



ENV.F.1/ETU/2010/0052r



# Design, implementation and cost elements of Green Infrastructure projects

**Presenters:** McKenna Davis and Matt Rayment

**Report authors:** Sandra Naumann, McKenna Davis, Timo Kaphengst (Ecologic Institute) and Mav Pieterse, Matt Rayment (GHK)



## Table of contents

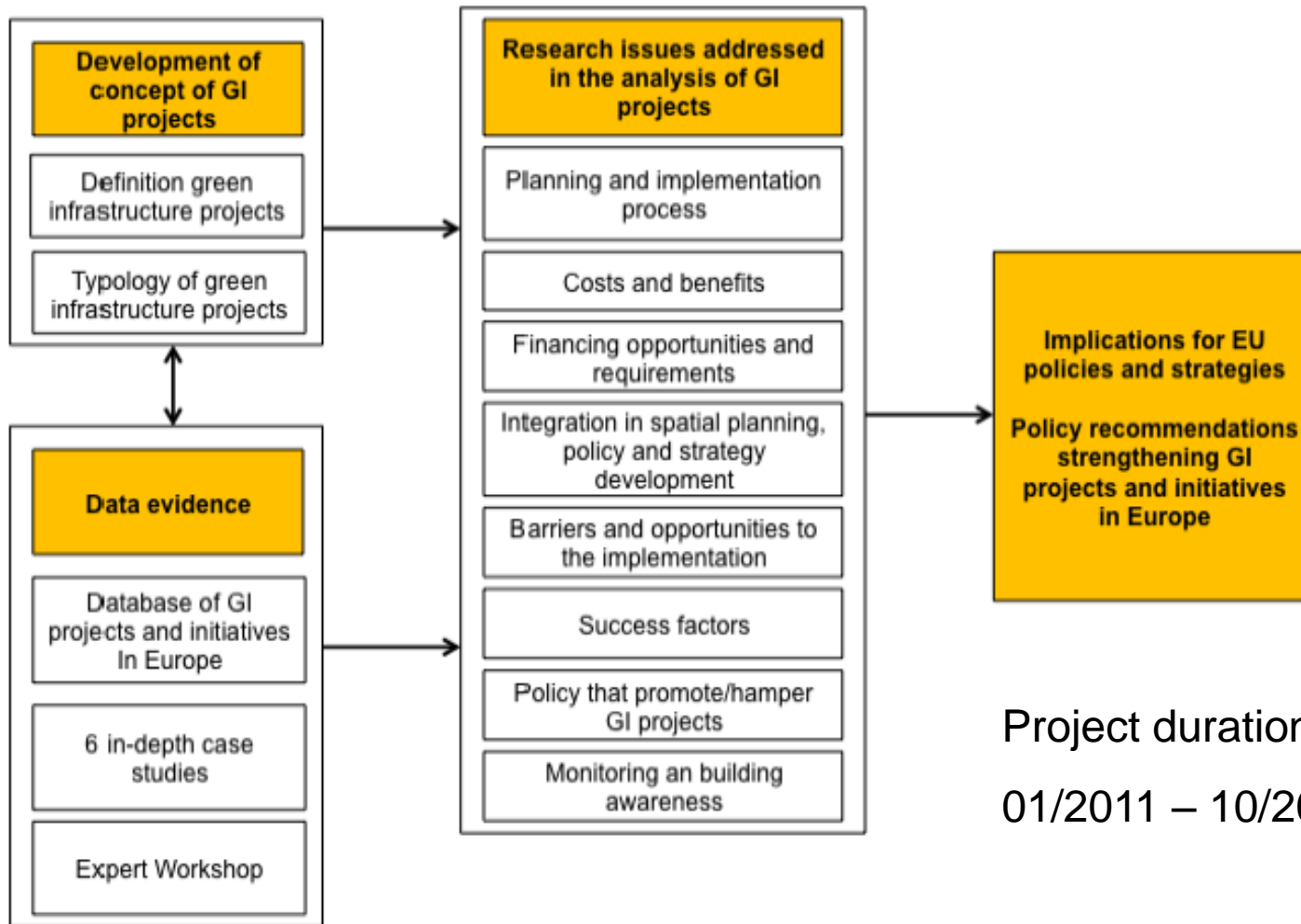
- Analytical framework
- Data evidence
- Typology and definition of green infrastructure
- Design and implementation aspects
- Financing considerations
- Costs and benefits
- Recommendations



© Morris K. Udall Foundation



# Analytical framework



Project duration:  
01/2011 – 10/2011



# Data evidence

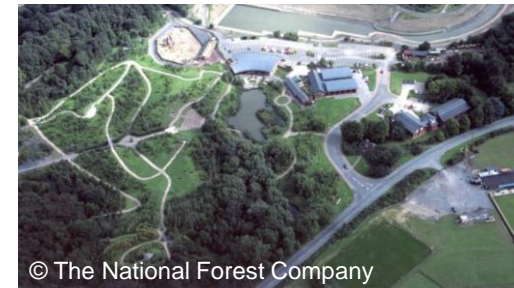
- ▶ Creation of a database of European GI projects (127 entries covering all EU-27 countries)
- ▶ Analysis of six in-depth case studies
- ▶ Expert workshop on green infrastructure

### Gallecs, Spain



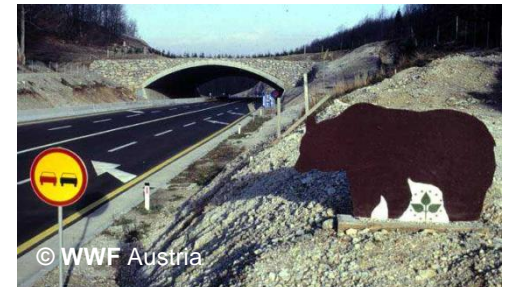
© Espairuralgallecs

### National Forest Creation, UK



© The National Forest Company

### Alpine Carpathian Corridor, Austria/Slovakia



© WWF Austria

### Greater Lyon green network, France



© In Situ

### 10Gemeten, the Netherlands



© Toomas Kokovkin

### Väinameri project, Estonia



© Kumpenie Klaaswaal



## Typology and definition of green infrastructure

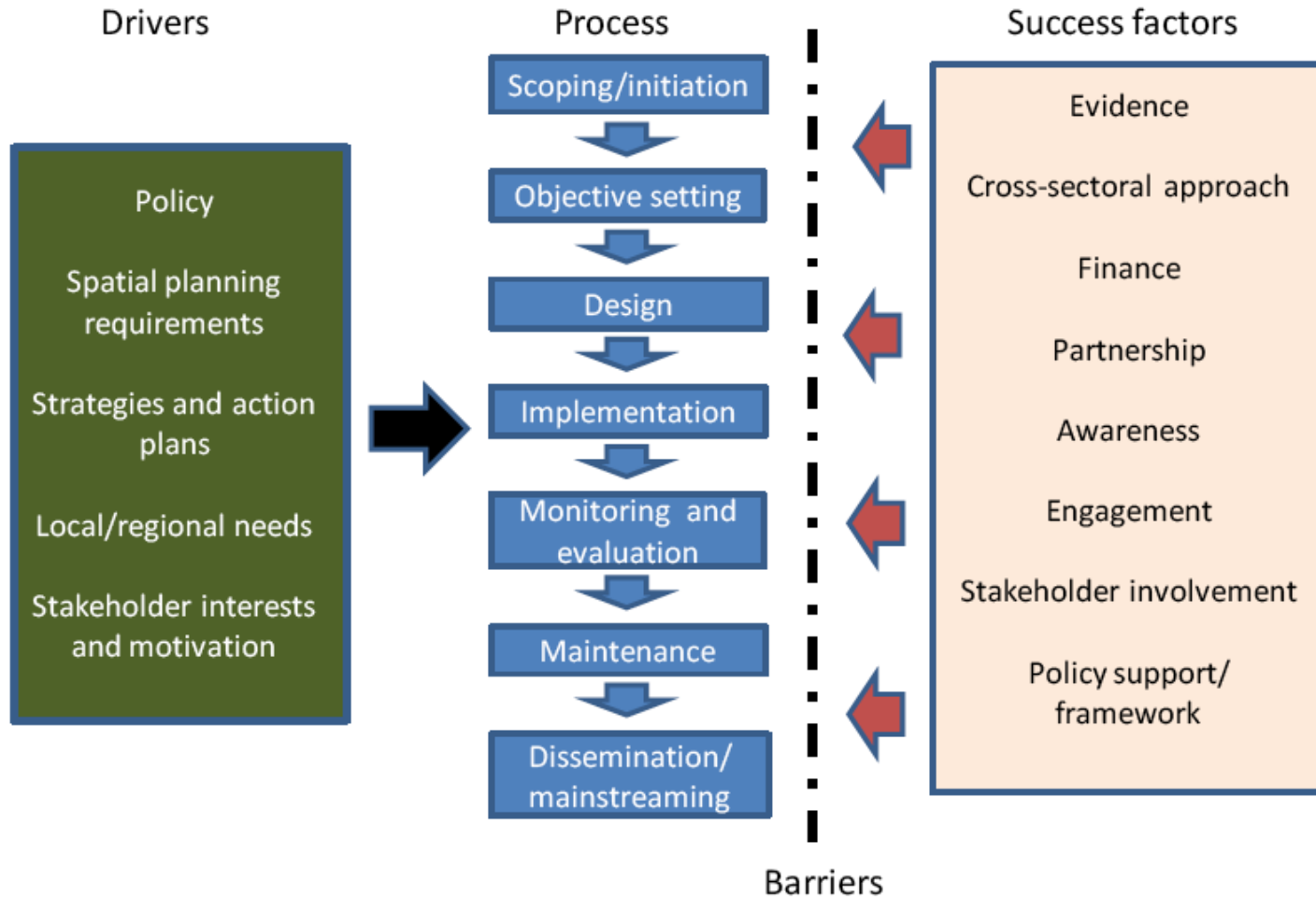
- ▶ Typology of green infrastructure projects - identification of key parameters (e.g. objectives, scale, types of green infrastructure components covered, activities or measures carried out, habitats addressed)
- ▶ Definition of green infrastructure:

**Green infrastructure** is the network of natural and semi-natural areas, features and green spaces in rural and urban, and terrestrial, freshwater, coastal and marine areas, which together enhance ecosystem health and resilience, contribute to biodiversity conservation and benefit human populations through the maintenance and enhancement of ecosystem services.

Green infrastructure can be strengthened through **strategic and co-ordinated initiatives** that focus on maintaining, restoring, improving and connecting existing areas and features as well as creating new areas and features.



# Design and implementation aspects





## Financing green infrastructure policies and initiatives

- ▶ No funding scheme specifically exists for the development and implementation of GI projects
- ▶ **EU-funds:** LIFE+ and European Regional Development Fund (ERFD)
- ▶ **National funds:** rural development programmes (co-financing), cross-national financing (e.g. Väinameri project)
- ▶ **Private funds:** foundations, NGOs, businesses and land owners; potential for increased PPPs and partnerships between industry and NGOs (e.g. via corporate social responsibility)



# Costs and benefits of Green Infrastructure

Matt Rayment

| G | H | K |



<b>Financial Costs</b>	One-Off Costs	Administrative, management and information costs	<ul style="list-style-type: none"> <li>Establishing management bodies</li> <li>Surveys</li> <li>Research</li> <li>Consultation</li> <li>Management plans</li> </ul>
		Costs of green infrastructure provision	<ul style="list-style-type: none"> <li>Land purchase</li> <li>One-off compensation payments</li> <li>Creation of green infrastructure</li> <li>Restoration of green infrastructure</li> </ul>
	Ongoing Costs	Administrative, management and information costs	<ul style="list-style-type: none"> <li>Running of administrative bodies</li> <li>Monitoring</li> <li>Ongoing management planning</li> <li>Communications</li> </ul>
		Costs of green infrastructure provision	<ul style="list-style-type: none"> <li>Maintenance of green infrastructure</li> <li>Costs of management agreements</li> <li>Costs of protective actions (e.g. ongoing planning controls, site wardening)</li> </ul>
<b>Opportunity Costs</b> (uncompensated)		Foregone development opportunities	<ul style="list-style-type: none"> <li>Value of potential development foregone</li> </ul>
		Foregone resource use	<ul style="list-style-type: none"> <li>Loss of mineral extraction</li> <li>Loss of water abstraction</li> <li>Loss of land development rights</li> </ul>
		Foregone output from land management	<ul style="list-style-type: none"> <li>Foregone agricultural output</li> <li>Foregone forestry output</li> </ul>
		Foregone socio-economic opportunities	<ul style="list-style-type: none"> <li>Loss of regeneration opportunities</li> <li>Loss of community uses of land</li> </ul>
		Reductions in land values	<ul style="list-style-type: none"> <li>Price of land</li> </ul>

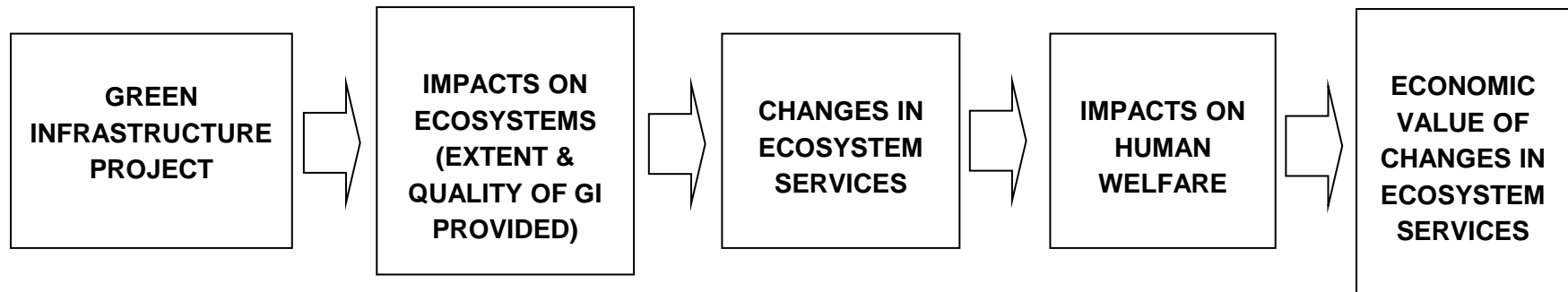


# Costs of green infrastructure projects

- ▶ Costs of 94 GI projects averaged €8.15 million (range €0.5 to €177m)
- ▶ Six case study projects:
  - ▶ One off costs averaged € 24 million
  - ▶ Recurrent costs averaged €1.3 million (6% of one-off costs)
  - ▶ Land management largest element, followed by land purchase
- ▶ Opportunity costs are significant but rarely documented
- ▶ Unit costs per hectare for restoration vary very widely
  - ▶ Range of €250 to nearly €1 million per hectare
  - ▶ Highest costs for restoration of urban parks and green spaces, especially those including buildings and gardens
  - ▶ Lowest for extensive semi-natural areas
  - ▶ Labour intensive work (e.g. scrub removal), land purchase and wider activities (e.g. awareness raising) increase costs



# Benefits of Green Infrastructure Projects



Source: Adapted from Defra (2007) – Framework for Ecosystem Services Valuation

In assessing benefits of GI projects, we can measure:

- ▶ Changes in **provision of green infrastructure** (e.g. area of habitat/green space)
- ▶ Changes in **delivery of ecosystem services** (e.g. tonnes C stored)
- ▶ Changes in the **value of ecosystem services** (e.g. value of flood damage prevented)
- ▶ **Economic and social impacts** (e.g. jobs and GDP created)



## Benefits of green infrastructure projects

- ▶ Benefits tend to be **much less quantified** than costs
  - ▶ Often assessed only in qualitative terms, or in terms of extent of GI provided or maintained
  - ▶ Much less evidence of extent and value of ecosystem services
- ▶ Where evidence is available, it shows that **value of benefits can greatly exceed the costs**
  - ▶ B:C ratio 4.8: 1 (English National Forest), 10:1 (Mersey Forest)
  - ▶ B:C ratios of 7:1 for N2K sites in France and Scotland
- ▶ GI projects often involve **substantial one-off costs** but provide flow of **benefits over long time period**
- ▶ GI often provides a **wide range of benefits** compared to grey infrastructure, but often plays a different role
- ▶ **New valuation tools** for GI are being developed



## Recommendations for policy action at all levels

1. **Explore and use opportunities for cross-sectoral integration** of green infrastructure in the relevant policies
2. **Increase awareness** of green infrastructure, promote capacity building and facilitate stakeholder involvement/consultation: create **platforms for exchange**
3. **Highlight the benefits received** by various sectors and stakeholders and discuss the cost effectiveness of green vs grey infrastructure



## Recommendations for EU policy action

1. Create a **legislative framework**
2. Increase **awareness** and facilitate **knowledge transfer** across the EU Member States
3. Maximise the **efficiency of EU funding**



# Thank you for your attention.

McKenna Davis

Matt Rayment

Ecologic Institute, Pfalzburger Str. 43-44,  
D-10717 Berlin  
Tel. +49 (30) 86880-0, Fax +49 (30)  
86880-100

mckenna.davis@ecologic.eu

www.ecologic.eu

GHK Consulting Ltd, Floor 2, 3  
The Crescent, Plymouth PL1 3AB, UK  
Tel. +44 1752 262 244, Fax +44 1752  
262 299

matt.rayment@ghkint.com

www.ghkint.com