Improving climate resilience in the urban environment: Enhancing the uptake and use of building-scale to city-scale decision support models by policymakers and industry

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arcc

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Project summary

- **Adaptation and Resilience in the Context of Change (ARCC)** Network: UK-wide network to develop and exchange knowledge and evidence to inform policy and practice.
- Covers a host of EPSRC projects with a focus on adaptation to changes in the built environment and infrastructure.
- Coordinates activities, knowledge exchange, information and engagement opportunities for adaptation.
- 37 complete or ongoing projects - These all include dissemination plans, including some which explicitly aim to provide models, visualisation tools, or data for stakeholder use.
- However, many tools and research outputs do not materialise in the form originally anticipated, or do not transition from the academic sphere to potential end users.
- It is felt that many of the research projects that have developed such models and outputs have the potential for much greater policy and practice application.

ARCC Project Outputs

- Building scale to city scale
- Large focus on London, but also Manchester, Newcastle, Leicester...
- Various modeling tools: *Demographic, Urban Climate, Climate Impact assessment tools, Land-use, hydro-dynamic, energy, building retrofit, housing, economic, transport, water resource systems, extreme weather mapping, energy-use, well being, CO_2 emissions, decision making and adaptation tools…*

Examples of what is available:

- Test Reference Years and other building design weather data for future climates
- Matlab weather data generator scripts
- Probabilistic future weather files which enable users to run weather through a buildings simulation model to predict behavior in the future under a range of climate change scenarios.
- XML database for future technologies

ARCC Project Outputs

Example of data that could be available:

- Urban climate data; Extreme weather data; Data on climate risks e.g. drought, flooding, overheating, heatwaves.
- Data on critical infrastructure, water demand…
- Building performance metrics and associated risk levels acceptable to designers and building users.
- Climate impact assessment and decision making tools
- Different city focused scenarios describing characteristics within the following categories: demography, society, governance, economy, planning and land use, housing, urban form, air quality, transportation, water, energy, and biodiversity.

Formats: Matlab scripts, Geo-spatial, GIS Toolkits, large .xls and .csv files, weather files presented in the .epw weather format, XML database, various programming languages (C#, C++), specialized software.

Project summary and methods

- Aim: Investigate and understand the current challenges and barriers, and ultimately provide a set of guiding principles to inform both stakeholders and researchers to help ensure data and models are suitable for informing policy-making and practice in the future.
- Progress to date: A desktop survey of relevant literature and ARCC projects, and scoping discussions.

Emerging Issues…

Difficult to define at the start of a project what integrated multi-data/multi-model projects will focus on and produce

Stakeholders often provide expert advice, but there is less interaction with personnel who would work with data/models

Lack of clear, stakeholder relevant, documentation on what models/data outputs have been provided and how they could be utilised

May be limited demand for outputs generated. Perceived robustness and added value of using new data.

Lack of guidance to help users understand and select the most relevant files for their needs, and understand differences if different files are used by others

Stakeholder engagement and pathway to impact often focused on providing information, rather than two-way engagement and working

Discord between data outputs and the type/format of stakeholder/industry data sets

Models or data outputs require expert knowledge to use and interpret, and cannot be used independently by stakeholders

Focus on empirical and scientific evidence, rather than how stakeholders could use outputs, and what this would mean for their practices.

Inconsistencies in results across different projects can cause confusion and provide a barrier to action and uptake

focus is often on the policy relevance, with researchers connecting less to how outputs could be used in practice

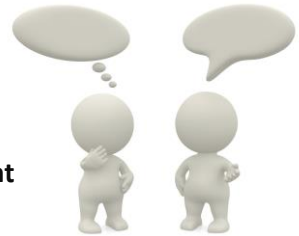
Increasing complexity of models/data not easily usable

Researchers leave before or at project completion. Restricts future use of models/data and link to technical advice.

Proposed tools /data do not materialise or in prototype stages

IPR, data licensing, and sharing of information across institutions

Research timeframes can be incompatible with needs of stakeholders, changing staff and priority areas.



Keeping stakeholders involved and engaged through the model development process can be difficult due to the timeframe of development and until outputs are available

Stakeholders may not have the computational and staff resources required to incorporate models, data, or results.

Management and longevity of outputs beyond project completion

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- Future plans: More detailed review of sub-set of ARCC projects, discussions with researchers involved in data/model production.
- Develop research framework: researcher and stakeholder surveys/questionnaires and interviews.
- Workshops to engage with targeted stakeholder groups to investigate the barriers and challenges of policy and industry uptake
- Use existing models and output from the ARCADIA project, and other relevant projects highlighted, to demonstrate and test possible strategies to better meet stakeholder requirements.

Next Steps

As part of the scoping study…to discuss today

- **Key issues and questions which have emerged**
- **Focus on data and models**
- **Stakeholder/user perspectives and needs**
- **How is data currently used by others, and how research outputs could be aligned with this**
- **Understanding how data could be presented and shared in future**
  - **What others are doing…**
  - **Changes needed to facilitate this**

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