



National Energy Efficient Building Project

Promoting energy efficient buildings.



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NATIONAL ENERGY EFFICIENT BUILDING PROJECT PHASE 3 - REPORT 2 DEEP DIVE WORKSHOP AND SURVEY RAW DATA APPENDICES Brisbane, Adelaide, Melbourne 2017

Abstract

NEEBP phase 2 consultation involved workshop in Brisbane, Melbourne and Adelaide to discuss the key factors affecting the capacity of regulators to verify compliance with the energy efficiency requirements of the National Construction code. This was followed up by a national survey. The raw data of these activities and input provided by others, with some preliminary observations, are contained within this report.

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Appendix 1 – Raw Responses, Brisbane Workshop

The following are the records of raw responses from the Brisbane workshop.

Table 1-i: Possible deliverable actions and solutions that could be found to enhance energy efficiency compliance from the consumer, regulator and professional perspectives.

Consumer:	Regulator:	Professionals:
Overseers to sign energy efficiency report prior to <u>signing contract</u> . With the builder making consumer aware of energy efficiency	Energy efficiency certificate tied to finance and loans. Banks to require an energy efficiency design cert as part of documents required for a mortgage or building contract	Should ensure that all energy efficiency assessors are accredited members of ABSA or BDAV
Increased energy efficiency awareness by industry practitioners	Australian government to certify imported materials comply with standards and requirements with energy assessors to inspect the building work	Sector-wide education capacity building to provide knowledge and skills to include energy efficiency at the design stage, before contracts and pricing
Mandatory compliance linked to finance/sale	Greater energy efficiency inspection. i.e. assessors to inspect the work they assess	Make builders more aware of energy efficiency requirements
Getting what you pay for	Inspections (either certifier or assessor)	CPD for builders
A fully performing house for future globe warming. 10 stars? Is it possible? – comfortable environmental living	Education for builders. We should mandate training for builders regarding energy efficiency solutions	Mandatory accreditation (with TESSA) for energy efficiency assessors
Educate consumer regarding energy rating of housing with advertising in media. For example, consumers may wonder 'What do star ratings mean?' and this could be equated in dollar value.	Education for designers. We should be pro-active! Require designers to acquire energy efficiency training, knowledge and appreciation; and have CPD points and mandatory training	Availability of information or development of software that enables consumer to do self-check
Higher tariff for high end users and users of air-conditioning units	Energy efficiency should be on house plans	Standard clause for energy efficiency contract
Electronic passport	Mandatory certification	Independent audit of compliance
How do I know my home is energy efficient?	Require all project data to be uploaded to electronic building passport before going to {illegible} for BA	Education at University and TAFE level for designers and a CPD scheme for tradies
That the energy efficiency measures in my design that have been required by NCC have been built; i.e. effective compliance assured by digital passport, QBCC audits etc	Energy efficiency compliance inspections during construction. We should also have CPD for builders and an energy efficiency assessment before contract.	There should be energy efficiency compliance inspections, an Electronic passport and CPD for builders
Energy efficiency compliance certificate included in design stage for a loan application		Education (all in the industry)
Certainty that my building is energy efficient through a certificate with details of what is in my building and an energy efficiency rating following an inspection after completion		

Table 1-ii: Questions that could be considered for the survey from a consumer, regulator and professional perspective.

Consumer:	Regulator:	Professionals:
Are you interested in understanding ongoing energy savings of your home design?	How do we make energy efficiency easily understood as part of contractual arrangements – industry & consumers?	What profession/trade do you most associate with/belong to?
Would you be motivated to use less electricity if there were higher tariffs?	How can we improve accountability & transparency for persons who complete Form 15's & 16's?	Rate your current level of knowledge/awareness of designing for energy efficiency 1-10 etc.
Would you like your certifier to only use qualified professionals to complete energy efficiency report?	How can we improve information transfer between project participants? Is the answer to that an Electronic Building Passport?	How confident are you in the application of energy efficiency requirements? 1-10 etc + other comments box
Would you like your building contract to include costing for energy efficiency measures such as insulation?	Should the specifications for energy efficiency be compulsory on all dwelling plans?	Does your profession/trade require ongoing training/PD points?
Would you like to avoid additional unexpected costs for energy efficiency measures by obtaining you energy efficiency report pre-building contract?	Should all building professionals be required to do CPD for annual renewal? Should we consider mandatory accreditation for energy assessors?	Do you think your profession/trade should have mandatory CPD point/training for energy efficiency? – Yes/no + please explain
Would you (or how would you) like to be able to access an Energy 'Digital Passport' for your home that included photos of installed insulation, invoices showing *R. value of insulation etc?	What is the best way to confirm the building complies with the approved plans through energy efficiency inspection? e.g. Should inspections be compulsory or random?	How would you prefer to be trained/keep your knowledge up to date? <ul style="list-style-type: none"> • Face to face meetings • Online/webinars • Articles • Workshops • Onsite training • Field trip/study tour
Is my Energy Assessor qualified to best practise standards?		

Appendix 2 – Raw Responses, Adelaide Workshop

The following tables contain the raw responses from Adelaide workshop attendees who were asked to value-add to the Brisbane survey development workshop by answering a selection of questions. Sustain SA then made a judgement on whether the issue was already covered in the survey, not in the scope (NIS) of this project, covered in part in the survey, or required further research (More research needed: MRS) and indicated this judgement in the right column. Some issues and questions were also added to the survey, and this is indicated in the same column.

Table 2-i: Why do we need to enhance delivery of energy efficiency compliance in the NCC?

Attendee response	Is this issue covered in the survey?
Nothing to add – but owners need to know long term benefit – just say will reduce power costs	Covered
To future proof dwellings	Covered
To save the building owner money for heating and cooling	Covered
Upgrade energy efficiency in existing building as renovations occur	NIS
To meet COA strategic plan becoming the first carbon neutral city	NIS
Reduce reliance on non-renewable energy resources	Covered
Lower on going heating and cooling costs	Covered
Linking appliance efficiency heating and cooling to the understanding of fabric performance	NIS
Improved indoor comfort	Covered
Nothing to add - timing of energy efficiency assessment	Covered
Planning consent	Covered
Social justice – getting what you paid for	Covered
Quality assurance – consumer isn't getting what they paid for	Covered
To lead climate change reducing efforts not follow	Covered
To drive change in manufacturing processed / industry	NIS
Improve products	
Better designs	
Quality of assessments	Covered
More workshops to assist knowledge and skills – workshops allow for questions and answers	too fine grain

Table 2-ii: What are the key factors affecting compliance for energy efficiency?

Attendee response	Is this issue covered in the survey?
It is not considered a life safety item	Covered
No specific inspections for energy efficiency compliance during construction	Covered
Lack of options to prove compliance	Aim of survey
Bad design	Covered
Certain development plans support materials and colours that go against energy efficiency performance (hills face zone) don't like use of Light colour roofs	Covered in part
Lack of understanding of value add	Covered
Specification changes with no measures on energy efficiency	Covered in part
The building costs of complying	Covered in part
No measures of impact of off-plan	Covered in part
Changes	Covered in part
Need consistency in applications by authorities	Covered in part
Problem with renovations and transportable – how far do you go?	NIS
Performance based solutions vary	Covered in part
Poor Build Quality	Covered
Air filtration	Covered
Building parks supervisor responsibility	???
Mandatory notifications	Covered
Assessing companies getting “the desired outcomes” to keep clients	Covered in part
Inconsistent code interpretation in different states	Covered
Poor choices in products	Covered
Limited old manufacturing processes Lack of trade training	NIS
Education Awareness	Covered
Delivery as per documentation	Covered

Attendee response to: 'What are the key factors affecting compliance for energy efficiency?'	Is this issue covered in the survey?
Under resourcing of the inspector bodies within Local Government	Covered
Audit levels	Covered
How serious are regulating bodies treating the issues	NIS
Are they resourced	Covered in part
Lack of commitment by government to local authorities to prioritise resources to ensure compliance	Covered
Builders and designers have a shop around to If they don't like the result they go elsewhere	Covered in part
Needs to be more continuity in results that are provided	Covered in part

Table 2-iii: In Brisbane the key issue was the disconnect between design, approval, compliance and performance. Is this the same issue in SA and Nationally? – What other issues should be addressed?

Attendee response	Is this issue covered in the survey?
Market distortion by volume builders & volume suppliers	Covered in part
How serious is the issue within the public?	NIS – MRS
Lack of inspection on building outcomes, approval. Does build meet that approval	Covered
The current tools available for energy assessment are not perfect and don't reflect actual performance	Covered
Continued learning and development for assessors; builders doing their own assessment; assessors not accredited who work for builders	Covered in part
Local government follow-up discrepancy between certificate of completion and as built	Covered in part
Volume builders. Sales teams don't understand passive design [therefore] = poor design for energy efficiency	NIS
Same S.A. product certification & installation	Covered in part
Best practice compliance during designing phase	Covered
8 BCA C.Z. -> the glazing calculator; habited/non-habited zones	Too fine grain
Unaccredited assessors	Covered in part
Lack of CPD for assessors	Covered

Table 2-iv: What is the biggest disconnect affecting compliance with energy efficiency requirements regarding NCC and Planning regulations for Class 1 buildings, alterations and additions, and Class 2 buildings?

Attendee response	Is this issue covered in the survey?
Legislative requirement not uniform, differing even from council to council	Covered in part
Level of on-site supervision of class 2 much higher	NIS
Project builders; lack of site supervisors; too many sites allocated	Covered
Builders only building to <u>lock-up stage</u> -> owner doesn't always install all energy efficiency requirements after builder finishes	Covered in part
Owner builders: no license construction	NIS
Builder contract with suppliers	NIS
The areas of non-compliance (seals etc) are not even on the radar at planning stage	Covered in part
Energy efficiency is not seen as important	Covered in part
Non-conforming products	Covered in part
<u>Site area and conditions</u> : i.e. long narrow blocks approved at land division don't suit energy compliance	Covered in part
Compliance with energy efficiency is not prioritised over life safety; resourcing issue?	Covered in part
Inability to identify specific products onsite; i.e. Are the pink batts <u>actually</u> R3 as specified?	Covered in part
The assessment of energy efficiency completed after planning consent	Covered in part
The look of the building from a planning perspective versus the minimum compliance requirements for the building to meet energy compliance	Covered in part

Table 2-v: What are the key tools, process, and systems that would improve compliance in SA and nationally?

Attendee response	Is this issue covered in the survey?
Auditing builders so they build what is specified in the energy compliance report	Covered in part
More inspections undertaken through the construction process to ensure compliant products etc.	Covered
Limited number of assessments an assessor can sign off on per week. This will stop mass off-sharing of work & poorly trained data inputs	Covered in part
Education for inspectors; more inspections	Covered
Auditing of energy efficiency assessments	Covered

Attendee response to 'What are the key tools, process, and systems that would improve compliance in SA and nationally?'	Is this issue covered in the survey?
Stopping project home builders doing energy efficiency assessments internally	NIS
Achieve compliance: 1. As in commercial buildings: do follow up tests!! – i.e. after 12 months; 2. In design allow for “obvious” additions by owner such as verandas/carports etc	Covered in part
Post build testing	Covered in part (but difficult to achieve)
Accredited assessors + ongoing CPD	Covered
Mandatory product marking & identification (easy for inspectors to confirm products installed)	Covered
Assessment tools that use current products (available) (prevents product substitution)	Covered in part
- mandatory inspections	Covered in part
- having key stakeholders have more ownership in the process	
Legislative requirements to mandate inspections at appropriate stages	Covered
• Provision of and allocation of resources to achieve the above	Covered
Bring energy efficiency compliance forward for planning consent	Covered

Table 2-vi: What do you think is the most important approach that can happen in the next 12 months?

Attendee response	Is this issue covered in the survey?
Clean up the energy efficiency industry	Covered
Certification of completion enforced with an owner and builder sign-off	Covered
Certificate of occupancy	Covered in part
Product compliance	Covered in part
Final Build	Covered in part
Government to fund more evidence based research in Housing energy efficiency	NIS
Identify most significant areas of non-compliance	NIS

Table 2-vii: What do you think is the most important approach that can be started and completed in the next 2 – 3 years?

Attendee response	Is this issue covered in the survey?
Close the gap for incorrect products IDs through SOC and legislated change	Covered in part
The regulation of housing building contracts provisions for stages of energy inspection	Covered in part
Over complicated system – go back to General Management Impact (G.M.I) principles	NIS
System for reviewing products used on site	Covered
Process to delay final sign off until products are verified	Covered in part
Tighten up regulations	Covered in part
Consistency of regulators across states	Covered in part
Blower testing post construction	Covered in part
Less complicated system	Covered in part
Education, and how we can make compliance simple in a performance based code	Covered in part
Penalties for non-compliance	Covered in part
Better subdivision planning	Covered in part
Renew the tools to provide energy ratings to ensure they are fit for purpose at the result	Covered in part

Table 2-viii: What do you think is the most important compliance regulation change needed to agree on in the next 12 months?

Attendee response	Is this issue covered in the survey?
Recognition of all renewable energy tools/appliances	NIS
Mandatory inspection at insulation stage	Covered in part
Certificate of occupancy for class 1A buildings	Covered in part
Eliminate non-accredited assessors	Covered in part
Mandatory contractual compliance	Covered in part
Accredited assessors	Covered in part
Audit of assessors ~ some poor examples obvious	Covered in part

Table 2-ix: What do you think is the most important approach to deliver energy efficiency compliance by 2025?

Attendee response	Is this issue covered in the survey?
Regulation and resources	Covered
Connect with the PDI Act and planning and design Code (SA)	Covered in part
The system is ahead of the game (future proof)	Covered in part
Trade training	Covered in part
Elegant enforced regulation	Covered in part
The base checklist	Covered in part
Make sure validity of rating is accurate and as built validates original rating	Covered in part
Make sure each stakeholder in industry has greater accountability	Covered in part
Make sure energy rating tools are fit for purpose	Covered in part
Make sure you have suitable resources to police	Covered in part
Understanding the area and the value add that energy efficiency has	Covered in part
Just do it!!	Comment

Table 2-x: What do you think are the 3 most important questions that should be asked in regard to regulation requirements?

Attendee response	Is this issue covered in the survey?
Ease/elegance of compliance	Covered in part
Regulations simplified	Covered
Should energy efficiency be a component of finance availability?	Covered
Long term contract liability for energy efficiency performance	Covered in part
Should energy efficiency be a component of insurance?	Covered in part

Table 2-xi: What do you think are the 3 most important practical tool questions that should be asked to provide direction on support for energy efficiency compliance?

Attendee response	Is this issue covered in the survey?
What will make people bother with energy efficiency compliance?	Covered
What would it take to get people excited about <u>and</u> delivering on energy efficiency compliance?	Added
What barriers should be removed to ^ energy efficiency compliance?	Covered
What role could valuations play?	Added
To convince people it is in their interests to live in a performing residence	NIS
Should there be an electronic checklist at lodgement stage?	Covered
Valuers' assessments included in the processes	NIS
Has the correct training been provided to: - assessor - installers - inspectors?	Covered
Can energy efficiency compliance be simplified, and info be provided in applications or online?	Covered in part

Table 2-xii: What do you think are the 3 most important professional assessment requirement questions that should be asked in the survey?

Attendee response	Is this issue covered in the survey?
That people should understand the legislation	Covered in part
Should the energy eff. Assessment be performed at the planning/strategic planning stage?	Covered in part
Would you be in favour of mandatory product notification (i.e. Stickers, markings) on site?	Covered in part
Do we want mandatory certificate requirement of the product?	Covered in part
How is it that solar panels mean higher costs for those who do not have solar panels? Can assessors explain the facts?	NIS

Table 2-xiii: What do you think are the 3 most important questions in regard to improving products and materials approach to deliver energy efficiency compliance?

Attendee response	Is this issue covered in the survey?
Consistent labelling; correct descriptors; Nationally understood	Covered in part
Making sure that the system values are understood by the installer	Covered in part
Branding details to a standard; enforce compliance of specification in construction	Covered in part
Should we have a product checklist?	Covered in part
Should we have mandatory training for trades?	Covered

Table 2-xiv: Sideline Queries: The following are extra topics that came up in discussion at the Adelaide workshop that were relevant but not explicitly answers to the above questions

Attendee response	Is this issue covered in the survey?
Victorian system has just gone from 5 inspections to 8 inspections; why not do energy check	Covered in part
Does industry support NatHERS?	NIS
Example statistics needed to understand problem	NIS – MRN
What is the level of court action or complaints either by regulatory authorities or dissatisfied clients concerning energy efficiency?	NIS – MRN
SA has licensed supervisors overseeing construction to achieve better compliance	Comment
What is the level of non-compliance with energy efficiency in Class 1 buildings?	NIS – MRN
Product identification & branding Australian Standards	Covered in part
Review issues of compliance in Victoria, NT who have mandated inspections	NIS – MRN
<ul style="list-style-type: none"> education – within the whole industry core compliance elements – what are the most important 	NIS – MRN (This is also covered in part)
WA conference last year re: mandatory inspections; In Vic – still many thousands of complaints, yet in SA & WA not mandatory & many less	Covered in part

Appendix 3a – Validation Workshop, Melbourne, Raw Responses

The following are extra topics that came up in discussion at the Melbourne workshop that were relevant but not explicitly actions, observations or recommendations based on the survey questions.

Table 3a-i: Issues from the Parking Bay

	Attendee Response
1	Reality check local Government planners will always be generalist they are not and never will be energy efficiency focused if they are going to rely on an accreditation scheme that the scheme had better be solid
2	Rating is not directly [tied] to whole home energy uses but public think it is when will this be transparently addressed
3	Improving definitions (NatHERS) – Energy rating (currently) is thermal comfort rating need to get the language right
4	Effectiveness, resourcing, professionalism of energy rather (AAOS) governance and transparency of Audits
5	Who is going to perform energy efficiency measures during building process
6	Residential mandatory disclosure
7	Certification of materials non-conforming and non-compliant
8	Who does these inspections, is there a registration requirement training and knowledge?
9	Isn't on site assessment the crux of this problem? Isn't solving this the key?
10	Building inspections stages
11	Post construction inspection pre-occupation
12	Do we have the critical people in the conversation notably surveyors and the VBA
13	How as certifying body can we ensure 100% compliance, most energy work is completed b/w frame and Final
14	Energy efficiency went from 2000 m2 to 1000 go lower
15	In Vic, how do we verify between mandatory frame and final inspections that all required insulation has been installed mostly not visible at completion
16	How to address problem of BLD surveyor conflict of interest in Vic Fundamental issue (paid by those they are assessing)
17	State vs National Approach what is possible
18	Speed – verification process needed ASAP
19	Need regulatory verification as opposed to voluntary mechanism
20	What non- compliance data do we have from the states how accurate is it?
21	Share the critical items checklist results
22	What was learnt from the EBP pilots
23	Adoption nationwide of existing state regulations and policies
24	Cross ref across whole of process consistency
25	More council resources to carry out on site checks and audits
26	Are there jurisdictions doing particularly well or poorly on energy efficiency compliance What about their regulatory system makes this the case
27	Sustainability Assessments separate as use , rather than built
28	Inspections – more points
29	Mandatory disclosure existing stock
30	Discrepancies NCC to NatHERS
31	QA how can this transfer into tangible compliance outcomes 9 without further regulations
32	How far can we go determining compliance during construction.? <ul style="list-style-type: none"> • builder's certification • testing pressure thermal comfort • multiple inspections
33	Compliance need to move beyond a first rate 60 star report the minimum standard
34	What are the unique challenges for different jurisdictions
35	How can compliance efforts work hand in hand with increased stringency
36	In largely privatised system how do we make sure inspectors surveyors aren't disadvantaged by being thorough in assessing energy efficiency
37	Independent assessment check scope who

Appendix 3b - Recommendations and Timelines by Survey Question, Melbourne Workshop

List of responses from one unit of the Melbourne workshop where separate groups of attendees were asked to fill out their observations, recommended actions and implementation timelines based on the data given from the survey. The individual questions to be analysed were chosen by each group based on their own professional experience. As such, some questions have been analysed by more than one group, and some questions were not analysed by workshop participants at all. Not all aspects of the table were assessed by each group due to time constraints.

Table 3b-i: Recommendations and Timelines by Survey Question

Survey Section	Survey Question	Observations	Recommended Action	Suggested Implementation Timeline
2A	8		State government consumer affairs could promote that contract variation for energy efficiency is technically illegal/malpractice. Maintain strong focus on independent inspection and audit regime during construction phase	n/a
2A	10		Construction phase energy inspections (not random. Set stages). Mandating who does these inspections. Clarify what independent needs to be. Targeted capacity building for different stakeholders.	n/a
2A	11	Data says do it at design phase, however it needs to be included as mandatory inspections.	Emphasise system and mandated in as built. Revisit need at first fix/second fix to achieve better outcomes (post construction is too late).	n/a
2A	11	Most effective prior to/during first fix and prior to internal cladding. Fix 2 and post occupancy too late to achieve and verify compliance.	Introduce mandatory additional verification inspections.	2020
2A	12		Need to streamline to ensure transfer of information is consistent and efficient.	n/a
2A	12	Builder should be legally responsible. Regulator should ensure that builder certifies compliance.	Through building contracts builder is to be made responsible for compliance. Strengthen warranty insurance to specifically cover energy efficiency compliance.	Now-2020
2B	13	Cost impacts. Who is responsible? – issue is no one wants to be in this space. Why would you if you can be personally liable?	Pre-occupancy sign-off by independent accredited person.	2020
2B	16	All agree as built compliance critical. Product substitution a big issue. Training and skills.	System to verify as built contract. QA systems designed and Mandated. Industry training needs to be Peer to Peer – people listen to people like themselves.	2020
2B	16		System to verify as built construction. QA Systems designed and mandated. Trade and builder training skills.	n/a

Survey Section	Survey Question	Observations	Recommended Action	Suggested Implementation Timeline
2B	17		National database beneficial if it enables tagging on-site and in real time at design implementation for certifier to check. Can form part of EBP so enables low cost audit off-site	n/a
2B	18		Support the pre-occupancy sign-off by an independent accredited person.	n/a
2B	20		Better (well) resourced auditing program. Do a national checklist now and widely promote to all players on-site. Get buy in from all states and industry associations. Be clear who is being audited and what for and for what purpose. Work out who does the auditing... is this a new role?	n/a
2B	22		On-site training for building products and installation.	2020
2B	23	High % of responses want (energy efficiency) factored into building contract.		Now
3	24	Variation in regulatory processes across states.	Checklists and energy ratings certificates (possibly electronic) to form part of the building contract and approved documentation.	Now
3	25	Energy Efficiency Checklist in contract documents.	Energy Efficiency Checklist in contract documents.	Now
3	25		Energy Efficiency Checklist as part of contract is strongly supported. Not to tie builder into post-occupancy performance as deemed unfair.	n/a
3	26		Ensure transparency in any strategies undertaken.	n/a
3	27		Develop standard data collect checklist available to all home inspections via internet. Make all available via onsite based app or software. Must cover design construct as built integrate across whole cycle. Integrate assessment with post-approval checks to recalculate on-site as current.	n/a
3	28	Product certification does not cater for product substitution. Lack of required inspections to verify compliance.	Develop EBP with all required functions.	Start Now, finish by 2020
3	28	Energy certificate does not meet specified.	Include in EBP – upload of materials. Tagging systems of materials so know what has been supplied to tie into multiple checkpoints.	n/a
4	31	Needs to be changing of regulations but also monitoring and enforce action by the regulators.	There should be greater regulations for energy efficiency compliance for new houses.	n/a
4	34		Mandated by regulation/legislation. Audit individual doing energy assessment (using all compliance methods). Legislate for as-built mandatory inspection (e.g. California) Systems to verify product specifications as-built.	n/a
4	35	Accredited assessors are regularly audited. CPD program for accredited assessors and architects.	Regular auditing and program for all stakeholders.	n/a
4	36	Ideally during construction when most effective.	Post-occupancy follow-up over years.	n/a

Survey Section	Survey Question	Observations	Recommended Action	Suggested Implementation Timeline
4	36	Currently no mandatory inspections for energy efficiency. Strong support for during construction and pre-occupancy. Post occupancy/pre-sale greater opportunities to inform actions for renovations.		n/a
4	37		Over 80% (moderate to high) viewed auditing of tradesperson as justified and supported.	n/a
4	38		Opportunity to provide guidance on how to deal with non-compliance. Introduce strategies to identify non-compliance early. Get people talking about compliance. Make repercussions of non-compliance meaningful, i.e. no occupancy permit.	n/a
4	39		Inspect prior – suggest pre-plaster	n/a

Appendix 4 – Survey Analysis and Validation

What follows is the raw data from each section of the National Regulator Needs Survey. Each section first summarises the observations and recommendations from both the Melbourne workshop and Sustain SA, before expanding on the data from each question as they were posed. *Italicised* text indicates that the recommendation was made from the Melbourne workshop. Where relevant, short answer questions and responses of ‘other’ are also included on a question-by-question basis. A ‘low’ usefulness, importance or priority rating, or a strong disagreement with a statement was treated as a negative observation and a ‘high’ usefulness, importance or priority rating, or a strong agreement with a statement was treated as an affirmative or positive observation. An interesting observation was something that stood out from the data that could not be categorised as either positive or negative and was worth noting.

The weighted average analysis provides an indicator of the order of responses from highest to lowest priority, or level of agreement (among others). Sometimes, due to the way a question is worded or because of how the overarching issue is perceived, all answers may skew positive or negative. This means that a 90% approval rating for an option from a question with overall high weighted averages may not be as critical as a 70% approval rating for an option from a question with low weighted averages overall. In some cases, the weighted average is indicative of bias, with regulatory actions often scoring higher than non-regulatory actions, simply because the survey was sent mainly to regulators. Weighted average is included to show an indication of data spread.

4.1 – Survey Section 1: Personal Information

Recommendation Summary

1. Due to the lack of response to the survey by NT, TAS, WA and ACT it is suggested that some further work on validating the results be undertaken prior to full recommendations being presented to the Ministers forum.
2. That although this project dealt with Class One buildings, it would be advisable to consider a similar process dealing with Class 2 apartment buildings although they have similar base issues assumptions about these results shouldn't be taken as easily transferable to other building types

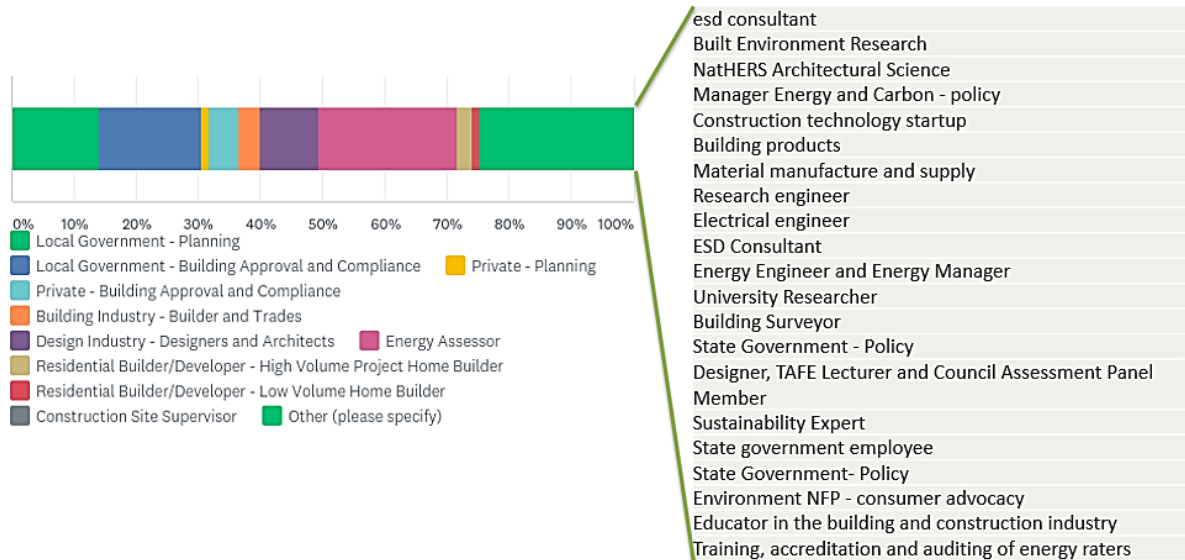
Table 4.1-o: List of all recommendations from the National Regulator Needs Survey, Section 1: Personal Information

Q. No.	Recommendations
1	<ul style="list-style-type: none"> There is a need to engage with Private (Planning, building approval and compliance) to test the recommendations
2	<ul style="list-style-type: none"> A targeted approach to consider the recommendations of those in the 18-35 category may be worthwhile across education and compliance as they are the future of the industry
3	<ul style="list-style-type: none"> <i>With low percentage of less experienced people linked to Q2 may be of interest to target less experienced and younger age group on the recommendation actions</i>
4	<ul style="list-style-type: none"> <i>Due to the underrepresentation in ACT, NT, TAS and WA, further, targeted research may be necessary</i>
6	<ul style="list-style-type: none"> <i>While the survey represents class one housing there is a need to test applicability and replicability with class 2 apartments as even though the some may be transferable – this needs to be tested</i>

Data and Raw Analysis

Q1: Which profession do you identify with the most?

Graph 4.1-i: Survey respondents by profession, with responses to 'other' included

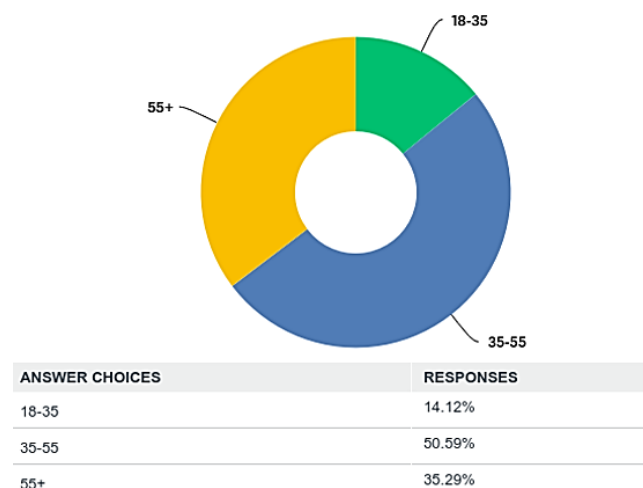


Analysis of Q1:

Affirmative Observations	<ul style="list-style-type: none"> Large percentages of respondents from 'Local government (planning, Building approval and compliance)' and 'energy assessor' categories
Negative Observations	<ul style="list-style-type: none"> Low representation from 'Private (Planning, Building approval and compliance)', 'builders and trades', and 'residential builder/developer (High & Low volume home builder)' sectors
Recommendations	<ul style="list-style-type: none"> There is a need to engage with Private (Planning, building approval and compliance) to test the recommendations

Q2: What age bracket do you belong to?

Graph 4.1-ii: Survey respondents by age, with percentages included

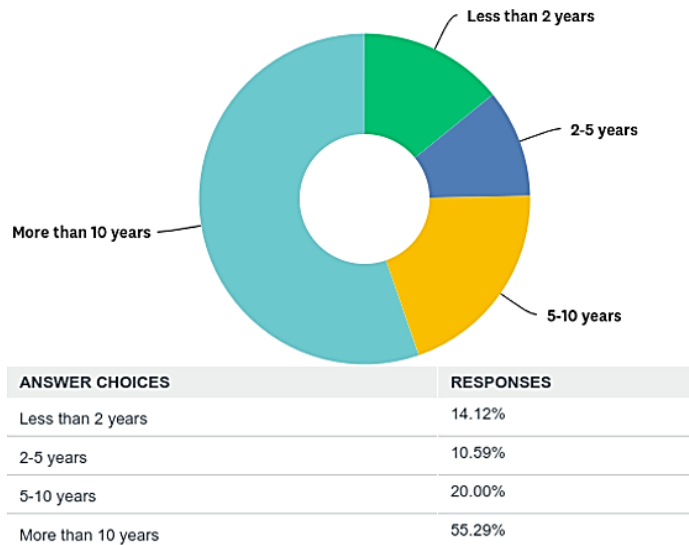


Analysis of Q2:

Affirmative Observations	<ul style="list-style-type: none"> Large percentage over 35, which implies they are experienced
Recommendations	<ul style="list-style-type: none"> A targeted approach to consider the recommendations of those in the 18-35 category may be worthwhile across education and compliance as they are the future of the industry

Q3: How many years have you personally been involved in energy rating, approval or building compliance in the construction industry for Class 1 housing?

Graph 4.1-iii: Survey respondents by years in field, with percentages included



Analysis of Q3:

- | | |
|--------------------------|---|
| Affirmative Observations | <ul style="list-style-type: none"> Large percentage above 5 years, which implies they are experienced |
| Recommendations | <ul style="list-style-type: none"> With low percentage of less experienced people linked to Q2 may be of interest to target less experienced and younger age group on the recommendation actions |

Q4: Which State(s) do you mainly operate in? (Select all that apply)

Graph 4.1-iv: Survey respondents by states operated in, with percentages included



Analysis of Q4:

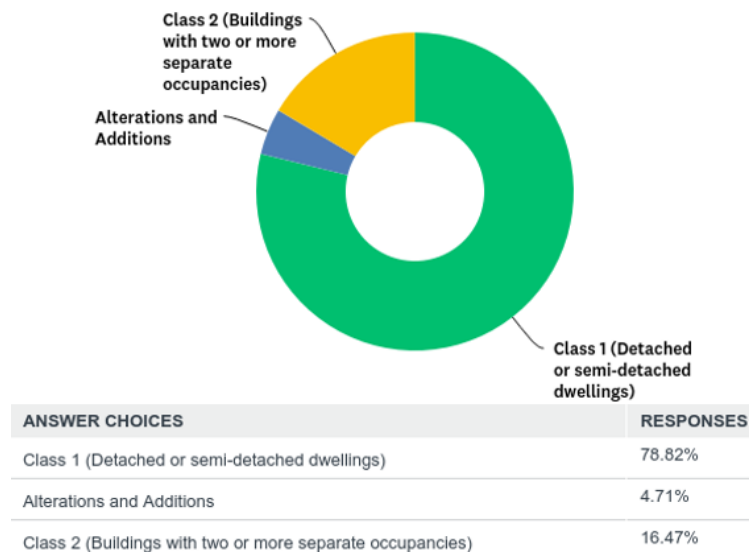
- | | |
|--------------------------|--|
| Affirmative Observations | <ul style="list-style-type: none"> Largest representation from Vic, then SA, NSW, Qld |
| Negative Observations | <ul style="list-style-type: none"> Low representation in ACT, NT, TAS and WA |
| Recommendations | <ul style="list-style-type: none"> Due to the underrepresentation in ACT, NT, TAS and WA, further, targeted research may be necessary |

Q5: What is the postcode of your main business address?

If required these postcodes can be provided on request. If we had decided to analyse postcodes as representing different types of climate zone in relationship to specific questions, then the responses to this question would have been relevant. The responses to this question were therefore omitted from the analysis.

Q6: Please indicate the type of construction that you feel most experienced to comment on.

Graph 4.1-v: Survey respondents by area of expertise, with percentages included



Analysis of Q6:

Affirmative Observations	<ul style="list-style-type: none"> Survey aimed at Class 1 and over 75% said that it was the sector they were most experienced to comment on
Recommendations	<ul style="list-style-type: none"> While the survey represents class one housing there is a need to test applicability and replicability with class 2 apartments as even though the some may be trasnfe3rbale this needs to be tested

4.2 – Survey Section 2: General Recommendation Summary

From the summary list of recommendations, it became obvious that the following recommendations needed further analysis filtering and testing:

- Implement a consumer awareness program by
 - Working with state government consumer affairs
 - Regulating enforcing energy efficiency compliance as part of the contract
- Implement a national mandatory auditing system which includes
 - Set stages for the audit
 - Who does the audit
 - Auditing the people involved in planning construction and assessment
 - Product specifications and installation
 - Audit tools
 - Training and education system
 - Pre-handover audit
 - Adequate resources and funding
- Implement capacity building program
 - education knowledge and training program
 - develop appropriate resources
 - providing consistent approach and code of practice
 - On-site training for product specification and installation

Table 4.2-i: Summary of recommendations for this section

Q. No.	Recommendation based on observations
7	<ul style="list-style-type: none"> Opportunity to provide consumer awareness on the value of energy efficiency compliance in reducing heating cooling loads, improving quality of life and reducing power bills
8	<ul style="list-style-type: none"> State government consumer affairs could promote that contract variation for energy efficiency is technically illegal / malpractice Maintain strong focus on independent inspection and audit regime during construction phase Need to develop systematic regime to check energy efficiency compliance with the Code Capacity building and resources are an essential component in improving energy efficiency compliance
10.	<ul style="list-style-type: none"> Construction phase energy inspections (not random. set stages) Mandating who does these inspections Clarify what independent needs to be Targeted capacity building for different stakeholders
11.	<ul style="list-style-type: none"> Introduce mandatory additional verification inspections Emphasise systems and mandated in as built Revisit need @ first fix /sec fix to achieve better outcomes (post construction is too late) Need to address issues at three stages <ul style="list-style-type: none"> Design development approval for energy efficiency must be part of contract and on plans During construction stage audit inspection regime should be mandated at agreed times Checked prior to handover for occupancy
12	<ul style="list-style-type: none"> Through building contracts builder is to be made responsible for compliance Strength warranty insurance to specifically cover energy efficiency compliance Need to streamline to ensure transfer of information is consistent and efficient
13	<ul style="list-style-type: none"> Pre-occupant sign off by independent accredited person Mandatory auditing tools Increased knowledge and awareness training on energy efficiency Consistent code of practice to deliver energy efficiency compliance
14	<ul style="list-style-type: none"> Mandatory Auditing, knowledge and training and consumer awareness introduced now On site product verification and substitution product regimes should be considered for 2020/ 2025 Voluntary auditing and self-regulation less likely to achieve energy efficiency compliance

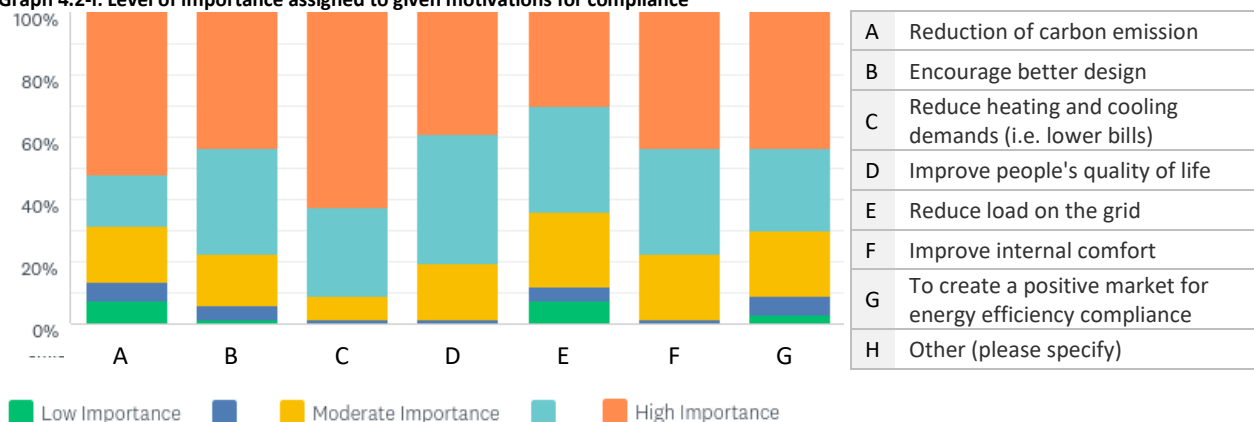
Table 4.2-i: Summary of recommendations for this section

Q. No.	Recommendation based on observations
15	<ul style="list-style-type: none"> A phased in approach of mandatory auditing should include correct windows installed and correct roof insulation installed well
16	<ul style="list-style-type: none"> <i>System to verify as built contract</i> <i>QA systems designed and Mandated</i> <i>Industry training needs to be Peer to Peer -people listen to people like themselves</i> <i>System to verify as built construction</i> <i>QA Systems designed and mandated</i> <i>Trade and builder training skills</i> Post occupancy auditing or checking was not seen as important
17	<ul style="list-style-type: none"> <i>National data base beneficial if it enables tagging on-site and in real time at design implementation for certifier to check. Can form part of EBP so that it enables low cost audit off site</i> Pre-occupancy audit would be useful
18	<ul style="list-style-type: none"> Support the pre-occupancy sign off by an independent accredited person
19	<ul style="list-style-type: none"> Regulation to enforce pre-audit before occupation or handover Work on liability and thermal testing not supported
20	<ul style="list-style-type: none"> <i>Better (well) resourced auditing program</i> <i>Do a national checklist now and widely promote to all players on site</i> <i>Get buy in from all states and industry associations</i> <i>Be clear who is being audited and what for and for what purpose. Work out who does the auditing. Is this a new role?</i>
21	<ul style="list-style-type: none"> Mandatory verification process for energy efficiency product supplied according to specs meets standards and installed correctly
22	<ul style="list-style-type: none"> <i>On-site training for building products and installation and knowledge delivery</i>
23	<ul style="list-style-type: none"> High percentage of responses want energy efficiency factored into building contract

Raw data and analysis

Q7: What level of importance would you assign to the following reasons for committing to residential energy efficiency compliance?

Graph 4.2-i: Level of importance assigned to given motivations for compliance



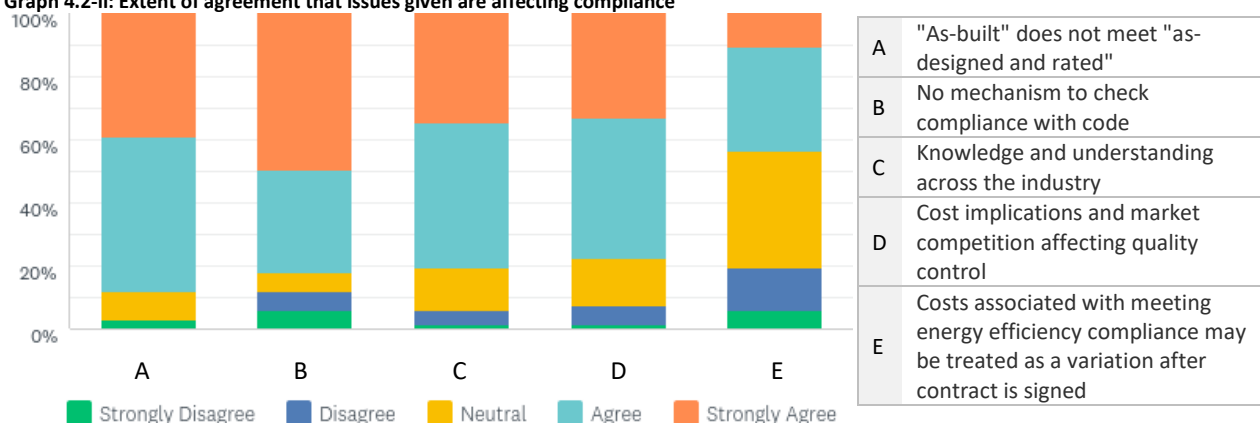
Analysis of Q7:

No.	Responses to 'Other'
1	Factor in market recognition of investment in energy efficient assets, including: infrastructure and design value, carbon reduction, ongoing energy cost efficiency, contemporary prestige, etc.
2	Consumer protection
3	Better high-density design....
4	Minimum compliance is the bar to get the building built. In my experience the industry shops around for the compliance methodology in order to get the lowest cost of compliance (prescriptive/performance/alternative solution). This doesn't necessarily translate into more efficient buildings.
5	Compliance with NCC and regulations and further training of building professionals
6	NatHERS is not applied fully anywhere - no wonder people are baulking - they haven't experienced the "scheme" operating as it was designed
7	Promotion of Zero Emission homes
8	Each kwh of energy use avoided in the first place is a fundamentally logical objective to aim for - this goes beyond peak load and carbon – it's just logical resource conservation - no matter what the source of energy is

Affirmative Observations	<ul style="list-style-type: none"> The highest level of importance for committing to residential energy efficiency compliance overall was given to 'reducing heating and cooling demands'
Interesting Observations	<ul style="list-style-type: none"> All options bar 'improving people's quality of life' received a weighted average of 4 or over
Negative Observations	<ul style="list-style-type: none"> 'Reduction of carbon emission' received the equal-highest 'Low importance' responses and the second highest 'High importance' responses – though the high far outnumbered the low 'Reducing load on the grid' is seen as the least important issue
Recommendations	<ul style="list-style-type: none"> <i>Opportunity to provide consumer awareness on the value of energy efficiency compliance in reducing heating cooling loads, improving quality of life and reducing power bills</i>

Q8: In your experience, to what extent do you agree or disagree that the following are affecting energy efficiency compliance?

Graph 4.2-ii: Extent of agreement that issues given are affecting compliance



Analysis of Q8:

Affirmative Observations	<ul style="list-style-type: none"> Over 85% of those surveyed agreed (~40% strongly) that when 'as-built does not meet as-designed-and-rated' energy efficiency compliance is affected 50% strongly agreed that there was 'no mechanism to check compliance with code'
Weighted Average Observations	<ul style="list-style-type: none"> All options received a weighted average over 4 (where agreement is high) bar the last option around cost variation
Negative Observations	<ul style="list-style-type: none"> The least agreed upon factor was that 'costs associated with meeting energy efficiency compliance may be treated as a variation after contract is signed' with 37% of responses neutral, and only 43% at least agreeing
Recommendations	<ul style="list-style-type: none"> State government consumer affairs could promote that contract variation for energy efficiency is technically illegal / malpractice Maintain strong focus on independent inspection and audit regime during construction phase Need to develop systematic regime to check energy efficiency compliance with the Code Capacity building and resources are an essential component in improving energy efficiency compliance

Q9: What do you believe it would take to get people committed to delivering on energy efficiency compliance?

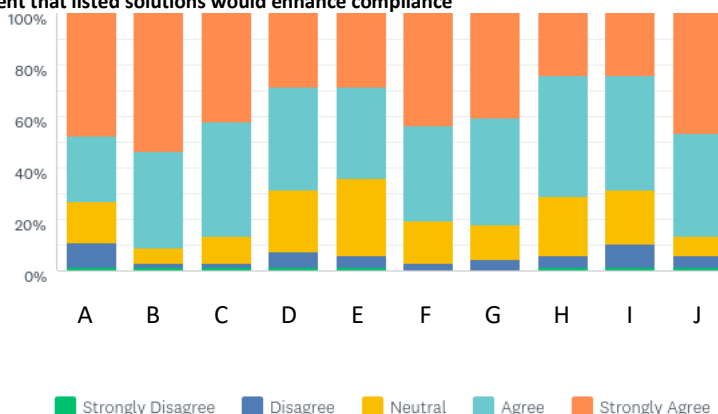
No.	Response
1	<ul style="list-style-type: none"> Statutory requirements for compliance assessment. Tools, organisations and education to support compliance
2	<ul style="list-style-type: none"> Non-compliance penalties. Education and behaviour change programs for industry. Awareness by property owners of compliance or otherwise and long-term cost impacts of owning/maintaining.
3	As built performance random auditing and testing. Compulsory energy efficiency rating disclosure.
4	Consumer value and demand: quantification of return on capital investment (gains), social commitment and personal values (satisfaction), contemporary market norms (competition), positive rhetoric to rebuff negative rhetoric (affordable housing) etcetera.
5	House Building Contracts with penalties for non-compliance
6	Get the PHB sales people to mention it and raise it as an important feature of a new home
7	More comprehensive checking for insulation. But also, an understanding of how important energy efficiency is.

No.	Q9. What do you believe it would take to get people committed to delivering on energy efficiency compliance?
8	Actual demonstrated savings because now the comment seems to be that those with Solar Panels are causing the higher prices! Even with so called clean energy and the propaganda about lower prices no one believes this, just another can for a cash grab by a wasteful Govt. As we save the cost of producing energy, the Govt just puts the rate per Kw higher to maintain revenue and even though we use less, we pay more!
9	Education, training and inspection, compliance signoff before handover to client.
10	Auditing and checks of work carried out on the building site.
11	Incentives and inability to do the wrong thing with checks/inspections.
12	Informed choice
13	education, inspection, penalties
14	From a certifier's perspective, more time to allow better assessment and inspections.
15	Energy efficiency needs to be taken seriously by the building industry. At present some sectors of the industry use energy efficiency as a marketing tool, but the detail gets lost in marketing hype and the current methodology for assessment relies too much on 'smoke and mirrors' that enables the industry to tailor the requirements to suit their needs rather than the other way around (as it should be)
16	Random inspection/auditing of buildings to confirm compliance with energy efficiency requirements
17	Demonstrate that it improves the sale price of the dwelling
18	as built audit
19	More emphasis on compliance with penalties.
20	Subsidies and grants
21	Nationally or state registered energy efficiency design providers who carry PI insurance for their field of expertise as well as a strong auditing program of design documentation compliance. Random testing of energy efficiency outcomes in the completed buildings to verify the compliance outcomes.
22	better design
23	<ul style="list-style-type: none"> Increased review of as built and testing to ensure compliance during the build Warranty on the energy efficiency as there is in structural build Education of the consumer
24	Knowledge
25	Understanding the implications on thermal comfort and operating cost reductions
26	Understanding the issues of quality and thermal comfort and the implications for ongoing cost burdens for the householder
27	It needs to be legislated into the Building Code and a min. 6-star rating adopted for residential homes. Unfortunately, the cost can be upwards of \$50k to a 200m2 home.
28	better understanding that the long term gains out way the initial increased costs and attention to detail required.
29	This needs to be driven by the building owner. They will need to understand the tangible benefits of energy efficient design & construction.
30	Better regulations
31	Greater regulatory control. If people are left to make their own decisions, they will invariably make poor choices due to a poor understanding of the requirements and principles needed.
32	<ul style="list-style-type: none"> higher statutory requirements. Verification of as-built standards (e.g. air tightness testing)
33	regulation and education.
34	mandatory disclosure of energy efficiency measures at point of sale. independent auditors to check compliance prior to occupation stage. consumer education of benefits and standards to drive industry
35	Independent inspection of critical aspects of energy efficient construction (insulation, sealing etc)
36	proper design and study analysis.
37	Policies making it mandatory for developers to build with energy efficiency in mind - insulation, double-glazing, and other design and construction materials and methods which are closer to European standards.
38	Regulations
39	better trained builders, inspection & monitoring during construction
40	Government commitment to random checking of compliance to the National Construction Code. De-registering any professional if they have signed off compliance for non-compliant buildings.

No.	Q9. What do you believe it would take to get people committed to delivering on energy efficiency compliance?
41	From my experience I find the people with whom I deal are committed to energy efficiency compliance.
42	Educated consumers driving demand for better compliance
43	Higher regulated requirements and policing of product conformity and compliance. Less allowance for trade-offs - setting minimum targets for key items.
44	Make double glazing standard to all habitable rooms. (with thermally broken frames or better) Easy to legislate, easy to check, delivers immediate efficiencies and designers are more careful with glazing design. Brings us in line with overseas best practice and bring down prices. The industry in SA complains about the price of double glazing but Tasmania and Victoria have transitioned as they have a cooler climate zone. The increase in demand has significantly brought down prices. Glazing is the greatest weak point in the building.
45	Higher minimum standards. Voluntary schemes won't work.
46	more inspectors operating to enforce compliance
47	Transparency and consumer demand would drive change in the market to deliver improved compliance. Government needs to ensure an effective regulatory framework is in place to reward compliance.
48	<ul style="list-style-type: none"> • Engage builders, owners with energy efficiency compliance at the initial stage of project development. • Demonstrate project energy efficiency compliance as part of development Plan consent stage
49	Enforcement by certifier at final inspection and tied to the Form 21
50	Further regulation - Site inspection at stages of construction to ensure what has been modelled is being constructed
51	Fines for falsifying information and more stringent checks on compliance to catch perpetrators. Better education for clients so they actively ask for more energy efficient measures. Checks by accredited energy assessors at the end of the job to ensure that the measures specified to meet a certain rating have been incorporated.
52	<ul style="list-style-type: none"> • Simple compliance inspection and reporting process. • Fines, planning permit amendment requirements for non-compliance.
53	Demonstrating the savings in real dollar terms that can be made by designing and building energy efficient buildings.
54	Education on what is required across all levels.
55	Compliance checking via an audit system with penalties for non-compliance
56	<ul style="list-style-type: none"> • Qualified independent certifiers only - not allowing companies to do their own certifications - Post building checks • More information on cost benefits of providing energy efficient homes -e.g. running costs reduced • Mandatory disclosure of energy ratings at point of sale
57	Making it part of the building code, i.e. mandatory.
58	effective regulation and compliance, effective building control inspections and sign-off
59	Make the builder responsible for it.
60	MANDATED COMPULSORY training
61	Increased accountability
62	Jurisdictions to make thermal calculation assessor accreditation mandatory, with independent policing as-built and strong penalties for non-compliance
63	Regulation
64	A greater understanding from local government authority and on-site trades about what is trying to be achieved from undertaking the energy efficiency report.
65	a properly resourced state-administered, enforced audit scheme. No state agency across Australia, to my knowledge invests appropriately in audits/monitoring of certifiers and "built as promised" outcomes
66	Make sure the house has an energy efficiency certificate when it is being sold or advertised for sale. Similar to your fridge or washing machine. Then the consumer makes the choice and of course the home owner/buyers wants a good house to sell/live in.
67	Save money on bills for improved energy efficiency i.e. bill subsidy to encourage certifiable improvements.

Q10: To what extent do you agree or disagree that the following would enhance energy efficiency compliance?

Graph 4.2-iii: Level of agreement that listed solutions would enhance compliance



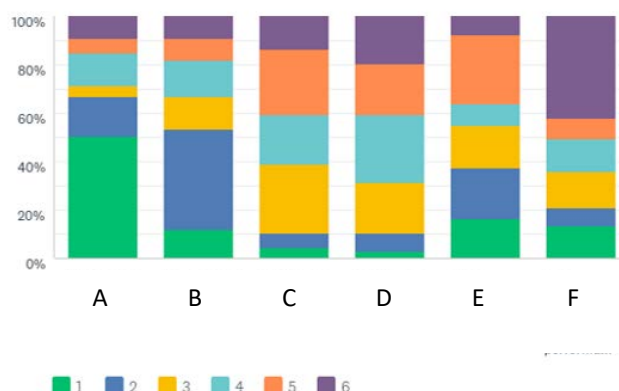
A	Improved regulations	F	Clearer responsibility and understanding by professionals and trades across the building cycle
B	Increased capacity to carry out inspections and assessment	G	Better awareness of energy efficiency compliance requirements and cost and performance implications of non-compliance
C	Increased resources to support energy efficiency compliance across industry regulators and assessors	H	Easier access to quality data on energy efficiency compliance and as-built performance
D	Greater consistency in energy efficiency rating	I	Better systems and tools that enable regulators and industry to meet compliance more easily
E	More time to focus on compliance in building design and approval stages	J	Clearly identified and defined accountability of industry, regulators and assessors to deliver high performance homes

Analysis of Q10:

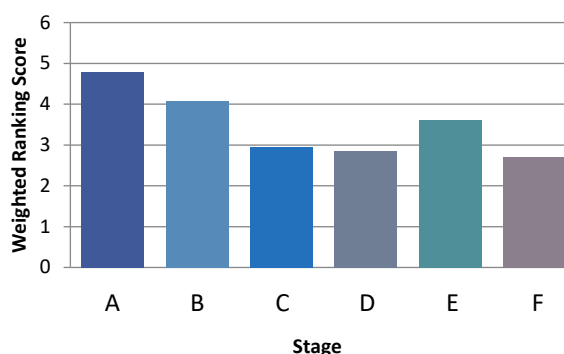
Affirmative Observations	<ul style="list-style-type: none"> Over 90% agree (53% strongly) that 'increased capacity to carry out inspections and assessment' would enhance energy efficiency compliance It was also widely agreed that 'clearly identified and defined accountability of industry, regulators and assessors to deliver high performance homes' and 'increased resources to support energy efficiency compliance across industry, regulators and assessors' would enhance energy efficiency compliance
Weighted Average Observations	<ul style="list-style-type: none"> Very low responses of strong disagreement for all options 'Greater consistency in energy efficiency rating', 'More time to focus on compliance in building design and approval stages', 'Easier access to quality data on energy efficiency compliance and as-built performance', and 'Better systems and tools that enable regulators and industry to meet compliance more easily' – had an average between 3 and 4, all others were above 4
Negative Observations	<ul style="list-style-type: none"> 'Improved regulations' and 'better systems and tools that enable regulators and industry to meet compliance more easily' had the highest levels of disagreement
Recommendations	<ul style="list-style-type: none"> Construction phase energy inspections (not random. set stages) Mandating who does these inspections Clarify what independent needs to be Targeted capacity building for different stakeholders

Q11: When do you think is the most critical time at which energy efficiency compliance and performance should be assessed? Please rank in order of importance, from 1 being the most important to 6 the least important.

Graph 4.2-iv: Stages of building by percentage of responses ranking that stage as the *n*-the most critical time for compliance to be assessed



Graph 4.2-v: Stages of building by highest rankings of importance for assessing compliance



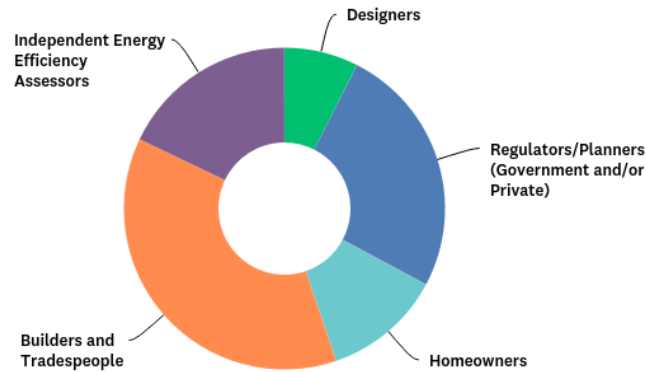
A	Design and rating stage	D	Construction, during second fix
B	Development and building approval stage	E	After construction, prior to handover
C	Construction, during first fix	F	Post-occupancy (e.g. 12 months) performance review

Analysis of Q11:

Affirmative Observations	<ul style="list-style-type: none"> • 'Design and rating stage' was rated highest overall, followed by the 'development and building approval stage' and 'after construction, prior to handover' option – and thus are the most critical times for energy efficiency compliance/performance to be assessed
Negative Observations	<ul style="list-style-type: none"> • 'Post occupancy performance review' was deemed least critical for compliance/performance testing
Recommendations	<ul style="list-style-type: none"> • <i>Introduce mandatory additional verification inspections</i> • <i>Emphasise systems and mandated in as built</i> • <i>Revisit need @ first fix /sec fix to achieve better outcomes (post construction is to late)</i> • Need to address issues at three stages <ul style="list-style-type: none"> ○ Design development approval ...energy efficiency must be part of contract and on plans ○ During construction stage audit inspection regime should be mandated at agreed times ○ Checked prior to handover for occupancy

Q12: Who do you believe should be legally responsible for ensuring energy efficiency compliance? (Select one only).

Graph 4.2-vi: Proportion of responses to question 12.

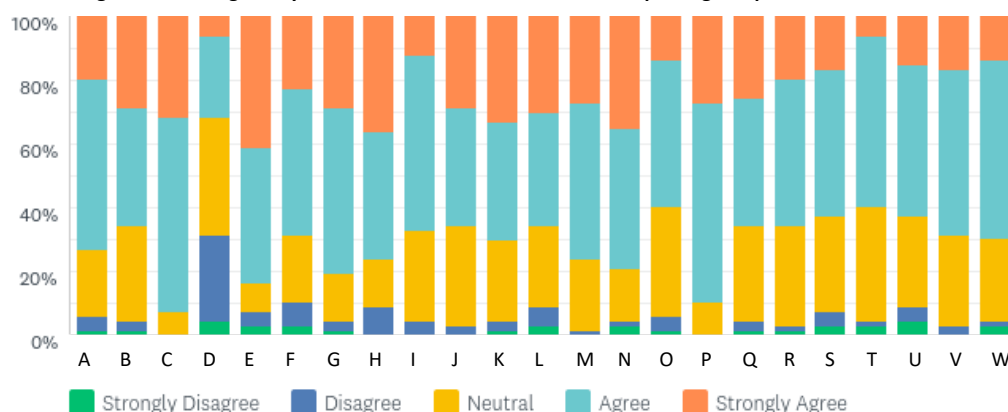


Analysis of Q12:

Affirmative Observations	<ul style="list-style-type: none"> Builders and tradespeople had the most responses
Interesting Observations	<ul style="list-style-type: none"> 12% saying that homeowners should be <i>legally responsible</i> for energy efficiency compliance seems high...
Negative Observations	<ul style="list-style-type: none"> Designers had the least responses
Recommendations	<ul style="list-style-type: none"> <i>Through building contracts builder is to be made responsible for compliance</i> <i>Strength warranty insurance to specifically cover energy efficiency compliance</i> <i>Need to streamline to ensure transfer of information is consistent and efficient</i>

Q13: To what extent do you agree or disagree that the following systems and tools would be useful in improving energy efficiency compliance:

Graph 4.2-vii: Extent of agreement that given systems and tools would be useful for improving compliance.



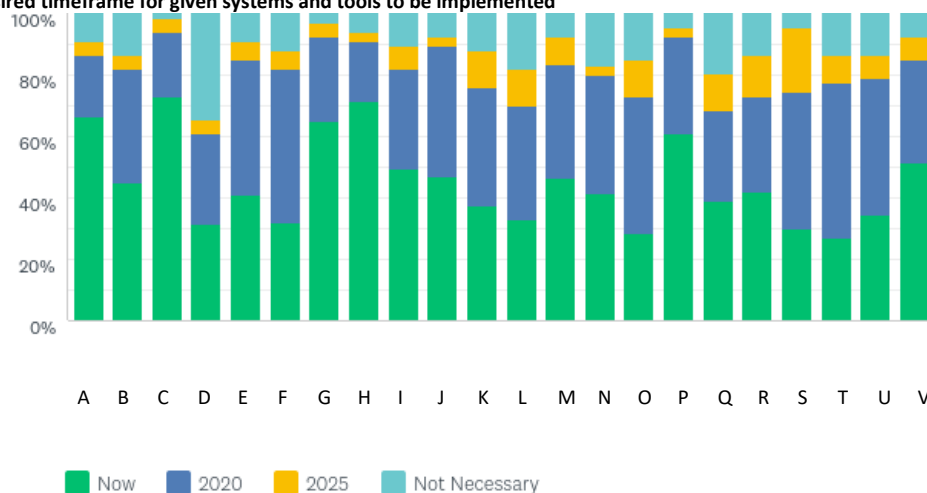
A	Improved and easy to use checklist tools	M	Consistent trade accreditation
B	Clearer regulation and legislation	N	Routine on-site task validation and sign-off
C	Knowledge and Training for Professionals	O	On-site data access for builders, regulators and industry
D	Voluntary auditing tools	P	Consistent code of practice for energy efficiency assessors
E	Mandatory auditing tools	Q	Quality assurance system
F	Electronic documentation and verification	R	On-site product verification
G	Auditing of energy efficiency assessments	S	System to track compliant specification and installation of fit-for-purpose products
H	Consumer awareness	T	Better documentation storage, retrieval and access
I	Consumer protection protocols	U	Compliance QA system for professionals, tradespeople and specifiers
J	Transparent and accessible data	V	Consistent systems and tools for identifying non-compliance and tracking remediation and completion
K	Consistent real estate identification and ranking for energy efficiency	W	Consistent systems for tracking remediation and completion
L	Thermal envelope testing		

Analysis of Q13:

Affirmative Observations	<ul style="list-style-type: none"> • 'Knowledge and training for professionals' & 'consistent code of practice for energy efficiency assessors' most widely agreed upon as the most useful in improving energy efficiency compliance • 'Mandatory auditing tools', 'Auditing of energy efficiency assessments', 'Consumer awareness', 'Consistent trade accreditation', 'Routine on-site task validation and sign-off' are the next highest in terms of agreement (strongly or otherwise)
Negative Observations	<ul style="list-style-type: none"> • 'Mandatory auditing tools' had highest strong agreement • 'Voluntary auditing tools' most widely disagreed with and as such least likely to be useful in improving energy efficiency compliance
Recommendations	<ul style="list-style-type: none"> • <i>Pre-occupant sign off by independent accredited person</i> • Mandatory auditing tools • Increased knowledge and awareness training on energy efficiency • Consistent code of practice to deliver energy efficiency compliance

Q14: By when should the following actions, systems and tools be implemented to effectively enhance energy efficiency compliance? (or not)

Graph 4.2-viii: Desired timeframe for given systems and tools to be implemented



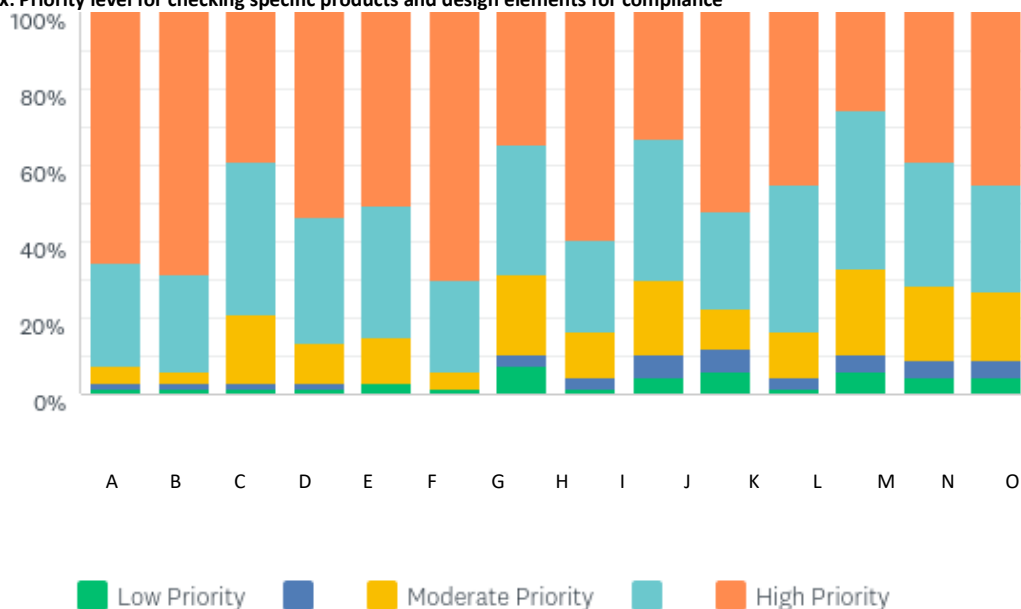
A	Improved and easy to use checklist tools	L	Thermal envelope testing
B	Better regulation and legislation	M	Trade accreditation
C	Knowledge and Training for Professionals	N	Task validation/sign-off
D	Voluntary auditing tools	O	On-site accessible data program for builders, regulators and industry
E	Mandatory auditing tools	P	Consistent code of practice for energy efficiency assessors
F	Electronic documentation and verification	Q	Quality assurance system
G	Auditing of energy efficiency assessments	R	On-site product verification
H	Consumer awareness	S	System to track compliance, performance and fit-for-purpose installation of products
I	Consumer protection protocols	T	Better documentation storage, retrieval and access
J	Transparency of data	U	QA for EE for compliance professionals, tradespeople and specifiers
K	Consistent real estate guidelines for energy efficiency	V	Systems and tools for correcting non-compliance

Analysis of Q14:

Observations for Now	<ul style="list-style-type: none"> 'Knowledge and training for professionals' (3), 'Auditing of energy efficiency assessments' (7), 'Consumer awareness' (8), 'Improved and easy to use checklist tools' (1) and 'Consistent code of practice for energy efficiency assessors' all had over 60% of their responses indicating they should be implemented now. Only three of the actions were found to have less than 30% of support for implementation now, none less than 25%.
Observations for 2020	<ul style="list-style-type: none"> All bar 'Voluntary auditing' (4), 'Thermal envelope testing', 'Quality assurance system' (-6) and 'On site product verification' (-5) had over 70% of responses suggesting that they should be implemented by 2020 or earlier.
Observations for 2025	<ul style="list-style-type: none"> Timeframe with the lowest percentages, only 'System to track compliance, performance and fit-for-purpose installation of products' (-4) had more responses at this year than 'not necessary', none had more responses for 2025 than for the timeframes of now and 2020 – this implies that at the very least these actions should all be implemented by 2020, if they are necessary, and a 'System to track compliance, performance and fit-for-purpose installation of products' can be implemented by 2025 if it hasn't already
Negative Observations	<ul style="list-style-type: none"> 'Voluntary auditing tools' had the most responses indicating that it was not necessary, and some of the lowest responses for the individual timeframes
Recommendations	<ul style="list-style-type: none"> Mandatory Auditing, knowledge and training and consumer awareness introduced now On site product verification and substitution product regimes should be considered for 2020/2025 Voluntary auditing and self-regulation less likely to achieve energy efficiency compliance

Q15: In a previous project, the following products or design elements were identified as critical factors in ensuring residential energy efficiency compliance. If they were used as part of an audit system to check that they met design specification and energy rating, what priority level for checking compliance would you assign each element?

Graph 4.2-ix: Priority level for checking specific products and design elements for compliance



A	Correct roof insulation supplied	I	Dampers on exhaust fans correctly specified and installed
B	Roof insulation well installed	J	Orientation and layout maximised for passive solar design
C	Roof sarking or equivalent correctly specified and installed (reflective moisture barrier)	K	Appropriate external shading installed as-designed
D	Correct wall and underfloor insulation supplied	L	Lighting installed as per approved lighting plan
E	Wall and underfloor insulation well installed	M	Hot water system correctly specified and installed
F	Correct windows supplied	N	Heating, ventilation and cooling (HVAC) correctly specified and installed
G	Correct roofing (including colour) supplied	O	Other (please specify)
H	Well-sealed thermal envelope (Roof, wall, window and floor)		

No.	Responses to 'Other'
1	Priority levels will vary according to climate zone.
2	Correct doors and screens
3	Ensure no changes to siting, what about the inevitable veranda addition that becomes an outdoor room etc and stuffs up everything!
4	As a certifier there is a need to ensure full compliance and therefore all of these elements are important to check/verify compliance.
5	Some of the above appear to be targeted at design stage rather than as built (e.g. orientation and layout, it would be highly irregular for orientation of a building to change)
6	greater knowledge about window energy rating should be understood and considered
7	Correct use of energy sources gas/electric/renewable for location
8	If building well sealed controlled air input/output needed (ERV or HRV)
9	Air quality testing, especially if building well sealed.
10	Smart metering
11	Power draw from electric security fencing and alarm systems

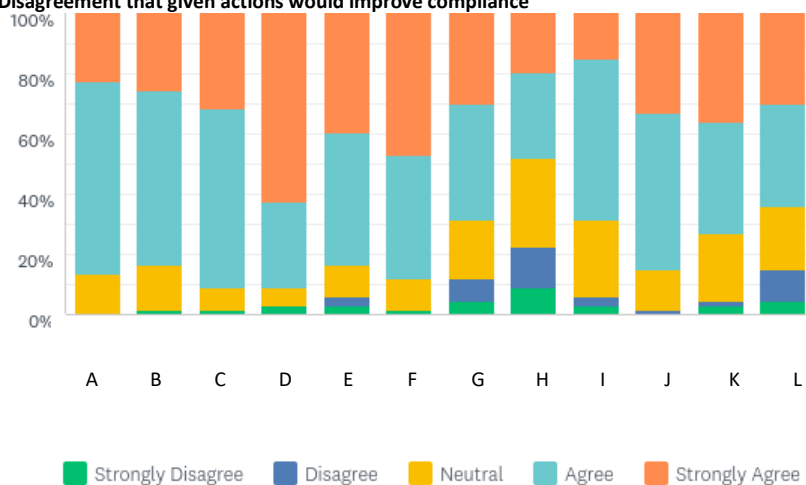
No.	Responses to 'Other'
12	Design features are different to compliance. A building design is rated, and presumably achieves a certain performance target. Compliance is about achieving that standard. The passive design question doesn't belong here. Other than that - It's all important.
13	Correct glazing type, frames and location of glazing- windows is generic. Glazing and frames to be marked with code
14	Roof ventilation installed
15	inclusion of passive solar design in this list is an outlier – it's not in the same compliance basket as the other items – can't see logic for inclusion here
16	Roof insulation under box gutters and through eaves over tops of external walls

Analysis of Q15:

Affirmative Observations	<ul style="list-style-type: none"> 'Correct Windows installed' and 'roof insulation well installed' were the two highest priorities for an audit system. In all categories where 'correct material' could be compared with 'material installed correctly', it was deemed a higher priority that the material be the correct one
Weighted Average Observations	<ul style="list-style-type: none"> All above 3.5 Only the three listed below and 'Hot water system correctly specified' below 4
Negative Observations	<ul style="list-style-type: none"> 'Lighting installed as per approved lighting plan', 'correct roofing supplied' and 'dampers on exhaust fans correctly specified' had the most responses at moderate priority and below
Recommendations	<ul style="list-style-type: none"> A phased in approach of mandatory auditing should include correct windows installed and correct roof insulation installed well.

Q16: The following actions would improve energy efficiency compliance. To what extent do you agree or disagree.

Graph 4.2-x: Agreement/Disagreement that given actions would improve compliance



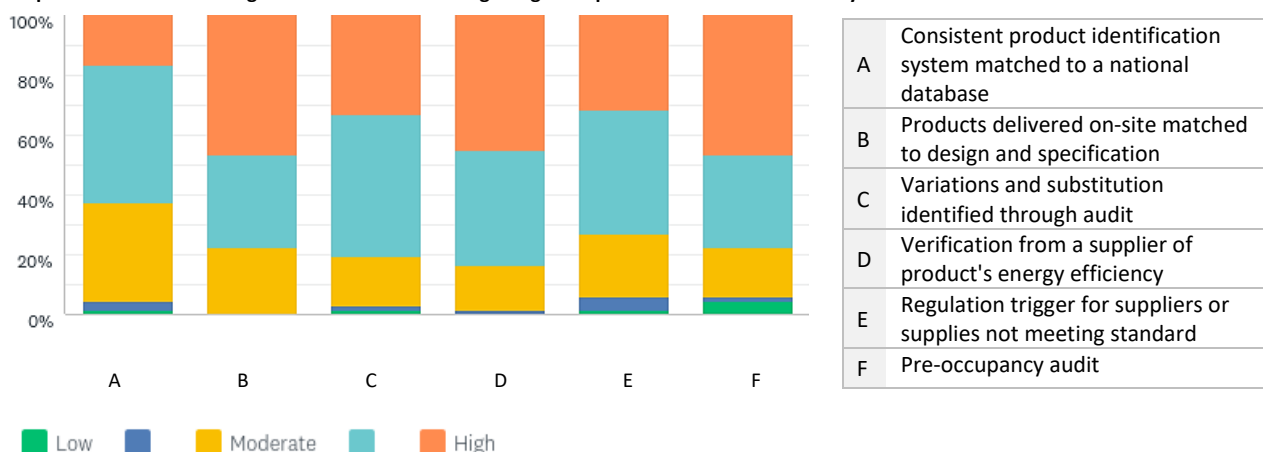
A	Design and product substitution clearly identified	G	Pre-occupancy thermal envelope performance test
B	All specified and installed products are specified fit-for-purpose	H	Post-occupancy (e.g. 12 months) performance measure protocol or tool
C	Clear performance data on products	I	Quality control systems in building product installation
D	'As built' construction is verified against design and rated approval	J	Designers, builders and tradespeople trained in energy efficiency compliance
E	Nationally consistent on-site auditing protocol	K	Energy efficiency compliance identified and costed in all building contracts
F	The energy performance rating is verified against design and as-built, pre-occupancy	L	Accredited energy efficiency performance assessors responsible throughout building process until handover

Analysis of Q16:

Affirmative Observations	<ul style="list-style-type: none"> 'Design and product substitution clearly identified' had no disagreement 'Design and product substitution clearly identified' 'Clear performance data on products', 'as-built construction is verified against design and rated approval', 'nationally consistent on-site auditing protocol', 'Designers, builders and tradespeople trained in energy efficiency' had more than 85% at least agree 'As-built construction is verified against design and rated approval' had the over 60% strongly agreeing that it would improve compliance
Weighted Average Observations	<ul style="list-style-type: none"> All above 4 bar 'pre-occupancy thermal envelope test', 'post-occupancy performance measure protocol tool' and 'Quality control systems in product installation' 'Post occupancy thermal envelope test' was the only one below 3.5
Negative Observations	<ul style="list-style-type: none"> 'Post-occupancy thermal envelope test' was the only one to have less than 50% at least agreeing that it would improve energy efficiency compliance, and the most strongly disagreeing
Recommendations	<ul style="list-style-type: none"> <i>System to verify as built contract</i> <i>QA systems designed and Mandated</i> <i>Industry training needs to be Peer to Peer -people listen to people like themselves</i> <i>System to verify as built construction</i> <i>QA Systems designed and mandated</i> <i>Trade and builder training skills</i> <i>Post occupancy auditing or checking was not seen as important</i>

Q17: Please rate the level of usefulness of the following methods for ensuring design and product substitution is clearly identified during installation:

Graph 4.2-xi: Usefulness of given methods for ensuring design and product substitution is clearly identified

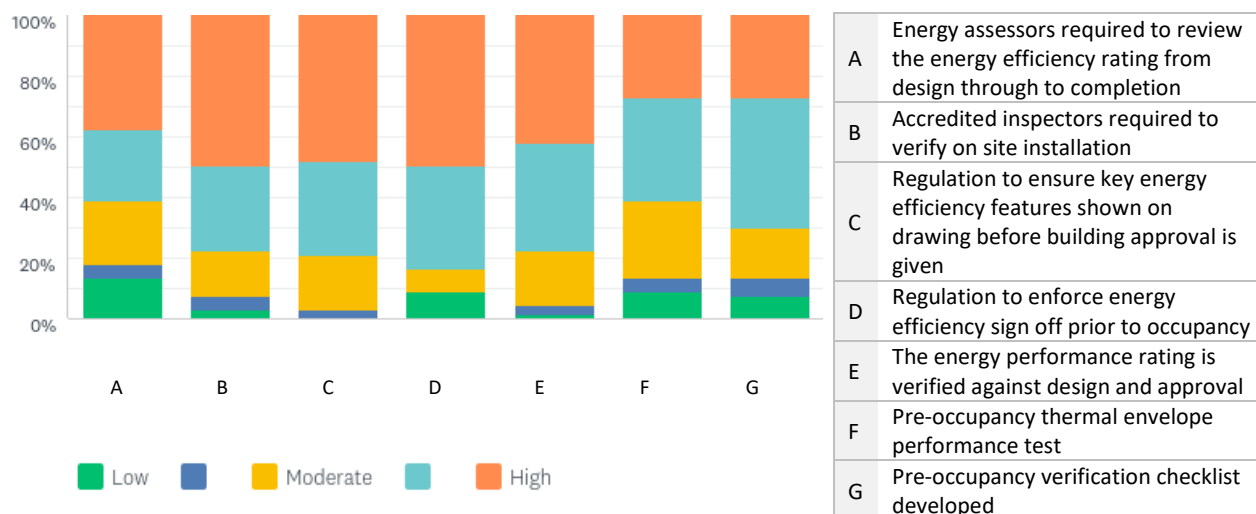


Analysis of Q17: (Note: This issue performed positively in Q16)

Affirmative Observations	<ul style="list-style-type: none"> 'Products delivered on-site matched to design and specification', 'Verification from a supplier of product's energy efficiency' and 'pre-occupancy audit' had the most responses of above moderate usefulness
Weighted Average Observations	<ul style="list-style-type: none"> All above 3.5 Only 'Consistent product identification system matched to a national database' and 'regulation trigger for suppliers or supplies not meeting standards' below 4
Negative Observations	<ul style="list-style-type: none"> Least highly rated for usefulness for ensuring product substitution is clearly identified during installation was a 'Consistent product identification system matched to a national database' – it also had the most responses that it would be of moderate or lower usefulness
Recommendations	<ul style="list-style-type: none"> <i>National data base beneficial if it enables tagging on-site and in real time at design implementation for certifier to check. Can form part of EBP so that it enables low cost audit off site</i> <i>Pre-occupancy audit would be useful</i>

Q18: Please rate the level of usefulness of the following methods for ensuring that the as-built construction is verified against design and rated approval:

Graph 4.2-xii: Usefulness of the following methods for ensuring that the as-built construction is verified against design

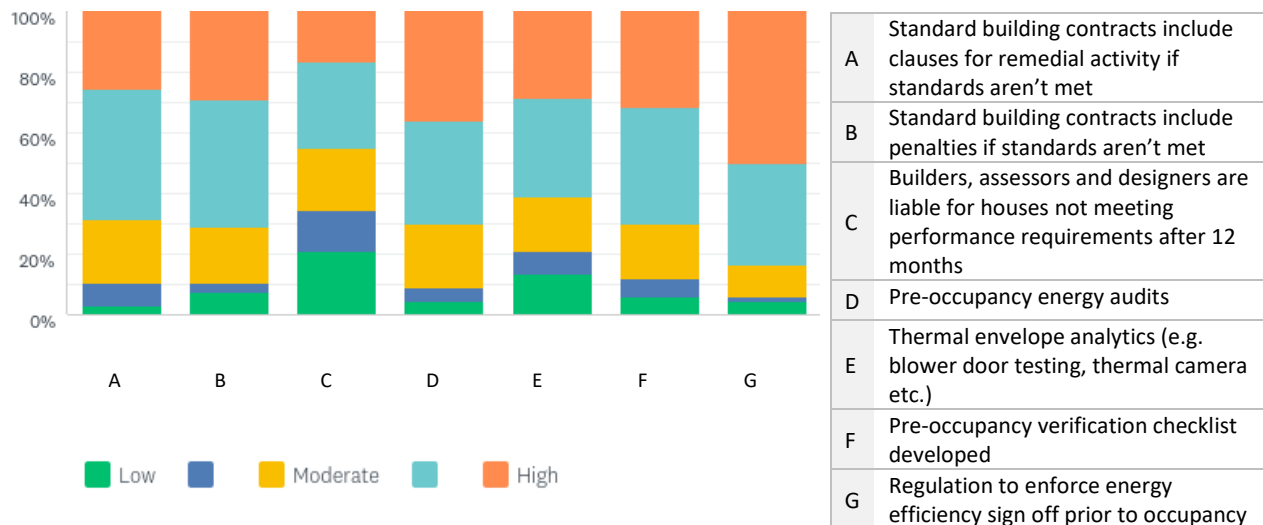


Analysis of Q18: (Note: This issue performed positively in Q16)

Affirmative Observations	<ul style="list-style-type: none"> 'The energy performance rating is verified against design and approval' and 'Regulation to ensure key energy efficiency features shown on drawing before building approval is given' had the least responses indicating that they were of below moderate usefulness All had over 50% of responses above moderate usefulness, while 'Accredited inspectors required to verify on site installation', 'Regulation to ensure key energy efficiency features shown on drawing before building approval is given', 'Regulation to enforce energy efficiency sign off prior to occupancy' and 'energy performance rating is verified against design and approval' received 75% of responses above moderate usefulness
Weighted Average Observations	<ul style="list-style-type: none"> 'Energy assessors required to review the energy efficiency rating from design through to completion', 'Pre-occupancy thermal envelope performance test' and 'Pre-occupancy verification checklist developed' were the only ones below 4, none of which had a weighted average below 3.5
Negative Observations	<ul style="list-style-type: none"> 'Energy assessors required to review the energy efficiency rating from design through to completion', 'Pre-occupancy thermal envelope performance test and 'Pre-occupancy verification checklist developed' received the more than 30% of responses indicating moderate usefulness or below. These all had upwards of 5% of their responses indicating that they would be of low usefulness in ensuring verification for this issue, along with 'Regulation to enforce energy efficiency sign off prior to occupancy'
Recommendations	<ul style="list-style-type: none"> Support the pre-occupancy sign off by an independent accredited person

Q19: Please rate the level of usefulness of the following methods for ensuring that the energy performance rating is verified pre-occupancy against design and as-built:

Graph 4.2-xiii: Usefulness of given methods for ensuring that energy performance rating is verified against design and as-built

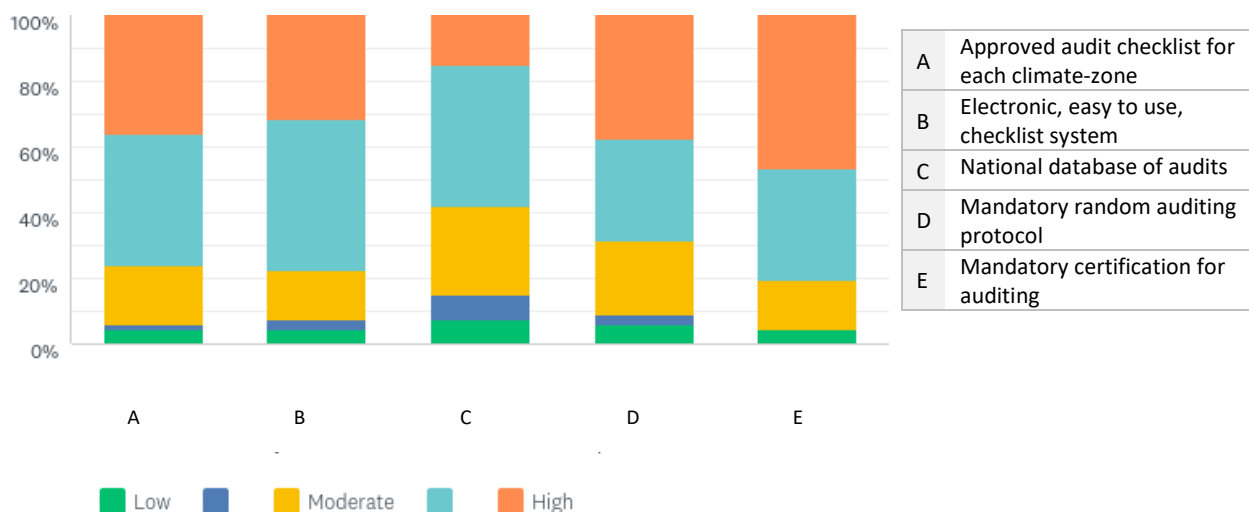


Analysis of Q19: (Note: This issue performed positively in Q16)

Affirmative Observations	<ul style="list-style-type: none"> 'Regulation to enforce energy efficiency sign off prior to occupancy' was the method which received the most responses rating it above moderate usefulness, and the most rating it of high usefulness for ensuring the energy performance rating is verified against design and as-built
Weighted Average Observations	<ul style="list-style-type: none"> Only 'Regulation to enforce energy efficiency sign off prior to occupancy' had a WA above 4 And only 'Builders, assessors and designers being liable for houses not meeting performance requirements after 12 months' was below 3.5
Negative Observations	<ul style="list-style-type: none"> 'Builders, assessors and designers are liable for houses not meeting performance requirements after 12 months' had less than 50% of responses indicating it would be an above-moderately useful method for use in this issue 'Builders, assessors and designers are liable for houses not meeting performance requirements after 12 months' and 'thermal envelope analytics' had the most responses indicating low usefulness in this issue
Recommendations	<ul style="list-style-type: none"> Regulation to enforce pre-audit before occupation or handover Work on liability and thermal testing not supported

Q20: Please rate the level of usefulness of the following elements in creating nationally consistent on-site energy efficiency auditing protocol.

Graph 4.2-xiv: Usefulness of given elements in creating nationally consistent on-site EE auditing protocol

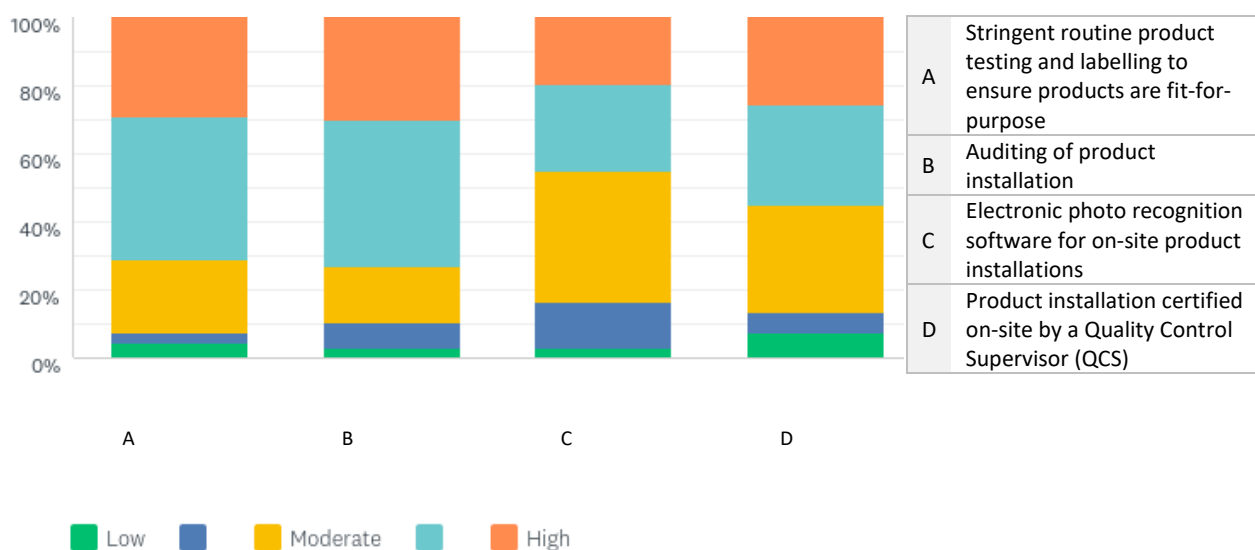


Analysis of Q20: (Note: This issue performed positively in Q16)

Affirmative Observations	<ul style="list-style-type: none"> All bar 'National database of audits' had over 65% of responses above moderate usefulness 'Mandatory certification for auditing' had over 45% of responses indicating it would be of high usefulness in this area
Weighted Average Observations	<ul style="list-style-type: none"> 'National database of audits' only one below 3.55 'Mandatory certification for auditing' only one above 4.10 Others lie between 3.91 and 4.01
Negative Observations	<ul style="list-style-type: none"> 'National database of audits' received the most responses stating that it would be of moderate or lower use (over 40%)
Recommendations	<ul style="list-style-type: none"> <i>Better (well) resourced auditing program</i> <i>Do a national checklist now and widely promote to all players on site</i> <i>Get buy in from all states and industry associations</i> <i>Be clear who is being audited and what for and for what purpose. Work out who does the auditing. Is this a new role?</i>

Q21: Please rate the level of usefulness of the following quality control systems in building product installation for energy efficiency compliance.

Graph 4.2-xv: Usefulness of the following quality control systems for product installation compliance

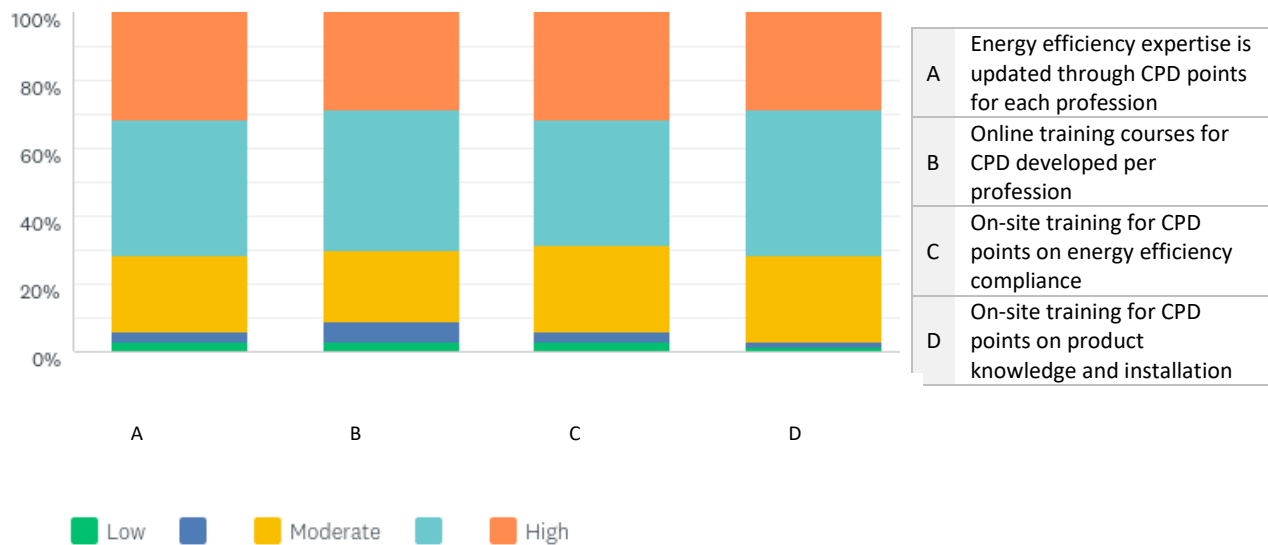


Analysis of Q21: (Note: This issue performed moderately in Q16)

Affirmative Observations	<ul style="list-style-type: none"> 'Stringent routine product testing and labelling to ensure products are fit-for-purpose' and 'Auditing of product installation' both received over 70% of their responses above moderate usefulness
Weighted Average Observations	<ul style="list-style-type: none"> All had WA below 4 Only 'Electronic photo recognition software for on-site product installations' was below 3.5 'Stringent routine product testing and labelling to ensure products are fit-for-purpose' and 'Auditing of product installation' were both within 0.02 of 3.9
Negative Observations	<ul style="list-style-type: none"> 'Product installation certified on-site by a Quality Control Supervisor (QCS)' had the highest low usefulness response 'Electronic photo recognition software for on-site product installations' had the most responses indicating usefulness below moderate, and moderate and below.
Recommendations	<ul style="list-style-type: none"> Mandatory verification process for energy efficiency product supplied according to specs meets standards and installed correctly

Q22: Please rate the level of usefulness of the following methods for training designers, builders and tradespeople in energy efficiency compliance.

Graph 4.2-xvi: Usefulness of given methods for training industry in EE compliance

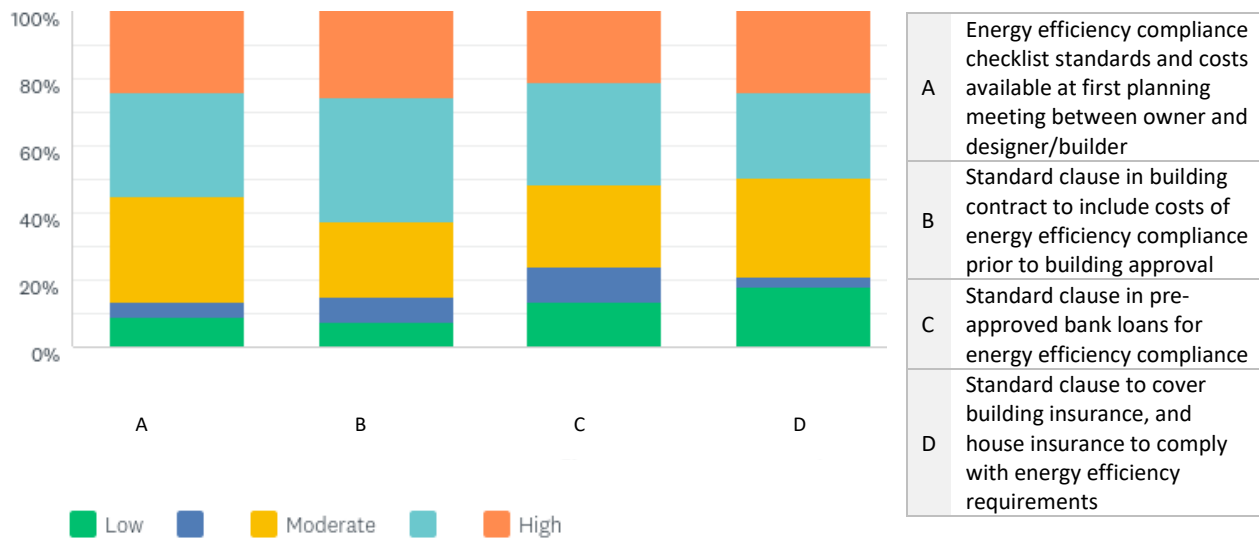


Analysis of Q22: (Note: This issue performed positively in Q16)

Affirmative Observations	<ul style="list-style-type: none"> All methods received over 65% of responses indicating they would be of greater than moderate use for training these people
Weighted Average Observations	<ul style="list-style-type: none"> All between 3.87 (Online training courses for CPD developed per profession) and 3.96 (On-site training for CPD points on product knowledge and installation) – fairly even
Negative Observations	<ul style="list-style-type: none"> 'Online courses for CPD developed per profession' had the most responses below moderate effectiveness
Recommendations	<ul style="list-style-type: none"> <i>On-site training for building products and installation and knowledge delivery</i>

Q23: Please rate the level of usefulness of the following methods for ensuring that energy efficiency compliance is identified and costed in all building contracts.

Graph 4.2-xvii: Usefulness of given methods for ensuring EE compliance is identified and costed in building contracts



Analysis of Q23: (Note: This issue performed positively in Q16)

Affirmative Observations	<ul style="list-style-type: none"> 'Standard clause in building contract to include costs of energy efficiency compliance prior to building approval' had the highest percentage of responses (over 60%) indicating above moderate usefulness in this issue
Weighted Average Observations	<ul style="list-style-type: none"> 'Energy efficiency compliance checklist standards and costs available at first planning meeting between owner and designer/builder' and 'Standard clause in building contract to include costs of energy efficiency compliance prior to building approval' both above 3.5 (by less than 0.2) Other two within 0.01 of 3.35 (Fairly even, but still with two distinct groups)
Negative Observations	<ul style="list-style-type: none"> 'Standard clause to cover building insurance, and house insurance to comply with energy efficiency requirements' and 'Standard clause in pre-approved bank loans for energy efficiency compliance' had the most responses of below moderate usefulness – the former with the most designated as low usefulness (at ~18%)
Recommendations	<ul style="list-style-type: none"> High % of responses want energy efficiency factored into building contract

4.3 – Survey Section 3: Systems and Tools

Recommendation Summary

Electronic Passport system

- Include products and installations
- Tablet or phone app
- Upload all materials documents specs and design
- Location look up for climate zones

An energy efficiency checklist / and rating assessment

- Inbuilding contract
- Prior to handover
- Post approval checking with variations occurring during the build period

Product verification system

- National data base of products and specifications
- Tagged system to ensure specified is supplied
- Verification for identifying energy products and materials and products substitution meets required standards

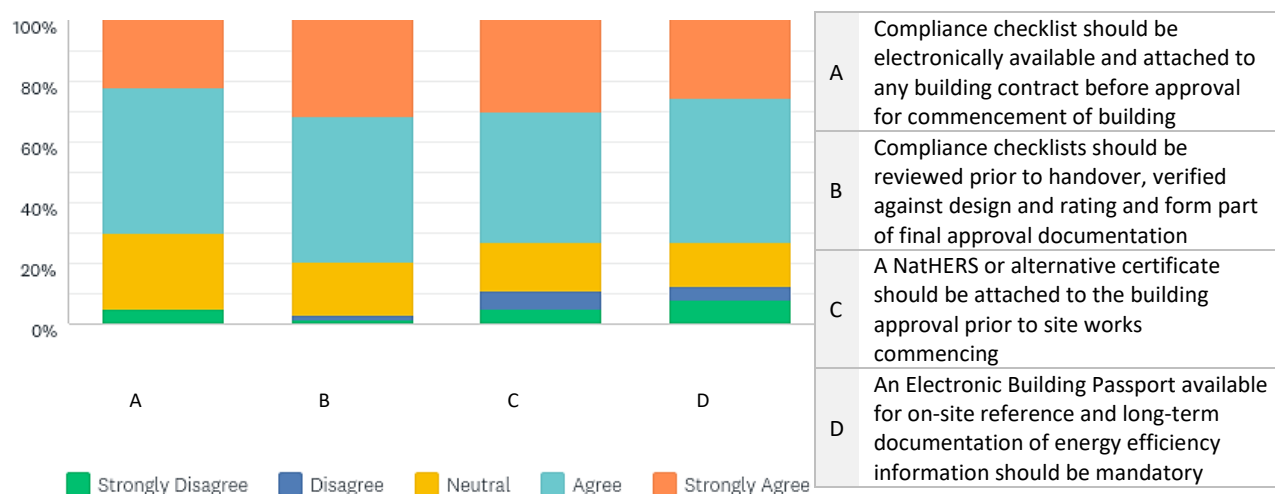
Table 4.3-i: Summary of recommendations for this section

Q. No.	Recommendations
Q24:	<ul style="list-style-type: none"> • Checklists and energy ratings certificates (possible electronic) to form part of the building contract and approved documentation • Compliance checklists should be available prior to handover
Q25:	<ul style="list-style-type: none"> • Energy efficiency Checklist in contract documents • Energy efficiency checklist as part of contract is strongly supported, • Not to tie builder into post occupancy performance as deemed unfair • Verification system for specified products to be developed which could be part of an electronic system
Q26:	<ul style="list-style-type: none"> • Ensure transparency in any strategies undertaken • EBP which includes verification system for products and installations should be further investigated and part of a phased in approach
Q27:	<ul style="list-style-type: none"> • Develop standard data collect checklist available to all home inspections via internet available through tablet or smart phone app • Make all (data) available via onsite based app or software • Must cover design, construct, as built, - (must) integrate across whole cycle • Integrate assessment with post approval checks to recalculate (energy efficiency) on site as current state of energy efficiency compliance
Q28:	<p>Develop EBP with all required functions and Include in EBP:</p> <ul style="list-style-type: none"> • Upload of materials documents, specs and design • Tagging systems of materials so know what has been supplied to tie into multiple checkpoints • Product and material verification system
Q29:	<ul style="list-style-type: none"> • An EBP should include <ul style="list-style-type: none"> ○ product's energy efficiency compliance documentation', followed by ○ 'show design energy efficiency compliance' and ○ 'verification system for identifying energy efficiency products and materials' • that support compliance with energy efficiency
Q30:	<ul style="list-style-type: none"> • Need a national data base of products and specification data base and substitution products for easy look up on site as part of EBP • Energy efficiency compliance requirement look up based on climate zone

Section 3. Systems and Tools – Raw Data and Analysis

Q24: To what extent do you agree or disagree with the following statements?

Graph 4.3-i: Extent of agreement with given statements

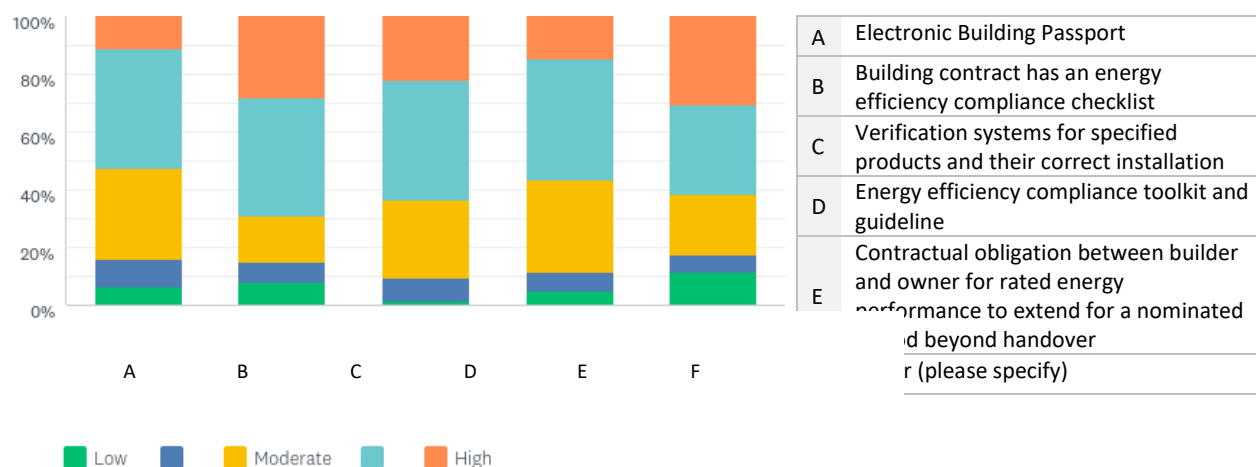


Analysis of Q24:

Affirmative Observations	<ul style="list-style-type: none"> All statements had over 70% of respondents at least agreeing 'Compliance checklists should be reviewed prior to handover, verified against design and rating and form part of final approval documentation' had the most strongly agreeing and least disagreeing (strongly or otherwise)
Weighted Average Observations	<ul style="list-style-type: none"> 'Compliance checklists should be reviewed prior to handover, verified against design and rating and form part of final approval documentation' had the highest WA at 4.06 All other options were above 3.75 – (fairly even)
Negative Observations	<ul style="list-style-type: none"> The statement 'An Electronic Building Passport available for on-site reference and long-term documentation of energy efficiency information should be mandatory' had the most respondents strongly disagree with it
Recommendations	<ul style="list-style-type: none"> <i>Checklists and energy ratings certificates (possible electronic) to form part of the building contract and approved documentation</i> Compliance checklists should be available prior to handover

Q25: How effective would the following systems and tools be for builders to ensure energy efficiency compliance?

Graph 4.3-ii: Effectiveness of given systems and tools for builders to ensure EE compliance



Analysis of Q25:

No.	Responses to 'Other'
1	What about the thousands of Owner/Builders with no overall contract?
2	Inspection is mandatory prior to occupancy in NSW - should be nation wide
3	Builders should be responsible for installation of any requirements
4	Need more information as to what these are
5	Penalty points for non-compliance
6	The electronic passport concept has appeal, but it feels throughout this survey that the energy efficiency performance of buildings and compliance of that component is being treated differently to the rest of the construction. This is not justified. Good builders build good product, poor builders cut corners all over. That's the issue
7	Builder has thermal/air infiltration test done prior to issue of OP/handover.

Affirmative Observations	<ul style="list-style-type: none"> 'Verification systems for specified products and their correct installation' had the least responses below moderate effectiveness 'Building contract has an energy efficiency compliance checklist' and 'Contractual obligation between builder and owner for rated energy performance to extend for a nominated period beyond handover' were seen as the most highly effective
Weighted Average Observations	<ul style="list-style-type: none"> 'Building contract has an energy efficiency compliance checklist' and 'Verification systems for specified products and their correct installation' had the highest WA which were within 0.01 of 3.75 'Electronic building passport' was the only one below 3.5
Negative Observations	<ul style="list-style-type: none"> 'Contractual obligation between builder and owner for rated energy performance to extend for a nominated period beyond handover' returned the most responses indicating that it would have a low effect in ensuring energy efficiency compliance
Recommendations	<ul style="list-style-type: none"> Energy efficiency Checklist in contract documents Energy efficiency checklist as part of contract is strongly supported, Not to tie builder into post occupancy performance as deemed unfair Verification system for specified products to be developed which could be part of an electronic system

Q26: How effective would the following tools be for regulators to ensure energy efficiency compliance?

Graph 4.3-iii: Effectiveness of given tools for regulators to ensure EE compliance



No.	Responses to 'Other'
1	Building License Rating system - based on audit results for build, quality energy efficiency shouldn't be seen in isolation from building best practice. If four different builders build the same house with different sub-contractors, you will get 4 different build qualities. Licences for new builders should be higher. They should be able to earn a different licence level with build quality.
2	Building Rules approval structure includes mandatory inspection and sign-off steps for energy efficiency elements, that have to be signed off before builders can proceed to the next construction stage
3	A certificate should be received by an accredited energy consultant on completed works
4	Need more information to form a view on this
5	Ability to apply penalty points for non-compliance

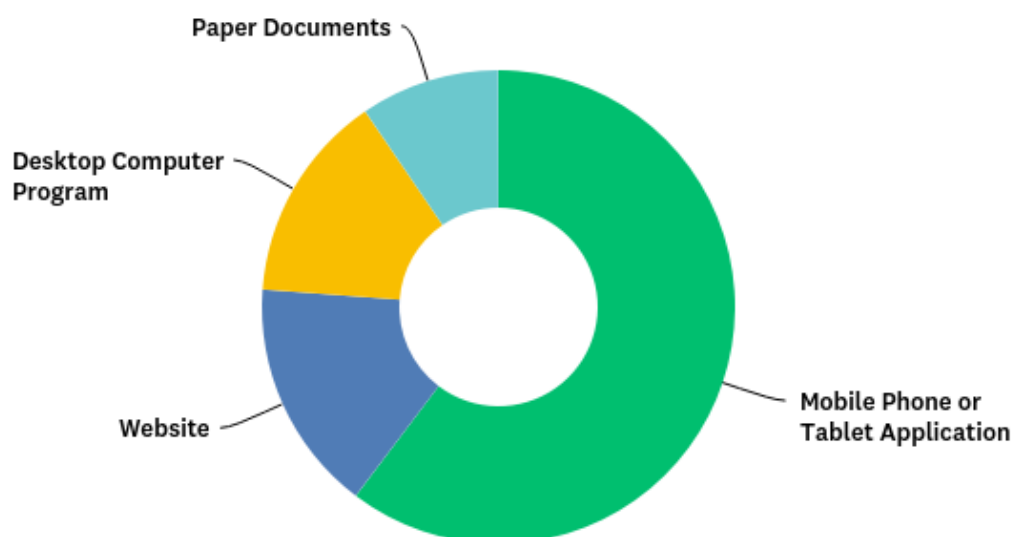
Analysis of Q26:

Affirmative Observations	<ul style="list-style-type: none"> All bar 'Energy efficiency compliance toolkit and guideline' were considered highly effective by at least 29% of respondents 'Electronic building passport', 'Building contract has an energy efficiency compliance checklist' and 'Verification systems for specified products and their correct installation' were all considered more than moderately effective by over 65% of respondents 'Verification systems for specified products and their correct installation' was considered to be of low effectiveness by the least number of respondents
Weighted Average Observations	<ul style="list-style-type: none"> 'Energy efficiency compliance checklist' was the only tool given a WA below 3.5 'EBP' and 'Verification systems for specified products and their correct installation' were the two highest (both within 0.02 of 3.85)
Negative Observations	<ul style="list-style-type: none"> 'Building contract has an energy efficiency compliance checklist' had the highest number of responses indicating it was of low effectiveness All bar 'EBP' and 'Verification systems for specified products and their correct installation' had over 10% of respondents say that they would be low on the effectiveness scale for this issue 'Energy efficiency compliance toolkit and guideline' had the lowest number of 'high effectiveness' responses
Recommendations	<ul style="list-style-type: none"> Ensure transparency in any strategies undertaken EBP which includes verification system for products and installations should be further investigated and part of a phased in approach

Note: EBP performed much better for regulators in Q26 than it did for builders in Q25.

Q27: What technology would you want a compliance tool to use (e.g. EBP, Compliance Checklist, product register, photographic evidence) to make it as effective as possible? (Select one only)

Graph 4.3-iv: Proportion of responses indicating the preferred technology for a compliance tool to use

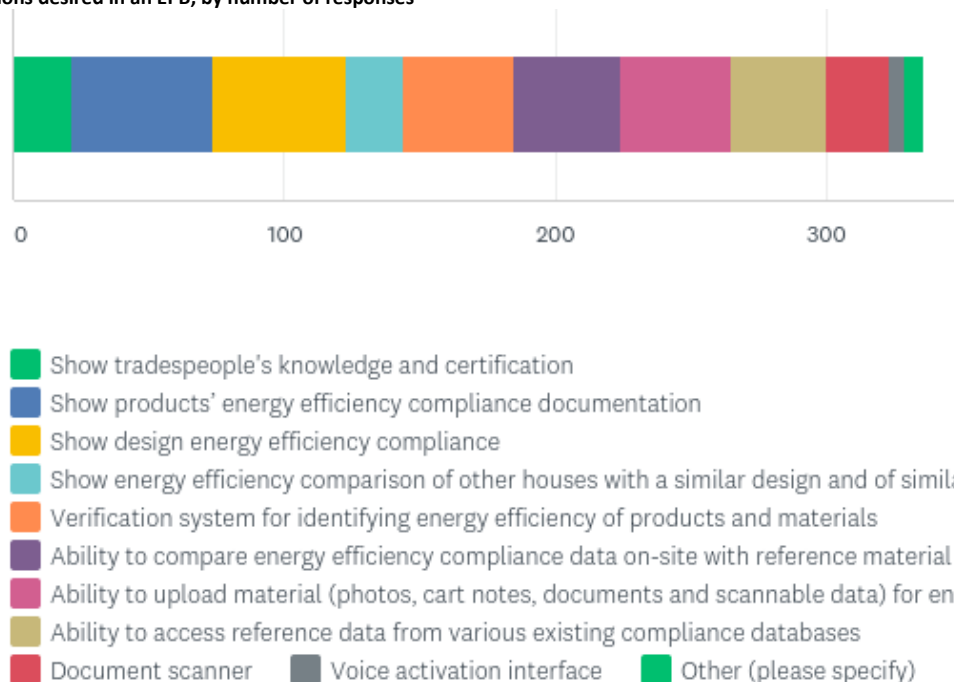


Analysis of Q27:

Affirmative Observations	<ul style="list-style-type: none"> • 'Mobile phone or tablet application' had over 60% of responses
Interesting Observations	<ul style="list-style-type: none"> • 'Website' and 'Desktop computer program' both had approximately 15% of responses each which is only 6% higher than for 'Paper documents' (which had 9%)
Negative Observations	<ul style="list-style-type: none"> • Paper had the least responses
Recommendations	<ul style="list-style-type: none"> • <i>Develop standard data collect checklist available to all home inspections via internet available through tablet or smart phone app</i> • <i>Make all (data) available via onsite based app or software</i> • <i>Must cover design, construct, as built, - (must) integrate across whole cycle</i> • <i>Integrate assessment with post approval checks to recalculate (energy efficiency) on site as current state of energy efficiency compliance</i>

Q28: Which of the following functions would you want an EBP to have, if one were to be created? (Select all that apply)

Graph 4.3-v: Functions desired in an EBP, by number of responses



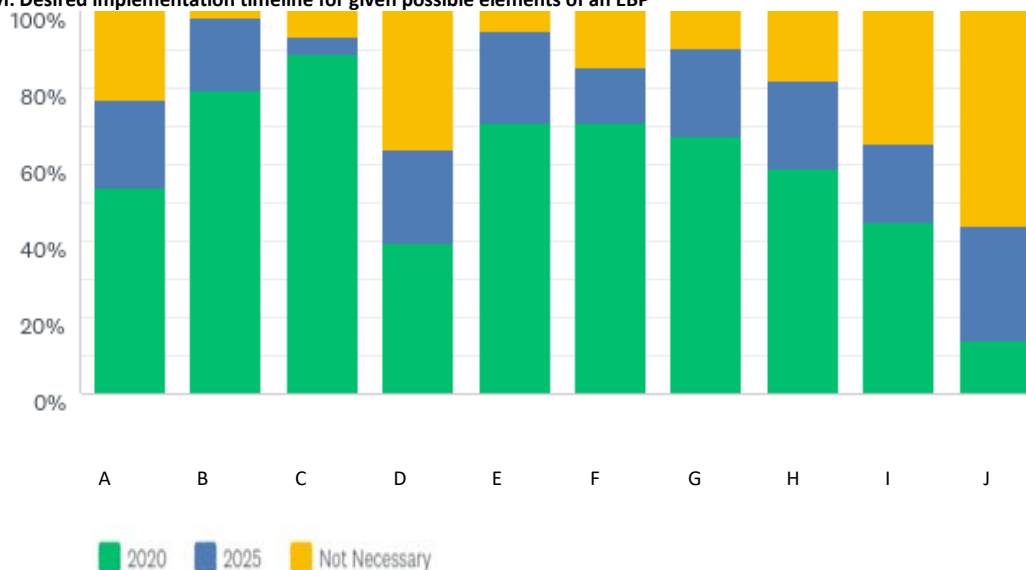
No.	Responses to 'Other'
1	Specification and Warranty information on products that affect energy efficiency rating and compliance
2	Access to smart meter data and analysis tools
3	This needs to be integrated into existing building permit processes, a separate EBP will not work unless this is a process that is integrated in to the whole BCA compliance process.
4	Have an accredited energy assessor sign off on a houses energy efficiency. Separate to PCA work
5	Need more info
6	An additional notes section
7	Mandatory checklist to enable issue of OP

Analysis of Q28:

Affirmative Observations	<ul style="list-style-type: none"> Top two responses were 'show product's energy efficiency compliance documentation' and 'Show design energy efficiency compliance' with over 75% of respondents indicating that they would want an EBP to have them Next highest grouping is 'verification system for identifying energy efficiency of products and materials', 'ability to compare energy efficiency compliance data on-site with reference material', 'ability to upload material for energy efficiency compliance...' and 'ability to access reference data from ... existing databases' which all received between 55-65% of respondents' approval
Interesting Observations	<ul style="list-style-type: none"> 11% had an 'other' response – check
Negative Observations	<ul style="list-style-type: none"> Options not mentioned above or below had around 35% of respondents wanting them 'Voice activation' had by far the least amount of responses
Recommendations	<p><i>Develop EBP with all required functions and Include in EBP</i></p> <ul style="list-style-type: none"> Upload of materials documents, specs and design Tagging systems of materials so know what has been supplied to tie into multiple checkpoints Product and material verification system

Q29: If an EBP was to be created, by which year do you believe the following elements should be implemented?

Graph 4.3-vi: Desired implementation timeline for given possible elements of an EBP



A	Show tradespeople's knowledge and certification	F	Ability to compare energy efficiency compliance data on-site with reference material
B	Show products' energy efficiency compliance documentation	G	Ability to upload material (photos, cart notes, documents and scannable data) for energy efficiency compliance into a national database system on-site or remotely
C	Show design energy efficiency compliance	H	Ability to access reference data from various existing compliance databases
D	Show energy efficiency comparison of other houses with a similar design and of similar size and climate-zone location	I	Document scanner
E	Verification system for identifying energy efficiency of products and materials	J	Voice activation interface

Analysis of Q29:

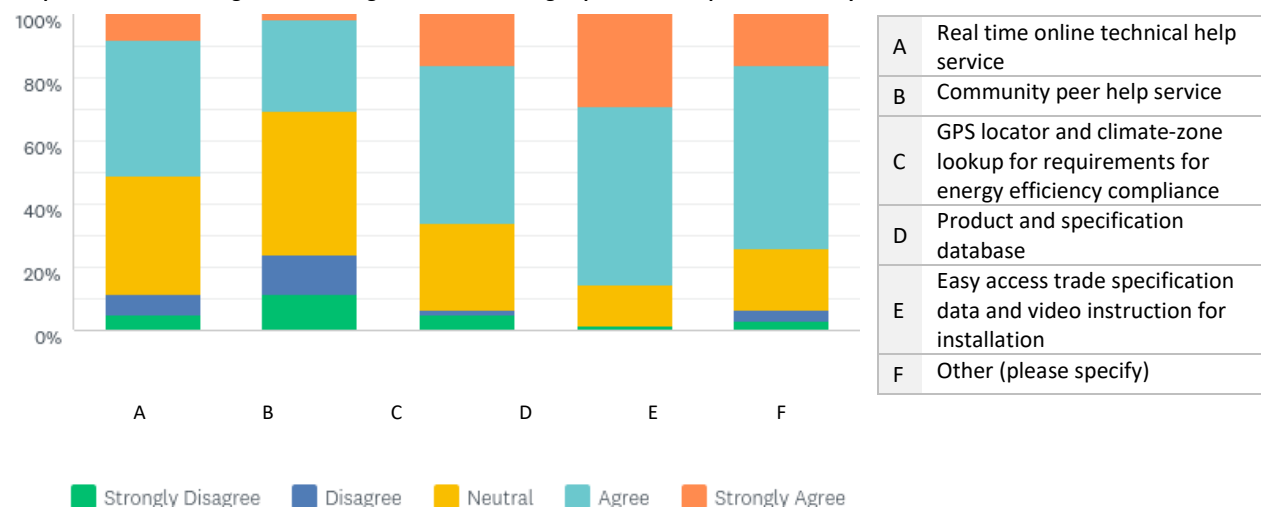
Observations for 2020	<ul style="list-style-type: none"> 'Show design energy efficiency compliance' had over 85% of responses stating it should be implemented by 2020 Closely followed by 'Show product's energy efficiency compliance documentation' with ~80% 'Document scanner', 'voice activation interface' and 'show energy efficiency comparison of other houses with a similar design, size and climate-zone location' were viewed as the least necessary to be implemented by 2020
Observations for 2025	<ul style="list-style-type: none"> Two lowest elements to be implemented by this year both had over 70% of their responses in the 2020 category Only 'Voice activation interface' had more than 25% of its responses stating it should be implemented by 2025 This basically means that for the necessary elements, if it hasn't been done by 2020, it should then be done in 2025
Observations on necessity	<ul style="list-style-type: none"> 'Voice activation interface' had by far the most amount of responses (over 50%) indicating that it is not necessary, followed by 'Document scanner' and 'show energy efficiency comparison of other houses with a similar design, size and climate-zone location' 'Show product's energy efficiency compliance documentation', 'show design energy efficiency compliance' and 'verification system for identifying energy efficiency products and materials' were deemed the least unnecessary
Interesting observations?	<p>Based on the above:</p> <ul style="list-style-type: none"> Top three priorities are: 'Show product's energy efficiency compliance documentation', followed by 'show design energy efficiency compliance' and 'verification system for identifying energy efficiency products and materials' Lowest three priorities are 'voice activation interface', 'document scanner' and 'show energy efficiency comparison of other houses with a similar design, size and climate-zone location'

Analysis of Q29:

- | | |
|-----------------|--|
| Recommendations | <ul style="list-style-type: none">• <i>An EBP should include the following elements that support compliance with energy efficiency</i><ul style="list-style-type: none">○ <i>product's energy efficiency compliance documentation, followed by</i>○ <i>show design energy efficiency compliance and</i>○ <i>verification system for identifying energy efficiency products and materials</i> |
|-----------------|--|

Q30: To what extent do you agree or disagree that the following elements should be implemented as part of an EBP or other compliance guideline/toolkit?

Graph 4.3-vii: Extent of agreement with given elements being implemented as part of an EBP system



No.	Responses to 'Other'
1	Online technical help or peer help will never work
2	Statement that the insulation installation photographed remained in the building and was not removed
3	Mandatory checklist for issue of OP

Analysis of Q30:

Affirmative Observations	<ul style="list-style-type: none"> Over 80% at least agreed that a 'product and specification database' should be a part of a compliance guideline/toolkit or EBP – This element also had the highest response of 'strongly agree' of all the options and the lowest disagree (strongly included) response. Over 65% at least agreed that a 'GPS locator and climate-zone lookup for requirements for energy efficiency compliance function and 'Easy access trade specification data and video instruction for installation' should be implemented in the desired tool/system
Weighted Average Observations	<ul style="list-style-type: none"> 'Community peer help service' had the lowest WA which was below 3 'Product and specification database' had the highest WA with 4.11 'Real time online technical help service' was the only remaining element to have a WA below 3.5
Negative Observations	<p>This clearly shows that the positive and negative observations are strong</p> <ul style="list-style-type: none"> 'Community peer help service' had the lowest responses of strong agreement and agreement, and the highest responses of disagreement and strong disagreement
Recommendations	<ul style="list-style-type: none"> Need a national data base of products and specification data base and substitution products for easy look up on site as part of EBP Energy efficiency compliance requirement look up based on climate zone

4.4 – Survey Section 4: Regulations

Recommendation Summary

Summary of recommendations for Section 4: Regulations

Building design approval process

- Energy efficiency explicitly laid out on plans prior to building contract approval
- Energy efficiency certification checked and provide prior to handover
- National guidelines for energy efficiency
- Independent assessment system

Audit

- Mandated by legislation – construction and pre-occupancy
- Assessors doing EE compliance and ratings
- Installed building products and materials
- Trades people

Non-Compliance: Develop non-compliance approach as a national system

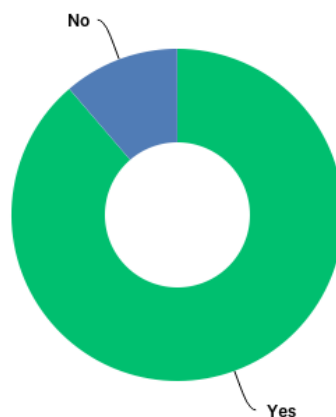
Table 4.4-i: Summary of recommendations for this section

	Recommendation
Q31:	<ul style="list-style-type: none"> • There should be greater regulations for energy efficiency compliance for new houses • Regulation may assist the industry to integrate and pull together to deliver energy efficiency compliance
Q32:	<ul style="list-style-type: none"> • Energy efficiency explicitly outlined on plans prior to building contract approval • Energy efficiency certification checked and provide prior to handover • Role of the financial institutions approval for loans and legal liabilities need further discussion and input and consensus about their role in energy efficiency compliance if at all
Q33:	<ul style="list-style-type: none"> • Energy efficiency requirements outlined on plans ... for building approval' NOW • Energy efficiency compliance referenced in a standard building contract' NOW • 'Mandating energy efficiency audits during the building cycle' and 'Pre-occupancy energy efficiency rating verified': 2020 or earlier
Q34:	<ul style="list-style-type: none"> • <i>Mandated by regulation/ legislation</i> • <i>Audit individual doing energy assessment (using all compliance methods)</i> • <i>Legislate for as built mandatory inspection e.g. California</i> • <i>Systems to verify product specifications as built</i> • <i>Self-regulation reporting not seen as effective</i>
Q35:	<ul style="list-style-type: none"> • <i>Regular auditing and program for all stakeholders</i> • First 2 areas for auditing should include <ul style="list-style-type: none"> ○ energy efficiency assessors ○ Installed building products and materials
Q36:	<ul style="list-style-type: none"> • <i>Post occupancy follow up over years</i> • Audits should occur during construction and at pre-occupancy
Q37:	<ul style="list-style-type: none"> • <i>Over 80% (moderate to high) viewed auditing of tradesperson as justified supported</i> • Increasing transparency of work done by industry needs further unpacking to understand what this means and how this could be achieved
Q38:	<ul style="list-style-type: none"> • <i>Opportunity to provide guidance on how to deal with non-compliance</i> • <i>Introduce strategies to identify non-compliance early</i> • <i>Get people talking about compliance</i> • <i>Make repercussions of non-compliance meaningful i.e. no occupancy permit</i> • Development of a non-compliance approach as a national system
Q39:	<ul style="list-style-type: none"> • <i>Inspect prior – suggest pre-plaster</i> • In developing a potential national non-compliance response system consideration should be given to pre-handover checklists and no handover until compliance is reached
Q40:	<ul style="list-style-type: none"> • Develop a national independent assessment system and accreditation system of energy efficiency compliance
Q42:	<ul style="list-style-type: none"> • Develop national consistent guidelines for energy efficiency

Section 4. Regulations – Raw Data and Analysis

Q31: “Greater regulation of energy efficiency compliance would help to provide a constructive environment for industry and compliance assessors to work together on improving energy efficiency compliance for new houses.” Do you personally agree with this statement?

Graph 4.4-i: Agreement with above statement

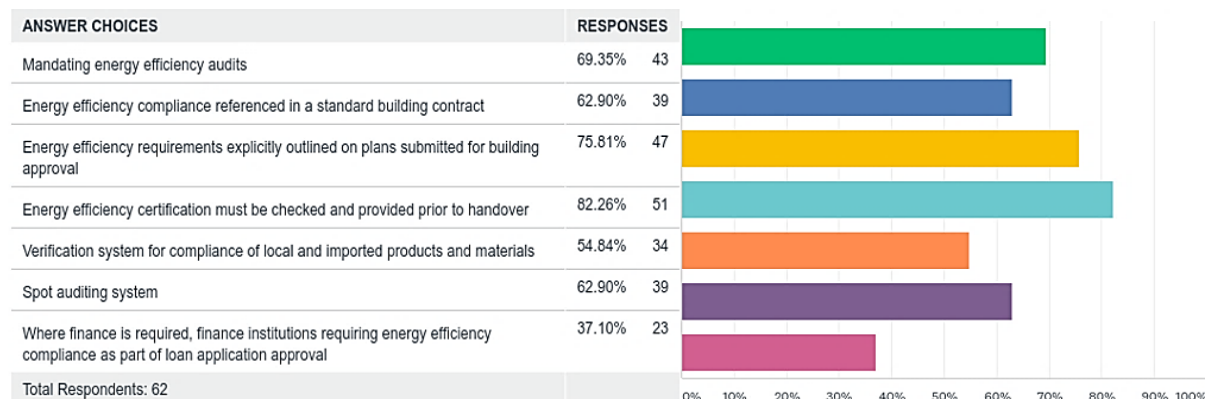


Analysis of Q31:

Affirmative Observations	<ul style="list-style-type: none"> • ‘Yes’ was the winner by far
Interesting Observations	<ul style="list-style-type: none"> • Majority are on board with extra regulation – this should inform the rest of the answers to this section
Recommendations	<ul style="list-style-type: none"> • There should be greater regulations for energy efficiency compliance for new houses • Regulation may assist the industry to integrate and pull together to deliver energy efficiency compliance

Q32: Which of the following regulatory actions would effectively assist in energy efficiency compliance? (Select all that apply)

Graph 4.4-ii: Percentage of responses indicating the given regulatory actions would effectively assist in EE compliance

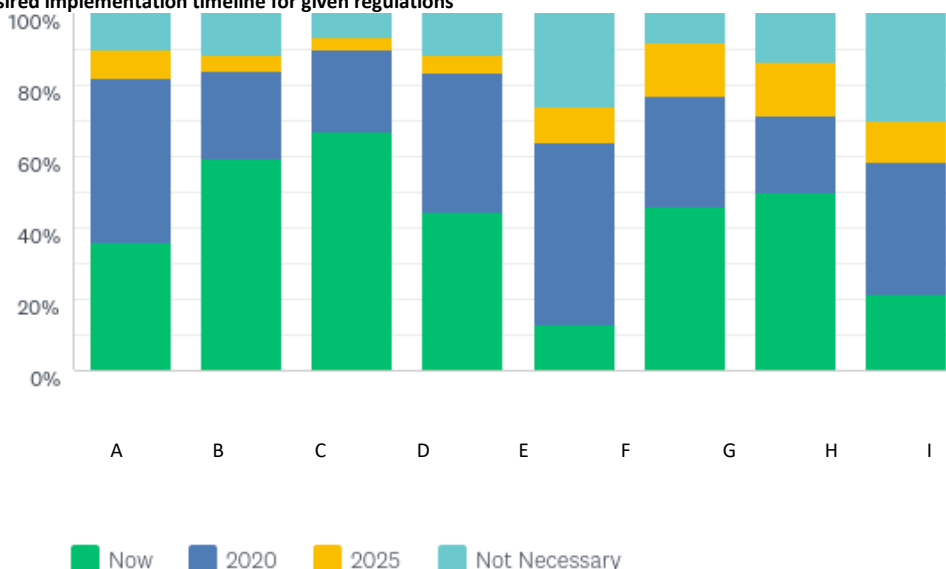


Analysis of Q32:

Affirmative Observations	<ul style="list-style-type: none"> Energy efficiency: 'certification being checked and provided prior to handover' and 'Energy efficiency requirements explicitly outlined on plans submitted for building approval', both received over 75% of responses
Interesting Observations	<ul style="list-style-type: none"> The three parts of enhancing compliance seemed critical through the whole process of design, during construction and at completion were the three highest scores.
Negative Observations	<ul style="list-style-type: none"> "Only" 37% said that 'Where finance is required, finance institutions requiring energy efficiency compliance as part of loan application approval' would be effective – the lowest of all options
Recommendations	<ul style="list-style-type: none"> Energy efficiency explicitly outlined on plans prior to building contract approval Energy efficiency certification checked and provide prior to handover Role of the financial institutions approval for loans and legal liabilities need further discussion and input and consensus about their role in energy efficiency compliance if at all

Q33: If recommended and if agreed, by which year do you believe the following regulations should be implemented:

Graph 4.4-iii: Desired implementation timeline for given regulations



A	Mandating energy efficiency audits during the building cycle	F	Verification system for compliance of local and imported products and materials
B	Energy efficiency compliance referenced in a standard building contract	G	Spot auditing system
C	Energy efficiency requirements explicitly outlined on plans submitted for building approval	H	Where finance is required, finance institutions requiring energy efficiency compliance as part of loan application approval
D	Pre-occupancy energy efficiency rating verified	I	Other regulation (please specify regulation and a year)
E	Post-occupancy follow-up at a nominated period beyond handover		

No.	Responses to 'Other regulation (Please specify regulation and year)'
1	Blower door test results to pass minimum standard e.g. 10m3/m2.h@50pa prior to issue of occupancy certificate
2	Accredited energy assessor responsible for work outside of the PCA role.
3	Reporting of non-compliance attached to licensee and publicly available
4	For the record – I see abundant plans in NSW that are well plan marked/labelled with energy efficiency requirements under the BASIX scheme - always room for improvement but wherever the survey states "Energy efficiency requirements explicitly outlined on plans submitted for building approval" – I just say – it's almost standard already for single dwells in NSW and has been for some years – this does not mean "built as promised" – which is of course a national issue
5	Mandatory checklist for issue of OP – now

Analysis of Q33:

Observations for Now	<ul style="list-style-type: none"> 'Energy efficiency requirements explicitly outlined on plans submitted for building approval' is a high priority given 67% of respondents said it should be implemented now Next most prevalent is 'energy efficiency compliance referenced in a standard building contract' with 59% of respondents putting it in this timeframe 'Post-occupancy follow-up at a nominated period beyond handover' is the lowest priority for right now (only 13% of responses in this timeframe), followed by 'Where finance is required, finance institutions requiring energy efficiency compliance as part of loan application approval' The remaining 3 ranged between 36% approval for immediate implementation (Mandating energy efficiency audits during the building cycle) and around 48% for the other two
Observations for 2020	<ul style="list-style-type: none"> 'Post-occupancy follow-up at a nominated period beyond handover' had the highest (50%) percentage of responses for action by 2020, likely due to its very low 'immediate action' response count First four options had at least 80% of their responses for 2020 or earlier

Observations for 2025	<ul style="list-style-type: none"> Of the last four options, 'Verification system for compliance of local and imported products and materials' and 'spot auditing system' had the largest percentages of responses for implementation by this time
Observations on Necessity	<ul style="list-style-type: none"> 'Energy efficiency requirements explicitly outlined on plans submitted for building approval' had the least number of 'Not necessary' responses 'Post-occupancy follow-up' and 'Where finance is required, finance institutions requiring energy efficiency compliance as part of loan application approval' had the highest number of 'Not necessary' responses – so they are clearly the lowest priorities
Recommendations	<ul style="list-style-type: none"> Energy efficiency requirements outlined on plans ... for building approval' NOW Energy efficiency compliance referenced in a standard building contract' NOW 'Mandating energy efficiency audits during the building cycle' and 'Pre-occupancy energy efficiency rating verified': 2020 or earlier

Q34: Which of the following auditing approaches do you believe would best serve energy efficiency compliance across the following areas?

Graph 4.4-iv: Percentage of responses indicating the auditing approach which best serves EE compliance across the given areas

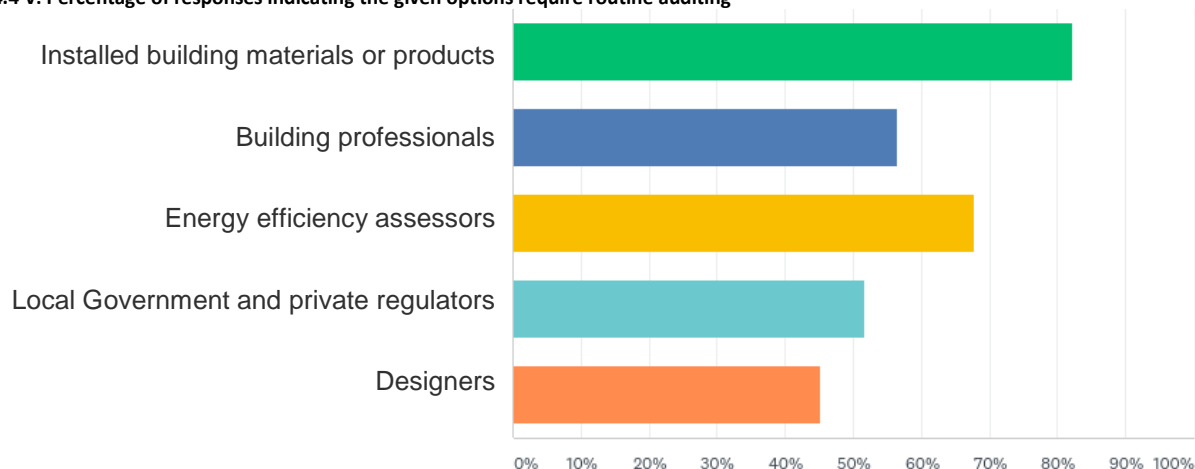


Analysis of Q34:

Affirmative Observations	<ul style="list-style-type: none"> For all the given areas 'Routine external auditing and inspections' took over 40% of responses The only case where this was not the most popular approach was for 'Energy efficiency assessors' who had 2% more responses for 'Independent spot auditing/inspection process' Other than the aforementioned area, 'Independent spot auditing/inspection process' received between 32% to 41% of the responses
Interesting Observations	<ul style="list-style-type: none"> Regulatory professionals had the highest responses in the 'self-regulated reporting' category – understanding why that is needs further investigation
Negative Observations	<ul style="list-style-type: none"> Based on these responses 'Self-regulated reporting' is 2-4 times less likely to best serve these auditing areas than the next nearest approach – so it is not widely viewed by regulators as an effective approach
Recommendations	<ul style="list-style-type: none"> Mandated by regulation/ legislation Audit individual doing energy assessment (using all compliance methods) Legislate for as built mandatory inspection e.g. California Systems to verify product specifications as built Self-regulation reporting not seen as effective

Q35: Which of the following do you believe should have routine energy efficiency compliance audits? (Select all that apply)

Graph 4.4-v: Percentage of responses indicating the given options require routine auditing

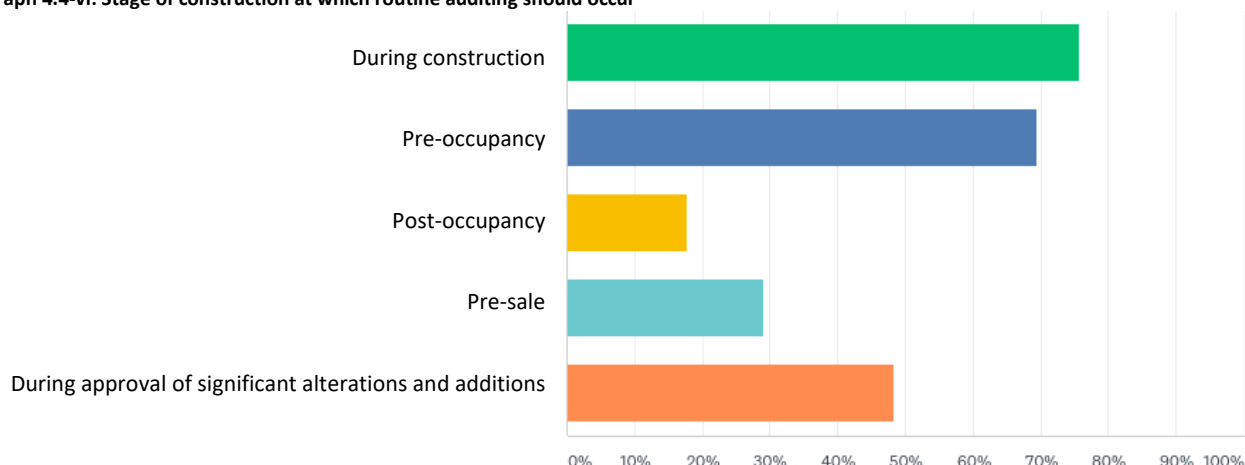


Analysis of Q35:

Affirmative Observations	• 'Installed building materials or products' and 'energy efficiency assessors' both had over 65% of responses indicating they should have routine audits
Interesting Observations	• Interesting that assessors needed auditing more than building professionals
Negative Observations	• The lowest number of responses belonged to 'designers' who were the only audit candidates to receive less than 50% of responses in favour of routine audits
Recommendations	<ul style="list-style-type: none"> • <i>Regular auditing and program for all stakeholders</i> • First 2 areas for auditing should include <ul style="list-style-type: none"> ○ energy efficiency assessors ○ Installed building products and materials

Q36: If guidelines or regulations were introduced for routine auditing for energy efficiency compliance for houses, when should they occur? (Select all relevant)

Graph 4.4-vi: Stage of construction at which routine auditing should occur

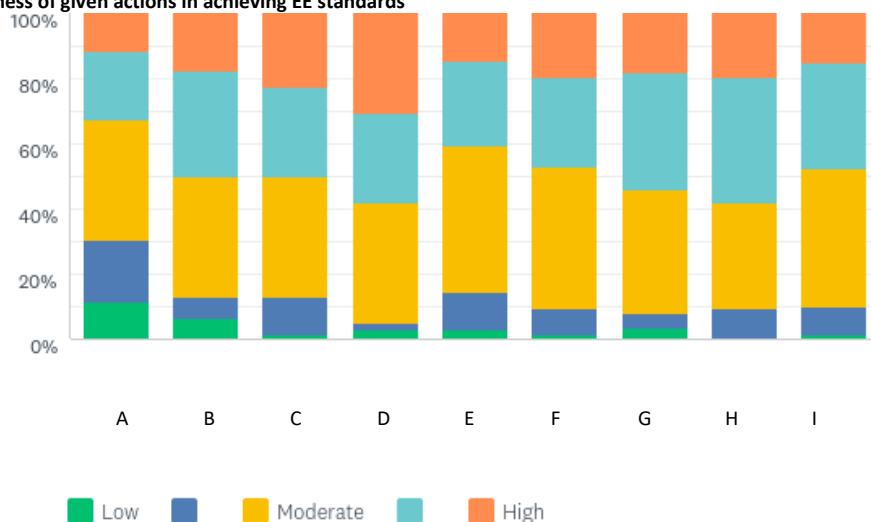


Analysis of Q36:

Affirmative Observations	• 'During construction' and 'pre-occupancy' were most selected
Interesting Observations	• Strong support for auditing during construction and pre-occupancy.
Negative Observations	• 'Post-occupancy' and 'pre-sale' were viewed as the worst times for routine audits
Recommendations	<ul style="list-style-type: none"> • <i>Post occupancy follow up over years</i> • Audits should occur during construction and at pre-occupancy

Q37: As a regulator please rate the level of usefulness of the following actions in achieving energy efficiency standards:

Graph 4.4-vii: Usefulness of given actions in achieving EE standards



A	Increased auditing of designers	F	Increased transparency of designers and specifiers of products and systems, through access to verified compliance data
B	Increased auditing of building industry and tradespeople	G	Increased transparency of building industry and tradespeople through access to verified compliance data
C	Increased auditing of energy efficiency assessors	H	Increased transparency of data associated with energy efficiency assessors (such as skills, experience, CPD points)
D	Increased auditing of products and materials	I	Increased transparency of regulators' decision making
E	Increased auditing of regulators	J	Other (please specify)

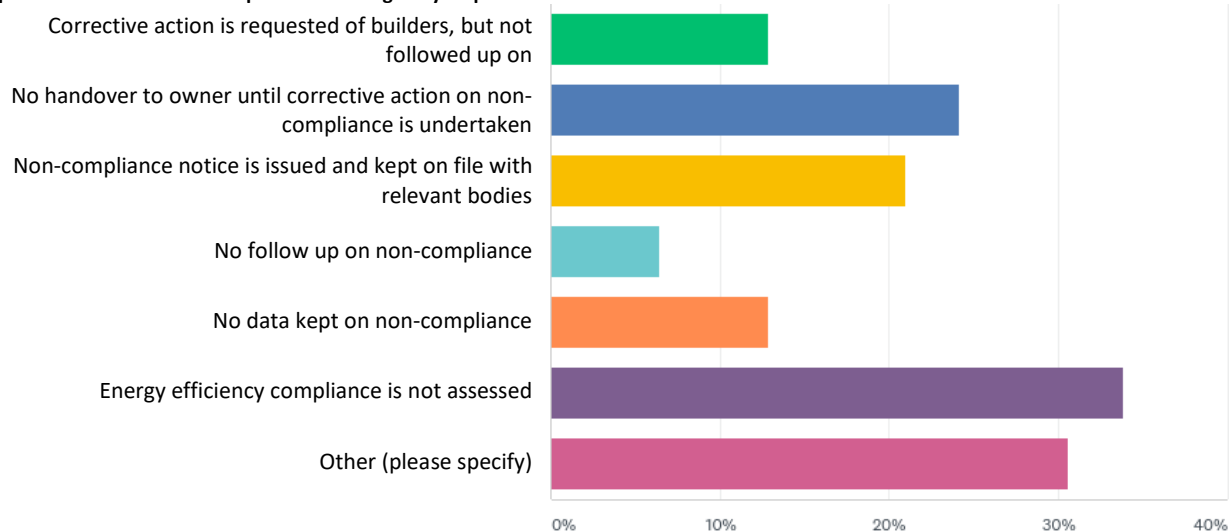
No.	Responses to 'Other'
1	Apply resources to maintain standards in: design (specification), and products and systems (performance), and regulation (compliance) along with spot audits on practitioners (competencies) who can be held legally responsible (accountability).
2	NatHERS is a scheme - not just the software. It also includes standard data entry procedures and assumptions, Training (Certificate IV) & assessor Accreditation, and the NatHERS Universal Certificate for uniform reporting and assessor transparency.
3	Can't rate - I'm not a regulator
4	Energy Assessors schemes currently under resourced. Very variable standards. Some excellent some very poor. I see clear gaming and poor practice all the time. difficult to establish degree of collusion occurring between assessors and designers - but for sure it's out there.

Analysis of Q37:

Affirmative Observations	<ul style="list-style-type: none"> 'Increased auditing of products and materials' had the most responses indicating that it was of high usefulness in this issue, and lowest responses indicating less than moderate use
Weighted average Observations	<ul style="list-style-type: none"> 'Increased auditing of designers' had the lowest WA (3.02) Highest three were 'Increased auditing of products and materials', 'Increased transparency of building industry and tradespeople through access to verified compliance data', and 'Increased transparency of data associated with energy efficiency assessors (such as skills, experience, CPD points)' all above 3.6
Negative Observations	<ul style="list-style-type: none"> 'Increased auditing of designers' had the highest number of responses indicating less than moderate and low usefulness in achieving energy efficiency standards, and least amount indicating above moderate and high usefulness
Recommendations	<ul style="list-style-type: none"> Over 80% (moderate to high) viewed auditing of tradesperson as justified and supported Increasing transparency of work done by industry needs further unpacking to understand what this means and how this could be achieved

Q38: How do you currently manage energy efficiency non-compliance? (Select all that apply)

Graph 4.4-viii: How EE non-compliance is managed by respondents



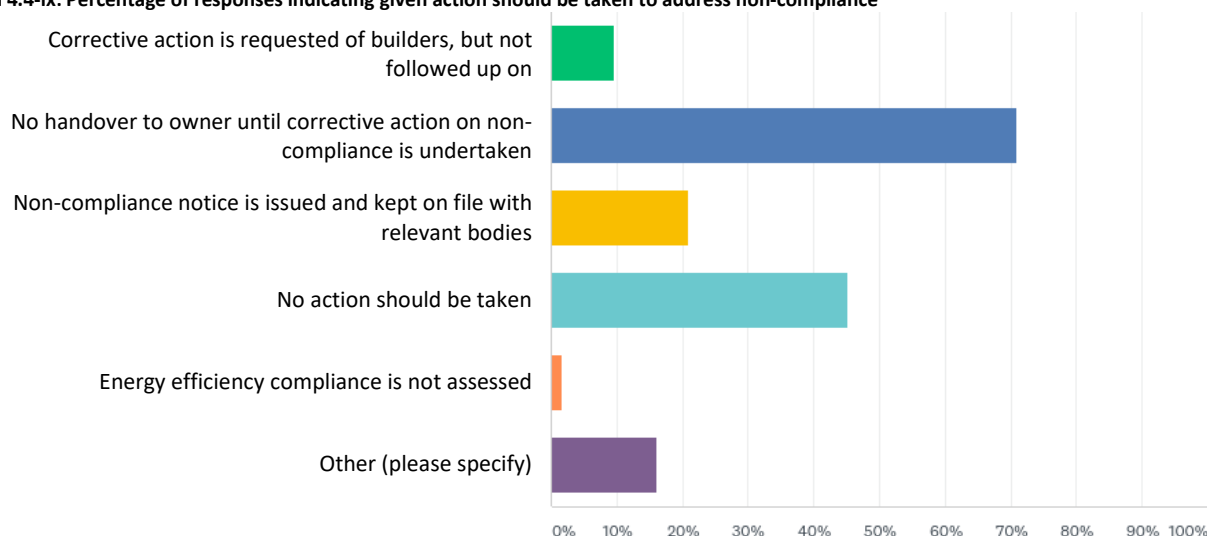
No.	Responses to 'Other'
1	Compliance is triggered through private certification and consumer complaints. The question as to whether verified manufacturer's systems have been properly installed, when completed and concealed, may not be raised or not known. If detected, non-compliance is the builder's responsibility and if not, corrected home warranty insurance can be applied to rectify the work and charge the builder accordingly. Further the builder is subject to a permanent record on their licence, licenced demerit points and infringement penalties. In addition, the private certifier can be held professionally accountable for failing to identify non-compliance.
2	I only review NatHERS reports at the planning phase
3	Reassessment and retrofit/additional methods to achieve compliance when alterations made during construction
4	There is no mandated requirement to inspect, if it were mandated then it would need to be adequately funded as most council resources in SA are stretched in meeting current mandatory requirements
5	We operate at the Planning stage and do not have the resources to currently conduct follow up audits with every development, however some investigations have taken place. Any issues can be dealt with by Planning Compliance team involving a standard fines and notices of non-compliance.
6	In Victoria, Directions to Fix and Building Notice and Orders are used for matters of non-compliance with the building approval
7	Stop work notice issued following on-site inspection By Local Government
8	Corrective action is requested, and Occupation certificates not issued until correction occurs (as per NSW BASIX requirements)
9	Addressed at Certification stage.
10	We request corrective action and make note on plans or keep on file
11	Minimal follow-up only if a complaint is issued
12	correspond directly with development proponent (never the owner, always the designer or energy rater) when plans not marked properly
13	Certification by installers statement from the builder
Responses of "N/a" or equivalent: 6	

Analysis of Q38:

Affirmative Observations	• 'No follow up on non-compliance' is quite low
Interesting Observations	• High 'Other' – check responses
Negative Observations	• 'Energy efficiency compliance is not assessed' is highest!
Recommendations	<ul style="list-style-type: none"> • Further research and work may be required to understand why this is the case • <i>Opportunity to provide guidance on how to deal with non-compliance</i> • <i>Introduce strategies to identify non-compliance early</i> • <i>Get people talking about compliance</i> • <i>Make repercussions of non-compliance meaningful i.e. no occupancy permit</i> • <i>Development of a non-compliance approach as a national system</i>

Q39: Assuming energy efficiency compliance is checked, what action(s) should be taken to address non-compliance? (Select all that apply)

Graph 4.4-ix: Percentage of responses indicating given action should be taken to address non-compliance



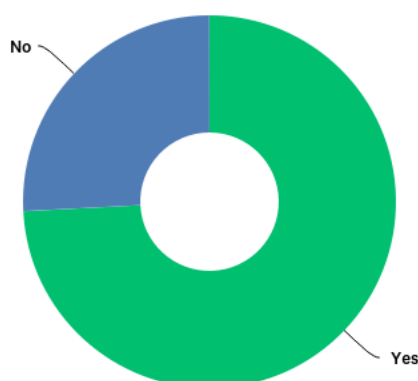
No.	Responses to 'Other'
1	Compliance is triggered through private certification and consumer complaints. The question as to whether verified manufacturer's systems have been properly installed, when completed and concealed, may not be raised or not known. If detected, non-compliance is the builder's responsibility and if not, corrected home warranty insurance can be applied to rectify the work and charge the builder accordingly. Further the builder is subject to a permanent record on their licence, licenced demerit points and infringement penalties. In addition, the private certifier can be held professionally accountable for failing to identify non-compliance.
2	Builder is charged the holding cost of the property until rectified.
3	Stop work notice issued by local Govt, and lifted once the changes have been made.
4	As mentioned in Q38. Occupation certificate is withheld, as required under BASIX.
5	Same enforcement as any other non-compliance
6	Don't know
7	Possible licence suspension until measures restored
8	The issue in the industry is there is no effective compliance method and so there is no identification of defects and so no follow up
9	Occupation certificate not released until rectified. This is exactly how the system is designed to operate in NSW and is set up to do so. Your use of 'handover' above presumably means o.c.? We should not be introducing new layers of red tape - just make the existing system work as it should via proper resourcing
10	Hold issue of OP may be tenuous (depends on whether relates to suitability to occupy?)

Analysis of Q39:

Affirmative Observations	<ul style="list-style-type: none"> • 'No handover to owner until corrective action on non-compliance is undertaken' is highest • Low responses for 'No action should be taken' and 'corrective action requested of builders, but not followed up on'
Negative Observations	<ul style="list-style-type: none"> • n/a
Recommendations	<ul style="list-style-type: none"> • <i>Inspect prior – suggest pre-plaster</i> • In developing a potential national non-compliance response system consideration should be given to pre-handover checklists and no handover until compliance is reached

Q40: Do we need independent assessment of energy efficiency compliance from the design phase through to the handover phase?

Graph 4.4-x: Proportion of responses to Q40



No.	Responses to the 'Further comments to support answer' section
1	Commercial pressures, poor management and undue influences without independent assessment can result non-compliance and undetectable concealed work. Theoretically the licenced designer, the trade contractor, the builder and the private certifier (building surveyor) can have their licence to trade suspended or cancelled due to serious negligence. In practice, there will be cases where the designer underspecifies building systems, the supplier delivers underspecified products, the builder projects are under supervised, trade contractors apply repetitive work competing to meet targets, building certifiers (surveyors) maybe overly dependent on certificates of performance are at risk of being under remunerated, while home owners may be overwhelmed by the experience. Therefore, work constructed in-situ (not prefabricated) will need a degree of independent assessment.
2	Trained and licensed assessors only do assessments
3	Most design when done, is Ok and usually built correctly. It is after that the Owner stuffs everything up, so a 12-month audit is good.
4	But this has to be undertaken by accredited energy rating assessors
5	Presently no checks are made, and builders just sign that they did the right thing, which isn't proven
6	Yes, but in the case of energy raters, designers and regulators regular audits should be adequate
7	This would be too hard to manage and difficult to enforce current bathers ok for design build to be reviewed at designated check points
8	We have undertaken some research into this in partnership with the VBA, and recommend that this occur on a semi-regular basis for every council.
9	Essential for green star projects
10	Yes, carried out by Local Government Building Surveyors as they have regulatory authority.
11	In NSW under BASIX, assessment is conducted at approval and pre-occupancy stages with relative success. further assessment at point-of-sale would ensure maintenance of measures, and encourage upgrade of existing stock
12	To avoid corruption, and to improve transparency
13	Current regulatory provisions adequately cover design, assessment and approval
14	Should be a standard part of the process
15	So long as effective assessment occurs prior to occupancy, may not be necessary for assessment throughout cycle

No.	Q40. Do we need independent assessment of energy efficiency compliance from the design phase through to the handover phase? – Responses to the 'Further comments to support answer' section
16	Building inspectors should be including energy efficiency compliance as part of the inspection regime they are required to undertake
17	It appears funding would be better targeted, to improve compliance outcomes, by focussing on verification at the end of the process, to ensure 'as-built' outcomes.
18	Well, it depends. We shouldn't NEED to, but many instances where figures are massaged, and components are either not installed or installed incorrectly has led me to say yes.
19	I feel that having assessments supplied by "In house assessors" is increasing the risk of under-performing homes being built
20	But only until product is installed.
21	There have been some cases where energy efficiency ratings are not accurate. Particularly builders and designers should not be able to do their own ratings as there is such variability in the software that if an item is changed then it can have a big impact on the rating and can be hard to determine what parameters were used in the modelling.
22	To ensure that design rating is followed through to as-built stage and compliance is still met
23	The industry self-regulation isn't working, hence the NEEBP project.
24	Independent accredited assessors separate to the PCA process
25	This is a very loaded question:) What format and who is doing it?
26	Only using accredited assessors
27	If this doesn't happen, the owner is unlikely to move into an 'as rated' house.
28	As before - we need the existing system to be properly resourced, audited ...not new systems
29	Can use current check and inspection system by educating the inspectors and certifiers more. In states with no on-going inspection. Yes, an inspection process should be introduced.
30	Prior to occupancy e.g. thermal testing, pressure testing for infiltration etc.

Analysis of Q40:

Affirmative Observations	• ~75% say yes
Interesting Observations	• n/a
Negative Observations	• ~25% say no
Recommendations	• Develop a national independent assessment system and accreditation system of energy efficiency compliance
PD/JD	

Q41. Are there any simple effective non-regulatory actions that could be adopted quickly by industry to enhance energy efficiency compliance?

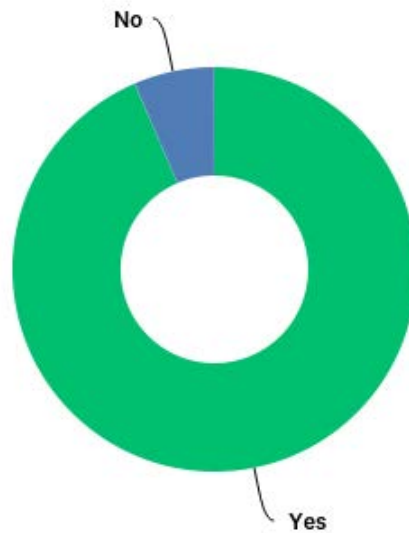
No.	Responses
1	<ul style="list-style-type: none"> • Best practice guidelines and checklists. • Demonstration homes.
2	While there is a market for private energy assessors who certify building energy efficiency standards there maybe scope of private building inspectors (pre-purchase) to inspect building energy efficiency in accordance with Australian Standards (AS4349: Inspection of Buildings). In the current suite of AS4349 standards part 0 is for other building inspections, part 1 pre-purchase building inspections, part 3 termite building inspections. The benefit of introducing and new part to AS4349 on energy efficiency building inspections (for private practitioners) sets a standard Australia-wide in both regulated and unregulated markets for what needs to be inspected and considered. In this way owners can engage independent energy efficiency building inspections to provide a written assessment (a form of private audit).
3	Offer a building sealing test and energy efficiency audit prior to hand over
4	As a builder/designer/owner gets a copy of 'approved plans', attached to these should be a copy of the guidelines to ensure the Energy efficiency of the building is maintained. This should be available to any future owner and not subject to ridiculous copyright hassles that future owners have to deal with to get copies of plans etc from Local Authority.
5	Having the builder contractually responsible for the performance of the as-built building through an independent process.
6	At final inspection stage, the energy rater is to undertake an inspection to confirm that their energy rating assessment has been complied with, or as a fall-back position, the builder can complete a self-assessment via a checklist before handover.

No.	Responses to: 'Q41. Are there any simple effective non-regulatory actions that could be adopted quickly by industry to enhance energy efficiency compliance?'
7	Holding NatHERS assessors responsible for reviewing 'as built' and independent auditing. While the responsibility rests with the builder to construct as per the plans, the NatHERS assessor should also want to see their 'design' operate as modelled.
8	Mandatory site inspections by energy assessors/professionals to ensure that compliance at design/approval is followed through to as-built stage
9	ProductWise propose is a market mechanism to reduce or remove the risk of NCP entering the supply chain and also to provide opportunity incentive for responsible behaviour. We must get it right at the front end of the supply chain to ensure safety and conformance throughout the built environment.
10	Certificate of compliance of energy rating prior to occupancy
11	Energy efficiency requirements as seen by many as a cost only. The first item to be downgraded/left out. This is common in trade culture. Minimum energy efficiency standards in NCC are often enacted casually. At this stage a stick rather than carrot is required to get the attention on site. Inspections and rectification is needed to 'educate' trades to comply with design and NCC requirements
12	One of the problems we face is the de-regulated environment, the only way around that other than to turn back the clock is for the industry to develop a conscience...
13	focus on the cost savings of energy efficiency and communicate via community based social marketing techniques.
14	On site check list by building companies to sign off on windows, so the owner knows they are complaint as per the energy rating.
15	Acceptance of manufacturing processes and their products.
16	Don't permit the V2.6.2.2 reference building alternative method of compliance to be used for standard/regular construction methods as it can be abused and end up with lower energy efficient building outcomes
17	Ensuring better design would ensure that minor non-compliance does not have a big effect.
18	<ul style="list-style-type: none"> • Blower door test on a random basis • Building sealing is the easiest to check and improve
19	Knowledge at design stage
20	Educate the general public about the benefits and reduced heating and cooling demand through high performance building
21	Education to all building professionals and residents including a few case studies of the good and the bad.
22	Education of the benefits to home owner
23	Designers need to be reminded that a min. 6-star energy rating needs to occur prior to lodgement to Council for approval.
24	Knowledge by builders of the benefit of energy efficiency measures.
25	Change regulations so that Council development staff asses all elements of an energy efficient building, not just thermal performance of envelope.
26	Improved education and awareness
27	Public awareness
28	Increased industry awareness of the importance of energy efficiency
29	No - only effective regulation and policing of compliance will enhance energy efficiency compliance
30	Carbon trading scheme
31	No, there will always be costs so the bulk of the building industry will not improve unless forced to.
32	Depends on procedures
33	Penalise developers who do not incorporate energy efficiency in their designs by blacklisting them
34	<ul style="list-style-type: none"> • Use positive results from blower door tests in their marketing. Make it a thing for consumers to want. But also ... need to make sure shading is installed. Often gets dropped from planning documents. • Increase the sophistication of consumer info. "You need a building that works wells in both summer and winter - our blower door tests make sure it performs well in winter; our shading and design for cross ventilation means it will be comfortable in summer"
35	better training of builders and installation contractors
36	Build energy efficiency training into all building sector trades and professions
37	Make energy assessment software and assessors using "Generic Values"

No.	Responses to: 'Q41. Are there any simple effective non-regulatory actions that could be adopted quickly by industry to enhance energy efficiency compliance?'
38	Using support from recognised industry associations to validate and verify products
39	Use of energy efficiency features by builders as core advertising features for new built houses
40	Yes - happy to discuss further
41	without a legal framework to enforce these things, it won't happen. it will need to be done state by state. They are responsible for building control measures. Unless these regulators become actively engaged in this discussion we are wasting our breath. That's the reality of it.
42	Train builders and trades people to do a job and there is no need for anything. Make them responsible for and certify their own work. They are paid trained professionals just the same as anyone else. There is no use getting a third party involved that a builder tradesperson can hide things from and do a 'dodgy'.
43	Yes, satisfaction of energy efficiency standards could be included as an explicit clause in the contract.
44	No - this is wasted time. Individual best practice is great, but to get genuine lift across Australia it requires better regulation, checking and audit – That's the bottom line
45	Certifier final Inspection checks for compliance prior to occupancy certificate being issued
46	I think the only way to address these issues is by external auditing and keeping everyone honest by accreditation and auditing. So, no, not really.
47	In QLD assessors are not required to be accredited - I feel all assessors should be required to be accredited through a governing body as per the remainder of the states. Building certifiers could do more to enforce the builder comply with meeting the energy efficiency requirements set out in the assessment, when completing their site inspections
48	Education
49	HERS reports amended to show a summary of key measures to be met by the builder. HERS reports endorse drawings that they assess, but relies on information being in drawings and not in specification.
50	All new buildings to have their energy efficiency rating published and prior to the sale of any building there should be an energy assessment undertaken. A checklist of what to look for and run through a program such as FirstRate to get a star rating. NOTE: be a simpler or modified program where you check the ceiling insulation as R4.0 but because it is roughly installed with 10% gaps the ceiling insulation is now input as R2.5....so now the house rates as 4.1 stars...That would get some action by the home owner to get there house up to scratch...and for them to be more diligent when changing things.
51	Spot checks by Certifiers and Councils
	'N/a', 'Don't know' or 'Not sure': 4
	Just 'No': 7

Q42: Is there a role for nationally consistent guidelines governing energy efficiency?

Graph 4.4-xi: Proportion of responses to Q42



Analysis of Q42:

Affirmative Observations	• ~94% say yes
Interesting Observations	• n/a
Negative Observations	• n/a
Recommendations	• Develop national consistent guidelines for energy efficiency

4.5 – Survey Section 5: Industry Capacity Building

Recommendation Summary

Summary of recommendations for the Section 5

Develop a national system for education and training that covers knowledge and understanding of products, product technology and building systems for energy efficiency compliance that contributes to CPD points training and accreditations regimes within professions.

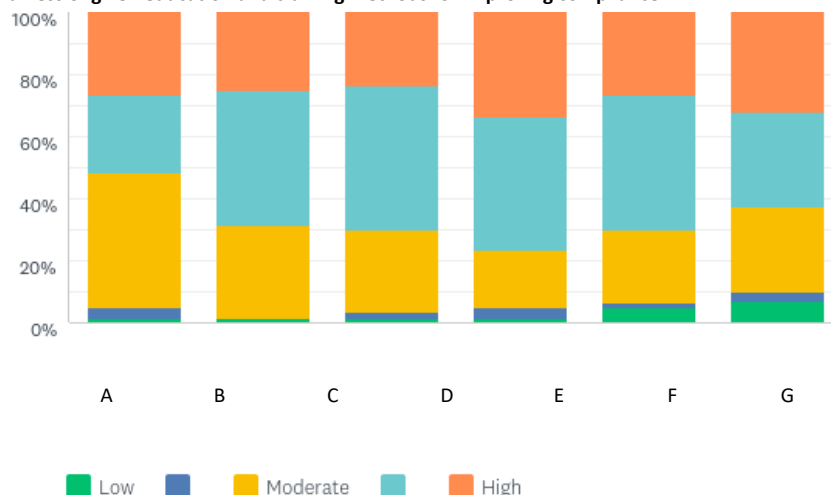
Table 4.5-i: Summary of recommendations for this section

Q. No.	Recommendations
Q43:	<ul style="list-style-type: none"> Ensure all training and development contributes to CPD points training and accreditation regimes within professions
Q44:	<ul style="list-style-type: none"> Develop consistent national guidelines that can be used as training guides for CPD points for all parts of the design development and approval and assessment professions for class one houses
Q45:	<ul style="list-style-type: none"> Develop a national system for education and training that covers knowledge and understanding of products, product technology and building systems for energy efficiency compliance

Section 5: Raw Data and Analysis

Q43: Please rate the level of usefulness of the following education and training methods for improving energy efficiency compliance standards:

Graph 4.5-i: Level of usefulness of given education and training methods for improving compliance



A	Increased education for designers and building industry through mandatory course requirements	E	CPD energy efficiency training/accreditation for regulatory professionals
B	Increased education for energy efficiency assessors through continuous improvement requirements	F	The establishment of an accredited profession for energy efficiency compliance officers
C	CPD energy efficiency training/accreditation for designers and building industry	G	Other (please specify)
D	CPD energy efficiency training/accreditation for energy efficiency assessors		

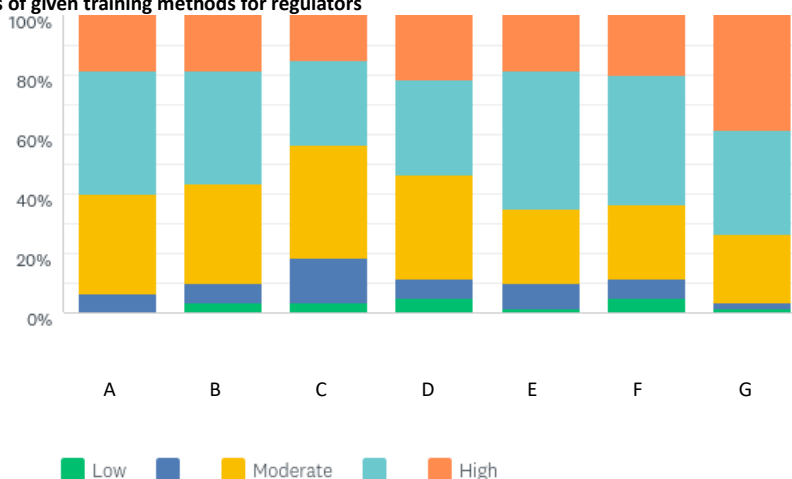
No.	Responses to 'Other'
1	Energy efficiency building standards is not 'rocket science'. There are much more complex and imperative aspects of building design and building work than Energy efficiency building standards. There is no need to introduce additional compliance officers for energy efficiency standards, as the current compliance can be extended/improved to ensure compliance of energy efficiency building standards. The triple bottom line principle applies, cost effective, socially beneficial, and environmentally beneficial.
2	Access to free online training is required for regional areas who don't have access to free seminars on Melbourne etc
3	Different states have different legislation governing energy assessors. I strongly object to being forced to join either ABSA or BDAV to obtain an energy efficiency certificate that does not have the words NOT ACCREDITED plastered all over it. There are other pathways to ensuring that a person is suitable to undertake energy assessment reports and having been a Senior Building Surveyor for 20+ years, having undertaken the NatHERS Cert IV course and being a Chartered Surveyor through the British Royal Institute of Chartered Surveyors, I am more than qualified to provide energy reports. South Australian Legislation does not require a person to be accredited with either ABSA or BDAV and therefore the NatHERS energy software should not lock people into being a member of either to enable a professional energy certificate to be granted. I feel very strongly on this as the software developer appears to have been hijacked by these organisations
4	I don't think the problem is because of lack of education, training and CPD, which is delivered by multiple providers currently. It is because of a lack of auditing and regulation.
5	The state regulator needs to do this.
6	Energy Assessors can expand their duties to include inspections and sign-off before occupancy

Analysis of Q43:

Affirmative Observations	<ul style="list-style-type: none"> The three 'CPD training/accreditation' options for different professions were rated higher than the corresponding alternatives of 'mandatory course requirements' and 'continuous improvement requirements' – thus the data shows that 'CPD training/accreditation' options are the most useful training methods
Weighted Average Observations	<ul style="list-style-type: none"> 'CPD training/accreditation for energy efficiency assessors' rated highest (4.03) – possibly further indication of a bias towards more regulations around energy efficiency assessors All WA's between 3.75 and 4.05 – fairly even
Negative Observations	<ul style="list-style-type: none"> 'CPD energy efficiency training/accreditation for regulatory professionals' and 'establishment of accredited profession for energy efficiency compliance officers' had the most 'low' responses – (only in the order of 5-7% of responses)
Recommendations	<ul style="list-style-type: none"> <i>Ensure all training and development contributes to CPD points training and accreditation regimes within professions</i>

Q44: How effective do you believe the following training methods would be for regulators (including planners, assessors, building surveyors, inspectors and associated officials)?

Graph 4.5-ii: Effectiveness of given training methods for regulators



A	Regular CPD updating on NCC and energy provisions	E	Face to face workshops to refresh knowledge on energy efficiency requirements in the NCC
B	Online webinars on energy efficiency requirements in the NCC	F	On-site training for regulators on energy efficiency requirements in the NCC
C	Refresher mobile training app specific to Section J of the NCC	G	Consistent national guidelines for implementing energy efficiency requirements in the NCC
D	Mandatory 1-day course on energy efficiency requirements in the NCC		

Analysis of Q44:

Affirmative Observations	<ul style="list-style-type: none"> 'Consistent national guidelines for implementing energy efficiency requirements in the NCC' had the least responses indicating they would be less than moderately effective and highest amount of responses indicating they would be highly effective
Weighted average Observations	<ul style="list-style-type: none"> 'Consistent national guidelines for implementing energy efficiency requirements in the NCC' only one above 4 'Refresher mobile training app specific to Section J of the NCC' only one below 3.5 All others in below 3.75
Negative Observations	<ul style="list-style-type: none"> 'Refresher mobile training app specific to Section J of the NCC' had the most responses indicating they would be less than moderately effective and least amount of responses indicating they would be highly effective
Recommendations	<ul style="list-style-type: none"> <i>Develop consistent national guidelines that can be used as training guides for CPD points for all parts of the design development and approval and assessment professions for class one houses</i>

Q45: To what extent do you agree with the following statements for energy efficiency compliance officers?

Graph 4.5-iii: Extent of agreement with given statements regarding EE compliance officers



Analysis of Q45:

Affirmative Observations	<ul style="list-style-type: none"> 'Energy efficiency compliance officers should have knowledge and understanding of products, product technology and building systems' had 95% agreement (53% strong) 'Energy efficiency compliance officers should have a professional association' had less than 4% disagreeing (strongly or otherwise)
Weighted average Observations	<ul style="list-style-type: none"> 'Energy efficiency compliance officers should have knowledge and understanding of products, product technology and building systems' had the highest with 4.45 'Energy efficiency compliance officers should have a tertiary education' had the lowest with 3.65 Others only 0.2 above that – fairly even aside from highest
Negative Observations	<ul style="list-style-type: none"> No real low ones... 'Energy efficiency compliance officers should have a tertiary education' had highest disagreement – but is that really much of a negative?
Recommendations	<ul style="list-style-type: none"> <i>Develop a national system for education and training that covers knowledge and understanding of products, product technology and building systems for energy efficiency compliance</i>

Q46. Any further comments?

No.	Responses
1	National consistency between states
2	The survey tool is difficult to navigate especially where you cannot return to previous pages for reference.
3	There are market forces that have a vested interest in advancing additional specialist fields such as energy efficiency compliance officers. Current energy efficiency assessors provide certification for building surveyors who have higher education qualifications to properly ensure building compliance standards. Building designers, builders, trade contractors and home owners, financiers, insurance providers can all provide a more informed contribution to ensuring building compliance. The current framework of building compliance can be made more efficient, but it does not need to be extended.
4	Please collaborate with ProductWise to develop a market mechanism.
5	Consider that most energy assessors are self-employed and can't usually attend full day workshops and paid seminars
6	Listen to real stakeholders and manufacturing of energy products including small business.
7	Education to be based on existing standards and practical experience
8	There needs to recognition that NatHERS stars are not an equivalent system to energy efficiency stars for appliances and have very different energy efficiency profiles for each climate zone, which has implications for any ROI on any improvements made.

No.	Responses to: 'Q46. Any further comments?'
9	<p>This was a very detailed survey which I am sure will produce a variety of results. However, what is evident to me is that unless some sort of mandatory legislative requirement is implemented, you will always get people taking shortcuts during the construction process.</p> <p>We see this with the many leaking apartment buildings being constructed. There appears not to be any meaningful sanctions on the builders of the defective products. Consumer protection must be increased. Energy efficiency usually lies within the building fabric and does not become evident until the building is used. Whilst there will be an increased cost during the build, savings are made during the life of the building by the end user.</p>
10	<p>None at this stage. This survey was quite long and appeared to be a bit repetitious. All of the ideas have some merit and could work, choosing the best pathway will be difficult.</p>
11	<p>Very difficult, additions are a problem as much as new building compliance with owner/builders and products from everywhere.</p> <p>I do not know how many dwellings have had a post construction assessment after a year or two.</p> <p>Most people I know are cutting down trees to get better solar access and it seems the aim is to not pay anything for power no matter how much it stuffs up the environment or in fact makes the whole street hotter. Need to cross reference all this energy efficiency construction with also using the natural environment to assist in living comfort by using passive means, ventilation and fresh air a good example.</p> <p>To have a massive network of auditing etc is a huge cost and only short term when the life of the building and the extent of changes that owners make to a building.</p> <p>Transportable buildings are a big issue, older buildings that people want as 'holiday home' are considered not to be an issue but may be the biggest users/wasters of energy.</p>
12	<p>This should be offered to supervisors, builders as a 1 - 3-day course to be accredited. A specific stamp developed that they can use for plans etc. like a JP stamp issued with a provider no. by Govt.</p>
13	<p>Most of the questions in the survey are leading questions. The survey is too long.</p>
14	<p>Air tightness testing is the simplest, most straightforward activity can be done to improve energy efficiency.</p>
15	<p>Support the BASIX online scheme as a mechanism to ensure compliance through the development assessment and construction certifications stages. This scheme could be expanded to include proposed options such as Electronic Building Passport, product information, etc.</p> <p>Thank you for the opportunity to participate.</p>
16	<p>Building inspectors need to be trained and handle this not a separate profession.</p>
17	<p>Mostly all covered</p>
18	<p>Force organisations such as Engineers Australia and Professionals Australia, etc., to lower membership fees to enable more energy/technical professionals to join, and thus be ethically accountable for their designs and construction activities.</p>
19	<p>Compliance is a safeguard that Governments should take more seriously. Minimum community standards as set out in the National Construction Code should be routinely checked for compliance as a matter of normal government business.</p>
20	<p>My thoughts are that the current energy reports are not worth the time and effort and money that has been put into them!</p>
21	<p>Keep the system simple.</p>
22	<p>Mandate blower door testing.</p>
23	<p>Further to the above and to my previous comments, I believe that all energy assessors must have formal tertiary training and should be a member of a professional organisation - BUT NOT LIMITED TO ABSA or BDAV. Experienced Building Surveyors seeking to undertake energy efficiency reports will have a far greater understanding of the legislation that non-building surveyors looking to do this and therefore being in that field should be automatically recognised as being accredited to undertake energy efficiency assessments and should not be penalised in any certificate purchase through the NatHERS software. I feel very strongly on this as the qualification level to become a Building Surveyor is tertiary level and requires annual CPD as part of that accreditation and considering energy efficiency provisions are set in the Building Legislation, Building Surveyors are at the forefront of Building legislation knowledge</p>
24	<p>Do it now not in years to come</p>
25	<p>If we are to have energy ratings, they need to be meaningful. This debate has come about due the lack of consistency, honesty and 'loopholes' which is understandable, but does need to be improved upon if we are to have integrity and support for them.</p>
26	<p>Should require a minimum of Certificate 4 qualifications and be independent.</p>

No.	Responses to: 'Q46. Any further comments?'
27	I feel the Industry (Energy assessors) requires more authority, transparency and accountability within the building industry and more awareness as to our role in the building industry in broader community.
28	I don't think we need to resort to online documentation/compliance verification. Perhaps start with paper based forms that are lodged with State regulatory institutions
29	Make builders responsible for their own work. Or create an independent energy assessor profession separate to PCA work.
	PCA's do not need more work lobbed on them in an already heavily regulated under resourced profession.
30	Keep the good work up and make sure you LISTEN to people along the way:)
31	For q45 "Energy efficiency compliance officers should have a professional association" - generally they already do - e.g. https://www.accreditedcertifiers.com.au/
	We don't need more associations we need professional practice - backed by audits, penalties and checks
32	Introducing regulation that every house has to have an energy rating certificate when it is sold...based on its current construction... assessed by an "Energy Efficient Compliance Officer" using a nation-wide program. Would ensure the focus was moved to include energy efficiency as a priority in all builds across all the disciplines associated with the construction.
33	No need to re-invent inspector or assessor accreditation - we have AAOs who can do the job
34	A comprehensive survey, the results of which I am very interested in hearing back.
35	This is an unusual area of regulation as the goal is not safety driven. If the overall objective is to lower emissions, then it's about who pays. The costs are theoretically measurable and allocable. There is an indirect community benefit, but we are not regulating existing houses. Therefore, the owner of the land on which the new work is being done has to pay the costs associated with not managing increased emissions for that work. There is some capacity for other costs e.g. regulator, industry education etc to be passed on as a cost to be borne by the community who does get that indirect benefit. Do we know what the real cost is that has to be attributed between the community benefit costs and the land owner costs? Presumably that will govern what measures can be implemented? Have the costs of the measures been calculated?

Other recommendations:

These recommendations came about because of conversations held at the Melbourne Workshop.

1. Workshops should be done in WA and NT to ensure they can contribute to the information and validate the recommendations
2. Information sessions via webinar should be developed and made available as a first step of education the industry and be included as CPD training points on the outcomes of the deep dive project
3. All data should be made available in a form that is easily downloadable for future reference and for training and education purposes or for development of research projects
4. When final recommendations are signed off an assessment of materiality simplicity and impact should be done prior to informing the building Ministers forum of the proposed pathway forward

Appendix 5 – Recommendation Logic, Decision Making

All industry recommendations have gone through a process of review based on the data evaluation. There have been a few general recommendations for follow-up based on the first section which could inform or consolidate a national review.

1/ Initial data review by Sustain SA

- The data review used the weighted score and numerical score and percentage score to determine the types of recommendations that could be made
- A weighted score of between 3.5 and 4.5 was deemed to be a high validation as to the direction a recommendation could take.
- Weighted score between 2.4 and 3.5 was seen as an interesting issue to discuss further
- And below 2.5 was seen as a negative response to the issue being raised
- These were then cross checked with other issues brought up in the workshops

This ended up with 28 recommendations

2/ Review by Melbourne workshops

- The Melbourne workshop had 2 tasks.
 1. To review each section and work on a question to provide some insight into the positive, interesting, negative and recommendations from the data. They rotated to ensure they saw each data set.
 2. They were then asked to provide a filter on a recommendation from the data that assessed materiality, simplicity and impact. Participants were also asked about timeline for implementation.

The 28 recommendations were then filtered into 16 high level recommendations

Although the workshop did not allow enough for each recommendation to be developed as part of the validation process it provided insights into the directions of the recommendations.

3/ Survey review validation by workshop participants

- A survey sent to all of the workshops participants had 3 separate requests
 1. Do you agree or disagree with the recommendations?
 2. How would you rank them in order of priority?
 3. What year would you expect them to be implemented?

4/ Logic review by Dsquared

- A final logic review was undertaken by Dsquared to verify the recommendations and identify any gaps for consideration in the final executive summary report.

Appendix 6 – NSW Individual Comments

As a part of the process to engage widely with professionals across states and territories, the Building Professionals Board of NSW was invited to complete the National Regulator Needs Survey. As part of this invitation, the Building Professionals Board of NSW felt they couldn't provide an organisational view and as such they provided some individual staff comments. Please note that the following comments should not be considered the view of the Building Professionals Board, but rather the views of individuals.

- An additional 'energy efficiency inspection' of a building will add to building costs and regulatory red tape; a full cost-benefit analysis would be needed.
- Some options as set out in the survey may create additional liability for licensed building surveyors/ accredited certifiers, which could affect the availability of professional indemnity insurance (this insurance is mandatory for building surveyors/ certifiers). Responsibility should sit principally with those who supply and install the products/materials – these people are in the best position to verify that the correct products are supplied and installed correctly.
- It is questioned whether a bank loan clause is an appropriate means to ensure energy efficiency is included in a building contract. Also, it is perhaps hard to imagine the circumstances in which an 'energy inefficient' house would be uninsurable from an insurer's perspective.
- Any compliance tool that is mandated should also be available via different channels (e.g. website and mobile app, rather than just one or the other). Also, a holistic 'building manual/ passport' (or similar), to be retained after completion, would ideally include e.g. the construction plans, NCC performance solutions, maintenance schedules and annual inspection reports, as well as energy efficiency information.
- It is questioned whether the building sector has capacity to cope with a raft of changes all at once (NCC 1 May 2019). Perhaps a staged approach could be considered if wide-sweeping changes are adopted. Changes would need to take into consideration the existing state variations in the NCC (e.g. the BASIX scheme in NSW).
- As an overall comment, a Guide to Volume 2 of the NCC (as exists for volume 1) would greatly assist industry (of course, this is outside the NEEBP scope and something the ABCB would need to consider).

Appendix 7 – Analysis, Synthesis and Priority Filtering

Table 5. Raw survey recommendations that reflect overall responses and workshop discussion

28 top recommendations from the survey report analysis and workshops that were obvious from the data			
<i>To provide consumer awareness on the value of energy efficiency compliance in reducing heating cooling loads, improving quality of life and reducing power bills</i>	<i>On site product verification and substitution product regimes should be considered for 2020/ 2025</i>	<i>Mandatory verification process for EE product supplied according to specs meets standards and installed correctly</i>	<i>On - site training for building products and installation and knowledge delivery</i>
<i>Construction phase energy inspections (not random. set stages)</i>	<i>Design development approval. EE must be part of contract and on plans During construction stage audit inspection regime should be mandated at agreed times Checked prior to handover for occupancy</i>	<i>Checklists and energy ratings certificates (possible electronic) to form part of the building contract and approved documentation</i>	<i>Develop a verification system for identifying EE products and materials which shows a product's energy efficiency compliance documentation. Should also show design energy efficiency compliance.</i>
<i>Introduce mandatory additional verification inspections</i>	<i>Support the pre-occupancy sign off by an independent accredited person</i>	<i>Ensure all training and development contributes to CPD points training and accreditation regimes within professions</i>	<i>Need a national data base of products and specification data base and substitution products for easy look up on site as part of EBP</i>
<i>Pre-occupancy audit would be useful</i>	<i>Regulation to enforce pre-audit before occupation or handover</i>	<i>Develop consistent national guidelines that can be used as training guides for CPD points for all parts of the design, development, approval and assessment professions for class one houses.</i>	<i>EBP which includes verification system for products and installations should be further investigated and part of a phased in approach</i>
<i>Pre-occupant sign off by independent accredited person</i>	<i>Ensure all training and development contributes to CPD points training and accreditation regimes within professions</i>	<i>EE Checklist in contract documents EE checklist as part of contract is strongly supported,</i>	<i>Product and material verification system</i>
<i>Consistent code of practice to deliver EE compliance</i>	<i>Ensure all training and development contributes to CPD points training and accreditation regimes within professions</i>	<i>High % of responses want (EE) factored into building contract</i>	<i>Development non-compliance approach as a national system</i>
<i>Mandatory Auditing, knowledge and training and consumer awareness introduced now</i>	<i>Audits should occur during construction and at pre-occupancy</i>	<i>Systems to verify product specifications as built</i>	<i>Energy efficiency explicitly outlined on plans prior to building contract approval EE certification checked and provide prior to handover</i>

Table 6. Synthesis of survey recommendations that reflect overall responses and workshop discussion into statements

<i>16 top combined "raw" questions for priority analysis by workshop participation from above table to be refined for validation survey</i>			
Tools and systems	<i>Phase in the development of national EBP system across EE compliance factors</i>	<i>Product Verification system and process for EE product supplied according to specs meets standards and installed correctly</i>	<i>Development non-compliance approach as a national system</i>
	<i>Develop a national audit/inspection system to improve compliance that can be applied across states and climate zones</i>	<i>Audit during construction at least 2–3 stage of the building process</i>	<i>Develop a national standard EE checklist to be used at the start and end of the building, design development and handover process</i>
Regulations	<i>EE on all design building plans prior to approval</i>	<i>EE part of building contract</i>	<i>EE compliance sign off prior to handover occupancy</i>
	<i>Verification system for products specs and substitution</i>	<i>Mandatory knowledge and training in EE across professions</i>	<i>Develop national accreditation system for EE assessors</i>
Education	<i>Ensure all training and development contributes to CPD points training and accreditation regimes within professions</i>	<i>Consumer awareness on the value of energy efficiency compliance in reducing heating cooling loads, improving quality of life and reducing power bills</i>	<i>Develop consistent national guidelines that can be used as training guides for CPD points for all parts of the design, development, approval and assessment professions for class one houses.</i>
	<i>On- site training for building products and installation and knowledge delivery</i>		




















Appendix 8 – Summary of Workshop Recommendations

This table provides a review of all survey questions, some suggested response recommendations and how they have been assessed to form priorities. Observations and recommendations from a question have been cross referenced with other questions where they have either complemented or reinforced the response. This process has enabled a consolidation of thoughts into the final priority recommendations. Some comments and recommendations were deemed out of scope of the project and haven't been taken forward.

Table 7. Prioritisation filtering

Question	Response from workshop Observations /recommendations	X Reference	General	Priority
1	• <i>There is a need to engage with Private (Planning, building approval and compliance)'to test the recommendations</i>		✓	
2	• <i>A targeted approach to consider the recommendation in the 18 -35-year age group may be worth considering across education and compliance as they are the future of the industry</i>	2 and 3	✓	
3	• <i>With low percentage of less experienced people, linked to Q2, it may be of interest to target less experienced and younger age group on the recommendation actions</i>	2 and 3	✓	
4	• <i>Due to the underrepresentation in ACT, NT, TAS and WA, further, targeted research may be necessary and/or workshops outlining the data and their impressions should be undertaken</i>		✓	
5	• <i>Post codes responses need to be further analysed to area, type and climate zone for relevance of experience and response</i>	5, 30	✓	
6	• <i>While the survey represents class one housing there is a need to test applicability and replicability with class 2 apartments, even though some recommendations may be transferable, this needs to be tested</i>		✓	
7	• <i>Opportunity to provide consumer awareness on the value of energy efficiency compliance in reducing heating cooling loads, improving quality of life and reducing power bills</i>	Section 5	✓	✓
8	<ul style="list-style-type: none"> • <i>State government consumer affairs could promote that contract variation for EE is technically illegal / malpractice</i> • <i>Maintain strong focus on independent inspection and audit regime during construction phase</i> • <i>Need to develop systematic regime to check EE compliance with the Code</i> • <i>Capacity building and resources are an essential component in improving EE compliance</i> 		✓ ✓ ✓ ✓	

Question	Response from workshop Observations /recommendations	X Reference	General	Priority
9	67 survey responses. See pg. 77 as to how these responses reinforce the data and the recommendations		✓	
10	<ul style="list-style-type: none"> Construction phase energy inspections (not random-set stages) Mandating who does these inspections Clarify what independent needs to be Targeted capacity building for different stakeholders 		✓ ✓ ✓ ✓	✓
11	<ul style="list-style-type: none"> Introduce mandatory additional verification inspections Emphasise systems and mandated in as built Revisit need @ first fix /sec fix to achieve better outcomes (post construction is too late) Need to address issues at three stages <ul style="list-style-type: none"> Design development approval ...EE must be part of contract and on plans During construction stage audit inspection regime should be mandated at agreed times Checked prior to handover for occupancy 		✓ ✓ ✓	✓ ✓ ✓ ✓
12	<ul style="list-style-type: none"> Through building contracts builder is to be made responsible for compliance Strength warranty insurance to specifically cover EE compliance Need to streamline to ensure transfer of information is consistent and efficient 		✓ ✓ ✓	
13	<ul style="list-style-type: none"> Pre-occupant sign off by independent accredited person Mandatory auditing tools Increased knowledge and awareness training on EE Consistent code of practice to deliver EE compliance 	13, 14	✓	✓ ✓
14	<ul style="list-style-type: none"> Mandatory Auditing, knowledge and training and consumer awareness introduced now On site product verification and substitution product regimes should be considered for 2020/ 2025 Voluntary auditing and self-regulation less likely to achieve EE compliance 			✓ ✓

Question	Response from workshop Observations /recommendations	X Reference	General	Priority
15	<ul style="list-style-type: none"> A phased in approach of mandatory auditing should include correct windows installed and correct roof insulation installed well. 	13, 14		
16	<ul style="list-style-type: none"> System to verify as built contract QA systems designed and Mandated Industry training needs to be Peer to Peer -people listen to people like themselves System to verify as built construction QA Systems designed and mandated Trade and builder training skills Post occupancy auditing or checking was not seen as important 		     	
17	<ul style="list-style-type: none"> National data base beneficial if it enables tagging onsite and in real time at design implementation for certifier to check. can form part of EBP so enables low cost audit off site Pre-occupancy audit would be useful 	17,18, 19	 	
18	<ul style="list-style-type: none"> Support the pre-occupancy sign off by an independent accredited person 	17,18, 19		
19	<ul style="list-style-type: none"> Regulation to enforce pre-audit before occupation or handover Work on liability and thermal testing not supported 	17,18, 19		
20	<ul style="list-style-type: none"> Better (well) resourced auditing program DO a national checklist now and widely promote to all players on site Get buy in from all states and industry associations Be clear who is being audited and what for and for what purpose work out who does the auditing ...is this a new role? 	17,18, 19	   	
21	<ul style="list-style-type: none"> Mandatory verification process for EE product supplied according to specs meets standards and installed correctly 			
22	<ul style="list-style-type: none"> On-site training for building products and installation and knowledge delivery 			

Question	Response from workshop Observations /recommendations	X Reference	General	Priority
23	<ul style="list-style-type: none"> High % of responses want (EE) factored into building contract 	23,24		✓
24	<ul style="list-style-type: none"> Checklists and energy ratings certificates (possible electronic) to form part of the building contract and approved documentation Compliance checklists should be available prior to handover 	23,24 17,18,19	✓	✓
25	<ul style="list-style-type: none"> EE Checklist in contract documents EE checklist as part of contract is strongly supported, not to tie builder into post occupancy performance as deemed unfair Verification system for specified products to be developed which could be part of an electronic system 	17,18,19 23,24,25,28	✓ ✓ ✓ ✓	✓ ✓
26	<ul style="list-style-type: none"> Ensure transparency in any strategies undertaken EBP which includes verification system for products and installations should be further investigated and part of a phased in approach 	25,26,28	✓ ✓	✓
27	<ul style="list-style-type: none"> Develop standard data collect checklist available to all home inspections via internet available through tablet or smart phone app Make all (data) available via onsite based app or software Must cover design, construct, as built, - (must) integrate across whole cycle Integrate assessment with post approval checks to recalculate (EE) on site as current state of EE compliance 		✓ ✓ ✓ ✓	
28	<ul style="list-style-type: none"> Develop EBP with all required functions and Include in EBP Upload of materials documents, specs and design Tagging systems of materials so know what has been supplied to tie into multiple checkpoints Product and material verification system 	28.29,30	✓ ✓ ✓	✓

Question	Response from workshop Observations /recommendations	X Reference	General	Priority
29	<ul style="list-style-type: none"> An EBP should include <ul style="list-style-type: none"> product's energy efficiency compliance documentation', followed by 'show design energy efficiency compliance' and 'verification system for identifying EE products and materials' that support compliance with EE 	28,29	✓ ✓ ✓ ✓	✓
30	<ul style="list-style-type: none"> Need a national data base of products and specification data base and substitution products for easy look up on site as part of EBP Energy efficiency compliance requirement look up based on climate zone 	28.29. 30	✓ ✓	✓
31	<ul style="list-style-type: none"> There should be greater regulations for EE compliance for new houses Regulation may assist the industry to integrate and pull together to deliver EE compliance 		✓ ✓	
32	<ul style="list-style-type: none"> Energy efficiency explicitly outlined on plans prior to building contract approval EE certification checked and provide prior to handover Role of the financial institutions approval for loans and legal liabilities need further discussion and input and consensus about their role in EE compliance if at all 		✓	✓ ✓
33	<ul style="list-style-type: none"> EE requirements outlined on plans ... for building approval' NOW Energy efficiency compliance referenced in a standard building contract' NOW 'Mandating energy efficiency audits during the building cycle' and 'Pre-occupancy energy efficiency rating verified': 2020 or earlier 		✓ ✓ ✓	✓
34	<ul style="list-style-type: none"> Mandated by regulation/ legislation Audit individual doing energy assessment (using all compliance methods) Legislate for as built mandatory inspection e.g. California Systems to verify product specifications as built Self-regulation reporting not seen as effective 		✓ ✓	✓
35	<ul style="list-style-type: none"> Strong support for during construction and pre-occupancy 		✓	
	<ul style="list-style-type: none"> Regular auditing and program for all stakeholders First 2 areas for auditing should include <ul style="list-style-type: none"> EE assessors Installed building products and materials 		✓	✓

Question	Response from workshop Observations /recommendations	X Reference	General	Priority
36	<ul style="list-style-type: none"> • Post occupancy follow up over years • Audits should occur during construction and at pre-occupancy 		✓	✓
37	<ul style="list-style-type: none"> • Over 80% (moderate to high) viewed auditing of tradesperson as justified and supported • Increasing transparency of work done by industry needs further unpacking to understand what this means and how this could be achieved 		✓	
38	<ul style="list-style-type: none"> • Opportunity to provide guidance on how to deal with non-compliance • Introduce strategies to identify non-compliance early • Get people talking about compliance • Make repercussions of non-compliance meaningful i.e. no occupancy permit • Development non-compliance approach as a national system 		✓ ✓ ✓	✓
39	<ul style="list-style-type: none"> • Inspect prior -suggest pre-plaster • Need to unpack Data 		✓	
40	<ul style="list-style-type: none"> • Develop a national independent assessment system and accreditation system of energy efficiency compliance 		✓	
41	62 survey responses. See pg. 83 as to how these responses reinforce the data and the recommendations		✓	
42	<ul style="list-style-type: none"> • develop national consistent guidelines for energy efficiency 	42, 44	✓	
43	<ul style="list-style-type: none"> • Ensure all training and development contributes to CPD points training and accreditation regimes within professions 			✓
44	<ul style="list-style-type: none"> • Develop consistent national guidelines that can be used as training guides for CPD points for all parts of the design, development, approval and assessment professions for class one houses. 	42,43, 44	✓	✓
45	<ul style="list-style-type: none"> • Develop a national system for education and training that covers knowledge and understanding of products, ... technology and ... systems for EE compliance 			✓

Other recommendations: These general observations are outcomes from the project data and have not been validated through the project workshops as such are suggested by the consultant. The ones marked * are included in the report the others are deemed to be of interest but may not provide on ground actions for enhancing energy efficiency compliance.

Specific question outcome observations.	
1	<i>There is a need to engage with Private (Planning, building approval and compliance)'to test the recommendations</i>
2	<i>A targeted approach to consider the recommendation in the 18-35-year age group may be worth considering across education and compliance as they are the future of the industry</i>
3	<i>With low percentage of less experienced people, linked to Q2, it may be of interest to target less experienced and younger age group on the recommendation actions</i>
4*	<i>Due to the underrepresentation in ACT, NT, TAS and WA, further, targeted research may be necessary- or workshops outlining the data their impressions and validate the recommendations</i>
5	<i>Post codes responses need to be further analysed to area, type and climate zone for relevance of experience and response</i>
6*	<i>While the survey represents class one housing there is a need to test applicability and replicability with class 2 apartments, even though some recommendations may be transferable this needs to be tested</i>
7*	<i>Opportunity to provide consumer awareness on the value of energy efficiency compliance in reducing heating cooling loads, improving quality of life and reducing power bills</i>

Suggestions for next steps as complementary actions for consideration	
1*	<i>Information sessions via webinar should be developed and made available as a first step of education for the industry and be included as CPD training points based on the outcomes of the deep dive project</i>
2	<i>A research project that provides evidence of number of non-compliance national and per state should be considered to back up need for compliance regulations and approaches</i>
3	<i>All data should be made available in a form that is easily downloadable for future reference and for training and education purposes or for development of research projects to further unpack the data and provide pathways forward.</i>
4*	<i>When final recommendations are signed off an assessment of materiality simplicity and impact should be done prior to informing the building Ministers forum of the proposed pathway forward</i>

Appendix 9 – Short Answer Responses to Q9 and Q41, Cross Checked Against Project Observations, Actions and Recommendations

Response No.	Q9. What do you believe it would take to get people committed to delivering on energy efficiency compliance?	Covered in recommendations
1	<ul style="list-style-type: none"> Statutory requirements for compliance assessment. Tools, organisations and education to support compliance 	✓
2	<ul style="list-style-type: none"> Non-compliance penalties. Education and behaviour change programs for industry. Awareness by property owners of compliance or otherwise and long-term cost impacts of owning/maintaining. 	✓ ✓ ✓
3	As built performance random auditing and testing. Compulsory energy efficiency rating disclosure.	✓
4	Consumer value and demand: quantification of return on capital investment (gains), social commitment and personal values (satisfaction), contemporary market norms (competition), positive rhetoric to rebuff negative rhetoric (affordable housing) etcetera.	✓
5	House Building Contracts with penalties for non-compliance	✓
6	Actual demonstrated savings because now the comment seems to be that those with Solar Panels are causing the higher prices! Even with so called clean energy and the propaganda about lower prices no one believes this, just another can for a cash grab by a wasteful Govt. As we save the cost of producing energy, the Govt just puts the rate per Kw higher to maintain revenue and even though we use less, we pay more!	
7	Get the PHB sales people to mention it and raise it as an important feature of a new home	✓
8	More comprehensive checking for insulation, in particular. But also, an understanding of how important energy efficiency is.	✓
9	Education, training and inspection, compliance signoff before handover to client.	✓
10	Auditing and checks of work carried out on the building site.	✓
11	Incentives and inability to do the wrong thing with checks/inspections.	
12	Informed choice	✓
13	education, inspection, penalties	✓
14	From a certifier's perspective, more time to allow better assessment and inspections.	✓
15	Energy efficiency needs to be taken seriously by the building industry. At present some sectors of the industry use energy efficiency as a marketing tool, but the detail gets lost in marketing hype and the current methodology for assessment relies too much on 'smoke and mirrors' that enables the industry to tailor the requirements to suit their needs rather than the other way around (as it should be)	
16	Random inspection/auditing of buildings to confirm compliance with energy efficiency requirements	✓
17	Demonstrate that it improves the sale price of the dwelling	
18	as built audit	✓

Response No.	Q9. What do you believe it would take to get people committed to delivering on energy efficiency compliance?	Covered in recommendations
19	More emphasis on compliance with penalties.	✓
20	Subsidies and grants	
21	Nationally or state registered energy efficiency design providers who carry PI insurance for their field of expertise as well as a strong auditing program of design documentation compliance. Random testing of energy efficiency outcomes in the completed buildings to verify the compliance outcomes.	✓
22	better design	
23	<ul style="list-style-type: none"> Increased review of as built and testing to ensure compliance during the build Warranty on the energy efficiency as there is in structural build Education of the consumer 	✓ ✓
24	Knowledge	✓
25	Understanding the implications on thermal comfort and operating cost reductions	
26	Understanding the issues of quality and thermal comfort and the implications for ongoing cost burdens for the householder	
27	It needs to be legislated into the Building Code and a min. 6-star rating adopted for residential homes. Unfortunately, the cost can be upwards of \$50k to a 200m2 home.	✓
28	better understanding that the long term gains out way the initial increased costs and attention to detail required.	
29	This needs to be driven by the building owner. They will need to understand the tangible benefits of energy efficient design & construction.	✓
30	Greater regulatory control. If people are left to make their own decisions, they will invariably make poor choices due to a poor understanding of the requirements and principles needed.	✓
31	Better regulations	✓
32	higher statutory requirements. Verification of as-built standards (e.g. air tightness testing)	✓
33	regulation and education.	✓
34	mandatory disclosure of energy efficiency measures at point of sale. independent auditors to check compliance prior to occupation stage. consumer education of benefits and standards to drive industry	✓
35	Independent inspection of critical aspects of energy efficient construction (insulation, sealing etc)	✓
36	proper design and study analysis.	

Response No.	Q9. What do you believe it would take to get people committed to delivering on energy efficiency compliance?	Covered in recommendations
37	Policies making it mandatory for developers to build with energy efficiency in mind - insulation, double-glazing, and other design and construction materials and methods which are closer to European standards.	✓
38	Regulations	✓
39	better trained builders, inspection & monitoring during construction	✓
40	Government commitment to random checking of compliance to the National Construction Code. De-registering any professional if they have signed off compliance for non-compliant buildings.	✓
41	From my experience I find the people with whom I deal are committed to energy efficiency compliance.	
42	Higher regulated requirements and policing of product conformity and compliance. Less allowance for trade-offs - setting minimum targets for key items.	✓
43	Educated consumers driving demand for better compliance	✓
44	Make double glazing standard to all habitable rooms. (with thermally broken frames or better) Easy to legislate, easy to check, delivers immediate efficiencies and designers are more careful with glazing design. Brings us in line with overseas best practice and bring down prices. The industry in SA complains about the price of double glazing but Tasmania and Victoria have transitioned as they have a cooler climate zone. The increase in demand has significantly brought down prices. Glazing is the greatest weak point in the building.	
45	Higher minimum standards. Voluntary schemes won't work.	✓
46	more inspectors operating to enforce compliance	✓
47	Transparency and consumer demand would drive change in the market to deliver improved compliance. Government needs to ensure an effective regulatory framework is in place to reward compliance.	✓
48	<ul style="list-style-type: none"> engage builders, owners with energy efficiency compliance at the initial stage of project development. Demonstrate project energy efficiency compliance as part of development Plan consent stage 	✓
49	Enforcement by certifier at final inspection and tied to the Form 21	✓
50	Fines for falsifying information and more stringent checks on compliance to catch perpetrators. Better education for clients so they actively ask for more energy efficient measures. Checks by accredited energy assessors at the end of the job to ensure that the measures specified to meet a certain rating have been incorporated.	✓
51	Further regulation - Site inspection at stages of construction to ensure what has been modelled is being constructed	✓

Response No.	Q9. What do you believe it would take to get people committed to delivering on energy efficiency compliance?	Covered in recommendations
52	Simple compliance inspection and reporting process.	✓
	Fines, planning permit amendment requirements for non-compliance.	✓
53	Demonstrating the savings in real dollar terms that can be made by designing and building energy efficient buildings.	
54	Education on what is required across all levels.	✓
55	Compliance checking via an audit system with penalties for non-compliance	✓
56	<ul style="list-style-type: none"> • Qualified independent certifiers only - not allowing companies to do their own certifications - Post building checks • More information on cost benefits of providing energy efficient homes -e.g. running costs reduced • Mandatory disclosure of energy ratings at point of sale 	✓
57	Making it part of the building code, i.e. mandatory.	✓
58	effective regulation and compliance, effective building control inspections and sign-off	✓
59	Make the builder responsible for it.	
60	MANDATED COMPULSORY training	✓
61	Jurisdictions to make thermal calculation assessor accreditation mandatory, with independent policing as-built and strong penalties for non-compliance	✓
62	Increased accountability	✓
63	Regulation	✓
64	A greater understanding from local government authority and on-site trades about what is trying to be achieved from undertaking the energy efficiency report.	
65	a properly resourced state-administered, enforced audit scheme. No state agency across Australia, to my knowledge invests appropriately in audits/monitoring of certifiers and "built as promised" outcomes	✓
66	Make sure the house has an energy efficiency certificate when it is being sold or advertised for sale. Similarly, to your fridge or washing machine. Then the consumer makes the choice and of course the home owner/buyers wants a good house to sell/live in.	✓
67	Save money on bills for improved energy efficiency i.e. bill subsidy to encourage certifiable improvements.	

Response No.	Q41. Are there any simple effective non-regulatory actions that could be adopted quickly by industry to enhance energy efficiency compliance?	Covered in recommendations
1	Best practice guidelines and checklists. Demonstration homes.	✓ ✓
2	While there is a market for private energy assessors who certify building energy efficiency standards there maybe scope of private building inspectors (pre-purchase) to inspect building energy efficiency in accordance with Australian Standards (AS4349: Inspection of Buildings). In the current suite of AS4349 standards part 0 is for other building inspections, part 1 pre-purchase building inspections, part 3 termite building inspections. The benefit of introducing and new part to AS4349 on energy efficiency building inspections (for private practitioners) sets a standard Australia-wide in both regulated and unregulated markets for what needs to be inspected and considered. In this way owners can engage independent energy efficiency building inspections to provide a written assessment (a form of private audit).	✓
3	Offer a building sealing test and EE audit prior to hand over	✓
4	As a builder/designer/owner gets a copy of 'approved plans', attached to these should be a copy of the guidelines to ensure the Energy efficiency of the building is maintained. This should be available to any future owner and not subject to ridiculous copyright hassles that future owners have to deal with to get copies of plans etc from Local Authority.	✓
5	At final inspection stage, the energy rater is to undertake an inspection to confirm that their energy rating assessment has been complied with, or as a fall-back position, the builder can complete a self-assessment via a checklist before handover.	✓
6	Holding NatHERS assessors responsible for reviewing 'as built' and independent auditing. While the responsibility rests with the builder to construct as per the plans, the NatHERS assessor should also want to see their 'design' operate as modelled.	✓
7	Having the builder contractually responsible for the performance of the as-built building through an independent process.	✓
8	Mandatory site inspections by energy assessors/professionals to ensure that compliance at design/approval is followed through to as-built stage	✓
9	ProductWise propose is a market mechanism to reduce or remove the risk of NCP entering the supply chain and also to provide opportunity incentive for responsible behaviour. We must get it right at the front end of the supply chain to ensure safety and conformance throughout the built environment.	
10	Certificate of compliance of energy rating prior to occupancy	✓
11	Energy efficiency requirements as seen by many as a cost only. The first item to be downgraded/left out. This is common in trade culture. Minimum energy efficiency standards in NCC are often enacted casually. At this stage a stick rather than carrot is required to get the attention on site. Inspections and rectification is needed to 'educate' trades to comply with design and NCC requirements	✓
12	one of the problems we face is the de-regulated environment, the only way around that other than to turn back the clock is for the industry to develop a conscience....	

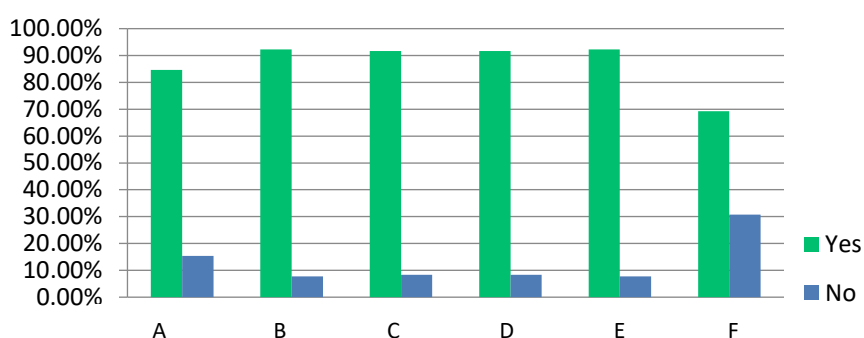
Response No.	Q41. Are there any simple effective non-regulatory actions that could be adopted quickly by industry to enhance energy efficiency compliance?	Covered in recommendations
13	focus on the cost savings of energy efficiency and communicate via community based social marketing techniques.	✓
14	On site check list by building companies to sign off on windows, so the owner knows they are compliant as per the energy rating.	✓
15	Acceptance of manufacturing processes and their products.	
16	Don't permit the V2.6.2.2 reference building alternative method of compliance to be used for standard/regular construction methods as it can be abused and end up with lower energy efficient building outcomes	
17	Ensuring better design would ensure that minor non-compliance does not have a big effect.	
18	Blower door test on a random basis Building sealing is the easiest to check and improve	✓
19	knowledge at design stage	✓
20	Educate the general public about the benefits and reduced heating and cooling demand through high performance building	✓
21	Education to all building professionals and residents including a few case studies of the good and the bad.	✓
22	Education of the benefits to home owner	✓
23	Designers need to be reminded that a min. 6-star energy rating needs to occur prior to lodgement to Council for approval.	✓
24	Knowledge by builders of the benefit of energy efficiency measures.	✓
25	Change regulations so that Council development staff assess all elements of an energy efficient building, not just thermal performance of envelope.	✓
26	Improved education and awareness	✓
27	Public awareness	✓
28	Increased industry awareness of the importance of energy efficiency	✓
29	No - only effective regulation and policing of compliance will enhance energy efficiency compliance	✓
30	Carbon trading scheme	
31	no, there will always be costs so the bulk of the building industry will not improve unless forced to.	
32	Depends on procedures	
33	Penalise developers who do not incorporate energy efficiency in their designs by blacklisting them	✓

Response No.	Q41. Are there any simple effective non-regulatory actions that could be adopted quickly by industry to enhance energy efficiency compliance?	Covered in recommendations
34	<ul style="list-style-type: none"> Use positive results from blower door tests in their marketing. Make it a thing for consumers to want. But also need to make sure shading is installed. Often gets dropped from planning documents. Increase the sophistication of consumer info. "You need a building that works wells in both summer and winter - our blower door tests make sure it performs well in winter; our shading and design for cross ventilation means it will be comfortable in summer" 	✓
35	better training of builders and installation contractors	✓
36	Build energy efficiency training into all building sector trades and professions	✓
37	Make energy assessment software and assessors using "Generic Values"	
38	Using support from recognised industry associations to validate and verify products	✓
39	Use of energy efficiency features by builders as core advertising features for new built houses	
40	Yes - happy to discuss further	
41	without a legal framework to enforce these things, it won't happen. it will need to be done state by state. They are responsible for building control measures. Unless these regulators become actively engaged in this discussion we are wasting our breath. That's the reality of it.	
42	Train builders and trades people to do a job and there is no need for anything. Make them responsible for and certify their own work. They are paid trained professionals just the same as anyone else. There is no use getting a third party involved that a builder tradesperson can hide things from and do a 'dodgy'.	✓
43	Yes, satisfaction of energy efficiency standards could be included as an explicit clause in the contract.	✓
44	no - this is wasted time. individual best practice is great, but to get genuine lift across Australia requires better regulation, checking and audit - that's the bottom line	✓
45	Certifier Final Inspection checks for compliance prior to occupancy certificate being issued	✓
46	I think the only way to address these issues is by external auditing and keeping everyone honest by accreditation and auditing. So, no, not really.	✓
47	In QLD assessors are not required to be accredited - I feel all assessors should be required to be accredited through a governing body as per the remainder of the states. Building certifiers could do more to enforce the builder comply with meeting the energy efficiency requirements set out in the assessment, when completing their site inspections	✓
48	Education	✓
49	HERS reports amended to show a summary of key measures to be met by the builder. HERS reports endorse drawings that they assess, but relies on information being in drawings and not in specification.	✓

Response No.	Q41. Are there any simple effective non-regulatory actions that could be adopted quickly by industry to enhance energy efficiency compliance?	Covered in recommendations
50	All new buildings to have their energy efficiency rating published and prior to the sale of any building there should be an energy assessment undertaken. A checklist of what to look for and run through a program such as FirstRate to get a star rating. NOTE: be a simpler or modified program where you check the ceiling insulation as R4.0 but because it is roughly installed with 10% gaps the ceiling insulation is now input as R2.5....so now the house rates as 4.1 stars...That would get some action by the home owner to get there house up to scratch...and for them to be more diligent when changing things.	✓
51	Spot checks by Certifiers and Councils	✓
	Responses of: 'N/A', 'Don't know' or 'Not sure': 4	
	Responses of just 'No': 7	

Appendix 10 – Prioritisation Survey

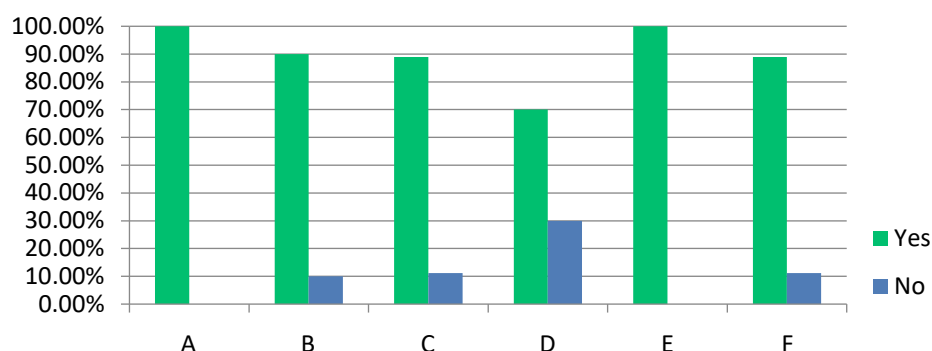
Q1 Do you believe that implementing the following actions regarding systems and tools will improve energy efficiency compliance?



A	Develop and implement a national Electronic Building Passport system (in the form of a mobile phone or tablet application) that shows the energy efficiency compliance of both the rated and approved design and the building products specified
B	Develop a national product verification system to ensure the energy efficiency of products supplied to builders meet Australian or appropriate standards and that those products are installed correctly'
C	Develop a national system, guideline or protocol for how non-compliance with NCC energy efficiency compliance is addressed'
D	Develop a national audit/inspection system that can be applied across all states and climate zone
E	Mandate an energy efficiency inspection audit during construction at 2-3 stages of the building process'
F	Develop a nationally standardised energy efficiency checklist to be used at the beginning of building approval and at the end of construction for consumers to discuss with their builder

Affirmative Observations	<ul style="list-style-type: none"> Large percentages of approval for all of these systemic and tool-based actions
Negative Observations	<ul style="list-style-type: none"> The option to 'develop a nationally standardised energy efficiency checklist to be used at the beginning of building approval and at the end of construction for consumers to discuss with their builder' had the highest percentage of disapproval

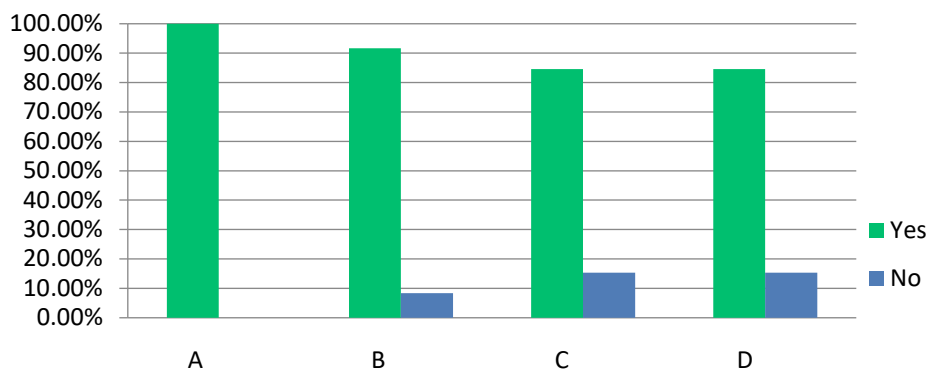
Q2 Do you believe that implementing the following regulatory actions will improve energy efficiency compliance?



A	Mandate that energy efficiency rating documentation is a part of all building designs and plans, prior to building approval
B	Regulate to ensure that there is an energy efficiency compliance sign off prior to handover and occupancy.
C	Develop regulations to include energy efficiency documentation in building contracts.
D	Develop regulations to verify that post-approval product or design substitutions meet approved energy efficiency rating standards and are Code compliant
E	Regulate for mandatory and appropriate energy efficiency knowledge and skill training across all professions and trades involved in the building process
F	Develop a nationally standardised accreditation system for residential building energy efficiency assessors.

Affirmative Observations	<ul style="list-style-type: none"> Large percentages of approval for all the regulatory actions
Negative Observations	<ul style="list-style-type: none"> The option to 'Develop regulations to verify that post-approval product or design substitutions meet approved energy efficiency rating standards and are Code compliant' had the highest percentage of disapproval

Q3 Do you believe that implementing the following industry capacity building actions will improve energy efficiency compliance?

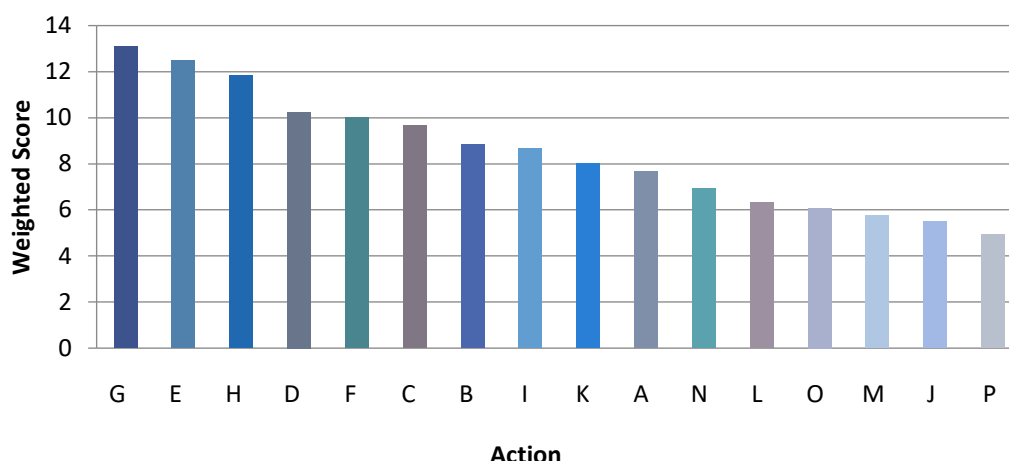


A	Ensure all energy efficiency compliance training and development contributes to recognised CPD points and accreditation regimes within each trade or profession’.
B	Increase consumer awareness of the value of energy efficiency compliance in reducing heating and cooling loads, improving comfort and quality of life and reducing power bills’
C	Develop consistent national guidelines for energy efficiency compliance with the National Construction Code that can be used for accredited training and development’
D	Where possible, undertake professional skills training on-site on energy efficiency compliance with the NCC requirements and all building product and material systems selection, performance and installation’

Affirmative Observations	<ul style="list-style-type: none"> Large percentages of approval for all the actions on industry capacity building
Negative Observations	<ul style="list-style-type: none"> n/a

Overall Observations for the Validity Testing Section	<ul style="list-style-type: none"> Overwhelming positivity on each of these priority actions indicates that there were no anomalous actions put forward through our process.
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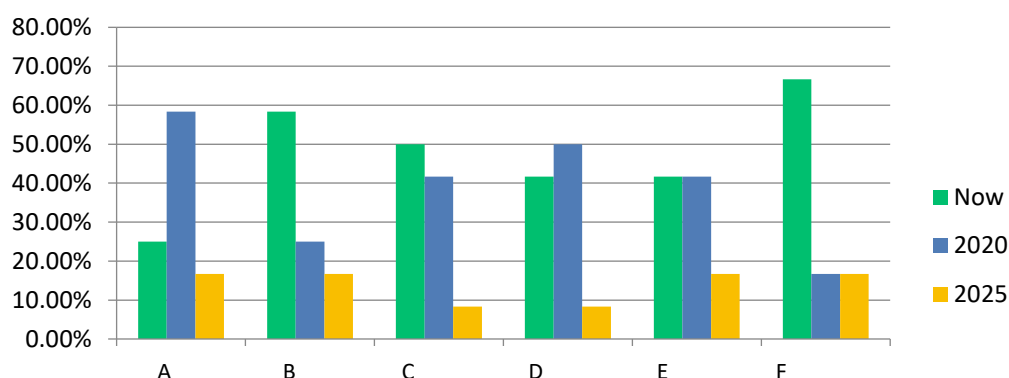
Q4 Please rank these actions from 1 to 16 in order of priority, where the highest priority (1) is given to the action that will have the greatest impact on energy efficiency compliance.



This very plainly suggests the prioritisation order of the actions

Rank	Statement	A.No.
1	Mandate that energy efficiency rating documentation is a part of all building designs and plans, prior to building approval.	G
2	Mandate an EE inspection audit during construction at 2-3 stages of the building process	E
3	Regulate to ensure that there is an energy efficiency compliance sign off prior to handover and occupancy.	H
4	Develop a national audit/inspection system that can be applied across all states and climate zones.	D
5	Develop a nationally standardised energy efficiency checklist to be used at the beginning of building approval and at the end of construction for consumers to discuss with their builder.	F
6	Develop a national system, guideline or protocol for how non-compliance with NCC energy efficiency compliance is addressed.	C
7	Develop a national product verification system to ensure EE of products supplied to builders meet Australian or appropriate standards and that those products are installed correctly	B
8	Develop regulations to include energy efficiency documentation in building contracts.	I
9	Regulate for mandatory and appropriate energy efficiency knowledge and skill training across all professions and trades involved in the building process.	K
10	Develop and implement a national Electronic Building Passport system (in the form of a mobile phone or tablet application) that shows the energy efficiency compliance of both the rated and approved design and the building products specified.	A
11	Increase consumer awareness of the value of energy efficiency compliance in reducing heating and cooling loads, improving comfort and quality of life and reducing power bills.	N
12	Develop a nationally standardised accreditation system for residential building energy efficiency assessors.	L
13	Develop consistent national guidelines for energy efficiency compliance with the National Construction Code that can be used for accredited training and development.	O
14	Ensure all energy efficiency compliance training and development contributes to recognised CPD points and accreditation regimes within each trade or profession.	M
15	Develop regulations to verify that post-approval product or design substitutions meet approved energy efficiency rating standards and are Code compliant.	J
16	Where possible, undertake professional skills training on-site on energy efficiency compliance with the NCC requirements and all building product and material systems selection, performance and installation.	P

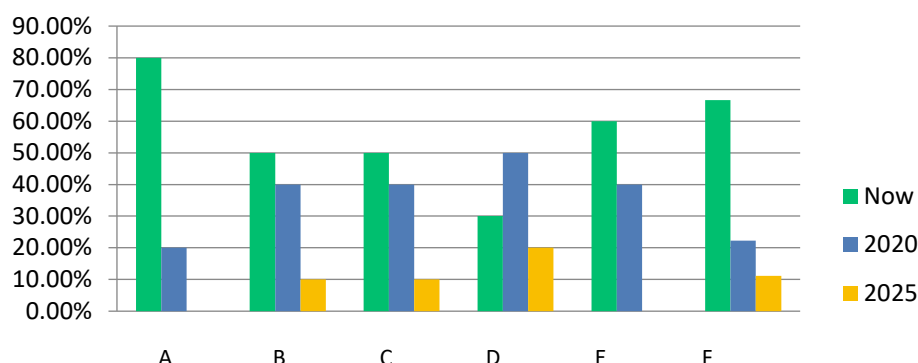
Q5 Indicate the time-frame in which you would expect that these actions regarding systems and tools would be practically implemented by.



A	Develop and implement a national Electronic Building Passport system' was highest for this time-frame
B	Develop a national product verification system to ensure the energy efficiency of products supplied to builders meet Australian or appropriate standards and that those products are installed correctly'
C	Develop a national system, guideline or protocol for how non-compliance with NCC energy efficiency compliance is addressed'
D	Develop a national audit/inspection system that can be applied across all states and climate zone
E	Mandate an energy efficiency inspection audit during construction at 2-3 stages of the building process'
F	Develop a nationally standardised energy efficiency checklist to be used at the beginning of building approval and at the end of construction for consumers to discuss with their builder

Observations for Now	<ul style="list-style-type: none"> The option to 'develop a nationally standardised energy efficiency checklist to be used at the beginning of building approval and at the end of construction for consumers to discuss with their builder.' was the most asked for action to implement 'now', This was followed by 'Develop a national product verification system to ensure the energy efficiency of products supplied to builders meet Australian or appropriate standards and that those products are installed correctly', and 'Develop a national system, guideline or protocol for how non-compliance with NCC energy efficiency compliance is addressed'.
Observations for 2020	<ul style="list-style-type: none"> The option to 'develop and implement a national Electronic Building Passport system' was highest for this time-frame, indicating that it might be harder to implement than other options. 'Develop a national system, guideline or protocol for how non-compliance with NCC energy efficiency compliance is addressed', 'Develop a national audit/inspection system that can be applied across all states and climate zones', and 'Mandate an energy efficiency inspection audit during construction at 2-3 stages of the building process' were next most supported for implementation by 2020.
Observations for 2025	<ul style="list-style-type: none"> 'Develop a national system, guideline or protocol for how non-compliance with NCC energy efficiency compliance is addressed' and 'Develop a national audit/inspection system that can be applied across all states and climate zones' had the lowest amount of support in this time-frame with the others only slightly more supported, which implies all of the options should be implemented by 2020 at the latest

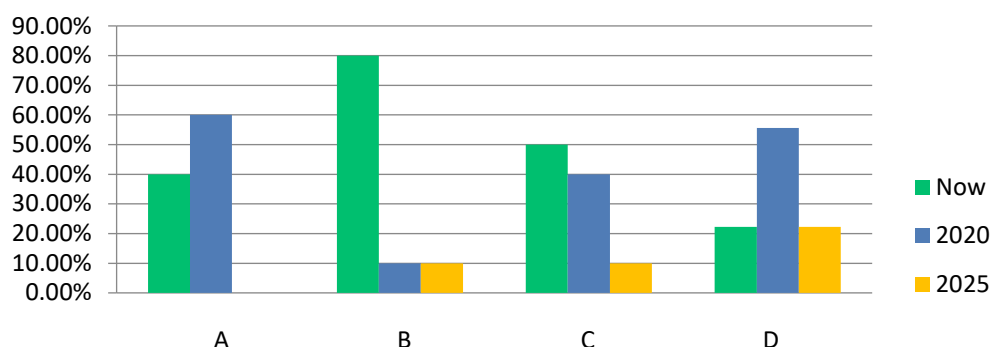
Q6 Indicate the time-frame in which you would expect that these regulatory actions would be practically implemented by.



A	Mandate that energy efficiency rating documentation is a part of all building designs and plans, prior to building approval'
B	Regulate to ensure that there is an energy efficiency compliance sign off prior to handover and occupancy'
C	Develop regulations to include energy efficiency documentation in building contracts
D	develop regulations to verify that post-approval product or design substitutions meet approved energy efficiency rating standards and are Code compliant
E	Regulate for mandatory and appropriate energy efficiency knowledge and skill training across all professions and trades involved in the building process'
F	'Develop a nationally standardised accreditation system for residential building energy efficiency assessors'

Observations for Now	<ul style="list-style-type: none"> The option to 'mandate that energy efficiency rating documentation is a part of all building designs and plans, prior to building approval' was the most asked for action to implement 'now' This was followed by 'Develop a nationally standardised accreditation system for residential building energy efficiency assessors' and 'Regulate for mandatory and appropriate energy efficiency knowledge and skill training across all professions and trades involved in the building process'
Observations for 2020	<ul style="list-style-type: none"> The option to 'develop regulations to verify that post-approval product or design substitutions meet approved energy efficiency rating standards and are Code compliant.' was highest for this time-frame. 'Regulate to ensure that there is an energy efficiency compliance sign off prior to handover and occupancy', 'Develop regulations to include energy efficiency documentation in building contracts' and 'Regulate for mandatory and appropriate energy efficiency knowledge and skill training across all professions and trades involved in the building process' were next most supported for this time-frame.
Observations for 2025	<ul style="list-style-type: none"> 'Develop regulations to verify that post-approval product or design substitutions meet approved energy efficiency rating standards and are Code compliant' had the highest amount of support for this time-frame at only 20%, which implies all of the options should be implemented by 2020 at the latest

Q7 Indicate the time-frame in which you expect that these industry capacity building actions would be practically implemented by.



A	Ensure all energy efficiency compliance training and development contributes to recognised CPD points and accreditation regimes within each trade or profession’.
B	Increase consumer awareness of the value of energy efficiency compliance in reducing heating and cooling loads, improving comfort and quality of life and reducing power bills’
C	Develop consistent national guidelines for energy efficiency compliance with the National Construction Code that can be used for accredited training and development’
D	Where possible, undertake professional skills training on-site on energy efficiency compliance with the NCC requirements and all building product and material systems selection, performance and installation’
Observations for Now	<ul style="list-style-type: none"> The option to ‘increase consumer awareness of the value of energy efficiency compliance in reducing heating and cooling loads, improving comfort and quality of life and reducing power bills’ was the most asked for action to implement ‘now’ This was followed by ‘Develop consistent national guidelines for energy efficiency compliance with the National Construction Code that can be used for accredited training and development’ and ‘Ensure all energy efficiency compliance training and development contributes to recognised CPD points and accreditation regimes within each trade or profession’.
Observations for 2020	<ul style="list-style-type: none"> The options to ‘Ensure all energy efficiency compliance training and development contributes to recognised CPD points and accreditation regimes within each trade or profession’ and ‘where possible, undertake professional skills training on-site on energy efficiency compliance with the NCC requirements and all building product and material systems selection, performance and installation’ were highest for this time-frame. ‘Develop consistent national guidelines for energy efficiency compliance with the National Construction Code that can be used for accredited training and development’ was the next most supported for this time-frame.
Observations for 2025	<ul style="list-style-type: none"> The option to ‘where possible, undertake professional skills training on-site on energy efficiency compliance with the NCC requirements and all building product and material systems selection, performance and installation’ had the highest amount of support for this time-frame at only 22%. This implies that all of the other options should be implemented by 2020 at the latest, with the final option possibly being able to be implemented by 2025.
Overall Observations for the Priority and Time-Frame Sections	<ul style="list-style-type: none"> Actions that could be undertaken now include consumer awareness, consistent checklists and guidelines and energy efficiency training in professions contribute to CPD points. Apart for the above the action of systems for products and material section to meet required energy efficiency standards and installed correctly should be achieved by 2020. The action where possible, undertake professional skills training on-site on energy efficiency compliance with the NCC requirements should completed by 2025, as all other actions were suggested to be completed by 2020.