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Climate Change Adaptation in Social Housing

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UNIVERSITY OF LEEDS



Climate change adaptation in the social housing sector:

Opportunities, Challenges and Drivers

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Presentation Structure



- Project Brief
- Aims and Objectives
- Project Scope
- Background: Justifying the Research
- Research Approach
- Key Findings
- Main Conclusions
- Limitations and Future Directions
- References



PROJECT BRIEF



- Initiated by JBA's work for the Adaptation Sub-Committee to Climate Change on climate change adaptation activity by local authorities.
- Exploratory study of climate change adaptation activity within the social housing sector by:
 - Investigating the degree to which housing associations are considering climate change adaptation in asset management and day-to-day operations for new builds and retrofitting existing ones;
 - Identifying the main opportunities and barriers to current and future adaptation as well as any best practice examples (physical adaptations which can be made to buildings, rather than resident behavioural change);
 - Understanding the statutory requirements and policy drivers in relation to adapting to climate change.



AIMS AND OBJECTIVES



- **Aim**

- To understand the opportunities and drivers for, and challenges to, climate change adaptation in the social housing sector.

- **Objectives**

- To identify the statutory requirements placed on English housing associations from relevant online documentation relating to climate change adaptation;
- To gain an overview of climate change adaptation being undertaken by housing associations from secondary sources;
- To understand the drivers and opportunities housing associations need to capitalise upon, as well as challenges they need to address, in ensuring their building stock is resilient to climate change. This includes the technical, economic, social, political and organisational feasibilities of actions; and
- Where possible, to identify examples of best practice which can assist other housing associations in ensuring their climate change resilience.



PROJECT SCOPE



- Ten-week placement undertaken as part of the University of Leeds' MSc Sustainability programme, hosted by JBA Consulting.
- Free online publications (statutory documents, academic literature and other relevant reports) examined in a literature review.
- Consultation with sector-specific organisations:
 - Social housing representatives from Sustainable Homes, Joseph Rowntree Foundation (JRF), Homes and Communities Agency (HCA), and National Housing Federation (NHF); and
 - Other relevant organisations- the ASC, Leeds Beckett Sustainability Institute (LSI), and Environment Agency (EA).
- Consultation with 5 housing associations managing stock in London (3) or Leeds (2):
 - Chosen for being a member of the SHIFT Index for Sustainability or for evidencing some climate change adaptation activity on their websites.



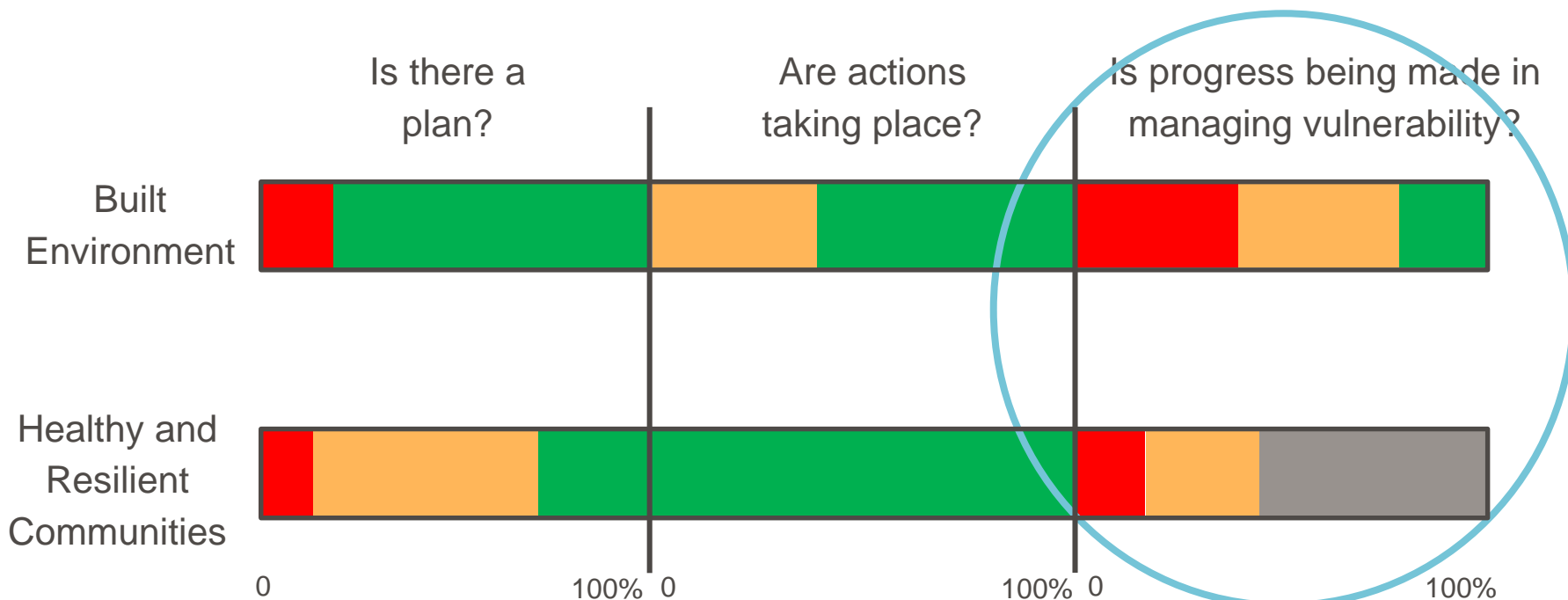
BACKGROUND:

Justifying the research



1. UK Progress in Managing Social Vulnerability

ASC's assessment of progress by the National Adaptation Programme. Diagram is adapted from the 2015 Progress Report on Preparing for Climate Change (pp.9):



Red= Lack of plans and policies, delivery of actions, or progress in addressing vulnerabilities
Amber= Some evidence of progress in some areas, adaptation priority partially addressed
Green= Progress being made, plans in place and actions being delivered
Grey= Insufficient evidence to make a judgement

2. Urban Climate Change Vulnerability and Risk

Hazard - physical manifestations of climatic variability (Brooks, 2003)

Vulnerability - reflective of the exposure or sensitivity of a system to hazardous conditions and its capacity or resilience to cope, adapt or recover from effects of those conditions (Smit and Wandel, 2006)

Adaptive Capacity - “Ability of systems, institutions, humans, and other organisms to adjust to potential damage, to take advantage of opportunities, or to respond to consequences” (IPCC, 2014: 1758)



Risk Assessment Framework (Carter et al., 2015: 6)

3. Climate Change and Social Justice

- **JRF- Triple Injustice**

- The socially vulnerable pay proportionately more and benefit less from certain policy responses (notably energy bill prices), but are responsible for the least emissions.



- **Climate Change and Social Justice Programme**

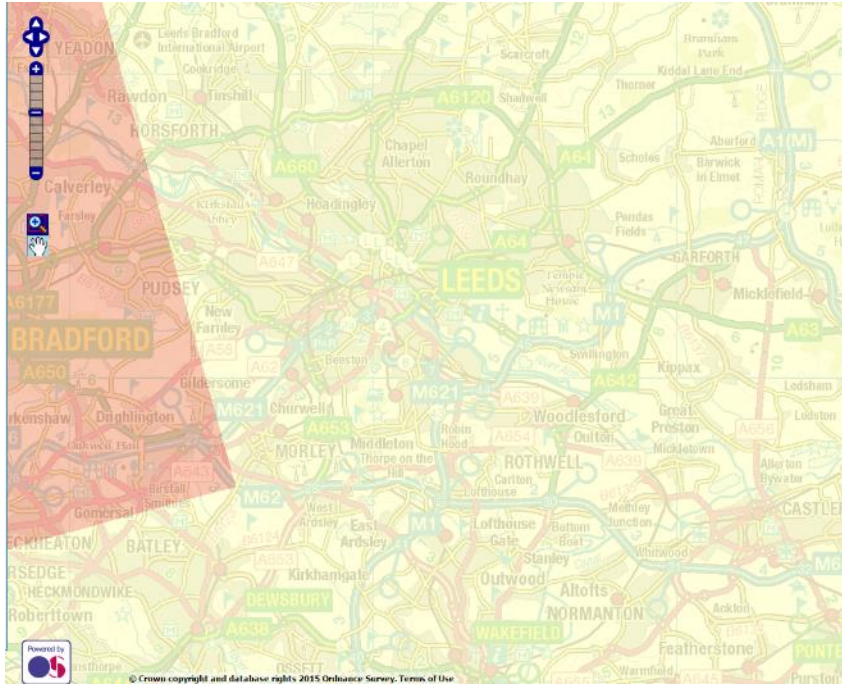
- Mapping indicators via the online *Climate Just* tool to explain factors making people more or less vulnerable to climate change.



$$\begin{aligned} & \text{Exposure to} \\ & \text{climate hazard} \\ & + \\ & \text{social} \\ & \text{vulnerability} \\ & = \\ & \text{climate} \\ & \text{disadvantage} \end{aligned}$$

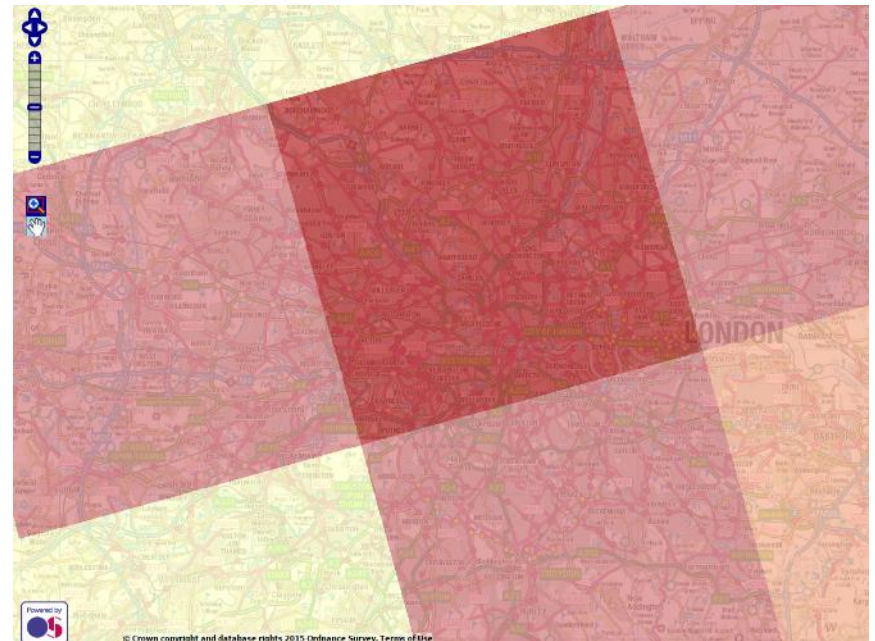
Image source: <http://www.climatejust.org.uk/>

A. Climate Just: Mapping Heat Disadvantage



← **Leeds** - Average vulnerability and mean summer maximum temperature 2050s

London - Average vulnerability and mean summer maximum temperature 2050s



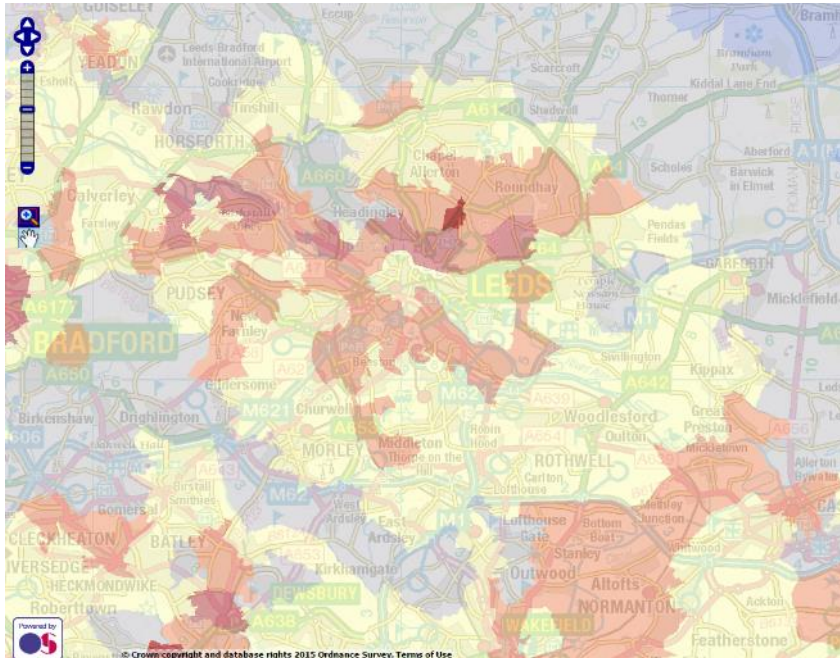
Central estimate (50th percentile) **RECOMMENDED**

Map Transparency: 60%

- Slight
- Extremely low
- Relatively low
- Average
- Relatively high
- Extremely high
- Acute

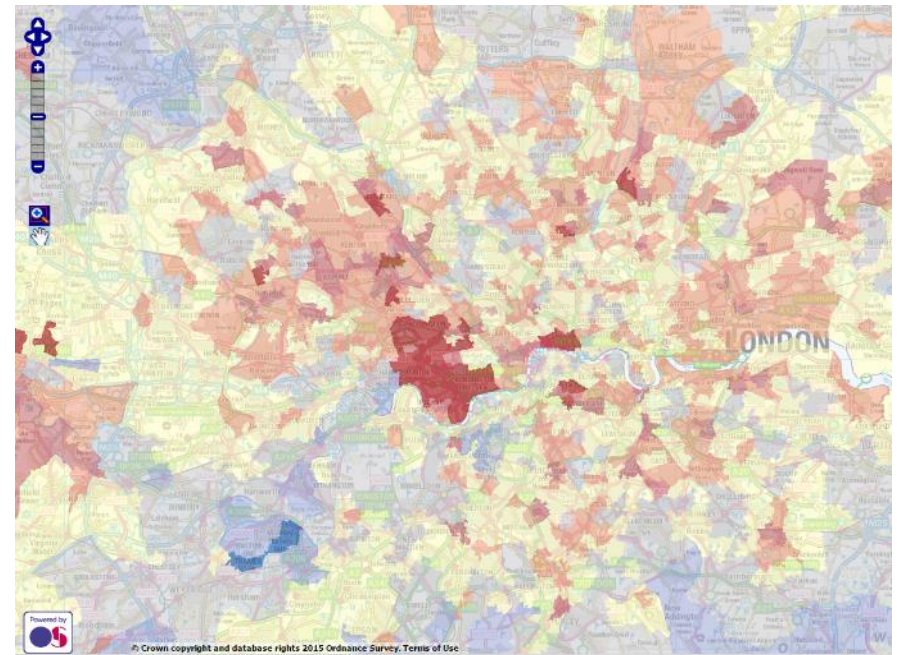
Source: <http://www.climatejust.org.uk/map>

B. Climate Just: Mapping Flood Disadvantage



← **Leeds** - surface water flooding disadvantage (1 in 30 years)

London - surface water flooding disadvantage (1 in 30 years) ↓



Surface Water disadvantage 1 in 30 years

Map Transparency: 55%

- Slight
- Extremely low
- Relatively low
- Average
- Relatively high
- Extremely high
- Acute

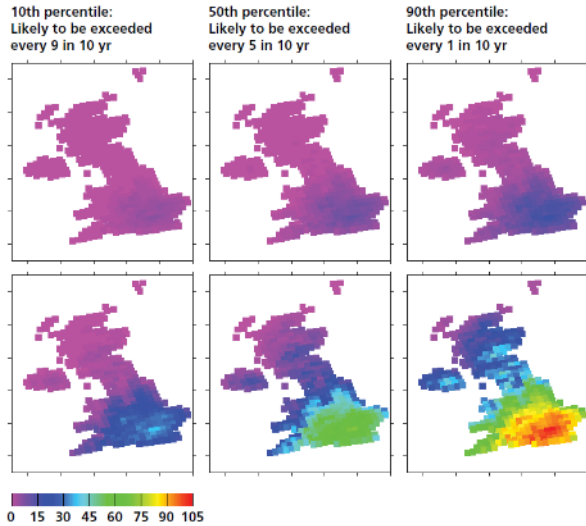
Source: <http://www.climatejust.org.uk/map>

3. Future Climate Change Risk

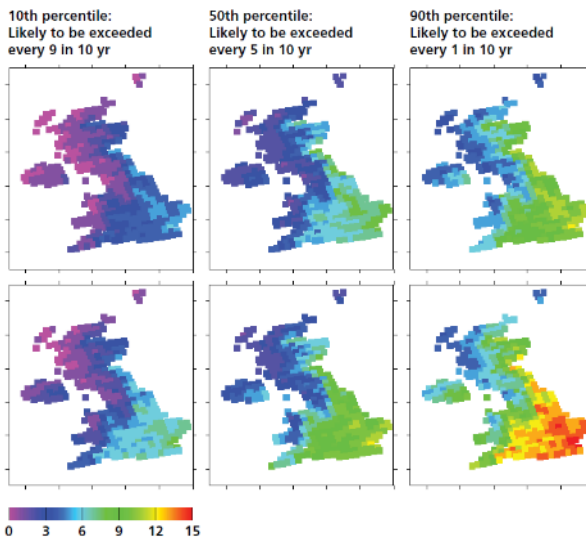
- The UK is likely to experience hotter, drier summers and warmer, wetter winters.
- Three greatest climate risks for the UK (IPCC, 2014)
 - (a) Overheating
 - (b) Flooding
 - (c) Water stress
- Increasing frequency and severity of extreme events as a result of these risks will cause great challenges for the resilience of humans and the built environment



3A. Risk of Overheating

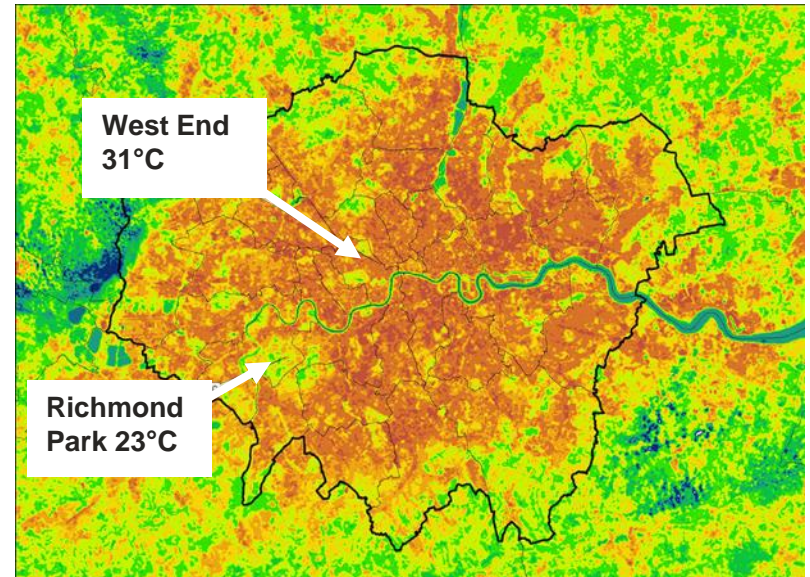


← Largest increase in hot days in southeast (increase of 20-50 days for 50th percentile)



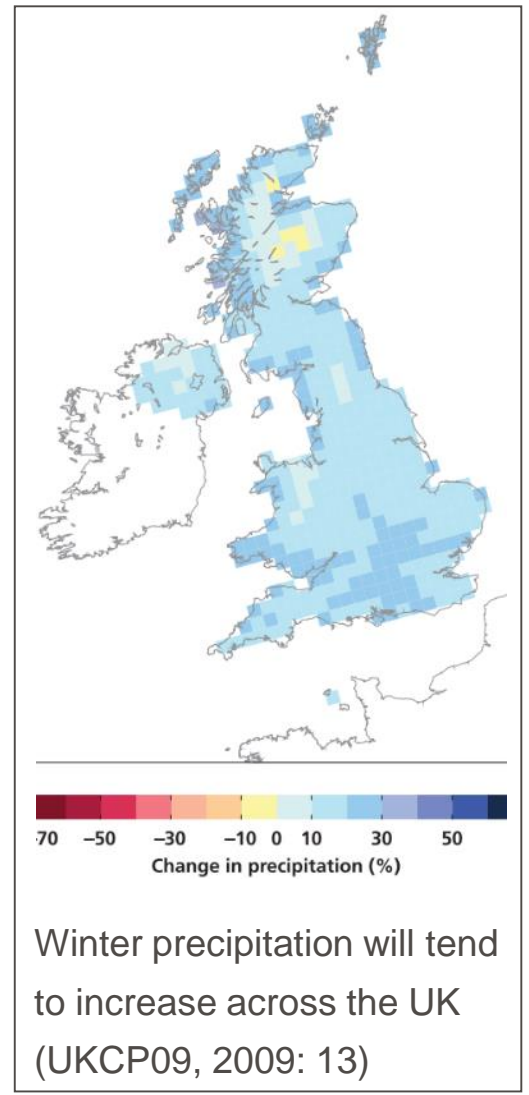
← Moderate increases in pattern of dry spells across UK, substantial increases in southeast associated with summer drying

Modelling from satellite imagery in 2011 of a typical summer's day in London shows the effect of the urban heat island in dense urban areas compared to open, green parks.



Arup (2014)

3B. Risk of Flooding

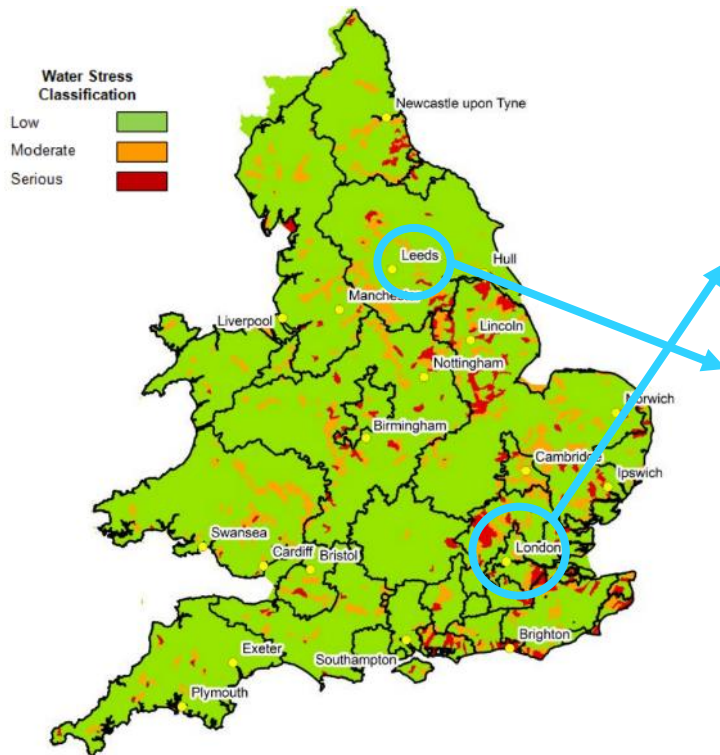


Surface water flooding - Heavy rainfall overwhelms the local drainage capacity - difficult to predict and pinpoint but is becoming an increasing issue in urban areas (see example above taken from the Environment Agency’s online surface water flood map).

Greater London and Yorkshire and the Humber region are the regions currently have greatest number of properties at significant risk of flooding (EA, 2009: 29).

3C. Risk of Water Stress

Indicative stress situation for each water company. Environment Agency and Natural Resources Wales used current and future water usage and climate change scenarios.



Water Company Area	2013 Classification					Final Stress
	Current Stress	Future Scenario 1	Future Scenario 2	Future Scenario 3	Future Scenario 4	
Affinity Water (formerly Veolia Water Central)	S	S	S	S	S	Serious
Affinity Water (formerly Veolia Water East)	S	S	S	S	S	Serious
Affinity Water (formerly Veolia Water South East)	S	S	S	S	S	Serious
Anglian Water	S	S	S	S	S	Serious
Bristol Water	M	M	M	M	M	Not Serious
Cambridge Water	M	M	M	M	M	Not Serious
Cholderton & District Water	M	M	M	M	M	Not Serious
Dee Valley Water	M	M	M	M	M	Not Serious
Dwr Cymru Welsh Water	M	M	M	M	M	Not Serious
Essex & Suffolk Water	S	S	S	S	S	Serious
Northumbrian Water	M	M	M	M	M	Not Serious
Portsmouth Water	M	S	M	S	M	Not Serious
Sembcorp Bournemouth Water	L	M	M	M	L	Not Serious
Severn Trent Water	M	M	M	M	M	Not Serious
South East Water	S	S	S	S	S	Serious
South Staffordshire Water	M	M	M	M	M	Not Serious
South West Water	M	M	M	M	M	Not Serious
Southern Water	S	S	S	S	S	Serious
Sutton & East Surrey Water	S	S	S	S	S	Serious
Thames Water	S	S	S	S	S	Serious
United Utilities	M	M	M	M	M	Not Serious
Veolia Water Projects	M	M	M	M	M	Not Serious
Wessex Water	M	M	M	M	M	Not Serious
Yorkshire Water	M	M	M	M	M	Not Serious

Table 1: Water company stress classification showing how the current and future scenarios have been combined (L = Low stress, M = Moderate Stress, S = Serious Stress).

Scenario	Water consumption	Climate change impacts
1	High	Severe
2	High	Moderate
3	Low	Severe
4	Low	Moderate

Table 4: Future scenarios broken down by water consumption and climate change impact

4. Adaptation vs. Mitigation

A dichotomy exists between mitigation and adaptation since historically, they have been framed by scientists and policy makers as two separate approaches to dealing with climate change... (Biesbroek et al., 2009)

Mitigation

“Taking action to tackle the causes of climate change, that is reducing concentrations of greenhouse gases in the atmosphere.”

(DEFRA, 2009: 2)

Adaptation

“The process of adjustment to actual or expected climate and its effects, in order to moderate harm or exploit beneficial opportunities”

(IPCC, 2012: 3)

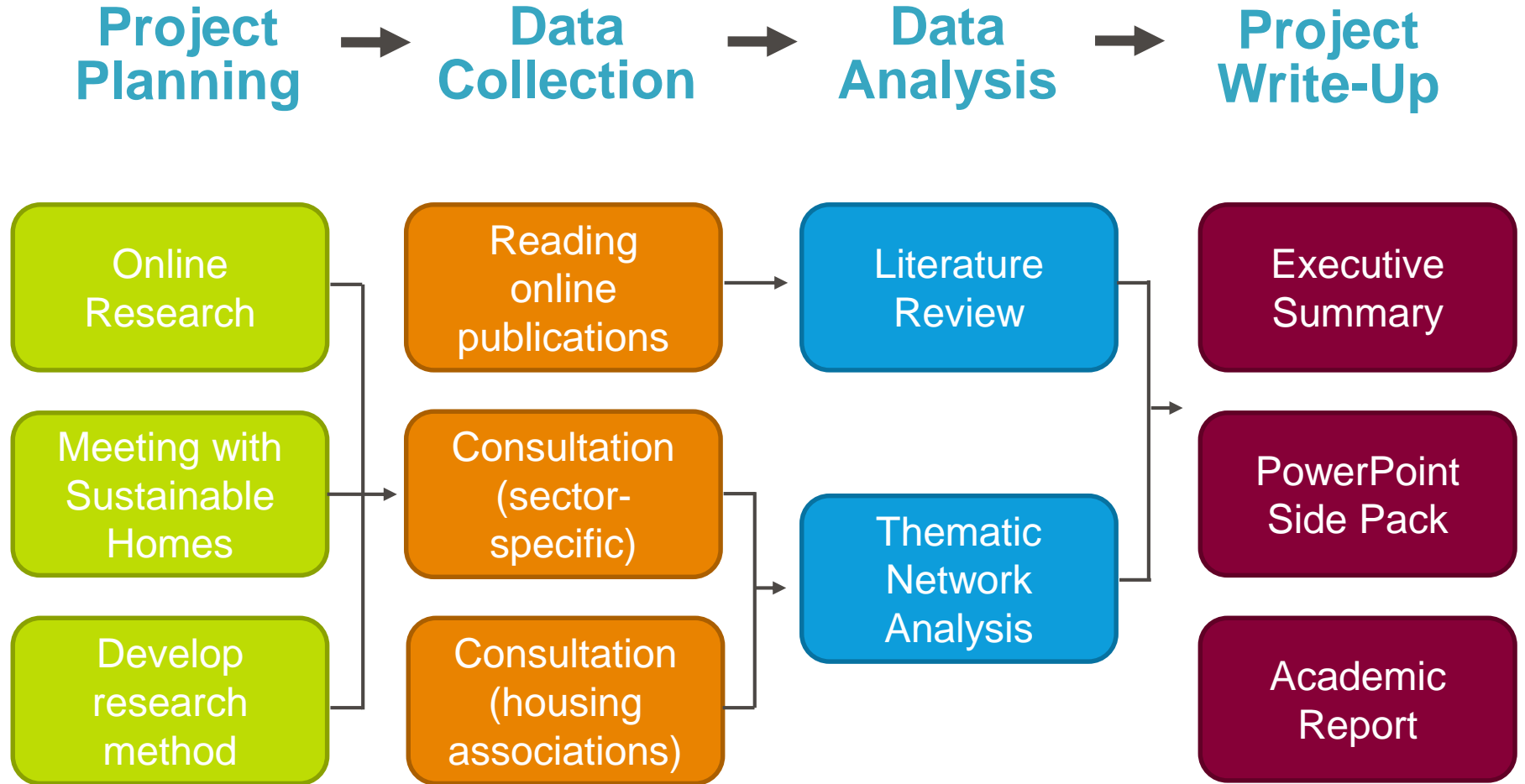
... However, it is increasingly acknowledged that the combined effect of mitigation and adaptation is necessary for being able to cope with the future impacts of climate change.



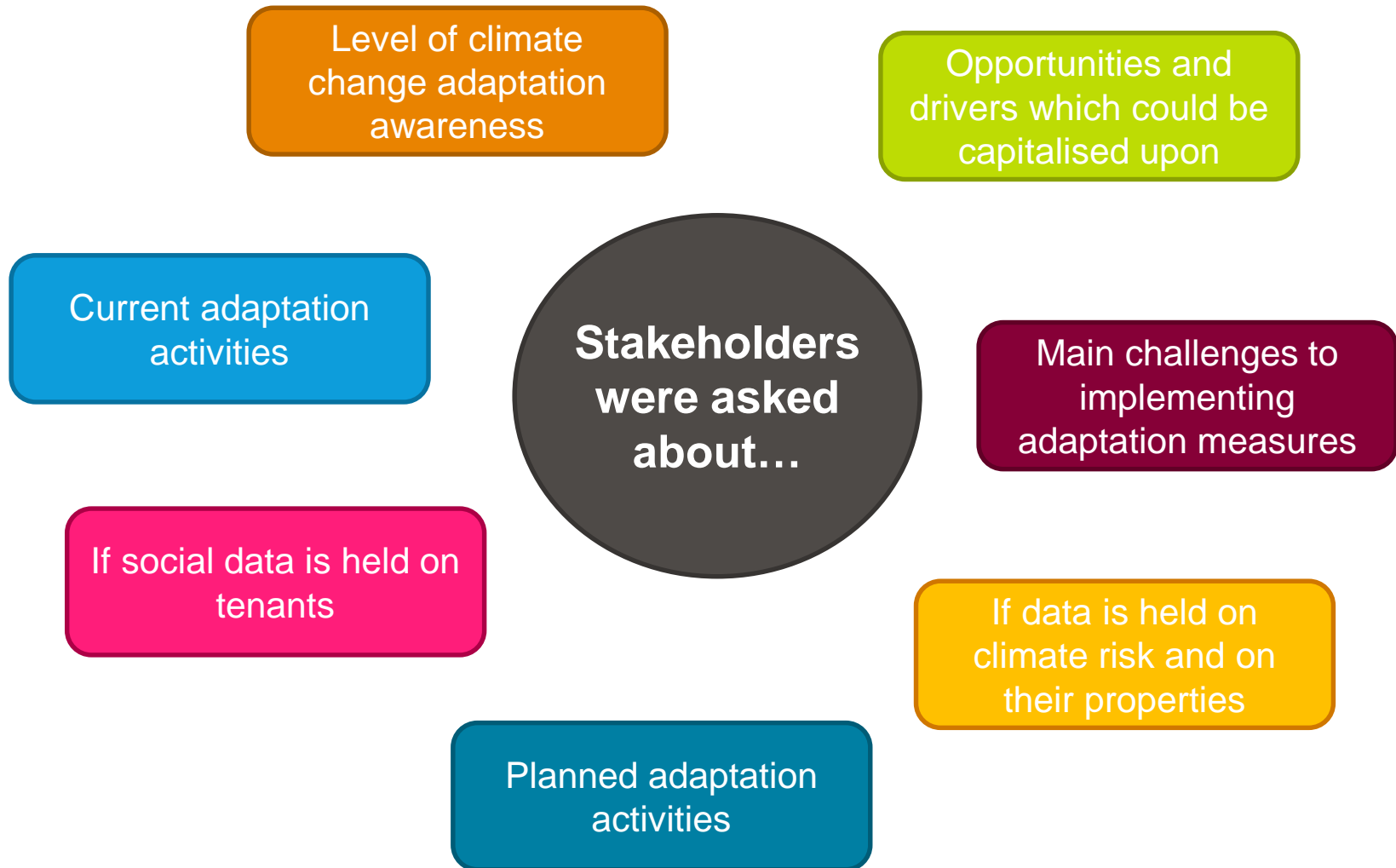
RESEARCH APPROACH



Research Approach



Research Approach: Consultation



KEY FINDINGS



1. Online Publications: Regulation and Policy

EU and National Policies

- EU Adaptation Strategy 2013
- UK National Adaptation Programme (2012)
- Climate Change Risk Assessment (2012)
- English Housing Strategy 2011

UK Building Regulations

- Approved Doc. H for surface water run-off and Approved Doc. G for water efficiency
- Part F (Ventilation) regarding internal temperatures, but *not* for avoiding overheating for residential health/ thermal comfort reasons

Sector- Specific

- Decent Homes Standard
- Code for Sustainable Homes (withdrawn March 2015)
 - Replaced by BRE's (voluntary) Home Quality Mark;
 - Minimum standards transferred to UK Building Regulations.



1. Online Publications: Environmental Strategies



*“2013 SHIFT assessment identified that there was a lack of an overall strategy and that a comprehensive strategy should address all aspects of sustainability throughout the organisation, **including adaptation to climate change...**”*

(ISHA, 2014: 2)

*“**Strategic objective.** Reduce the impact of climate change on our communities. Adaptation... **evaluate the present and future risk** of summer overheating, drought and flooding and manage this risk.”*

(Peabody, 2012: 3)

Social housing providers' strategies

- Statements made on the need to *address or unlock the future potential* of climate change adaptation
- One of the strategies- strategic objective for *evaluating the present and future risk* of the three climate risks
- Many talk of ensuring all new homes are built *at least* at Code Level 4 (or higher) within the Code for Sustainable Homes

1. Online Publications: Academic Literature



Aligning well with the findings from the interviews (see following slides)...

- Analysis on policies and annual reports of (Dutch) housing associations showed governance on implementing mitigation measures appeared effective, but “climate change adaptation” was not mentioned (Roders et al., 2011);
- In a study of UK preparedness, there was a high awareness of flooding and climate change, but perception of the risk was low (Bichard and Kazmierczak, 2012), believing the authorities were responsible for flood protection;
- UK households are reliant on *intuitive reactive* coping responses and struggle to build long-term adaptive capacity (Porter et al., 2014);
- Respondents from the housing development sector argue the focus has been on *mitigation* i.e. energy efficiency measures to achieve energy cost savings (Georgiadou et al., 2012);
- Designing for overheating not seen as pressing concern (ibid, 2012), yet occupants in one (German) study ranked physiological needs of air quality and thermal comfort of highest importance (Voelker et al., 2013);
- Significant relationships between thermal comfort and elevated temperatures with house type, age, construction, tenure, occupancy (Lomas and Kane, 2013).

2. Sector-Specific Organisations: Overall Messages



Drivers:

- Obligation as responsible social housing providers to protect tenants (impacts organisation reputation);
- Acceptance that climate change risk will become more acute in the future;
- Adhering to minimum UK Building Regulations (for flooding/ water efficiency).

Opportunities:

- Delivery- voids; major works; planned maintenance;
- Regulatory- thermal comfort added to energy performance certificates;
- Organisation(s) take “ownership” of overheating issue for tackling it;
- Long term climate change built into insurance calculation costs.

Challenges:

- Competing priorities
 - Alleviating fuel poverty; reducing winter fuel bill costs; achieving Decent Homes Standard;
- Financial restrictions
 - Capped rent; lack of funding for adaptation projects; lack of Board investment since financial return is not immediate;
- Regulatory
 - Lack of political will; lack of regulation on thermal comfort;
- Technical/ project delivery
 - Capacity of construction industry; how, when and securing the expertise for delivery.
- Climate awareness & level of concern
 - Climate risks are relatively new risks; resident education on risks/ buy-in.

2. Sector-Specific Organisation Viewpoints



Environment Agency-

- Difficult to wholly attribute water scarcity to climate change since population increase is the major issue;
- EA have “ownership” over the issue of flood risk, whereas the same does not exist for risk of buildings overheating;
- Need an open space for monitoring and learning purposes rather than a finger pointing exercise of blame e.g. for when there has been negative consequences of poor design on thermal comfort.

Leeds Beckett Sustainability Institute-

- From a regulatory perspective, the use of the Standard Assessment Procedure (SAP) for building performance is simplistic/ static and does not explicitly account for thermal comfort;
- There are *dynamic* thermal simulation software packages, but are more complex than SAP, so are perhaps out of reach for certain businesses in terms of expense and complexity which then requires the right expertise.

3. Housing Associations: Awareness and Activity



Climate risk awareness-

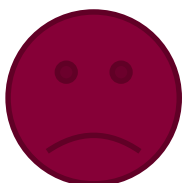


- Knowledge and understanding of risks and how they potentially impact properties and tenants is very good;

Current level of action-



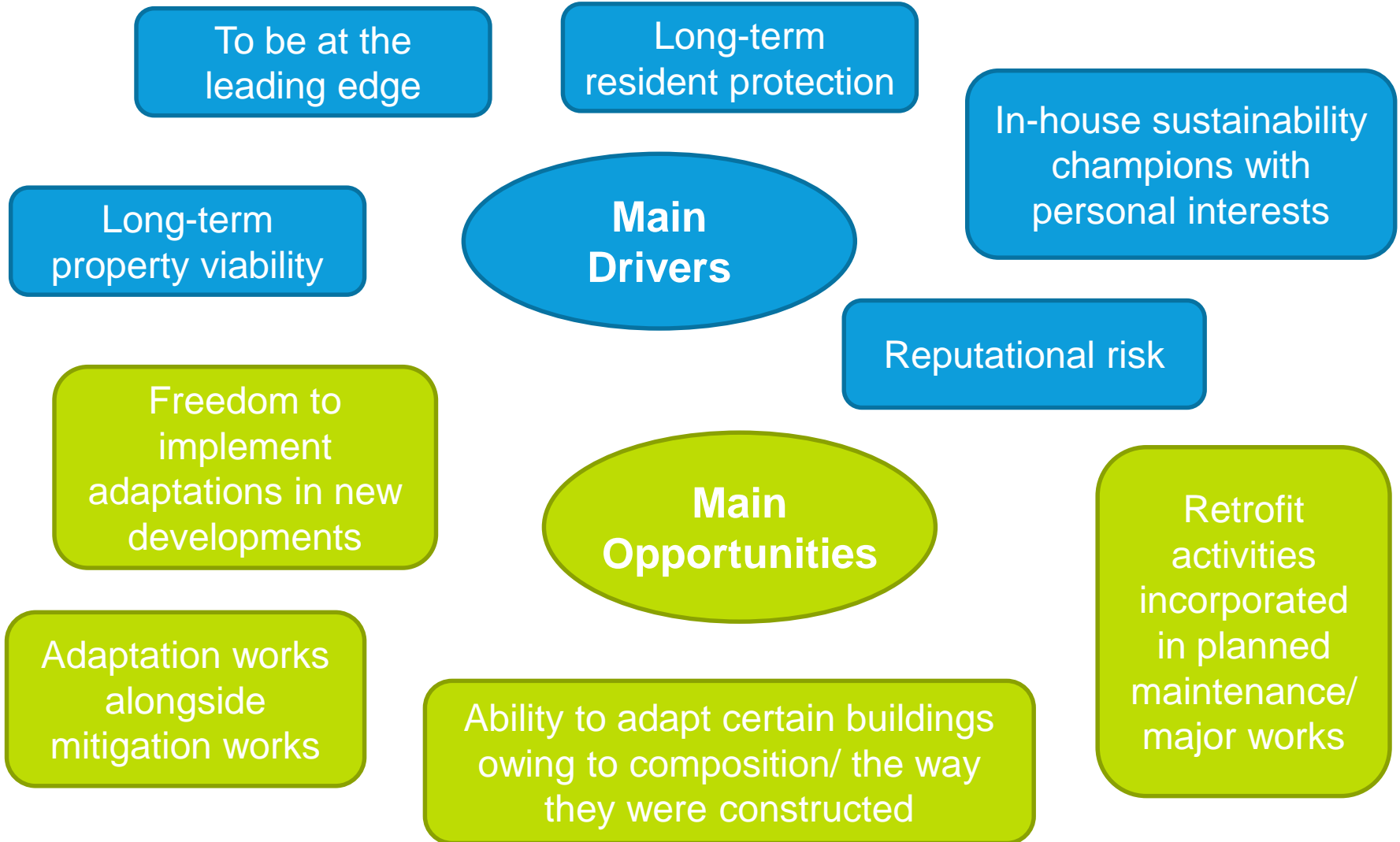
- Flooding and overheating of increasing concern, water stress is not a concern;
- General perception that water stress is the responsibility of water companies, and that flood protection (in London), provided by the authorities is sufficient;
- Action currently taken is *reactive* to specific extreme events;
- Do not tend to go beyond Building Regulations and other legislation for climate-related activity;
- Extreme climate events not frequent or severe enough to demand immediate, widespread action;



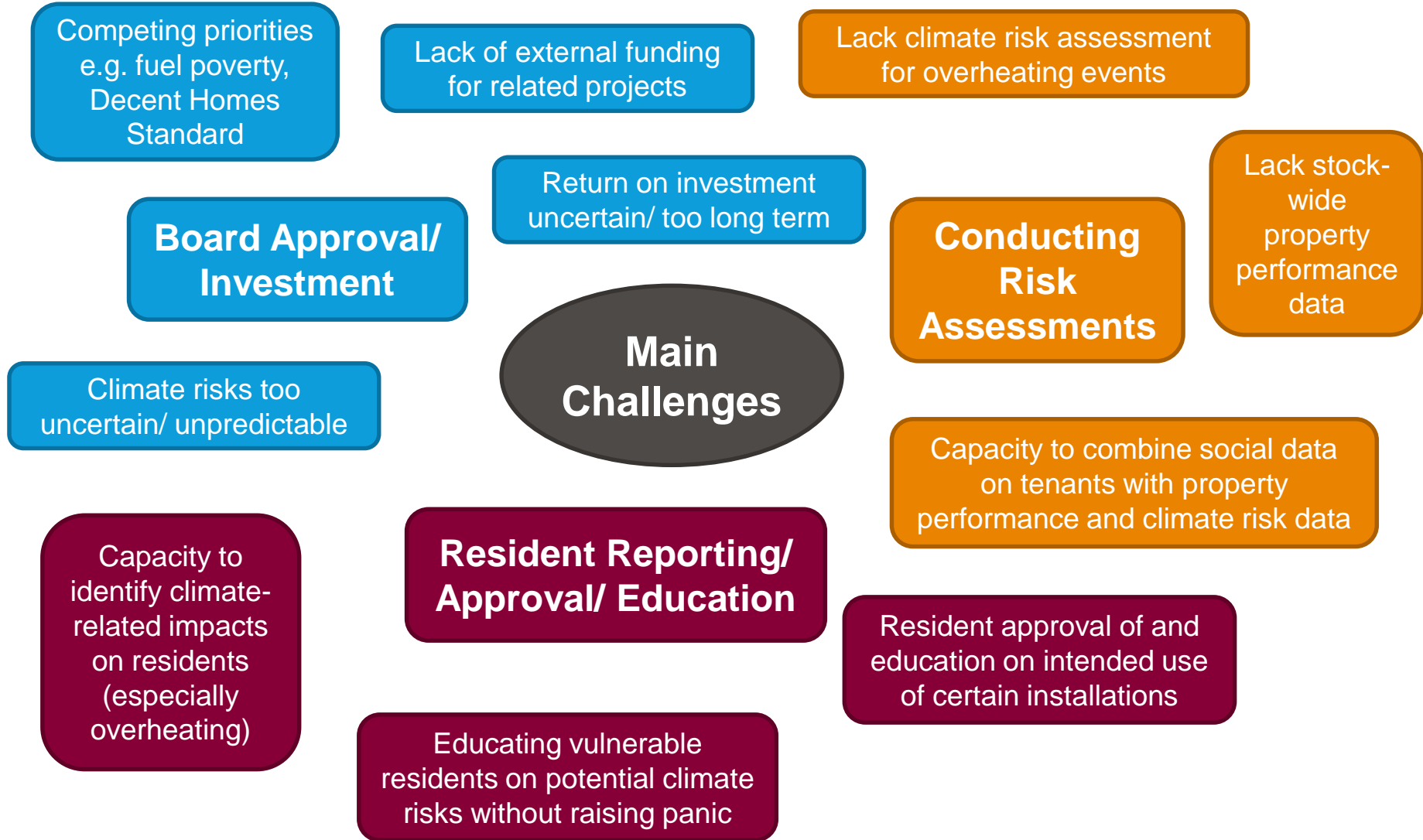
Strategic climate change action-

- Adapting properties to climate change is *not* embedded within strategic asset management.

3. Housing Associations: Opportunities and Drivers



3. Housing Associations: Main Challenges





MAIN CONCLUSIONS



Main Conclusions



- Despite excellent climate awareness, the approach of housing associations remains a “wait and see” tactic;
 - Climate related events not considered frequent or severe enough, and lack of confidence in ability of scientific community to predict extreme events;
- Alleviating fuel poverty and reducing winter fuel bills remains a greater priority;
 - As are other business and social imperatives (i.e. short term return on investment, ability to quickly let out properties; Decent Homes Standard etc.);
- The responsibility for coping with and recovering from extreme climate events considered the responsibility of other bodies;
 - i.e. water stress by water companies; flood risk by local or other authorities. But who is responsible for overheating?
- Overcoming the barrier between strategic climate adaptation objectives is challenging;
 - i.e. organisations need their day to day operations teams on board, as well as the approval and correct education of residents on implementation and operation.

LIMITATIONS AND FUTURE DIRECTIONS



Limitations and Future Directions



- Temporal constraints limited the study to the exploration of a handful of housing associations, considered leaders within the context of climate change;
 - Future work in this area should be carried out with a range of housing associations at different stages of their climate change journey and from different regions in England, for a more representative account of “typical” housing association.
- Basic, exploratory questions were asked of the social housing providers about whether or not they held data on their tenants (in terms of vulnerability), risk assessment data (in terms of the climate risks) and in some cases property data was discussed;
 - It may be possible to develop a climate risk assessment which accounts for these three data sets for assessing the relative vulnerability of a particular tenant, in a particular property, to a particular climate hazard. One of the next steps could be to explore the level of interest in this need, and identify the missing gaps in data availability.



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