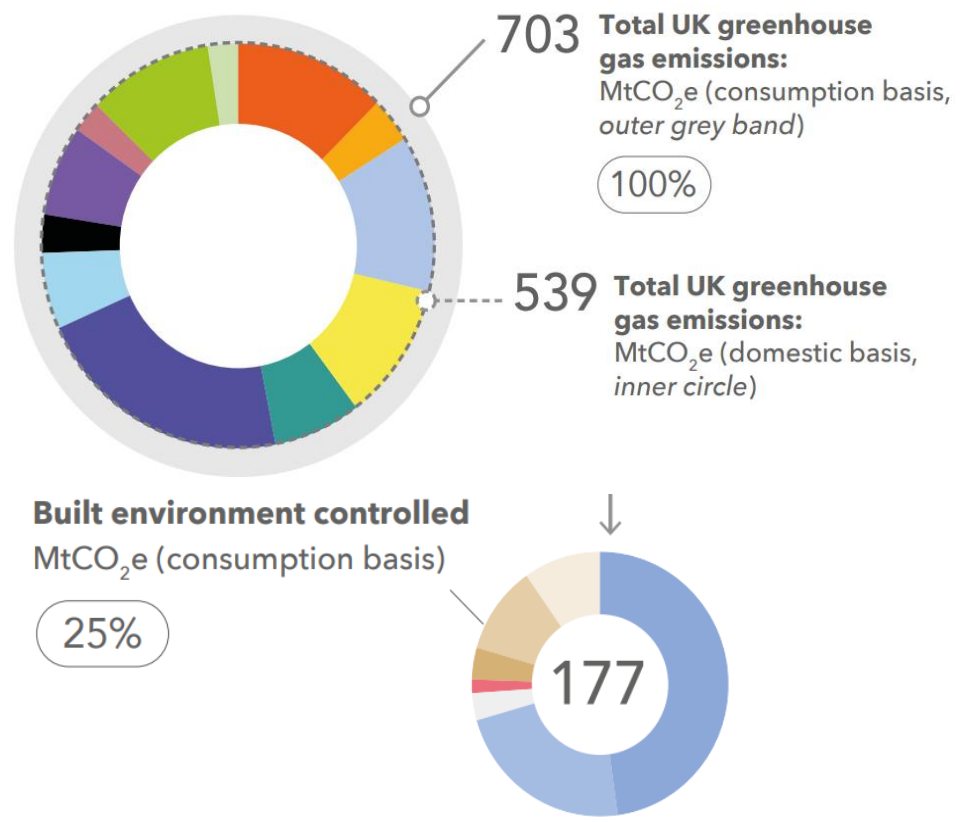


Pioneering Net Zero Carbon Construction Planning Policy in B&NES

Investigating the industry's response

Background

UK Green Building Council, 2021. Net Zero Whole Life Carbon Roadmap. Technical Report.



BUILT ENVIRONMENT SECTORS

- Buildings (Non Domestic) Embodied Carbon
- Buildings (Domestic) Embodied Carbon
- Infrastructure Embodied Carbon
- Infrastructure Operational carbon
- Buildings F-Gas
- Buildings (Non-domestic) Operational Carbon
- Buildings (Domestic) Operational Carbon

Embodied carbon
(material production, construction, demolition, etc.)

Operational carbon
(heating, lighting, cooling, ventilation, etc.)

UK construction emissions legislation

Current building regulations – Part L

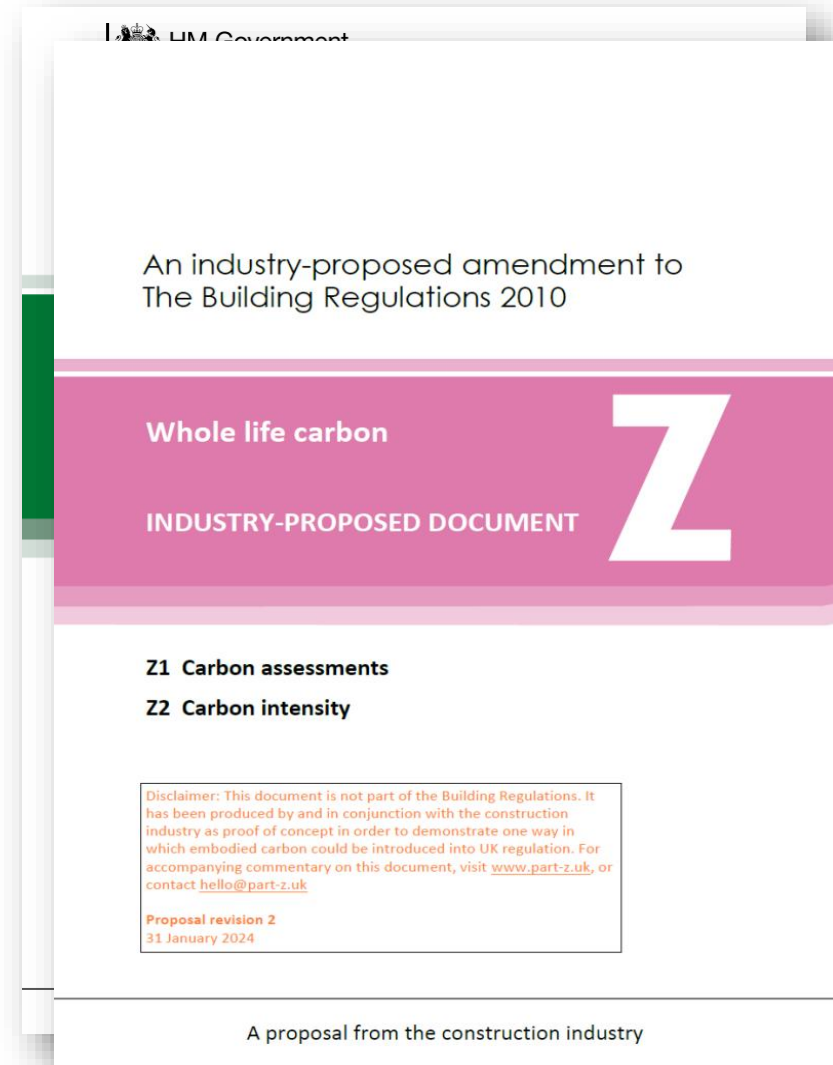
- Has included operational energy targets since 2006
- Last updated 2022

2025 – Future Homes Standard

- Operational carbon only – further reductions
- Optional on-site energy generation
- Criticised for lack of ambition

Rejected – Part Z

- Proposed amendment to measure and cap whole-life carbon (operational and embodied)
- Associated Parliamentary Bill rejected in 2023, with further research commissioned



B&NES planning policies

Introduced January 2023

Bath & North East
Somerset Council

BATH AND NORTH EAST SOMERSET

SUSTAINABLE CONSTRUCTION CHECKLIST
SUPPLEMENTARY PLANNING DOCUMENT

ADOPTED NOVEMBER 2018

Version 2 Minor Revisions: February 2020



Keynsham Civic Centre, the Council's award-winning sustainable office

Policy SCR6 – New built residential

- Space heating < 30 kWh/(m²a)
- Total energy use < 40 kWh/(m²a)
- On-site renewables matching total energy use
- Offsetting only if demonstrably infeasible


Policy SCR7 – Major non-residential new build developments

- Developments > 1000 m²
- 100% operational carbon reduction relative to Part L Target Emission Rate
- Fabric-first approach with on-site renewables
- Offsetting of residual emissions allowed

Policy SCR8 – Embodied Carbon

- Residential > 50 dwellings
- Non-residential > 5000 m²
- Cap of 900 kgCO₂e/m² Modules A1-5 (cradle to completion)
- Substructure, superstructure and finishes
- No offsetting

Policy comparison



Illustrative CO₂ reduction potential

Targets / Limits	2013 Part L	2025- Future Home Standard / CCC	2023- B&NES
Space heating (kWh/m ² /year)	50-80*	Varies	30
Total energy use (kWh/m ² /year)	60-100*	Varies	40
Floor U-value (W/m ² .K)	0.13	0.13	0.13
External Wall U-value (W/m ² .K)	0.18	0.18	0.16
Roof U-value (W/m ² .K)	0.13	0.11	0.12
Window U-value (W/m ² .K)	1.4	1.2	1.2
Air permeability at 50 Pa (m ³ /h.m ²)	5-8	4-5	3
PV	Not required	0-40% ground floor area equiv	100% match total energy use
Embodied kg CO ₂ /m ²	None	None	Targets for major projects – 900 kg CO ₂ e/m ²

Others

- Cornwall (2023)
- Bristol City Council (2025)
- Greater Cambridgeshire
- North Somerset
- Central Lincolnshire
- ...

Our collaboration



- Supported by Bath University's Policy Support Fund
- Phase I:
January–July 2023
- Phase II:
January–July 2025



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Aiming to:

- Understand industry adoption of the policies and influence on building design
- Determine the policies' reception by practitioners and changes over time
- Inform future development in B&NES and beyond

Research methods



Planning application analysis (Phase I and II)

- Building performance data submitted through 'Energy Summary Tool' (SCR6)
- Energy assessment documents (SCR7)
- Whole life carbon assessments (SCR8)



Applicant survey (Phase I and II)

- Sent to all applicants within study period
- Focusing on applicant's experience and anticipated policy impacts

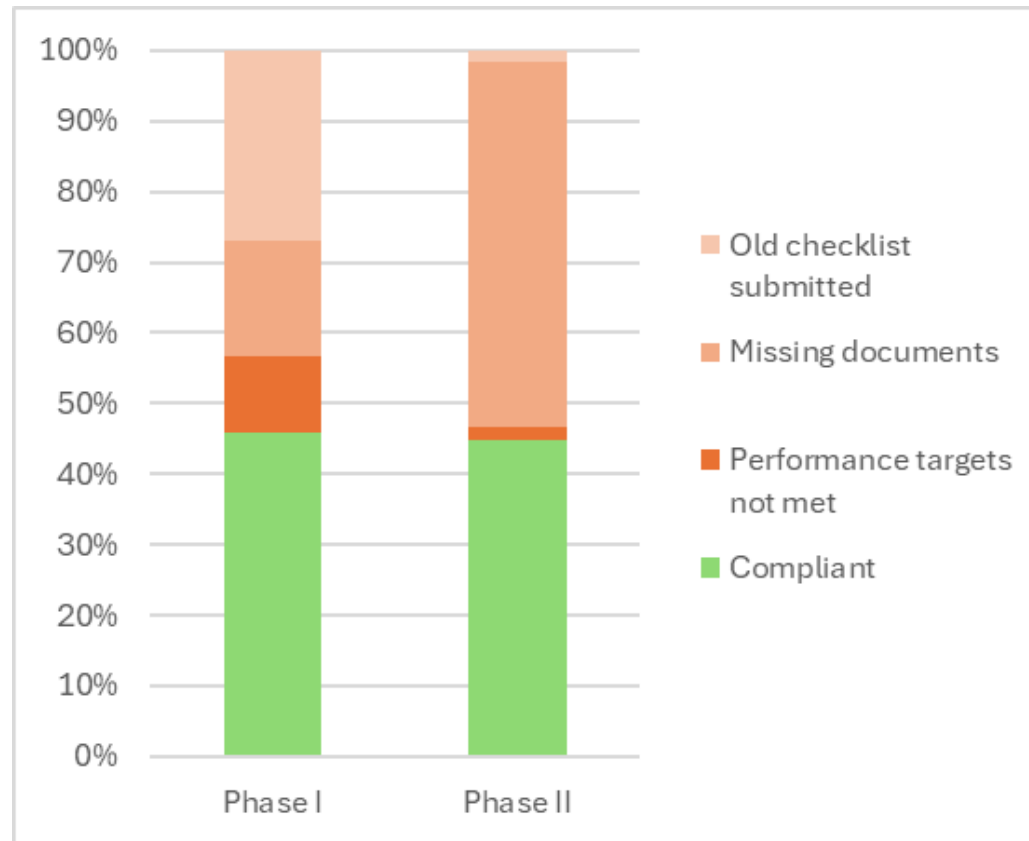


Interviews with experienced applicants (Phase II)

- Deep dive into challenges, opportunities, and evolution of policy response

Analysis of domestic planning applications (SCR6)

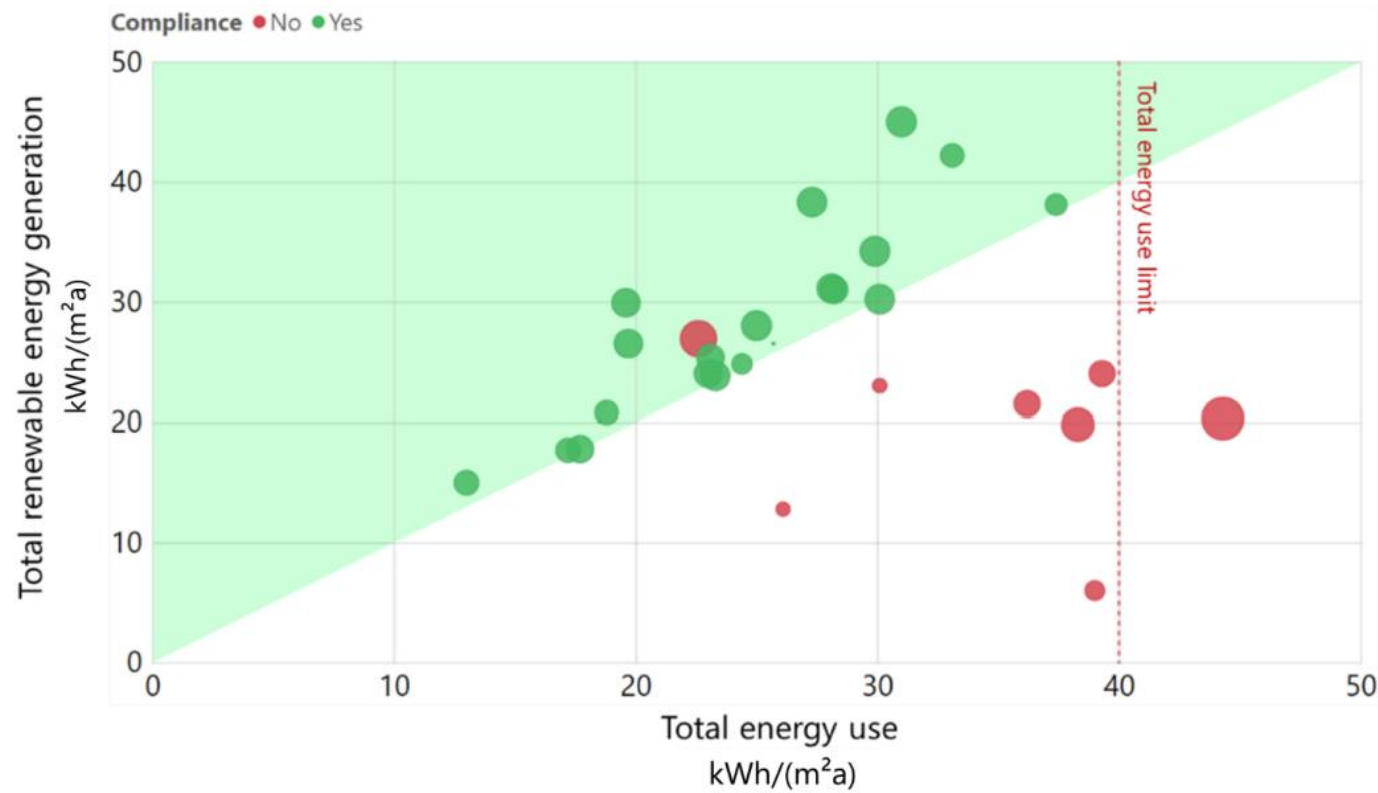
(as initially submitted)



- Most applications are not compliant due to submitting incorrect or missing documents → Lack of policy awareness
- Correct document submission usually with energy targets met
- Limited progress in policy awareness
- No applications yet refused on these policies

Analysis of domestic planning applications (SCR6)

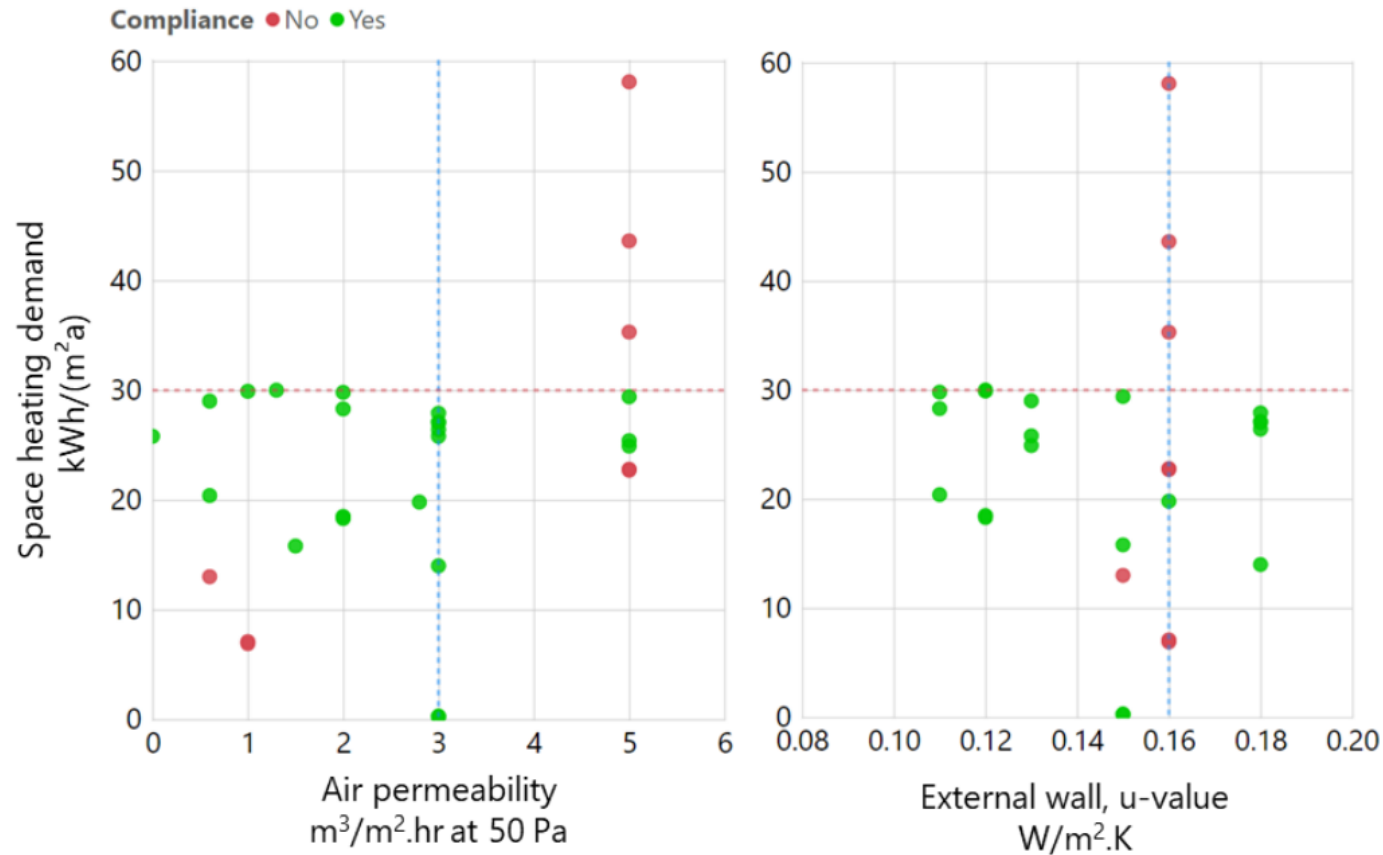
(as initially submitted)



- Some projects struggling to meet renewables targets (some evidence this is getting easier in Phase II)
- All applications using PV panels.

Analysis of domestic planning applications (SCR6)

(as initially submitted)



- Air permeability values often highly optimistic – needs to be verified during construction.
- Recommended U-values often adopted.
- Heat pumps universal, and mechanical ventilation with heat recovery common.

Policies SCR7 and SRC8

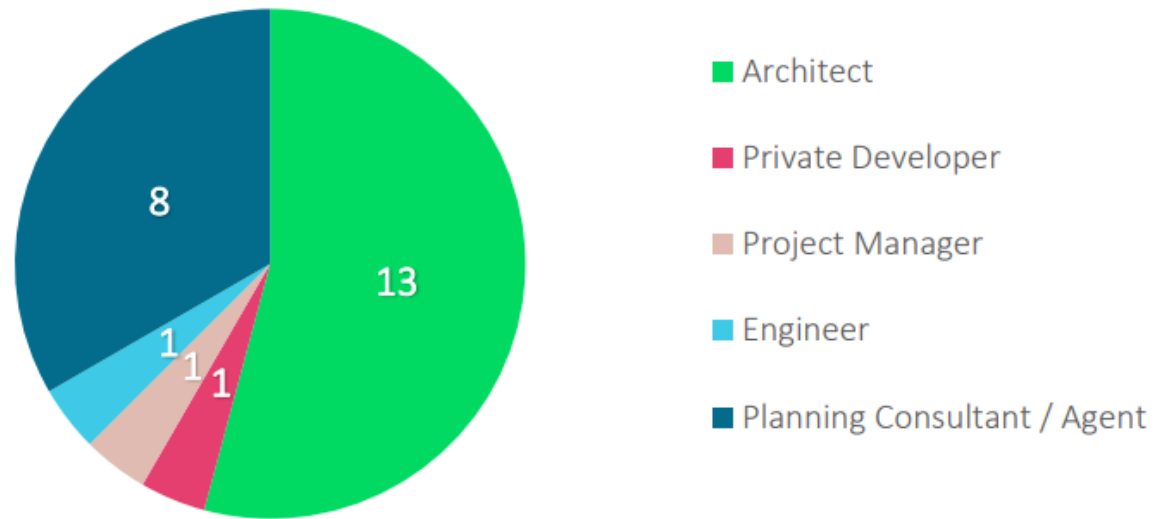
- Only four applications during study periods
 - 2 SCR7 non-residential operational carbon
 - 2 SCR8 major residential embodied carbon
 - 621 and 634 kgCO₂/m² – both comfortably below 900 kgCO₂/m² limit



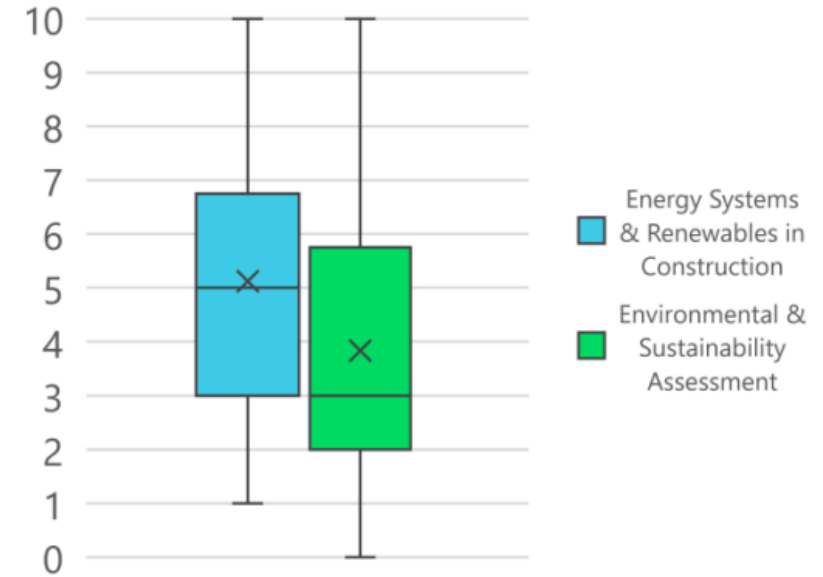
Questionnaire (Phase I)

24 responses (65%)

Applicant roles



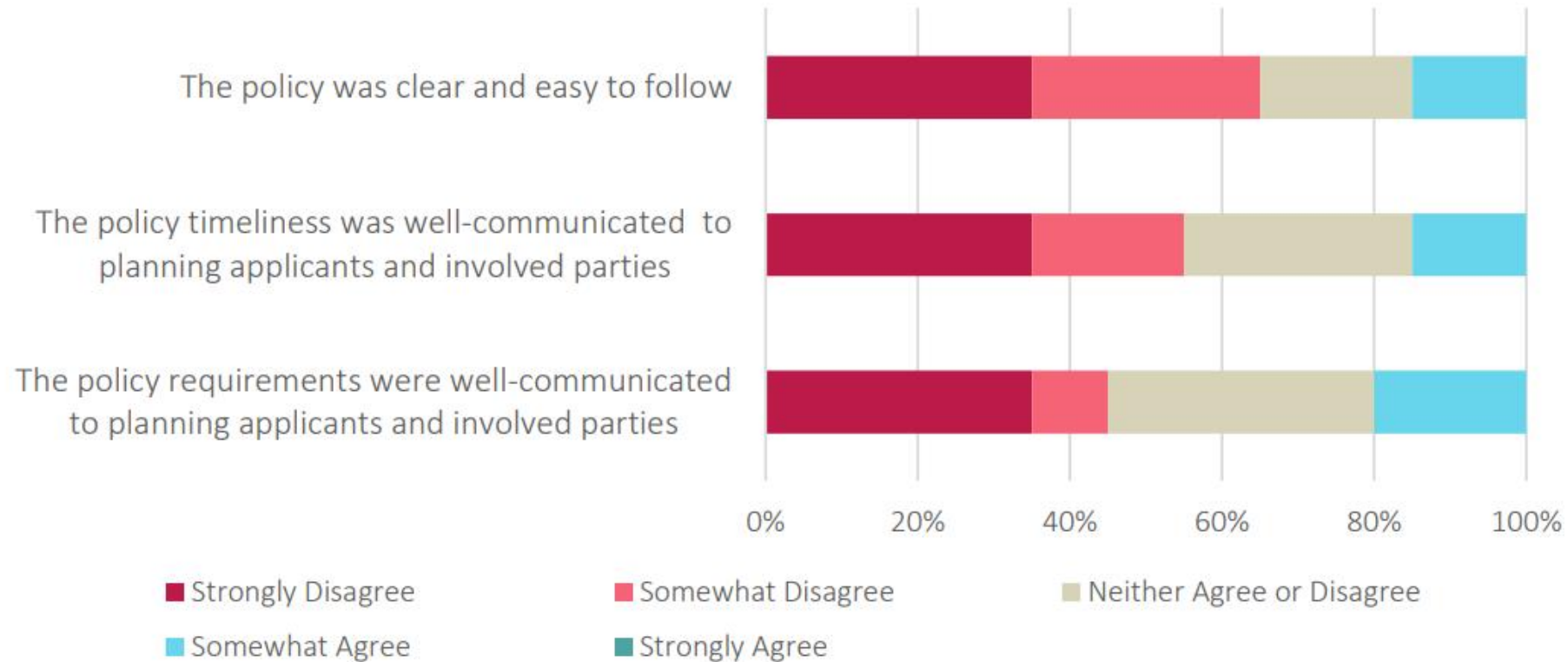
On a scale of 0-10, please rate your experience in the areas below. 0 = Beginner, completely new to me. 10 = Specialist, this is the main part of my job.



- Primarily architects or planning consultants from small organisations with 10+ years' experience.
- Variable knowledge of sustainable design and environmental assessment.

Questionnaire (Phase I)

24 responses (65%)

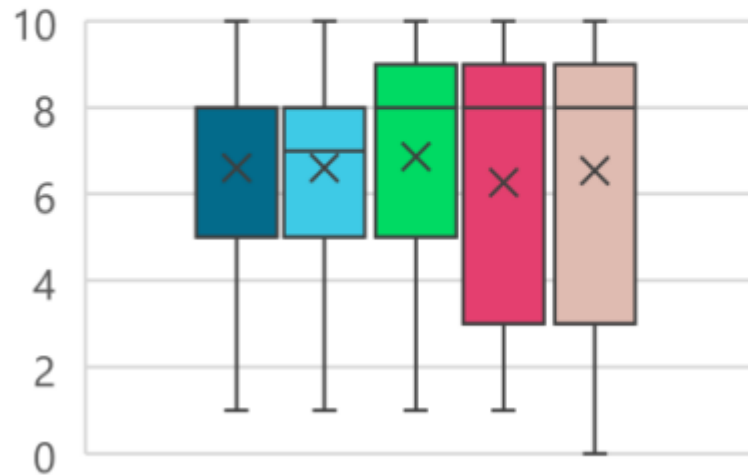


- Generally negative view of policy communication during early stages.

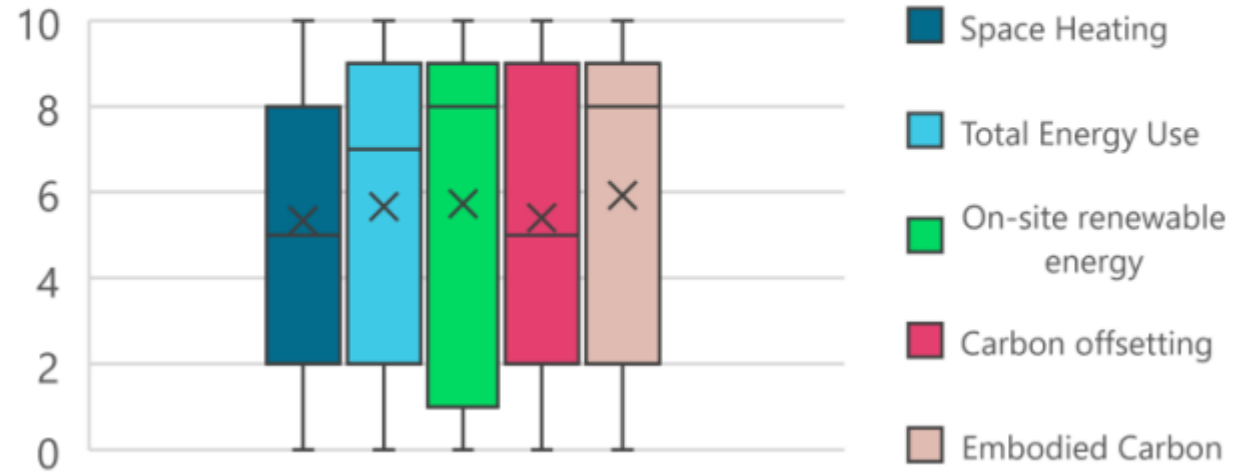
Questionnaire (Phase I)

24 responses (65%)

(a) After policy adoption, what is the perceived level of difficulty in meeting requirements below? 0 = Not Applicable. 1 = Very Easy. 10 = Very Challenging.



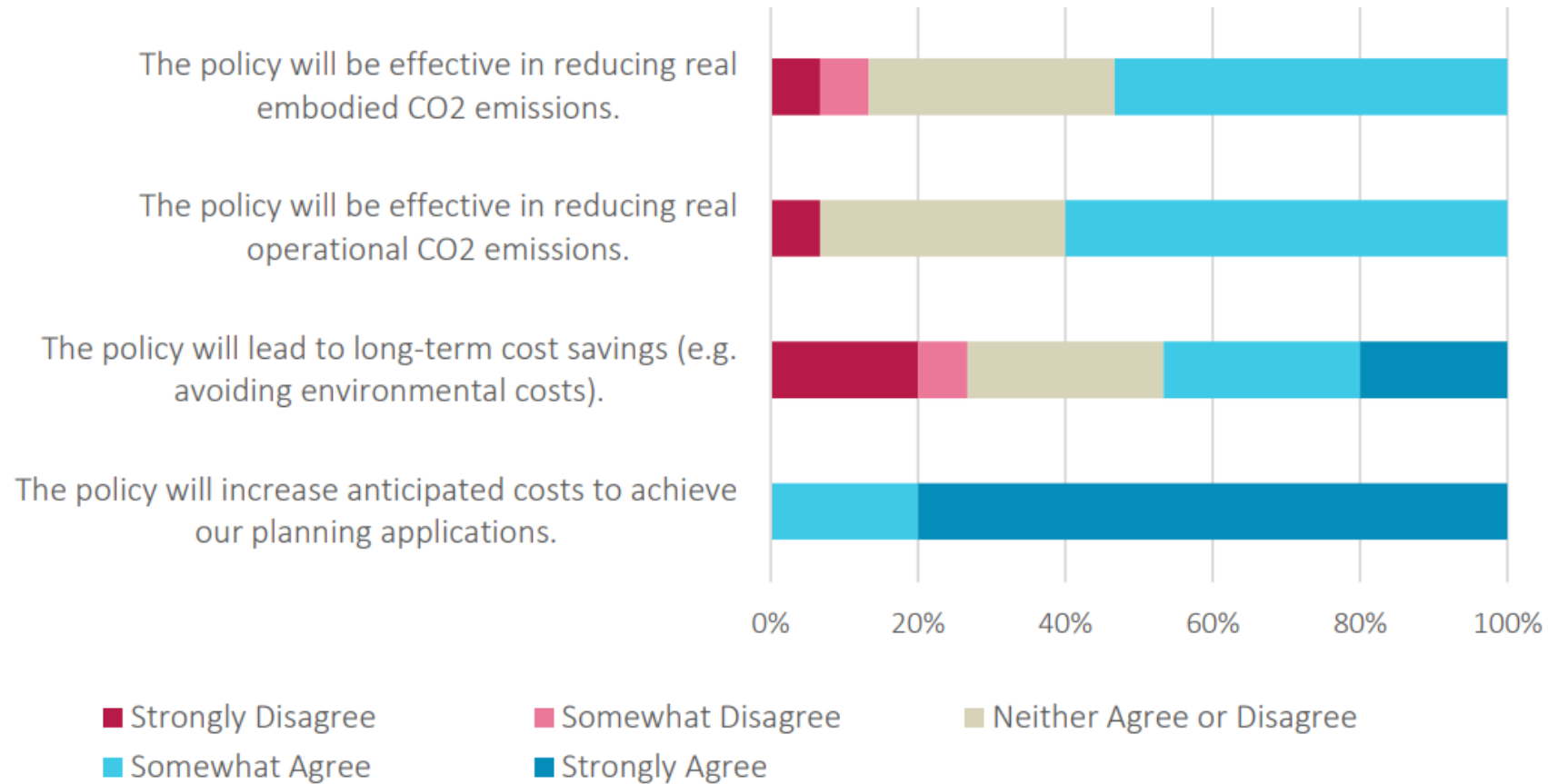
(b) To what degree have the following policy requirements affected your design process? 0 = Not Applicable. 1 = No change, you are already doing this. 10 = Major change, you had to substantially change your design process.



- All policy aspects considered challenging, particularly on-site renewables.
- Variable levels of expected impact – diversity of current practice.

Questionnaire (Phase I)

24 responses (65%)



- Expectation that policies will reduce emissions.
- Universal cost concerns.

Phase I Report (October 2023) and paper (April 2024)



<https://researchportal.bath.ac.uk/en/publications/pioneering-net-zero-carbon-construction-policy-in-bath-amp-north->



<https://keycities.uk/2024/04/23/civic-partners-in-net-zero/>

Key findings

#1 Significant impacts on building design

- Nearly all buildings can comply with requirements (theoretically)
- Requires efficient heating and ventilation strategies
- Some highly optimistic air-tightness and PV generation claims
- Translation through to construction still uncertain

#2 Concerns from practitioners

- Variable levels of existing expertise and acceptance
- Universal cost concerns
- Additional design detail required at planning stage

#3 Wider impacts

- Driving uptake of knowledge and skills
- Limited direct impact on application refusals
- Likely to reduce emissions and energy demand – not yet confirmed

Further Work

Appetite and need for further study, expanded:

- Temporally – to track changes in policy response over time and follow projects to occupation
- Geographically – to include a larger and more diverse region with more policies
- Disciplinarily – involving social scientists and policy experts



Thank you!



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