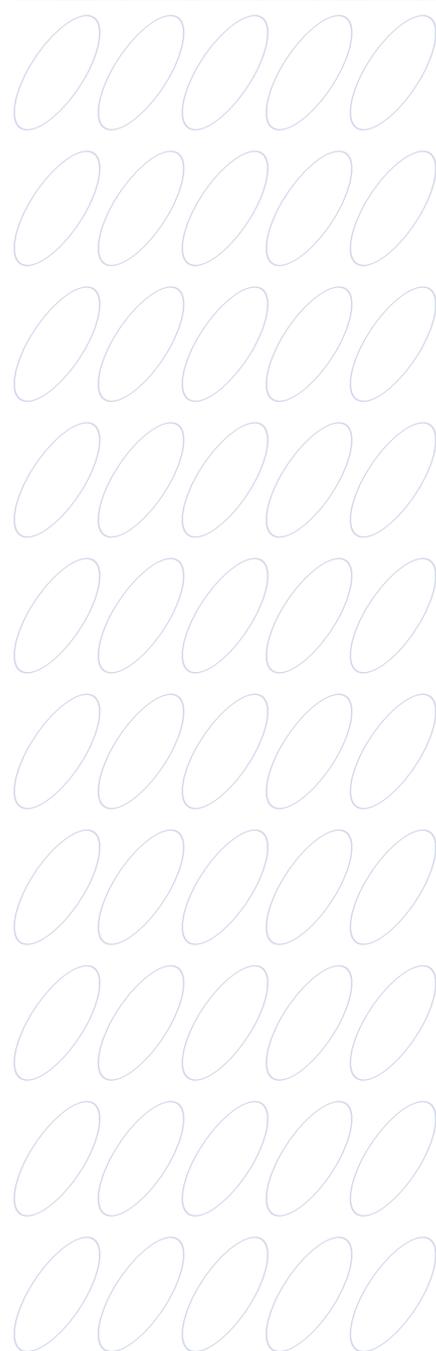


arcc coordination network
annual report

2010



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ARCC coordination network:
Annual report 2010. UKCIP,
Oxford.

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executive summary

1

Now in its second year, the Adaptation and Resilience to a Changing Climate (ARCC) Coordination Network (ACN) programme has successfully built on earlier work to further strengthen effective coordination and engagement activities both between the 14 ACN research projects and with the wider adaptation in the built environment community.

The UK Climate Impacts Programme (UKCIP) provides the management and support role for the network and aims to enhance the cooperative development of the overall ACN research programme and to help promote benefits to all participants.

Key achievements in 2010 include:

- Further exploration of links and synergies both between research projects and with stakeholders and end users through a series of focussed forum meetings.
- Enhanced communications through the publication of a series of ACN newsletters, further development of the ACN website and by establishing links with and contributing to other networks and organisations.
- Progress on capturing key messages on cross-cutting themes such as overheating in the urban environment from across the portfolio of projects.
- Involvement in identifying and scoping areas within the built environment and infrastructure sector requiring additional research, such as the UK energy sector.
- Initial development of dissemination strategies including the establishment of a central metadatabase for geospatial outputs, to help ensure results are widely available to appropriate audiences.

Further information on both the network and the individual research projects can be found on the ACN website at www.ukcip-arcc.org.uk. Details of future events and papers and presentations from previous meetings are also available.



introduction to the arcc coordination network

2

The ARCC Coordination Network is funded by the Engineering and Physical Sciences Research Council (EPSRC, project EP/G036586/1). It exists to enhance the cooperative development and dissemination of research between and beyond a portfolio of EPSRC-funded projects focusing on adaptation to a changing climate in the buildings and infrastructure sectors, including transport and water resource systems.

The ACN is managed and supported by UKCIP, University of Oxford. The contract started on 1 January 2009 and the current programme runs for 55 months to 31 July 2013.

The aims and objectives of the ACN are:

- to facilitate collaboration by establishing an integrating network;
- to facilitate stakeholder and researcher participation within the portfolio of projects;
- to maximise the potential benefits of the research to all end users through broadening engagements and targeted dissemination of outputs;
- to facilitate the further exploration of related knowledge and research gaps.

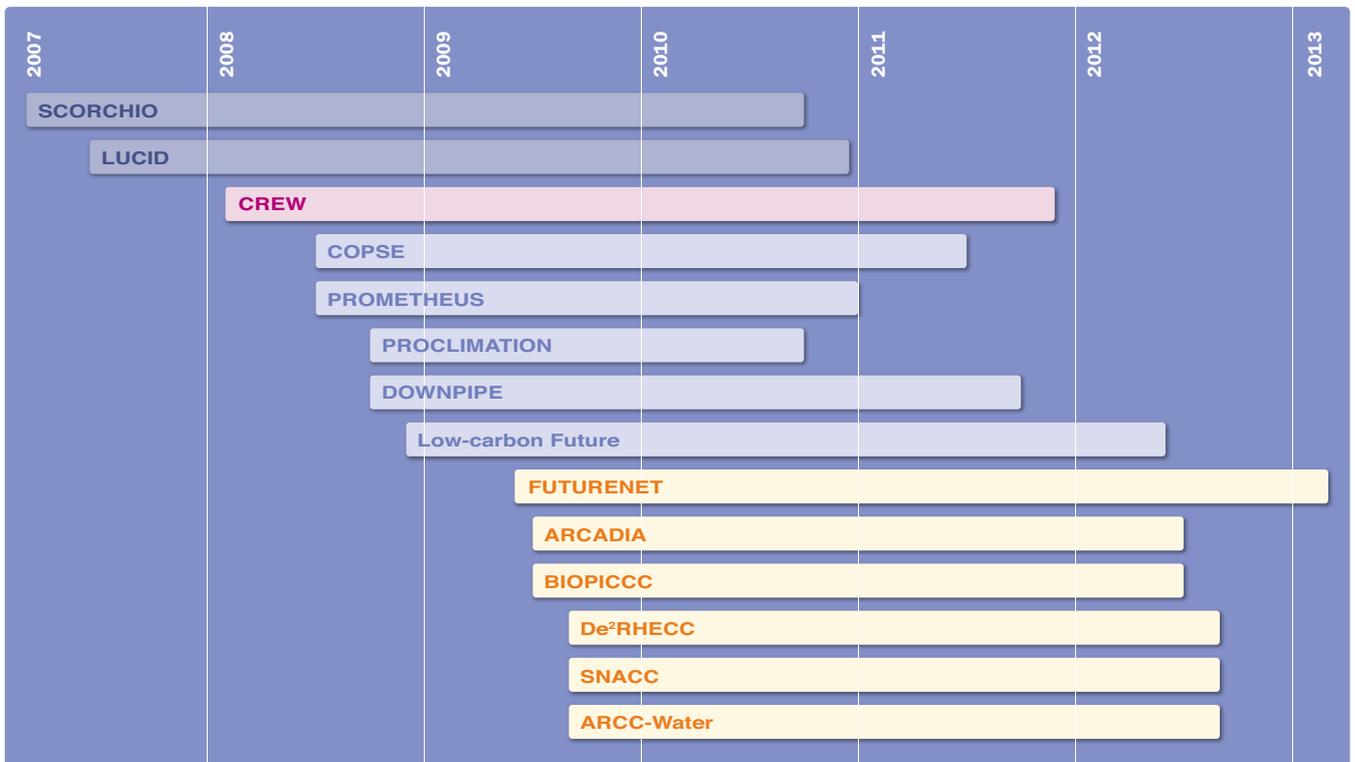
Fourteen research projects plus the coordination role provided by UKCIP currently form the network and further details of all the projects can be found in section 9.

During 2010, work by UKCIP within the network has sought to build on and expand the initial engagement and interaction processes initiated in 2009. Priority has been given to enhancing opportunities for further coordination both between projects, and between researchers and stakeholders, with initiatives focussing on either general issues of relevance to all projects or specific technical issues relevant to smaller sub-sets of projects. Work has also continued on further improving communication and dissemination: four projects came to completion at end of 2010 bringing new challenges to help ensure effective dissemination of research outputs.



the acn suite of projects

3



The 14 research projects currently within the ACN originated in several distinct stages. SCORCHIO and LUCID both started in 2007 in response to an EPSRC call for climate change research into urban environments. Both projects finished in late 2010 and the focus now is on working with the research groups to help disseminate the outputs and key findings effectively.

The CREW project started in early 2008 as a result of the EPSRC IDEAS factory call on coping with extreme weather events and is now due to finish in late 2011.



In the third stage, five projects were funded by the EPSRC from mid to late 2008 specifically to study the use of probabilistic climate change projections in adaptation decisions within the buildings sector. PROMETHEUS and PROCLIMATION are just finishing, COPSE and DOWNPIPE will complete in mid 2011 while the LCF project continues to mid 2012.

Finally, six projects: ARCADIA, ARCC-Water, BIOPICCC, DeDeRHECC, FUTURENET and SNACC were all funded under the EPSRC Adaptation and Resilience to a Changing Climate programme. All started in mid-2009 with approximately 3 year work programmes (slightly longer for FUTURENET).

As the portfolio of projects working on adaptation in the built environment area expanded, the EPSRC established the ACN, coordinated by UKCIP, to foster networking among the projects, to engage stakeholders at all stages of the research process and to help promote the wide dissemination of project outputs. This coordination project started in 2009 and continues to mid 2013.

The latter six research projects were all developed under the auspices of the 10 year Living with Environmental Change (LWEC) programme; a partnership of major UK public sector funders of environmental research, including the research councils and central government departments, which aims to ensure government, business and society have the foresight, knowledge and tools to mitigate, adapt to and capitalise on environmental change. The ARCC projects are specifically aimed at responding to one LWEC theme: to make infrastructure, the built environment and transport systems resilient to environmental change, and to develop more sustainable, less energy-intensive systems and approaches that are socially acceptable, economically advantageous and more environmentally harmonious.



coordination activities

4

Experience gained from the earlier Building Knowledge for a Changing Climate (BKCC) and the Sustaining Knowledge for a Changing Climate (SKCC) programmes, highlighted the importance of effective coordination and communication both between researchers, especially in large multi-disciplinary research consortia, and particularly with stakeholders and other end users. Engagement through such a network as the ACN has been shown to help ensure end users are more informed and better able to contribute to the research and more willing and able to exploit the outputs and help disseminate the results further in their respective communities. Whilst all projects have their own stakeholder groups, the ACN seeks to enhance the wider researcher–stakeholder interaction through regular forum meetings and other initiatives.

4.1 Stakeholder Forum and Integrating Research Forum meetings

Stakeholder forum meetings are held to provide timely opportunities to seek stakeholder advice and to develop relationships within and among end-users. Integrating research forum meetings offer an opportunity to share progress and research results between projects and to focus on identifying common needs and furthering cross-project interactions.

The first stakeholder meeting was held on 16 March 2010, followed by the first integrating research forum on 17 March 2010, both hosted by the DeDeRHECC project at the University of Cambridge. In response to a key message arising from these meetings that there was a need to promote stronger links between the two communities, a joint forum meeting was subsequently held on 27 and 28 September 2010 hosted by the BIOPICCC team at the University of Durham.

All meetings were well attended, with updates on relevant policy frameworks provided by Defra, DCLG, the Technology Strategy Board (TSB), the Chartered Institute for Building Service Engineers (CIBSE) and others as appropriate. All reports and presentations from the meetings are available on the ACN website.

Key areas discussed and taken forward include:

- issues relevant to stakeholders realising the benefits from individual projects, the overall research and the ACN;



- identification of links and overlaps between projects based on adaptation at the building, community and city levels;
- exploration of cross-cutting themes. A number of possible themes were suggested by the participants with the four main areas explored in more detail;
- the most effective ways to disseminate complex information on climate change risks to those it will affect including the community, the local authority, service providers and local policy makers.

These meetings have provided good opportunities to forge new links both between research projects and between researchers and stakeholders. This is an on-going process and will continue, but now that such links have been established, future meetings are likely to focus principally on cross-sectoral themes (see section 4.2).

4.2 Cross-cutting themes

Recognising the need to focus on specific cross-cutting issues of relevance to some or all of the ACN projects, smaller themed meetings have been held in response to either project suggestions for further coordination or requests for information from policymakers.

- Wind Data Task Group. This was established to address the lack of availability of wind information in the UKCP09 climate projections, to look at current practices and procedures for providing wind data based on existing climate information and to discuss options for achieving consistency. A first teleconference between seven ACN projects was held on 23 March 2010 to explore the various approaches currently being used by researchers and to consider possible ways forward.
- The Use of Probabilistic Information in Building Design. A first coordination meeting was held on 5 May 2010 to facilitate discussions on overlapping issues between the five ACN projects exploring the use of the UKCP09 probabilistic climate change projections and in particular the use of the projections to produce weather data for building thermal simulation analysis. A follow-up meeting was held on 30 November 2010 and included consideration of potential approaches to updating the CIBSE weather years.
- Overheating in buildings, neighbourhoods and cities. In response to a request from government for the latest research results to help inform policy decisions, a seminar was held on 1 December 2010 hosted by Defra and DCLG and facilitated by UKCIP. Researchers from all projects with an interest in overheating were invited to respond to a series of questions raised by the policy makers to help provide evidence on which to base future decisions.



4.3 Contributions to individual projects

In addition to organising and facilitating ACN coordination meetings, UKCIP scientists attend individual research project stakeholder meetings whenever possible to help provide expert knowledge on climate change impacts, resilience and adaptation options. This interaction also helps identify outputs of potential interest to the broader adaptation community.

It is anticipated that as the projects come to an end, the research outputs may be used to provide case studies applicable to the wider built environment community which may then enhance the UKCIP portfolio of information and advice to others in this sector.



new research: the uk energy sector and its infrastructure

5

Recognising the limited scope of current research to inform decision makers on adaptation and resilience to a changing climate in the UK energy sector and its infrastructure, the EPSRC requested the ACN to develop recommendations for future research in this area.

Using the outcome of previous BKCC and SKCC consultations as a basis, a two-day internet workshop was held on 14 and 16 June 2010. Participants (users, stakeholders and researchers representing government, academia, industry and NGOs) were invited to explore current challenges, to identify knowledge gaps and to suggest priority areas for potential research. Key subject areas considered were:

- Future energy demand
- Future energy mix, fuel choices and national energy security
- Interactions between the energy and transport sectors
- The role of renewable energy and emerging technologies
- Links with other utilities
- Building resilience into new and existing infrastructure
- Influence of policies on adaptation measures
- Tools for on-going assessment and improved decision making

A final report synthesising the issues and priorities raised during the workshop was submitted to the EPSRC in July 2010 and formed the basis of a subsequent call for research proposals on this topic. Up to £3m is available potentially to support suitable research projects over a 5 year period. It is anticipated that successful projects will start in spring 2011 sponsored by the Research Councils UK Energy Programme and participating in the ACN.



effective communication & dissemination

6

Effective and timely communication of information from across the entire portfolio of projects helps engage both the broad research community and a range of potential end users and continues to strengthen the interaction between all participants.

Various mechanisms have been established to inform the national and international built environment community of progress and forthcoming events within the network. These include the publication of newsletters, the ACN website and interactive forum, and timely contributions to other related networks and organisations to promote the overall activities and achievements of the network.

To help broaden the reach and enhance the value of all research outputs (reports, publications, data sets, tools and guidance), UKCIP is also tasked with helping network projects to ensure effective dissemination of results to appropriate audiences. This can be achieved partly through the sustained engagement of stakeholders throughout the research process but also by targeting additional dissemination routes for final outputs. This work builds on the existing achievements of individual research groups in publishing and promoting their results.

In addition, the ACN will be working with researchers to draw out key messages from across the entire portfolio of projects in the form of themed papers on various cross-cutting issues of relevance to stakeholders and end users. These synthesis documents should enhance the benefits, and aid dissemination, of research outputs.

6.1 Newsletters

Three ACN newsletters have been issued in 2010 (February, May and October) to provide updates on the progress of individual projects and of the network, to promote forthcoming activities within the ACN and to provide information of interest to all those engaged in the projects and the wider built environment community. These newsletters are distributed electronically to an expanding list of over 400 national and international recipients including researchers, project stakeholders, other end-users, funding agencies and decision makers and are also made available to all through the ACN website. It is anticipated that these newsletters will continue with issues approximately every 4 months as required.



6.2 Website

The ACN website continues to be updated and expanded to ensure maximum outreach and to help integrate the work and resources from across the network. Summaries of all the research projects, links to project and other relevant websites, and specific information on future events and past meetings are all available. Current work is focussing on helping to ensure all results and outputs from the first four projects to reach completion are made available in a timely and appropriate manner.

In addition, the ACN discussion forum is open to all and is accessed by registration through the website. It is intended to foster discussions on specific issues of interest raised by participants.

6.3 Data Management Issues

The ACN Data Management Group (DMG) includes representatives from all projects and UKCIP and was established in early 2010 to:

- identify any common data requirements between projects and aid in obtaining this data more efficiently if appropriate;
- help identify and record interim and final output products for each research project using a common format;
- assist in the wide dissemination of research outputs.

The first DMG meeting was held on 28 January 2010 in Birmingham to consider the conclusions and recommendations for future research consortia as highlighted by the BKCC programme. Further discussions at the meeting focussed on the expectations of the projects, the overall ACN network and of EPSRC and end users. A DMG work plan was subsequently circulated and agreed.

One of the main aims of the ACN is to help projects make available and share research outputs and a key recommendation arising out of the BKCC programme was to enhance this dissemination of geospatial data by concentrating on the collation and dissemination of metadata, rather than the actual data which remains the responsibility of the researchers. Recent ACN work in this area has focussed on the systematic production of a metadatabase which records information on all research products which are then made available through an existing geographic information system, GiGateway. The first data sets can now be accessed at <http://www.gigateway.org.uk/> and others will be added as they become available.



6.4 Links with other organisations

Significant working links have been established and are maintained with the:

- LWEC programme
- EPSRC, especially with respect to future research needs
- CIBSE, in particular looking at future weather data
- TSB Modern Build Environment Knowledge Transfer Network (MBE KTN)
- TSB Design for Future Climate: Adapting Buildings competition

Initial scoping discussions have also been held with the US National Science Foundation (Resilient and Sustainable Infrastructure) and the ACN concerning the possibility of strengthening links between similar research programmes, including more formal linkages.

In addition, a number of presentations on the ACN and its portfolio of research projects have been given in response to invitations by other organisations. The ACN was also invited to the TSB annual conference, Innovate10, to showcase current research on climate change adaptation in the built environment. Representatives from UKCIP, ARCC-Water, LUCID and ARCADIA attended.



project management

7

The ACN is overseen by a project management advisory group consisting of the principal investigator (Richard Washington, University of Oxford) and two co-managers (Chris West and Roger Street, UKCIP) with responsibility to monitor and evaluate the progress of the ACN relative to contract milestones and objectives and to oversee details of the future work programme.

Financial statement

Expenditure Category	Budget	Actual expenditure	Funds available
Staff Costs	178,579	77,923	100,656
Travel and subsistence (including participants from research projects)	99,969	5,873	94,096
Consumables, conferences, publications etc.	106,383	17,994	88,389
Overheads	149,373	37,505	111,868
RPLJ0 Award Total	£534,304	£139,295	£395,009

Overall, expenditure is tracking the profile anticipated from the contract work programme. For the future, staffing levels are expected to remain stable. Three large coordination events are planned: the Mid-Term conference, 6 and 7 April 2011, a meeting to map future research requirements (mid 2012) and a final dissemination meeting (early 2013), plus a series of smaller themed workshops. Significant resources also remain available for planned stakeholder documents, final dissemination reports and on-going data management issues.



the next steps

8

Building on accomplishments to date, the future work programme for coordination activities within the ACN will expand on outline activities already agreed with the EPSRC, whilst maintaining flexibility to respond to requests for additional coordination activities from both projects and stakeholders. There is also a continued need to adapt to the changing political agenda and the increased focus on localism.

8.1 Mid-Term Conference

The immediate priority for 2011 will be organising the ACN Mid-Term conference to be held on 6 and 7 April at St Catherine's College, University of Oxford. This conference, *Adapting our Built Environment — ARCC Contributions and Challenges*, will highlight research accomplishments to date, the relevance of this work to policy and decision makers, linkages to other research nationally and internationally, and will begin to explore outstanding knowledge gaps of relevance to the built environment. This conference will be open to all with an interest in adaptation in buildings and infrastructure and the focus will be on themes and case studies as a means of bringing together and further exploring the research completed, underway and outstanding.

8.2 Projects coming to completion

Individual meetings are being held with the four projects (LUCID, SCORCHIO, PROCLIMATION and PROMETHEUS) which finished in 2010 to discuss final dissemination issues. Inevitably, some of this work will continue into early 2011 as projects seek to finalise outputs and scientific papers. In addition, 'so-what' documents for each project are being written by stakeholders based on the overall project findings to help promote the value of the research from an end-user perspective.

There is also an on-going need to continue to engage with these research teams at an appropriate level, particularly up to and including the mid-term conference but also in follow-up joint activities such as themed papers. Early indications are that the projects are keen to maintain an involvement in future ACN events and there is some money in the budget to support this.



8.3 Integration of new research projects

A new 5-year EPSRC/RCUK research project, the UK Infrastructure Transition Research Consortium (UK ITRC), will join the network from 1 January 2011. This work will develop and demonstrate a new generation of systems simulation models and methods to inform analysis, planning and design of national infrastructure (energy, waste, water, transport and telecoms), including exploring alternative investment strategies. The research is being funded through a £4.5m programme grant from the EPSRC with additional sponsorship of £2.6m from project partners, industry and government.

In addition, as a result of the EPSRC Energy Call, several research projects focussing on adaptation to climate change in the energy sector are likely to be funded from spring 2011 for up to five years. These will also join the ACN.

The challenge for the ACN will be to integrate these new and diverse research consortium projects into the existing network to ensure maximum mutual benefit and to enhance cross-project interactions and opportunities.

8.4 Cross-sectoral themed meetings

Based on the recent joint Stakeholder and Integrating Research Forum meeting, 14 cross-cutting themes of interest to the network were identified and the four of highest relevance were explored in more detail: community scale adaptation, decision support tools, overheating issues and the links between mitigation and adaptation. The first such themed meeting on urban overheating was held in December 2010 partly in response to a request from decision makers for further evidence. Other events will be prioritised and facilitated as required.

8.5 Collaborative activities

- Talks are underway with the Chartered Institute of Building Services Engineers (CIBSE) to publish a special issue of their technical journal, Building Services Engineering Research and Technology, concentrating on ACN project and themed papers. It is hoped this will follow the mid-term conference and act as a continued focus for the case studies and results presented at the meeting.
- On-going collaborations in particular with the Defra Built Environment project and DCLG work on urban overheating.
- Enhancing links with other national and international networks in particular the US National Science Foundation (Resilient and Sustainable Infrastructure Network).



the acn research projects

9

1 Sustainable Cities: Options for Responding to Climate Change Impacts and Outcomes (SCORCHIO)

Geoffrey Levermore, University of Manchester
1 Mar 2007 – 30 Sept 2010

Aim: To develop tools for analysis of adaptation options in urban areas, with a particular emphasis on heat and human comfort in the built environment.

2 The Development of a Local Urban Climate Model and its Application to the Intelligent Development of Cities (LUCID)

Michael Davies, University College London
14 June 2007 – 16 Dec 2010

Aim: To develop, test and apply state-of-the-art methods for calculating local climate in the urban environment. The impact on the internal built environment, energy use and the consequences for health will then be explored and the implications for urban planning considered.

3 Community Resilience to Extreme Weather (CREW)

Steve Hallett, Cranfield University
4 Feb 2008 – 3 Nov 2011

Aim: To gain a better understanding of the effects of extreme weather events and to develop a set of tools for improving the resilience of local communities.

4 Coincident Probabilistic climate change weather data for a Sustainable built Environment (COPSE)

Geoffrey Levermore, University of Manchester
1 July 2008 – 30 June 2011

Aim: To develop a methodology for deriving weather data for building designers etc. that is based on future data rather than observational records from the last 20 years or so.



5 Decision support for building adaptation in a low-carbon climate change future (LCF)

Phil Banfill, Heriot-Watt University

1 Dec 2008 – 31 May 2012

Aim: To produce a general, deterministic and computationally efficient methodology for adequately sizing Low Carbon Future heating, ventilating, and air-conditioning plant and equipment in buildings.

6 The use of probabilistic climate scenarios in decision making for adaptation of building and property drainage

Lynne Jack, Heriot-Watt University

1 Oct 2008 – 30 Sept 2011

Aim: To realise potential benefits to property drainage design and adaption by using probabilistic data from UKCP09. The location and extent of any under-capacity will be identified and adaptation solutions proposed, thus impacting positively on the mitigation of flood risk.

7 The use of probabilistic climate data to future proof design decisions in the buildings sector (PROMETHEUS)

David Coley, University of Exeter

1 July 2008 – 31 Dec 2010

Aim: To develop a new set of probabilistic reference years that can be understood and used by building designers.

8 The use of probabilistic climate scenarios in building environmental performance simulation (PROCLIMATION)

Vic Hanby, De Montfort University

1 Oct 2008 – 30 Sept 2010

Aim: To develop and implement methodologies for using probabilistic climate scenarios (UKCP09) in building simulation and other related analytical procedures.

9 Adaptation and Resilience in Cities: Analysis and Decision making using Integrated Assessment (ARCADIA)

Jim Hall, Newcastle University

1 Jul 2009 – 30 Jun 2012

Aim: To provide system-scale understanding of the inter-relationships between climate impacts, the urban economy, land use, transport and the built environment and to use this understanding to design cities that are more resilient and adaptable.



10 Built Infrastructure for Older People In Conditions of Climate Change (BIOPICCC)

Sarah Curtis, Durham University

1 Jul 2009 – 30 Jun 2012

Aim: To develop a methodology for selecting locally sensitive, efficient adaptation strategies during the period up to 2050 to ensure that the infrastructures and health and social care systems supporting well-being of older people will be sufficiently resilient to withstand harmful impacts of climate change.

11 Water System Resilience (ARCC-Water)

Mark New, University of Oxford

1 Sept 2009 – 31 Oct 2012

Aim: To develop an integrated ‘whole system’ approach to water resource planning in SE England under multiple uncertainties, in which portfolios of infrastructure and demand management options are considered to maintain secure supplies and enhance the environment.

12 Suburban Neighbourhood Adaptation for a Changing Climate (SNACC): identifying effective, practical and acceptable means of suburban re-design

Katie Williams, University of the West of England

1 Sept 2009 – 31 Aug 2012

Aim: To answer the question: how can existing suburban neighbourhoods be best adapted to reduce further impacts of climate change and withstand ongoing changes?

13 Future Resilient Transport Networks (FUTURENET)

Chris Baker, University of Birmingham

1 Jun 2009 – 28 Feb 2013

Aim: To determine the nature of the UK transport system in 2050 both in terms of its physical characteristics and its usage, and to assess resilience to climate change.

14 Design & Delivery of Robust Hospital Environments in a Changing Climate (DeDerHECC)

Alan Short, University of Cambridge

1 Sept 2009 – 31 Aug 2012

Aim: To investigate the design and delivery of economical and practical strategies for the adaptation of the NHS Retained Estate to increase its resilience to climate change whilst meeting the challenging carbon reduction goals and performance requirements of the NHS.



The Adaptation and Resilience in a Changing Climate (ARCC) Coordination Network brings together a range of research projects funded by the Engineering and Physical Sciences Research Council (EPSRC). These look at the impacts of climate change and possible adaptation options in the built environment and its infrastructure including water resources, transport systems, telecommunications, energy and waste. The overall programme contributes to the Living with Environmental Change Programme (LWEC) to make infrastructure, the built environment and transport systems resilient to environmental change, and to develop more sustainable, less energy-intensive systems and approaches that are socially acceptable, economically advantageous and more environmentally harmonious.

The UK Climate Impacts Programme provides the management and support role for the network which aims to enhance the cooperative development of the programme and help promote benefits to all participants.

www.ukcip-arcc.org.uk

UK Climate Impacts Programme

The UK Climate Impacts Programme (UKCIP) works at the boundary between research and society helping organisations to adapt to inevitable climate change. Since 1997, UKCIP has been working with the public, private and voluntary sectors to assess how a changing climate will affect a range of businesses and organisations and to help them prepare for the consequences

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