), *The EnergyFit Homes Initiative Working Paper 3: National consumer survey results*, CSIRO, Brisbane.
	Building trades and professionals survey	Romanach, LM., Jeanneret, T. and Hall, N. (2015), *The EnergyFit Homes Initiative Working Paper 4: Housing specialist industry survey results*, CSIRO, Australia.
	Real estate agent survey	Romanach, LM., Jeanneret, T. and Hall, N. (2015), *The EnergyFit Homes Initiative Working Paper 4: Real estate industry survey results*,

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[5] Clean Energy Council 2012, "Clean Energy Australia Report 2012" page 35

		CSIRO, Australia.
	On-line benefit framing message testing	Leviston, Z., Malkin, S., Green, M., & Gardner, J. (2015) *The EnergyFit Homes Initiative Working Paper 5: Message frame testing*, CSIRO, Australia
Common Capital	National energy information system benchmarking	Clark, M., Potts, J. (2014) *The EnergyFit Homes Initiative Working Paper 6: Australian Information Systems for Household Energy Efficiency*, Common Capital. Australia.
	International rating tool benchmarking	Clark, M., (2015) *The EnergyFit Homes Initiative Working Paper 7: International information Systems for Household Energy Efficiency,* Common Capital, Australia.
	Stakeholder mapping research	Adams, H. Clark, M. (2015) *The EnergyFit Homes Initiative Working Paper 8: Home Energy Efficiency Stakeholder Map*, Common Capital, Australia.

This section explains why better information is needed for existing homes, summarises the background to the EnergyFit Homes project, describes achievements of the project to date, and outlines the structure of the remainder of the report.

1.2 Policy problem

There is a lack of clear and reliable information on the energy performance of the vast majority of Australian homes. Without this information, it is most likely that people engaging in market transactions (such as buying, selling, leasing or renting), maintenance or investment in these properties are making decisions without fully appreciating the energy costs and benefits of these decisions. This can result in inefficient outcomes.

For example, homeowners and investors have little motivation to invest in energy efficiency because the value of this investment is not easily conveyed to prospective purchasers or tenants at time of sale or rent. This is a particular problem because energy efficiency investments are often "invisible", either because they are physically hidden from view (such as insulation) or because the general public do not readily appreciate them (such as different water heating technologies) or because there is little knowledge or advocacy for these particular property features by the residential property marketing industry. In the case of a property sale, without a means of appreciating the year-on-year benefits of energy efficiency, prospective purchasers will be reluctant to factor in these many year benefits into the purchase price they offer. This contrasts with more visible investments where prospective purchasers and tenants are prepared to pay a premium, such as kitchen upgrades.

When purchasers and tenants are considering homes to buy/rent, they typically are not able to identify the likely energy costs of living in the home, nor its comfort potential, nor are they able to compare these with the energy costs of other homes. The type of heating and cooling system, water heating and lighting in a home can have a significant bearing on the costs of running the home. And if the home has an onsite generation system then this can deliver significant running cost savings. If a purchaser/tenant was better informed on these running costs then they may chose a home with a higher purchase price/rent so as to gain lower running cost benefits.

Even outside of the time of property transactions, lack of information can lead to inefficient energy decisions. Owner-occupiers and tenants will be reluctant to invest in energy efficiency if they are unable to identify which improvements are likely to deliver a favourable return on investment. This can be the case for new investments, such as installing onsite generation, or upgrades, such as installing a solar water heater when replacing a failed water heater. And this is particularly the case for those investments that have longer pay-back periods.

Working across the housing sector, these inefficiencies lead to greater levels of energy use than would be the case if better information on the energy performance of homes were available. Accompanying this high energy use are higher environmental externalities, such as higher air pollution from power stations, and greater greenhouse gas emissions.

The Allens Consulting Group in its Consultation Regulation Impact Statement on Mandatory Disclosure of Residential Building Energy, Greenhouse and Water Performance has described these market failures in detail[6]. To quote from the Executive Summary of this report:

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[6] Allen Consulting Group, 2011, *Mandatory Disclosure of Residential Building Energy, Greenhouse and Water Performance: Consultation Regulation Impact Statement*, fourth draft report to the National Framework for Energy Efficiency Building Implementation Committee, March.

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"Underinvestment in a building's energy, greenhouse and water performance may represent a significant problem. Underinvestment is likely to apply across the entire residential housing stock — which is a significant consumer of energy/water and will grow over time.

"There exists only limited empirical evidence supporting adverse selection in this market. Data is limited, and there exists no comprehensive national study on which evidence can be obtained. That said however, the market does show characteristics of a product that is conducive to adverse selection and market outcomes are consistent with what would be expected.

"The range of policies and regulations currently in place do not fully address the information problems in the residential building market. Indeed, with the exception of schemes operating in the ACT and Queensland, there is little government action in place to directly address information problems whatsoever.

In light of this, there exists a case for intervention to assist the market overcome information problems — so long as this intervention is economic welfare enhancing."

1.3   Policy context

A number of initiatives are in place to address the market failures that limit efficient investment in the energy efficiency of Australian buildings:

- All classes of new buildings are required to meet the energy performance requirements of the Australian Construction Code. These requirements also apply to major renovations and refurbishments of existing buildings.

- Under the Commercial Building Disclosure (CBD) Program, energy efficiency information needs to be provided in most cases when commercial office space of 2000 square metres or more is offered for sale or lease.

- Through the Equipment Energy Efficiency Program, a wide range of energy using equipment needs to meet minimum energy performance standards and/or display energy rating labels. Products covered under this program include a number of household fixed appliances such as air conditioners, water heaters and lighting.

- The NABERS program provides a means for owners and tenants to rate the energy performance (and other environmental indicators) of a building. This can be done as a self-assessment, for internal use, or via an accredited rating, so that the performance of the building can be compared with other like buildings. The NABERS program has been successful in driving higher performing buildings, especially in the commercial sector. It is an example of a scheme that was established as a voluntary scheme and, once it matured and built up a critical mass of support, transitioned to be used in a mandatory way (for the CBD program).

- A number of parties have developed systems and tools to rate the energy performance of existing homes. Across these there are the capabilities necessary for an energy performance disclosure system, though no single tool currently provides this.

Despite this broad range of programs, their reach into the existing home market is limited. Australian Construction Code requirements only apply to new homes and major renovations. Whilst the Equipment Energy Efficiency Program does include a number of household fixed appliances such as air conditioners, water heaters and lighting, it currently does not cover passive design elements such as insulation, draft proofing, efficient glazing and shading. And the current suite of home energy performance rating systems have limited uptake.

For many years, Australian governments have proposed initiatives to address this policy gap. The Australian Government, in its 2004 Energy White Paper, committed to "work with the states and territories to require landlords and building owners to disclose energy performance information in leases and sales agreements."[7] Measures to implement this commitment for mandatory disclosure of energy performance were included in COAG's National Strategy on Energy Efficiency[8].

This COAG-level work resulted in implementation of the Commercial Building Disclosure program discussed above. For the residential sector, work did not progress beyond the release of a consultation Regulation Impact Statement for a residential scheme. A 2012 report on the National Strategy indicated that "continuing commitment of several jurisdictions to the implementation of Residential Building Mandatory Disclosure is unclear."[9]

In the COAG Energy Council's 2015 National Energy Productivity Plan, jurisdictions have agreed to "improve residential

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[7] Australian Government, 2004, Securing Australia's Energy Future. Available at: http://pandora.nla.gov.au/pan/10052/20050221-0000/www.dpmc.gov.au/publications/energy_future/docs/energy.pdf
[8] See measures 3.2.2 and 3.3.2 of https://www.coag.gov.au/sites/default/files/nsee_update_july_2010.pdf
[9] https://www.coag.gov.au/sites/default/files/National%20Partnership%20on%20Energy%20Efficiency%20-%20Annual%20Report%20to%20COAG%202011-12.pdf

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building energy ratings and disclosure". The Council's rationale for pursuing this work is that "many homeowners and tenants are choosing homes to buy or rent or are renovating their homes without adequate information about their expected energy performance, comfort and likely future energy costs."

The Council has committed "to consider a range of different tools to improve information for residential buildings, including options for implementing a national approach to residential building energy ratings and disclosure."[10]

The Council has indicated that this work stream will "examine and build upon" current initiatives, specifically:

- The Victorian Government's Residential Efficiency Scorecard – a voluntary household efficiency rating tool currently under development.[11]

- The ACT's existing requirement for the disclosure of energy performance of homes when they are being sold[12];

- The research conducted through the EnergyFit Homes project[13].

1.4 Stakeholder commitment

(i) Government

As mentioned above, Australian governments have had commitments, since 2004, to improve the level of information on the energy performance of existing homes and the current COAG level commitment is to consider a range of different information provision tools and to consider options for a national approach to rating and disclosure.

One jurisdiction, the ACT, has a mandated program for the provision of this information when homes are sold. The Queensland Government previously required a sustainability declaration (a compulsory checklist) when selling a home. The scheme was discontinued in 2012[14].

Governments are also directly involved in developing rating tools that could be, to differing extents, used to assess the energy performance of homes. These include the Victorian Government's Residential Efficiency Scorecard and the NABERS Residential Tool and the NatHERS scheme, both of which are overseen by cross-jurisdictional committees.

(ii) Industry

Our findings from interviews with wide range of stakeholders[15] is that there is a very high degree of support for developing a standard, agreed national voluntary disclosure system to measure, benchmark and communicate information on the energy performance of existing homes. Many key stakeholders are concern that governments have not been able to achieve this. Looking forward, they are concerned that the work program outlined in the National Energy Productivity Plan is insufficient to bring forward a national system in a timely manner.

An indication of this level of support is the financial and time commitment that project partners have provided to the EnergyFit Homes Project. The project has received a total investment of $0.62 million, with $0.35 million provided by the CRC and $0.27 million provided government and industry stakeholders. In addition to the financial contribution, the members of project steering committee also provided their time to participate in steering committee meetings and other associated tasks. They also typically are involved in the governance of existing initiatives, such as NABERS, Green Star, and NatHERS via ABSA, and other sustainable buildings forums/processes such as ASBEC and CSIRO's national conversation project.

It is because of this demonstrated commitment by key stakeholders to invest time and resources into developing a national disclosure system that we believe that the lean administration model recommended in this report is viable. We have confidence that the level of goodwill and commitment demonstrated to date would flow into participation, initially, in the steering committee and advisory groups to consult on and market test the implementation model, and subsequently into the board and working groups that oversee implementation.

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[10] COAG Energy Council, 2015, National Energy Productivity Plan 2015-2030. Available at:
http://www.scer.gov.au/sites/prod.energycouncil/files/publications/documents/National%20Energy%20Productivity%20Plan%20release%20version%20FINAL_0.pdf
[11] For more information, see: http://www.energyandresources.vic.gov.au/energy/environment-and-community/energy-efficiency/residential-efficiency-scorecard
[12] For more information, see; http://www.planning.act.gov.au/topics/buying,_selling_and_leasing_property/sales/energy_efficiency
[13] https://scer.govspace.gov.au/files/2015/12/NEPP-Work-Plan-version-for-release-20151203sc.pdf
[14] https://en.wikipedia.org/wiki/Sustainability_declaration
[15] Clark, M., 2015, Home Energy Efficiency Stakeholder Map, Common Capital. Australia.

(iii) Consumer groups

Historically, those consumer groups that represent the interests of low-income consumers have been most active on energy policy. Our findings from interviews with stakeholders was that there is a general consensus that a framework would mostly like have the greatest success in encouraging improvements in medium-grade building stock, and reward already high performing homes.

As such, these consumer groups do not see direct value to their constituency in a national voluntary disclosure system, though they do see that a system for measuring and benchmarking performance could help with minimum standards and other low-income policy objectives.

1.5   How a national voluntary disclosure system can complement other policies

A national voluntary disclosure system to measure, benchmark and communicate information on the energy performance of existing homes, as recommended in this report can support the following policies and program:

- Energy efficiency incentive schemes, such as the NSW Energy Saving Scheme, the Victorian Energy Efficiency Target, SA Retailer Energy Efficiency Scheme, the ACT Energy Efficiency Improvement Scheme and the Commonwealth's Emissions Reduction Fund. These schemes could use the EnergyFit Homes ratings methodology and metric as the basis for crediting energy efficiency improvements to existing homes. This would be similar to how these schemes use existing systems such as NABERS ratings and the Energy Rating Label.

- EnergyFit Homes ratings methodology and metric could also be the basis for policy initiatives to improve the energy efficiency of dwellings. For example it could be used to define a minimum energy performance standard for housing, which would target the poorest performing homes.

Similarly, a number of existing policies and programs can support the effective implementation of a national voluntary disclosure system for existing homes:

- Energy star ratings for fixed equipment, such as air conditioners and water heaters can assist with the accuracy of rating a home.

- Energy rating of building products such as insulation, windows and ducting can also assist with the accuracy of rating a home

- Initiatives to drive sustainability housing knowledge into the residential real-estate sector, such as the Liveability Real Estate Framework, provide a basis for engaging this sector in translating ratings into a new value proposition for consumers.

- The owners of the various existing rating systems and tools have extensive knowledge and capabilities that will be invaluable in implementing the national voluntary disclosure system.

One existing rating system, NatHERS, provides a method and metric for rating the thermal performance of homes. This is mainly used to rate performance as part of building approval for new homes and major renovations. There is the potential for a national voluntary disclosure system to provide information that would complement new homes ratings to allow for the energy performance of a home to be assessed across its lifecyle.

1.6   EnergyFit research framework

The overarching objective of this project is to reduce greenhouse gas emissions from the construction and operation of homes by increasing market interest in low carbon, energy efficient homes. Energy use in households represents 21% of total Australian emissions (Australian Government, 2011). Specific project objectives include:

- To understand the motivations and information needs of homebuyers, lessees, and intermediaries involved in the point of sale and lease, and to identify the information content and presentation that is most likely to influence purchase decisions for energy efficient homes;

- To identify strategies for improving the flow of effective information in the home vendor sales and rentals and marketing channels and homebuyer purchasing processes to best influence energy efficient home purchase and lease decisions, including how information should be communicated, and by whom;

- To determine the content, presentation and delivery channels for home energy rating/assessment tools that will effectively influence homebuyers and lessees and financiers toward valuing energy efficient performance in their purchasing decision;

- To engage the wider real estate, property and energy efficiency industry in developing a blueprint for the implementation of a standard national framework for home energy rating/assessment tools; and

- To converge the outcomes into a framework, business case, and implementation plan for consumer-responsive, applicable tools that will increase market interest in energy efficient homes.

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To meet these objectives project sought to answer five overarching questions:

1. What information do consumers need about the energy performance of homes?

2. At what decision points?

3. From which trusted sources?

4. In what form?

5. What is required to make this happen in terms of governance, technology and market frameworks?

To answer these questions the project undertook original primary and secondary research into consumer, industry, policy and technical elements of residential energy performance measurement and communication. This project explored the key information and behavioural factors as well as the market structures that influence the purchase and lease of new and existing energy efficient homes.

These delivered research streams are summarised in Table 2 below.

Table 2 Previous EnergyFit Homes Project research streams

Research stream (Working Paper)	Lead	Scope
International literature review (Working Paper 1)	CSIRO	Literature review 94 research papers on current knowledge and research on this topic, both in Australia and internationally.
Consumer focus groups (Working Paper 2)	CSIRO	12 focus groups, 107 participants from Canberra, Sydney, Central Coast and Brisbane involving owner-occupiers, renters and investors, to establish the baseline understanding of energy efficient home rating tools and establish the baseline understanding and attitudes towards the idea of voluntary rating and disclosure by homebuyers and lessees, sales and rentals staff and real estate agents across Australia.
National consumer telephone survey (Working Paper 3)	CSIRO/Swinburne University	National telephone survey (866 responses) to determine the influence, understanding and priority of energy efficiency features for homebuyers and lessees; and useability and potential influence of voluntary disclosure information.
Building trades and professionals survey (Working Paper 4)	CSIRO	Online survey of 492 building professionals and trades people and energy efficiency product installers on the gaps in information and skills to support increased sales and rentals of energy efficient homes.
Real estate agent survey (Working Paper 4)	CSIRO	Online survey of 140 real estate agents, including a small subset of Liveability Real Estate Framework trained agents, on the gaps in information and skills to support increased sales and rentals of energy efficient homes.
Consumer message testing (Working Paper 5)	CSIRO	National online consumer testing (2008 responses) of energy efficiency benefit framing to determine the visual devices and linguistic phrases that motivate home purchases and leases.
National energy information system benchmarking (Working Paper 6)	Common Capital	Desktop review of 22 national tools and systems relevant to benchmarking energy efficient homes, including data sources, the credibility and usefulness of each source, and any availability or access costs and barriers to data use.
International rating tool benchmarking (Working Paper 7)	Common Capital	Comparative desktop review of 15 European and American building rating systems employed for selling buildings with an emphasis on energy efficient and sustainability. This covered all aspects of other international building rating systems, including the development process, the administration and governance structure, the assessment method and presentation, costs to administrator and to consumers and the impact or outcome delivered by the systems.
Stakeholder mapping consultation (Working Paper 8)	Common Capital	Stakeholder mapping and interviews to document the existing rating landscape, establish stakeholders and stakeholder preferences, and to review stakeholders involved in the existing sale/lease transaction process to identify opportunities for triggering voluntary ratings and managing any risks in the process that may affect the uptake of ratings. Views were sought from the state and national government agencies, research organisations, consumer groups property sector, product suppliers, banks, energy companies and the real estate market, as well as those involved in the transaction process, including transaction process advertising media, valuers, and property inspectors.

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1.7 Structure of this report

This report has two parts. Part I draws together the findings of the previous eight EnergyFit Project research streams to recommend an Implementation Pathway for a national voluntary disclosure system.

- Section 2 translates the project's research findings on consumer's energy information needs into high-level requirements for national voluntary disclosure system.
- Section 3considers the options and forms recommendations on a model to deliver these information and system attributes.
- Section 4 sets out a model for the governance, system and market operating elements needed to implement this system.
- Section 5.1 recommended for a marketing plan for the system.
- Section 6 provides our recommendations on how the system can be implemented and a financial analysis of the operating model.

Part II of this report then provides the findings of our detailed economic analysis of the public and private benefits of implementing the recommended system.

Part I Implementing a national voluntary disclosure system

Business plan and implementation pathway report

2. Consumers' information requirements

This section translates research findings of consumer energy information needs into high-level requirements for a national voluntary disclosure system. It draws together the findings of eight primary and secondary research streams of the EnergyFit project to provide recommendations against the first four project research questions:

1. What information do consumers need about the energy performance of homes?

2. At what decision points?

3. From which trusted sources?

4. In what form?

EnergyFit research and consultation established that there is high consumer demand, and stakeholder support for a national voluntary disclosure system. Research findings on the content, timing, source and forms of information required to meet consumer need are summarised in Figure 1 and explained below.

Figure 2 Recommended information requirements for a voluntary disclosure system
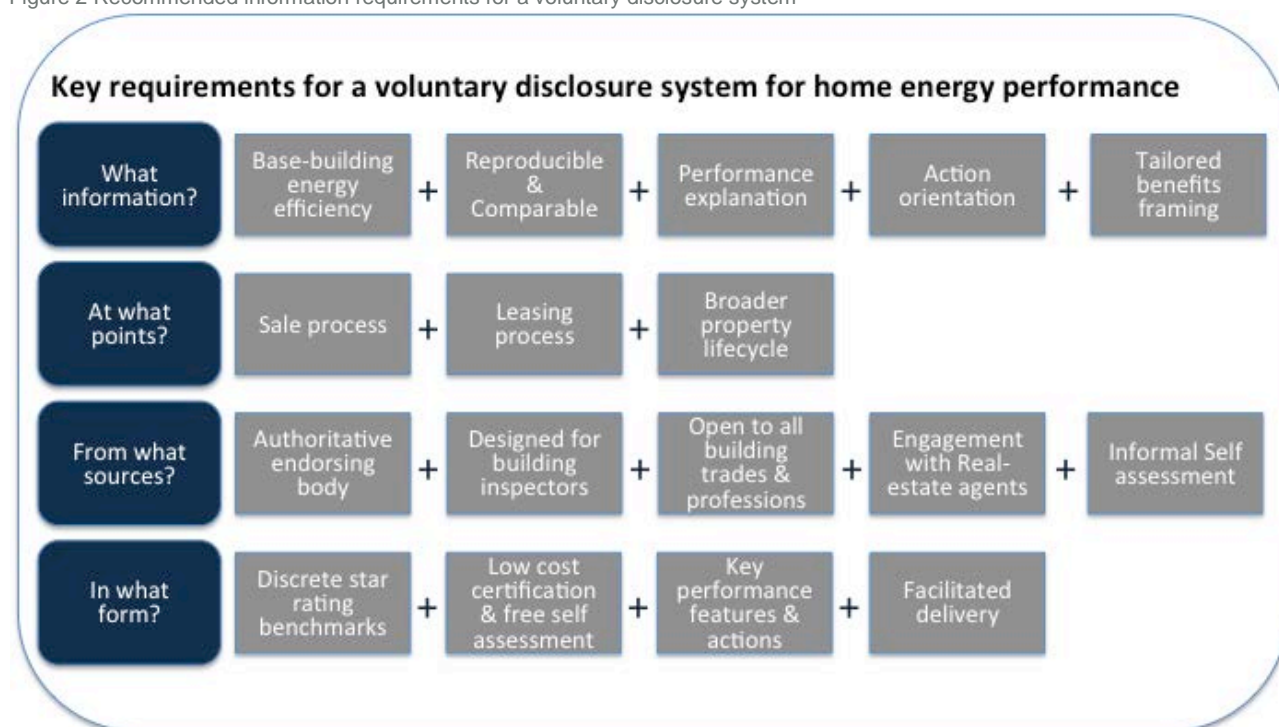
What information

- Objectively measure and benchmark base building energy efficiency:
  - energy performance fixtures (insulation, windows, lighting, fixed appliances, and onsite generation) which are readily improved through refurbishments;
  - their interaction with site characteristics (climate zone, orientation, building fabric, etc) which influence the relative importance of fixtures, and require more substantial renovations to improve;
  - excludes removable fittings (non-fixed appliances) which account for around 35% of energy use, but are not relevant for communication with third party buyers or tenants who will bring their own different appliances
- Information needs to be reproducible – if different parties measure the same home, they should reach the same conclusion
- Information need to allow consumers to compare the relative performance of one home with others of similar size and locations
- Performance information needs to be supported with additional explanatory information that consumers can understand and verify (e.g. the key features that underlie a performance result)
- Performance information should be supported with, tailored action oriented tips to improve performance for a specific house

	• Communicate broader, more subjective benefits (comfort, property value, bill savings, sustainability) framed in ways that are tailored to resonate with values and priorities of different market segments
	• Excludes high rise apartments – their base-building performance best dealt with through NABERs
At what points	• Information should be able to be provided and relevant throughout the sale and lease process (not just the end) and throughout the broader property lifecycle (incl. renovations, appliance purchasing, energy cost management)
From what sources	• Must be endorsed by an authoritative, national body (such as a government body or a body with government and non-government stakeholder representation) and delivered by the broad cross section of property trades and professions who are involved across the above decision points.
In what form	• Formally certified ratings, date stamped with periods of validity
	• Packaged with layered supporting information on performance explanation and improvement actions
	• Online and physical form
	• Informal self-assessment/ratings estimates
	• Personally facilitated explanation of ratings benefits (tailored benefits framing)

The remaining sections of Part I draw together research findings to answer the final research question: what is required to make this happen. Section 3 considers the options and forms recommendations on a model to deliver these information and system attributes. Section 4 sets out a model for the governance, rating system and market operating elements needed to implement this system. Section 5.1 recommends a marketing plan for the system, including consumer segments, products, pricing, distribution and promotion of ratings and information. Section 6 provides our recommendations on how the system can be implemented. Part II provides the findings of our detailed economic analysis regarding the public and private benefits of implementing the recommended system.

1. The need for an energy information system

The EnergyFit national consumer survey shows strong interest amongst consumers in renting and/or buying energy efficient homes and obtaining information on the energy performance of homes during the sale and lease process[16]. This interest also extends to home renovations, and covers both owner occupants and investment property owners. As shown in Table 3, CSIRO research found that 92% of households consider it important to have information on the energy efficiency of homes as part of sale and lease processes. The same survey found 89% of consumers reported that an energy efficient home would be more attractive to buy or rent. This is consistent with broader literature findings that energy efficiency information provided at the point of sale and lease is particularly effective, and that this information is relevant throughout the building life cycle.

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[16] Refer pages 6-8. Romanach, LM., Jeanneret, T. and Hall, N. (2015), The EnergyFit Homes Initiative: National consumer survey results. CSIRO, Brisbane.

Table 3 Frequency of responses for importance of energy efficiency information delivery at specific times when buying/renting or renovating a home[17]

TIME OF DELIVERY	YES		NO		TOTAL	
	N	%	N	%	N	%
Buying or renting a home						
In the building inspection report	787	92.3	66	7.7	853	100
At open inspections	708	82.9	146	17.1	854	100
In home sales/rental ads	615	72.1	238	27.9	853	100
At the mortgage/leaseapplication	481	57.4	357	42.6	838	100
Renovating a home						
As part of builder's/architect's renovation plans	793	92.7	62	7.3	855	100
When looking at appliances and product advertisements	787	91.6	72	8.4	859	100
Getting quotes from professionals for upgrading/installing home products	784	91.6	72	8.4	856	100
When getting advice or development application approval from local council	681	79.9	171	20.1	852	100

Common Capital's meta-evaluation of European and United states home energy information systems found across jurisdictions, the value of home increased with energy efficiency performance by between 3% and 14% when a high energy efficiency performance was consistently disclosed to buyers[18].

Despite the existence of over 22 different home energy information systems in Australia[19], this demand is not being met. These systems all have their respective strengths. Many have been designed for purposes other than disclosing the energy performance of homes. These include: regulatory, technology specific, understanding operating energy consumption, or state specific. Individually, each system has many of the required features to address consumer needs, but no system has all of these features.

EnergyFit Homes consumer, industry and stakeholder research identified a number of barriers between reported consumer demand for information, and take-up of the information already available. The remainder of this section covers the major consumer and stakeholder requirements to address these gaps.

However, Common Capital research found the single biggest barrier to addressing consumer demand was the lack of consumer, industry and government consensus, specifically with respect to a consistent national approach for measuring and communicating home energy performance[20]. Achieving this consensus requires developing a system that meets the information needs of consumers, and developing governance that meets the needs of stakeholders. As discussed in Section 4.2 many of the existing tools could be adapted to be suitable for such a system. Government, industry, research and consumer stakeholders need to collaborate to build a system that meets these consumer and stakeholder requirements.

2. What information

Common Capital research found that the primary metric for measuring and communicating energy performance should be base building energy efficiency[21]. Energy efficiency can be objectively defined, measured and verified far more reliably than other considerations such as cost or comfort. Consumers require information in a form that conveys the relative performance of their home in a way that is consistent and comparable with similar homes. This information needs

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[17] Refer Table 24,. Romanach, LM., Jeanneret, T. and Hall, N. (2015), The EnergyFit Homes Initiative: National consumer survey results. CSIRO, Brisbane.

[18] See Table 11 of Clark, M., 2015, International information Systems for Household Energy Efficiency, Common Capital. Australia.

[19] Clark, M., 2014, Information Systems for Household Energy Efficiency, Common Capital. Australia. Note, this working paper makes reference to 23 different home energy information systems. Neither list is fully comprehensive and new products have emerged since the working paper was prepared.

[20] Clark, M., 2015, Home Energy Efficiency Stakeholder Map, Common Capital. Australia.

[21] Refer section 3.2 of Clark, M., 2015, Home Energy Efficiency Stakeholder Map, Common Capital. Australia.

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supporting explanatory information on the reasons and context for performance results. Information needs to be action oriented to drive energy saving improvements. Messages about the benefits of performance should be tailored to take into account the diverse range of consumer drivers, particularly efficiency, environment and comfort.

(iv) Base-building energy efficiency

Of all options for communicating energy performance, energy is the most objective metric and best able to be constantly measured and communicated for a range of purposes.

EnergyFit focus group research found that the main motivation for owner occupiers and tenants to invest in energy efficiency was to reduce energy costs[22]. The EnergyFit literature review has also identified comfort as a strong driver for energy efficiency renovations[23]. The EnergyFit focus group research showed that participants' perception of home comfort involves both energy efficient (such as thermal efficiency; natural light and airy) and non-energy efficient features (home location; amenities and outdoor-space)[24]. EnergyFit focus group participants questioned the assumptions behind rating tools and found such ratings limited, as they do not take into consideration the impact on households' costs and home comfort[25]. Focus group findings also suggest that environmental benefits alone will only motivate a minority of households to accept higher rent or home prices due to energy efficient measures, with cost being the main driver. As building energy performance is relatively consistent over time, it is an appropriate base measure that can be used to estimate and communicate other more subjective value drivers, such as cost and comfort, which depend on household needs, preferences and actual behaviour.

The EnergyFit consumer survey showed that households rate energy efficiency features as highly important and therefore communication of how these features contribute to home energy performance, potential energy costs and home comfort could form the basis of communication between vendors/landlords and buyers/renters[26]. This scope covers building fabric (e.g. ceiling insulation, windows, floor plan etc), fixed appliances (e.g. built in space heating and cooling and ventilation, water heating, lighting) and onsite energy generation (e.g. solar PV).

Non-fixed appliances can account for on average 35% of home energy consumption. For information systems aimed at helping consumers operate their homes more effectively, measurement of non-fixed appliances and their operation is highly important. However, the key driver for an national voluntary disclosure system is to stimulate investment in upgrading the energy performance of existing homes, by allowing the market to recognise this investment in sale and lease transaction prices. The system must therefore focus on the elements of energy performance that are transferred when homes are sold and leased, which does not include the energy used by non-fixed appliances.

Household behaviour impacts on energy consumption, and therefore home energy performance is subject to external factors such as household size and practices within the home. Such variance can be a barrier for objectively communicating home energy performance. As such it is important that consumers are aware of what information a rating provides and that actual energy performance is subject to such factors.

The base building features that drive energy consumption can be divided into fixtures and site characteristics. Fixtures can be relatively easily varied through minor refurbishments to improve energy performance. Site characteristics can also have significant impacts on overall building energy performance. Some characteristics are unalterable (eg. climate zone), others require major renovations to achieve improvements in performance (e.g. zoning, orientation). Variations in site characteristic are important to understand the relative significance of different fixtures for a given building (for example the importance of glazing and shading can vary significantly depending on window size and orientation).

Some of the key base building features for inclusion are:

Building fabric
- Ceiling insulation
- Window and door sealing, glazing and shading

Fixed appliances
- Ducted/built-in heating, ventilation and cooling systems
- Water heating
- Lighting

On-site generation
- Rooftop Solar PV

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[22] Refer to page 57. Hall N, Jeanneret T, Romanach LM (2014) The EnergyFit Homes Initiative: Focus group results. CSIRO, Australia.
[23] Refer to page 3. Romanach LM, Jeanneret T, Hall N and Yip E (2014) The EnergyFit Homes Project: Literature review and gap analysis. CSIRO, Australia.
[24] Refer to page 28. Hall N, Jeanneret T, Romanach LM (2014) The EnergyFit Homes Initiative: Focus group results. CSIRO, Australia.
[25] Refer to page 40. Hall N, Jeanneret T, Romanach LM (2014) The EnergyFit Homes Initiative: Focus group results. CSIRO, Australia.
[26] Refer to page 14. Romanach, LM., Jeanneret, T. and Hall, N. (2015), The EnergyFit Homes Initiative: National consumer survey results. CSIRO, Brisbane.

Some of the key base building site characteristics for inclusion are:

Alterable	• Building materials
	• Orientation
	• Internal zoning
	• Size
Unalterable	• Climate zone

The relative importance of these factors may vary significantly from home to home, depending on many changeable factors. In measuring the energy performance of a home, an information system should reflect the relative importance of these features based on factors like building materials, climate zone and orientation.

Whilst there are many ways to improve a home's base building energy performance, there are a relatively small number of activities that can consistently deliver significant energy savings. At the other end of spectrum there are activities that can have small or no energy savings benefits. As such, a national voluntary disclosure system is best placed to focus on the higher value activities, rather than those with diminishing benefits. This observation was confirmed in the business case presented in Part II.

Stakeholder research confirmed that information on the performance of apartments and units in multi-dwelling buildings is as desired and as important as for detached or semi-detached homes. Unfortunately, in the case of high-rise apartments the base-building factors that drive performance are beyond the control of individual apartments. Energy used in common areas such as pools, lifts and central hot water systems comprise up to 30 to 50% of the energy use of an apartment building. These factors for the most part are completely or largely under the control of building owners corporations, and accounted for in building strata levies. Non-fixed appliances contribute most of the direct energy use by apartment occupants. This energy use does not transfer to future occupants, and is not relevant for the purposes of communicating performance at the point of sale or lease. For these reasons, the energy performance information requirements for high-rise apartments are much closer to those in commercial buildings. The existing National Australian Building Energy Rating System (NABERS) for commercial buildings could be readily adapted to provide base-building benchmarking information.

The situation is typically different in low-rise flats and units, where there is a greater share of fixtures and fixed appliances under the control of owners. For this reason, low-rise flats and units should be included within the scope of a national voluntary disclosure system.

(v) Comparable and consistent

Above all, a disclosure system must provide information that is comparable and consistent. That is:

Comparable	The results for one home must be easily understood and compared with those of other similar homes. Performance should be benchmarked relative to equivalent homes.
Reproducible	Measurement and communication approaches must be objective, reliable and reproducible to ensure that if different people measure the same home they get the results within the same range.

Stakeholders consider comparability as an essential attribute for an information system to facilitate the development of market value for energy efficient homes. When consumers seek to buy or rent a home, they typically consider a range of options first. To be meaningful, information on home energy performance needs to be in a form that allows consumers to compare the **relative** energy performance of the different homes they are considering. This will allow them to compare and value efficiency features alongside the other features that factor into their decision such as price, location, size, condition. This means that a system must both measure energy performance, and benchmark performance against similar homes.

Ensuring information remained consistent was seen as essential by stakeholders in ensuring the credibility of an information system. The majority of stakeholders strongly believe that reproducibility in measurement is essential to the success of a system. There is a high-level of consensus that a system would lose public credibility if results for the same home varied when different people provided the information.

(vi) Performance explanation

In addition to providing information on energy performance, research found that the context of that performance was essential to effective communication. A key attribute of an information system is that it provides additional, layered, supporting information on home energy performance to build consumer trust and facilitate improvement actions.

Common Capital research found that simple energy performance information was very effective at getting consumer attention[27]. It also found that consumers then sought additional, easily verifiable information to be able to assess the relevance of headline energy efficiency performance information. Consumer-facing stakeholders believe this would be common, and that a system needs to allow consumers to validate results for themselves.

Information on performance based on objective, verifiable home features that consumers can readily understand serves three purposes: (1) it allows consumers to verify key factors underlying performance claims, to build trust and reduce measurement errors; (2) it aligns with the real estate consumer experience, which is based around the identification of key features and the consideration of their future potential and trade-offs; and (3) it primes consumers for taking future action – by understanding the features that lead to higher energy performance. It is important to consider this final point, understanding that consumers are likely to look at numerous potential homes before selecting one. If many of these homes have information about energy performance and the features that drive it, it provides consumers with tools to better understand the features to look out for and consider investing in future homes. For example, feedback from focus group participants suggest they are familiar and appreciate the use of star ratings to communicate energy efficiency[28].

In providing this information, it is also critical to do so in a way that doesn't overload consumers. The whole package of information would need to be simple, engaging and easily accessed by householders.

(vii) Action orientation

Stakeholders and international research suggested that it is desirable to accompany energy performance information with supporting information on tailored actions that can be taken to improve performance. For example a survey of 3000 European households, found that householders were twice as likely to have carried out one or more energy efficiency measures if the Energy Performance Certificate provided at the point of sale included recommendations on energy savings opportunities[29].

For example, action oriented information could include (figures included for illustrative purposes only):

- Your rating would increase by 1 star if you install ceiling insulation
- Your home could sell for $5000 more if you install a solar photovoltaic system

In providing action oriented information, care should also be taken not to overwhelm consumers with too many details.

(viii) Tailored benefits framing

Information provided from a rating needs to include the benefits of better energy performance. While a very high majority of households want information on energy performance, different households see the benefits of this information in different ways. For example, unpublished research by Insight and Reason for the NSW Office of Environment and Heritage found that many consumers equate energy efficiency and sustainability messages with loss and sacrifice, while at the same time desire lower energy running costs and improved comfort.

Given the broad range benefit frames consumers may hold, it is likely to be very challenging to develop measurement tools that can identify and adapt messages to different customer segments. To avoid potentially adverse message framing, while maximising the potential for benefits to resonate with households, the following attributes are recommended:

1. Specific, dwelling level information produced should be relatively objective and value judgement free (eg. focus on relative energy performance and key features that drive/could improve)
2. Broad based communication on the benefits of the system should be grounded in those message frames that resonate with the broadest number of customer segments.
3. Dwelling specific information should be provided by specialist professionals with a trained understanding of the importance of delivering energy efficiency information in the context of different customer demographics and appropriate benefit frames (e.g. Liveability Real Estate Specialists, who placed greater importance on

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[27] Refer section 5.3 of Clark, M., 2015, International information Systems for Household Energy Efficiency, Common Capital. Australia; and section 3.2 of Clark, M., 2015, Home Energy Efficiency Stakeholder Map, Common Capital. Australia.
[28] Refer to page 40. Hall N, Jeanneret T, Romanach LM (2014) The EnergyFit Homes Initiative: Focus group results. CSIRO, Australia.
[29] IDEAL-EPBD 2011, *Key findings & policy recommendations to improve effectiveness of Energy Performance Certificates & the Energy Performance of Buildings Directive*, <www.ecn.nl/docs/library/report/2011/o11083.pdf>

communicating energy efficiency with clients when compared to non-Liveability Real Estate agents in the EnergyFit specialist surveys[30]).

3. At what points

Key requirements for a voluntary disclosure system are that it provides information that is relevant and suitable for the mediums, channels and audiences involved:

- across the sale and lease process – including web-advertising, open for inspections and building inspection and property management reports
- at other key decision points of property lifecycle including, but not limited to, research, planning, purchasing and assessment processes around renovations and refurbishments, energy procurement and major appliance purchases.

International research confirmed information on the energy performance of homes at the point of sale and lease was highly effective in Europe and the United States[31]. There is strong stakeholder support in Australia across government, industry and consumer groups for the provision of this information. Research found that timing of the provision of this information is critical, and that home sales and leasing should be viewed as a process rather than a discrete event. If information is provided too late in the process, it loses its efficacy. Reviews of the European Energy Performance Certificates and energy audit disclosure in Austin Texas found that disclosure needs to occur early in the sale process to influence behaviour. Disclosure at the point of signing a contract reduces effectiveness, as householders are not able to include energy performance as a consideration when they were browsing homes for purchase[32]. Respondents to the EnergyFit consumer survey were very supportive of receiving energy efficiency information throughout the sale and lease process, as well as other points in the property lifecycle[33].

Recent research (Instinct and Reason, 2014) found that "Half (49%) of those surveyed reported having only done minor renovation or improvement work and a further one in six (17%) have done none. So it is about one in three that have done more substantial renovation work in the past 3 years".

Relevant energy savings potential will change throughout the property lifecycle. For example, as illustrated by Figure 4, at construction and major renovation stages information is most often targeted to expert audiences such as architects and builders. This is because these stages intersect with building code requirements and the energy savings options available are typically much more extensive, included changes to factors like building fabric, size, orientation, and construction quality.

Conversely, at buy/sell, occupy (by owner or tenant) and minor refurbishment stages there are no regulatory requirements to engage with energy performance and improvement options are also limited. Previous research also found that while the majority of consumers are interested in energy performance, it is only one of many features that they engage with and so information needs to be targeted and easy to understand[34].

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[30] Refer to page 14. Romanach, LM., Jeanneret, T. and Hall, N. (2015), The EnergyFit Homes Initiative: Housing specialist and real estate industry survey results. CSIRO, Australia.
[31] Refer to section 5.2.1, Clark, M., 2015, International information Systems for Household Energy Efficiency, Common Capital. Australia
[32] Eg Laine, L 2011, "Room for improvement: The impact of EPCs on consumer decision-making, Consumer Focus
[33] Refer to page 16. Romanach, LM., Jeanneret, T. and Hall, N. (2015), The EnergyFit Homes Initiative: National consumer survey results. CSIRO, Brisbane.
[34] Refer to section 5.1.2, Clark, M., 2015, International information Systems for Household Energy Efficiency, Common Capital. Australia

Figure 3 Stages of the property lifecycle
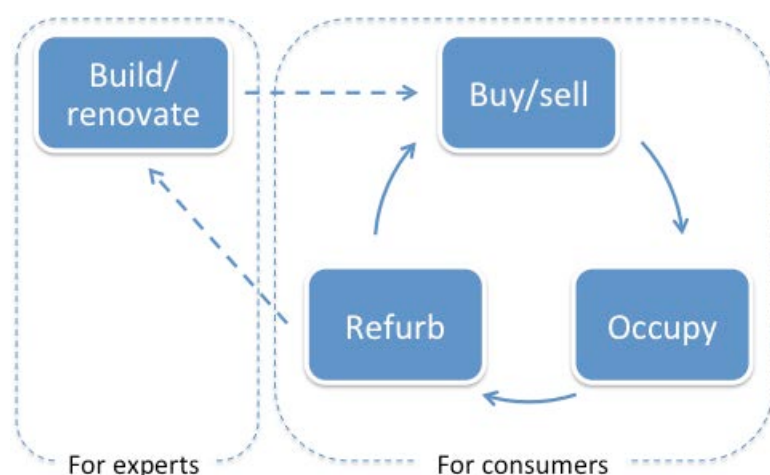
The information requirements at each of these different stages varies slightly. The EnergyFit National Consumer survey found that key points in the buy/sell process where consumers want energy performance information on homes are:

- Property advertisements (83%)
- Open for inspections (72%)
- Building inspection reports (92%)

This means that information needs to be in a form that can be readily certified as reliable to develop and maintain third party trust. It requires supporting processes to manage homeowner privacy issues, and obtain homeowner consent for collection and the release of performance information. It also requires systems that allow verifiable information to be provided through online (eg. real estate advertisements) and printed mediums (eg. physical certificates).

The EnergyFit focus groups and stakeholder research found a misalignment of expectations and market power between landlords and renters. The EnergyFit focus group research found that renters valued energy efficiency as much as buyers. However, renters expressed concerns that energy efficient features would be translated into higher rental prices. In contrast, research found that landlords typically did not value energy efficiency features due concerns on return of investment[35]. With this in mind, information provision for the leasing process should be designed to engage and allow property managers to facilitate communication between landlords and prospective tenants.

Common Capital research also found that consumers wanted information during home occupancy[36]. The required attributes of this information are likely to be different. The information is for personal use rather than external communication, so greater detail and customisation may be possible or desirable, and there is less need for formal, independently certified information. As the occupant is reviewing their own energy performance, it is possible to consider total energy use, not just base building, and provide comprehensive advice on savings opportunities. There are at least seven information systems in Australia that provide information for this stage of the building lifecycle.

Finally, the information requirements for the refurbishment process will also differ. Refurbishments cover capital improvements to homes that don't require planning approval of building design expertise. For example, they include isolated kitchen and bathroom upgrades, refreshing or replacing of paint, flooring gardens. Installed individually, the six energy saving features identified as a priority in section 2 would all be categorised as refurbishments.

The drivers of energy efficiency investment during refurbishment differ between landlords and owner-occupants. Previous research has shown that owners that intend to live in the home after refurbishment tend to be concerned about running costs and building comfort, while landlords focus on investments that will increase property value and make the building easier to rent.[37] European research also found that owners are twice as likely to invest in energy efficiency upgrades during refurbishments when they received upgrade tips at the point of sale along with an energy efficiency rating.

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[35] Refer to pages 57-59. Hall N, Jeanneret T, Romanach LM (2014) The EnergyFit Homes Initiative: Focus group results. CSIRO, Australia.

[36] Refer section 3.2 of Clark, M., 2015, Home Energy Efficiency Stakeholder Map, Common Capital. Australia.

[37] Beillan, V et al, 2011, "Barriers and drivers to energy-efficient renovation in the residential sector. Empirical findings from five European countries", ECEEE 2011 Summer Study, <http://proceedings.eceee.org/visabstrakt.php?event=1&doc=5-072-11>

If an effective national voluntary disclosure system is established to drive demand for efficient homes, energy performance information will help consumers understand the impact of refurbishment decisions. For example, this may involve simple, free self-assessment by consumers to understand the impact that different options will have on future building performance. It may also involve building information systems that can be easily packaged and delivered by the tradespeople responsible for installing energy savings refurbishments (eg. insulation, windows, solar photo voltaic, or high efficiency heating and cooling).

4. From what sources

Research identified a wide range of trusted sources of energy performance information. Systems that may have direct financial value require trained and certified assessors.[38,39] These systems include the KfW-Effizienzhaus system which is used for low interest loans, the Green Deal system which allows access to both loans and government subsidy programs, and point of sale disclosure programs where the energy label may form part of sale considerations and create a value premium. Consumer surveys in a number of countries also confirm the value of an on-site energy efficiency expert in influencing household decisions.[40,41] However, this expertise comes at a cost, and if not managed can impact on scheme takeup. For example, a UK Government review of the low takeup of the Green Deal noted that successful energy efficiency schemes "need to strike a balance between ease of access, consumer protection and compliance with regulation".[42]

Stakeholder research broadly aligned with these findings. There was high-level consensus among stakeholders that the most important factor is the credibility of the board endorsing information, rather than the individual involved in delivering it. There was high consensus among stakeholders that an energy information system should be open to allow any service provider to deliver it provided they could comply with requirements around quality and reproducibility. There was broad consensus among stakeholders that the board could be from government or a quasi-autonomous nongovernment organisation. There was also strong consensus that for a national voluntary disclosure system to achieve cross-industry support, it should be developed and overseen in an open and collaborative way with government, industry, research, and consumer groups. In light of the above findings on tailored message framing and consumer priming requirements at point of sale or rent, we also recommend that a system integrate with the Liveability Real Estate Property Marketing Framework.

There is a broad range of potential sources of information. These range from individual professionals to an overarching endorsing organisation. Some examples are illustrated in Table 4 below.

Table 4 Potential information sources

Type	Example sources
Peer to peer	Self-assessment, interactions with friends and neighbours
Government	Local, state or national agencies and research organisations, building approvals process
Property sector	Real estate agents, property managers, property data providers, building inspectors, property valuers
Professionals and trades	Electricians, plumbers, architects, designers, builders, handypersons
Product suppliers	Insulation, window, solar or appliance retailers
Non-government organisations	Choice, Clean Energy Council, Green Building Council
Energy efficiency	Energy assessors, NatHERS assessors, GEMS labels

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[38] Hamilton, B 2010, *A Comparison of Energy Efficiency Programmes for Existing Homes in Eleven Countries*, Regulatory Assistance Project, February 2010

[39] Rosenow, J, Eyre, N, Rohde, C and Bürger, V, 2013, "Overcoming the upfront investment barrier", *Energy & Environment*, Vol 24 No 1

[40] Amecke H 2011, "The effectiveness of Energy Performance Certificates: Evidence from Germany", Climate Policy Institute Berlin

[41] Wilson, C, Crane, L, Chryssochoidis, G 2014 "Why do people decide to renovate their homes to improve energy efficiency?", Tyndall Centre for Climate Change Research, Working Paper 160, June 2014

[42] House of Commons 2014, "The Green Deal: Watching Brief (Part 2): Government response to the Third Report of Session 2014–15", Energy and Climate Change Committee, HC 882

(ix)   Authoritative endorsing body

The 22 Australian information systems benchmarked in our research[43] are delivered by a cross section of these sources. In addition to these systems, most providers of energy efficiency products and services also produce their own consumer information on energy efficiency performance. As discussed in Section 1 above, despite this surplus of consumer information, studies consistently find that consumers' information needs are not being met. The strong consensus among government, industry and consumer stakeholders interviewed by Common Capital is that inconsistent information and messaging across industry and government is a major barrier to consumer trust. There is a very high-level of stakeholder support for establishing a standardised, authoritative, national system for communicating information on the energy efficiency of existing homes. Stakeholders believe that if such a system can be established with an open and collaborative Governance structure, and with provision of credible information, then a critical mass of industry will embrace it. Stakeholders believe that the endorsement body that maintains such an information system, combined with the efficient and consistent provision of information is the single most important factor to establishing consumer trust[44].

(x)   A diversity of delivery sources is desirable

Consumer research identified trust for a wide range of trades and professions, and demand for information across a broad range of decision points. The most trusted professionals identified were construction specialists such as architects, electricians, building inspectors, builders and plumbers. The least trusted professionals were real estate agents, display home staff, mortgage providers and home insurers[45]. There is also strong consensus among stakeholders that members of a broad range of trades and professions should be able to deliver information, provided they are supported by appropriate training, accreditation, and compliance. In a voluntary system, the more people that can deliver information, the greater the likelihood it will be delivered. It also reflects a general agreement that the cost of providing information is likely to be lower if this can be done by service providers who are trusted and already interacting with households.

We interviewed representatives of building services industries that could potentially bundle certified assessments. Of these, building inspectors were the most likely service providers for three reasons. Pre-purchase building inspections occur at high volumes and closely align with the home sale process (when most ratings are expected to occur). Building inspectors typically have the required levels of insurance to undertake the activities required to verify the adequacy of insulation, solar PV and solar hot water systems. Pre-purchase building inspections are typically bundled with other value-add services such as pest inspections for between $250-800. At the right price point, with adequate consumer demand, stakeholder research suggests that a sufficient number of building inspectors would be willing to bundle optional energy efficiency assessments.

Other potential commercially viable delivery channels are energy efficiency product installers such as insulation, lighting, solar PV, solar hot water. These industries typically have the requisite skill levels and insurance for a streamlined energy efficiency assessment. They also have aligned commercial incentives in terms for the benefits of third party verification of their product benefit claims. If a system was suitably streamlined, stakeholders reported that it is feasible that the price for assessments could be subsidised or waived as part of bundling with product installation costs. However providing information through these industries alone is likely to be inadequate to the objectives of a system. Moreover, previous research indicates that consumers who engage these services are likely to belong to customer segments that already value energy efficiency, and have less need for energy savings information. To succeed in driving more customers to value and invest in energy savings refurbishments, an information system must reach higher numbers of consumers from a broader range of customer segments.

For rental properties, builders and handypeople who provide maintenance and renovation services for property managers and owners are possible delivery channels.

This is not an exhaustive list of potential trades. Stakeholders concurred that a system should be open to anyone who could meet the requirements to deliver consistent and quality assessments, to drive competition and innovation in delivery and pricing. Many stakeholders pointed to the flexibility of who could participate in the NABERS assessor framework for commercial buildings. There was consensus that the training and administrative barriers to participation should be kept to a minimum.

(xi)   Real estate agent and property manager training and engagement

As identified in Section 2, key attributes of an effective energy performance information system is a capacity to additionally explain performance at a "features" level and communicate benefits using frames adapted to the values and beliefs of different customer segments.

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[43] Clark, M., 2014, Information Systems for Household Energy Efficiency, Common Capital. Australia.
[44] Refer to section 3.4 of Clark, M., 2015, Home Energy Efficiency Stakeholder Map, Common Capital. Australia.
[45] Refer to page 18. Romanach, LM., Jeanneret, T. and Hall, N. (2015), The EnergyFit Homes Initiative: National consumer survey results. CSIRO, Brisbane.

The Liveability Real Estate Framework is an example of how this can be delivered. The Centre for Liveability Real Estate provides an integrated training, compliance and marketing framework for real estate sales agents and property managers to verify sustainability features of existing and new homes and communicate their benefits using frames tailored to the values of different consumer segments at point of rent or sale.

Stakeholder research suggests that Liveability Real Estate Framework trained real estate agents are unlikely to play an active role in conducting certified performance assessments. However with appropriate system design they have the potential to be highly effective conduits of information in a number of ways:

- Real estate property managers have a critical role to play in facilitating communication and reducing split incentives between landlords and tenants
- Real estate sales agents are highly influential in shaping the property features that prospective buyers and renters notice and value

As such, it is important that national voluntary disclosure system is designed to connect with real estate agents and property managers' commercial drivers. Done this way, the system will see real estate agents and property managers using the energy performance information to:

- build consumers' trust regarding their transparency and capability to communicate about home energy efficiency
- bring consumers' attention to the monetary and non-monetary benefits of energy efficient homes, features and performance assessments, and
- provide facilitated disclosure and explanation of performance in the context of the key performance features and potential improvement measures, tailoring the framing of benefits to individual consumers at point of rent or sale.

Property managers also can play an important role in identifying potential service providers in the rental market that can serve as ratings assessors, such as builders and handypersons.

(xii) Self-assessment is important

A significant number of stakeholders felt strongly that optional, informal self-assessment was an essential attribute for an information system. This was seen as another channel through which understanding and trust of a voluntary system could be spread.

Most stakeholders saw merit in allowing the system to be used online for free by households for their own research purposes. Some stakeholders went further. They believed that free self-assessment was in fact critical to the success of a voluntary system. These stakeholders pointed to their experience of the National Australian Building Energy Ratings System (NABERS). They argue that if building owners were not able to conduct their own informal NABERS ratings they would have been far less likely to incur the cost and risk of a formal rating. Under a voluntary rating system, ratings are only of benefit to a homeowner if they showcase the energy efficiency strengths of a home. A free, informal self-assessment allows a homeowner to understand what a home performance is likely to be, and how to maximise it before they invest in a formal rating for marketing purposes.

5. In what form

The primary research findings on the form of information that consumers require is that it should combine star ratings with supporting information products. Information should be available online in the form of physical certificates and with the explanation of value and actions facilitated to allow for tailored messages. Consumers should have access to certified formal ratings for the purposes of communication with third parties, and informal estimates and supporting information for their personal use. Certified information must be low cost. Informal information should be free.

These recommendations draw from EnergyFit as well as previous research. There was also very high, but not unanimous, support for these positions across stakeholder groups. These findings are explained below.

(xiii) Star ratings

Meeting the requirement for relative and comparable information requires a form of rating. Ratings are a readily understood way to communicate comparative performance against benchmarks.

To be effective, a rating needs to include three key components:

- a means of measuring the energy performance of a home in a reliable and repeatable way;
- a means of using the measurements to benchmark the performance of home relative to equivalent homes; and
- a means of communicating the energy performance of the home to third parties in a universally trusted way. This can be used for a range of purposes, including:
  - o rating the home and comparing its performance with other homes;
  - o using the measurement and benchmark components to describe a minimum standard for home energy performance, which can then be used in a voluntary or mandatory capacity.

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o   using the rating to understand the financial aspects of home energy use and energy efficiency improvements
o   using the rating to identify energy saving opportunities

Figure 5shows the interaction of these components.

Figure 4 Rating components
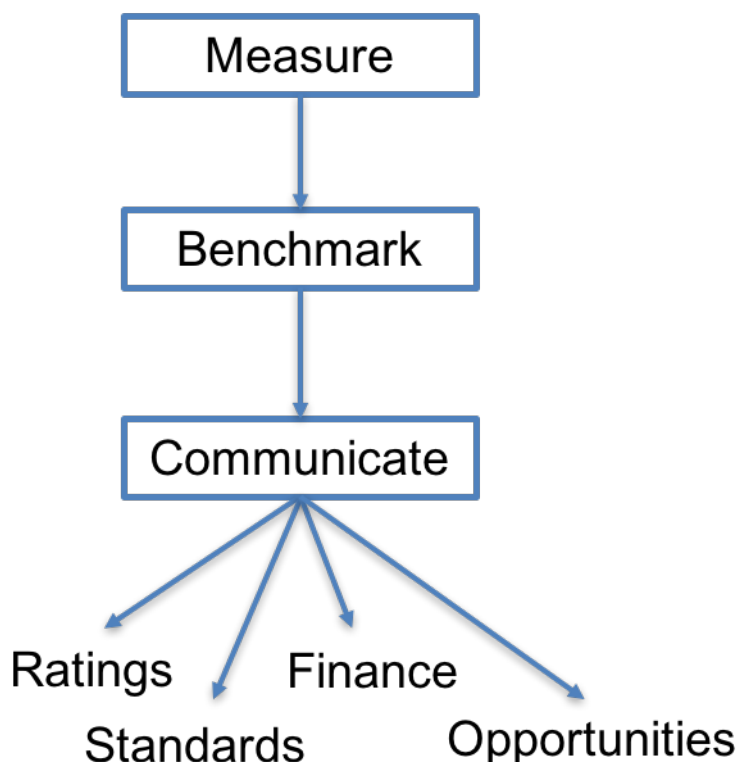
By way of example, the NABERS rating system *measures* the energy usage and floor area of an office building, uses this data to calculate normalised energy use (energy use per meter squared) that can be *benchmarked* with other buildings, and translates this into a star rating that can be *communicated* to third parties.

Another important feature of the NABERS rating system is its simplicity. The system was designed to rely only on information that is readily available to the property section – energy bills and floor plans. The complexity of the system is built into the ratings algorithm, with the user input and results being user oriented and easy to use.

User simplicity will be an important feature of a rating component of the national voluntary disclosure and will involve a departure from the approach taken in a number of existing residential rating tools, that involve complex data entry processes.

National and international research suggests that consumers have a strong preference for some discrete star ratings systems, and find other forms of ratings difficult to understand.[46] Research found that the most effective United States and European building labels align with their labelling programs for energy efficient appliances, Energy Star in the US and the A-G scale in Europe. A survey of 3000 householders in five European countries found that Germans had trouble understanding the more complex German home rating scale. Germany subsequently simplified its scale to align with the European A-G scale. [47]

A strong majority of Australian stakeholders interviewed by Common Capital support the use of ratings to communicate the comparative energy efficiency of homes. Within this majority, most stakeholders believe that consumers are likely to resonate most strongly with star-based rating systems. Stakeholder consultation suggested that the success of appliance

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[46] Refer to section 5.3.1, Clark, M., 2015, International information Systems for Household Energy Efficiency, Common Capital. Australia
[47] IDEAL-EPBD 2011, *Key findings & policy recommendations to improve effectiveness of Energy Performance Certificates & the Energy Performance of Buildings Directive*, <www.ecn.nl/docs/library/report/2011/o11083.pdf>

energy star ratings and NABERS depend upon consumer familiarity and understanding of star ratings scales. These stakeholders believe that consumers understand and value ratings, and are familiar with them from appliances, hotels, and an increasing array of Internet services.

These findings however raise tensions with other research findings. Many stakeholders involved with new building standards felt that it was essential that ratings should use a different scale from new build. Some raised concerns that a star rating system could result in consumer confusion over the equivalence of a five star (out of five) existing building with a five (out of ten) star NatHERS compliance benchmark. They fear that such inconsistency would cause confusion and undermine the credibility of both systems. Ensuring systems are aligned perfectly could avoid this inconsistency[48].

International research showed alignment with new building ratings was effective in encouraging deep retrofits in European disclosure schemes[49]. However, most stakeholders believe that this is neither desirable nor possible in Australia, due to the different scope and high cost of the existing new-build ratings. The stakeholders who raised concerns over inconsistency with NatHERS suggested that ratings for existing buildings could use a different kind of scale, such as the European A-G or bronze, silver, gold and platinum certification.

A minority of stakeholders however were sceptical of the value of ratings, and suggested that simple checklists could be sufficient to communicate existing home energy efficiency. But the general consensus was that a system which considers how features interact in a specific home is necessary to provide meaningful information.

Many other stakeholders felt that ratings confusion between new and existing homes is unlikely to be a material issue, as there is limited overlap between the new build and existing home markets. Within this overlap, the number of existing buildings that are likely to achieve a five star rating is even smaller[50].

The EnergyFit project specifically tested a range of rating types with consumers in focus groups and online message testing, including a star rating, the European A-G scale, and "gold/silver/bronze" ratings. The star rating and European A-G scale rating performed well, while the "gold/silver/bronze" rating performed relatively poorly.[51] When these ratings types were presented in isolation (i.e. without a Liveability Real Estate Framework message), more people recollect the star rating than the European A-G scale[52], and of those that did recollect the images, a greater percentage of those recalling the star rating were said it made a positive difference to the appeal of the home.[53] Focus groups identified star ratings as a familiar and visual compelling communication device for performance, however it was noted that additional information to justify and explain the assumptions was needed[54]. Message testing found that consumers consistently valued homes with four (out of five) stars significantly higher than equivalent homes with no energy efficiency rating information.[55] Consumers were further asked to identity the features of their ideal home, and then compare a home with those features to an equivalent four star home without those features. Under certain message frames (typically combinations of energy ratings and Liveability Real Estate Framework style message framing), consumers stated they were more willing to visit the four star home, found the four star home more appealing, and stated they would be very willing to pay their estimated price for the four star home.[56] The other visual communication devices tested were not effective. The results of the message testing suggest that the most effective communication approach of all, was the combination of star ratings or European A-G scale ratings with Liveability Real Estate Framework style message framing, tailored to different consumer segments.[57]

On balance we recommend that a voluntary disclosure system communicate energy performance via star ratings, and (where appropriate) in concurrence with messaging that promotes the comfort and lifestyle advantages of homes with EnergyFit characteristics. Consumer demand is essential for the success of a voluntary disclosure system. New homes account for around 2% of the national housing stock each year[58], and are subject to regulatory obligations to meet minimum energy efficiency standards. These regulations also apply to major renovations in existing homes, such as

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[48] Refer to section 3.5 of Clark, M., 2015, Home Energy Efficiency Stakeholder Map, Common Capital. Australia.
[49] Refer to section 4.2 of Clark, M., 2015, International information Systems for Household Energy Efficiency, Common Capital. Australia.
[50] Refer to section 3.5 of Clark, M., 2015, Home Energy Efficiency Stakeholder Map, Common Capital. Australia.
[51] Refer p58 of Leviston, Z., Malkin, S., Green, M., & Gardner, J. (2015). The EnergyFit Homes Initiative: Message frame testing. CSIRO, Australia.
[52] Refer p37 of Leviston, Z., Malkin, S., Green, M., & Gardner, J. (2015). The EnergyFit Homes Initiative: Message frame testing. CSIRO, Australia.
[53] Refer p40 of Leviston, Z., Malkin, S., Green, M., & Gardner, J. (2015). The EnergyFit Homes Initiative: Message frame testing. CSIRO, Australia.
[54] Refer to p40 of Hall N, Jeanneret T, Romanach LM (2014) The EnergyFit Homes Initiative: Focus group results. CSIRO, Australia.
[55] Refer p23 of Leviston, Z., Malkin, S., Green, M., & Gardner, J. (2015). The EnergyFit Homes Initiative: Message frame testing. CSIRO, Australia.
[56] Refer pp31-33 of Leviston, Z., Malkin, S., Green, M., & Gardner, J. (2015). The EnergyFit Homes Initiative: Message frame testing. CSIRO, Australia.
[57] Refer p58 of Leviston, Z., Malkin, S., Green, M., & Gardner, J. (2015). The EnergyFit Homes Initiative: Message frame testing. CSIRO, Australia.

[58] Commonwealth of Australia (2008) *ENERGY USE IN THE AUSTRALIAN RESIDENTIAL SECTOR 1986 – 2020; p25*

extensions or substantive alterations. Renovated homes subject to efficiency standards may comprise up to 8% of house sales[59].

The remainder of the market is not subject to any standards of performance measurement, and represents a much larger opportunity for energy savings. Even renovated homes are likely to have significant saving opportunities, as the minimum standards apply only to the renovated section of the home. Adoption of NaTHERs and BASIX is driven by compliance obligation, not consumer marketing. The ratings systems for new homes as such do not have strong brand awareness outside the building industry. Even within this context, compliance ratings are most commonly used to provide binary pass/fail standards rather than to communicate relative performance.

For these reasons the known benefits of a star ratings system outweigh the potential risks of brand confusion with compliance ratings. We recommend that the visual design of the star ratings and system branding seeks to mitigate the residual risk of confusion between disclosure ratings and NatHERS compliance benchmarks.

(xiv) Low cost certificated ratings and free self-assessment

The majority of stakeholders believe that some form of formally certified ratings is required for effective communication of home energy efficiency at the point of sale and lease. They believe an endorsed assessor, accredited by a credible governance body, must provide the certificate.

Some stakeholders believe that a range of certificate types might be desirable, including for example:

- A free online assessment for research purposes that is not certified

- A low cost and less accurate (while highly repeatable) formal assessment that is officially certified to suit most homes

Note the vast majority of stakeholders agreed that consumer did not require a system with highly accurate predictions of household energy consumption, if it meant tradeoffs with ratings costs. Accuracy in this sense means the capacity to predict actual outcomes within a narrow band (e.g. +/- 5%). Beyond a base-level of accuracy, measurement of the large number of physical and behavioural factors that drive variation in energy consumption is seen as likely to drive up ratings costs. However, accuracy is distinguished from precision or repeatability, which stakeholders concur cannot be compromised on. For example, a given ratings (e.g. 3 stars) may represent a broad range of potential real work energy outcomes. However, stakeholders believe that it is essential system rules and quality assurance are such that if different assessors rate the same home, they will all agree on the same rating.

There is high consensus that the information must be low cost or free. However, some emphasise that consumers will not value information that is free, and it must have a nominal price that can be waived as part of bundled offers. There is general support for tiered forms of information provision including free informal self-assessment[60].

Based on our analysis of the market incentive structures and administrative funding requirements, a price will need to be charged for formal ratings in order to attract sufficient numbers of ratings assessors. Of the potential trades and professions that could deliver information, we have identified building inspectors as the most likely to be able to do so at scale for a price that is attractive to consumers. CSIRO research found that consumers are unlikely to pay more than $200 - $250 for formally certified information on home energy efficiency. A high number of consumers, 44%, reported that they were unwilling to pay anything for information[61]. For this reason it is paramount to keep the costs of information provision to a minimum. The majority of stakeholders believed that it is not possible to ensure consistent information is provided without some kind of on-site assessment. A degree of pre-completion of information over the phone or online might be possible, but stakeholders believed that on-site verification was essential to provide third parties buyers/renters with confidence in its veracity. Stakeholders reported that labour and customer acquisition costs in Australia mean that it is not typically cost effective to provide any trade visit to a home for less than $100-200. This means that bundling energy efficiency performance assessments with existing services is the most likely scenario for onsite certification of building performance to be delivered within reported consumer price thresholds.

As outlined in section 3 above, self-assessment and informal ratings estimated must be provided for free, to allow consumers to understand the potential benefits of disclosing their certified ratings without costs or risks.

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[59] Common Capital analysis based on ABS 4102 (2002). 6% of houses are renovated every year on average, 34% of renovations involve extensions or other external renovations. We have conservatively assumed that houses are 4 times more likely to have a major renovation prior to sale than average.
[60] Refer to section 3.5 of Clark, M., 2015, Home Energy Efficiency Stakeholder Map, Common Capital. Australia.
[61] Refer to page 18. Romanach, LM., Jeanneret, T. and Hall, N. (2015), The EnergyFit Homes Initiative: National consumer survey results. CSIRO, Brisbane.

(xv) Key performance features and actions and facilitated delivery

As outlined in section 1 above, consumers require explanation of performance results to help understand and trust that ratings are relevant for them. Consumers also desire information of possible actions to improve performance. Internationally, such action-oriented disclosure systems have proved effective[62]. Finally as outlined in sections 1 and 3 the diverse consumer attitudes on the benefits of energy efficiency mean that facilitated explanation of benefits is desirable. These three factors have additional implications for the form of information.

In addition to providing certified ratings and informal self-assessment, the system needs to provide supporting information products. These should include explanation of the key features (or lack of) that result in rating performance and suggested actions to improve ratings.

As well as physical and digital ratings and information, the system should be designed to allow facilitated communication of ratings benefits, leveraging the message framing developed within the Liveability Real Estate Framework...

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[62] Refer to section 5.4.2 of Clark, M., 2015, International information Systems for Household Energy Efficiency, Common Capital. Australia.

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3. Potential models for information provision

There is a broad range of potential implementation models for the governance, administration and operation of a national voluntary disclosure system. These models vary by the structure of organisations and the allocation of responsibilities between different parties. The selection of an implementation model has implications for the administrative costs, credibility and efficacy of an information system. For the purposes of the EnergyFit project, the selected implementation model drives the business and marketing plans, and has significant implications for key cost assumptions in the cost benefit analysis.

This section identifies the major components of a national voluntary disclosure system, and considers three main implementation options. These options have been drawn from stakeholder consultation, benchmarking of national and international systems and consideration of related effective industry and government programs in Australia. The three main options considered are:

- Centralised administration
- Lean administration
- Self-administration

This section sets out a high level analysis of these options and a recommended implementation option for a national voluntary disclosure system. Sections 4 and 5.1 set out the administrative and governance model and a marketing plan for how this model would work in practice. Section 6 provides a road map for developing and implementing this model.

Consultation with energy efficiency stakeholders has revealed a high level consensus that energy efficiency ratings should be available for homes at the point of sale and lease, and that the rating system should be designed to deliver consistent results at the lowest possible cost to consumers. Implementing this system will require an effective administration and governance structure that ensures consistent ratings at least cost.

Different information systems in Australia and internationally vary significantly in their governance and administration. However, these systems share a number of generic, core activities that are essential for their operation. The primary difference between implementation models is in the allocation of responsibility for these different activities.

1. Governance and administration models

As detailed in section 6, there was an overwhelming agreement of stakeholders about the desired attributes of an energy information system. There was also consensus amongst stakeholders about the objectives of system governance, administration and operation. Where stakeholders differed is on the precise implementation model required to meet these objectives.

Stakeholders agreed that a rating system needed to be endorsed by a credible body, with government and non-government stakeholder representation that delivers consistent results at the lowest possible cost to consumers. As detailed in Section 2, qualitative and quantitative consumer research clearly supported stakeholder perspectives that there will be very little demand for a system where ratings cost more than $200-$250. Only 56% of households reported that they were prepared to pay for energy performance information.

The size and structure of governance administration has significant implications for the costs of a system. Government and industry stakeholder feedback was that under any plausible implementation scenario, ongoing administrative costs would have to be cost recovered through ratings. Therefore, the administrative arrangements has significant implications for the affordability of ratings and likely take up. System costs and take up in turn have significant implications for the cost-benefit case for establishing a system. Therefore it is critical to design the administration and governance to deliver credible and reliable ratings for minimal cost.

Stakeholder views on system governance and implementation required to achieve this objective covered a spectrum of positions: from no formal governance through to a full time well resourced administrator. For the purposes of analysis, these perspectives can be grouped into three general implementation model options. The three general options identified are:

- Centralised administration
- Lean administration
- Self-administration

Centralised administration involves a large and active administrator with close control over all aspects of delivering ratings. Lean administration gives delivery partners greater autonomy to act within an agreed framework. Self-administration involves agreed industry standards or codes of conduct with no active administration.

Various environmental initiatives currently in place in Australia provide examples of these general implementation options. The NABERS and Green Star programs make use of an administrator, and have close control over the design,

provision and promotion of ratings. They actively manage issues like tool development, training, accreditation, audits and compliance. The GreenPower and Commercial Building Disclosure schemes alternatively use a leaner administrative model, with a small administrator providing rules for providing accredited products. Standards Australia and the Australasian Procurement and Construction Council's code of conduct on procurement of construction products provides examples of self-administration. These successful schemes do not have significant administrative oversight, but rely on temporary working committees to develop a fixed standard that guides market delivery.

In order to compare the advantages and disadvantages of these models, it is necessary to define in more detail the activities involved in delivering a home energy rating system that meets the desired requirements. Section 2 sets out the generalised components of a rating system. Sections 3 to 5 set out these models in a standardised way. Section 6 compares the advantages and disadvantages of each, recommended a preferred model for detailed analysis.

2.   Components of an energy rating system

To help compare implementation options side by side, it is helpful to consider a generalised model of an energy information system that aligns with the required attributes identified in Section 2 above. We have done this by adapting a *component business model*[63] approach to outline all the elements of administration and governance for a home energy rating system.

A component business model shows the essential autonomous *components* of a business, within the overall structure. The model identifies *system competencies* that describe the major activities delivered by the structure, at operational objective level. It also identifies the different *accountability levels* at which competencies are handled. Each autonomous component of the business model is allocated to both a system competency, and an accountability level.

Figure 6 below illustrates the generic component business model for a national voluntary disclosure system.

Figure 5 A generic component business model for a naional voluntry disclosure system

System competencies			
Accountability level	**Demand generation**	**Rating development and design**	**Rating delivery**	**Rating integrity**
Direct	Promotional materials	Rating system principles	Data entry rules	Reproducibility principles
Control	Monitor and report demand	Functional specification for rating system	Assessor training Assessor certification	Delivery partner accreditation System level reproducibility
Execute	Rating promotion Customer engagement Public website	Energy consumption model Rating benchmarks Rating calculator	Conduct ratings Certify ratings Rating database	Rating level reproducibility

As the above model shows, we have identified four key competencies that are required for the successful implementation of a rating system. These are:

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[63] IBM Business Consulting Service (2005) "Component business models: Making specialization real", <https://www-935.ibm.com/services/us/imc/pdf/g510-6163-component-business-models.pdf>

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System Competency	Purpose
Demand generation	To deliver customers for the rating
Rating development and design	To determine how buildings are measured, and develop the calculation system that allows this measurement
Rating delivery	To apply the measurement system to households in a reliable and repeatable manner
Rating integrity	To ensure that all components in the system work as intended to provide meaningful information to customers

To deliver these four competencies we have identified 20 main components of a national voluntary disclosure system. These components vary in terms of the degree with which they are strategic or operational in focus. Accordingly, responsibility for providing different components lies at different levels of seniority in the system.

The component business model has three levels of accountability. Responsibility for each component is allocated to one accountability level. The accountability levels are:

Accountability level	Role
Direct	Components at this level provide strategic direction and corporate policy to other components. They also facilitate collaboration with other components.
Control	These mid-tier components serve as checks and balances between the "direct" and "execute" levels. They monitor performance, manage exceptions and act as gatekeepers of assets and information.
Execute	These "boots on the ground" components provide the business actions that drive value creation in the enterprise. They process assets and information for use by other components or the end customer.

These core competencies, accountability levels and components will be required under each different model for governance and administration. In its simplest form a component business model might represent a single organisation. However when applied to different governance models, there will be a number of different parties involved with responsibility for different components. The parties involved in each of the three implementation models fall into one of three categories:

Board
- The body endorsing the national voluntary disclosure system, having responsibility for strategic direction and overall responsibility for the effectiveness of the system
- Examples include the NABERS Steering Committee, the GBCA Board (Green Star), Council of Australian Governments (CBD)

Administrator
- Responsible for coordinating strategic direction of implementation: providing secretariat support to the Board and operational oversight of delivery partner activities at a program level
- Examples include the NABERS Administrator, the GBCA (Green Star)

Delivery partner
- Parties involved in providing individual ratings at a site by site level, or supporting outsourced administrative activities
- Examples include accredited NABERS and Green Star assessors, approved NABERS auditors

Superficially, these three types of party appear to align with the three accountability layers in the component business model. Governing bodies generally are responsible for strategic direction, administrators for system control, and delivery partners for execution. However, in practice this is rarely the exact case. Nor should it be. Components should be allocated to the parties best able to deliver them according to the objectives and desired attributes of the system, and the capabilities of the parties involved.

Sub-sections 3 to 5 illustrate the potential allocation of accountability for components between these three party types, for the three different implementation options. For each model below, business components are coloured differently to reflect which of these parties is responsible for that component:

Board	Administrator	Delivery partner

3. Centralised administration

Under a centralised structure, a single administrator is appointed to manage both the day to day delivery of the national voluntary disclosure system along with quality assurance, rating promotion and rating design. A board directs the activities of the administrator, setting out a strategic direction for the system and rating integrity expectations.

Under these arrangements, some elements of rating delivery may be outsourced to delivery partners. In particular, the direct customer interactions such as conducting ratings and directly engaging with householders is best managed by delivery partners acting within the framework set out by the administrator

Figure 6 Component business model for central administration

Accountability level	System competencies			
	Demand generation	Rating development and design	Rating delivery	Rating integrity
Direct	Promotional materials	Rating system principles	Data entry rules	Reproducibility principles
Control	Monitor and report demand	Functional specification for rating system	Assessor training / Assessor certification	Delivery partner accreditation / System level reproducibility
Execute	Rating promotion / Customer engagement / Public website	Energy consumption model / Rating benchmarks / Rating calculator	Conduct ratings / Certify ratings / Rating database	Rating level reproducibility

Key:	Board	Administrator	Delivery partner

1) Examples

The NABERS scheme provides an example of this form of administration. A National Steering Committee provides strategic direction for the National Administrator, which is an agency of the NSW Government. The National Administrator is responsible for demand generation, rating development and design, rating delivery and rating integrity, outsourcing the point of actual delivery to "Accredited Assessors" that are contracted to the National Administrator to provide ratings, and act in strict accordance with the rating rules. The National Administrator is not involved in rating sales to customers. Assessors are responsible for conducting ratings for their own customers, and direct promotion to individual rating customers.

2) Benefits

The main advantages of this model are a high level of control over ratings reproducibility. The main disadvantages are the high costs through which this control is achieved, and the challenges in maintaining flexibility and innovation in centralised bureaucratic structures. Further considerations are as follows:

Advantages	• Direct control over rating integrity system may improve rating reproducibility
	• Single rating model – no customer confusion arising from multiple ratings
	• Governments may prefer high degree of control by an administrator
Disadvantages	• Higher overheads arising from large administrator
	• Limited incentive for the administrator to innovate in service delivery, as administration

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costs are generally passed on to Accredited Assessors as a fixed fee per rating.
- High overheads mean that government subsidies may be required to make this system viable.
- High degree of control limits market ability to innovate in rating design and delivery, which may increase overall costs.

4. Lean administration

This second model aims to minimise the administrative cost of a national voluntary disclosure system while retaining overall control of rating integrity and rating reproducibility.

As illustrated in Figure 8, the administrator does not directly deliver the rating system, but ensures that all elements are functioning as intended. The board in this model matches that for centralised administration, and is responsible for high level strategic direction. An administrator is established to ensure that the market is able to implement this strategy.

This model provides a greater responsibility to delivery partners, and hence leads to more flexibility and delivery innovation. Delivery partners have both a clear guideline on the outcomes they must deliver, and freedom to achieve these outcomes, rather than acting as agents for an administrator. This means that there is a significantly greater scope for competition and innovation in all elements of the system design and delivery.

Figure 7 Lean component business model

Accountability level	System competencies			
	Demand generation	Information design and development	Information delivery	Information integrity
Direct	Promotional materials	Rating system principles	Data entry rules	Reproducibility principles
Control	Monitor and report demand	Functional specification for rating system	Assessor training / Assessor certification	Delivery partner accreditation / System level reproducibility
Execute	Rating promotion / Customer engagement / Public website	Energy consumption model / Rating benchmarks / Rating calculator	Conduct ratings / Certify ratings / Rating database	Rating level reproducibility

Key: | Board | Administrator | Delivery partner |

3) Examples

Examples of a lean governance and administration system include the government run GreenPower and Commercial Building Disclosure schemes.

The GreenPower administration structure is particularly lean. The overall principles for the system are established by the government in legislation. Delivery partners (energy retailers) are free to innovate in their promotion and packaging of GreenPower products within these principles. The GreenPower administrator (an agency in the NSW Government) is responsible for monitoring overall compliance, and does so by requiring that participating energy retailers submit an annual independent audit of their purchase and sale of GreenPower compliant electricity. Under this system, delivery

partners are responsible for the day-to-day delivery and administration of GreenPower, but system integrity is still assured by the GreenPower administrator and clear governance principles set out by the board.

The Commercial Building Disclosure (CBD) scheme is administered by the Australian Government. Like GreenPower, the governing principles for CBD are established in legislation. An administrator (an agency in the Australian Government) is responsible for the administration of the system, with the majority of the day to day delivery of ratings outsourced to a delivery partner that acts within agreed guidelines. CBD requires that an energy efficiency rating be disclosed whenever a commercial office building is sold or leased. Proponents of rating products may seek approval from the administrator for endorsement of their rating as meeting the CBD requirements. At this stage, NABERS is the only approved rating product. The CBD administrator outsources rating design, delivery and integrity to delivery partners (primarily the NABERS administrator and NABERS Accredited Assessors). The NABERS administrator must comply with rating integrity and framework principles established under the CBD legislation, and make monthly compliance reports to the CBD administrator.

4)   Benefits

The main advantages of this model are acceptable levels of reproducibility, with low administrative costs and associated pass through to end customers. The low levels of administration however, mean that processes need to be designed with great thought and managed very closely to ensure delivery partner performance.

Advantages	• Small central administrator minimises scheme costs • System integrity assured by independent audits • Market delivery means greater scope for innovation in design and delivery, reducing overall costs and resulting in greater rating coverage as delivery partners innovate to meet rating demand
Disadvantages	• Higher risk of damage to rating integrity by less reliable market operators and potential for inconsistent rating calculators due to lower level of central control • Needs clear system of reporting to retain system integrity

5. Self-administration

This model completely decentralises the design, delivery and management of the national voluntary disclosure system to delivery partners.

As illustrated in Figure 9, under this model, the board would set out standards or codes of practice for delivery partner activities, but would not actively manage the system. There is no central administrator. Delivery partners would voluntarily agree to adhere to the accepted standard/code of practice, and independently develop systems and processes to ensure that their business complies with the standard. Rating integrity is limited to auditing and quality assurance by delivery partners, and the overarching protection of consumer law to ensure that delivery partners act in accordance with their commitment to adhere with the standard.

Note that in this case the "board" could be a standards or industry association that puts together a temporary committee to develop a high level standard / code of practice document. On publication of the document, the board may choose to leave it as a standard until such a time as a new version is required.

Figure 8 Self-administration component business model

Accountability level	Demand generation	Rating development and design	Rating delivery	Rating integrity
Direct	Promotional materials	Rating system principles	Data entry rules	Reproducibility principles
Control	Monitor and report demand	Functional specification for rating system	Assessor training Assessor certification	*Delivery partner accreditation* *System level reproducibility*
Execute	Rating promotion Customer engagement Public website	Energy consumption model Rating benchmarks Rating calculator	Conduct ratings Certify ratings Rating database	Rating level reproducibility

Key: | Board | *Component not allocated* |

5)   Benefits

The main advantages of this model are virtually zero administrative costs to be delivered, and scope for considerable industry innovation in tool development and delivery. The main disadvantages are the risks to system credibility if the lack of quality assurance oversight results in systemic poor quality or non-reproducible ratings.

Advantages
- No active central administrator means lower overall scheme costs
- Established system for joint industry/government creation of market standards (Australian Standards)
- Market delivery means greater scope for innovation in design and delivery, reducing overall costs and resulting in greater rating coverage as delivery partners innovate to meet rating demand.

Disadvantages
- May lead to many competing rating tools and consumer confusion
- Limited capacity to provide system integrity. Quality assurance generally provided by general consumer protection laws with no active enforcement.
- Training may be more difficult if different systems are developed

6. Recommended approach

The consensus position of stakeholders is that an energy disclosure system must deliver consistent results at the lowest possible cost to consumers. The administration of an energy disclosure system is a critical component in providing this reproducibility and managing consumer costs.

Table 5 provides a summary comparison of the three administration models described above.

Of the three implementation models considered above, the self-administration model presents the greatest disadvantages to successfully implementing a national voluntary disclosure system. The prospect of competing rating tools under this administration model clashes with the stakeholder preference for national consistency in the way homes are rated and the way the ratings are communicated. Also, the limited ability, under self-administration, for independent quality assurance will affect consumer and industry acceptance of ratings.

While the central administration model addresses these matters, it is likely to be the most expensive governance model to implement and also the one that may be slowest to adapt to innovation. Such innovation, especially by the various delivery partners, will be important to ensure the system adapts to change (in areas such as how ratings are conducted, the type of home energy use practices the ratings cover, and how the system is promoted to housing consumers). Innovation will also serve an important role in keeping implementation costs down.

Key strengths of the lean administration are that it provides a structure for national consistency and quality control, whilst also allowing for innovation in delivery.

Our experience from the EnergyFit Homes project is that there is a groundswell of support amongst key stakeholders in participating, on a voluntary basis, in the governance of a national voluntary disclosure system. This level of interest is most encouraging. It is also necessary to make a lean administration approach viable. Low-governance costs, combined with strong incentives for innovation ensure that ratings costs are kept low – a key housing consumer criteria for the success of the system.

This level of interest in participating in governance is currently demonstration in voluntary participation in the governance of similar initiatives - NABERS, Green Star, and NatHERS via ABSA. Strong participation is also observed in other initiatives, such as the NSW Government's collaborative residential project and CSIRO's National Conversation. These demonstrate that experts and key stakeholders are willing to offer their time to support initiatives, recognising the benefit to their sector. And ASBEC's "National Framework for Residential Ratings"[64] recommends that industry actually lead scheme development - shows very strong support from industry stakeholders for such a scheme.

Based on the above considerations, the lean administration model is best suited for a national voluntary disclosure system. This approach will reduce the overall cost of the system and allow each party to perform their ideal role – a government- or government/non-government stakeholder backed administrator providing oversight to ensure system reliability, and market-based delivery partners ensuring least cost to consumers.

A lean administration model can ensure a consistent message to the market and effective quality assurance at a low cost. This model outsources delivery to partners who then have a strong incentive to innovate and cut costs.

Given that the early stages of implementing a national voluntary disclosure system will involve significant investment in establishing key system elements, there will need to be more intensive governance during these years. During this time, the administrator will most likely be relatively active in establishing rules and processes for the system, play a hands on role in designing the rating system, governance structure and auditing processes etc. Once the system is "bedded in" with established governance, rules and operational rating system, the governance can transition to a leaner structure.

Table 5 Administration model comparison

Model	Central admin	Lean admin	No admin
Administrative costs	High	Low	Very low
Quality control and reliability	High	High	Low
Scope for market innovation to reduce delivered costs	Low	High	High
Inconsistent messages to the market	None	None if controlled by	Likely

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[64] January 2016, http://www.asbec.asn.au/research/

		administrator	
Startup costs and overheads	High – likely to need significant starting capital	Modest starting capital required to establish administrator and rating framework	Very low – use committee to set standard
Time to market	12-24 months to finalise tool development and roll out. Would use existing system as a starting point	12-24 months to agree on framework and for market rollout of tool/s (including adapting existing systems)	12-24 months to agree on standard and for market rollout of tool/s (including adapting existing systems)
Scaleability	Higher volumes will increase administrator overheads	Administrator overheads do not significantly increase with scale.	Very high, no ongoing overheads

4. Recommended governance and operating framework

This section sets out our recommended business plan, governance and operating framework for a new national voluntary disclosure system. It draws together the findings from section 2 on the recommended requirements of the system and recommendations from section 3 on the optimal implementation model. It sets out a proposed vision, mission and objectives for the system, and the proposed governance and operating framework. This covers a detailed assessment of the roles, accountabilities, functions, activities, and resources for each of the parties involved in the system.

The key recommendation of this section is that government, industry, research and consumer groups work together to establish and operate a national voluntary disclosure system.

The proposed mission of this system is to provide authoritative, accessible and reliable consumer information that facilitates step transformations in the energy efficiency of Australia's existing homes.

To achieve this mission, the system must drive uptake of both energy ratings and energy saving actions. This requires a governance and operating framework to ensure the relevance, accessibility, integrity and reproducibility of information.

This system should involve an open, collaborative and authoritative governance board, an administrator, and the rating system and marketing support to drive market delivery of ratings and information.

The governing board is the final decision maker for the endorsing body. It is responsible for setting and supervising the *strategic* direction of the system. Working groups will assist the board to establish and govern the system. We propose that the endorsing body initially establish three working groups with responsibility and membership split across different areas of specialist expertise. These areas are user experience and marketing; technical building energy performance measurement and rating; and system governance, policy and stakeholder management.

The Administrator has four main roles: secretarial support for the board and working groups, and providing operational control through contract management of third party delivery partners. The priorities for operational control are compliance, marketing and providing supporting technology such as a website.

There are three main sets of delivery partners: a system operator, accredited ratings assessors and real estate agents/property managers. The system operator is contracted to the administrator to develop and manage the core distribution and management technology platform on a day-to-day basis. Accredited assessors are responsible for promoting and delivering certified ratings to individual homes. Real estate agents and property managers are crucial intermediaries, who can facilitate consumers understating of the value of homes and features with appropriate training and engagement.

Under this approach, the board would be responsible for setting system objectives and performance indicators. The administrator would be responsible for monitoring and ensuring that delivery partners achieve these objectives. Delivery partners would have authority and incentives to innovate to improve reliability, affordability and uptake of ratings.

This section details our recommendations on how this is to be achieved. The following sections provide a high-level marketing plan, an implementation plan and financial analysis to establish and operating this system.

1. Purpose of proposed system

We recommend that government, industry, research and consumer groups work together to establish and operate at a national voluntary disclosure system in order to achieve the following:

Vision	That all Australians live in homes that provide the benefits of 21st Century energy performance.
Mission	To provide authoritative, accessible and reliable consumer information that facilitates step transformations in the energy efficiency of Australia's existing homes.
Strategic objectives	To drive 150,000 home energy efficiency ratings per year with supporting information and convert 30% of these ratings to energy saving refurbishments by 2027.
Outcomes	• $14,604 million in home owner and tenant bill savings to 2056 • 550,000 homes brought up to 21st century standards of comfort and energy affordability by 2036 • 35,757 GWh of electricity and 18,614 TJ of gas saved by 2056 • $5,068 million in new sales for high efficiency energy service and building products by 2036
Activities	• Generate demand for endorsed ratings and information products – through system/product integrity, broad based consumer marketing, and by helping the real estate industry, building inspectors specialist ratings assessors, rental market service providers and energy savings product and services suppliers to directly engage with home owners, vendors, buyers, renters and landlords. • Oversee the design & development of endorsed home energy efficiency ratings and information products that are – authoritative, relevant, understood, objective, comparative, affordable,

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accessible, verifiable and action oriented.

- Enable provision of affordable, reliable and endorsed ratings and information products by ensuring that supporting tools, skills, incentives, distribution channels and management systems are made available to industry delivery partners.
- Ensure the integrity of endorsed ratings and supporting information through efficient processes, functions and incentives that maintain a level of rating and information reproducibility required to ensure consumer and industry trust.

2. Current capabilities and gaps

As outlined in Section 2, we have formally reviewed 22 information systems that are currently available in Australia. Since this review was undertaken, the Victorian Government has announced its commitment to delivering a Residential Efficiency Scorecard to help Victorians understand the energy performance of their homes.[65] We have interviewed potential administrators and tool providers on their capabilities and interest in developing or administering a national voluntary disclosure system to provide energy ratings and information products for existing homes. We have interviewed a broad cross section of industry, government, research and community group stakeholders and thought leaders on the requirements and current capabilities in Australia for such a system.

Currently no single organisation meets all the requirements for system governance and administration, or for providing rating and information systems. However, several organisations have many of the desired requirements and could establish a system governance and administrative framework. A number of rating and information tools could also be adapted to meet the desired system requirements.

The research also found principle interest from potential industry delivery partners. However outside the Australia Capital Territory, energy efficiency ratings are not common practice for these industries, and there are high-levels of inconsistency in the information provided. While there is high consumer demand for home energy performance information, there is little awareness of any major tools or potential administrators.

This sub-section summarises the main capabilities and gaps in terms of alignment with the recommended national voluntary disclosure system. It also considers a non-exhaustive list of potential endorsing bodies, administrators and tool providers. These could be approached for their interest in progressing the recommendations set out in the remainder of this report covering system functional requirements, financial marketing plan and implementation road map.

1. Governance and administration

A key research finding is that the stakeholders believed industry and consumers would require a government body or a body with government and non-government stakeholder representation to serve as the endorsing body. Stakeholders did not have a preferred host organisation. There was consensus that stakeholders would support this body if it established sufficient cross industry engagement, sufficient resources and administration to promote, deliver and maintain reproducibility at scale.

A non-exhaustive list of the potential candidates most frequently identified includes:

- The NSW Government (NABERS Administrator)
- The Victorian Government (Residential Efficiency Scorecard Administrator)
- The Australian Government (NaTHERS Adminstrator)
- Green Building Council of Australia
- Clean Energy Council
- CSIRO

None of these organisations currently have the governance or administrative frameworks in place to develop and operate the proposed national voluntary disclosure system. However there was general agreement that these and potentially other organisations could establish the systems required with sufficient internal will and funding.

With the exception of the Clean Energy Council, each of these organisations currently has some kind of home energy performance measurement tool. However, none of these tools cover the scope of desired attributes, market scale or administrative capacity. Nor do any of these organisations have the recommended governance structures to provide open and collaborative decision-making across government, industry, research and consumer groups. Government

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organisations tend to lack external representation in their governance bodies, and non-government organisations do not generally include government representation.

At the time of writing, we understand that the Victorian Government is assessing options for development, delivery, marketing and administration of its Scorecard. The Government is also considering a voluntary program or new requirements for energy disclosure at point of sale or lease. At this stage it is understood that the Scorecard only covers Victorian homes, but could be adapted to be national with additional funding and support.

2. Existing information systems

Table 6 provides an overview of the 22 Australian home energy efficiency information systems reviewed.

Table 6 Overview of Australian information systems reviewed[66]

Systems providing information to support buying and selling of homes	
Queensland Sustainability Declaration (now discontinued)	Two of these systems involve an auditing process and completion of a checklist. One involves a complex rating of the thermal performance of the home. Scope covers passive thermal design features, fixed appliances and onsite generation. The outputs of the assessment, in the form of star ratings or list of features audited, are used to differentiate homes and to recommend implementing missed energy efficiency opportunities. Systems require training to conduct assessments, which are estimated to cost between $85 and $360.
Liveability Real Estate Framework's benchmarked 17 Liveability property features (the 17Things™)	
ACT House Energy Rating Scheme	
	A liveability 17 Things™ property appraisal is conducted free for homeowners and investors by specialist sales agents or property managers during the selling/renting cycle.

Systems providing information to occupiers of existing homes	
NABERS ratings	These systems typically involve assessments that can be completed by occupiers with general knowledge of their home. They are typically free on-line calculators that cover whole of house energy consumption. They provide outputs in the form of performance metrics or benchmarks and advice on behaviour and low-cost savings options.
NABERS Energy Explorer	
My AGL IQ	
Ergon Energy's Household Energy Use Calculator	
ClimateWork's Low Carbon Lifestyles	
Ecologic	
The Australian Government's Your Energy Savings (energy efficient living section)	

Systems providing information to support refurbishments	
The Victorian Government's Smarter Renovations Planner	These systems assess specific actions that can be undertaken during renovation to improve energy efficiency via passive thermal design, major appliances and onsite generation. Whilst many are free on-line self-assessments, they typically require some knowledge of a home's main building elements. They typically involve tailored checklists that focus on higher cost actions.
Energymakeovers' Sustainability & Efficiency Evaluation of Dwellings (SEED)	
Synergy's Energy Efficient Home Renovator	
Your Energy Savings (building and renovating section)	Results are presented online or as a printable report in the form of performance metrics, benchmarks and/or tips

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[66] Clark, M., 2014, Information Systems for Household Energy Efficiency, Common Capital. Australia.

NatHERS accredited software	These systems typically involve assessments using complex auditing processes, models or calculators. They typically require expert users with knowledge of buildings materials and simulation expertise. They can be high-cost such as between $400-$2400. They are either used to check a building design (thermal performance and/or major appliances) against minimum standards or to recognise efforts beyond compliance using performance metrics or benchmarks.
BASIX	
eTool	
The SA Government's Energy Efficient Home Design	
The Australian Windows Association's Window Comparison Tool	Results are typically presented as a star rating and/or detailed information on energy efficiency features.
The Green Building Council of Australia's Green Star Multi Unit	
The Australian Government's Your Home Technical Manual	
The HIA's GreenSmart Home	

Whilst there is considerable diversity in the functionality and application of these, none addressed the scope of desired attributes. However many of these systems could be adapted to meet both information and system attributes.

The major gaps against information attributes of currently available systems are shown in Table 7 below.

Table 7 Gap analysis of current information systems

Attribute	Gaps
Scope	No systems are currently designed with the scope required to communicate base building energy performance to third parties at the required level of (i) simplicity, (ii) reproducibility and (iii) choice of options.
	Most systems are either designed for building code compliance, requiring detailed design information; for home occupants, focussing on behaviour and actual energy use; or for renovations, focussing on a checklist of opportunities. No systems provide a benchmark suitable for point of sale or lease disclosure.
	Systems designed for building code compliance do not cover fixed appliances, or are state-specific
	Few systems cover both building fabric and fixed appliance energy efficiency.
Delivery points	Only three systems are designed for third party communication at the points of sale and lease:
	• QLD sustainability declaration (now ended)
	• Liveability Real Estate Framework
	• The ACT House Energy Ratings Scheme (ACTHERS)
	The remaining 20 systems are targeted at either existing occupants for personal use, or are for compliance or design purposes for new build and renovations.
Contextual & relative	Many of the systems reviewed provide contextual information on the relative impact of features (and behaviours) for given homes. However, two of the three point of sale and lease systems listed above are features-based checklists, and do not currently have the capacity to assess the relative importance of different features for given contexts.
Performance benchmarking	Several existing systems include a capacity to benchmark relative performance against similar homes. There are two types of benchmarks in place. Systems for newly constructed homes, such as NatHERS, BASIX, and Green Star Multi Unit, benchmark against modelled compliance standards. Systems for occupied homes, such as MyAGL and Ecologic, benchmark operational energy use against similar homes.
Benefit framing	Of all the systems reviewed the only one that provides personalised benefits framing is the Liveability Real Estate Framework. This has a comprehensive set of messages on performance benefits at a home and features level, tailored to different customer segments. The system provides supporting tools and training to develop industry capacity to identify customer segments and tailor messages.

Cost and accessibility	Most of the reviewed systems relied on extensive data collection. Of the reviewed systems, Ecologic was best able to estimate home energy use using easily gathered data. This system uses internet functionality such as mapping and appropriate default settings to allow a quick and easy calculation.

Two ratings that were not included in the review may be potential candidates for a disclosure system, the CSIRO AusZEH Design and the Victorian Government's Residential Efficiency Scorecard. These ratings were in development during the review, and are not yet market ready. However, as part of our research we interviewed the tool developers on planned functionality and deployment models. We were also able to see a prototype demonstration of the Residential Efficiency Scorecard.

Based on our understanding of developers' plans for these tools, both tools will come very close to achieving the recommended desired attributes needed for a national voluntary disclosure system. At the time of writing, neither two had demonstrated whether the tools could meet the required KPIs for ratings time or reliability. For this to occur both CSIRO and the Victorian Government need to secure funding and invest in the following: user experience design, a front end web-platform, field services application, backend databases to manage certified ratings and assessors, administration and quality assurance processes required to deliver ratings at scale. The Residential Efficiency Scorecard only had benchmarking data for Victorian homes, but could be expanded nationally with additional investment in data sets for other jurisdictions.

Of all the systems reviewed, including those under development, only the mandatory schemes have significant awareness amongst potential delivery channels for ratings and information products. These are ACTHERS, BASIX and NaTHERS. None of these systems is able to benchmark existing buildings without extensive data collection. Access to data from previous ratings may help to address this gap. New building rating data is now being routinely collected through the NatHERS and BASIX systems.

ACTHERS and NatHERS only assess the thermal performance of the home, and do not include fixed appliances such as lighting, hot water or solar PV. BASIX is only available in NSW, and relies upon ready access to building design information. Consequently, an initial investment in capacity building and promotion of participation is likely to be required, whichever tool provider is selected for the national voluntary disclosure system.

As outlined in Section 2, a key attribute of a system is an ability to integrate with the Liveability Real Estate Framework. This is the only current system with the capacity for adaptive benefits framing. While it lacks the capacity to provide comparative information on home energy performance, it is designed to complement a ratings system. The systems designed to help real estate agents and property managers understand and promote the benefits of energy efficient homes and features in ways targeted to align with the values of different customer segments. The real estate agent survey identified limited understanding of energy efficiency benefits and a perceived lack of client interest as a key barrier to agent provision of energy performance information. This is despite consumer research showing very high demand for information on home energy performance.

A significant increase in trained Liveability Real Estate Specialist sales agents/property managers is required in order to achieve a critical mass of property marketing professionals who enhance consumer demand, facilitate adaptive message framing of rating and performance benefits and advocate for this new value proposition. An initial investment to accelerate specialist training for real estate sales agents/property managers is an important feature of the national voluntary disclosure system recommended in this report.

Consumer research did not identify material levels of consumer awareness of any of the systems identified, with the exception of the mandatory ACTHERS system in the ACT. Consequently, whichever tool provider is selected for a national voluntary disclosure system, a significant initial investment in marketing will be required to develop wide scale consumer awareness.

Section 3 details the proposed governance and operating framework required to address these gaps and establish a national voluntary disclosure system. Section 6 sets out a high-level road map and budget for addressing these gaps in order to develop and operate the proposed national voluntary disclosure system.

3. Overview of recommended model

We recommend that government, industry, research and consumer groups collaborate to identify and agree on a body to endorse a national voluntary disclosure system, and to establish governance and administration, that transitions after establishment to lean arrangements, to oversee its development and operation. The endorsing body could be an existing or new entity and either a government body or a body with government and non-government stakeholder representation, provided it has the governance structures required to achieve industry and consumer support. We recommend governance and administration adapted from the *lean administration* model outlined in Section 3 with a mix of parties involved at governance, administration and delivery.

Figure 10 below, provides an overview of main parties involved in the proposed system and their high-level relationships. The endorsing body is composed of a governing board, working groups and an administrator. Direct communication with consumers and delivery of ratings is conducted by a number of industry parties. Rating tools and technical support are

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provided by a designated system operator, which reports to the administrator on operational matters, and services the needs of ratings assessors.

Figure 9 Proposed governance and operating model for national voluntary disclosure system
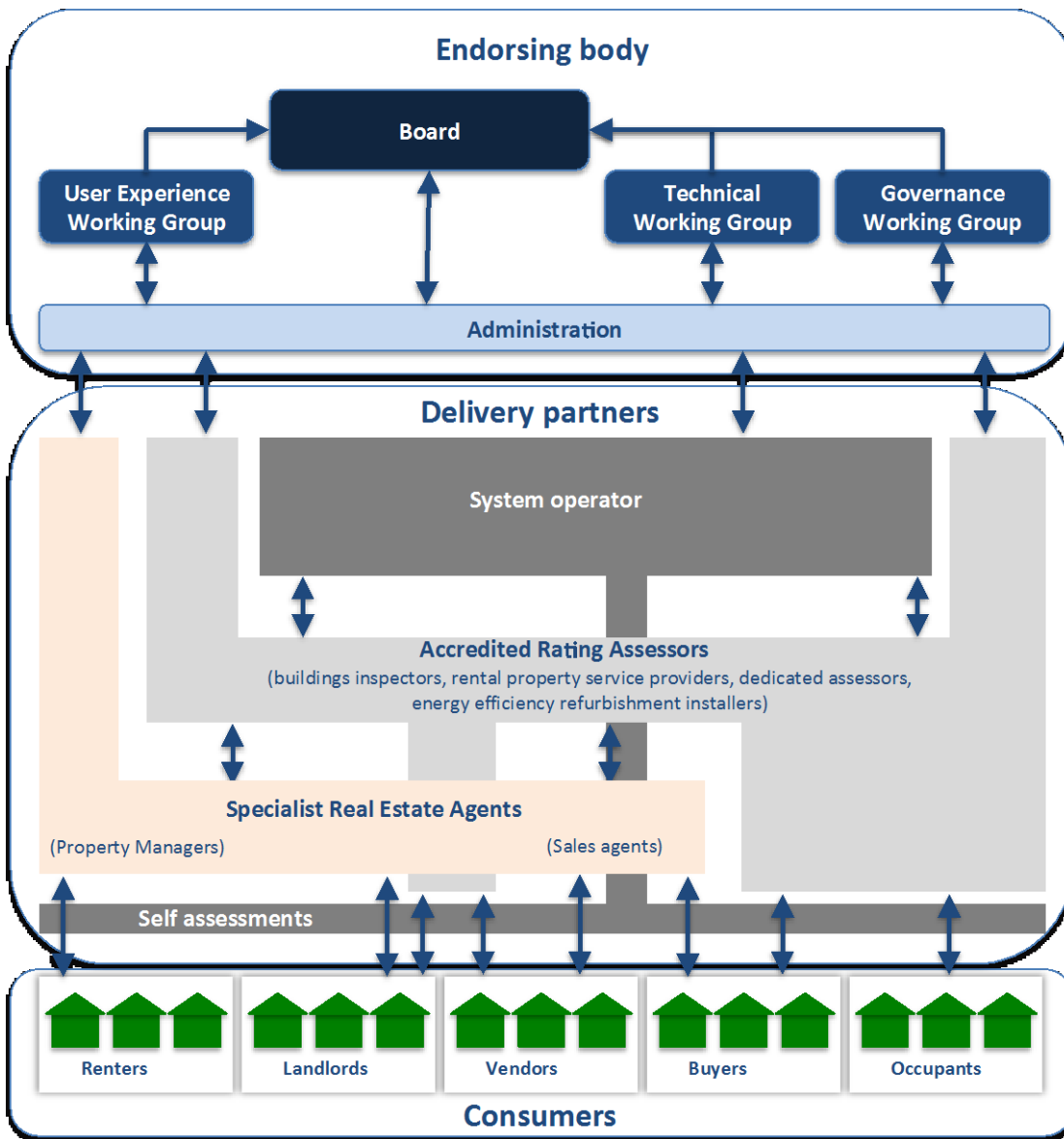
We have adapted the generic lean administration component business model, to align with the recommended requirements of parties involved in this specific information system. These are set out in Figure 11 below. Subsections 4 to 7 explain these components in more detail and the activities and functions required by each group of parties to meet their accountabilities.

Figure 10 Component business model for national voluntary disclosure system

System competencies			
Accountability level / **Demand generation**	**Information design and development**	**Information delivery**	**Information integrity**

Direct

Marketing strategy	Rating system principles	User experience principles	Rating reproducibility principles

Control

Marketing and brand management	Functional specification for rating system	Assessor accreditation	Delivery partner accreditation
Monitor and report demand	Rating design	Assessor training	System level quality assurance
	Information product content	Data capture rules	Input data Evidentiary standards
	Ensure rating relevance	Assessor compliance	Rating level reproducibility
		Monitor and accessibility & experience	Assessor level reproducibility

Execute

System promotion	Energy consumption model	Conduct ratings assessments	Rating management system
Customer priming		Certify ratings	Assessor management system
Direct rating sales	Rating benchmark calculations	Self-assessment	Input data validation
Web presence	Rating tools & delivery platforms	Information product delivery	Rating conversion tracking
Demand tracking	Information product development	Value communication	
	Model & benchmark updates		

Delivery Partners

Key: | Board | Administrator | System Operator | Certified ratings assessors | Real estate agents |

4. Endorsing body and its board

(xvi) Endorsing body

As outlined in Section 2, the endorsing body could be either a government body or a body with government and non-government stakeholder representation, provided it has a governance structure and the commitment and capabilities required to effectively deliver the system. Stakeholder consensus is that to reduce shortcomings with current systems, the crucial requirement is that the endorsing body has the broad support of a critical mass of industry, government, research and community group stakeholders.

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A government endorsing body could be hosted by a single government that operates the system on behalf of and in consultation with industry and other governments. For example the NSW Government operates the NABERS commercial program nationally, with input and funding from the national, state and territory governments provided through the NABERS Steering Committee. Alternatively, a government endorsing body could be a combination of state and/or national governments jointly managing the authority of a program or a statutory authority. For example, the Equipment Energy Efficiency Program is implemented through an Intergovernmental Agreement between the Commonwealth, states and territories. Alternatively other bodies such as the Australian Energy Market Commission operate as quasi autonomous authorities, reporting through to national, state and territory energy ministers under the Council of Australian Governments (COAG) framework.

However, national programs and authorities under COAG typically take many years if not decades to develop and evolve. Many successful COAG programs (including the above examples) evolved from initiatives and governance structures started by a smaller number of state jurisdictions.

Given the history of delays and challenges in establishing a standard national framework at a COAG level, it may be preferable for one or two jurisdictions to lead the development of a system in consultation with other jurisdictions and stakeholders. Once established the endorsing body could later be transitioned to a COAG framework. Alternatively, it could continue as a national program, hosted by one jurisdiction on behalf of the others, such as NABERS and GreenPower.

Alternatively, if a body with government and non government stakeholder representation were to host and establish the system, it would similarly need to work with governments and other stakeholders. Likewise it could establish the system as a program or a separate body. Examples of government and non-government -led national programs include:

- The Australian Buildings Code Board
- The Australia Standards managed by Standards Australia
- The Australian Energy Market Operator's ownership structure

There are advantages and disadvantages of different structures for an endorsing body. Ultimately, the body or bodies hosting the endorsing body will consider these matters in consultation with other stakeholders. As set out in Section 6.1, a significant initial investment will be required to establish this system. Once established the proposed lean administrative business model will operate on a cost recovery basis. Therefore, the largest determinant of the endorsing body is likely to be the capacity and willingness to establish it. As the cost benefit analysis in section 10 sets out in detail, there is a strong case for public and industry investment.

(xvii) Governing Board

As illustrated, the governing board is the final decision making body for the endorsing body. It is responsible for setting and supervising the *strategic* direction of the system. Working groups will assist the board to establish and govern the system. We propose that the endorsing body initially establish three working groups with responsibility and membership split across different areas of specialist expertise. These areas are user experience and marketing; technical building energy performance measurement and rating; and system governance, policy and stakeholder management.

In line with the lean administrative model, the key competencies for which the board is accountable for are set out in Table 8.

Table 8 Governing Board key competencies

System competency	Component accountability	Activities
Demand generation	Marketing Strategy	• Endorse marketing and brand management strategy

Information design and development	Information system principles	• Oversee the establishment of and adherence to the principles governing the composition of ratings and supporting products, based on the attributes identified in section 2 including:
		   o Scope, context, relevance, form, framing
		   o User experience, uptake and conversion rates
		   o System, administrative and individual rating cost
		   o Technology platforms and formats

Information delivery	Delivery targets	• Set system performance targets including for:
		   o Accessibility
		   o Uptake or ratings and information products
		   o Households investing in energy upgrades
		   o Building stock improvement
		• Oversee performance against targets and direct action to improve performance/raise targets if required

	User experience	• Oversee the establishment of and adherence to the principles to govern experience of users including consumers, delivery partners and broader stakeholders

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	principles	
Information integrity	Reproducibility principles	• Oversee the establishment of and adherence to the principles governing the standards of rating reproducibility that must be adhered to maintain credibility

As outlined in Section 2.4, a key attribute of a system is that the endorsing body provides open and collaborative decision-making across government, industry, research and consumer groups. To ensure ongoing stakeholder engagement and support and consumer credibility the board should:

- be comprised of representatives from government, industry, research and consumer groups
- be appointed through processes open to nomination and input (if not direct selection) from government, industry, research and consumer groups
- have board appointments for a fixed period with a transparent and democratic process for reappointment and filling vacancies
- have transparent and democratic decision making processes

Given the strategic level of accountabilities, the board is only likely to need to meet periodically (for example quarterly). Membership would most likely be unpaid to keep system costs down.

(xviii) Working groups

While strategic in nature, decision making on information and reproducibility principles will need to be informed by detailed analysis of a range of governance, policy, marketing, design and technical energy performance issues. The volume of issues to be considered is likely to be highest in the initial establishment stage of the system while the governing principles and operating framework are being set up. To assist and advise the board and administrator in this initial and ongoing analysis we propose the establishment of advisory working groups that report to the board.

These proposed working groups serve three goals:

- engage with national expertise on a broad range of issues
- expand ongoing stakeholder engagement and collaboration beyond board appointment processes
- keep the resources requirements of the Administrator to a minimum

As with the board membership, participation on these working groups would be unpaid. Sizes would not need to be fixed. Participation in these groups could be more flexible than the more formal processes required for a board, provided a balance was struck between manageability of size and fair distribution of workload. To manage these considerations, the board would most likely need to establish work programs and assign tasks to groups.

We propose that the endorsing body initially establish three working groups with responsibility and membership split across different areas of specialist expertise. These areas and the components for which they are accountable for providing detailed strategic direction on are set out in Table 9.

Table 9 Proposed working groups and accountabilities

Working Group	Accountable for providing strategic direction on:
User experience	User experience - Advise and assist the board on design, application and evaluation of principles to guide the ongoing delivery of successful experience that covers: • consumer and ratings assessors • rating tool and information product appearance, platforms, accessibility, framing, interface, and usability
	Marketing - Advise and assist the board on design, execution and evaluation of the promotion and marketing plan
Technical	Technical building energy performance measurement and rating
Governance	System Governance - Advise and assist the board on establishing, monitoring and maintaining organisational charter and the board appointment and decision marking processes and procedures
	Stakeholder management – advise and assist the board on establishing, monitoring and maintaining engagement with a critical mass of stakeholders to ensure adoption of the system as a national voluntary disclosure system.
	Policy - advise and assist the board on engagement and coordination with other government and non-government organisations on the development, implementation and evaluation of complementary policy and program initiatives

The final number and composition of groups would depend on the required tasks. As would the time a group is required, and the frequency with which it needs to meet. Given the heightened workload in the establishment stage of the system,

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there would be benefit in the administrator temporarily providing additional policy and project resource assistance to working groups and the board.

Based on the high level of stakeholder interest and commitment to a national voluntary disclosure system, our research suggests that there would be many highly skilled volunteers to participate in these working groups.

5. System administration

As outlined in Section 4 we recommend, following establishment, a lean administration model for the system, in order to keep administrative costs to a level at which the total rating costs remain within the price range of consumers.

Note that this requirement is only partially premised on the assumption that the organisation that hosts the administrator will seek to run the system on a cost recovery basis. If a host organisation is willing to fund ongoing cost recovery through ratings, then larger administration may be feasible. However, as outlined in Section 3 there are benefits associated with lean administration. In particular, voluntary systems need to respond to market conditions, and the administrator will need agile decision making and the ability to rapidly develop and introduce innovations. These attributes may not be possible within a large bureaucracy.

This Administrator has two main roles:

- Provide secretarial support to the board.
- Provide operational control for the board through contract management of third party delivery partners.

There are several goals for managing operational control through outsourced contracts. These are:

- Containing development and administration costs through competitive tender and contract management
- Accessing specialist expertise of a calibre which would prove challenging to obtain or develop and retain internally
- Allow agile delivery with innovation and responsiveness to market feedback, while retaining administrative control over desired outcomes
- Creating strong incentives for achieving desired outcomes through financial penalties and contract re-tendering

There are also risks associated with outsourced program delivery that must be carefully managed through the tender, contract drafting and contract management:

- Outsourced delivery partners own a critical amount of core IP, systems and data to the extent that switching providers would be costly, disruptive and unlikely – thereby removing incentives for the provider to deliver, innovate and contain costs
- The contract manager lacks oversight of sufficient operational performance detail to assess and manage contractual delivery of outcomes
- The contract manager lacks staff with the appropriate skills, support or empowerment to monitor and enforce contractual rights

It is critical that the assignment and management of administrator accountability for system components is done in a way that manages these risks while achieving the benefits.

Table 10 sets out the core system components for which the administrator is operationally accountable. Table 11 sets out the additional delivery partner accountabilities that the administrator must take particular care of to retain contractual control, should it be required.

Table 10 Administrator accountabilities

System competency	Component accountability	Activities
Demand generation	Monitor and report demand	Establish and administer processes for measuring demand for certified and self-assessed ratings, information products and conversion rates (ratings to action) against KPIs
		Report findings to User Experience working group, board, and system operator for action
Information design and development	Functional specification for ratings	Adapt ratings principles from working groups to detailed functional specifications and KPIs for system operator tender selection criteria and contractual conditions
		Monitor and contractually manage delivery of functional specifications and KPIs by the system operator during contract period
	Rating design	Design and develop visual design and branding of ratings and information products based on consumer insights, in consultation with technical and user experience working

		groups
	Ensure rating relevance	Review technology and building stock trend information and benchmark data updates from system operator, marketing strategy results, and user experience monitoring
		Ensure rating functional specifications, benchmarks and information products remain relevant
Information Delivery	Monitor accessibility and experience	Gather feedback on relevance, ease of access and affordability of the system and products and the quality of user experience from: • Consumers • Accredited assessors • Real estate agents • Broader stakeholders
	Assessor compliance	Monitor and enforce accredited assessor compliance with reliability and quality requirements through QA process
		QA process to include contracting third party assessors to reassess ratings (approx. 5%) on random and targeted basis
Information integrity	Delivery partner accreditation	Control and administer tender processes to assess appoint and manage marketing and system operator delivery partners
		Develop and manage contract to ensure marketing and system operator delivery to contracted commitments including: Rating reproducibility Tool accessibility Rating cost Rating take up Conversion rates
	System level reproducibility	Control the establishment and operation of quality assurance processes for ratings reproducibility, including: monitoring and providing incentives to meet required rating reproducibility KPIs at system operator and assessor levels Taking appropriate compliance and enforcement level at system operator contract, and individual assessor level
	Input data evidentiary standards	Set appropriate, objective, auditable, but commercially feasible evidentiary standards for the rating input requirements developed by the System operator For example determine the evidence require to demonstrate a home has ceiling insulation to the appropriate R value for the climate zone

In order to manage the above risks associated with contract management, we recommend that the administrator is also responsible for the additional system components that are delegated to third party partners for execution. These are described in Table 11 below.

Table 11 Additional delivery partner accountabilities to be controlled contractually by the administrator

Component	Delivery partner accountabilities requiring close contractual management
	Control broad-based consumer marketing to drive awareness and demand for the information system through contracts to marketing and advertising delivery partners.
	Ensure system operator and other delivery partner access to and cross platform consistency in delivery of system branding, marketing messages and collateral through system operator contract.
	Prime market demand and ensure consumer access to rating explanations and energy saving refurbishment benefits through delivery partnership agreement and real estate agent/property manager training subsides (5400 agents over 2 years).
Assessor training	Control the adequacy of the assessor training delivered by the system operator, by managing the desired outcomes of training through the QA framework rather than training inputs through: • contractual requirements on the system operator to ensure rating reproducibility KPIs are met, with a sliding scale regime of penalties based on materiality of breaches • certification requirements for individual assessors to achieve minimum reproducibility levels through random and targeted audits with a sliding scale of penalties for breaches (e.g. fine, suspension/cancellation of certification and rating system account access, mandatory retraining).
Assessor	Maintain rights and capacity to control certification of each individual assessor while contractually delegating day to

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certification	day responsibility for managing certification to the system operator through:
	• Ensuring the administrator retains contractual ownership of the assessor accreditation system and database (in the event of system operator contract termination of non-renewal) • Ensuring the administrator retains access to assessor accreditation and access to the system for quality assurance purposes • Contractually require system operator to manage assessor accreditation and access to rating system; and ensure that accredited assessors maintain minimum levels of rating reproducibility
Rating database	Maintain rights and capacity to review rating input and results at individual household level while contractually delegating day to day responsibility for managing the ratings database to the system operator through:
	• Ensuring the administrator retains contractual ownership of the entire ratings management system and database including inputs and outputs in the event of contract termination or non-renewal. The system operator will likely retain ownership of any background IP including the actual ratings algorithm. • Ensuring the administrator retains access to the ratings system for quality assurance purposes
	Contractually require system operator to manage rating reproducibility at system and assessor levels

In order to deliver these accountabilities, the administrator would have four main functions. These are set out in Table 12.

Table 12 Proposed administrator functions and activities

Administrator Function	Key activities
Secretariat	Help establish governing board and working groups
	Provide ongoing secretariat support to the board and working groups
	Provide the board operational assistance to develop and run a tender process for a system operator to develop and operate the rating system
	Provide the board operational assistance to develop and run a tender process for marketing delivery partners to develop and deliver broad based consumer marketing to drive awareness and demand for the information system (including ratings & information products)
	Procure supplier and subsidise real estate agent/property manager training in, including promotion of the endorsed rating as the national standard, tailored framing of the benefits of ratings, energy saving homes features and refurbishments
	Manage contracts with delivery partners (system operator, marketing partners, real estate agents) to ensure obligations and KPIs are met (including access, take up, reproducibility).
	Manage contracts to ensure administrator retains access and ownership of critical delivery systems (including ratings and accreditation portals and databases)
Quality assurance	Operational control of quality assurance processes for ratings and information products to ensure reproducibility and other requirements are met at system operator and individual assessor levels, including: • Contracting third party assessors to reassess ratings (approx. 5%) on a random and targeted basis to monitor, and provide incentives to meet required rating reproducibility KPIs at system operator and assessor levels • Implementing appropriate compliance and enforcement at system operator contract and individual assessor level
Marketing	Provide the board operational assistance to develop and implement the marketing and promotion strategy including: • Funding and managing a broad based consumer marketing campaign delivered by the marketing partner. • Funding and managing targeted events and promotion to potential assessors through events and networks • Subsidising training of 5400 trained real-estate agents and property managers over two years to develop critical mass of agents/property managers who are trained to promote the rating system and the benefits of energy saving homes, features and upgrades. The system administrator will also have an important role to work with property managers to skill up their builders and handypersons for delivering ratings. • Contract managing the system operator to ensure user experience, branding, accessibility, uptake and other marketing KPIs are met

The resource requirements for these administrator functions will vary over time. The establishment stage is likely to require a greater number of resources to help develop the systems and processes. Once these systems are established and the governance and delivery contracts and administrative processes are in place, the resource requirements will be lower, if processes are designed efficiently. In the initial stage, senior officer level skills are required for executive

governance, building energy performance, marketing, and procurement. Once governance systems and delivery contracts are in place, the more junior skills will be required to provide secretariat support, manage the contracting of audits, and to monitor and report on contract performance. Senior resources would be required for the escalation and management of any governance, contractual or compliance issues that emerge.

Note that the different skill sets required do not necessarily equate to the number of staff required. As outlined in Part II we have assumed 2.5 EFT plus consulting budget for establishment, and 2.5 EFT ongoing staff requirements, increasing over time to 3.5 EFT. If the administrator is located in an existing organisation, it can draw on part time specialist marketing and procurement assistance from other resources. Similarly, if the administrator is located in an existing organisation, it can draw on existing management, finance, human resources and information technology support. For this reason, lower administration costs should be possible if a larger established organisation hosts the endorsing body. The board will need to monitor administrative costs and system efficiency.

6. Delivery partners

The proposed system has three main types of delivery partner, as illustrated in Figure 10, and explained in Section 3. These are:

- The system operator
- Accredited ratings assessors
- Sustainability trained real estate agents and property managers

The system operator is contracted to the administrator to develop and manage the core rating system on a day-to-day basis. Accredited assessors are responsible for delivering certified ratings to individual homes. Appropriately trained and engaged real estate agents and property managers are crucial intermediaries, who facilitate consumers understanding of the value of homes and features. The accountabilities, functions and activities of these parties are as follows.

(xix) System operator

The system operator's accountabilities relate to the development, operation and improvement of the core systems involved in day-to-day delivery of ratings and information products. The system operator is contracted to the administrator, and receives revenue from a share of each certified rating. Depending on the results of the proposed tender process, the administrator may share some of the initial system development costs, in exchange for contractual control and ownership of core rating system. However, it is important that the system operator also benefits from system performance, by receiving a share of revenue per ratings. This provides ongoing incentives for the system operator to maximise the efficiency, usability, reliability of the system, in addition to contractual obligations and penalties.

There are several potential administrators who have rating algorithms, but require the rating system technology, governance and administrative functions to delivery ratings and information products at scale (e.g. The Victorian Government or CSIRO). There are potential rating tool providers that have algorithms, but lack administrative or endorsing body potential (eg. EcoLogical). There are other potential administrators who have governance and administrative capabilities that could be readily adapted, but lack suitable rating tools and rating system technology infrastructure (eg. the NSW Government NABERS administrator). Alternatively the Administrator could be a joint venture between several entities combining existing rating algorithm, governance, and administrative capabilities (eg. NSW and Victoria / CSIRO).

Under any of these scenarios we recommend that it is crucial to the efficient and effective operation of the system that the governance, administration and delivery layers are kept separate. This means that under all scenarios the administrator tender a fixed term contract to a third party system operator to develop and operate the core rating system.

The key system components that the system operator is accountable for are:

Table 13 Rating system operator accountabilities to be controlled contractually by the administrator

System competency	Component	Activities
Demand Generation	Web presence	Establish and maintain system web presence as a delivery channel, inline with marketing and brand management requirements
	Demand tracking	Track demand for certified and self-assessed ratings, information products and conversion rates (ratings to action) against KPIs
		Report findings to administrator
Information Design and Development	Information product content	Control the content for information products to support rating, in line with high-level system functional requirements (eg. key features that underlie performance result, tips to improve performance, performance-benefit messages)
		Tool provider responsible for market testing, innovating and updating information products to

		maximise rating uptake and retrofit conversion rates
	Energy consumption model	Maintain and operate model to predict the base building home energy consumption data used to calculate ratings against benchmarks
	Rating benchmark calculations	Maintain and operate the data sets and models used to benchmark home energy performance against equivalent homes to generate ratings
	Rating tools & delivery platforms	Develop, maintain and operate the rating system and tools required for ratings delivery, including: • Field rating tools/API/aps for accredited assessors • Printing physical rating certificates/stickers (if required) • Web self-assessment portal, API and aps for consumers • Ensure supporting systems to allow reliable delivery at scale
	Information product development	Maintain and operate the integration of information products into rating delivery platforms
	Model & benchmark updates	Gather data for administrator on rated home features to allow updating of benchmarking data sets
		Monitor technology and market developments in energy savings features and building stock baseline improvements for the administrator to allow updating of benchmarks and functional requirements
Information delivery	Assessor accreditation	Determine accreditation requirements as necessary by the system operator to meet contractual obligations around: • Rating reproducibility • System costs • Manage accreditation and ensure assessor commitment to rating reliability, conduct requirements and consent to audit regime and penalties
		Provide Administrator system permissions and functionality to • monitor rating inputs, outputs and evidence at household and assessor level • take appropriate enforcement action (including accreditation and assessor login suspension/cancellation)
	Assessor training	Control the development, delivery and updating of training if required, as determined necessary by the system operator to meet contractual obligations around: • Rating reproducibility • System costs • Ratings uptake
	Data Capture rules	Control business rules, logic flow and functionality to determine how best to capture required data to calculate ratings, considering efficiency, reproducibility and user experience. (Eg. pre-populate inputs based on Google Maps and/r building age, etc.)
	Certify ratings	Manage day to day data validation and certification of ratings using automated online processes.
		Meet contractual obligations to ensure rating reproducibility at system and assessor levels
		Provide Administrator with autonomous system access required to independently audit all ratings and supporting evidence
	Self-assessment	Provide platform and ensure accessibility, user experience, and uptake of the free non-certifed "self-assessment" for consumers
	Rating level reproducibility	Control the identification and implementation of systems required to ensure rating reproducibility targets are met from home to home
	Assessor level reproducibility	Control the identification and implementation of systems required to ensure rating reproducibility targets are met from assessor to assessor
	Rating management system	Develop and maintain rating management system for issuing ratings and database for storing rating input
		Provide and maintain accounts and appropriate permissions for: • Administrator • Rating auditors • Accredited assessors • Individual households
		Administrator to maintain contractual ownership of system and database
		Provide access and facilitate integration of accredited ratings to third party platforms/products/apps to maximise exposure, i.e. web services access for home sale and lease websites, government information portals etc.

	Assessor management system	Develop and maintain management system for issuing accreditations and tracking assessor performance, and database of accredited assessors
		Provide and maintain accounts and appropriate permissions for: • Administrator • Rating auditors • Accredited assessors
		Administrator to maintain contractual ownership of system and database
	Input data validation	Develop and maintain system functionality and operational processes to validate input data and ensure it meets evidentiary standards required by the Administrator (E.g. ensuring insulation levels are installed and maintained correctly and are appropriate to given climate zone,)
	Rating conversion tracking	Develop and maintain system functionality to allow data gathering on which ratings and self-assessments lead to energy savings refurbishments and rating improvements (e.g. track aggregated rating improvements and new features for homes which are re-rated/self-assessed then rated, while protecting consumer privacy)

Selection, management and incentives for system operator

As outlined above, we propose that the System Administrator select a system operator through competitive tender process. The precise requirements and participants in this process will depend on which entities become the endorsing body and administrators, and be signed off by the system board. We propose three mechanisms to encourage the system operator to continually ensure the success of the system. These are: limited term contracts, contractual performance obligations on reproducibility and uptake, revenue share per rating.

To drive ongoing performance and avoid organisational complacency and bureaucratisation, system operators should be on limited term contracts. For these contracts to provide meaningful incentives, it must be practical and cost effective for administrators to switch providers in the event of non-delivery or changing policy and consumer requirements. Many outsourcing contracts are awarded on the lowest upfront cost, and result in foregoing ownership of core elements. This makes the transaction costs of switching providers high, as alternative future providers would face significantly higher establishment costs to compete. Without this competitive incentive, outsourcing contract managers are left to rely on the intensive management of contractual obligations regarding operational performance.

Therefore the tender process must be designed with a view to maintain future contract renewal as a strong performance incentive structure for the system operator. A key requirement is that at the end of the contract, ownership of the rating system would rest with the administrator. Unless the administrator retains ownership of the rating system, the initial system operator is virtually guaranteed to have its contract renewed, due to the transaction costs involved in switching providers. Ownership of the underlying ratings algorithm could rest with the party that originally owned it.

Contractual obligations for operational performance are none-the-less a key part of the incentive structure for the system. As outlined above, the system operator would have ongoing contractual obligations to ensure delivery against KPIs for key system components, including rating uptake, accessibility and reproducibility.

Finally it is important that the system operator receives ongoing incentives to maximise system performance and minimise costs. Fixed price contracts provide poor incentives for exceeding minimum contractual requirements and continuous incremental performance improvements. This project has developed an extensive evidence base for the high-level demand and functional requirements of the system. However there are many potential nuanced variations in how each of these requirements can be designed and executed. Exactly which detailed design features work best, through which delivery channels and customer segments, can only be known through market testing. Moreover, consumer demands, and household energy efficiency features will continually change over time. If the system meets its objectives to transform the market for energy efficient homes, then it will accelerate the rate of change within properties. Therefore, continuous innovation and incremental improvement must be integral for the success of the system. The capacity of small commercial providers to rapidly innovate and adapt, is a key reason for contracted delivery of the ratings system under the lean administration model. To capture these benefits the appropriate incentives must be put in place. Therefore, we recommend that the system operator be able to receive a share of revenue per rating.

Optimising system performance

Our recommended operating model allocates a number of components to the system operator that might traditionally be retained by the administrator. These include accreditation, training and front-end rating design. This is a very deliberate recommendation to ensure a holistic approach to system design and delivery and an alignment of incentives.

These factors all have significant impacts on the system costs, user experience and rating reproducibility. The more complex accreditation processes are, the higher the administrative costs and less attractive participation is. Higher administrative cost and lower assessor supply both result in higher rating costs, and fewer ratings. Similarly the more

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complex and costly tools are due to the greater likelihood of errors, higher compliance costs, more time consuming ratings, poorer user experience and higher training requirements.

If the administrator designed these elements and then the allocated operation was given to the system operator, this would create split incentives. The administrator would focus on compliance while the system operator would focus on cost, and neither would have visibility of control over components needed to achieve their respective goals. This would create a high risk, as is not uncommon with many government run programs, that administrative costs would be prohibitively high and contracted delivery partners would seek to cut costs at the expense of compliance.

The incentive structures outlined above provide the appropriate balance of incentives and controls on the system operator to both generate demand and ensure rating reproducibility and quality. The allocation of accountabilities must then empower the system operator with control of all the components they need to achieve these goals and while enabling the administrator to hold the system operator accountable for success.

Accredited ratings assessors

Under the proposed operating framework, the primary delivery channel for certified ratings is accredited ratings assessors. Based on industry consultation we have identified a number of service providers that obtain accreditation as assessors under a voluntary information system. These are building inspectors, dedicated sustainability assessors, installers of energy savings features and equipment and maintenance/renovation service providers to the rental market (builders and handypersons).

These assessors will play a crucial role in the success of the system. Most of the system components need to be designed and operated with a view to ensuring they align with the commercial incentives, skills and resources, and the practicalities of business processes for potential and accredited assessors. However, in terms of the proposed business component model, accredited assessors are only directly accountable for executing two components, as set out in Table 14.

Table 14 Accredited ratings assessor accountabilities to be controlled contractually by the administrator

System competency	Component	Activities
Demand Generation	Direct rating sales	Persuade individual consumers to undertake formal certified assessments of homes
Information delivery	Conduct ratings assessments	Gather and input required data and evidence into ratings field tools
		Upload to rating system for validation and certification
		Issue certified rating to customer
		Maintain a required rating reproducibility and conduct standards
		Submit to audit requirements and comply with enforcement actions
		Pay license (or equivalent) fees to system operator
	Information Product delivery	Provide explanation, context and advice around the supporting information products generated by rating tools including: • explain the key features that underlie performance result • suggested energy savings refurbishments

The key roles of these different groups are as follows.

Building inspectors & dedicated assessors	Building inspectors are expected to be the primary direct delivery channel for conducting formal certified ratings for buyers, vendors and landlords. Ratings are most likely to be sold as an optional ad-on as part of a package of existing building inspection services. With sufficient market demand, dedicated assessors may also emerge that specialise in delivering certified ratings and information products.
	Both groups would directly market and sell their services to consumers, and work with real-estate agents for referrals. The commercial viability of these sales and marketing efforts will be heavily dependent on the underlying level of awareness and demand that the administrator can create through broad based marketing.
Rental market service providers	Buildings inspectors are not expected to be a significant provider of ratings to the rental market. It is likely that those already working in this sector will be best placed to incorporate energy ratings into their services. It is common for real estate property managers to utilise the services of builders and unlicensed handypersons. With a well designed rating system, that is user focused and easy to use, these parties could offer ratings to venders during

Energy saving product installers	Energy efficiency refurbishment installers offer a further channel for direct delivery certified ratings. Examples include installers of energy efficiency air-conditioning, windows, insulation, water heating, lighting and solar PV. Installers may sell certified ratings or bundle their costs with installation to provide independently endorsed certification of product claims.

A crucial success factor for a national voluntary disclosure system rests on their being a sufficient number of accredited assessors who are capable of both selling and delivering ratings. For sufficient numbers of people to seek initial accreditation as assessors, they must believe that ratings will be in the commercial interest of their business. For building inspectors, dedicated assessors and rental market service providers, the primary incentive is likely to be the additional revenue they can obtain by selling ratings. For energy efficiency product installers, there may be an additional incentive in terms of anticipated greater product sales, by bundling ratings with installation.

For these incentives to be material, two things must occur:

- The broad based consumer awareness and engagement campaign must stimulate consumer awareness, and drive demand and value for ratings and information products
- Process efficiency needs to be integral to all aspects of the system to ensure that the administrative, licensing, audit and rating transaction costs allow ratings to be provided for a price consumers are willing to pay while offering assessors enough additional revenue to offset the opportunity costs of rating delivery

In considering whether the ratings would offer sufficient incentives to potential assessors, it is inadequate to calculate the cost of a rating based on the time it takes by the hourly rate of an assessor, plus admin costs. Most building trades and professionals' existing business models are structured around performing a certain number of jobs per day. Extending the time they spend at one site could result in not having enough time to visit as many sites in a day. For example if a building inspector can inspect three sites a day on average, an extra 30 minutes to conduct a rating on one site could mean they don't have time to inspect the third site. This means the cost of the rating must be calculated not on the hourly rate of the time it takes to complete, but the opportunity cost of the revenue they would have made on the third job. In this example, if the marketing campaign and rating product development can generate sufficient demand that the first two sites both want ratings, then the opportunity cost can be shared. In this way the more successful the system administrator and system operator are at generating demand, the lower the cost of ratings will be, and in turn a likely higher demand.

In section 10 we have modelled various uptake scenarios based on different rating prices. As detailed in the assumptions report, the sensitivity of the business case is tested against a range of installer margins. These tests confirm that the program has a net benefit to consumers even with significant installer margins (>100%). The exact margins charged by installers will need to be market tested, and will depend heavily on the demand for ratings that can be generated through marketing.

If the ratings tools are designed to be as efficient and intuitive as recommended, then the training and accreditation requirements for assessors should be minimal. As outlined above the more complex the ratings tools are the higher the delivery and administrative costs and the likelihood of inconsistent ratings, and the lower the appeal to consumers and assessors.

Mandatory continuous improvement training is a common feature for accredited information delivery systems. For many of these systems, training is important due to the complexity of the system. However, training is also a key revenue generator for administrators, and required to cover the high administrator staffing costs.

Given the very high price sensitivity of both consumers and of installers it is essential that all aspects of this system are as efficient as possible. Therefore, the field tools for delivering ratings and information products must be designed to be efficient and the user-experience intuitive so as to require as little training as possible. Ideally training should be no more onerous than completing a short online course and exam. It is an essential functional requirement that tools and evidentiary requirements are so intuitive, efficient, and easy to understand and use for both consumers and assessors, that extensive training is not required. Together with an easy to use tool and relevant training, quality assurance audits will be used to maintain the creditability of ratings.

Similarly, it is not uncommon for government administrative programs to have complex accreditation processes. Often there are unclear correlations between accreditation requirements and program goals. Similarly it is common for accreditation processes to attempt to foresee and prevent compliance issues, well before it is possible to do so. This is often the case because administrators lack the sufficient resources, powers or support to rigorously enforce compliance breaches when they occur. We recommend that to ensure the efficiency and success of the system, the system operator be empowered to design and adapt accreditation requirements as needed to achieve both reproducibility and uptake obligations.

Ideally accreditation should require little more than:

- providing ABN, appropriate insurance certificates of currency, passing required training
- contractually consenting to compliance and enforcement regime, code of conduct and licensing fee structure

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It may be appropriate for accredited assessors to undergo a provisional accreditation period with mandatory independent audits of their ratings.

In order to enable the success of these efficient training and accreditation processes a well functioning compliance process is essential. The proposed system balances delivery efficiency with independent ratings audits by the administrator, the system operator's contractual obligations to ensure reproducibility. and the accreditation obligations on the assessors. For this approach it is essential that the endorsing body empowers the system administrator to routinely enforce and publicise compliance breaches.

Trained and engaged real estate agents and property managers

As outlined in Section 2 real estate agents and property managers are key intermediaries in property market decision-making. If agents and property managers can be harnessed to communicate the value of energy efficient homes, features and ratings, they have the potential to be a powerful distribution channel for the system. Conversely, if a national voluntary disclosure system does not engage agents and property managers with its value proposition, their scepticism or opposition could provide a significant barrier to consumer engagement. The Liveability Real Estate Framework is an example of how to train and motivate agents and property managers to promote and facilitate understanding of the system's value.

Agents and property managers facilitate communication and exchanges of value between buyers and sellers, tenants and landlords. In doing so they have significant influence with respect to the property features they identify and the value and potential they attribute to them. Agents and property managers curate and manage all aspects of the property sales and rental cycle including:

- the selection and value placed on positive and negative property features and potential enhancements in appraisals and viewings
- the photographs and features selected and promoted in advertisements
- the selection and framing of the features of a home and its potential that are emphasised in open-house inspections for prospective tenants and buyers
- the recommended maintenance and improvements communicated to landlords

Property inspections are not just for active buyers or renters. It is common for neighbours or people thinking about buying one day to browse advertisements and attend property inspections to understand the market and get ideas about what they might like to do for their own homes. As such, real-estate agents and property managers are a channel to communicate the understanding and value of energy efficient homes (features and ratings) to existing occupants.

EnergyFit research determined that real estate agents and property managers are open to discussing energy efficiency information at the point of sale and lease. More than half of the real estate agents interviewed as part of a national survey identified energy efficiency features to potential buyers "most of the time" or "all of the time". International evidence supports this result. For example, 66% of real estate agents in France would "often" or "always" include a good energy efficiency rating when selling a property[67]. Training is an important factor in the agents' willingness to point out energy efficiency features. With appropriate training, real estate agents are significantly more likely to talk about energy efficiency with potential homebuyers. On average, trained Liveability Real Estate Framework real estate agents considered energy efficiency ratings "important" to the sale of a home, while other agents were neutral on average.

As outlined, the Liveability Real Estate Framework is "features-based" property marketing framework which provides training, resources and communication strategies to empower real estate agents and property managers to promote and advocate for the value of energy efficiency homes and features at point of sale or rent. It does so using nuanced message framing that targets different consumer segments This customisation of messaging widens the consumer reach of the value proposition afforded by a rating system and re-engages many consumers who want to reduce their energy costs and achieve comfort but have been disengaged by negative connotations that "sustainability" and "energy efficiency" messages have acquired

In the proposed system's operating model, we allocate key accountabilities to real-estate agents and property managers, as outlined in Table 15.

Table 15 real estate agent and property manager accountabilities to be contractually controlled by the administrator

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[67] European Commission DG Energy 2013 "Energy performance certificates in buildings and their impact on transaction prices and rents in selected EU countries", Project code SP-0165 / CEENEREPC April 2013

System competency	Component	Activities
Demand Generation	Customer priming	Stimulate customer interest and awareness in the existence and value of the system, efficient homes and efficient features
		Suggest or facilitate engagement accredited ratings assessors as part of building inspection, property maintenance, or sales/lease preparations
Information delivery	Value communication	Facilitate conversations to help people understand the relationship between the benefits of efficient homes, features and high ratings and the connection with property value

Property managers are the primary intermediaries between investors and tenants. They are crucial in facilitating communication to generate demand, engaging rating assessors and promoting energy savings refurbishments. If successful they can help break down split incentives between property vendors and buyers. They play a crucial role in generating demand, facilitating ratings and personalised framing of benefits, and promoting energy savings refurbishments. A recent pilot study[68] in the ACT is extending the knowledge base of applying the Liveability Real Estate Framework to the rental market.

We do not propose any formal allocation of these accountabilities. They are crucial components to the success of the property information system. The system must be designed and managed to provide engagement and incentives for agents to voluntarily fulfil these roles. For the system to succeed it needs to engage with and be understood and valued by as many agents as possible. The Liveability Real Estate Framework is a good example of an approach to achieve this..

The more specialist trained agents there are, the greater the role they can play in market priming and value realisation for consumers at point of sale or rent. The high-level marketing plan in Section 5.1 sets out our recommendations on the actions required to drive this outcome.

7. Consumers

As set out in Section 3, there are five main consumer groups for home energy performance information. These are home owners and investors vendors, buyers, renters and landlords. In practice individual consumers may belong to more than one group at a time, and many consumers will belong or aspire to belong to different groups over their lives. Ratings and information products need to be relevant to the different needs of each group at different times in the buying/selling/renting cycle and in between the buying/selling/renting cycle but also allow standardised communication between consumers of different groups about the comparative performance of specific homes.

Renters are unlikely to directly purchase certified ratings. They are more likely to request information about or receive ratings through facilitated communication by property managers, with landlords responsible for purchasing ratings and rating products.

Buyers, sellers and investors are the prime target markets for direct sales of certified ratings and information products from building inspectors and dedicated assessors. Property sales and lease agents may also promote or facilitate access to ratings. Agents may provide these consumer groups with personalised context on ratings benefits and potential energy savings renovation opportunities to improve ratings and benefits.

Home occupants who are not currently planning to participate in the property market are less likely to buy formal certified ratings as stand alone products. They are potential customers for certified ratings and information products for free or nominal charge, when bundled with the sale of energy savings refurbishments.

All five groups are likely customers for the free, uncertificated self-assessments. Each group would seek to verify or obtain a risk free understanding of the implications of a certificated rating. Ratings and information products would be obtained directly off a web-based platform from the system operator.

The high-level marketing plan in Section 5.1 sets out the proposed product, pricing, promotional plan and channels for reaching these consumer groups.

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[68] The 'Energy Efficiency Information for Tenants' pilot was completed by the Centre for Liveability Real Estate (CLRE) on behalf of the ACT Government's Environment and Planning Directorate (EPD) between July 2015 and January 2016.

5. Consumer awareness and engagement plan

This section provides an outline for an integrated consumer awareness and engagement plan, covering the key target markets, pricing, distribution and promotional strategies. This outline is intended as the starting point for the development of a comprehensive marketing plan which will be developed by the administrator. This outline covers major target markets and segments, information products and pricing structure, distribution channels and delivery platforms, and the promotional strategy for the roll out of the system.

The primary markets for this system are homeowners and investors of existing freestanding and semi-detached homes across Australia. The information priorities for these consumers are also likely to further divide into vendors, buyers, renters and landlord as they enter and exit particular times in the buying-selling-renting cycle that triggers their interaction with the system. Further segmentation is relevant by individual consumer attributes (life stage, values, socio economic factors, etc.) and property type. These variations in consumer sub-segments have implications for the required message framing, promotion and distribution of ratings and development and delivery of information products.

Home energy efficiency ratings and information products will be used to communicate information to third parties (e.g. from vendors to potential buyers) and for first party use (e.g. owners, occupants). These parties are likely to cut across a wide range of the different consumer segments and sub segments. They need to be designed in a way that they will be easily recognised and understood by a range of consumers with different needs, value and priorities at particular times in in the renovation-capitalisation moment and in the buying-selling-renting moment.

To address these needs we recommend two main products: (1) formal certified ratings with explanatory information and (2) informal self-assessment ratings estimates. The price of formal ratings would be set by the market, but we estimate would be in the order of $100-$200. The price of informal estimates would be free.

The proposed operating model involves a combination of direct and indirect distribution through industry delivery partners. Certified ratings would be delivered in person by on site assessors, using web applications on tablets or laptops. Informal self-assessment ratings estimates could be accessed by consumers in the same way, online, or by phone. In both cases the system operator would be responsible for developing and maintaining the platform to support delivery.

An effective promotional strategy is critical to establishing the system as a Australian standard for consumers and industry. For the system to become recognised as a national standard it requires awareness and adoption amongst a critical mass of consumers and building trades people and professionals. Therefore, integral to the system, is a significant, consistent and sustained awareness and engagement pathway in order to reach this critical mass. We recommend three pillars to this campaign:

1. Broad based advertising
2. Real estate agent and property manager engagement
3. Direct assessor promotions

This section details the rationale and considerations for each of these sets of recommendations. The following section provides an implementation road map and budget, which includes the responsibilities, timing and resources of this marketing plan. The broad based advertising budget is the largest establishment cost involved in the system. Part II of this report illustrates the impact that rating take-up rates and conversions have on the benefits and cost-effectiveness of the system. The larger and more effective the marketing campaign, the higher the benefits of the system.

1. Target markets

As outlined in Section 2, 92% of housing consumers consider it important to have information on the energy efficiency of a home when buying or renting.

The proposed system is designed to serve the information needs of all consumers who are interested in the energy performance of homes that they own or live in, or plan to own or live in. However, uptake is likely to be much higher under a narrow range of customer segments. We recommended that the product design, pricing, promotion and distribution are targeted to ensure the needs to these segments are addressed. This sub section sets out the major customer segments and their likely key requirements.

The scope of the system is limited to the market for as built, existing homes. It could be applied to the 1.7% of homes that are newly built each year, which are already subject to regulatory minimum energy performance requirements. This also excludes medium to high-density multi-dwelling homes.

Within this market there are five main property information consumer segments: homeowners and investors and vendors, buyers and renters. In practice individuals could fall into two or more of these segments over their life, or even at the same time. However, with respect to understanding the energy performance of any particular home, they are likely to belong to one segment.

Table 16 Property information consumer segments

Segment	Needs
Renters	• Trusted, independent information on the likely comfort and base building running costs of prospective rental properties • A means to compare similar properties' performance alongside price and other features • Understand the drivers of comfort and running costs which they can influence (i.e. behaviours and non-fixed appliances) and the costs and benefits of doing so • Understand which property features are important
Investor/Landlords	• Understand the relative comfort and base building running cost of their property compared with other similar rental properties on the market • Understand the impact that their properties' performance has for its value and rental yield • Be able to provide trusted, independent verification to communicate these benefits and capture this potential value • Understand the costs and benefits of improving performance • Understand which property features are important
Vendors	• Understand the relative comfort and base building running cost of their property compared with other similar rental properties on the market • Be able to provide trusted, independent verification to communicate these benefits and capture this value • Understand the impact that their properties' performance has for its potential value • Understand the costs and benefits of improving performance • Understand which property features are important
Buyers	• Trusted, independent information on the likely comfort and base building running costs of prospective property purchases • A means to compare similar properties' performance alongside price and other features • Understand the impact that their properties' performance has for its potential value • Understand the costs and benefits of purchasing a higher performing building versus improving the performance of a lower performing building • Understand which property features are important
Homeowners/Owner occupiers	• Understand the relative comfort and base building running cost of their property compared with other similar rental properties on the market • Understand the drivers of comfort and running costs which they can influence (i.e. behaviours and non-fixed appliances) and the costs and benefits of doing so • Trusted, independent information on the likely impact potential energy saving purchases will have on home performance and the associates costs and benefits • Understand the impact that their property's performance has for its potential value • Understand which property features are important

These segments can be further divided by consumer attributes (life stage, values, socio economic factors, etc) and property type. The information priorities for consumers are also likely to vary depending on the touch point in their property journey that triggers their interaction with the system. This has implications for the design of ratings and information products. These variations in consumer sub-segments have implications for the required message framing, promotion and distribution of ratings and information products. The different property types segments have implications for the potential market size and take up rates.

Property types and market opportunity

The primary purpose of formal, certified ratings is to allow vendors and landlords to provide prospective customers with trusted, independent information on building performance. Under a voluntary system, vendors and landlords only have an incentive to pay for this information if it will make their property look better than alternative properties. For this reason, the early adopters of certified ratings are likely to be those with high performing properties (e.g. equivalent of 4 or 5 out of 5 stars). This is likely to be the case for both owner-occupied and rental properties. Once the system is more wide spread, there may be benefit in differentiating mid range properties (e.g. equivalent of 3 stars) from lower unrated properties. Under this scenario, consumers may be more likely to pay for a certified rating, if they can verify at no cost that the rating would be high.

The second likely early adopters would be purchasers of energy savings products that would result in higher ratings (e.g. insulation retrofits). For these consumers, research suggested that products installers would look at offering ratings a third party verification of their product benefits. For this to work effectively, installers would need to be able to conduct an informal rating (or ratings) at no cost to understand building performance before and after product installation. This would enable installers to authoritatively communicate the improvement that purchasing their product would have on building energy performance. Again under this scenario, it would not be in the interests of the consumer to pay for a certified rating before they improved performance.

Consumer segments framing, promotion and distribution

Home energy efficiency ratings and information products will be used to communicate information to third parties (e.g. from vendors to potential buyers) and for first party use (e.g. owners, occupants). These parties are likely to cut across a wide range of the different consumer segments and sub segments. They need to be designed in a way that they will be easily recognised and understood by a range of consumers with different needs, value and priorities.

Consumer research has shown that different consumer segments respond very differently to the framing of energy efficiency messages. Some frames have very positive effects on certain segments, but negative effects on others (eg. environmental or energy savings). In order to resonate with a wide range of segments, standard message framing for ratings and information products must avoid the message frames that have negative connotations for any major segment.

The CSIRO EnergyFit message testing study has found that the most effective framing communication method was the use of generic star ratings combined with Liveability Real Estate Framework style benefit messages tailored to an individual's customer segment. This type of customised benefits framing is possible with the support of real estate agents/property managers and assessors trained to recognise customer needs and priorities and tailor messages accordingly.

We recommend a promotion and distribution strategy which meets these goals, as outlined below.

2. Products and pricing structure

The structure of products and pricing needs to balance a number of competing system design requirements. This includes consumer demand, delivery partner incentives, and administrator cost recovery. This section sets out our recommendations on how to achieve this balance.

The actual price paid by consumers for certified ratings will be set by the market. While there is very high consumer demand for information on home energy performance, consumers are highly price sensitive. Research found that 38 percent were prepared to pay between $100 -$250, 44% not prepared to pay anything. These are stated intents, and not based on market conditions with real products and costs. Actual willingness to pay could be lower.

A majority of stakeholders felt strongly that if ratings did not have a nominal price associated with them, they would not be valued. This price could be waived in exchange for the purchase of other goods and services (e.g. energy savings products). However, these stakeholders felt that consumers would need to make a conscious trade off to value the formal rating. There was high stakeholder consensus that demand would be limited if consumers could not obtain a zero cost estimate of their home energy performance before paying for a certified rating.

Balanced with this are the requirements to provide incentives to assessors to promote and deliver ratings and information products, and the need for the administrator and system operator to recover costs. As discussed in section 4.6, energy efficiency product installers may have sufficient incentives to subsidise the cost of rating delivery as part of their existing sales process. However their reach is limited to those consumers already engaged with energy savings products. Ratings may improve sales conversion ratios, within the current market for these products, but are unlikely to significantly expand this market.

Building inspectors are another distribution channel who reach a different set of property consumers that may not already be engaged with the potential of energy savings products. In the rental market, similar circumstances apply to those parties offering renovation and maintenance services - builders and unlicensed handypersons. If these parties can be incentivised to promote and deliver ratings, they have the potential to engage a broader cross section of consumer segments with the benefits of energy efficient homes and features. However, it is only in their commercial interests of to promote and deliver ratings if the additional revenue is commensurate to the opportunity cost of the additional time it takes.

For these reasons we propose two main product types under the national voluntary system. These products and their proposed price structure are set out in Table 17.

Table 17 Proposed products and price structure

Product	Features	Price Structure

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	Rating	
Formal Certified Rating + Information products	**Rating** • Formal star rating scale) • Benchmark base building energy efficiency relative to similar homes • Certified by endorsing body – real time certification through web portal • Non-transferable sticker and /or printed/emailed certificate with address • Include issue date, and period validity **Information products** Supporting information to provide context and evidence for ratings, e.g.: • Key features/lack of features behind rating • Actions to improve ratings • Explain rating basis (e.g. baseline energy, with accuracy range)	• Set by market. -Research suggests likely range $100 to $200 • $6-17 dollar in administrative fees per rating paid by Asssessor • Recommended system design requirement to ensure ratings can be delivered in 30 minutes of less • Potential to be bundled/discounted/waived as part of delivery for related building products and services
Informal Ratings Estimate + Information products	• Estimate of number of stars that would be achieved in rating • Self-assessment/informal assessor completion • System generated estimate without certificate • Unlimited scenario modelling per home • Information products as per formal rating	• Free • No administrative charge

3. Distribution and delivery

The proposed operating model involves a combination of direct and indirect distribution through industry distribution partners, as detailed in Section 4.6. Certified ratings would be delivered in person by on site assessors, using web applications on tablets or laptops. Informal ratings estimates could be delivered in the same way, online, or by phone. The system operator would be responsible for developing and maintaining the platform to support its use by ratings assessors. The key distribution partners and delivery methods are set out in Table 18.

Table 18 Distribution by partner and delivery method

Distribution partner	Product	Channel Type	Delivery method
System operator	Certified Ratings	Indirect	Provide web and mobile application for accredited ratings assessors and portal to manage their customers' ratings Allow optional customer/phone pre-completion prior to onsite verification of evidentiary requirements and certification
	Ratings Estimate	Direct	Direct consumer facing web and mobile application for self-assessment
	Ratings Estimate	In direct	Web and mobile application for the interface of informal self-assessment for third party providers Assessor customer management portal to allow saving of rating estimates and conversion to certified ratings when evidentiary criteria is provided and verified
	Ratings Estimate	In direct	API and licensing agreements for third party providers to develop supporting products
Accredited Assessors	Certified Ratings	Direct	Direct promotion and delivery of ratings to customers using web and mobile aps for Assessors Allow optional customer/phone pre-completion prior to onsite verification of evidentiary requirements and certification
	Ratings Estimate	Direct	Direct promotion and delivery of ratings to customers using web and mobile aps for Assessors Allow optional customer/phone pre-completion prior to onsite verification of evidentiary requirements and certification
Real Estate Agents and	Certified	In direct	Promote ratings to vendors, landlords, buyers and tenants

Property Managers	Ratings		Refer vendors, landlords and buyers to Accredited Assessors
			Facilitate understanding of rating results and improvement options, using tailored message framing developed for real estate agents within the Liveability Real Estate Framework
	Ratings Estimate	In direct	Promote ratings to vendors, landlords, buyers and tenants
			Refer vendors, landlords, tenants and buyers to Accredited Assessors and/or self-assessment options
			Facilitate understanding of rating results and improvement options, using Liveability Real Estate Framework style tailored message framing

4. Consumer awareness and engagement strategy

An effective promotional strategy is critical to the system to be recognised as a national standard for consumers and industry. This project's research showed a very high level of demand for information on home energy performance, and high levels of industry support for providing this information. However, Common Capital research also found that there are over 22 home energy performance information systems already available in Australia. Stakeholder consultation suggested that reasons why these systems were not meeting consumer demand, was that lack of a consistent national approach for measuring and communicating. Section 2 sets out many of the key functional requirements for an ideal energy information system. However, for any system to become a national standard it requires awareness and adoption amongst a critical mass of consumers and building trades people and professionals. A significant, consistent and sustained promotional effort is required to reach this critical mass. Developing and overseeing this campaign are key responsibilities of the governing board and administrator, as detailed in 4.3. We recommend three pillars to this campaign:

1. Broad based advertising
2. Residential real estate agent and property manager engagement
3. Direct assessor promotions

Dr Chris Reardon's research on the uptake of sustainable housing in Australia identified that a barrier to improving the efficiency of the building stock is the failure of this sector to cross over from the innovator or early adopters.[69] This refers to Rogers' theory of technology diffusion[70]. Rogers segments consumers based on their pre-disposition to try new things ranging from innovators to laggards. Rogers postulates that demand for a new innovation will remain low, unless it can reach a critical mass of early majority adopters between amount 16 to 50% of the potential market. However, at this level, the rate of demand reaches an inflection point, and rapidly escalates to mass-market penetration.

Figure 12 below illustrates this diffusion curve. The blue bell curve shows a normal distribution of potential consumers, by adoption segment. The yellow curve is a technology diffusion j-curve showing the market share corresponding to the consumer segments reached.

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[69] Reardon, Chris (2009) *The diffusion of sustainable practices within the Australian Housing Industry: Implications for Future Change Management*, PhD Dissertation, University of Technology Sydney
[70] Rogers Everett M. (2003) *Diffusion of Innovations*, Free Press

Figure 11 Technology diffusion curve
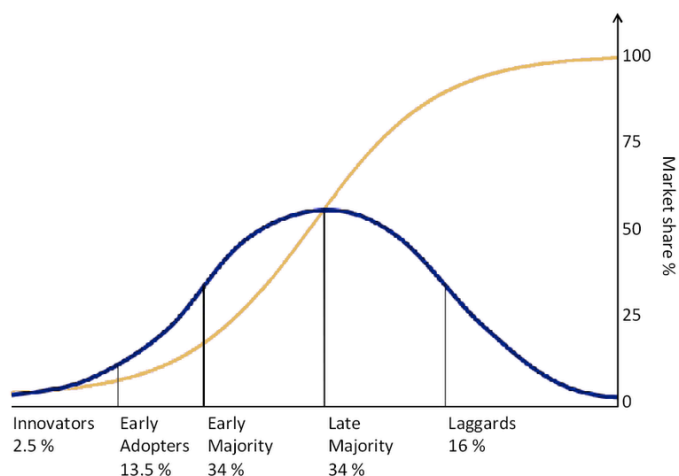
Reardon references a theory from Moore (1991) that unless new innovations can achieve a level of market penetration beyond consumer innovators and early adopters, they are likely to experience permanently low growth. Self-sustaining growth is possible only if they achieve market acceptance by more "conservative" consumers.

The Australian solar photovoltaic industry is an example of effective government policy taking an industry to this early majority adoption phase. A Rocky Mountain Institute (RMI) study found that the labour cost component of total solar PV prices in Australia are significantly lower than in the United States despite higher wages in Australia. [71] RMI found that one of the key factors in these lower costs was significantly lower sales and marketing costs for solar PV in Australia than in the United States. RMI found that a higher concentration of solar PV penetration in the Australian market meant that the primary source of new business for installers was direct referrals from friends and neighbours.

As another example, Figure 13 shows how the NABERS program has successfully moved beyond the early adopter phase for offices. For the first six years of the program to 2004, direct promotion of the program saw the number of offices with NABERS ratings grow 11% of the market. Over the next five years, to 2009, a number of supporting voluntary initiatives by governments and the property sector grew this to 45% of the market. Since then the introduction of mandatory disclosure (the Commercial Building Disclosure program) and further voluntary initiatives has driven further grow to around 80% of the market in 2015.

[71] Rocky Mountain Institute (2014) *Lessons from Australia: Reducing solar PV costs through installation labor efficiency*

Figure 12 NABERS Energy Rating Timeline, office buildings and major supporting initiatives
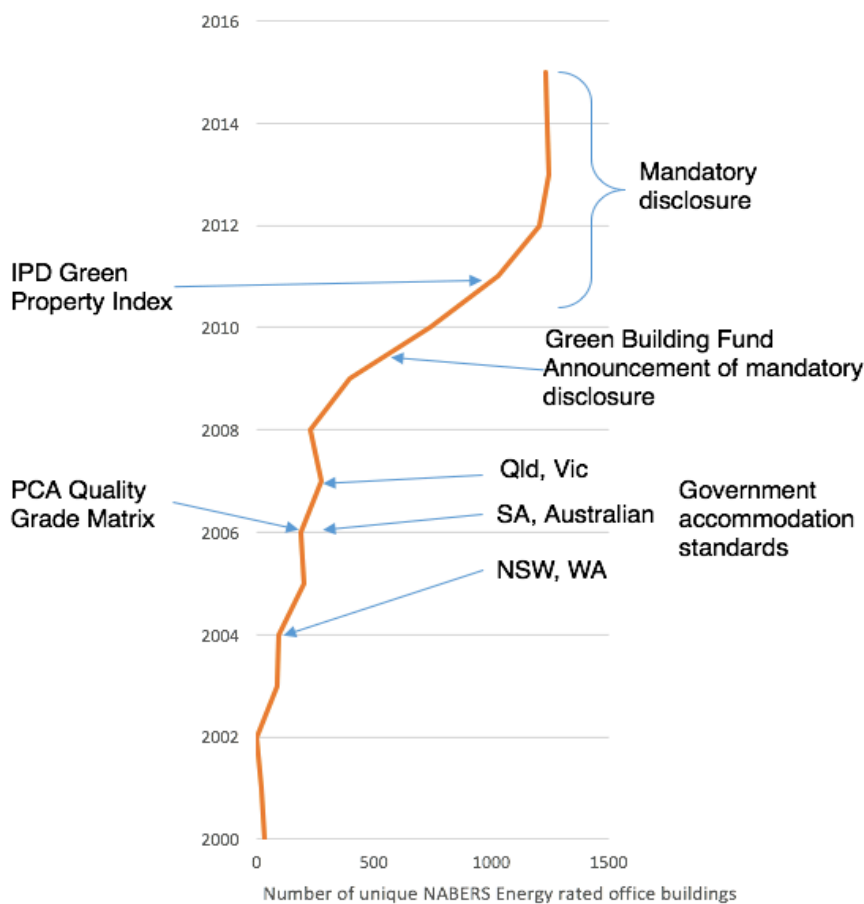
The objective of the promotional campaign should be to achieve an equivalent market penetration over the initial years of the system. The business case and market impact report in Part II of this paper, models consumer uptake at 13% (within the early adopter range) and 38% (midway through early majority). Both scenarios yield positive net benefits for the public, industry and households. The higher uptake scenario yields benefits an order or magnitude greater. We recommend that the marketing budget and promotion campaign be set to achieve this latter uptake level.

This sub-section explains the rationale and key considerations for these pillars.

(xx) Broad based promotional campaign

Stakeholder consultation identified an initial significant investment in promotion as critical to the success of Australia's widely regarded equipment energy rating system. Energy Rating labels are noticed by 97% of consumers (up from 45% in Victoria 1991[72]), and are a key source of information in 60% of appliance sales. [73] The current level of consumer awareness has been described as "usually encountered only with the biggest market leading brands and very high profile celebrities"[74]. Stakeholders emphasised the importance of a similar investment to establish awareness among consumers of the system[75].

By way of example, marketing and promotion were critical to the early success of NABERS. Between 1998 and 2004 NABERS administrators implemented a promotion strategy to attract early adopters to the scheme. This marketing and

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[72] Artcraft Research 2006, "Appliance Performance Labelling in Australia and NZ", Equipment Energy Efficiency, Australia.
[73] "Energy Ratings Label review"ACIL Allen 2014
[74] Artcraft Research 2006, "Appliance Performance Labelling in Australia and NZ", Equipment Energy Efficiency, Australia. To quote from the report "The remarkable level of awareness of the energy rating label makes this device an incredibly valuable information asset. Built on nearly 20 years of promotional efforts by governments, appliance manufacturers and retailers, the energy rating label has both recognition and credibility. The label should be regarded and further developed as the important 'brand' that it already operates as in the market place – the Energy Efficiency Brand."
[75] Refer to section 3.6 of Clark, M., 2015, Home Energy Efficiency Stakeholder Map, Common Capital. Australia.

promotion was able to attract building owners, representing a significant proportion of the market, to the scheme and provided a critical mass for large scale participation by the market[76].

An effective broad based promotional campaign would convert general demand for home energy information to a specific requirement for the ratings, estimates and information products of the system. A campaign could direct consumers to the central web site, and to the various distribution channels.

Moreover, an effective promotional campaign would in turn increase the likely success of the different distribution channels. If consumers already had a general awareness of the system, the concept of ratings and its credibility distribution partners could focus their resources on converting interest into ratings and energy saving refurbishments.

Without a strong underlying level of consumer awareness and specific demand for the system, distribution partners would need to invest a significant amount of their resources in generating this demand. This would likely slow the potential growth in two ways. Higher marketing and sales costs for individual assessors would result in higher ratings prices and in turn lower demand for ratings. Lower demand would likely result in lower interest from potential assessors, which would result in reduced direct promotion of the system. Conversely if a critical mass of consumers and assessors can be established, increased demand allows lower prices and increases the number of assessors, both of which in turn help foster increased demand.

To achieve this, we recommend that the introduction of the system be supported by a significant investment in an advertising campaign. We recommend that the details for this campaign be develop in as part of the development of the broader marketing strategy. The system financial forecast in Section 6 include provisions for this advertising campaign.

In addition, separate work (National Conversation on Sustainable Housing) is focussing on raising public awareness of and aspiration for the co-benefits of energy efficient housing; i.e. a "comfort healthy affordable lifestyle". This work aims to improve the capability of non-professional home renovators to digest more detailed information, through the use of social media and peer support. If implemented, initiative will provide an additional platform for cross-promotion and distribution of ratings and information products.

(xxi) Real estate sales agent and property manager engagement

As detailed in section 4.3, real estate agents and property managers can play a critical role in either driving or hindering the uptake of a voluntary disclosure system. Every year, nearly 600,000 homes are either sold or rented in Australia. Real estate agents and property managers play a central role in facilitating almost all of these transactions. Real estate agents and property managers must be engaged if a voluntary disclosure system aims to allow property consumers to communicate with each other regarding how energy efficiency performance benefits homes. A key pillar of the promotional strategy must be engaging sale agents and property managers to help promote and explain these benefits.

Energy ratings on their own have little relevance to the objectives or business processes of real estate agents and property managers. In selling and renting homes, agents and property managers engage consumers with individual features as they combine to shape potential of a property as a home or an investment. Ratings are abstract and un-emotive. They are difficult to weave into a typical sales and lease narrative about the broader potential of a home, alongside emotive considerations like value, location, community and renovation potential. If ratings don't help agents and property managers communicate the benefits of a home, they have little reason to engage with and understand the system. Without this engagement, agents and property managers are unlikely to validate consumer questions about the connection between ratings and benefits like comfort, operating costs and property value.

As also detailed in section 4.3, the Liveability Real Estate Framework has been specifically designed with the processes and needs of agents and property managers in mind to help them understand and sell the benefits of sustainable homes. Within this "features-based" framework is the capacity to showcase energy ratings, while providing context around their connection to specific features and the home's broader potential. As also discussed, the framework also provides tools to help agents, property managers and others understand which values and lifestyle segments consumers belong to, and corresponding messages about benefits that are most likely to resonate at point of sale or rent.

We recommend that the development of the promotion strategy include close engagement with the real estate industry (both sales and rental side) on the design and implementation of the system to ensure effective engagement with agents and property managers. In addition we recommend that a portion of the marketing budget be allocated to provide subsidised training in the Liveability Real Estate Framework to sales agents and property managers to help establish a critical mass of engaged agents to champion the system and empower consumers.

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[76] Unpublished "NABERS Supporting Policies and Initiatives, Common Capital 2016"

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(xxii) Industry Promotion

The final recommended pillar of the promotional strategy is direct sales and marketing activities by accredited ratings assessors. As discussed, there are likely to be three main types of assessors: building inspectors, energy saving product installers and dedicated assessors. The first two types of assessor would be providing ratings and information products as an optional value add to their core business activities. If there were sufficient underlying demand generated for the system, it may be commercially viable for some assessors to specialise full time in rating homes. All of these building trades professionals will already have sales and marketing capacity built into their existing business models as cost structure. The role for the promotional strategy will be to ensure that assessors have the support they need to enable efficient, effective and consistently direct sales and marketing of ratings and information products. To support this, there are three main things that the administrator would need to ensure. These are:

Strong consumer awareness and demand	The general marketing campaign should explain the existence and general benefits of the system to consumers, rather than rely on assessors
	This should allow assessors to focus their sales and marketing costs and focus on closing leads and delivering ratings.
Assessor engagement	As part of the broader marketing strategy the administrator will need to engage with prospective and accredited assessors to promote delivery of the system products, maintain consistent messaging and understand and support assessors' sales and marketing needs.
Commercial incentives	The administrator and system operator need to ensure that total ratings time and administrator costs are low enough to provide commercially attractive returns for prospective assessors
Marketing support	The administrator should ensure that the assessors have the marketing, website and other support they require to provide consistent and compelling messages to accompany the advertising campaign

6. Implementation road map

This section sets out a high-level road map for resourcing, developing and implementing the governance and operating elements of the national voluntary system, detailed in Section 4. It sets out the major stages, activities and time frames, a draft administration budget and financial forecast, a risk analysis and recommended next steps.

The proposed implementation plan involves 18 months to build support and establish the governance of the system followed by a four-year period in which the operational aspects of the system are established and implementation ramps up. This ramp up period allows for the establishment of consumer and industry awareness and trust, and an opportunity to test and improve system features and performance with early adopters. After this initial establishment period, we expect the system will gradually increase its market reach and impact. A review will be conducted once the system is operating effectively at scale, which we anticipate will take five years from commencement. The review will also consider, amongst other matters, the merit of transitioning to a mandatory system – given that there is strong stakeholder support for this policy approach.

We estimate that over a five to eight year period a total of $6 million to $7 million of seed funding is needed to implement the system. Beyond seed funding, administration fees, paid for each accredited rating completed, will be the primary revenue stream.

This seed funding will primarily be used to support governance establishment, ratings methodology development and system promotion. In combination, these elements will drive the uptake of energy ratings towards the critical mass needed to sustain the system. We anticipate that this critical mass will be attained within eight-years, after which the system will be self-funding.

Financial modeling of the recommended voluntary system, shows that the seed investment of $6 million to $7 million over 5 to 8 years will yield a significant net public benefit of between $42 million and $535 million and provide industry with $437 million to $5,068 million in revenue from home owners and renters investing in energy efficiency upgrades.

We anticipate that the level of seed funding provided for a voluntary system will directly effect the number of ratings conducted and hence, the benefits the system is able to enable.

Quality ratings, lean administration and effective promotion are the primary means of driving the critical mass of ratings needed to achieve a self-sustaining voluntary system. A mandatory system, should this be introduced, is expected to drive greater uptake of ratings, potentially allowing the system to be self-sustaining in a shorter period.

The net public and private benefits under a range of scenarios are discussed in detail in Part II of this report.

Next steps

With the release of this report, the next steps are to present it to key government, industry and consumer stakeholders and to invite feedback on the reports findings and recommendations. Through this engagement process, interested parties will be invited to identify the level of involvement they wish to have in the consulting and market testing stage and the level of resourcing they are able to provide to support this work.

The EnergyFit Homes project has identified a broad range of stakeholders who would make a significant contribution to the development of a national voluntary disclosure system. These include government and non-government stakeholders who have the interest and capabilities to contribute to the governance of the system, those with expertise in ratings systems, user experience and promotion and those with the capacities to provide system operator services.

This breadth of this available interest, expertise and capability significantly enhances the prospects of successfully implementing a national voluntary disclosure system, especially with a continuation of the collaborative approach taken by stakeholders throughout this project.

1. Implementation stages, activities and time frames

We recommend that a national system to provide information on the energy performance of existing homes be implemented through five stages. These cover engaging with key stakeholders on the findings and recommendations of this report, through to scaled operation of the system, review and potential transition to a mandatory system. This roadmap spans an 18 month of development followed by five years of ramping up implementation. We believe this to be an ambitious though achievable timetable, given the activities involved and growing stakeholder support for a national voluntary disclosure system. There is the potential for implementing the system sooner, given the level of stakeholder support and the net benefits it provides, as detailed in Part II of this report.
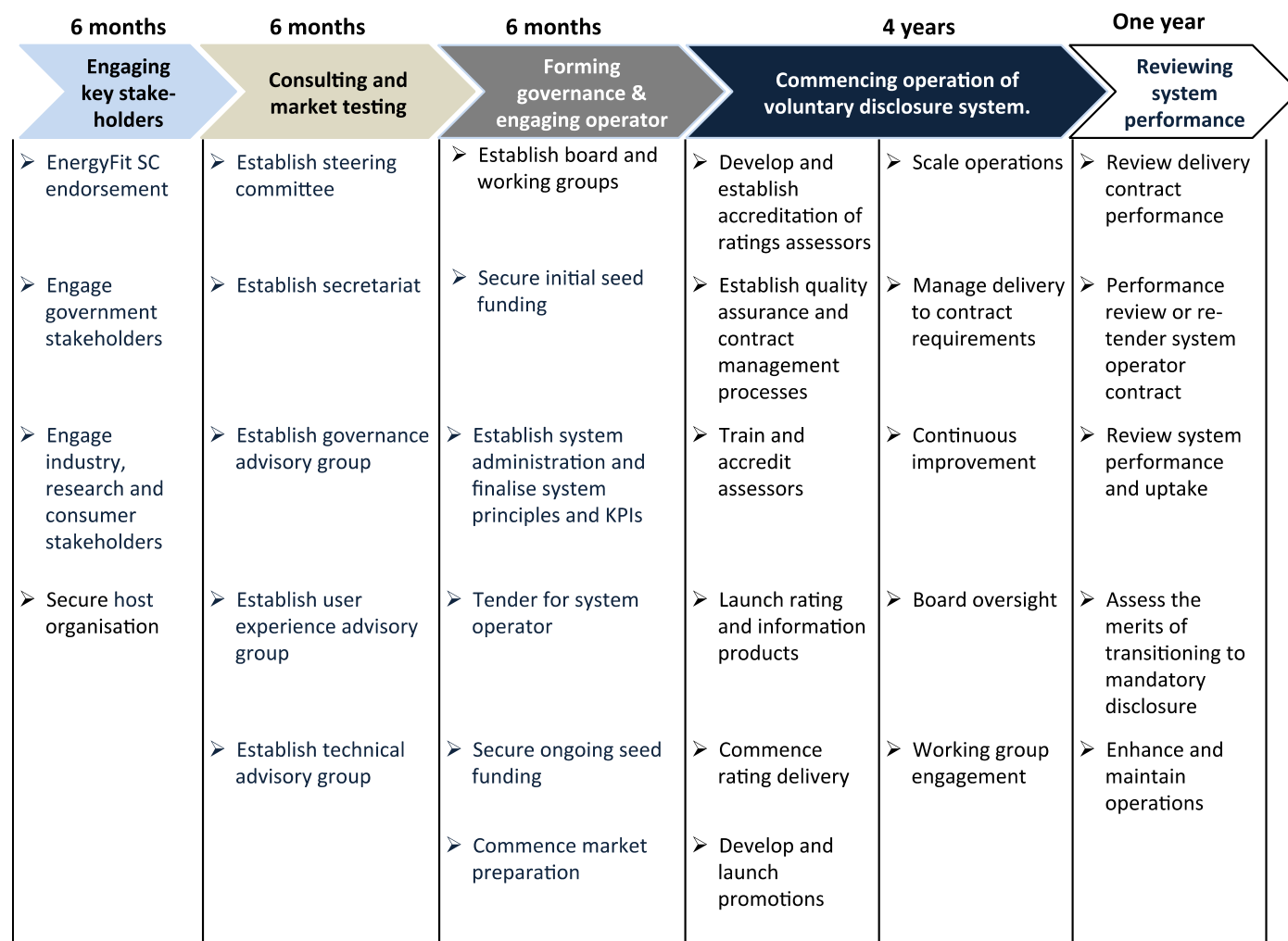
The five stages are:

1. **Engaging key stakeholders** by discussing this report's findings and recommendations. Based on the significant stakeholder commitment throughout the EnergyFit Homes project, we anticipate that the outcome of this stage will be the formation of a core group of government and non-government stakeholders committed to

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contributing to and resourcing further development of the system. The objective of this stage is to secure a host organisation to establish and provide secretariat support for a transitional industry-government strategic advisory panel, and technical working groups.

2. **Consulting and market testing** of the implementation model presented in this report. This stage will involve further development of the model to the point where it can be implemented. Key tasks will involve validating the findings of this report (specifically, those relating to the governance of the disclosure system), the user experience necessary to drive the system's success and the technical specifications for the process of rating homes. It is anticipated that a steering committee will oversee this work, with each of the three areas guided by a stakeholder advisory group. The outcome of this stage will be detailed functional specifications that can be used to establish system governance structures and engage service providers to deliver operational aspects of the system.

3. **Forming overarching governance and engaging system operator.** This stage involves formalising the high level governance structures, specifically the system board, its working groups and the system administrator. It is possible that those participating in the stakeholder advisory groups may participate in one of the working groups. A key task for the administrator will be engagement, through a competitive process, of the system operator. The system operator will be responsible for developing the rating system, training and accreditation processes needed to commence the system.

4. **Commencing operation of voluntary disclosure system.** A critical goal for the early years of the system will be the building of a critical mass of ratings and associated energy efficiency improvements. All parties - the board, administrator, system operator, accredited assessors and Real Estate Agents - will have important roles to play to achieve this.

5. **Reviewing system performance**. This detailed review will document evidence of how the system is performing against its intended objectives. In particular, it will consider how effective the system has been at building a critical mass of voluntary energy ratings and energy efficiency improvements. The review will also consider the merit of transitioning to a mandatory system – given that there continues to be stakeholder support for this policy approach. The outcome of this stage will be system improvements and recommendations to governments on the merit of a mandatory system.

The key activities of these stages are illustrated in Figure 14 (below) and explained in the remainder of this section.

Figure 13 High-level implementation road map

6 months	**6 months**	**6 months**	**4 years**		**One year**
Engaging key stake-holders	Consulting and market testing	Forming governance & engaging operator	Commencing operation of voluntary disclosure system.		Reviewing system performance
➢ EnergyFit SC endorsement	➢ Establish steering committee	➢ Establish board and working groups	➢ Develop and establish accreditation of ratings assessors	➢ Scale operations	➢ Review delivery contract performance
➢ Engage government stakeholders	➢ Establish secretariat	➢ Secure initial seed funding	➢ Establish quality assurance and contract management processes	➢ Manage delivery to contract requirements	➢ Performance review or re-tender system operator contract
➢ Engage industry, research and consumer stakeholders	➢ Establish governance advisory group	➢ Establish system administration and finalise system principles and KPIs	➢ Train and accredit assessors	➢ Continuous improvement	➢ Review system performance and uptake
➢ Secure host organisation	➢ Establish user experience advisory group	➢ Tender for system operator	➢ Launch rating and information products	➢ Board oversight	➢ Assess the merits of transitioning to mandatory disclosure
	➢ Establish technical advisory group	➢ Secure ongoing seed funding	➢ Commence rating delivery	➢ Working group engagement	➢ Enhance and maintain operations
		➢ Commence market preparation	➢ Develop and launch promotions		

1. STAGE 1: ENGAGING KEY STAKEHOLDERS

Timing: 6 months

The goals of this stage are to obtain stakeholder feedback on the findings and recommendations of this report and engage with key stakeholders that may be involved in developing and delivering the system.

The outcomes of this stage are anticipated to be:

- Detailed feedback on the reports findings and recommendations;
- Formation of a core group of government and non-government stakeholders committed to contributing to and resourcing further development of the system.

The key activities for this stage are set out in Table 19 below.

Table 19 Stage 1 activities

Activities	Purpose
EnergyFit steering committee endorsement	Obtain and implement feedback from the project steering committee on this report Obtain approval for broader dissemination of findings Secure funding for engaging with stakeholders
Engage government stakeholders	Obtain feedback on the report and explore opportunities for involvement in and resourcing of subsequent stages. Explore opportunities to build on government knowledge, ratings systems and capabilities to facilitate the development of a national voluntary disclosure system. Explore opportunities for the EnergyFit Homes project to complement activities under the COAG Energy Council's National Energy Productivity Plan.
Engage industry, research and consumer stakeholders	Obtain feedback on the report and explore opportunities for involvement in and resourcing of subsequent stages. Explore opportunities to build on industry, research and consumer stakeholder knowledge, ratings systems and capabilities to facilitate the development of a national voluntary disclosure system.
Secure host organisation	Secure a host organisation and seed funding to co-ordinate and lead next phase

2. STAGE 2: CONSULTING AND MARKET TESTING

Timing: 6 months

The goals of this stage are to:

- Further develop the implementation model presented in this report to the point where it can be implemented;
- Identify seed funding opportunities.

Key tasks of this stage will involve validating the findings of this report, specifically, those relating to the governance of the disclosure system, the user experience necessary to drive the system's success and the technical specifications for how homes will be rated. These findings will then be translated into detailed specifications suitable for implementation.

It is anticipated that a strategic advisory panel will oversee this work, with each of the three tasks guided by stakeholder advisory groups and supported by a secretariat.

Details of the specific roles of the working groups are:

- Governance –to validate the governance and operating framework recommended in this report and develop a structure, charter, electoral rules and processes for the governing body and administrator;
- User experience - to validate marketing and user experience findings and translate these into detailed roles and responsibilities for the system administrator and functional requirements for the system operator. These function

requirements will be used (together with technical functional requirements) to develop tender documents for engaging a system operator in Stage 3;

- Technical – to validate the technical requirements proposed and translating these into:
  - o Roles for the system administrator; and
  - o Functional requirements and objective assessment criteria for market testing of processes (for example, an expression of interest to gauge market capabilities and interest in providing the system operator functions, and to validate cost and revenue assumptions presented in Part II).

  The function requirements will be used (together with user experience functional requirements) to develop tender documents for engaging a system operator in Stage 3;

This advisory panel and working groups could potentially transition to permanent governance structure, with fair and transparent re-appointment processes in stage 3.

This stage involves three key tasks, led by the host organisation with support from the advisory panel and technical working groups. The first is to validate the Energyfit Homes project recommendations regarding:

- System governance and strategic policy objectives

- Consumer needs and user experience requirements for ratings and information

- Technical specifications required to deliver policy and consumer requirements

The outputs of this work will be a validated objectives, a proposed governance design and charter, as wells as technical specifications and objective assessment criteria for a formal expression of interest procurement process.

The second task of this stage will be to formally market-test the interest, capacity, tool functionality, development and operating costs of prospective service providers required to develop different operational aspects of the system. This would be done through a formal expression of interest tender, using the technical specifications and assessment criteria through.

The third task is to assess the outcomes of this expression of interest process to support decision making of the host and other organisations on provision of seed funding to implement the system. The outcomes of the expression of interest would also be used to design the formal second stage procurement process for stage 3.

In this stage the host organisation and other partners could potentially also commence early stage marketing plan activities, particularly with respect to engaging the real estate industry to developing knowledge and demand for information on home energy performance.

The role of the advisory panel and three working groups is to ensure that the three streams of work integrate together. In particular, it will be critical to ensure that policy objectives and consumer needs drive the design of technical and administrative requirements.

The outcomes of this stage will be:

- Detailed functional specifications that can be used to establish system governance structures and engage service providers to deliver operational aspects of the system.
- Seed funding opportunities identified.
- A further potential outcome is the steering committee and advisory group arrangements may form the basis for ongoing governance.

The key activities for this stage are set out in Table 20 below.

Table 20 Stage 2 – Key activities

Activities	Purpose
Establish steering committee	Set overall direction for the work of this stage
	Ensure the three work streams of this stage integrate together
	Secure host and funding for secretariat
	Identify seed funding sources to establish and implement the national voluntary disclosure system
Establish secretariat	Support steering committee
	Ensure coordination and integration of the advisory groups' work.
	Translate the functional requirements for the system operator developed by the user experience and technical working groups into tender documents for engaging the system operator.

Establish governance working group	Validate the governance and operating framework recommended in this report
	Develop a structure, charter, electoral rules and processes for the governing body and administrator;
Establish user experience working group	Validate marketing and user experience findings in this report
	Translate these validated findings into detailed roles and responsibilities for the system administrator and functional requirements for the system operator.
Establish technical working group	Validate the technical requirements proposed in this report
	Translate these validated findings into roles for the system administrator and functional requirements and objective assessment criteria for market testing of processes.
Conduct formal expression of interest tender	Formally market-test the interest, capacity, tool functionality, development and operating costs of prospective service providers required to develop different operational aspects of the system. This would be done through a formal expression of interest tender, using the technical specifications and assessment criteria through.
	Assess the outcomes of this expression of interest process to support decision making of the host and other organisations on provision of seed funding to implement the system. The outcomes of the expression of interest would also be used to design the formal second stage procurement process for stage 3.
Engage real estate industry	The host organisation and other partners could potentially also commence early stage marketing plan activities, particularly with respect to engaging the real estate industry to developing knowledge and demand for information on home energy performance.

3. STAGE 3: FORMING OVERARCHING GOVERNANCE AND ENGAGING SYSTEM OPERATOR

Timing: 6 months

The goals of this stage are to:

- Establish the overarching governance structure needed to deliver a national voluntary disclosure system
- Secure seed funding
- Finalise the governing principles, key performance indicators and functional requirements of the system;
- Engage, by tender process, the system operator and promotions service providers;
- Establish the operating framework sufficient for the system to commence; and
- Commence preparing the market for the system's commencement.

The first task for this stage is to establish the board and working groups that will oversee implementation of the system. As mentioned above, this may occur by the steering committee and advisory groups translating into the board and working groups.

The roles of the three working groups will mirror those of the stage 2 advisory committee – i.e., governance, user experience and technical issues.

As set out in Section 4.3, the board will require diverse representation, such as from government, the building products and property industries, research institutions and consumer organisations. Initial representatives can be appointed by nomination, with the governance working groups tasked to establish future election processes.

An early role for the board will be to secure the seed funding from the opportunities identified in stage 2. The board will also need to establish the system administrator. Options for a system administrator range from an established organisation hosting the administration to a new organisation formed to provide the role. It is possible that the source of seed funding may also influence the system administrator arrangements.

If an established organisation hosts the administration, only a small project team would be required to establish the governance and administrative arrangements. We estimate that these staffing requirements are minimal (Initially 1 -2 temporary senior project officers with an understanding of the area and skills in executive governance). This team would require access to others with skills in marketing and tender management.

An early role for the system administrator will be to engage, by tender process, the system operator, using the functional specifications developed in stage 2.

The system administrator and, once engaged, the system operator will then establish an operating framework that is sufficiently developed to allow the system to commence.

Based on the extensive research for this project, the board, working groups and administrator will need to maintain focus on ratings reproducibility and their widespread adoption, as these factors are particularly important to the likely success of this system.

Previous attempts to establish a national residential energy disclosure system have stalled over detailed design considerations. Overcoming this risk will require the board, working groups and administrator being focussed on strategic goals and success measures, and a commitment to getting a minimal quality product to consumers, which can be improved over time based on real market feedback.

The system administrator will have a role in preparing the market for the system's commencement. Roles include engaging promotions service providers and commence engagement and training with real estate agents/property managers.

The outcomes of this stage are:

- The system's board and working groups are established
- The system's administrator, with contract management, marketing and compliance capabilities, is established.
- The board agrees to the principles & key performance indicators for marketing, rating design, user experience and rating reproducibility
- A system operator is engaged by the administrator
- Promotions service providers are engaged by the administrator
- Remaining funding is secured
- Market preparations have commenced.
- System ready for implementation

The key activities for this stage are set out in Table 21 below.

Table 21 Stage 3 – Key activities

Activities	Purpose
Establish board and working groups	Set in place the overarching governance
Secure initial seed funding	Resource the establishment of the system
Establish system administrator	Administrative team to drive system set up and implementation
Finalise system principles and KPIs	Develop and obtain board agreement on the principles and KPIs to govern: Building performance measurement and rating User experience Rating reproducibility Brand and marketing strategy
Develop functional requirements and tender process to engage the system operator	Transitional administration team to: translate these principles to functional requirements design a tender process to engage the system operator to develop and manage core technology for management and distribution platforms for the system
Tender for the system operator	Transitional administration team to: manage tender process for system operator for board approval engage system operator to commence system development
Establish final budget and resource requirements	Finalise administrative and marketing budget and resource requirements based on tender process results
Secure ongoing seed funding	Secure remaining seed funding for ongoing administration and

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	system delivery
Establish administrator & design processes	Design contract management, audit and compliance, marketing and stakeholder management processes
Commence market preparation	Engage with real estate agents and commence subsidies for real estate agent/property manager training to develop agent capacity and prime market demand for the system to commence in Stage 4

4. STAGE 4: COMMENCING OPERATION OF VOLUNTARY DISCLOSURE SYSTEM

Timing: 4 years

The key goals of this stage are to:

- launch the system; and
- build up a critical mass of ratings and associated energy efficiency improvements; and
- monitor and improve performance.

Launching the system will require establishing a number of system components:

- The process by which ratings assessors will be training and accredited;
- The quality assurance processes to the system administrator will use to ensure quality ratings

Once these are in place, the system operator will be able to commence training and accrediting ratings assessors.

At this stage, the system administrator will launch promotions activities, including ongoing real estate agent/property manager engagement and training, to drive a demand for ratings.

Once the system is launched, the system administrator and system operator will undertake activities to monitor progress and improve performance. The board and working groups will continue to provide high level oversight of the system.

We have estimated that it will require five years for the activities described in this stage to build a critical mass of ratings to make the system financially self-sustaining and to build strong recognition amongst housing consumers of the value of the system.

We estimate around one year for the first implementation phase. We would envisage that system operator could achieve a soft launch of ratings and information products well within this period. The objective of this soft launch is to test the distribution, delivery and administrative systems to identify and address weaknesses before the promotions campaign rams up and starts driving demand volume.

We estimate that it will take a further three years of implementation for the system to reach maturity and a critical mass of ratings to make the system financially self-sustaining and to build strong recognition amongst housing consumers of the value of the system. This estimated is based on the average time taken other successful environmental market initiatives to reach maturity. Examples include NABERS, GGAS, the Victorian Energy Efficiency target and the NSW Energy Savings Scheme. The time this actually takes will depend on how affordable and relevant the ratings and information products are, and how effective the promotion strategy and distribution systems are.

The outcomes of this stage will be:

- Successfully implemented system meeting rating uptake, reproducibility, user experience an conversion KPIs
- Critical mass of market adoption
- Successfully delivered and scaled down promotions campaign

The key activities for this stage are set out in Table 22 below.

Table 22 Stage 4 – key activities

Activities	Purpose
4.1 Implementation	
Develop and establish accreditation of ratings assessors	System operator to develop and establish assessor training and accreditation systems
	System operator to develop and establish system access and functionality for administrator to monitor and audit assessor and accreditation system performance

Establish quality assurance and contract management processes	System administrator to establish quality assurance process designed in Stage 3, as described in Section 4.3
	Administration to establish ongoing contract management processes to monitor and ensure System operator delivery of KPIs as described in Section 4.3
Train and accredit assessors	System operator to commence training and accreditation of ratings assessors
Launch rating and information products	System operator to launch the distribution and management platform for ratings and information products
Commence rating delivery	Accredited assessors to commence providing ratings
	System operator to establish a web-based service for conducting self-assessed estimates
Develop and launch promotions	System administrator to commence promotions campaign to drive takeup
	Ongoing real estate agent/property manager training and engagement to further driver uptake and assist housing consumers in identifying value from ratings.
4.2 Continuous improvement	
Scale operations	System administrator to drive uptake in demand and assessor supply through ongoing promotions activities. These activities can be scaled down once a critical mass of the market engages in ratings.
	System operator to drive increased number of ratings while maintain quality and reproducibility
	System administrator to scale up the quality assurance processes to ensure rating quality and reproducibility
Manage delivery to contract requirements	System administrator to manage services delivered by system operator and promotions partners to meet contractual obligations and performance KPIs
Continuous improvement	System administrator to improve administrative efficiencies
	System administrator to monitor promotion and brand strategy objectives and improve as required
	System operator to monitor uptake, cost, quality and user experience of ratings and implement continued product and system improvements.
Board oversight	Board to meet to monitor administrator delivery of system level objectives
Working group engagement	Working groups to meet as required to review and provide direction of governance, user experience or technical issues.

5. STAGE 5: REVIEWING SYSTEM PERFORMANCE

Timing: One year

The goals of this stage are to:

- Review the system against its intended objectives;
- Consider the merits of transitioning to a mandatory system
- Performance review or retender and contract the system operator

We estimate that the review of the system will take at least one year to conduct and reach agreement on the findings. This includes the time require to retender and contract the system operator. It also covers the time taken for a broader

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system and market review, and development of recommended next steps, including recommendations on the merits of transitioning to a mandatory system.

Our research found both very strong stakeholder support for and opposition to a mandatory system. Our research of international systems showed mandatory systems in Europe were highly effective. Stakeholder consultation in Australia also found that systems like NABERS were able to achieve public and private benefits and stakeholder support, in a voluntary form. Whilst, the case for a mandatory system was out of scope for this research project, it has previously been considered at length, as noted in section 1. Should governments and stakeholders revisit this issue at a later date, an effective national voluntary disclosure system would be well positioned to transition to a mandatory system – as has been the case with the voluntary NABERS system forming the basis for Commercial Building Disclosure.

A voluntary system is likely to drive far greater discipline amongst the various system players to ensure that information provided by ratings is relevant, costs are minimised and processes align with good business practices. Without these factors, a voluntary system will not succeed. As such, there is merit in establishing a voluntary system ahead of any potential transition to a mandatory system.

This view was supported by a significant group of stakeholders who argued strongly that the initial success of NABERS as a voluntary system, was critical to ensuring the system was appropriate and the commercial building market was ready by the time Commercial Building Disclosure was implemented. Stakeholders noted that the early adopters of a voluntary system are likely to be those who will benefit from showcasing their already high performing homes. Delivering immediate benefits to early adopters then provides an evidence base for early majority consumers who wish to capture similar benefits. It is unlikely that such a pathway to building good will and support would occur if a residential system were to commence as mandatory.

Should governments desire to progress to a mandatory system, this would require regulatory impact assessment processes, cabinet, potentially COAG, and parliamentary approval.

As discussed above, it is important that the system operator is engaged under commercial terms, creating commercial tensions for performance. One means to ensure this commercial focus of the system operator is to retender this function ever, say, three years. Once the system reaches maturity, it is likely that this arrangement will be viable. During the establishment stages, though, it is likely that a three-year contract may not be sufficient for the system operator to receive sufficient return on their investment. This may limit the field of parties interested in providing this role, further limiting the opportunities for commercial tensions.

As such, there may be merit in considering the first system operator contract as a longer period contract than subsequent contracts. If this is done, then there will need to be performance review points built into the contract.

The outcome of this stage will be:

- System improvements, informed by a comprehensive review;
- System operator reviewed or retendered
- A report to governments on the merit of transitioning to a mandatory system.

The key activities for this stage are set out in Table 23 below.

Table 23 Stage 5 - key activities

Activities	Purpose
Review delivery contract performance	System administrator to review delivery of system operator contract and design revised functional requirements, obligations KPIs as required.
Performance review or re-tender system operator contract	System administrator to review or retender system operator contract for another fixed term. If only a review is conducted then a timeframe will be set for retendering.
Review system performance & uptake	Board and working groups to oversee review of system level performance including governance, administration and delivery Consider and act on findings
Assess the merits of transitioning to mandatory disclosure	Board to work with government to facilitate assessment of costs benefit of and market readiness for mandatory disclosure
Enhance and maintain operations	Continue and improve system operation

2. Summary of system financial forecasts

This section provides a high-level forecast of the major cost and revenue elements of the proposed system over the initial 10 years of operations. Costs and revenue are broken down by the major parties: system administrator, system operator, accredited assessors and Real Estate agent/property manager training. They cover the initial establishment costs and recurrent operating costs and revenue. We have designed this system with a view to it operating on a cost recovery basis over the program lifetime. We forecast that the proposed system will break even after six years for the system administrator and from year four for all other parties.

We have assumed that the governance board and working group members provide their time on a volunteer basis. As detailed in the Cost-Benefit Analysis in part II, we have modelled numerous scenarios of different system costs and performance assumptions. The largest drivers of variation in the forecast financial results are ratings take up and the amount spent on promotions. This, in turn, is a major driver of variations in the up take of ratings.

This section summarises the financial forecasts under two different scenarios: (i) high promotions spend (resulting in high uptake of ratings), (ii) medium promotions spend (resulting in medium update of ratings). These are detailed in Section 5.4 and Table 25. Part II provides extensive detail on the range of scenarios modelled. Moreover it summarises our detailed analysis of the net public and private benefits associated with the proposed system, and the business case for establishing the system. This section is intended to assist with business planning and to establish the proposed operating framework.

The main findings of this analysis are as follows:

System Administrator	- An initial investment of $6 million (medium promotions) to $7 million (high promotions) is required to establish and promote the system over five to eight years, covering: $200,000 for the development of administration and governance systems. $50,000 for training development $500,000 in year 0 for rating system development and $200,000 from year 1 to 5 for rating system operation (based on competitive tender). $2.8 million to $4 million for marketing and promotions $300,000 (plus inflation) annual operating budget for administrator covering staff (2 EFT, growing to 3 EFT after 5 years) and independent quality assurance audits. - Administrator income from fees will grow to $1 million within 10 years based on the high uptake rate. Income will fully recover administration costs from year 5 in this scenario.
System operator	- System development costs will be funded by the administrator, based on a competitive tender process - System operating costs and profits are to be recovered through share of ratings licensing fees forecast at $10 per rating, rising over time to $1,000,000 p.a. from year 10 based on the high uptake scenario
Real estate agent training	$162,000 will be provided over two years in sustainability marketing training subsidies for up to 5,400 real estate agents/property managers
Ratings Assessors	- Assessors will charge on average $158 per rating with an average rating time of 45 minutes - We forecast an average of 46,000 to 150,000 ratings per year after 10 years under the medium and high marketing budget scenarios respectively

Table 24 Medium-level administration financial forecasts – Scenario 1: Medium promotions spend

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Assumptions
Revenue											
Seed Funding	$1,837,009	$1,257,470	$768,278	$767,223	$719,955	$457,196	$279,071	$74,760	$-	$-	
Administration fees	$-	$308	$6,094	$37,648	$124,996	$279,209	$480,832	$696,879	$900,522	$1,077,844	$20/rating
System operator licence fees	$-	$154	$3,047	$18,824	$62,498	$139,604	$240,416	$348,439	$450,261	$538,922	$10/rating
TOTAL Revenue	**$1,837,009**	**$1,257,931**	**$777,419**	**$823,695**	**$907,448**	**$876,010**	**$1,000,319**	**$1,120,078**	**$1,350,782**	**$1,616,766**	
Expenditure											
Administrator establishment costs	$200,000	$-	$-	$-	$-	$-	$-	$-	$-	$-	
Administrator staffing	$352,521	$299,299	$302,436	$305,632	$308,890	$379,310	$382,692	$386,138	$389,650	$393,229	2.5FTE
Assessor training	$45,256	$11,597	$11,597	$11,597	$34,791	$46,388	$57,985	$57,985	$57,985	$46,388	
Marketing and promotion	$658,232	$663,889	$237,737	$243,681	$249,773	$256,017	$262,417	$268,978	$275,702	$282,595	
Liveability agent training	$81,000	$81,000	$-	$-	$-	$-	$-	$-	$-	$-	
Rating audits	$-	$1,993	$22,602	$43,961	$51,497	$54,691	$56,810	$58,538	$60,159	$61,663	
System operator seed funding	$500,000	$200,000	$200,000	$200,000	$200,000	$-	$-	$-	$-	$-	
System operator license payment	$-	$154	$3,047	$18,824	$62,498	$139,604	$240,416	$348,439	$450,261	$538,922	
TOTAL Expenditure	**$1,837,009**	**$1,257,931**	**$777,419**	**$823,695**	**$907,448**	**$876,010**	**$1,000,319**	**$1,120,078**	**$1,233,757**	**$1,322,796**	
Net income	$-	$-	$-	$-	$-	$-	$-	$-	$117,025	$293,969	

* indicative budget. Transitional administrator to establish the exact budget for marketing costs to achieve market penetration above the inflection point for rating demand.

Table 25 High-level administration financial forecasts – Scenario 2: High promotions spend

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Assumptions
Revenue											
Seed Funding	$2,656,621	$2,080,350	$770,002	$701,826	$552,113	$-	$-	$-	$-	$-	
Administration fees	$-	$1,025	$17,714	$109,046	$362,227	$809,093	$1,393,279	$2,019,292	$2,609,210	$3,122,807	$20/rating
System operator licence fees	$-	$513	$8,857	$54,523	$181,114	$404,546	$696,639	$1,009,646	$1,304,605	$1,561,403	$10/rating
TOTAL Revenue	$2,656,621	$2,081,887	$796,572	$865,395	$1,095,454	$1,213,639	$2,089,918	$3,028,938	$3,913,815	$4,684,210	
Expenditure											
Administrator establishment costs	$200,000	$-	$-	$-	$-	$-	$-	$-	$-	$-	
Administrator staffing	$352,521	$299,299	$302,436	$305,632	$375,991	$379,310	$473,386	$478,556	$577,997	$585,154	2.5FTE
Assessor training	$45,256	$11,597	$11,597	$11,597	$34,791	$46,388	$57,985	$57,985	$57,985	$46,388	
Marketing and promotion	$1,477,844	$1,483,501	$237,737	$243,681	$249,773	$256,017	$262,417	$268,978	$275,702	$282,595	
Liveability agent training	$81,000	$81,000	$-	$-	$-	$-	$-	$-	$-	$-	
Rating audits	$-	$5,978	$35,945	$49,962	$53,786	$55,864	$57,411	$59,000	$60,475	$61,987	
System operator seed funding	$500,000	$200,000	$200,000	$200,000	$200,000	$-	$-	$-	$-	$-	
System operator license payment	$-	$513	$8,857	$54,523	$181,114	$404,546	$696,639	$1,009,646	$1,304,605	$1,561,403	
TOTAL Expenditure	$2,656,621	$2,081,375	$787,715	$810,872	$914,340	$737,578	$851,199	$864,518	$972,159	$976,124	
Net income	$-	$-	$-	$-	$-	$71,514	$542,080	$1,154,774	$1,637,051	$2,146,683	

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Part II Costs and benefits of the recommended approach
Business case and market impact report

7. Overview

Part II of this report provides a summary of the findings of the cost benefit analysis we conducted to understand the case for a voluntary disclosure system, and to optimise the design of the system detailed in Part I. In order to conduct this analysis, we built an economic model to understand the public and private costs and benefits of the proposed system, and how these might vary. This section summarises our modelling approach and assumptions, as well as the cost benefit findings and conclusions.

The costs and benefits in this model arise from consumers purchasing a voluntary disclosure rating at the point of sale or lease and investing in upgrades to improve the rating. The main costs are those associated with administering the system, delivering/purchasing ratings, and energy efficiency investments. The main public benefits stem from the broader energy market and environmental benefits from lower energy demand. The main consumer benefits stem from energy bill savings, and industry benefits from consumer investment in energy efficiency products and services.

The cost and benefit models were informed by the "Consultation Regulation Impact Statement for the Mandatory disclosure of residential building energy, greenhouse and water performance", prepared by the Allen Consulting Group in July 2011 (henceforward "the Mandatory Disclosure RIS"). Updated cost and benefit data is used as available, and the model is amended to suit the proposed implementation.

Given the voluntary nature of the proposed system, costs and benefits are highly subject to market adoption of the system. To understand the interaction of these costs and benefits with market adoption, we developed an uptake model that tested multiple scenarios. The two key parameters underpinning each scenario are the extent to which householders opt in to the system by purchasing an energy rating during a sale or lease transaction; and the extent to which householders act on the information they receive by investing in energy efficient upgrades to their home. Our uptake model also considered interaction between the prices charged for ratings and the level of marketing spend, with assumptions informed by EnergyFit project consumer research.

This business case tests a very broad range of possible market responses. Under the most conservative scenario tested, EnergyFit ratings are obtained for only 13% of home sales after the system has been in operation for 20 years, and action is taken in less than 10% of these to upgrade their rating as a result. The most optimistic scenario tested has EnergyFit ratings obtained for almost 40% of home sales when the system is at its peak, with action taken in 30% of these homes to upgrade their performance. The model assumes a gradual increase in rating take-up by households based on a typical innovation adoption curve, with 50% of the modelled maximum rating take-up reached after 7 years of system operation. Table 26 shows the range of uptake scenarios assessed.

Table 26 Business case key parameters

Parameter	Low range	Mid range	High range
Maximum rating take-up	13% of home sales	-	38% of home sales
	7% of home rentals	-	19% of home rentals
Energy efficiency upgrades	7.5% of rated homes	15% of rated homes	30% of rated homes

Our cost benefit analysis concluded that there is a very sound public and private business case for a national voluntary disclosure system under our recommended operating model. Based on the cost and pricing structure of our recommended operating model, the analysis yielded positive results for all parties under all take-up scenarios. A summary of the model outcomes under the lowest and highest take-up scenarios is provided in Table 27 below.

Table 27 Overall cost benefit results

Key Result Indicator	Scenario 1A: Low takeup, Low action	Scenario 2c: High takeup, High action
NPV of seed funding investment	$42m	$535m
Average rating cost ($2016)	$159	$159
Annual electricity savings in 2036	158 GWh	1,827 GWh

Annual gas savings in 2036	103 TJ	1,197 TJ
Household investment in energy efficiency	$437m	$5,068m
NPV of household investment	$186m	$2,797m

Note: the level of seed funding provided (which is modelled to range from $6 to $7m total) will have some effect on the scale of benefits. This is because the largest use for the seed funding is for marketing and promotion. More funding for this is expected to drive more ratings and deliver greater benefits.

It is important to understand that all take-up scenarios assumed the system involved an initial investment in marketing within the range recommended in Part I. Without adequate marketing funding take-up would be significantly lower. As discussed in Part I, if market penetration is unable move beyond early adopters the system is unlikely to achieve sustained take-up. We also modelled low adoption rates along these lines and found positive but negligible net benefits.

Based on this analysis we conclude that there is a very sound public and private business case for a national voluntary disclosure system under our recommended operating model. Developing this system makes sense for business, government and households for all feasible market response scenarios.

Our recommended design for a voluntary disclosure system requires an initial investment of between $6 to $7 million over five to eight years for system administration, after which it would operate on a cost recovery basis. This investment would deliver a net public benefit of between $42 to $535 million, 158 GWh to 1,827 GWh in annual electricity savings and $63 million to $733 million in annual household bill savings, and $437 to $5,068 million for industry from additional investments in household energy efficiency.

Should the scheme be made mandatory after five years of operation, the public and private benefit is significantly increased. Assuming that a mandatory scheme leads to low level of energy efficiency upgrade by participating homes, the net public benefit from government investment to 2056 is $470 million, with a net private benefit of $1,830 million.

8. Methodology

As outlined above, the costs and benefits in this model are driven by conducting ratings, of which a proportion result in energy efficiency actions. The main costs are those associated with administering the system, delivering/purchasing ratings, and investing in energy efficiency upgrades. The main public benefits stem from the broader energy market and environmental benefits from lower energy demand. The main private benefits stem from consumer energy bill savings and industry revenue from consumer investment in energy efficiency upgrades and purchases of ratings.

This section explains the overall structure of the model, the major categories of costs and benefits, and the framework for scenario modelling. The next section details the assumptions and evidence sources for the inputs we used in the model.

The net present value of costs and benefits under the system are modelled using a discount rate of 7%, consistent with government policy and the Mandatory Disclosure RIS. The analysis is taken over a system life of 20 years, with energy and financial savings benefits extending to 2056.

1. The model

Figure 15 below illustrates the framework cost benefit model for a voluntary disclosure system. The model involves a series of cost components, covering ratings, energy efficiency upgrades and system administration overheads. In includes an uptake model based on the penetration of housing sales and leases that involve ratings, and the proportions of rated homes that result in energy efficacy upgrades. It involves a cost benefit model considering the public and private costs and benefits of different parties, and the recovery costs for administrative overheads.

Figure 14 EnergyFit cost and benefit model
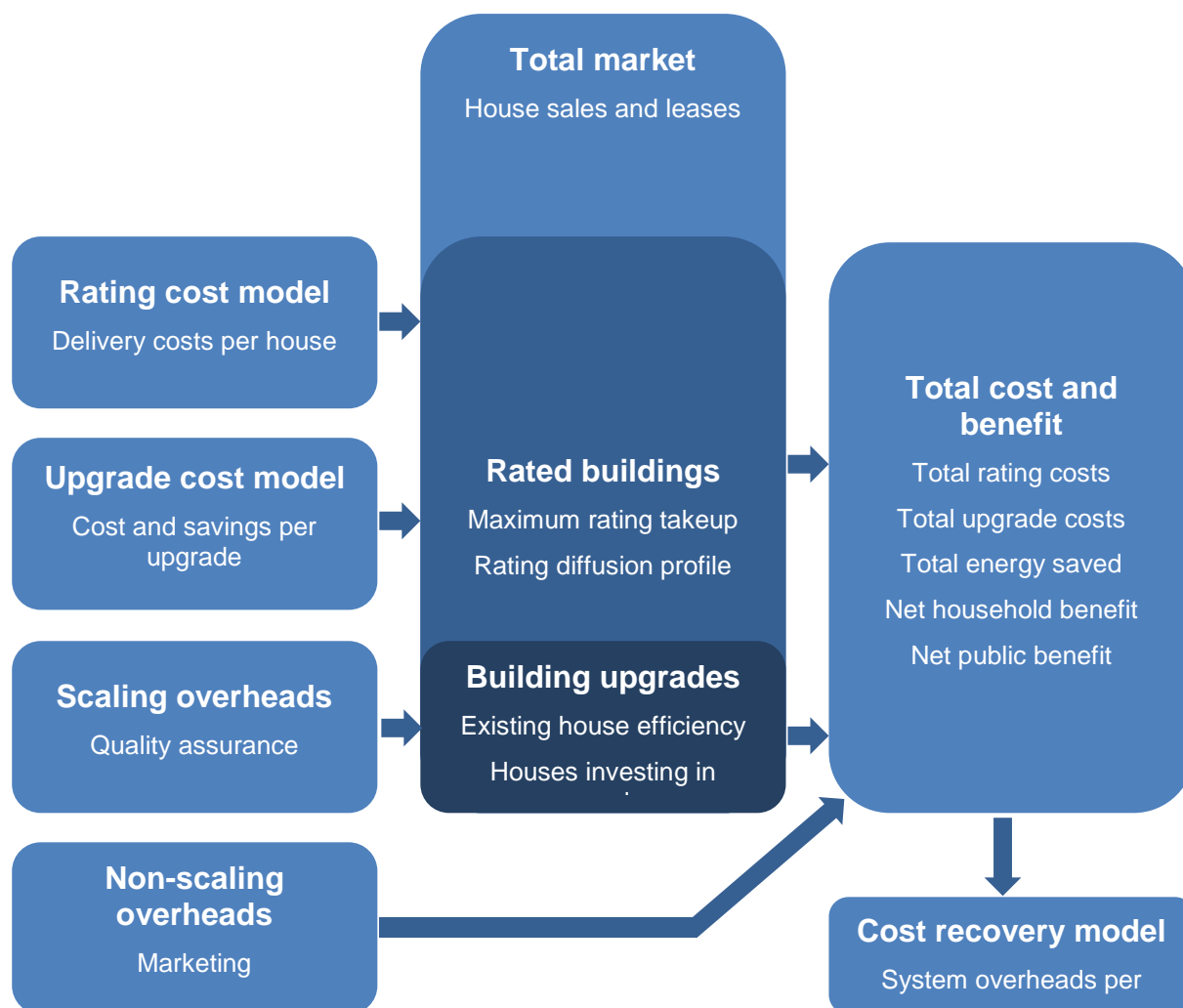
Costs and benefits are modelled at an individual level, and scaled up to market level costs and benefits based on projected rating adoption rates, and the likelihood of a rating participant going on to upgrade the energy efficiency of their home. Additional non-scaling costs associated with system administration, governance and marketing are also added to determine the total cost and benefit of the system both to participants and to the broader public. The rating administration fees required to meet system overheads are established by the total cost of system overheads per participant.

2. Costs

The direct costs modelled in this business case relate to the cost to consumers in obtaining a rating and investing in upgrades, and administration and governance costs. These costs include:

- *Direct rating costs:* the time taken to perform a rating, and the hourly rate of the assessor. The business case assumes that the majority of ratings are provided as an added value service while the assessor is already on site. The direct rating costs also include any delivery incentives provided to assessors to encourage them to include a rating in their broader suite of on-site services.
- *Indirect rating costs:* the business case models indirect costs associated with an EnergyFit rating including the cost of real estate agent time to promote and help to arrange a rating during the sale or rental process, and the opportunity costs for the householder to be on-site during the rating process.
- *Training and insurance costs:* delivery partners will incur a range of costs to ensure that assessors have the appropriate capability to perform household energy efficiency ratings, and appropriate insurance coverage for on-site rating work. As a primary channel to market, the business case also includes training for real estate agents/property managers in both the rating system and the Liveability Real Estate Framework.
- *Marketing and promotion costs:* the cost of promoting the system to householders and professionals involved in the property sale and lease process, including advertising, website and marketing materials.

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- *Development and maintenance costs:* The business case allows for the cost of developing and maintaining the technical components of an EnergyFit rating, including developing or adapting a rating system, and rules and processes for providing ratings.
- *Administration costs:* these costs include registering assessors, quality assurance, and establishing and maintaining an appropriate governance system.
- *Investments in energy efficiency upgrades:* the cost of upgrading the energy efficiency of a home in response to the EnergyFit rating. These costs include the purchase and installation of energy efficiency upgrades.

While the business case incorporates most costs modelled in the Mandatory Disclosure RIS, some minor costs from that report are not incorporated into this analysis as they do not apply to a voluntary system. These include:

- *Compliance* – the business case includes quality assurance costs to maintain confidence in the system, but does not include a compliance or penalty regime that would apply if it was unlawful not to obtain a rating when selling or leasing a home.
- *Public enquiry line* – the Mandatory Disclosure RIS includes the cost of responding to enquiries arising from those affected by a mandatory energy efficiency disclosure process. Under a voluntary system, delivery partners will manage any enquiries about their product through existing channels.

See section 9 for a detailed explanation of the modelled costs and benefits, including key assumptions.

3. Benefits

The direct benefits modelled in this business case relate to the investment in energy efficiency stimulated by participation in the system. These benefits include:

- *Energy bill savings:* estimated direct financial savings to households from lower energy bills (including income from generated electricity sold to retailers through feed-in tariffs)
- *Public benefits:* estimated public benefits from avoided energy consumption include reduced greenhouse gas emissions, an avoided need to invest in new energy market infrastructure, and a reduction in public health costs arising from energy generation (such as air pollution from coal-fired power plants). The modelling methodology for public benefits is derived from the NSW Government report "2015 Review of the NSW Energy Savings Scheme".
- *Business benefits:* estimated increase in consumer investment in energy efficiency products and services

4. Scenarios

The end goal of voluntary disclosure is to deliver energy savings through an increased investment in household energy efficiency. Two key parameters drive the potential effectiveness of the system in meeting this goal:

- Takeup: the extent to which the market adopts the voluntary rating during home sale and lease transactions
- Action: the proportion of people that obtain a rating choosing to invest in energy efficiency

In recognition of the importance of these two key parameters, this business case includes a number of scenarios covering a possible range for each.

Table 28 Scenario summary

		Takeup	
	Scenario	LOW	HIGH
ACTION	LOW	1a	2a
	MEDIUM	1b	2b
	HIGH	1c	2c

An additional scenario modelling the effect of the scheme if it should be made mandatory after five years of operation is detailed in section 12 below.

See section 9.6 below for more detail on these scenario settings.

9. Key assumptions and data sources

1. Rating cost model

The rating cost model sets out the direct rating costs associated with an assessor visiting and rating a home. This model estimates the market cost to deliver ratings based on the following inputs and assumptions:

- *Time taken for rating.* Based on a simple preferred rating approach, we assume that a rating will take 45 minutes to complete and document. The impact of a longer rating time is tested in a sensitivity analysis (see section 11.1).
- *Travel time.* We consider that most ratings will be completed by an expert that is already on site for another purpose, and provides a rating as a value-add service. Travel time is assumed to be zero for 75% of ratings. Travel is factored in at 40 minutes per rating on average for the remainder.
- *Hourly rate.* The labour costs for a rating provider are based upon the "skilled worker" wage rate used for the Victorian Government time cost calculator, part of the Victorian Guide to Regulation (2014). This hourly rate includes business costs and overheads. The effective hourly rate for each state is estimated by scaling the Victorian rate in proportion to the state level average weekly earnings published by the Australian Bureau of Statistics (ABS 6302).
- *Delivery incentive.* The model assumes that assessors will charge a $50 per rating delivery incentive on top of the cost of providing the rating to reflect the role of providing the services as a value-add to existing services, and to reflect the potential opportunity cost of extending their presence on site to complete a rating.
- *Assessor training and insurance.* While assessors may already carry insurance that is adequate for rating purposes, additional insurance costs for assessors have been modelled at a rate consistent with the Mandatory Disclosure RIS. While training may be delivered online, we have conservatively incorporated the cost of face to face training. Training costs to ratings assessors may include developing training materials and running training sessions. Developing the materials is assumed to cost $44,000, reviewed every five years. Training delivery costs are set at $11,000 per session (increasing with inflation) with up to 20 assessors per session. At system establishment only one session is required under all scenarios, ramping up to meet rating demand to a peak of between 3 and 15 sessions per year.
- *Administration fees.* The administration fees are set to recover on-costs after initial startup. For more information on the scaling and non-scaling overheads that drive these fees, see section 3 and 4 below. The administrator passes a fixed fee per rating to the system operator to covers its operating costs. This is referred to here as a licence fee and is the primary income stream for the system operator for rating system maintenance and upgrades.
- *Real estate agent and property manager costs.* The additional time taken for a real estate agent and property managers to assist in organising a rating is included in the cost per rating (although it would be recovered through a separate process). The analysis uses assumptions consistent with the Mandatory Disclosure RIS at 10 minutes of administrative time per assessment.
- *Household opportunity costs.* The business case values the cost of the household giving up their time while their home being rated using the "household" rates from the Victorian Guide to Regulation time cost calculator (2014). Costs for other states are scaled from the Victorian rates using ABS data in the same way as rating provider costs.

Ratings costs are based on current business practices. Once the volume of ratings increases under a national voluntary disclosure system, there is the potential for innovative new delivery methods and lower costs. The incentive structures built into the proposed system are designed to deliver this.

This sub-model provides a per-rating cost to consumers for ratings in each state, increasing each year with inflation and wage increase projections from the Victorian time cost calculator. The first year costs for each state are summarised in Table 29 below.

Table 29 Costs per rating in year 1.

Cost component	NSW	VIC	QLD	SA	WA	TAS	NT	ACT
Rating costs including delivery incentive	$122	$115	$119	$114	$135	$108	$130	$120
Administration fee	$20	$20	$20	$20	$20	$20	$20	$20
System operator license	$10	$10	$10	$10	$10	$10	$10	$10

TOTAL FIRST YEAR RATING FEE	$142	$135	$139	$134	$155	$128	$150	$140
+ Household opportunity costs	$47	$43	$45	$43	$54	$39	$51	$46
+ Real estate agent costs	$11	$10	$11	$10	$13	$9	$12	$11
TOTAL FIRST YEAR COST	$200	$188	$195	$187	$222	$176	$214	$198

*Note that assessors will pay a single fee to the administrator covering both administration fee and system operator license.

2. Upgrade cost model

The system benefits derive from those householders that take action to upgrade the energy efficiency of the home after a rating. A detailed sub-model was developed to determine the upgrade cost for these homes.

It is expected that a national voluntary disclosure system will be particularly beneficial in stimulating additional investment in energy efficiency improvements that require medium to large capital investment and many-year payback periods. These are the type of investments that are typically overlooked in the absence of information (such as that which a national voluntary disclosure system will provide).

The potential upgrades tested in this business case include:

- Upgrade ceiling insulation to an appropriate level for the local climate.
- Install LED bulbs to replace halogens
- Install draught proofing
- Install solar PV
- Install double glazing
- Install solar hot water system with an electric boost to replace an existing electric hot water system

Note that this list is an indicative set of potential upgrades for the purposes of testing the potential benefits derived from energy efficiency disclosure. It is not an exhaustive list of possible energy efficiency upgrades but covers most of the largest ready savings opportunities available to most Australian households. Using a subset of potential upgrades is a conservative approach as additional cost effective upgrades stimulated by disclosure would improve the business case by delivering additional private benefit at no additional system cost. Also, the modelling is based on implementation of these upgrades using current cost models. The national voluntary disclosure system offers the potential to drive uptake of these measures, potentially shifting costs down.

Model inputs are:

- *Costs to install energy efficient upgrades.* Industry or government data was used where available to inform these costs. Where updated costs were not published, the business case uses upgrade costs from the Mandatory Disclosure RIS, adjusted for inflation. Data sources include "The Value of Ceiling Insulation" (ICANZ September 2011), "Small-scale technology certificates - data modelling for 2016 to 2018" (Green Energy Markets 2016) and published retail price of high quality dimmable LED 12V bulbs.
- *Energy savings from energy efficient upgrades.* Savings for each installation were based on industry data and the Mandatory Disclosure RIS. Data sources include those used for installation costs, "Australian Residential Lighting Survey – Pilot" (Equipment Energy Efficiency April 2013), "Simple Window Comparison Tool" (Efficient Glazing) and the NABERS Home Energy Explorer.
- *Generated and exported electricity.* For PV systems, average new system size for each state is sourced from "Small-scale technology certificates - data modelling for 2016 to 2018" (Green Energy Markets 2016). Average system generation for each state is based on outputs from installed PV systems on PVOutput.org, and cross checked against theoretical system potential using the online PVWatts calculator. 50% of generated electricity is exported to the grid (assumptions match "Small-scale technology certificates - data modelling for 2016 to 2018" (Green Energy Markets 2016)).
- *Potential for upgrade.* The business case assumes that the likelihood that homes have already installed an EnergyFit upgrade matches current market averages, and discounts the likely cost and benefit accordingly. Data used to inform the current takeup of these upgrades includes the "Environmental Issues: Energy Use and Conservation March 2014" (Australian Bureau of Statistics), "Victorian Households Energy Report" (Sustainability Victoria, May 2014), "Small-scale technology certificates - data modelling for 2016 to 2018" (Green Energy Markets 2016) and the "Australian Residential Lighting Survey – Pilot" (Equipment Energy Efficiency April 2013).
- *Home size.* Most of these installation costs scale with home size. The average size of homes in each state was estimated using historical building approvals data published periodically by the Australian Bureau of Statistics (ABS 8752)
- *Energy price forecasts.* Household electricity prices were estimated with reference to the "2014 Residential Electricity Price Trends" published by the Australian Energy Market Commission, and medium term

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forecasts in the "Economic Outlook" paper published by the Australian Energy Market Operator. Off-peak prices are used as the baseline for electric hot water system replacement. Gas prices were sourced from current standing offers, and are assumed to conservatively increase with inflation due to uncertainty in medium term prices forecasts. The EnergyFit business case would improve if gas prices increase beyond inflation as expected. Wood fuel savings are also estimated, based on figures used in the Mandatory Disclosure RIS.

- *Feed-in tariff assumptions.* Exported electricity is sold to the grid at regulated feed-in tariff rates, or market rates where available. Modelled rates are detailed in Table 30, as sourced from government regulators and www.energymadeeasy.gov.au for market offers.

Table 30 Modelled feed-in tariffs by state

NSW	VIC	QLD	SA	WA	TAS	NT	ACT
5.1c/kWh	5c/kWh	6c/kWh	6.8c/kWh	7.13c/kWh	5.5c/kWh	25.54c/kWh	6c/kWh

- *Business as usual projections.* A certain proportion of households are already investing in energy efficiency upgrades. This business case uses the business as usual upgrade trends determined for the Mandatory Disclosure RIS as a conservative base case.
- *Savings persistence.* To ensure a conservative cost savings model, a 2% annual decay factor is applied to all energy savings to allow for system failure and a small rebound effect. This decay factor was cross referenced against the NSW Project Impact Assessment with Measurement and Verification Method calculator, which includes a persistence model. The method used here is more conservative, as the savings from LED lighting, insulation, draught proofing and double glazing do not decay in that calculator over 10 years.
- *Life of installed equipment.* Installed equipment life is consistent with the Mandatory Disclosure RIS. LED lighting, insulation and double glazing are assumed to have a 20 year life. Solar hot water and draught proofing need to be replaced every 10 years. Solar PV is assumed to have a 20 year life.
- *Potential property value premium.* Evidence from jurisdictions with a point of sale energy efficiency disclosure system suggests that the market will place a value premium on homes with a higher rating. The business case models an expected value premium for potential energy efficiency upgrades. Further details on the value premium model are outlined in section 7 below.

The model assumes that householders only invest in upgrades that have a positive net present value based on upfront costs, energy bill savings and the expected property price premium (using a 7% discount rate. The modelled net present value of energy efficiency upgrades in each state is summarised in Table 31.

Table 31 Modelled net present value of energy efficiency upgrades in each state

Upgrade		NSW	VIC	QLD	SA	WA	TAS	NT	ACT
Package 1	LED lighting	$3,186	$3,199	$3,817	$3,926	$2,908	$2,869	$3,561	$2,390
Package 2	Insulation + Package 1	$14,343	$19,611	$13,125	$15,569	$13,859	$15,952	$13,866	$19,674
Package 3	Draught proofing + Package 2	$6,762	$7,983	$6,648	$7,593	$7,171	$7,566	$6,885	$9,086
Package 4	Solar PV + Package 3	$8,656	$8,679	$10,246	$11,803	$10,177	$7,566	$14,886	$8,099
Package 5	Solar hot water + Package 4	-$838	-$184	$253	$502	$339	$837	$967	$239
Package 6	Double glazing + Package 5	-$2,865	-$11,254	-$1,717	-$5,570	-$9,039	-$891	-$1,759	-$5,197

This suggests that all upgrades are cost effective in each state, apart from double glazing, and solar hot water in NSW and Victoria. Double glazing becomes cost effective in most states at a property value premium of 14%, which lies at the upper bounds of the observed premiums in other jurisdictions.

Based on these calculations, the business case assumes that households choosing to upgrade will invest in each of the five possible energy efficiency opportunities not already present in their home, apart from double glazing. The following

table shows the assumptions used in the business case for the proportion of these households that upgrade (based on the business as usual presence of the potential upgrades). See Table 40 for more detail.

Table 32 Household upgrade extent in each state as proportion of maximum action

Upgrade		NSW	VIC	QLD	SA	WA	TAS	NT	ACT
Package 1	LED lighting	100%	100%	100%	100%	100%	100%	100%	100%
Package 2	Insulation + Package 1	22%	9%	24%	7%	12%	9%	24%	6%
Package 3	Draught proofing + Package 2	19%	8%	21%	6%	11%	8%	21%	6%
Package 4	Solar PV + Package 3	15%	6%	13%	4%	8%	7%	18%	5%
Package 5	Solar hot water + Package 4	0%	0%	9%	2%	2%	6%	11%	2%
Package 6	Double glazing + Package 5	0%	0%	0%	0%	0%	0%	0%	0%

This table shows, for example, that of the homes in NSW that chose to upgrade, 22% of these install insulation. Note that only a proportion of participating homes choose to upgrade, varying by scenario (see Table 38 in section 6 below for detail).

3. Scaling overheads

Scaling overheads for the administration of the system relate to quality assurance costs. For the purposes of this business case, we have assumed that the proportion of ratings subject to random quality assurance checks is based upon a simple sample size calculation for a 95% confidence interval and 5% error margin. This means a high proportion of ratings are checked during the ramp-up phase, reducing over time as the number of ratings increases. This is a relatively conservative figure for a voluntary system.

Quality assurance checks are assumed to involve an expert visiting the rated building and redoing the rating to check for errors. The estimates of time taken match that for the initial assessment, although all quality assurance checks are assumed to involve travel, and additional data entry time is allocated to reflect the need to provide comment on the original rating.

This sub-model provides a cost of quality assurance per rating.

4. Non scaling overheads

An EnergyFit rating system will incur a number of costs irrespective of the extent to which the system is adopted by the market. These include marketing costs, the staffing costs and overheads associated with running an administrator, website costs, development and startup costs.

Under any scenario, the low number of ratings in the first few years of system means that costs to the system operator and the system administrator will not be immediately recoverable from system participants. The business case assumes that one or a number of seed funding providers will cover the initial costs associated with administering the system, along with system operator costs. This initial funding is not recovered from system participants. Once the system is established, the costs of administering the system can be recovered from ratings assessors through a low administrative fee per rating.

The business case measures the net public benefit of this initial seed funding investment, along with the private benefit associated with investing in an EnergyFit rating and energy efficiency upgrade.

System operator costs:

- $500,000 in year 0 to develop or adapt a rating system for delivery as an EnergyFit rating.
- $200,000 per year from year 1 to year 5 for initial system operation

- Staffing costs – from year 6, we assume that ongoing support and development will involve an effort equivalent to 1 EFT for web design and programming, and 1 EFT for technical support. As in section 1, these costs are based on the "skilled worker" wage rate from the Victorian Government time cost calculator.

Administration costs (initially borne by seed finding provider(s), passed to administrator and recovered from administration fees once system is established):

- $200,000 in year 0 to develop rules and establish administrator governance. This cost is assumed to recur every 10 years as rules and governance systems are reviewed.
- Staffing costs – we assume a lean model with minimal staff, with 2.5 full time equivalent staff to establish the system.
- $800,000-$2.5m for a broad-based marketing campaign promoting the new system over the first two years. It is assumed that a marketing campaign of a smaller scale is used in scenario 1 (low takeup).
- $226,000 per annum (+ inflation) for promotional materials.
- $162,000 over the first two years to train real estate agents, as an important channel to market.

5. Cost recovery model

The cost recovery model is based on the overheads incurred in administering the system over the long term. A per-rating administration fee is established for each scenario based upon the fixed and scaling costs outlined above. Note that the administration fee includes a licence fee, which is passed on to the system operator.

The model assumes a fixed administration cost per rating to meet long term administrator and system operator costs.
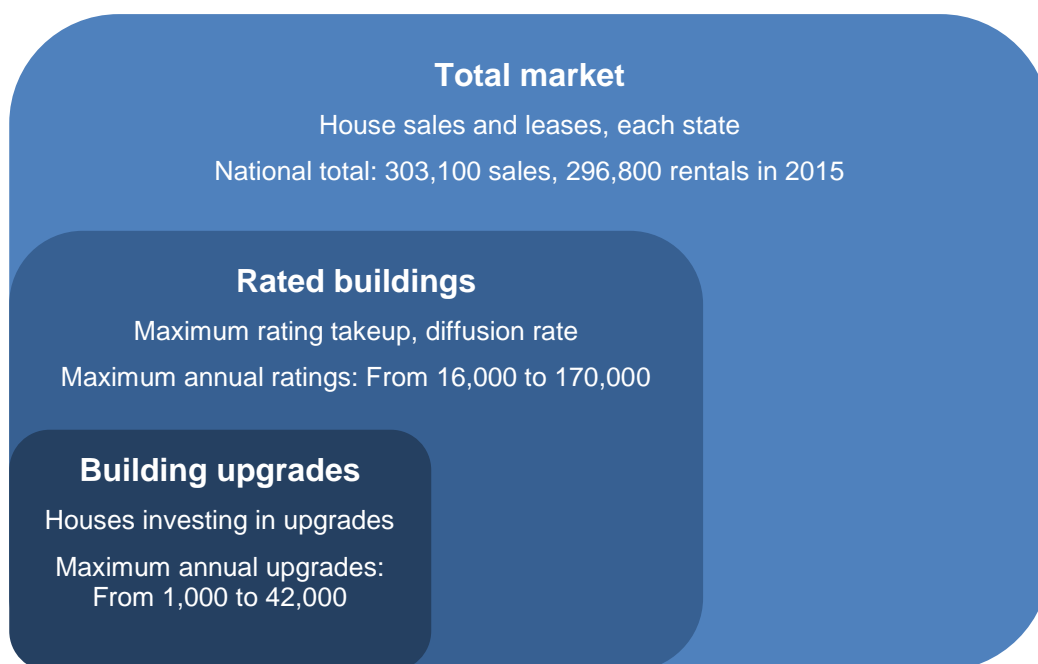
Table 33 Administration fees per rating

Scenario	Administration fee
Administrator fee	$20
System operator license	$10

These modelled fees allow the administrator to recover all system administration overheads after a seed funding period. Higher fees would allow a more rapid transition to cost recovery.

6. Market size model

The market for EnergyFit ratings is a subset of the national house sales and rentals market. The size of the market will depend upon the market response to the rating system.

Figure 15 Market size model

Figure 15 Market size model

Total market

House sales and leases, each state

National total: 303,100 sales, 296,800 rentals in 2015

Rated buildings

Maximum rating takeup, diffusion rate

Maximum annual ratings: From 16,000 to 170,000

Building upgrades

Houses investing in upgrades

Maximum annual upgrades:
From 1,000 to 42,000

(xxiii) Total market size

The total size of the sale and rental market is derived from published data. The size of the housing market and number of sale transactions is published regularly by the Australian Bureau of Statistics. The total number of house sales during each year of the business case is assumed to match the 2010-2014 average. The best data for rental at a house level is published by Housing NSW for the NSW market only. The number of rental transactions outside NSW year is estimated from the Housing NSW report and census data on the total number of rental dwellings in each state.

Table 34 Estimated number of house sales and rental transactions per state per year

STATE	NSW	VIC	QLD	SA	WA	TAS	NT	ACT	total
House sales	89,000	79,400	65,800	21,600	32,800	7,900	2,000	4,600	303,100
Rental transactions	83,400	65,100	70,600	25,600	35,400	7,500	4,000	5,200	296,800
TOTAL	172,400	144,500	136,400	47,200	68,200	15,400	6,000	9,800	599,900

Source: ABS 6416 "Residential Property Price Indexes: Eight Capital Cities", March 2015, Housing NSW "Rent and sales reports - June 2015", Census

(xxiv) Maximum takeup

The business case models the range of potential market responses to the rating with three scenarios, informed by the EnergyFit report "National Consumer Survey Results"[77]. Consumers were asked whether they would be willing to pay for information about the energy efficiency of a home at the point of sale, with responses summarised below.

Table 35 Willingness to pay for energy efficiency information during house sale

Acceptable cost for energy	Responses	Cumulative

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[77] Romanach, LM., Jeanneret, T. and Hall, N. (2015), The EnergyFit Homes Initiative: National consumer survey results. CSIRO, Brisbane.

efficiency home information		%
Over $500	29	4%
Up to $500	75	13%
Up to $250	206	38%
Up to $100	152	56%
Not willing to pay	361	100%
TOTAL	841	100%

Source: CSIRO "National Consumer Survey Results" (April 2015)

More than half of the survey respondents were willing to pay up to $100 for energy efficiency information during a house sale. The scenarios for maximum potential market for an EnergyFit rating are derived from these figures, as shown in Table 36 below.

Table 36 Scenario summary - maximum rating takeup by the market

Scenario	Description	Maximum takeup (sales)	Maximum takeup (rentals)
1	Low takeup	13%	6%
2	High takeup	38%	19%

As the rating will cost less than $250, both the low and high takeup scenarios represent a conservative estimate of the maximum potential market. It is quite likely that the maximum takeup is even stronger. The same EnergyFit survey also found that 92% of people considered that energy efficiency would be an important component in a building inspection, suggesting strong community support for a rating regime. A stronger adoption by the market will improve this business case, so the model does not test the highest potential takeup figures.

We have assumed that people in the rental market are half as likely as those in the sale market to be willing to pay for energy efficiency information. We note that the EnergyFit survey did not find any statistically significant difference for respondents that were renting their home, so the potential market for rentals may be stronger than modelled.

The modelled maximum number of ratings varies by scenario based on these uptake assumptions, as shown in Table 37 below.

Table 37 Estimated maximum number of ratings per year by scenario

STATE	NSW	VIC	QLD	SA	WA	TAS	NT	ACT	total
Scenario 1 (low takeup	16,805	14,992	12,424	4,079	6,193	1,491	378	869	57,231
Scenario 2 (high takeup)	50,092	44,688	37,035	12,157	18,461	4,446	1,125	2,589	170,593

(xxv) Diffusion rate

An important factor in modelling the cost and benefit of a new product is the rate at which it is adopted by the market. We assume that it will take some time for the potential market for ratings to learn of the opportunity and take action. This business case uses a typical innovation diffusion model (shifted Gompertz distribution) to estimate the likely number of householders choosing to rate their home at the point of sale and lease. Note that this model scales with the potential market in each scenario.

Figure 17 shows this diffusion model applied to the two takeup scenarios modelled in this business case over a 20 year period.

Figure 16 Rating takeup over time – house sales
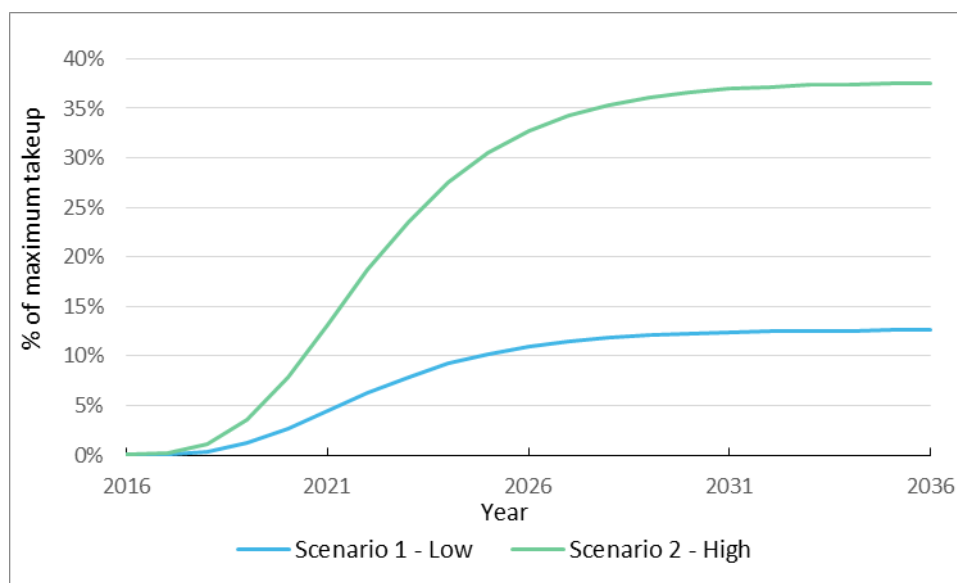
Under this model, rating takeup is slow for the first 3 years (early adopter phase), before growing exponentially from the fourth year as the majority of the potential market adopts the program. Half of the maximum market takeup is reached after 6 years of system operation, with 80% of the potential market using the rating within 10 years.

(xxvi) Homes investing in upgrades

The number of homeowners acting to improve their EnergyFit rating by upgrading the energy efficiency of their home is a key parameter in this business case. The private and public value of the system depends upon stimulating this investment activity.

The business case includes three investment variations for each of the takeup scenarios listed above. The possible range of investment response as modelled is outlined in Table 38 below.

Table 38 Action rate variations by scenario

Scenario	Action rate
Low action (1a, 2a)	7.5%
Medium action (1b, 2b)	15%
High action (1c, 2c)	30%

The Mandatory Disclosure RIS modelled a response by the market of between 15% and 30%, varying by the level of confidence that the market has in the scheme. The upper bound of 30% reflects the observed response to rating disclosure in the ACT. Prior research suggests that this upper bound may be conservative. A selection of evidence of the market response to energy efficiency information is shown in Table 39.

Table 39 Action by the market in response to energy efficiency information

Scheme	Response
Green Deal (UK)	62% made an energy efficiency installation after a Green Deal assessment
Energy Performance Certificates (Netherlands)	Proportion of market with poor ratings (E, F or G) halved over 10 years
Energy Performance Certificates (Finland)	Proportion of the market with a leading rating (A) doubled to 50% in less than five years

This suggests a possible scenario of 50-62% of rated homes investing in an upgrade after receiving a rating. These high response rates are not modelled in the business case.

A lower level of action is incorporated into this business case to reflect a worst case scenario, should the market response be significantly lower than that experienced in other jurisdictions. This case is considered unlikely and is incorporated primarily as a sensitivity analysis.

The actual investment made by these homes varies by state based on the business as usual presence of the upgrade opportunity. The household eligibility for each upgrade opportunity is outlined in Table 40.

Table 40 Energy efficiency upgrade opportunity for households in each state

STATE	NSW	VIC	QLD	SA	WA	TAS	NT	ACT
Lighting*	100%	100%	100%	100%	100%	100%	100%	100%
Insulation	22%	9%	24%	7%	12%	9%	24%	6%
Draught proofing	89%	89%	88%	89%	88%	88%	88%	90%
Solar PV	80%	81%	61%	61%	70%	83%	84%	83%
Solar hot water	59%	25%	73%	40%	30%	87%	62%	49%
Double glazing	100%	100%	100%	100%	100%	100%	100%	100%

Source: Australian Bureau of Statistics "Environmental Issues: Energy Use and Conservation March 2014" Sustainability Victoria "Victorian Households Energy Report", Equipment Energy Efficiency "Australian Residential Lighting Survey – Pilot", Green Energy Markets "Small-scale technology certificates - data modelling for 2016 to 2018". Double glazing is assumed to be an opportunity for all Australian homes.

*Note that lighting upgrade costs and benefits are based on market averages so already incorporate business as usual.

The modelled average per-household cost and savings for participants that undertake an upgrade in the first year of system operation are outlined below. Note that the model assumes that households will only undertake actions that are cost effective, as outlined in Table 32 above.

Table 41 Average cost and energy bill savings for upgraded homes for the first year of system operation

STATE	NSW	VIC	QLD	SA	WA	TAS	NT	ACT
Average upgrade cost	$5,574	$5,322	$8,610	$6,554	$6,378	$9,579	$9,521	$8,149
Average first year energy bill savings	$1,072	$1,243	$1,202	$1,228	$1,228	$1,483	$1,928	$1,648

7. Cost benefit calculation

The cost benefit calculations for this business case are based upon the costs and savings outlined above. In all cases the net benefit is calculated in terms of a net present value of the investment over an assumed life for the rating system of 20 years at a discount rate of 7%.

(xxvii) Public benefits

Public benefits from the system are modelled with reference to the NSW Government "Energy Savings Scheme Review Part 2: Options Paper" methodology. Public benefits are modelled for each state to reflect the avoidable long term costs of energy supply. The NSW paper describes this cost as "the cost of increasing energy supply in the longer term where all costs (including capital costs) are variable", and estimates this at $125 per MWh of electricity.

Cost component	Cost per MWh

Electricity generation (including carbon price)	$83.30 per MWh
Transmission and distribution network capacity	$18.90 per MWh
Line losses	6% or $7.20 per MWh
Health impacts of air pollutants associated with electricity generation	$14.40 per MWh

Source: NSW Government 2015: Review of the NSW Energy Savings Scheme, Part 2: Options Paper.

We have estimated that the long run marginal cost of electricity in other states is 80% of the NSW benefit (or $100/MWh).

The public value of avoided gas consumption is based on the long range marginal cost of gas. This cost is modelled by gas supplier Jemena for household customers at $13 per GJ of gas. Note that this cost does not include fixed long range network and distribution costs.

(xxviii) Private benefits

Householder benefits are calculated from energy savings and property value premiums arising from upgraded home energy efficiency. Energy cost saving calculations are outlined in section 8.4.

The expected property market response to the EnergyFit rating is modelled with reference to international evidence obtained by Common Capital[78]. This report includes a meta-analysis of studies into markets with a point of sale disclosure system, showing that the market typically places a 5-10% premium on homes showing a high energy efficiency rating at the point of sale.

Table 42 Observed property premium, international studies

observed premium	UK	EU 1	EU 2	EU 3	US 1	US 2	US 3	US 4
Study size	325,950	31,993	50,000	9,000	15,668	2,537	1,600,000	171,087
Highest rating	11%	12%	15%	7%				
High rating	11%	8%	12%		5%	9%	9%	9%
New building equiv.	5%	2%	6%					
Older building	0%	0%	0%	0%	0%	0%	0%	0%

Source: Clark, M., 2015, International information Systems for Household Energy Efficiency, Common Capital. Australia, cited from various sources. Note that studies have been summarised to a common base for comparison purposes. "Highest rating" is EU rating A or Minergie, "High rating" is EU rating B, Energy Star or LEED, "New building equiv." is EU rating D, and older building is EU building F or the average market performance.

An anticipated value premium for homes upgrading their energy efficiency performance in Australia, and communicating this upgrade using an EnergyFit rating, was calculated using a weighted average of these results. To simulate rating levels in Australia, upgrades were packaged in increasing levels of energy savings and comfort improvement, with the highest premium reserved for homes that take all the modelled energy efficiency actions. The final premium includes a "voluntary effectiveness factor" of 75% to account for the fact that the value premium transfer in a voluntary market may not be as effective as it would be in a mandatory market as is the case in the EU. Note that several of the noted studies found a high premium in voluntary markets in the USA, suggesting that this factor may be excessively conservative. The modelled property value premiums stimulated by EnergyFit ratings are outlined in Table 43 below.

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[78] Clark, M., 2015, International information Systems for Household Energy Efficiency, Common Capital. Australia.

Table 43 Modelled property value premiums, EnergyFit ratings

Upgrade level	Upgrade activity	Property value Premium
Package 1	LED lighting	0%
Package 2	Insulation + Package 1	3.6%
Package 3	Draught proofing + Package 2	5.2%
Package 4	Solar PV + Package 3	6.9%
Package 5	Solar hot water + Package 4	7.7%
Package 6	Double glazing + Package 5	8.5%

The effective premium in each state is established using average house price and property tenure data for each state. The average house price per state is sourced from the Australian Bureau of Statistics "ABS 6416 Residential Property Price Indexes: Eight Capital Cities, Jun 2015". Future house prices are modelled as increasing in line with inflation. The Corelogic "Capital Markets quarterly report" provides average tenure data. The discounted premium is based upon the expected property premium at the point of sale, discounted by 7% in line with net present value calculations.

Table 44 Potential house value premiums for energy efficiency upgrades, by state

STATE	NSW	VIC	QLD	SA	WA	TAS	NT	ACT
Average house price, 2015	$600,932	$455,959	$447,567	$377,637	$514,117	$293,096	$539,148	$580,000
Average tenure, years	11.2	11.8	10.2	8.3	8.8	9.6	6.7	9.7
Average time to sale, years	5.6	5.9	5.1	4.2	4.4	4.8	3.4	4.9
Discounted premium, package 1	$0	$0	$0	$0	$0	$0	$0	$0
Discounted premium, package 2	$15,349	$11,412	$11,825	$10,640	$14,242	$7,903	$16,035	$15,585
Discounted premium, package 3	$22,672	$16,857	$17,467	$15,716	$21,037	$11,673	$23,686	$23,022
Discounted premium, package 4	$29,996	$22,302	$23,109	$20,793	$27,833	$15,444	$31,337	$30,458
Discounted premium, package 5	$33,327	$24,779	$25,676	$23,102	$30,924	$17,159	$34,817	$33,841
Discounted premium, package 6	$36,659	$27,256	$28,242	$25,412	$34,015	$18,874	$38,298	$37,224

A sensitivity analysis was run to test the impact of a lower price premium on the business case, as summarised in section 11.3.

An average property premium achieved by upgraded buildings in each state is determined by combining the premiums for each upgrade package (Table 43) with the upgrades installed in each state (Table 32), as summarised in Table 45.

Table 45 Average property premium for upgraded properties by state

Property premium	NSW	VIC	QLD	SA	WA	TAS	NT	ACT
Average premium per upgrade	2.9%	1.1%	3.5%	1.0%	1.7%	1.7%	4.1%	1.0%

10. Business case analysis

1. Household costs and benefits

The total cost and benefit to households under the modelled scenarios is outlined below.

The level of investment by consumers in both ratings and upgrades varies between the modelled scenarios, reflecting the wide range of possible market responses. Under all scenarios the largest component of household costs is their investment in energy efficiency upgrades.

Table 46 Total cost to households to 2036

Household costs to 2036, $M	1A	1b	1c	2a	2b	2c
Rating costs	$151 M	$151 M	$151 M	$437 M	$437 M	$437 M
Investment in energy efficiency upgrades	$437 M	$875 M	$1,749 M	$1,267 M	$2,534 M	$5,068 M
Opportunity cost to households	$43 M	$43 M	$43 M	$124 M	$124 M	$124 M
TOTAL HOUSEHOLD INVESTMENT	$631 M	$1,068 M	$1,943 M	$1,828 M	$3,095 M	$5,630 M

These costs ramp up over time based on an increasing response by the market to the system. The annual household investment over 20 years is shown in Figure 18 below.

Figure 17 Total cost to consumers, scenario 1b (low takeup, medium action), $M
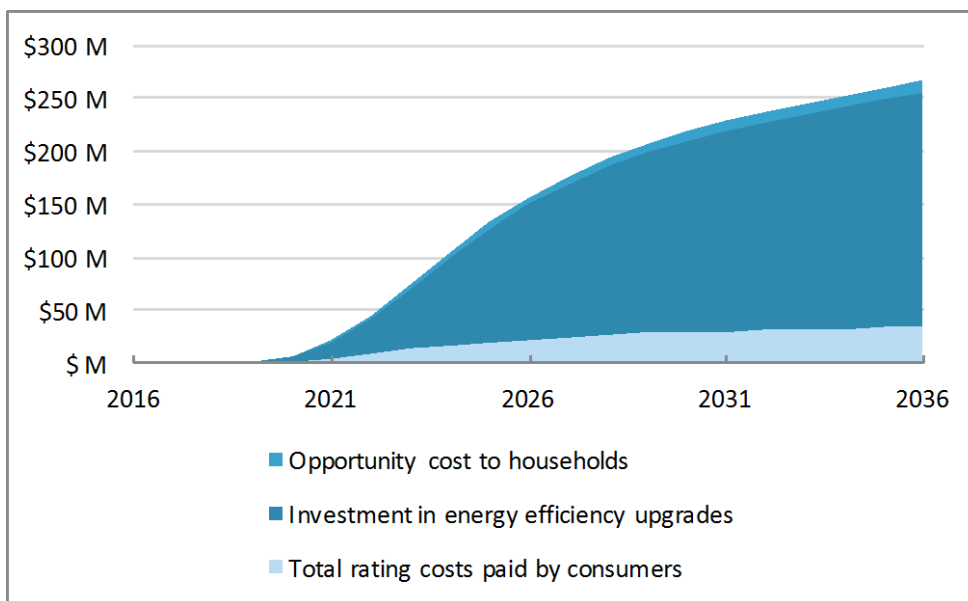
Household benefits in terms of reduced energy bills also vary by scenario, based on the modelled level of investment in energy efficiency stimulated by the rating. The total benefits to households are summarised in Table 47 below. Note that the system has a positive value to households under all scenarios.

Table 47 Household benefits from energy efficiency investments under each scenario

Household BENEFITS FROM INVESTMENTS TO 2036	1A	1b	1c	2a	2b	2c
Total electricity savings, GWh	3,085	6,171	12,341	8,939	17,879	35,757

LOW CARBON LIVING CRC

Total gas savings, TJ	1,606	3,212	6,425	4,654	9,307	18,614
Total energy bill savings from investments, $M	$1,260 M	$2,520 M	$5,040 M	$3,651 M	$7,302 M	$14,604 M
Total property value premium for participants, $M	$401 M	$803 M	$1,605 M	$1,163 M	$2,326 M	$4,651 M
Net present value of household investments, $M	$186 M	$446 M	$965 M	$540 M	$1,292 M	$2,797 M

The household benefits also increase over time with system adoption. The range of annual electricity savings for each scenario is shown in Figure 19 below. Note that scenario 2a is shown on the chart to reflect an overlap - the upper range benefits from scenario 1 are higher than the lower range benefits from scenario 2.

Figure 18 Modelled annual electricity savings range, MWh
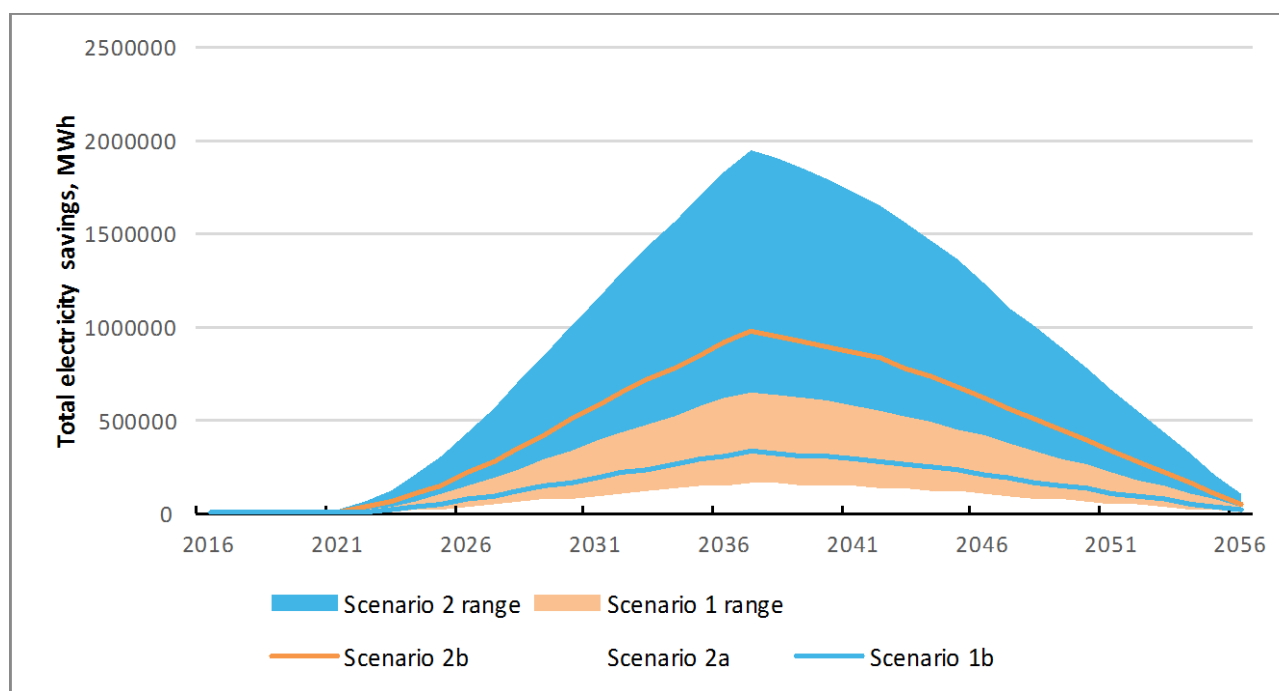
Note that while this business case models system costs over 20 years to 2036, the benefits to householders taking action in 2036 extend for the life of those investments, so energy bill savings occur until 2056.

2. Business costs and benefits

The benefits to business from an EnergyFit rating system primarily arise from household investment in energy efficiency products and services as outlined in section 1 above and summarised below.

Table 48 Business benefits

Business benefits	1A	1b	1c	2a	2b	2c
Total increased investment in energy efficiency upgrades	$437 M	$875 M	$1,749 M	$1,267 M	$2,534 M	$5,068 M
Direct investment in ratings	$151 M	$151 M	$151 M	$437 M	$437 M	$437 M
Jobs for assessors at maximum rating takeup	660	660	660	660	660	660

The number of assessors required to meet rating demand is calculated based on a maximum of three assessments per day, and assuming that households seek ratings from assessors when they are on site in proportion to the demand for ratings (that is, for 13% of their jobs in scenario 1 and 38% of jobs in scenario 2).

The income profile for the system operator over the life of the program in scenario 2 is depicted in Figure 20 below.

Figure 19 System operator income
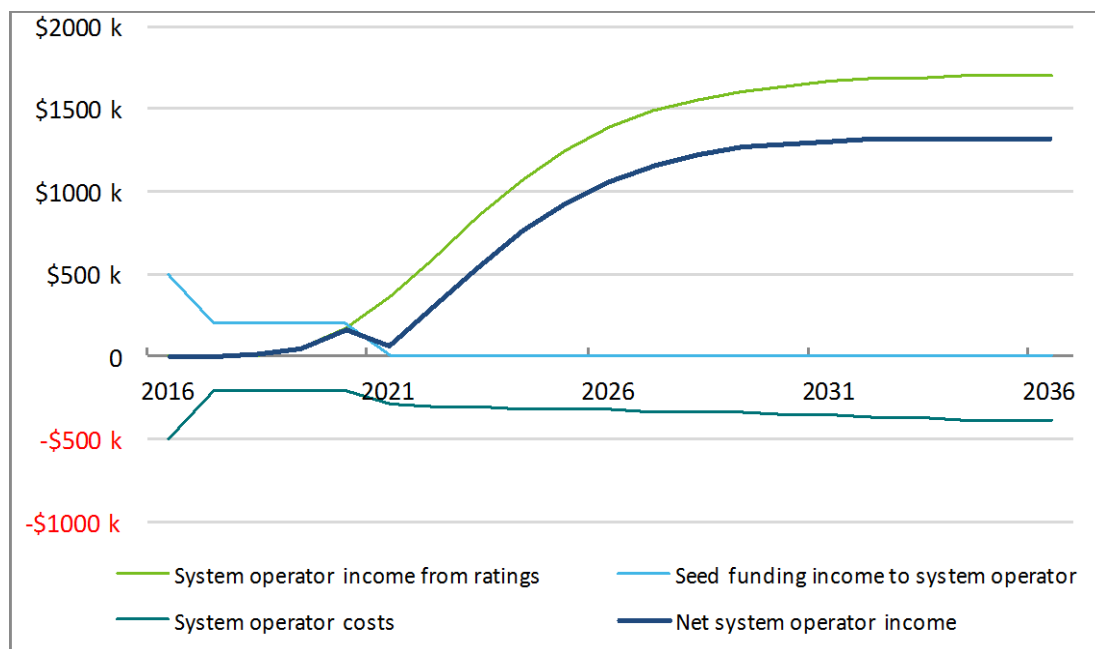
As shown in Figure 20, system operator income from ratings grows throughout the life of the program. Initial costs are met through seed funding.

The system operator may seek to charge an additional premium on their services above these market rates to increase revenue. This would reduce the cost effectiveness of the system to households, while increasing business benefit. A sensitivity analysis of the net benefit to households if the system operator fee is increased is outlined in section 11.1.

## 3. Public sector costs and benefits

The business model assumes that the system is administered by a publicly owned entity, such as staff within a government agency (though it could also be administered by other public/private arrangements).. Under all scenarios, the system is able to fully recover administration costs only after ratings begin ramping up after a few years of operation.

Table 49 Seed funding provider(s) and administrator costs and benefits

System administrator costs summary	1A	1b	1c	2a	2b	2c
Total seed funding provider(s) contribution	$6.2 M	$6.2 M	$6.2 M	$6.8 M	$6.8 M	$6.8 M
Seed funding period	8	8	8	5	5	5
Per rating administration fee (including system operator license)	$30	$30	$30	$30	$30	$30
Administration fee % of rating cost	19%	19%	19%	19%	19%	19%
Net present value of seed funding provider(s) investments, $M	$42 M	$88 M	$182 M	$129 M	$265 M	$535 M

The seed funding required to meet administration costs are heavily weighted to the first 5 years based on system marketing and awareness raising activities. The largest single use of seed funding is for a marketing campaign to raise community awareness of the rating system. Under high takeup scenarios, the system administration costs are fully recovered from participants from the sixth year of operation.
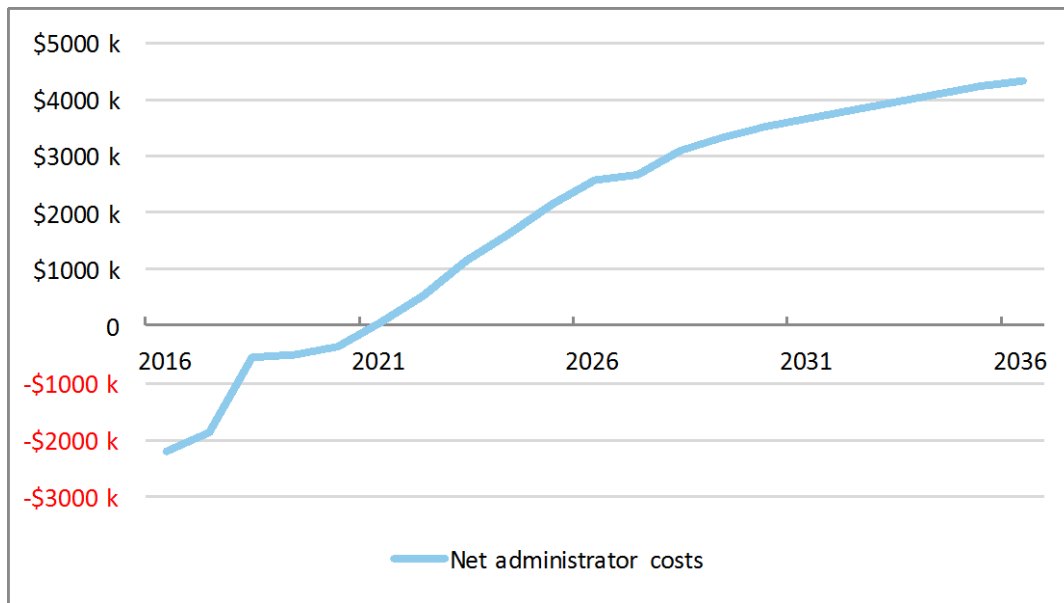
This analysis shows investment by seed funding provider(s) in an EnergyFit rating will deliver a very significant public net benefit. As the system is designed to recover its own costs within a few years, a relatively modest public investment of between $6m and $7m is enough to establish a self-sustaining system that will stimulate household savings of between $1.2b and $14.6b to 2056.

Note that under the high takeup scenario the administration fees more than cover administrator costs. The net income to the administrator under this scenario is sufficient to repay the initial seed funding, plus interest. Assuming that the seed funding is provided to the administrator at the 2016 TCorp bond rate (6%), the administrator could use excess income from administration fees to repay the initial seed funding within 11 years of the scheme inception, as shown in Table 50.

Table 50 Seed funding repayment through administration fee

System administrator costs summary	1A	2a	3a
Total seed funding to be repaid (including interest)	$7.8 M	$7.9 M	$7.9 M
Years to repay investment from scheme inception	N/A	11	6

The repayment rate for each scenario is depicted in Figure 22 below. This figure also depicts repayments under a mandated disclosure scenario, as detailed in section 12

Figure 21 Seed funding repayment profile.

Seed funding repayment profile

Legend: High takeup (2A) — Medium takeup (1A) — Mandatory implementation (3A)
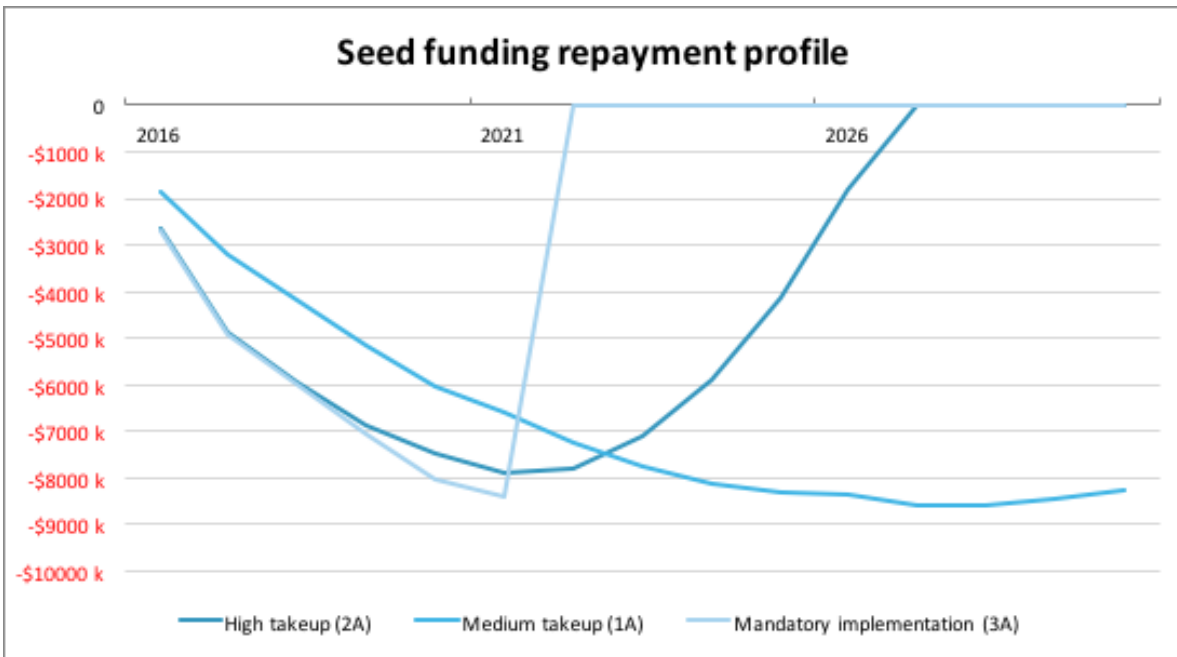
These figures strongly support the higher seed funding level in marketing and promotion to drive market takeup and enable repayment of the initial investment.

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11. Sensitivity analysis

1. Delivery costs increase

The delivery costs of the system as modelled in this business case could increase for two main reasons:

- Assessors seeking increased profits. The business case models rating costs based on the Victorian Government business time cost calculator, which includes business on-costs. It is possible that the assessors will seek to charge higher rates than set out in this calculator to increase profits in the system, or to improve the benefits to rating provider businesses.
- Longer than expected rating time. We have assumed that a rating can be calculated in 45 minutes. A more complicated rating could take longer, increasing the cost to consumers.

This analysis tests the sensitivity of the business case to an increasing delivery cost arising from either of these factors. To model this sensitivity, a profit margin of 50% was added to assessor costs. The impact on delivery costs associated with this profit margin was the equivalent of doubling the rating time.

This has the following impact on average rating costs by scenario:

Table 51 Sensitivity test - average rating costs increase

Average household rating cost	Scenario 1	Scenario 2
Baseline average rating cost, $2015	$168	$168
Average rating costs, sensitivity test (increase due to 50% profit margin on assessor costs)	$199	$199

These costs directly add to the out of pocket expenses for households without adding any benefit. The impact on private net benefit is shown in Table 52 below.

Table 52 Sensitivity test - net present value of household investment incorporating assessor profit margin

Net present benefit of household investment	1A	1b	1c	2a	2b	2c
Baseline NPV, $M	$186 M	$446 M	$965 M	$540 M	$1,292 M	$2,797 M
Increased rating cost NPV, $M	$124 M	$321 M	$714 M	$358 M	$929 M	$2,070 M

As expected, the value of the rating to householders declines as the assessor increases profits. However, even with a reasonable profit margin this analysis shows that the system delivers a significant net benefit to participating households.

A breakeven analysis was run to further test the sensitivity of this business case to increasing rating costs. This analysis is shown in Figure 23 below. Under the most conservative scenario (1a – low takeup and action), the system has a positive net benefit to consumers with increasing rating costs until the average cost to consumers is **$480**. Note that this includes the opportunity cost of the householder time. This rating cost would only be reached if the rating delivery time is extended to more than 4 hours, or the delivery partner seeks an unrealistic profit margin on all costs. As neither of these is likely, this sensitivity test suggests that the system has a positive net benefit to consumers under all likely rating cost scenarios.

Figure 22 Breakeven analysis - net public value by rating time for scenario 1a (low takeup, low action)
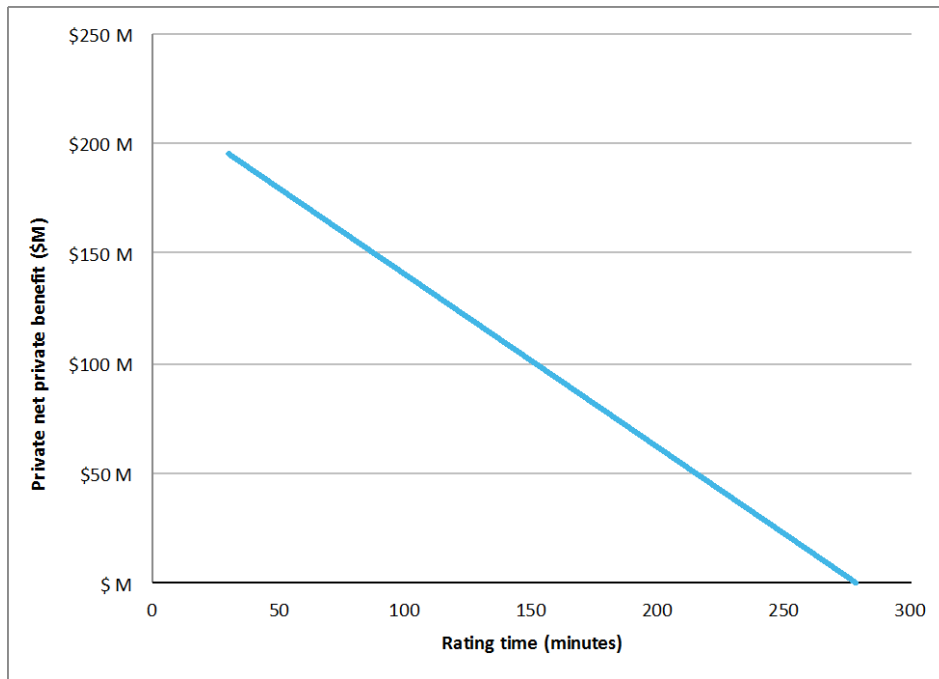
We note that increased costs would affect system takeup in practice. Previous research into consumer interest in energy efficiency information at the point of sale shows that interest drops off significantly at higher costs, as depicted in Table 35 above. The scenarios modelled in this business case are based on the reported[79] interest in this information at a $500 price point (scenario 1 - low takeup) and at $250 (scenario 2 – high takeup). That is, higher delivery costs make the higher takeup scenario less likely, especially if the out of pocket costs exceed $250. The analysis above shows that the scheme has a positive net benefit to participants for higher delivery costs, even when takeup is low.

Note that increased delivery costs do not directly affect the public benefit of the system as it does not affect the investment by the seed funding provider(s).

2. Lower rating take-up

The business case is also dependent upon rating takeup. A lower than anticipated rating takeup will affect both the private and public case for the system, as it would result in fewer energy efficiency upgrades.

A maximum takeup rate of 4% of sales and 2% of rentals was modelled to test the sensitivity of the system to a very low adoption by the market. This low rate matches the proportion of consumers that would be willing to pay more than $500 for energy efficiency information at the point of sale (see Table 35). The results of this analysis are summarised in Table 53 below. The baseline results for scenario 1 (low takeup of 13%) are included for comparison.

Table 53 Sensitivity test - net present value of household and public investment for very low rating takeup

SCENARIO	VERY LOW	VERY LOW	VERY LOW	BASELINE	BASELINE	BASELINE

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[79] Romanach, LM., Jeanneret, T. and Hall, N. (2015), The EnergyFit Homes Initiative: National consumer survey results. CSIRO, Brisbane.

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	TAKEUP, LOW ACTION	TAKEUP, MEDIUM ACTION	TAKEUP, HIGH ACTION	(1A)	(1b)	(1c)
Net present value of public investment, $M	$7 M	$22 M	$50 M	$42 M	$88 M	$182 M
Net present value of private investment, $M	$57 M	$137 M	$297 M	$186 M	$446 M	$965 M

While the benefits for the system are significantly lower than the baseline, the system still has a positive net benefit for both private and public investment under this extremely low takeup scenario. This suggests that the system would be worthwhile for all participants under any feasible takeup rate.

3. Lower property premium

One of the primary drivers for a point of sale energy efficiency disclosure is to help the market to value more energy efficient homes. The business case includes a moderate property premium of 1 to 3% for upgraded homes on average. To test the sensitivity of the business case to a lower property value increase for higher ratings, a scenario was run for a 50% lower property premium, with the following results.

Table 54 Sensitivity test - net present value of household and public investment for lower property premium

SCENARIO	1A, 50% lower property value premium	1B, 50% lower property value premium	1C, 50% lower property value premium	BASELINE (1A)	BASELINE (1b)	BASELINE (1c)
Net present value of public investment, $M	$42 M	$88 M	$182 M	$42 M	$88 M	$182 M
Net present value of private investment, $M	$172 M	$431 M	$951 M	$186 M	$446 M	$965 M

The system still displays both private and public benefit at the lower property premium, suggesting that it will be worthwhile even if very inefficient at driving increased property values.

A breakeven analysis further tests the sensitivity of the business case to property premiums. This analysis suggests that at the lowest rate of action, the system displays a positive private and public net benefit for any property value premium. Table 55 summarises the net benefit of the scheme with no property premiums.

Table 55 Sensitivity test - net present value of household and public investment with no property premium

SCENARIO	1A, No property value premium	1B, No property value premium	1C, No property value premium	BASELINE (1A)	BASELINE (1b)	BASELINE (1c)
Net present value of public investment, $M	$42 M	$88 M	$182 M	$42 M	$88 M	$182 M
Net present value of private investment, $M	$38 M	$149 M	$371 M	$186 M	$446 M	$965 M

That is, the system has a positive net benefit for public and private investment under all scenarios even if it does not result in a premium to property prices through investments in energy efficiency alone.

12. Mandatory disclosure scenario

An additional scenario was modelled to show the impact of the scheme if it should be made mandatory after five years of operation. This analysis is presented below as a separate scenario.

A number of key changes are made to the base business case model to reflect the higher cost and adoption rate of a mandatory scheme:

- The costs and takeup of the scheme in the initial five year period are assumed to match the "high" takeup scenario (scenario 2).
- From year 6, 90% of house and rental transactions are assumed to require a rating, with the remainder either not complying with the mandatory requirement or already rated.
- Quality assurance costs are assumed to scale with increased ratings.
- Monitoring and enforcement costs are assumed to sit with existing consumer protection processes and are not explicitly modelled.

Income to the scheme administrator and system operator are sufficient to manage the scheme from year 6, so no additional seed funding is required for this scenario.

Table 56 Mandatory disclosure scenario outcomes

Key Result Indicator	Scenario 3A: Mandated disclosure from year 6, Low action	Scenario 3C: Mandated disclosure from year 6, HIGH action
NPV of seed funding investment	$470m	$1,897m
Average rating cost ($2016)	$158	$158
Annual electricity savings in 2036	1,152 GWh	6,050 GWh
Annual gas savings in 2036	934 TJ	3,737 TJ
Household investment in energy efficiency	$4,171m	$16,682m
NPV of household investment	$1,830m	$9,777m

13. Conclusions

Based on this analysis, we conclude that there is a very sound public and private business case for a national voluntary disclosure system using our recommended governance and operating model. Developing this system makes sense for business, government and households for all feasible market response scenarios.

This business case tests a very broad range of possible market responses. Under the most conservative scenario tested, EnergyFit ratings are obtained for only 13% of homes sold after the system has been in operation for 20 years, and action is taken in less than 10% of these to upgrade their rating as a result. The most optimistic scenario tested has EnergyFit ratings obtained for almost 40% of homes sold when the system is at its peak, with action taken in 30% of these to upgrade their performance.

The case is positive for all parties under this broad range of scenarios. The analysis above shows that even the most optimistic scenario modelled in this business case is quite likely. Research for the EnergyFit project suggests that almost 40% of consumers are willing to pay more than $250 for energy efficiency information at the point of sale. This is much higher than the average out-of-pocket price of a rating under the high takeup scenario in this model ($158). Evidence from energy efficiency schemes in Europe suggest that up to half of the market may take action to upgrade their ratings, above the 30% maximum modelled here.

1) A positive return on seed investment

In all scenarios, seed funding is essential during the ramp up period, primarily for initial promotion and the development of administrative and governance systems. Using the lean administration model recommended in this paper, ongoing system costs are low, and the system is able to recover all ongoing costs under all scenarios from the fifth year of operation. To recover costs, the system administrator will charge per-administration fees of $30. $10 of these fees will be paid to the system operator as a licence fee and to cover ongoing costs.

This initial seed funding will deliver a strong public benefit through energy savings, as households participate in the system and invest in improved energy efficiency. The net public benefit from these savings indicates the system is positive even for conservative scenarios, indicating that investment is warranted.

Given the public benefits and industry benefits of the system, this seed funding could be provided by government, non-government stakeholders or combination of both.

2) Significant increase in household energy efficiency retrofits is good for households and industry

Australian households have historically been reluctant to invest in upgrading the energy efficiency of their home without a significant direct financial incentive. International evidence suggests that a new point of sale disclosure system that allows consumers to value these efforts at the point of sale and lease will unlock significant new investment in energy efficiency.

This increased activity benefits both individuals and the energy efficiency market. Household investments in energy efficiency products and services are estimated at between $631m and $5,630m. This market opportunity includes $151m-$437m investment in energy efficiency ratings, and $437m and $5,068m investment in upgrades such as ceiling insulation, energy efficient lights, draught proofing and solar hot water, with associated benefits to the supply and installation market.

The individual benefit in this investment is clear, with a net present value to householders of $186m to $2,797m based on a 7% discount rate. Householders will save between $1,260m and $14,604m on energy bills. Participating homes will see a total property price premium of between $401m and $4,651m. Households will save a total of between 3,085 GWh and 35,757 GWh of electricity and 1,606 TJ to 18,614 TJ of gas.

3) Benefits of participation for delivery partners

On average, assessors will charge between $158 per assessment in $2016. 19% of this charge covers system administration, governance and rating system development costs. The remainder of this charge reflects the time taken to do the rating and other costs borne by the delivery partner, and an incentive payment to the person delivering the rating of $50. This payment gives building inspectors and other potential rating assessors a strong incentive to offer a rating as a value-add service, and will be an important component in driving higher market uptake.

4) Conclusions

A modest total initial investment of between $6 million to $7 million over five to eight years is enough to establish a system that will fully recover its costs when established and deliver significant household energy savings. The net public benefit of this investment is between $42m and $535m.

Participating households will invest between $437m and $5,068m in household energy efficiency improvements to 2036. In 2036, the annual household energy bill savings from these investments will be worth between $63m and $733m. This private investment in energy efficiency has a net present value of $186m to $2.8b.

Business will also benefit, both from a healthy new market for energy efficiency ratings, and from a major boost in household energy efficiency retrofits.

Based on these findings, we recommend that industry, government, research and consumer groups collaborate to establish a national voluntary disclosure system based on the pathway set out in Part I of this report.

FOR FURTHER INFORMATION

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