Forum 3

Summary of work completed by NHBC (April to October 2012) For WP2

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ELIOS II - Overview

Facilitating access to insurance so as to stimulate innovation and promote eco-technologies in the EU.

Specific aims of NHBC's work on WP2:
- To assess the availability of data on failures and defects in the EU construction industry
- To test availability of data by selecting 10 eco-technologies
- To summarise results in 10 case studies

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Summary of NHBC work

- Selection of 10 eco technologies

- Questionnaire
    - Finalised questions
    - Design paper and online versions
    - Distribution
    - Collation and analysis of results

- Completed the 10 case studies

Selection of eco-technologies

- Started with a list of 35 widely spread technologies

- Filtered down to a suggested list of 10

- Final list agreed with ELIOS II partners

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Final 10 selected eco-technologies

- **Energy production**
  1. Photovoltaic panels (PVs)
  2. Ground Source Heat Pumps

- **Energy conservation**
  3. Double skin curtain wall / façade
  4. Mechanical ventilation with heat recovery (MVHR)
  5. Vacuum insulated panels (VIPs)
  6. Biomaterials, e.g. straw, hemp, sheep's wool
  7. Paper based insulation, e.g. Warmcel

- **Water**
  8. Rainwater harvesting, incl. catchment basins & grey water recycling
  9. Green or brown roofs

- **Other sustainability related technologies**
  10. Low VOC materials, e.g. paints, kits and glue

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Questions and questionnaire

- Outline of questions drawn from ELIOS II partners
- Detail added by NHBC, from partner briefing
- Questions agreed with ELIOS II partners
- Questionnaire available in 3 versions/languages

  Email version that was unique to each recipient

  URL link for impersonal email and websites

  PDF and paper

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Target audience for completion

- Across EU
- Range of businesses
  - Manufacturers, builders, insurance etc.
- Personalised contacts
- Sourced by NHBC and partner contacts
  - Supplemented by Google searches and LinkedIn contacts and LinkedIn groups

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Targets by Sector by Country

A process was followed to introduce ELIOS II and the survey

- Personalised introductory email

- Survey link sent

- Reminder, if needed

- 2nd reminder for specific sectors

- "Thank you" email to those who responded

A summary of the results will be sent to those who requested to see this.

Response questionnaire

- Number of organisations approached: 445
- Response with filled-in q'naire: 70
- Response by phonecall/email : 17

→Reponse rate 20%

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- From a range of business sectors

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- From a representative sample of 13 EU-countries

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Responses by sector
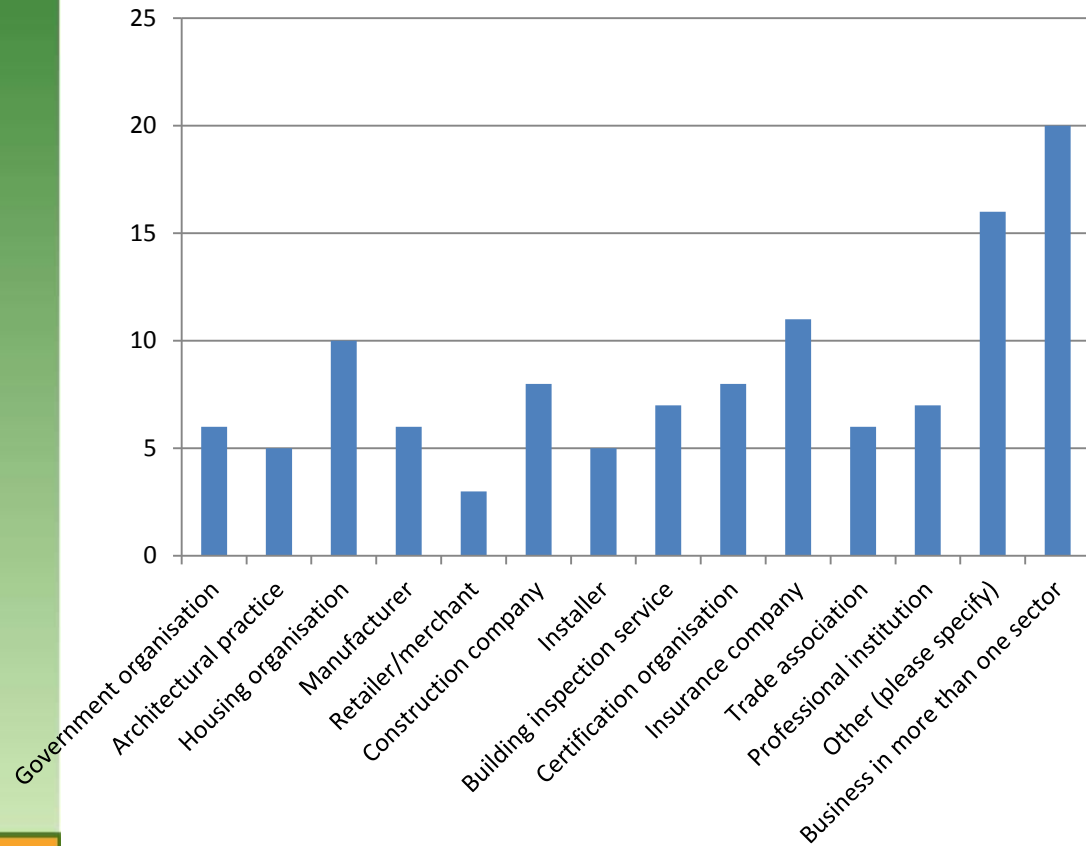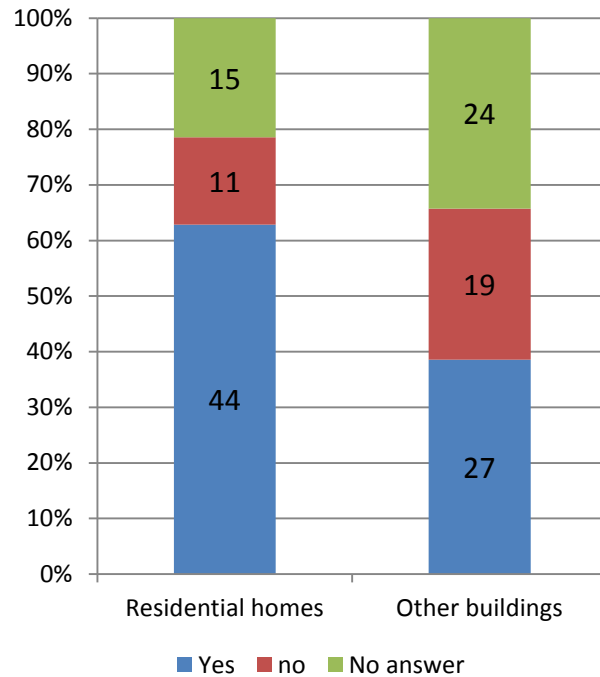

Summary
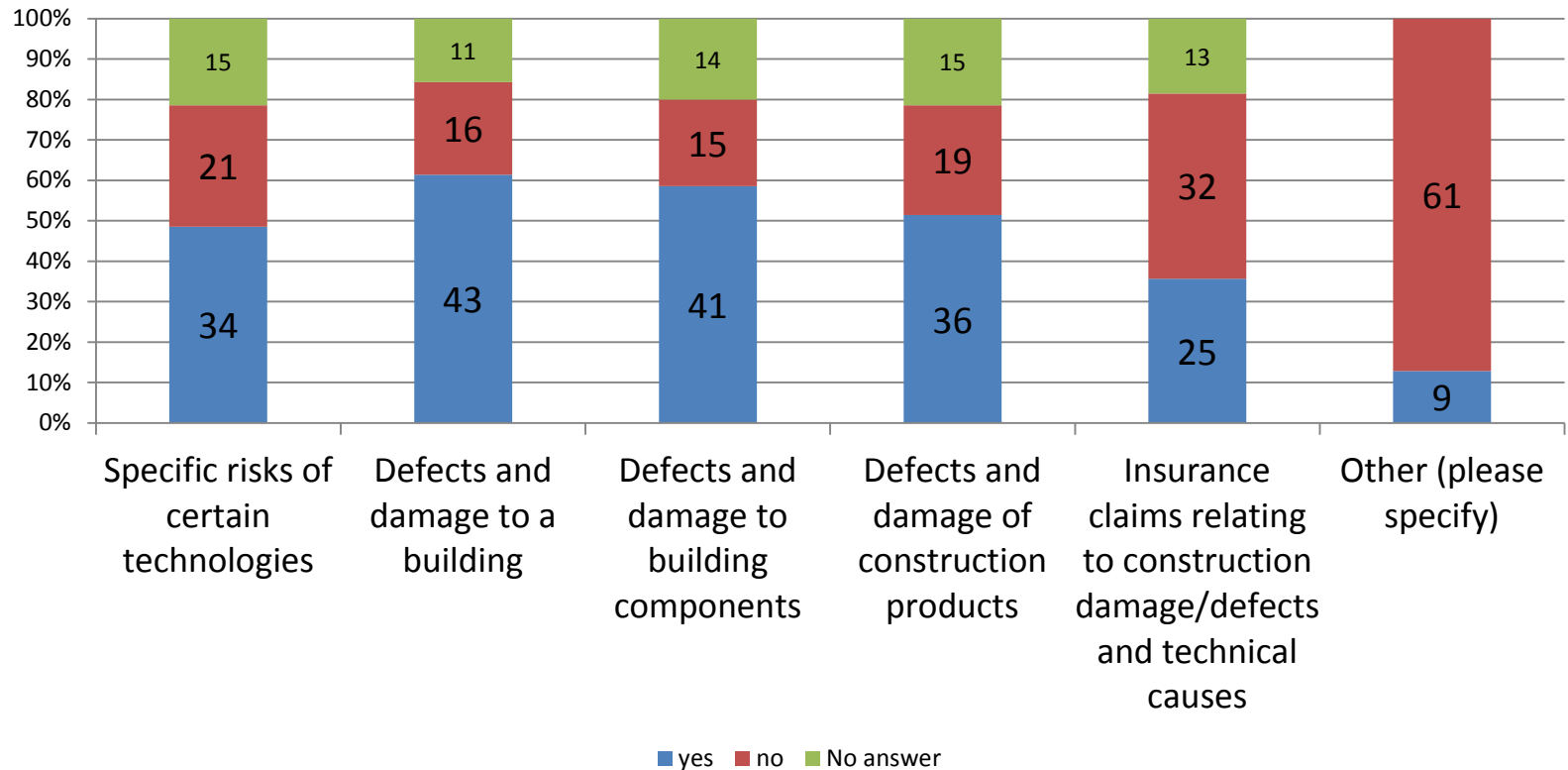- Responses from all industry sectors
- Responses on all 10 eco-technologies

Summary of findings
(Key Questions)

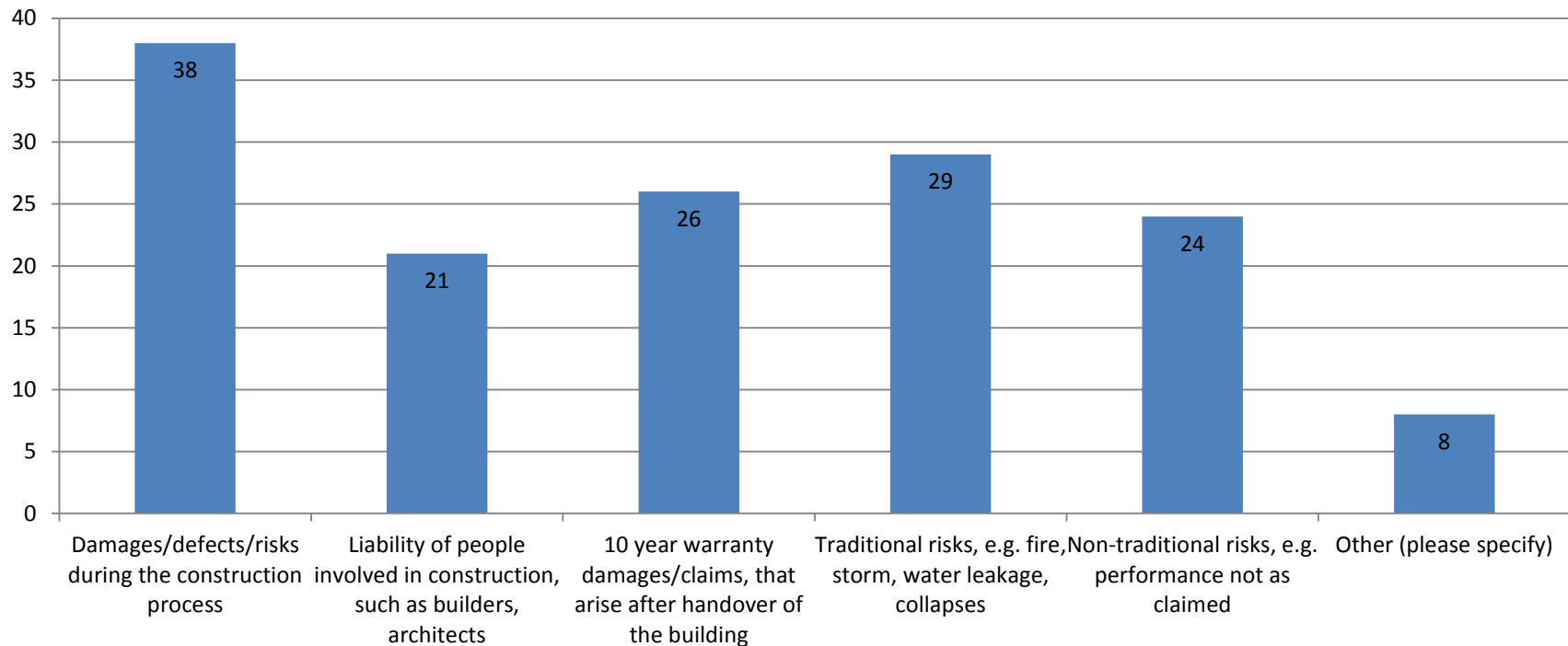The following slides contain detail on each of the key questions

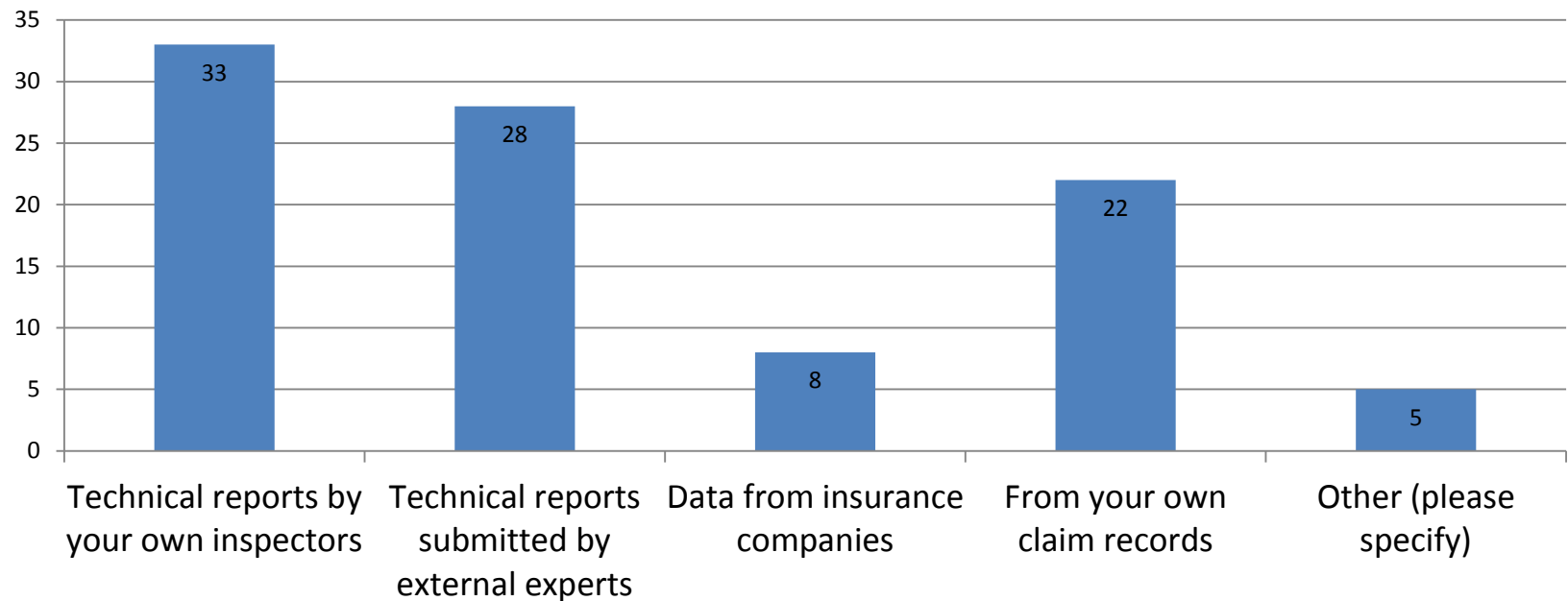# Question : What building types do you collect data on?
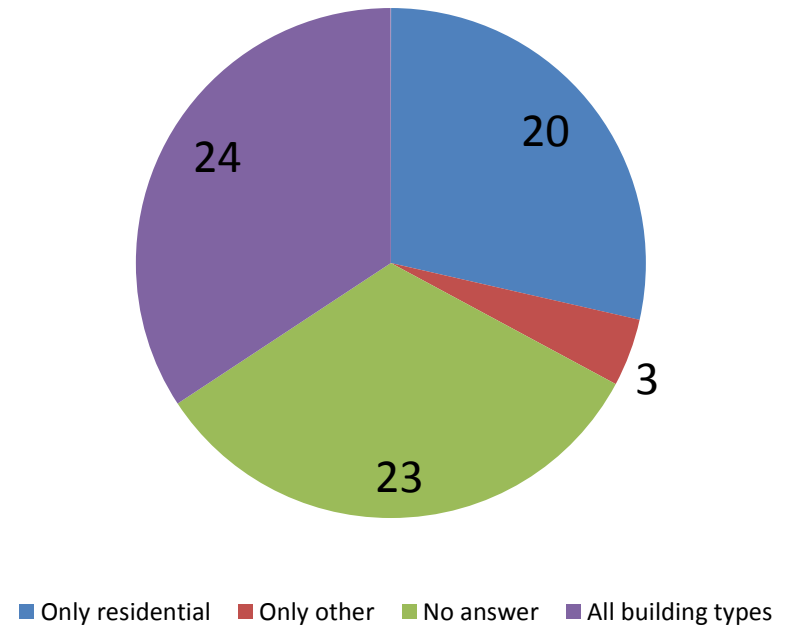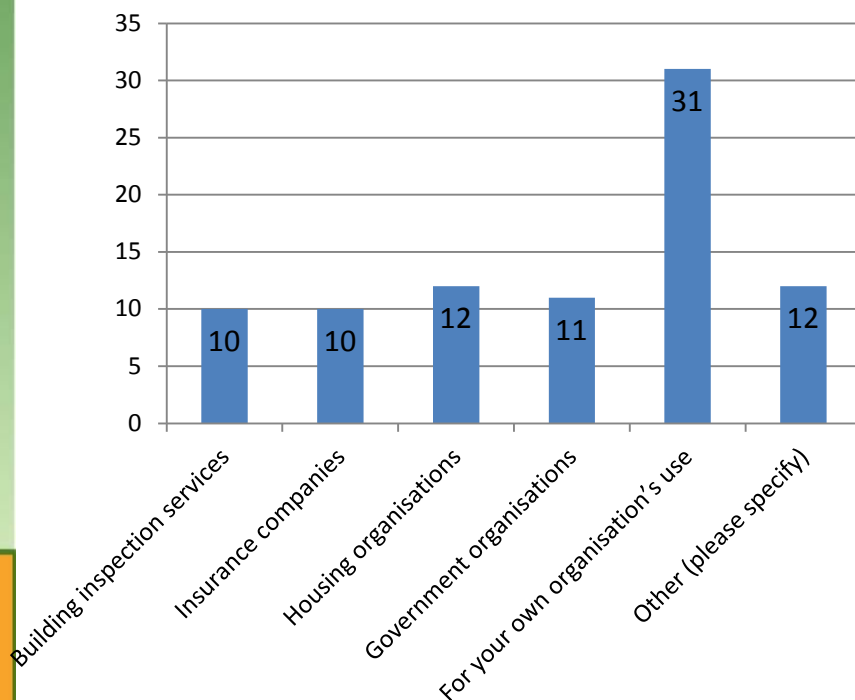
Question: What data is collected?

Question: What kind of damages / defects do the data refer to (please tick all that apply)?

Question: How do you collect the data ?

Question: For whom do you collect the data?
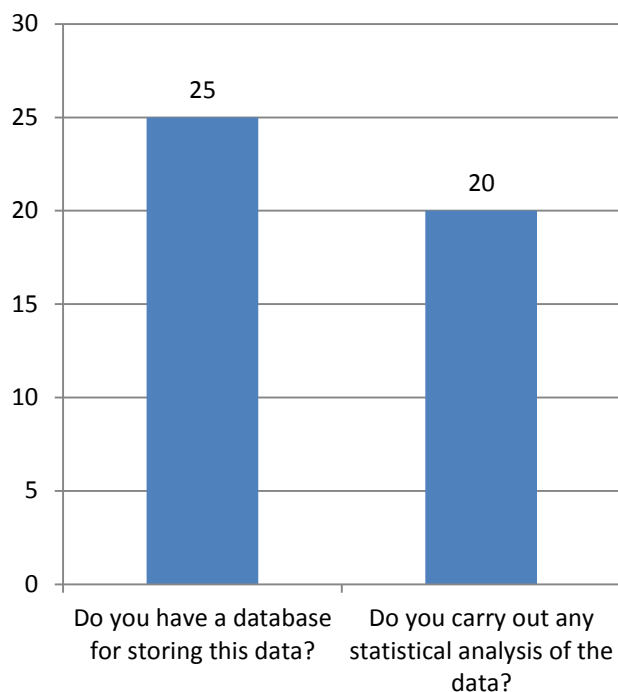

Where published
- 34 on the web
- 20 in newsletters
- 28 in another publications

What is published
- 32 only summary data
- 21 all raw data
- 20 publish anonymous raw data

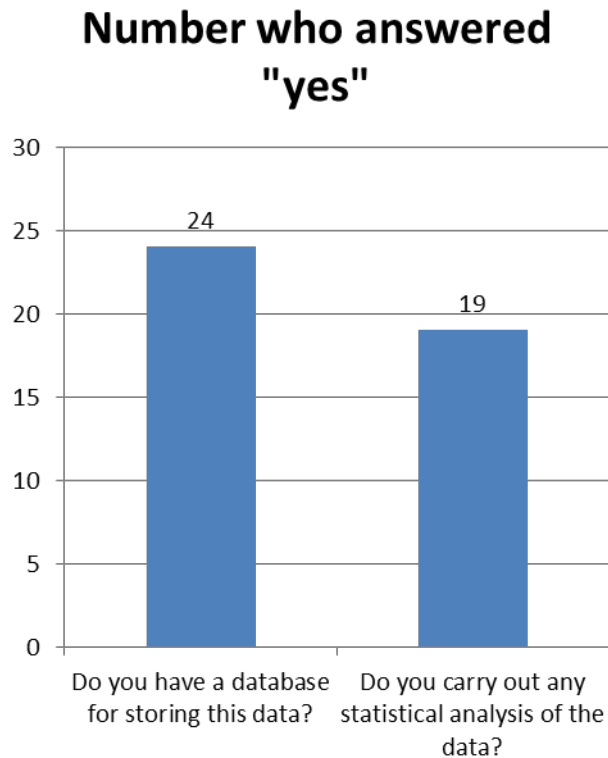# Question: Do you have a database?

Number who answered yes

Sector with database	
Government organisation	4
Architectural practice	1
Housing organisation	3
Manufacturer	1
Retailer/merchant	0
Construction company	2
Installer	1
Building inspection service	4
Certification organisation	5
Insurance company	9
Trade association	2
Professional institution	2
Other (please specify)	7

Year database started, and number of databases

1967	1
1970	1
1990	2
1991	1
1995	1
1998	1
2000	2
2002	1
2004	1
2005	1
2006	1
2007	4
2008	1
2009	1
2011	1

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Question: Do you run statistical analysis?

Number who answered "yes"

| Sector with database	
Government organisation	2
Architectural practice	1
Housing organisation	4
Manufacturer	3
Retailer/merchant	1
Construction company	1
Installer	1
Building inspection service	4
Certification organisation	4
Insurance company	7
Trade association	1
Professional institution	1
Other (please specify)	6
Business in more than one sector	8

Summary of case studies

- The following slides contain a summary of the 10 case studies

- The slides present a high level overview of the responses, reference to the actual case studies should be made for more detailed information.

- A more in-depth look at the Solar PV case study
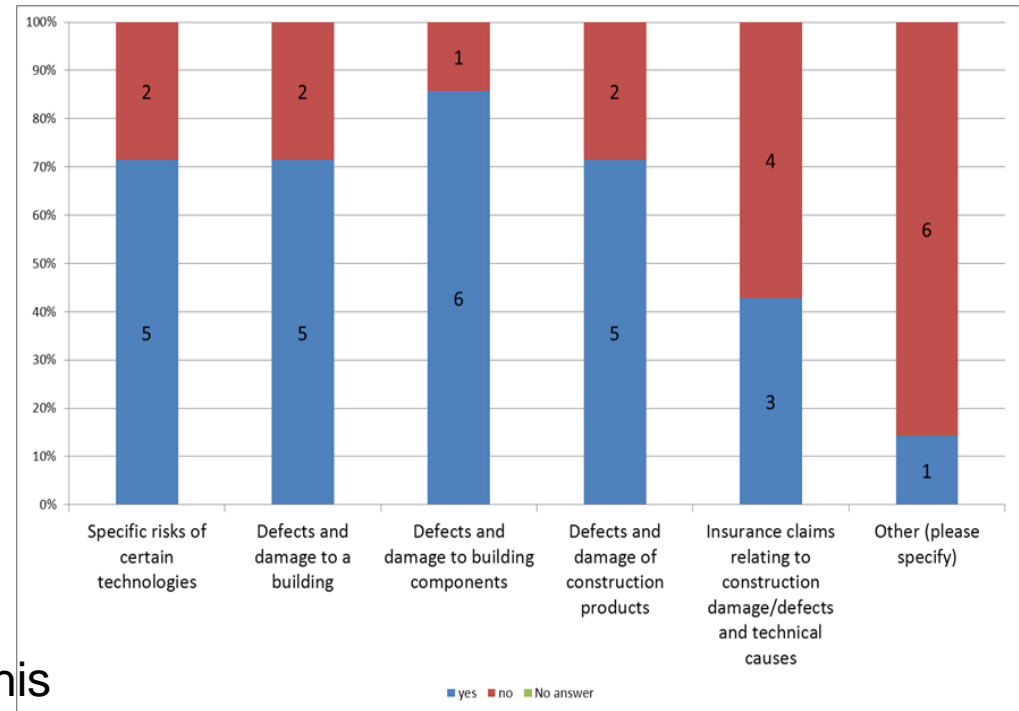
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1. Ground Source Heat Pumps

Number of questionnaires on this technology
- 9 (13% of 70 responses)
- 117 installations
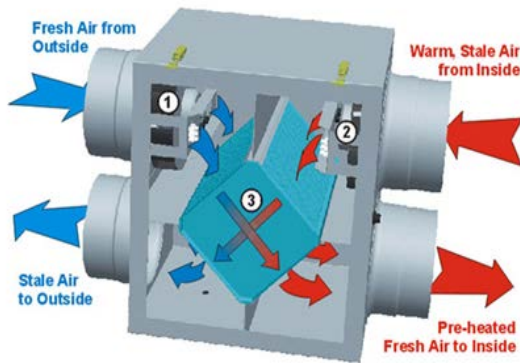- 26 (22%) have defects
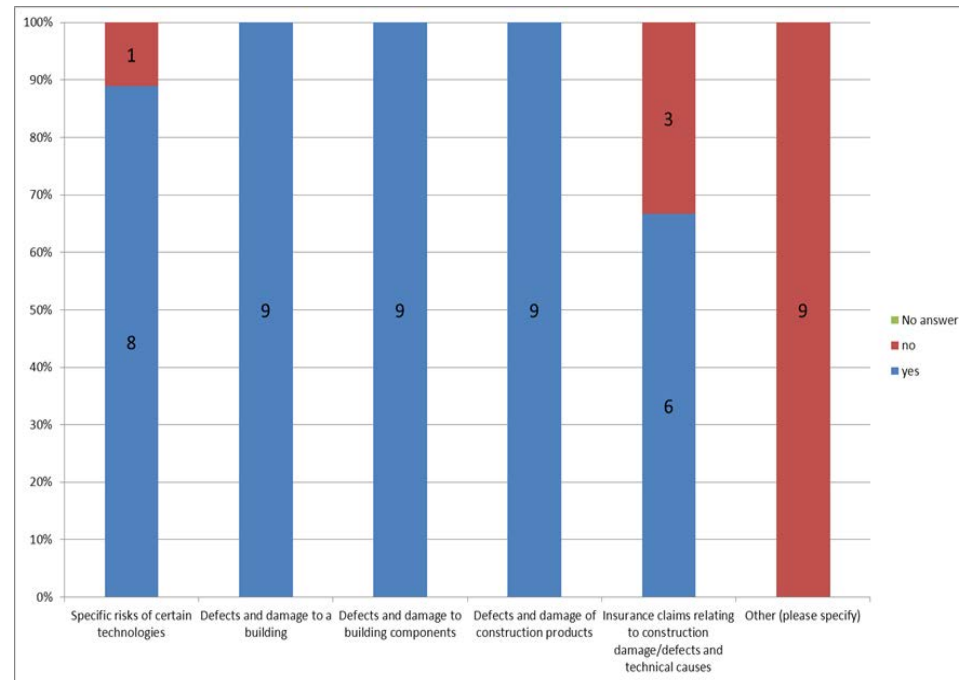
2. Double-Skin Curtain Walls/Façades

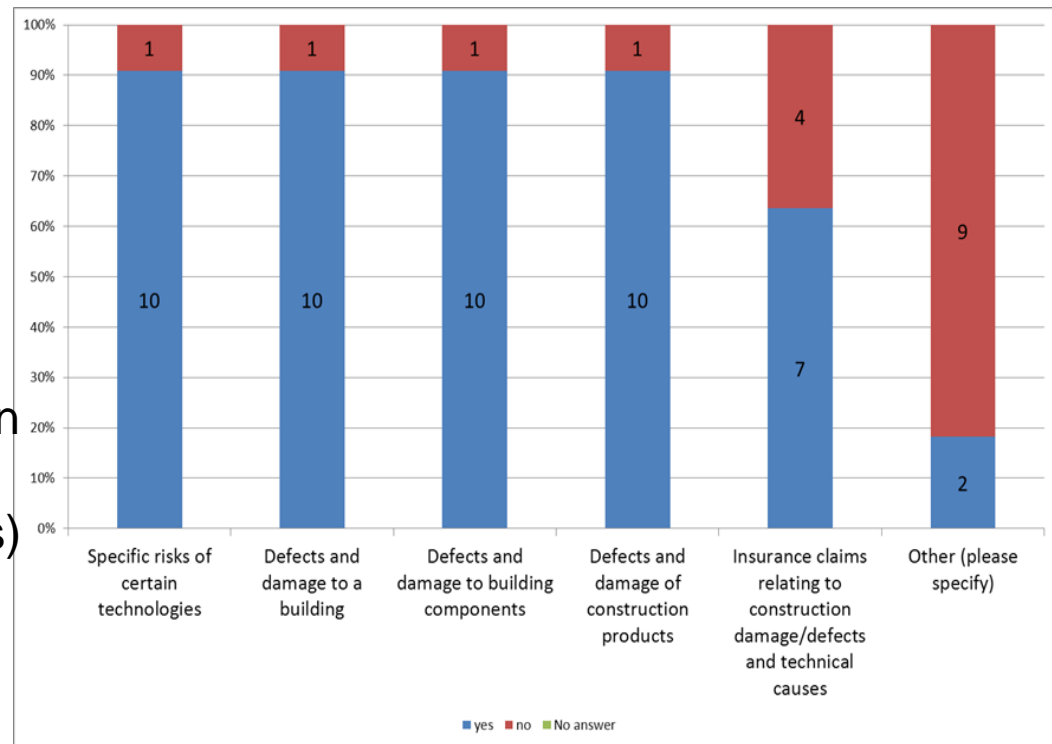Number of questionnaires on this technology
- 7 (9% of 70 responses)
- 172 installations
- 57 (33%) have defects

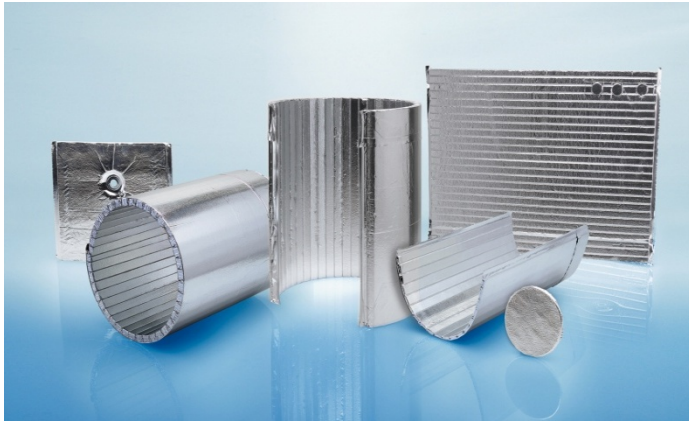# 3. Mechanical Ventilation with Heat Recovery (MVHR)

Number of questionnaires on this technology
- 11 (16% of 70 responses)
- 651 installations
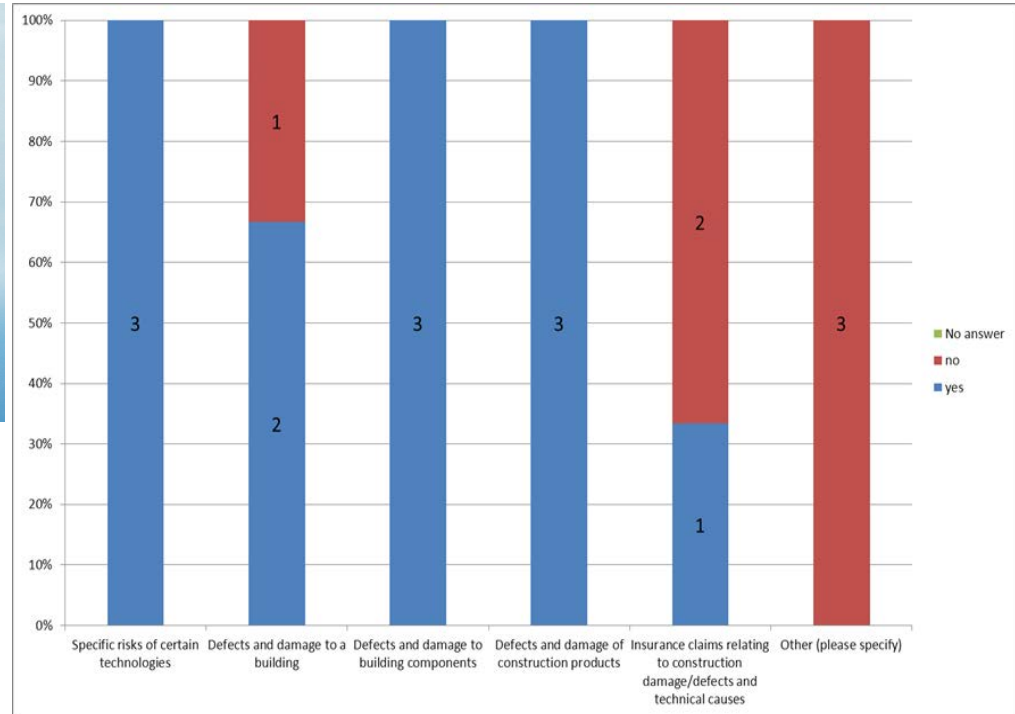- 41 (6.3%) have defects

4. Vacuum Insulated Panels (VIPs)

Number of questionnaires on this technology
- 3 (4% of 70 responses)
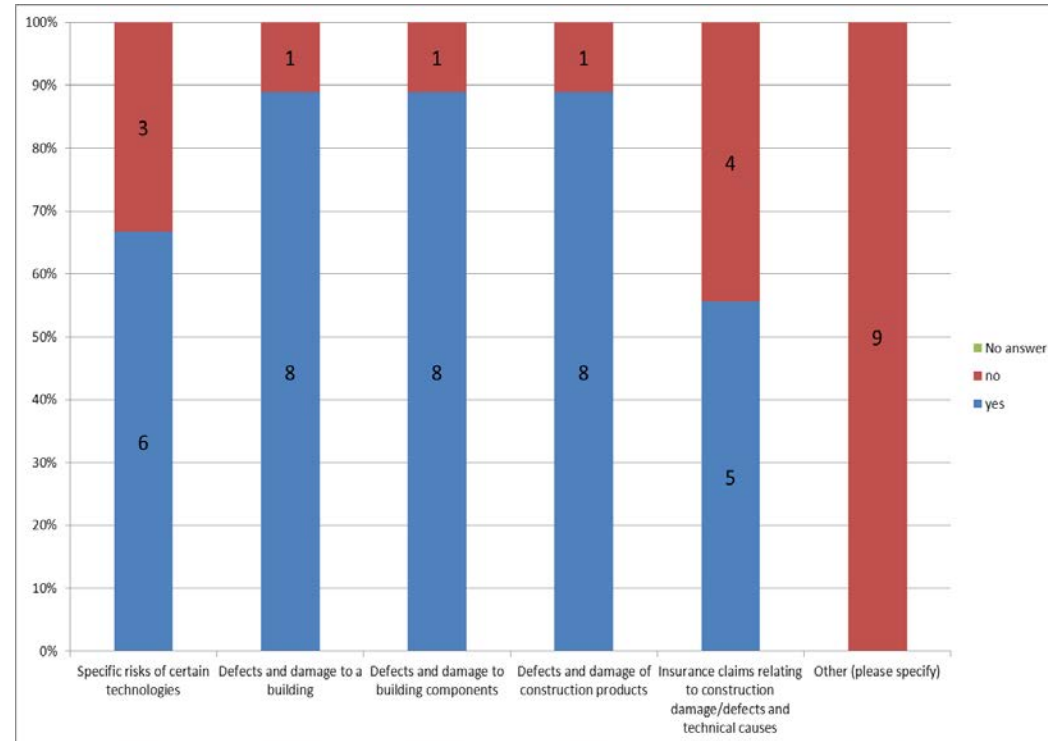- 15 installations
- 3 (20%) have defects

5. Bio-Material Insulation

Number of questionnaires on this technology
- 9 (13% of 70 responses)
- 9 installations
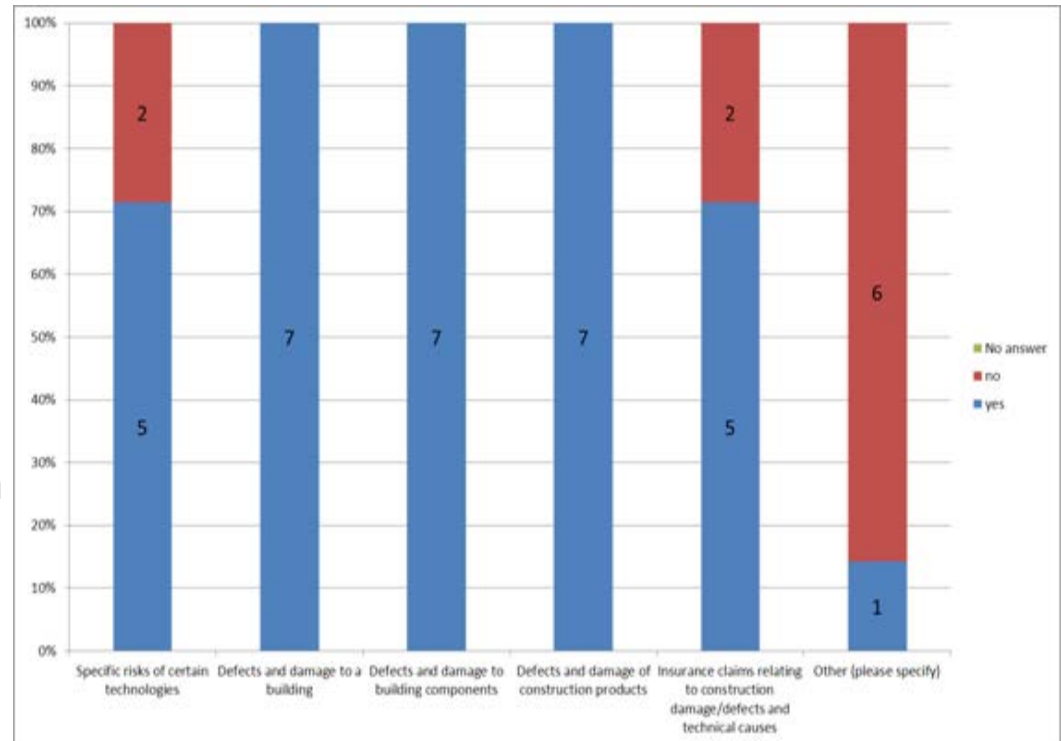- No reported installations with defects

6. Paper-Based Insulation

Number of questionnaires on this technology
- 7 (10% of 70 responses)
- 26 installations
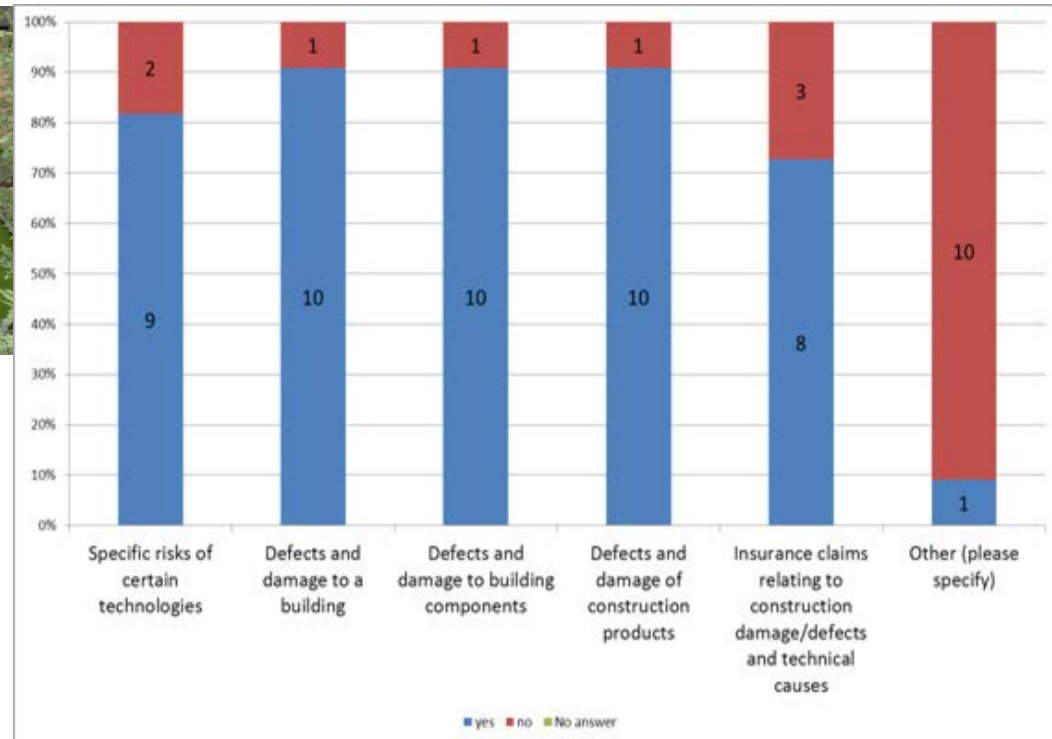- 1 reported installations with defects

7. Rainwater Harvesting incl. Catchment Basins and Grey Water

Number of questionnaires on this technology
- 11 (16% of 70 responses)
- 183 installations
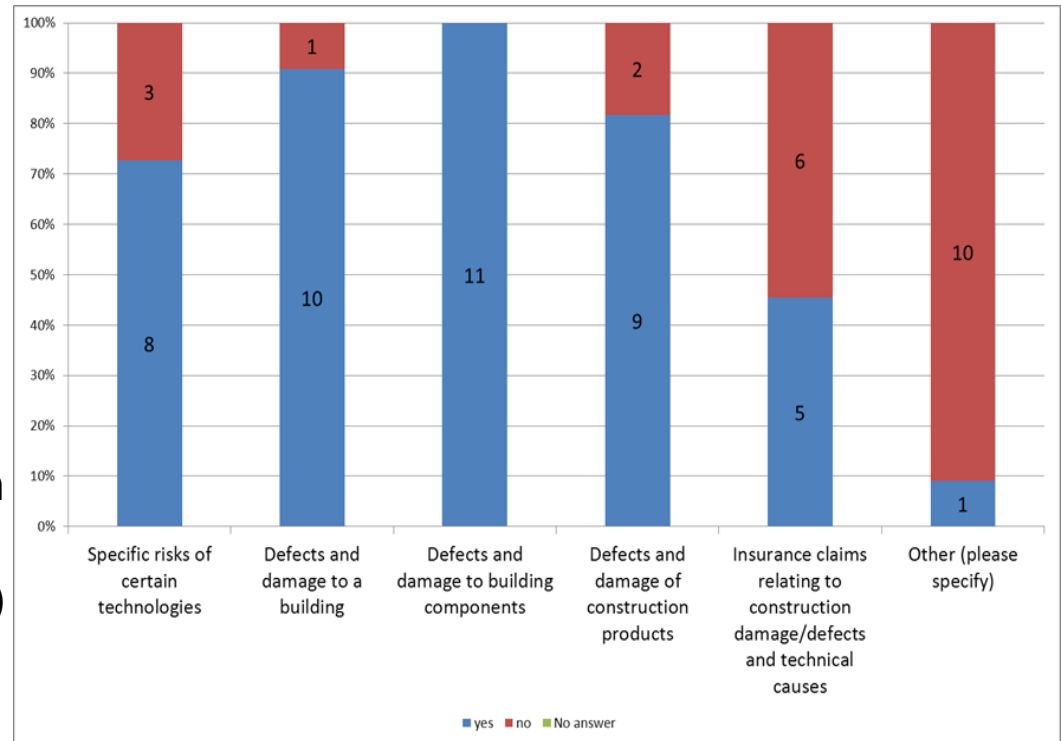- 13 installations had defects

8. Green and Brown Roofs

Number of questionnaires on this technology
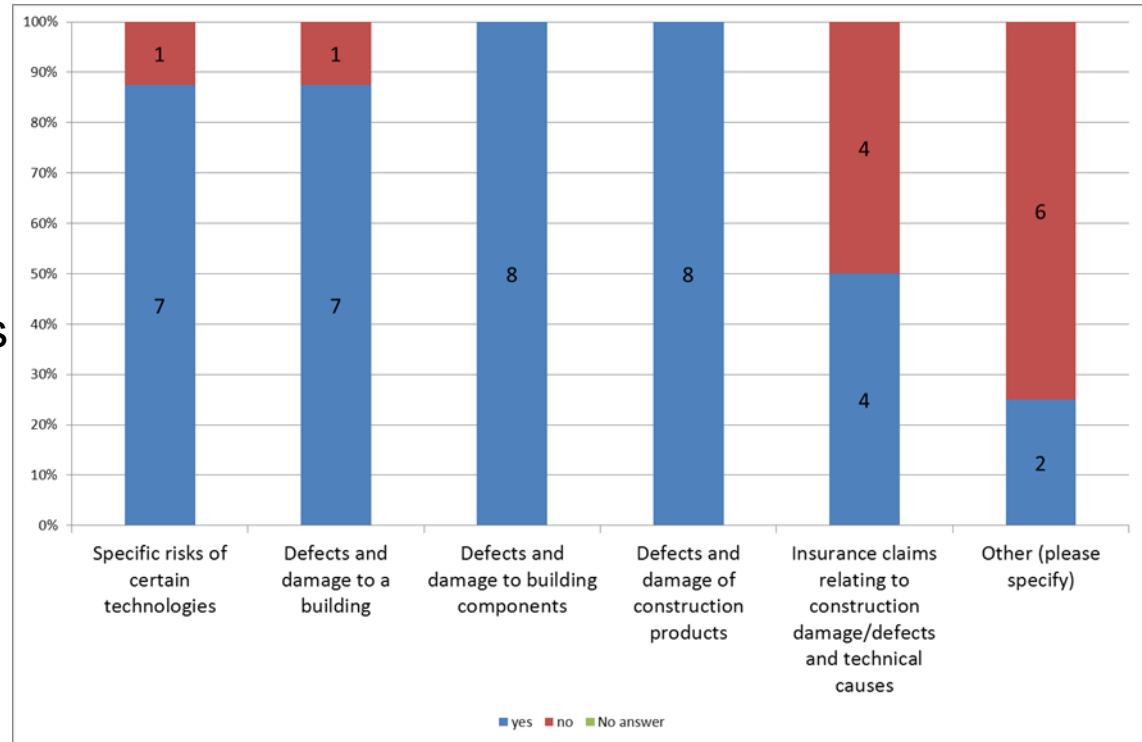- 11 (16% of 70 responses)
- 206 installations
- 30 installations had defects

9. Low-VOC Materials

Number of questionnaires on this technology
- 8 (11% of 70 responses)
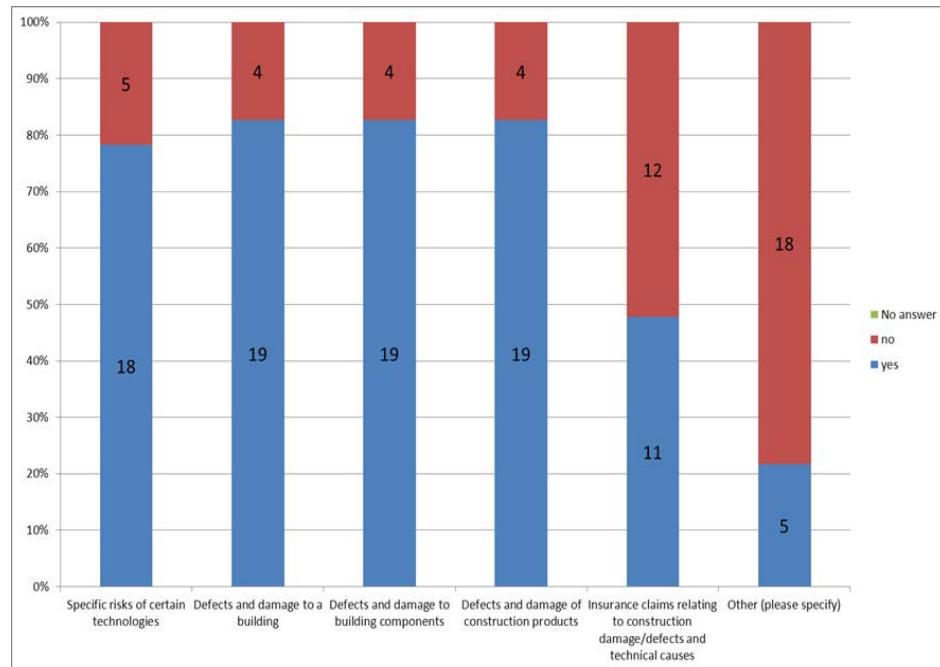- 402 installations
- 50% of installations had defects

10. **Photovoltaic Panels (PVs)**

Number of questionnaires on this technology
- 23 (34% of 70 responses)
- 22,558 installations
- 502 (2.3%) have defects

10. Photovoltaic Panels (PVs)

Reason for failure/defect	Number	% of total
Requirement management		
Change in client's requirements	0	0.0%
Misunderstanding of the effectiveness of the technology	1	0.0%
Poor project management	0	0.0%
Inaccurate engineering or architectural data	3	0.0%
Delivery		
Late delivery	0	0.0%
Storage issues	0	0.0%
Awkward packaging	1	0.0%
Poor transport of product	11	0.0%
Installation		
Incorrect design for installation	1	0.0%
Incorrect installation documentation	401	1.8%
Failure in installation	141	0.6%
Commissioning failure	137	0.6%
Operational failure		
Product failure once installed	31	0.1%
Incorrect user documentation	256	1.1%
Misuse of product by end-user	0	0.0%
Performance not as claimed	142	0.6%
Other		
No other reasons were given for failure		
Total		

Most significant reason given
- Incorrect installation documentation

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Question: Is a EU-wide database on risks and building pathology useful?
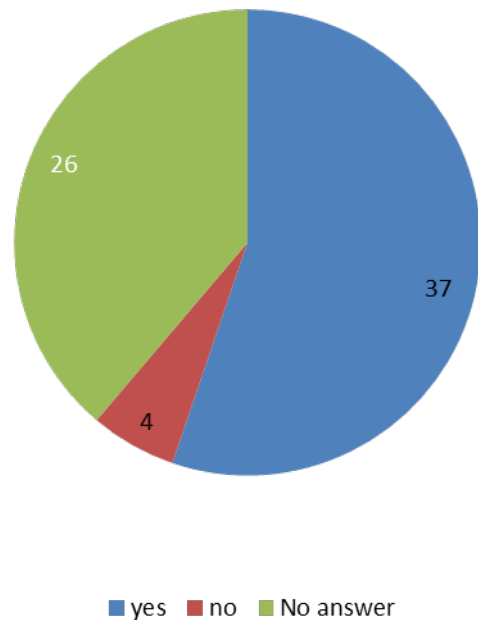
No:
- Too hard to do EU wide because of climate change across the EU
- As business have their own data [on these technologies]

Yes:
- Good to make this analytical not anecdotal
- Good to get lessons already learnt in some countries into last to adapt [a new technology]
- Vital to driving improvement
- Will improve build quality
- Needs to be done on all technologies
- There is a massive need for this

26

37

4

■ yes ■ no ■ No answer

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Key Conclusion from NHBC's involvement

It looks that with appropriate care and due diligence a pilot ELIOS database could be constructed to enable the EU industry to identify the potential risk of damage / defects affecting eco-technologies and use this information for risk assessment or plan for their reduction.

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