



National Audit Office

9th Annual EUROSAI WGEA Meeting
Stockholm 11th - 13th October 2011

Environmental Issues associated with Infrastructure

Marcus Popplewell, National Audit Office, UK

Project Objective

To provide an overview of the common environmental and sustainability impacts associated with infrastructure, along with governance structures that can be put in place to manage them, in order to help the auditor when designing an audit.

Progress to Date

- **Stage 1:** develop a model of infrastructure development and identify the environmental and sustainability impacts that can occur – *comments on first draft received from Working Group in September 2011*
- **Stage 2:** examine various governance structures which can enable Governments to identify, manage and mitigate the environmental and sustainability impacts of infrastructure – *awaiting Working Group comments on first draft*
- **Stage 3:** compile case studies – *examples received from Working Group members and looking for others from across WGEA*

Forward Timeline

- **January 2012:** First draft of the research paper and circulation for comments
- **March 2012:** Submission of comments on first draft of the research paper by subcommittee members
- **Mid 2012:** 11th Steering Committee meeting and consideration and approval of the draft research paper
- **March 2012- September 2012:** Incorporation of comments of subcommittee members and re-circulation
- **October 2012:** Final draft of the research paper submitted to the Secretariat
- **April 2013:** Final version of the research paper
- **June 2013:** 15th meeting of the INTOSAI WGEA

Report Structure

- Introduction and scope
- Environmental and sustainability impacts of infrastructure projects
- Model of infrastructure development and key processes/outputs
- The tools governments use to address the impacts from infrastructure
- The role of the auditor and example case studies

Key global challenges lead to demands for big infrastructure projects



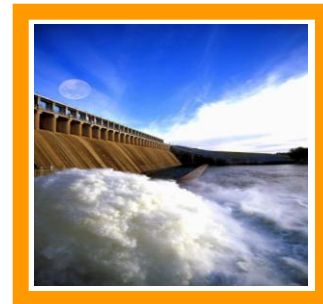
Climate change



↑ Population



Food security



↑ Water demand



↑ Energy demand



↑ Urbanisation



Alleviating poverty



Counter-terrorism

Source: Government Office for Science



Infectious disease



Bio-diversity

Infrastructure can be local or have impact across a wider area



Environmental and Sustainability Impacts of Infrastructure Projects

Ecology

Impacts on natural habitats of flora and fauna, movement of animals, species population dynamics

Water resources and the water environment

Impacts on water resources; flood risk; water consumption; and water embedded in the materials used to build and maintain the infrastructure

Land

Land use change affecting resilience to flood risk; deforestation; pollution; and remediation. Impacts on areas of historic or cultural significance.

Energy, Greenhouse Gases & other emissions to air

Impacts from energy use during construction and operation including use of machinery, transportation, lighting and other electricity use

Materials

Impacts embedded in the materials used during construction, including materials derived from natural resources e.g. timber, concrete, steel, etc, and energy used to manufacture the materials.

Human Environment

Impacts on the local community, local and non-local economy and the built/historic environment

But there can also be positive impacts...

- Creating opportunities to minimise water consumption e.g. utilising rainwater
- Re-using or recycling materials
- Incorporation of energy saving features into infrastructure design
- Using local suppliers strengthens the local economy and reduces transportation emissions
- Restoration or enhancement of wildlife habitats affected by developments

We have produced a model of infrastructure development and key processes/outputs to help the auditor

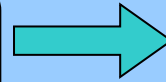
- A generic 7 stage model of an infrastructure project lifecycle, from planning through to construction, operation and disposal
- Each stage mapped to key processes or outputs
 - to help auditor understand at which points of the lifecycle impacts occur and how they can be addressed

POLICY

Wider Context

Stage 1

Identify policy need and options to meet need



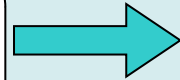
- **Identify the policy need** or desired policy outcome.
- **Set out the options** available to solve the problem (including a do nothing option).
- **Options appraisal** to identify the best option for meeting the policy need
- Prepare the **high level business case**.

PROJECT

Project Start Up

Stage 2

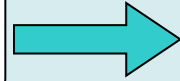
Draw up Project Brief



- Prepare a **feasibility study**
- Prepare a **business case**
- Address options for **choice of delivery model**

Stage 3

Development of Delivery Strategy



- Identify and consider impact of regulations / restrictions
- Prepare **procurement strategy**
- Prepare **output based specification**
- Prepare **contract strategy**

Project Delivery

Stage 4

Draw up Design Brief



- Prepare outline **design brief**
- Prepare **detailed design brief**

Stage 5

Construct Infrastructure



- Build infrastructure
- Test infrastructure
- Monitor construction against performance criteria and indicators

Operational Service

Stage 6

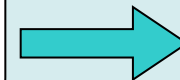
Operate and Maintain Infrastructure



- Monitor performance & benefits realisation
- Contract management

Stage 7

Disposal / Decommissioning of Infrastructure



- Decommission plan and strategy (including finance model)

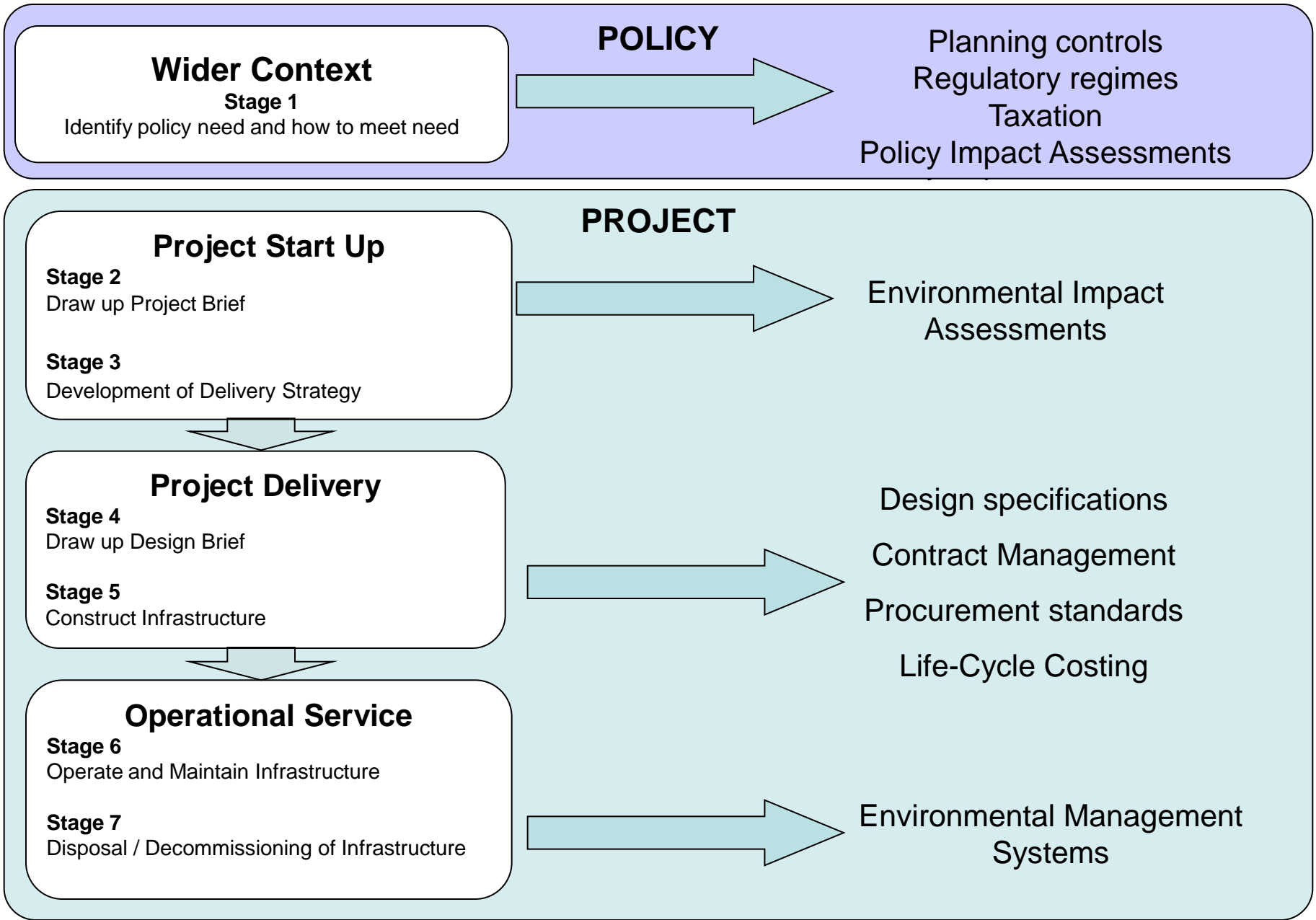
We have then considered how governments address environmental and sustainability impacts

- Range of tools, structures and processes
- Some international obligations which drive national measures

- Variation between countries reflecting local economy and political culture
 - Government's own practices
 - Mandatory regulation of private sector
 - Voluntary best practice

Infrastructure Model

Governance Structures



We will be setting out how SAIs can engage with the audit of environmental and sustainability considerations in infrastructure, using Case Studies

- Not an audit guide but a paper to help auditors consider the potential for, and scope of, audit investigations
- Can help design environmental audits or demonstrate how environmental impact issues can be built into wider performance audits

Audit types that we have already identified from case studies

- Policy level governance tools
 - Brazil - environmental impact assessments on public work
 - Brazil - evaluation of environmental monitoring of public works
 - ECA - spending on domestic water supplies from EU structural funds
- Focus on environmental/sustainability aspects of a project
 - Estonia – sustainability of heating supply
 - New Zealand – planning to meet forecast demand for drinking water
 - United Kingdom – sustainable construction on the government estate
- Environmental/sustainability consideration within a wider audit scope
 - Estonia – development of waste water treatment
 - United States – clean water trust fund
 - United Kingdom – preparations for the 2012 Olympics

Discussion

- Thoughts on the model and structure
- Any additional governance structures
- Further case study suggestions