Long-term planning and systems thinking for infrastructure investment

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Systems failure
Critical infrastructure hotspots

- Energy
- Transport
- Energy, water, waste, ICT
- Composite
Critical infrastructure hotspots in China

Composite infrastructure vulnerability
Rail, aviation, shipping, electricity and wastewater assets
System analysis in the Thames Estuary
Looking to the long term: how much should be invested in flood defence in England?
National infrastructure assessment

Scenarios
- Demography
- Energy prices

Strategies of infrastructure provision
- Economy
- Climate

Sector infrastructure system models
- Energy
- Transport
- Water
- Wastewater
- Waste
- ICT

National infrastructure database and analysis archive

Sectoral and cross-sectoral results

Stakeholders
Changing demand for infrastructure services
Infrastructure systems analysis
Appraisal of future performance

MI: Minimum intervention
CE: Capacity expansion
SE: System efficiency
SR: System restructuring
Main messages from NISMOD

• The greatest capital investments will be required for energy supply and transmission – unless a ‘predict and provide’ transport policy is adopted.
• Provision of extra road space does not on its own yield benefits in the long term, but it may do if accompanied by smarter choices and an adapted fleet.
• Increased efforts to reduce water demand will delay but not avoid major new investments in water supply.
• The trend of centralisation of waste water infrastructure is unlikely to be reversed.
• The quantity of solid waste we produce may have decoupled from economic growth.
• Major infrastructure investments are needed over the coming decades, but in all cases will yield greatest economic, social and environmental benefit if accompanied by innovation to manage demand for infrastructure services.
Final conference: 15 October 2015

The Future of National Infrastructure
A system-of-systems approach