LOW CARBON LIVING CRC

Low Carbon Built Environment Knowledge Hub

Survey results

SP0008

V1.0

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Survey distribution: People in government, industry and at universities through connection to the CRC for Low Carbon Living program, the ASBEC Research Working Group and related networks.

Survey duration: 14 March to 12 April

Contents

Executive Summary

The SP008 Low Carbon Built Environment Knowledge Hub project aims to deliver a key goal of the CRC-LCL to increase the access and use of research and evidence by practitioners and policy makers, and to provide an enduring platform for CRC Node of Excellence and partner collaboration. It will do so by curating and providing easy access to a wide range of quality research and resources on Low Carbon Living.

To ensure that the specifications for the Knowledge Hub solution reflect the requirements from all our stakeholders, the project conducted a survey of CRC partners, and extended networks, in March to April 2017. The survey attracted a good response from partners in State and Local Government. Though not many participants were from industry, those who completed the survey were still representative from across most areas of industry. Majority of responses came from either Victoria or NSW.

A key finding was that people currently use informal methods of discovery when searching for information to assist with the various decisions they face in their roles in the built environment. Predominantly, people either contact colleagues or their 'expert' network, or are informed by this network. The focus is on easy-to-find, best-you-can-find and easy-to-use. People are also 'pushed' information through various news outlets and 'trusted' organisations. There was a desire for more reviewed forms of evidence, if it could be more easily found or accessible. When searching for information, each sector differs in criteria, though all identified 'trust' of source as an important factor.

The responses on what decisions they face in the future, and what research they require, group into four broad categories: understanding current state, finding new solutions, planning transition pathways and understanding co-benefits. The biggest response was looking for innovation in either community engagement and human behaviour, industry engagement or new technologies. There was also a call for modelling and evaluation with many requests for case studies. The hot topic for research was in energy systems, energy efficiency, energy productivity or renewable energy.

The survey found that those involved in the CRC for Low Carbon Living have a better experience in collaborative research, but note that further improvement in engagement in research for policy design is still desired. This emphasises the need for the Knowledge Hub solution to continue the CRC legacy in supporting collaborative research projects and find even better ways to facilitate such future cooperation between government, industry and academia.

Based on the analysis of the survey results, it is also recommended that the Knowledge Hub solution 'feed' informal networks, rank its resources highly in Google search results, have flexibility in search capability across multiple facets, offer both 'easy to understand' translated summaries and show its users the link back to related reports and relevant resources, while taking a prominent position as a trusted authority on evidence for low carbon living in the built environment.

The project's next steps are to incorporate these findings into the specifications for the Knowledge Hub solution and include the detailed list of research requests in the list of priority content to be reviewed by the Steering Committee.

Survey Objectives

- To gather input from stakeholders on their use and needs for evidence in the built environment.
- To also gather input in how stakeholders collaborate on research projects.
- To identify need for evidence to assist with future decision-making.

Method

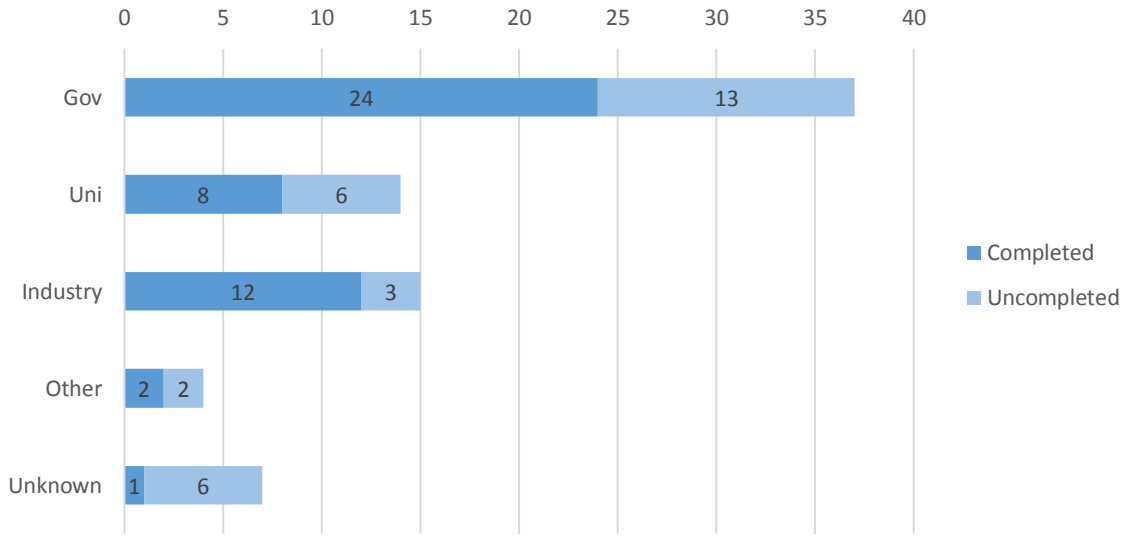
The survey was distributed as a link by email. Participation was anonymous. Both quantitative and qualitative data was collected.

Questions were asked about the participants role in the built environment, the information they use in their role, and how they collaborate in finding new information. Participants were also asked open questions about what their future research priorities are.

Appendix A contains the complete list of questions.

Participants

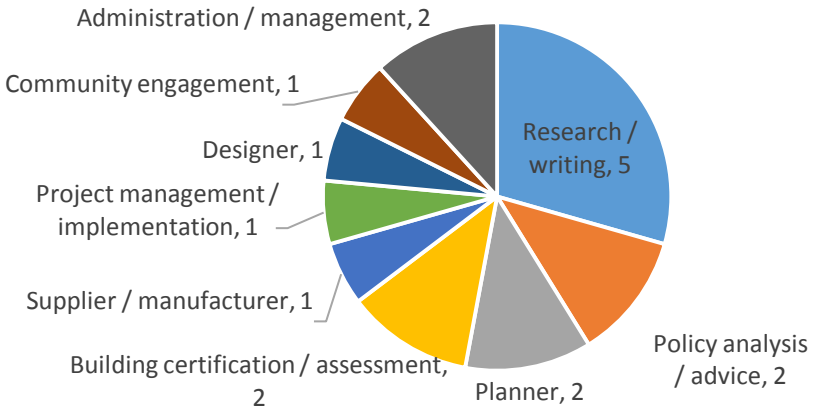
- 77 responses were received
- 47 responses fully completed



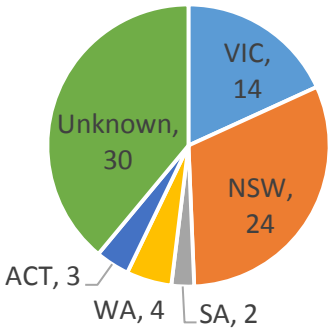
Government participants were:

- 21 at State-level
- 12 at Local-level

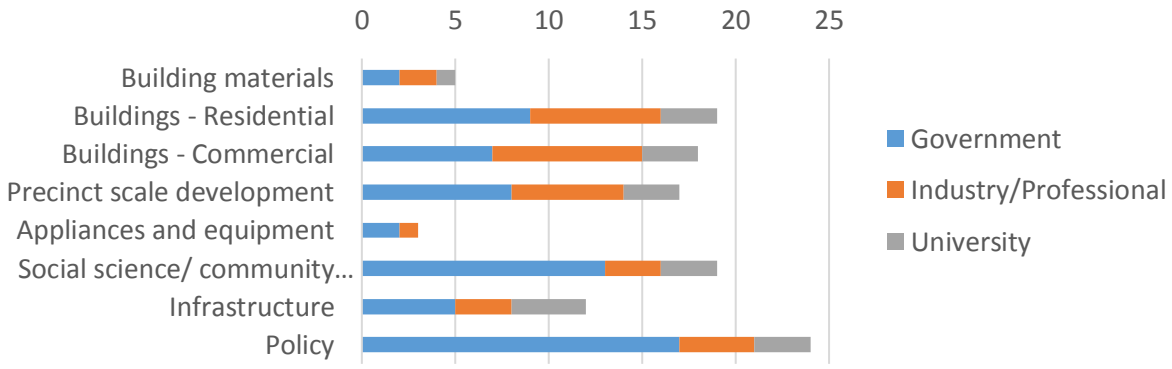
The major role of Industry participants were:



Participants were located in the following states:

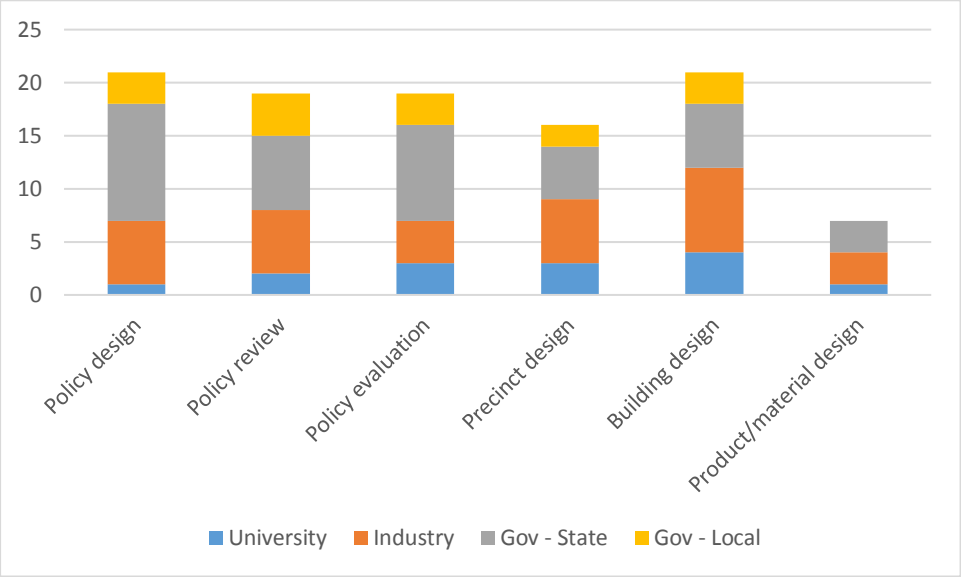


Participant's main focus of work were evenly distributed across building sector, precinct, social science/community, and policy. There was less representation from the products and materials sectors.



Results

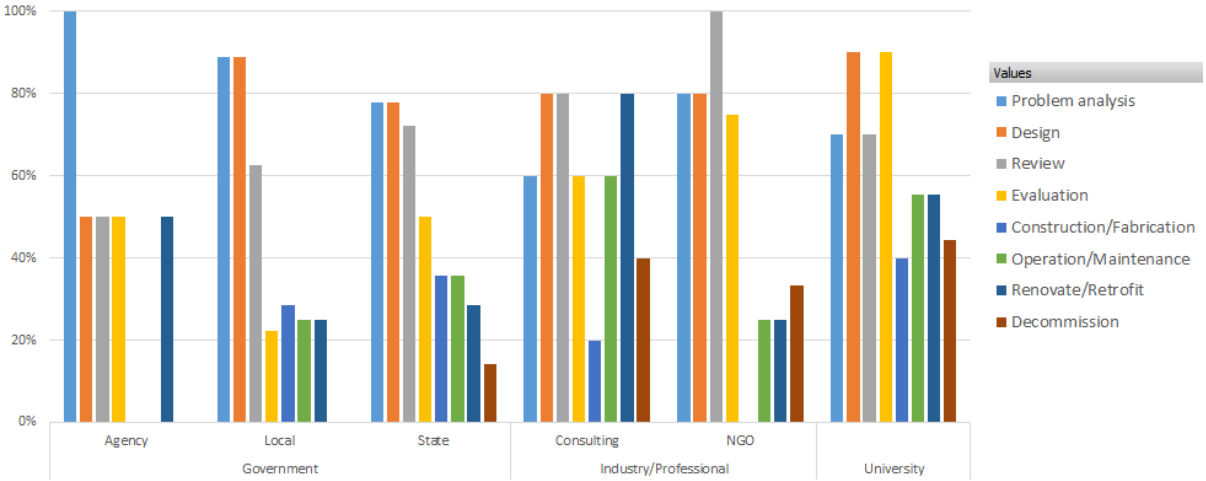
Q7.2 What kinds of decisions do you influence?



The survey participants have an active role in most design decisions across the built environment, except for product/material design.

This information is used to understand the responses in subsequent questions.

Q7.3 At which stage does information have the most importance?



Key points from responses to this question:

- Government's focus is on analysis and design.
- Industry consulting and NGOs value the evidence in review also.
- Unis see the benefit in design and evaluation.

- Evidence is not so important during construction, operation, renovation or decommissioning stages.

Q8.2 What resources do you use, and how easy are they to find?

Responses given identify what they use, and what is easy, or not easy, to find. The number of participants responding with N/A influenced the importance of the resource (less important is indicated in light grey).

	Currently use and it is easy to find	**Currently use but it is hard to find**	**Would use more if it was easier to find**
All	Google results Professional / trade magazines Using your network ie calling a peer News reports and articles in the media Attending conferences / workshops Blogs	Commercial and market research	Data sets
Government & Industry	Public opinion in social media, etc	Conference papers, Briefings, guides, research reviews	Journal articles (peer reviewed) Books & ebooks Reports from universities
Government only		Technical documents	Case studies Discussion / Position papers
University only			Reports from independent Internal reports from your organisation Existing policy, regulatory impact

A ranking of responses is included in Appendix B, including an indication of possible use if the resource was easier to find.

Q8.3 When searching for information to support a decision, what criteria are the most important?

By sector, and in descending order of importance, responses were:

Government:
1. Topic
2. Producing organisation
3. Date
4. Accessible online

Industry:
1. Topic
2. Date
3. Discoverability

University:
1. Topic
2. Published in Peer-reviewed Journal

Key distinguishing points:

- Government participants value the authoritativeness of a resource.
- Industry rate easy-to-find evidence.
- University responses indicate preference for peer-reviewed material.

Q8.4 Thinking about the information generally used in your organisation's decision making…

Participants ordered by importance the following values (where 1 is highest importance), by sector:

	Trustworthy	Easy to understand	Valued by your organisation	The best evidence you can find	Practical to use in your work
University	1	5	2	4	3
Industry	1	5	2	3	4
Government	1	4	2	5	3
State	1	5	2	4	3
Local	1	2	3	5	4

Notable…

- Trust in the information is most important.
- Industry rated the 'best you could find' higher, others favoured practical to use.
- Interestingly Local government voted for 'easy to understand' as second most important.

Q8.5 How do you find out about new information? And how important is the source of information?

The following table indicates the highest responses for importance of a source for finding out about new information. By sector:

	How important	Government	Industry	University
Asking colleagues or experts	Very	71%	64%	
	Somewhat			43%
Colleagues sharing information, in person, by email, etc	Very	57%	67%	
	Somewhat			43%
Websites of key organisations	Very	42%		
	Important		45%	
	Somewhat			71%
News reports and articles including print, online, radio, etc	Very	38%	50%	
	Somewhat			67%
Email newsletters/lists	Important	46%	67%	
	Somewhat			57%
Social media eg.Twitter, LinkedIn, Facebook, etc	Important	39%	42%	
	Somewhat			50%
Workplace intranet or information service	Important		38%	50%
	Somewhat	43%		
Journal subscriptions	Very			57%
	Important		50%	
	Somewhat	38%		
Blogs	Important		45%	
	Somewhat	48%		67%
Libraries	Important			57%
	Not	65%	50%	
Institutional repositories	Important			33%
	Not	55%	44%	
Alerts/RSS from databases and information services	Somewhat		78%	43%
	Not	40%		
Subject databases and clearing houses	Not	61%	40%	29%

Notably…

- Colleagues / experts keeping them informed was most important for Government and Industry (either by asking or by being told).
- Journal subscriptions was most important for the University sector, and libraries and intranet / information services were also important sources for new information.
- News reports, websites of key organisations, and newsletters were also important for Government and Industry.
- Industry also found blogs an important source of new information.

Q9.2 What are the biggest decisions you will need research for over the next three years? /

Q9.3 What research do you need to support those decisions?

Participants submitted 95 comments on a broad range of decisions and research requirements. Most fall into four main themes:

1. **Understanding current state**

   There was a clear requirement for analysis and modelling of solutions (36) and evaluation of existing solution (39) using case studies, comparisons, and methods reviews.

2. **Finding new solutions**

   The majority of responses require innovation (72), either in community engagement and human behaviour (27), industry engagement (23) or in technology (34).

3. **Transition pathways**

   Around a third of the responses (35) were asking for information to assist with transition pathways. Comments included a requirement for tools, strategies, communication methods and models to assist with the transition planning.

4. **Understanding co-benefits**

   There was also a call for better understanding of co-benefits (31), in health and wellbeing, value proposition and cost benefits, productivity, and liveability.

Appendix C contains all responses.

Q10.2 What types of collaboration activities do you do and how satisfied are you with your engagement in them?

Summary of responses:

Collaboration activity	Response
Formal projects or ongoing work as a part of a team	Majority of respondents do this but want better engagement
Instigate proposals for new projects/work	Majority of Government respondents wanted better engagement, but Industry were satisfied.
Participate in proposals for new projects/work	However, majority of Industry responses wanted better engagement in new projects.
Using formal methods of networking	Majority of respondents were satisfied.
Using informally methods of networking	Majority of Government respondents were satisfied, but Industry wanted better engagement.

In brief,

- Those involved in Policy Design feel that, though already collaborating, would like better engagement.
- Those involved in Building Design feel that they are happy with the level of collaboration.
- Participants from Industry, who are also involved in the CRC program, feel more satisfied with their project engagement than those not involved in the CRC.

Appendix D contains all responses.

Q10.3 Are you, or have you been, involved in a research project in the CRC for Low Carbon Living?

Just under half (45%) of the completed responses indicated an involvement in the CRC (Industry (25%), Government (50%), University (75%))

Q10.4 Does your organisation, or is your organisation prepared to, put funding towards collaborative research?

Government predominantly are providing funding, and Industry providing in-kind support.

	Government	Industry/Professional
In kind support	13%	**33%**
No, not able to fund	17%	25%
Would consider funding	17%	17%
Yes, currently provide funding	**46%**	8%

Q11.1 Do you have any other comments on the use of information in the built environment sector?

Responses given:

Government

- We need a national public sector procurement and construction sharing resource/website.

- We would like to get more information about sustainable housing across to our residents though we have tried many avenues such as offering rebates for sustainability assessments of plans, rebates for taking up sustainability courses by building trades and professions, etc.
- It would be great to know if you have any social research information on what would be the best way to disseminate information.

- Australians love property. This should be a super easy topic to engage the public in as long as its framed and packaged correctly. CRCLCL needs a greater focus on engaging, mainstream public communications - not just the tech nerdy stuff!

- There are also a lot of research and projects happening outside of the CRC that have strong linkage with CRC activities - It would be great to investigate how to identify those projects / research, who is doing them and how to link it to the knowledge hub.

- Generally, information is dispersed. There would be great benefit in easy-access information finding and linking to engagement.
- Furthermore, research and evidence gathering efforts need to be much more focused on necessary and desirable industry trajectories, respective actual markets gaps and innovation to close these including through behaviour change.

- Issues about privacy and the level of details that can be made available for use.

- Hard to plough through the information out there. Time poor and information overload.

Industry

- There is a lot of information in a lot of different locations.
- Any attempt to categorise and validate this information and collect it all in one place would be valuable to industry, particularly information relating to the actual energy performance of the existing building stock (not A grade office towers but all of the other building types).
- Great initiative.

- The biggest problem with information in the built environment is that it doesn't seem to flow to the trades on site who continue to build such poor performing residential rubbish, or to the consumers who has to live in it!
- Until builders and the myriad related trades start to collaborate on site to build thermally and energy efficient buildings that are then certified as such by an independent certification mechanism, this is at best a theoretical exercise.

- Interesting you left urban planners off the first urban professional list of the survey! Planners are generally the deciders of each development on the ground. DA planners are often relatively recent graduates and need the evidence base to enable them to 'knock back' non-climate resilient developments.

- There is so much information out there - it will be great to have it organised in a searchable way.
- There are also opportunities for sharing information between the public and private sector as well as the academic sphere.

University

- We need information at a building level.

In brief,

- Various comments relating to the need to access information easily, including sharing across sectors, and accessing data sets.
- Also comments made on improving consumer engagement, and industry engagement at trades' level.
- Comment also made regarding transition pathway, and identifying and closing market gaps.

Limitations

The survey did not receive enough completed responses in the following sectors to draw confident conclusions on those sectors:

- Government – at federal level

  In order to address this limitation, the project is planning a Workshop to be held in Canberra and inviting participation from federal government stakeholders.

- Industry

  This survey was constructed to match some of the questions used in the Closing the Loop project's survey. Their survey received over 100 responses from industry. These results will also be used to guide the Knowledge Hub project.

- Academia

  Stakeholders from the CRC Nodes have been interviewed and participated in workshops for this project and their input has already been incorporated into the project's specifications.

Recommendations

Based on the analysis of the survey responses, the recommendations for the Knowledge Hub solution are:

1. To time evidence delivery for early decision steps and initial and evaluation stages of projects.
2. To feed into people's informal networks and use 'news' networks to distribute evidence.
3. To ensure that Knowledge Hub resources are prominent in Google search results.
4. To offer evidence that is harder to find (see Q8.2).
5. To have flexibility in searching options to meet various needs of users from different sectors.
6. To facilitate the provision of 'easy to understand' translations.
7. To provide trusted sources of evidence in an easily identifiable way.
8. To support the collaboration currently occurring in the CRC for Low Carbon Living program but still find ways to improve cooperation on research projects.
9. To include the survey participants' list of research needs into the content prioritisation managed by the project's Steering Committee.

These recommendations will be incorporated into the Project's specifications for the website solution.

Appendix A: Survey

LOW CARBON LIVING CRC

Low Carbon Built Environment Knowledge Hub

Policy and practice in the built environment.

Do you need information about sustainability and carbon reduction strategies to help you make your design decisions, in either policy or practice? If so, we would like your feedback.

The Low Carbon Built Environment Knowledge Hub project would like your opinion on what information you think is important to use when making decisions that affect the built environment.

This survey should only take you about 15 min.

The information you provide will go to development of an online Knowledge Hub that will help you to find the *right* information at the *right* time in the *right* format for your design decisions.

Thank you for your time and please pass on to your colleagues and network.

Results
This survey is anonymous and data collected will be non-identifiable. We will ask for your email address at the end, should you want to be further involved in the project. Note that this information will not be linked to your survey responses.

Your participation in this research is voluntary. By proceeding to complete the survey, you are indicating that you have read and understood the information above, and are agreeing to participate.

For any questions about the survey or project, please contact
Michelle Zwagerman
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https://www.swinburne.edu.au/LCL-knowledge-hub

SWINBURNE UNIVERSITY OF TECHNOLOGY

Please tell us about yourself

Q2.2 What is the main sector in which you work?

- ❍ Government (1)
- ❍ Industry/Professional (2)
- ❍ University (3)
- ❍ Other (4) _____

If Other

Q3.1 What sub-sector of the build environment industry is your main focus?

- ❍ Design (Architecture, landscape architecture, urban design, industrial design) (4)
- ❍ Engineering (5)
- ❍ Consulting (6)
- ❍ Construction (3)
- ❍ Peak body, Professional Association/Society, NGO, Lobby Group (7)
- ❍ Supplier/Product Manufacturer (12)
- ❍ Property Developer (2)
- ❍ Utilities and Service Provider (9)
- ❍ Community (11)
- ❍ Other (please specify) (10) _____

Q3.2 What is the main focus of your work? (Select all that apply)

- ❑ Policy (9)
- ❑ Building materials (1)
- ❑ Buildings - Residential (2)
- ❑ Buildings - Commercial (3)
- ❑ Precinct scale development (4)
- ❑ Appliances and equipment (5)
- ❑ Social science/ community engagement (6)
- ❑ Infrastructure (8)
- ❑ Other (please specify) (7) _____

Q3.3 Which of the following describes your main role?

- ❍ Policy analysis / advice (1)
- ❍ Project management / implementation (3)
- ❍ Research / writing (4)
- ❍ Designer (Architect, landscape architect, urban designer, industrial designer) (5)
- ❍ Building certification (6)
- ❍ Planner (8)
- ❍ Engineer (9)
- ❍ Construction (2)
- ❍ Contractor (7)
- ❍ Supplier/Manufacturer (14)
- ❍ Community engagement (16)
- ❍ Administration / management (12)
- ❍ Media and communications (13)
- ❍ Education/ training (20)
- ❍ Other (please specify) (15) _____

If Industry/Professional

Q4.1 What sub-sector of the build environment industry is your main focus?

- ❍ Design (Architecture, landscape architecture, urban design, industrial design) (4)
- ❍ Engineering (5)
- ❍ Consulting (6)
- ❍ Construction (3)
- ❍ Peak body, Professional Association/Society, NGO, Lobby Group (7)
- ❍ Supplier/Product Manufacturer (12)
- ❍ Property Developer (2)
- ❍ Utilities and Service Provider (9)
- ❍ Community (11)
- ❍ Other (please specify) (10) _____

Q4.2 What is the main focus of your work? (Select all that apply)

- ❑ Policy (9)
- ❑ Building materials (1)
- ❑ Buildings - Residential (2)
- ❑ Buildings - Commercial (3)
- ❑ Precinct scale development (4)
- ❑ Appliances and equipment (5)
- ❑ Social science/ community engagement (6)
- ❑ Infrastructure (8)
- ❑ Other (please specify) (7) _____

Q4.3 Which of the following describes your main role?

- ❍ Policy analysis / advice (1)
- ❍ Project management / implementation (3)
- ❍ Research / writing (4)
- ❍ Designer (Architect, landscape architect, urban designer, industrial designer) (5)
- ❍ Building certification (6)
- ❍ Planner (8)
- ❍ Engineer (9)
- ❍ Construction (2)
- ❍ Contractor (7)
- ❍ Supplier/Manufacturer (14)
- ❍ Community engagement (16)
- ❍ Administration / management (12)
- ❍ Media and communications (13)
- ❍ Other (please specify) (15) _____

If University

Q5.1 What is the main focus of your work? (Select all that apply)

- ❑ Policy (9)
- ❑ Building materials (1)
- ❑ Buildings - Residential (2)
- ❑ Buildings - Commercial (3)
- ❑ Precinct scale development (4)
- ❑ Appliances and equipment (5)
- ❑ Social science/ community engagement (6)
- ❑ Infrastructure (8)
- ❑ Other (please specify) (7) _____

If Government

Q6.1 What level of government do you work in?

- ❍ Local (1)
- ❍ State (2)
- ❍ Federal (3)
- ❍ Agency (10)

Q6.2 What is the main focus of your work? (Select all that apply)

- ❑ Policy (9)
- ❑ Building materials (1)
- ❑ Buildings - Residential (2)
- ❑ Buildings - Commercial (3)
- ❑ Precinct scale development (4)
- ❑ Appliances and equipment (5)
- ❑ Social science/ community engagement (6)
- ❑ Infrastructure (8)
- ❑ Other (please specify) (7) _____

Q6.3 Which of the following describes your main role?

- ❍ Policy analysis / advice (1)
- ❍ Politician (2)
- ❍ Project management / implementation (3)
- ❍ Research / writing (4)
- ❍ Designer (Architect, landscape architect, urban designer, industrial designer) (5)
- ❍ Building certification (6)
- ❍ Education/ training (7)
- ❍ Planner (8)
- ❍ Engineer (9)
- ❍ Community engagement (16)
- ❍ Administration / management (12)
- ❍ Media and communications (13)
- ❍ Other (please specify) (15) _____

Making decisions

The following questions are about your role in making policy design or practice design decisions.

Q7.2 What kinds of decisions do you influence? (Tick all that apply)

- ❑ Policy design (1)
- ❑ Policy review (2)
- ❑ Policy evaluation (3)
- ❑ Precinct design (4)
- ❑ Building design (5)
- ❑ Product/material design (6)
- ❑ Other (please specify) (7) _____

Q7.3 At which stage does information have the most importance?

	Not important (1)	Somewhat important (2)	Important (3)	Very important (4)	N/A (5)
Problem analysis (1)	❍	❍	❍	❍	❍
Design (2)	❍	❍	❍	❍	❍
Review (3)	❍	❍	❍	❍	❍
Construction/Fabrication (6)	❍	❍	❍	❍	❍
Operation/Maintenance (7)	❍	❍	❍	❍	❍
Renovate/Retrofit (8)	❍	❍	❍	❍	❍
Evaluation (4)	❍	❍	❍	❍	❍
Decommission (9)	❍	❍	❍	❍	❍
Other (5)	❍	❍	❍	❍	❍

Access to Information

The following questions are about the resources you use to make a decision.

Q8.2 What resources do you use, and how easy are they to find? (Please answer all categories)

	Currently use and it is easy to find (1)	Currently use but it is hard to find (2)	Would use more if it was easier to find (3)	N/A (4)
Reports from independent consultants (1)	❍	❍	❍	❍
Reports from universities (22)	❍	❍	❍	❍
Professional / trade magazines (2)	❍	❍	❍	❍
Google results (or use another search engine) (3)	❍	❍	❍	❍
Use your network ie. calling a peer /colleague /expert/ friend (4)	❍	❍	❍	❍
Internal reports from your organisation (15)	❍	❍	❍	❍
Case studies (5)	❍	❍	❍	❍
Technical documents (10)	❍	❍	❍	❍
Existing policy, regulatory impact statements, international standards (24)	❍	❍	❍	❍
Briefings, guides, research reviews (11)	❍	❍	❍	❍
Discussion / position papers (21)	❍	❍	❍	❍
Attending conference/workshop/seminar etc (23)	❍	❍	❍	❍
Conference papers (8)	❍	❍	❍	❍
Public opinion in social media / talk back radio etc. (9)	❍	❍	❍	❍
News reports and articles in the media (12)	❍	❍	❍	❍
Blogs (6)	❍	❍	❍	❍
Books and eBooks (7)	❍	❍	❍	❍
Journal articles (peer reviewed) (13)	❍	❍	❍	❍
Commercial and market research (14)	❍	❍	❍	❍
Data sets (e.g. research or government data) (16)	❍	❍	❍	❍
Other (please specify) (25)	❍	❍	❍	❍

Q8.3 When searching for information to support a decision, what criteria are the most important? (Please number your top 3 criteria)

_____ Topic (1)
_____ Author (2)
_____ Producing organisation (3)
_____ Publishing company or journal (4)
_____ Published in peer-reviewed journal (5)
_____ Discoverable via a search engine like Google (6)
_____ Discoverable via my library (12)
_____ Date published (7)
_____ Cited in a report or article (8)
_____ Recommended by a colleague (9)
_____ Country of origin (10)
_____ In an email newsletter or website you trust/use regularly (11)
_____ Accessible online (13)
_____ Written for application in policy or practice (14)
_____ Cost (15)
_____ Other (please specify) (16)

Q8.4 Thinking about the information generally used in your organisation's decision making, would you say it is...

_____ Trustworthy (1)
_____ Easy to understand (2)
_____ Valued by your organisation (3)
_____ The best evidence you can find (4)
_____ Practical to use in your work (5)

Q8.5 How do you find out about new information? And how important is the source of information?

	Not important (1)	Somewhat important (2)	Important (3)	Very important (4)	N/A (5)
Asking colleagues or experts (2)	❍	❍	❍	❍	❍
Colleagues sharing information, in person, by email, etc (4)	❍	❍	❍	❍	❍
Email newsletters/lists (5)	❍	❍	❍	❍	❍
Websites of key organisations (12)	❍	❍	❍	❍	❍
Workplace intranet or information service (13)	❍	❍	❍	❍	❍
Libraries (8)	❍	❍	❍	❍	❍
Institutional repositories (6)	❍	❍	❍	❍	❍
Journal subscriptions (7)	❍	❍	❍	❍	❍
Alerts/RSS from databases and information services (1)	❍	❍	❍	❍	❍
Subject databases and clearing houses (11)	❍	❍	❍	❍	❍
News reports and articles including print, online, radio, etc (9)	❍	❍	❍	❍	❍
Social media eg.Twitter, LinkedIn, Facebook, etc (10)	❍	❍	❍	❍	❍
Blogs (3)	❍	❍	❍	❍	❍
Other (please specify) (14)	❍	❍	❍	❍	❍

Your priorities for future research

We would like to know what your priorities are for future research in low carbon / sustainable built environment, to assist you in evidence based decision making.

Q9.2 What are the biggest decisions you will need research for over the next three years? Please list up to three below.

1 (1)
2 (2)
3 (3)

Q9.3 What research do you need to support those decisions?

1 (4)
2 (5)
3 (6)

Collaborating on research

The Knowledge Hub is being developed under the mantle of the CRC for Low Carbon Living program, a cooperation between government, industry and academia. The aim of this project is to enable the continuation of that cooperation between all interested parties beyond the program's completion.

The following questions aim to identify how you currently collaborate on research and your involvement in developing information.

Q10.2 What types of collaboration activities do you do and how satisfied are you with your engagement in them?

	Currently do, and satisfied (1)	Currently do, but want better engagement (2)	Do not do, but would like to be engaged in (3)	N/A (5)
Formal projects or ongoing work as a part of a team (1)	❍	❍	❍	❍
Instigate proposals for new projects/work (2)	❍	❍	❍	❍
Participate in proposals for new projects/work (3)	❍	❍	❍	❍
Commission /Fund projects (4)	❍	❍	❍	❍
Meet at organised events - conferences, workshops etc. (5)	❍	❍	❍	❍
Meet informally - private meetings, network events etc (6)	❍	❍	❍	❍
Via social media, informal groups, non-face-to-face communication eg newsletters, facebook groups, blogs (7)	❍	❍	❍	❍
Informally share information/ resources with collegues (8)	❍	❍	❍	❍
Informally share information/ resources with other people in your industry/ professional networks (9)	❍	❍	❍	❍
Other (please specify) (10)	❍	❍	❍	❍

Q10.3 Are you, or have you been, involved in a research project in the CRC for Low Carbon Living?

❍ Yes (1)
❍ No (2)

Q10.4 Does your organisation, or is your organisation prepared to, put funding towards collaborative research?

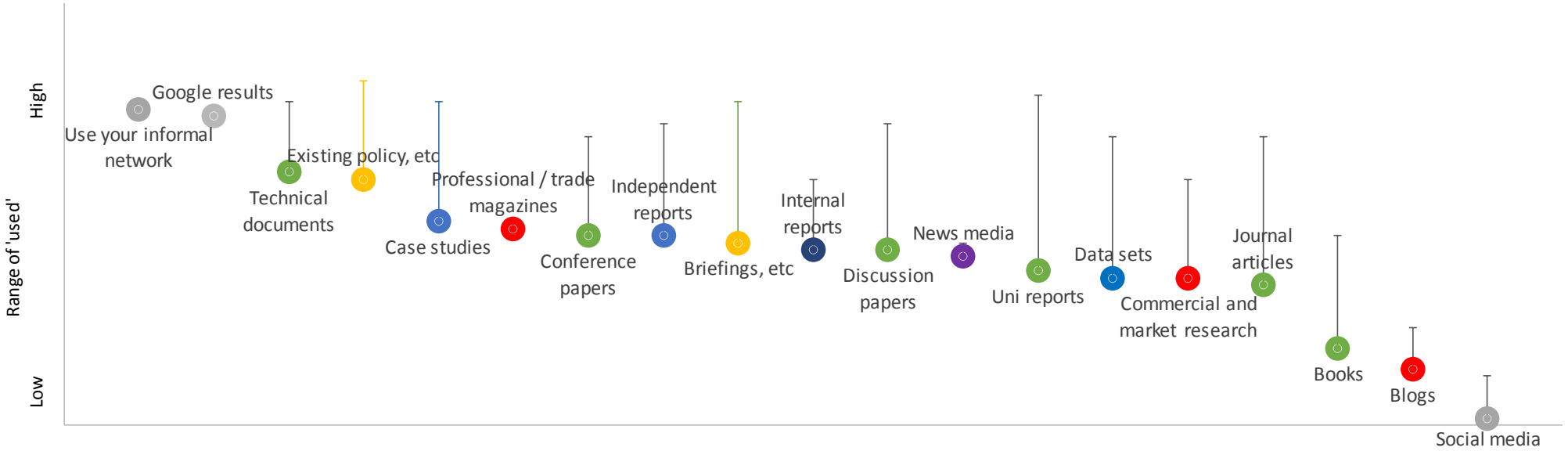
- ❍ Yes, currently provide funding (1)
- ❍ Would consider funding (2)
- ❍ No, not able to fund (3)
- ❍ In kind support (5)
- ❍ Do not know (6)
- ❍ Other (please specify) (4) _____

Q11.1 Do you have any other comments on the use of information in the built environment sector?

Q11.2 Would you be interested in being interviewed so that you can provide further input into the project? If so, please provide email address. Your email address will not be linked with your survey responses.

Appendix B: Responses to Question 8.2

A ranking of types of evidence used, also showing the possible use if the resource was easier to find.



Appendix C: All responses to Questions 9.2 and 9.3

Sector legend: Government – Green Industry – Red University – Yellow

What kinds of decisions do you influence?	Q9.2 What are the biggest decisions you will need research for over the next three years?	Q9.3 What research do you need to support those decisions?
Precinct design, Building design, Product/material design	Governance of Precinct scale renewable systems	Applied Research
	Emerging technologies eg different sorts of batteries and energy sources	Business Cases
	Compatibility and functionality of different renewable energy technologies on a network / grid	Case studies
Product/material design	Automation in building	How to upgrade existing buildings
	Low cost energy sources	Energy sources costs and benefits
	Built environments particularly retrofit existing	Sealing of houses how to measure
Policy design, Building design, Product/material design	Value proposition for the benefits of (building services) maintenance for energy efficiency	Performance assessment of maintenance interventions including quantifying the costs and benefits (
	Benchmarking tools (energy and emissions) for existing buildings (beyond NABERS)	A good picture/database of the current existing Australian building/property sector - what buildings, what use, what services, what energy use
	Tools to help industry retrofit and recommission buildings for improved energy productivity	Quantifying the benefits of expanding mandatory energy disclosure to all building types (i.e. expanding CBD program)
Other - Communication design and delivery	How to engage the NSW public in moving to the NSW Government's twin climate goals of net zero by 2050 and resilient NSW	Social research including psychology
	How to get engage program delivery partners and users/customers in the NSW Government's climate actions over the next five years	Market research
	How to move our stodgy and risk averse Government department into the modern era of communications and customer centricity	Changing nature of democracy and citizen participation

What kinds of decisions do you influence?	Q9.2 What are the biggest decisions you will need research for over the next three years?	Q9.3 What research do you need to support those decisions?
Policy review	Transition pathways for a low carbon economy, identifying complex system interactions and how clean energy and resources can be accessible to all socio-demographics	Systems transition research
	How sustainable building policy can be developed further so it is fully enshrined as the norm, while being attractive and helpful to property developers	building policy review and literature review of international approaches
Policy review	How best to argue for the co-benefits of Health and built environments	reports
	evidence-based policy and translation strategies	case studies
	Options for Data and infrastructure to support decision-making	strategies
Policy design, Policy review, Policy evaluation, Other - Program design and implementation	Potential uptake of energy efficient upgrades in the residential built environment	Market analysis
	Role the stakeholders who are already active across the whole property lifecycle can play in promoting more energy efficient uptakes in the residential property market	Stakeholder consultation
	How to make energy efficiency in the residential property market the new norm	Consumers survey and message framing analysis
Other - decisions that business make to improve energy productivity	Natural Gas energy productivity	examples and data on implementation of technologies including outcomes
	Large energy user energy productivity	
	Emerging technology for energy productivity	
Policy review, Policy evaluation, Precinct design, Building design	Solar and battery systems	Review of established life cycle methods
	Zero carbon rankings for construction products eg a certification system similar to Forestry Stewardship Council	Post occupancy analysis of large housing projects eg Carlton Housing Redevelopment
	Life cycle cost analysis of housing models	Technical comparison of solar/battery systems
Policy design, Policy review, Policy evaluation, Other - Investment	Market share	Statistics on market
	Environmental requirements / compliance	Compliance
	Funding sources	Funding avenues

What kinds of decisions do you influence?	Q9.2 What are the biggest decisions you will need research for over the next three years?	Q9.3 What research do you need to support those decisions?
Policy design, Policy review, Policy evaluation	Policy framework and potential government intervention to expedite the uptake of building information modelling.	Productivity improvements from building information modelling and construction innovations
	Regulation of building energy performance , specifically with respect to requirements for service and maintenance activities	Energy efficiency data for service and maintenance activites
	Pathways and competency requirements for commissioning practitioners	Importance of commissioning with respect to building performance
Precinct design, Building design, Other - Precinct infrastructure	Client project work where we select technologies based on economic, environmental and social benefits and build a business case on these.	Engineering & technical analysis
		Policy analysis
		Environmental impact analysis
Policy design, Precinct design, Building design	Low carbon building and precinct design and technologies	research+evidence to support case for better buildings and precincts
	Health and wellbeing in buildings	case studies and examples with evaluation including cost-benefit
	sustainable, affordable housing and urban growth	guidance, tools and benchmarking
Policy design, Policy review, Precinct design, Building design	Precinct scale low-carbon initiatives	
	Relationships between urban form and transport	
Policy design, Policy review, Policy evaluation, Building design, Product/material design	Co-benefits of low carbon projects	International research
Policy design	What methods are best used to influence behaviour change in industry	social research
	What people/trades are most influential in producing sustainable housing in the residential supply chain	examples of what other countries, states and cities are doing
	How can we shift the market to produce carbon neutral housing	
Policy design, Policy evaluation, Building design	How to achieve carbon neutrality in existing built environment	International evidence base
	Cost implications for carbon neutral buildings over business as usual	Case studies

What kinds of decisions do you influence?	Q9.2 What are the biggest decisions you will need research for over the next three years?	Q9.3 What research do you need to support those decisions?
	Co-benefits (health, productivity, wellbeing) of low carbon built environment	Health/productivity/wellbeing research
Building design	How much to invest in retrofitting?	Cost effective retrofitting of existing building stock
	How to make buildings today desirable tomorrow?	Triple bottom line results of rapid environmental policy change
	What will infrastructure investment look like in the future?	Triple bottom line results of infrastructure investments
Building design	cost effective energy saving initiatives for public sector buildings	case studies
	innovative, efficient and effective methods of construction	climate specific solutions
	sustainable building materials, services and systems	life cycle costs and benefits
Building design	Evidence based decision making on sustainability design and features of buildings and precincts	Case studies of implementation nationally
	New building construction methods	What is being done internationally (state of art)
	New building technologies	Research into impact of technologies and construction improvements
Policy design, Policy review, Policy evaluation, Precinct design	Defining liveability in the context of urban densification	Characteristics that make a place "liveable"
	Addressing housing affordability	Models for the provision of affordable housing
	Business models for local energy generation and consumption, reform of the National Energy Market	Financially viable models to support local energy generation
Policy design, Policy review, Other - Community engagement programs	How to engage with the community in building sustainably	Quantifiable benefits of sustainable building
	How to get trustworthy information regarding sustainable building products to pass on to the community	A cost-benefit analysis of choosing a sustainable product over the life of the building
Policy review, Policy evaluation, Building design, Other - behavioural change on ground projects, capital works for environmental conservation and management, DA assessment	Integrated future design for environment and urban development in existing Sydney	various council studies
		own consultant investigations
		international studies/ university studies

What kinds of decisions do you influence?	Q9.2 What are the biggest decisions you will need research for over the next three years?	Q9.3 What research do you need to support those decisions?
Policy design, Policy review, Policy evaluation, Precinct design, Building design, Product/material design	Proposed development on place and people	Impact of proposed developments - methodology to assess
	Water and bushland management	
Policy evaluation, Precinct design, Building design	Reduction efficiencies for proprietary stormwater treatment measures in an Australian context	Rigorous scientific testing and results
	Stormwater pollutant reduction parameters to suit local or regional conditions	Results that are verified for local conditions
Policy design, Policy evaluation, Building design, Product/material design	Value of environmental features in property valuation	yes
	Zero energy buildings	
Policy review, Policy evaluation, Building design	Expansion / development of online sustainability assessment tool for buildings	Topic specific evidence around environmental and cost benefits of sustainable building
	Appropriate policy for local government to use to achieve more sustainable built environments	Evidence of effectiveness or otherwise of existing policy frameworks
Other - Community Choices	Cost- benefit analysis of the installation of certain products verses the status quo	
Policy evaluation, Precinct design, Building design	improve sustainability outcomes in the residential sector	cost data to challenge perception that building green costs more
	cost effectively (where possible) enable transition to low carbon built environment	
Policy design, Policy review, Precinct design	Social Impact of built environments	Funding for independent research
	Environmental Impact of built environments	Research with a view to practical application
	Affordability of and access to infrastructure	Information from trustworthy sources
Policy design, Policy review, Policy evaluation	designing a pathway to zero net emissions in the buildings/ built environment sector	understanding energy demand
	how to decrease emissions substantially in the next decade	understanding building trends (design, construction, retrofit)
		intensity of the energy grid

What kinds of decisions do you influence?	Q9.2 What are the biggest decisions you will need research for over the next three years?	Q9.3 What research do you need to support those decisions?
Building design, Product/material design	Social and technical innovations that provide building solutions for affordability	Social theory based
	Research on the changing nature of energy systems	Technical systems based
	Research on Living Laboratories	Environment and sustainability research
Policy design, Policy evaluation, Precinct design	living infrastructure component targets	downscaled climate change projections
	codes to control development in urban renewal precincts	microclimate analysis tools
	climate change resilience indicators	quantification of living infrastructure benefits
Policy design, Policy review, Building design	cost benefit analysis (for individual dwelling owner, community and developers) of climate resilient dwellings and precincts	
	encouraging urban food	
	suburban trees and backyards in urban design for water management and air temp control	
Policy design, Precinct design	Precinct scale microgrid, nanogrid , smart grids	Case studies
	Building Performance at a range of scales	Study Tours
	PV and Battery storage at a range of development scales	Research reports
Policy design, Policy review, Precinct design, Building design, Product/material design	Measuring and demonstrating the impact the industry is having in all areas	Current figures on energy use for our sector and the sources (renewable/non renewable)
	Employment outcomes/figures for our industry / economic impact	LCA and circular economy figures for the industry
	Energy use and the makeup of the energy in our networks	Employment figures for our industry/economic impact
Other - Researcher phd with architectural and construction background.	Retrofiting measures to the commercial sector.	Energy performance
	Return of investment of relevant measures.	Potential to retrofit
	Implementation finding for those measures.	Environmental performance

Appendix D: All responses to Question 10.2

		Formal projects or ongoing work as a part of a team			Instigate proposals for new projects/work			Participate in proposals for new projects/work		
		Currently do, and satisfied	Currently do, but want better engagement	Do not do, but would like to be engaged in	Currently do, and satisfied	Currently do, but want better engagement	Do not do, but would like to be engaged in	Currently do, and satisfied	Currently do, but want better engagement	Do not do, but would like to be engaged in
Involved in CRC	Government	42%	37%	0%	33%	30%	11%	42%	37%	0%
	Industry	100%	0%	0%	100%	0%	0%	100%	0%	0%
Not involved in CRC	Government	45%	24%	12%	40%	25%	12%	45%	12%	21%
	Industry	0%	36%	20%	14%	15%	36%	0%	43%	13%

		Commission /Fund projects			Meet at organised events - conferences, workshops etc.			Meet informally - private meetings, network events etc		
		Currently do, and satisfied	Currently do, but want better engagement	Do not do, but would like to be engaged in	Currently do, and satisfied	Currently do, but want better engagement	Do not do, but would like to be engaged in	Currently do, and satisfied	Currently do, but want better engagement	Do not do, but would like to be engaged in
Involved in CRC	Government	50%	33%	0%	50%	28%	5%	67%	19%	6%
	Industry	100%	0%	0%	100%	0%	0%	67%	25%	0%
Not involved in CRC	Government	44%	29%	6%	58%	18%	10%	50%	28%	6%
	Industry	0%	0%	38%	43%	27%	9%	43%	36%	0%

		Via social media, informal groups, non-face-to-face communication eg newsletters, facebook groups, blogs			Informally share information/ resources with colleagues			Informally share information/ resources with other people in your industry/ professional networks		
		Currently do, and satisfied	Currently do, but want better engagement	Do not do, but would like to be engaged in	Currently do, and satisfied	Currently do, but want better engagement	Do not do, but would like to be engaged in	Currently do, and satisfied	Currently do, but want better engagement	Do not do, but would like to be engaged in
Involved in CRC	Government	42%	26%	11%	42%	32%	6%	42%	32%	8%
	Industry	33%	40%	0%	67%	25%	0%	67%	25%	0%
Not involved in CRC	Government	45%	24%	10%	58%	24%	5%	58%	24%	8%
	Industry	43%	18%	22%	0%	50%	0%	25%	29%	20%