

CIBSE Design Framework

CIB W108 – Climate Change and the Built Environment

4/10/2007



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Setting the Scene

- **Buildings, new and existing, have to be able to offer a safe and comfortable environment to their occupants, throughout their lifetime**
- **Climate change is happening for the next 50 years (even if we achieve 0 CO₂ emissions tomorrow)**
- **UK Building Regulations and Codes of Practice are concentrated on mitigating the causes of climate change, i.e. minimising CO₂ emissions from new and existing buildings**
- **We also need to adapt to its impacts**



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Research Project

- **Collaboration between UKCIP (Climate Impacts Programme) and CIBSE (Chartered Institution of Building Services Engineers)**
- **UKCIP strategic mission:** help organisations assess how they might be affected by climate change so that they can prepare for its impacts
 - In the construction and building sector the above can, for example, contribute towards enabling building designers to take account of future, rather than historic, climate as a key design issue
- **CIBSE:** provides guidance for building services engineers, part of it related to the use of weather/climate information
 - Up to now with the relatively unchanging nature of weather/climate → available information was suitable
 - In time of rapidly changing climate existing information is no longer able to properly deal with future proofing of buildings



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Research Project

Aim:

- **The project will help to provide the building industry with a basis for integrating climate change mitigation and adaptation into design**

Objectives:

- **Review CIBSE guidance and identify current practices**
- **Develop a coherent and consistent conceptual framework for using weather/climate data in building services design**



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Review Outcomes

The review identified:

- The need for future guidance on the use of weather information, especially on the use of climate change projections
- Some gaps in the existing weather/climate information available for future building design
- The desirability to explicitly express the uncertainty related to the various design tools and methods



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Design Framework

A design framework based on a generic design process is proposed, which relates:

- Current practices (design methods/tools, theory, regulations etc)
- Weather/climate information available for present and future
- Uncertainty related to both tools and weather data

The framework incorporates input from CIBSE members, and can be adapted to address future developments



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Design Framework

CIBSE Design Framework (Draft):

- **Developed as an online tool, to allow the flexibility and the regular updates required**
- **Based on design processes recognised by building professionals**
- **Provide links to building regulations and codes of practice**
- **Provide links to existing design guidance**
- **Provide links to existing weather/climate information**
- **Provide guidance on the use of weather/climate information**
- **Provide the base for the use of the forthcoming UKCIP08 climate change projections**



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The science behind the UKCIP 08

The UK is leading the way in the state-of-the-art science of providing probabilistic projections of climate change for use in impacts and adaptation assessments:

- **Hadley Centre climate model run ~300 times to create a range of projections**
- **Each projection weighted by how well it represents historical and current climate**
- **Single results from other IPCC climate models incorporated**
- **Results downscaled to provide more detailed descriptions of change for the UK**

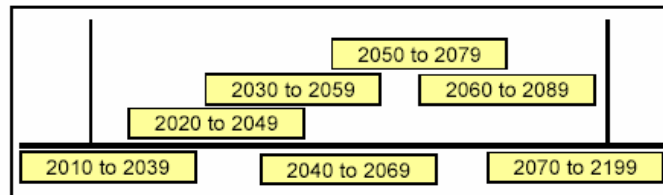


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UKCIP08



- 25km grid
- Pre-defined aggregated areas of administrative regions and river basin areas
- Multiple overlapping 30-year time slices
- Weather Generator to provide a statistical representation of daily and hourly weather at 5km resolution

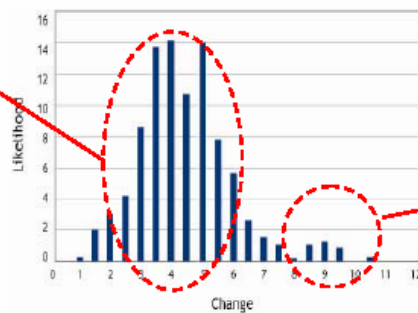


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UKCIP08

- UKCIP08 will present information in a probabilistic way to include model uncertainty - users will have a range of climate change projections
- It will be up to users to decide how they use this range
- Depends on attitude towards risk and type of decision

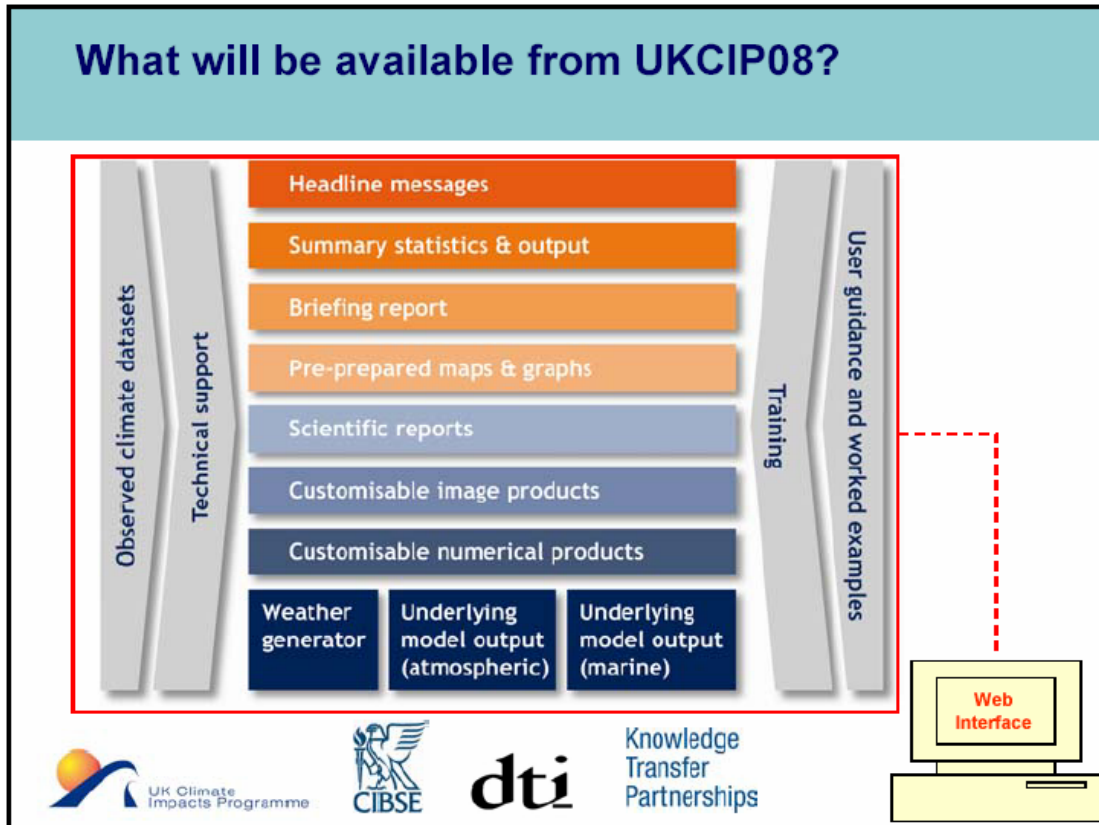
Risk inclined?



Risk averse?



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UKCIP08 in the Design Framework

- UKCIP08 will provide building professionals with a large amount of climate/weather related information
- The above information will not be in the same format as the weather related data used in building design
- Some customisation of UKCIP08 will be needed in order to be used by professionals in a consistent way

UK Climate Impacts Programme

CIBSE

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UKCIP08 in the Design Framework

- **EPSRC (Engineering and Physical Sciences Research Council) has called for research proposals which explore the use of probabilistic weather information in building design**
- **Both CIBSE and UKCIP will be actively involved in helping to develop the research proposals**
- **It is expected that the outcome of the research projects will add some knowledge to the use of probabilistic information (UKCIP08) in building design**
- **The Design Framework can provide an intellectual base for the dissemination of the outcomes**



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