The challenges of adapting infrastructure

Large investments will be needed to build, maintain and replace infrastructure.

- Maintaining and upgrading ageing infrastructure stock
- Socio-economic & climate drivers of increasing demand for infrastructure

<table>
<thead>
<tr>
<th>OECD economies</th>
<th>Emerging economies</th>
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<tbody>
<tr>
<td><strong>EU</strong>: €1.5tn for 2010-2020</td>
<td><strong>China</strong>: $9tn for 2008-2017</td>
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<tr>
<td><strong>USA</strong>: $1.7-3.6tn for 2010-2020</td>
<td><strong>India</strong>: $2.7tn for 2008-2017</td>
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<td>(ASCE, 2013)</td>
<td>(OECD, 2007)</td>
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# Bringing together funding and financing

<table>
<thead>
<tr>
<th>Funding</th>
<th>Financing</th>
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<tbody>
<tr>
<td>Charges to beneficiaries – e.g., water tariffs,</td>
<td>Bonds: municipal, private, green, project</td>
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<td>Revenues from general taxation – local and national</td>
<td>Lending: commercial, public (e.g., EIB, CDC)</td>
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<td>Transfers – EU funds (Cohesion, ERDF), philanthropy, ODA</td>
<td>PPPs</td>
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<td>Self-supply – private investment reducing the need for public infrastructure</td>
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Examples of city-level adaptation

• Working with nature
  – Copenhagen Cloudburst Management Plan
  – Toronto Green Roofs

• Preventing future climate impacts
  – Ex-post: NY Home Buyout Plan
  – Ex-ante: London Thames Barrier
Copenhagen Cloudburst Plan

- Use of green and blue spaces to reduce need for protective infrastructure
- Economic benefits: damages avoided, positive effect on real estate prices & local taxes
- Co-benefits: cleaner air, more recreational areas and improved quality of life
Toronto green roofs

- All residential, commercial and institutional buildings over 2000 m² required to provide 20-60% living roofs (April 2012)
- Doubling in price but tripling roof’s lifetime + reduced annual utility costs for heating and cooling + quality of life benefits
- Reducing urban heat island effect & stormwater runoff
New York Home Buyout Plan

Hurricane Sandy (Oct. 2012)

– $400 million buyback offering full pre-storm fair market value + additional incentives (with cap)
– New York State initiative on a voluntary basis
– Open to Owners of homes in 1-in-500 year floodplain where damages >50% of property value
London Thames Barrier

- 520-metre-long band of 10 gates protecting 125 km² of central London against a 1-1000 flood to the year 2030
- Building in robustness: engineers planned for 8 mm/year sea-level rise (currently: 6 mm/year)
- Increasing risk & Thames Estuary 2100: maintenance costs and upstream plans
Strengthening the business case for climate resilient investment

Reduce costs
- Reduce financing costs (e.g. green bonds)
- Use flexible approaches and avoid lock-in
- Increase efficiency of asset management
- Reduce unnecessary red-tape & policy-driven uncertainty

Increase (realised) benefits
- Design to achieve co-benefits (multi-functionality)
- Align tariffs to costs
- Fiscal & regulatory instruments – e.g. land-value capture
- Account for value of flexibility
Climate Change Risks And Adaptation: Linking Policy And Economics

1. Risks in a changing climate
2. Approaches to climate change risks in OECD countries
3. Overview of costs and benefits at the regional and national level
4. Framework for risk-based approaches to informing adaptation planning
5. Financing adaptation in OECD countries
6. Tools to mainstream adaptation into decision-making processes
THANK YOU

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http://oe.cd/adaptation