

# Climate proofing the world's infrastructure: *the role of engineering*

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Chair (2006-2011), Expert Panel for Water,  
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**BBC NEWS**  
**US & CANADA**

21 July 2011 Last updated at 05:20

**Climate change 'threatens peace', UN official warns**

*Note: Water/energy/food nexus*



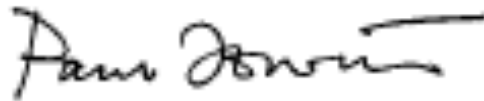
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# The importance of infrastructure



**Paul Jowitt**  
President,  
Institution of Civil Engineers



*“Infrastructure is vital to our way of life. It is vital to society. It is vital to economic growth in an increasingly competitive world. It is vital to the environment. And it is vital to the very existence of a civilised society.”*



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# *Engineering the Future*

*Engineering the Future*  
is a broad alliance  
representing the UK's  
450,000 professional  
engineers



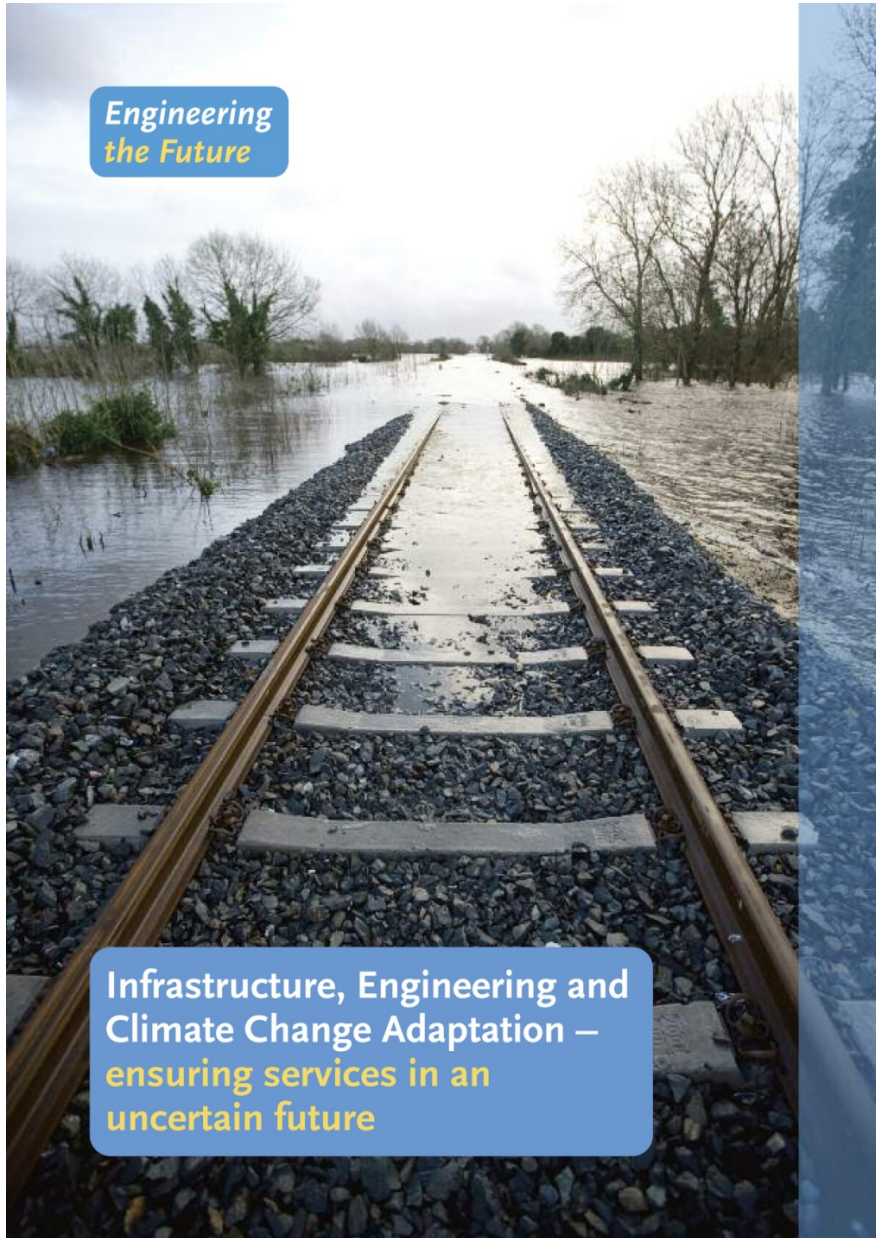
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Engineering  
the Future



Infrastructure, Engineering and  
Climate Change Adaptation –  
ensuring services in an  
uncertain future

## Climate Change Adaptation report to UK government (February 2011):

- Energy sector
- Transport sector
- Communications sector
- Water sector
- Interdependencies



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# Adaptation vs. Mitigation

- Often arbitrarily separated, but in reality (frequently) interrelated
- Significant adaptation is needed under the most optimistic mitigation scenarios
- If mitigation is not very successful, adaptation is critical
- Humankind already demonstrates many examples of adaptation



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# Water Infrastructure

- Responsible for public health
- Needs to adapt to climate change and population growth/urbanisation and increasing environmental regulation
- But 1 in 8 people still have no access to safe water, and 40% still do not have adequate sanitation



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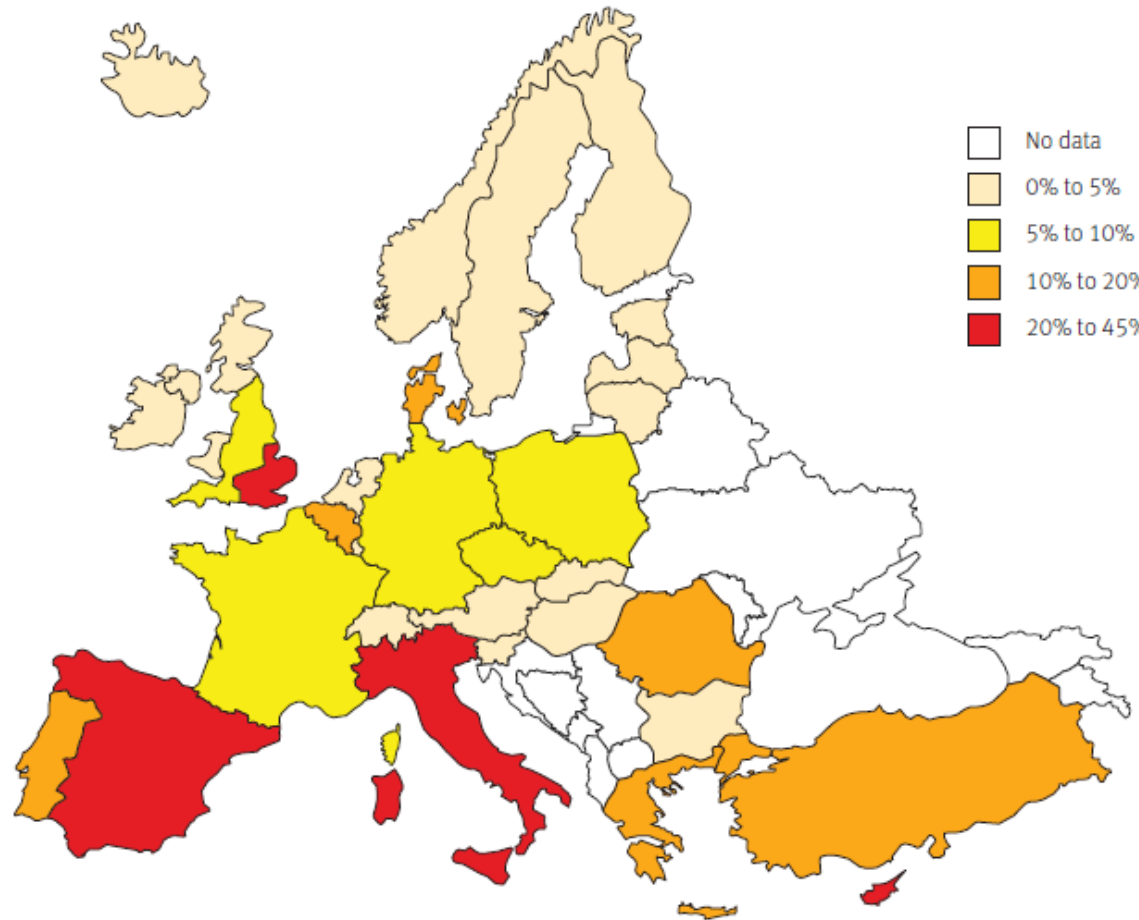
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# Water exploitation today



Actual abstraction as a proportion of effective rainfall



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# UK projections and likely consequences

- More pluvial, fluvial and coastal flooding
- Water quality deterioration
- Abstraction and discharge restrictions

Outputs from UKCPOG (UK-wide unless noted otherwise)

Parameter	Scenario A	Scenario B	Scenario C
Winter mean temperature	+0.2 to +2.0°C	+1.1 to +3.0°C	+1.7 to +5.7°C
Summer mean temperature	+0.5 to +1.4°C	+1.2 to +3.9°C	+2.1 to +8.1°C
Summer daily max. temp. (South East)	+2.2°C	+3.7°C	+6.7°C
No. of very hot days (>28°C) (London)	+1%	13 times more	+1%
Annual mean precipitation	-5 to +6%	+0%	+8 to +73%
(South West)	-9 to -46%	+4 to +23%	+22 to -2%
Winter mean precipitation	+4.3 to +30.5cm	-9 to -28%	+3.5 times more
Summer mean precipitation		+5.7 to +36.3cm	
No. of days with heavy rain (>25mm)			+7.5 to +43.3cm
Mean sea level			

Note: The ranges shown reflect regional variations and variations from the 2020s to the 2080s



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# Constraints

- Existing infrastructure investment (especially in developed countries)
- Asset life compared to uncertainties in projections
- Interdependencies among infrastructure sectors



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# Asset Life

- Asset life compared to uncertainties in projections
  - ICT 5 years
  - Pumping and treatment 20-40 years
  - Networks 50-100 years
  - Reservoirs, aqueducts and trunk sewers 100+ years



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# Potable water

- Conservation/demand reduction
- Multi-function reservoirs
- “In-property” final treatment
- Local re-use and rainwater collection
- Local area storage



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# Used and flood waters

- Foul/surface water separation; sewage treatment modifications
- SUDS and porous surfaces
- “Sacrificial” flood areas along rivers and in urban areas
- Flood protection for key infrastructure



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# Barriers

- Sunk costs (\$5,000 per capita in developed vs. \$50 in developing world)
- Finance and allocation of costs (benefit is for future generations)
- Existing regulatory models
- Conflicts between operating efficiency and resilience/sustainability



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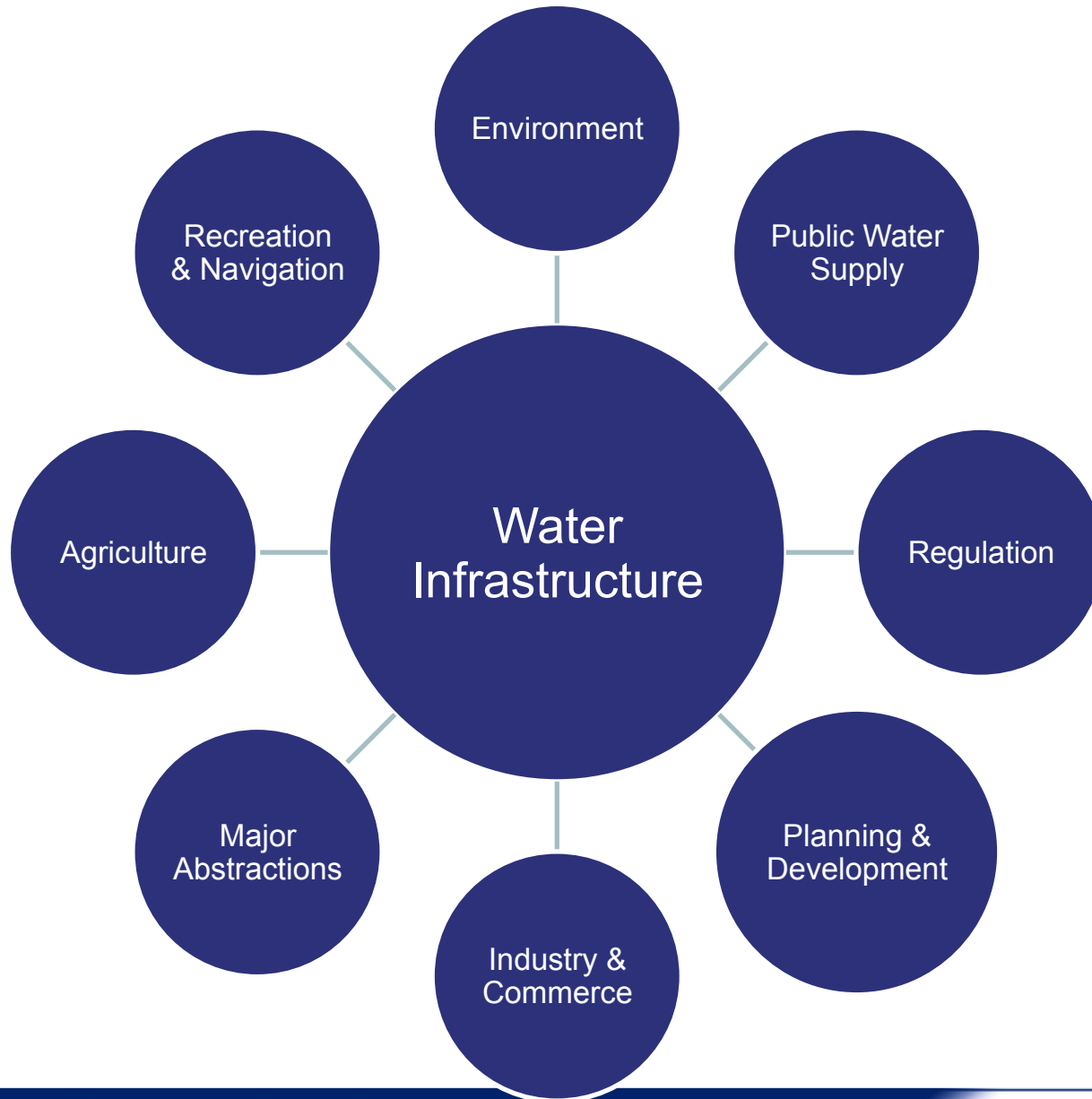
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# Stakeholders



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# Thank you!



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