Sustainability in Road Construction

NRA ROAD CONFERENCE

Knockranny House Hotel, Westport

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Overview

- Introduction to sustainable development/sustainability
- NRA approach to sustainability and Green Roads
- SUNRA projects on Sustainability

"Marketing sustainability is the toughest sales job on the planet"

Environmental Management
CSR
Greening of Operations
Industrial Ecology
Stakeholder Engagement
Life-Cycle Assessment
Pollution Prevention (P^2)
Sustainable Development
Design for Environment (DfE)
Green Design
Urban Reinvestment
Brownfield Redevelopment
ISO 14001
Waste Reduction
Closed Loops
Radical Resource Productivity
Radical Transactiveness
Sustainable Technology
Systems Thinking

Clean Technology
Eco-Efficiency
Eco-Effectiveness
Biomimicry
Triple Bottom Line
Inclusive Capitalism
Base of the Pyramid
Community Capitalism
Corporate Citizenship
Voluntary Regulation
Civic Entrepreneurship
Full Cost Accounting
EMS
Risk Management
Leapfrog Technology
Cradle to Cradle
Restorative Technology
Balanced Scorecard
Corporate Governance
Transparency

Digital Divide
Cultural Diversity
Natural Capitalism
Ecological Footprint
Product-to-Service
Integrated Product Mgmt
Natural Step
Building the Pyramid
Compass Index
SROI
Blended Value
GRI
Precautionary Principle
Green Procurement
Green Building
SMS
ISIS
CDM
EUAs
B24B

Source: Stuart Hart,
with thanks to Marty LaGod,
with additions by AtKisson

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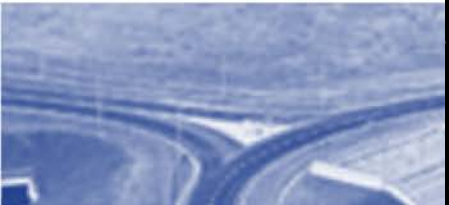
Core Concepts of Sustainability



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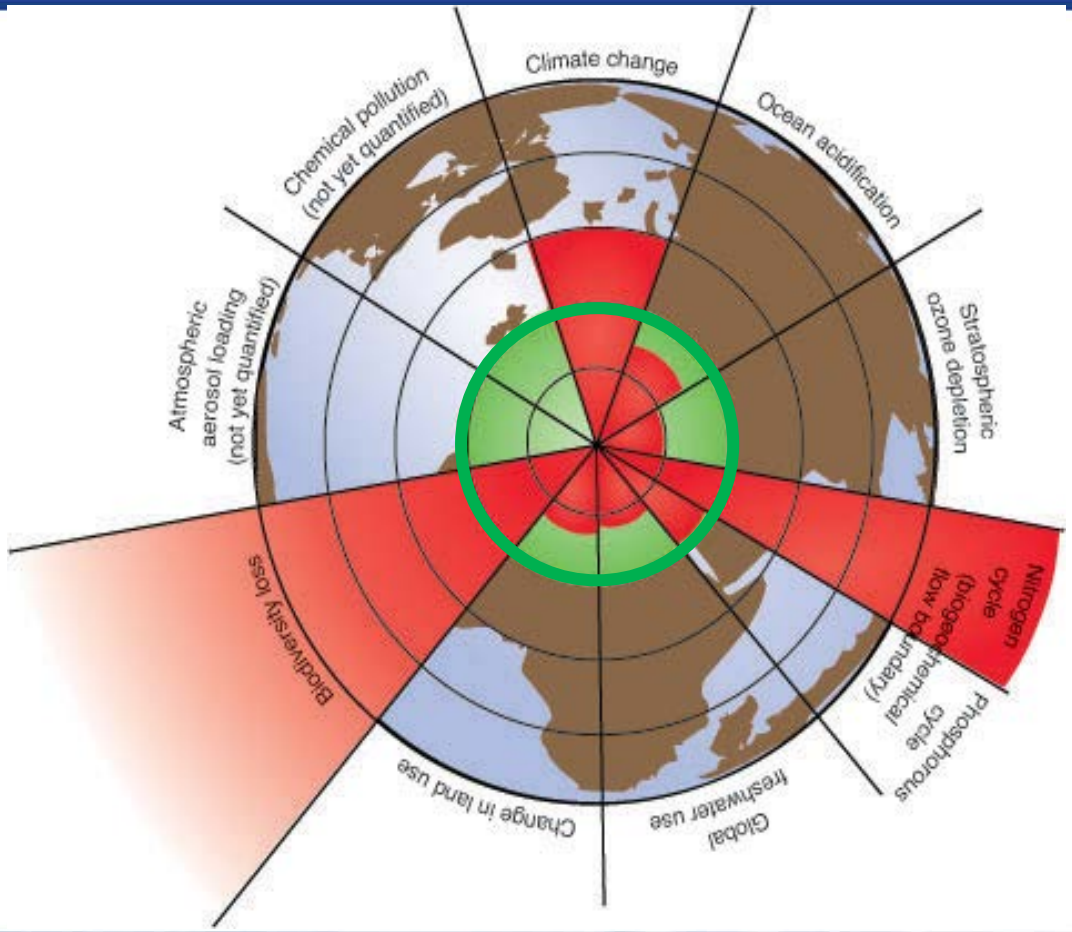
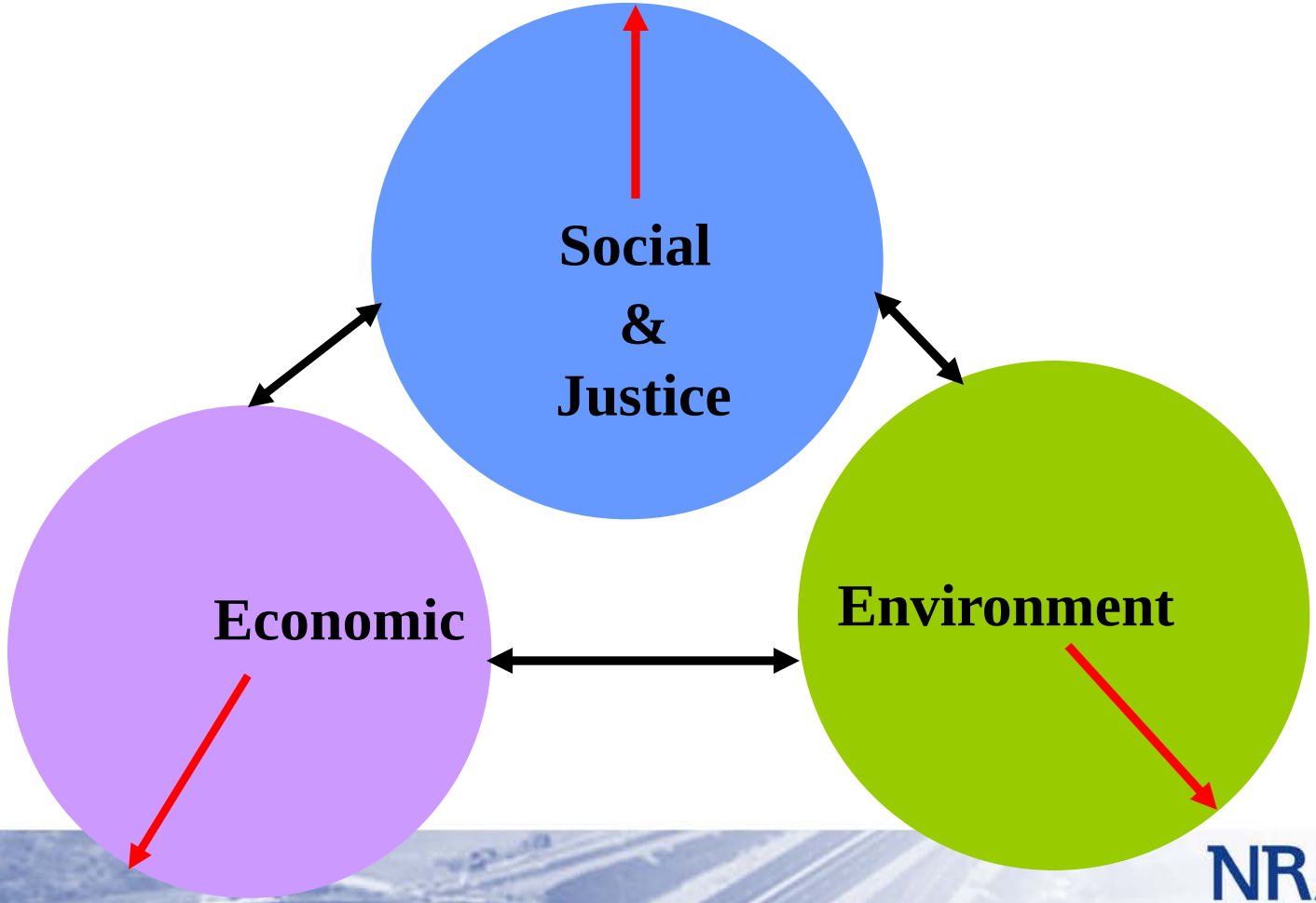
PLANETARY BOUNDARIES



Rockström, J., W. Steffen, K. Noone, Å. Persson, F. S. Chapin, III, E. Lambin, T. M. Lenton, M. Scheffer, C. Folke, H. Schellnhuber, B. Nykvist, C. A. De Wit, T. Hughes, S. van der Leeuw, H. Rodhe, S. Sörlin, P. K. Snyder, R. Costanza, U. Svedin, M. Falkenmark, L. Karlberg, R. W. Corell, V. J. Fabry, J. Hansen, B. Walker, D. Liverman, K. Richardson, P. Crutzen, and J. Foley. 2009. Planetary boundaries:exploring the safe operating space for humanity. *Ecology and Society* **14**(2): 32. [online] URL: http://www.ecologyandsociety.org/vol14/iss2/art32/

Three Pillars of Sustainability



NRA Corporate Definition-2002

- **To be sustainable, development must improve economic efficiency, protect and restore ecological systems and enhance the well-being of the people.**

- **Sustainable development requires that economic growth supports social progress while respecting the environment; that social policy underpins economic performance and that environmental policy is cost effective.**

Main Sustainability Principles Identified

- Reduce GHG's associated with road transportation and construction,
- Protect the natural environment and cultural heritage,
- Provide a road network that facilitates modal shift objectives,
- Support and promote best practice procedures on the integration of transportation and land use planning,
- Introduce innovative construction methods, materials and operating practices so as to reduce energy consumption.

Sustainability Evaluation System for Road Infrastructure

- As a pilot, the use of the UK CEEQUEL http://www.ceequal.com/ was applied to the construction phase of ***N7*** Naas Road Widening & Interchanges Scheme.
- In association with CH2MHILL we looked at adapting the "US Green Roads" system as a sustainability evaluation tool for Irish road infrastructure.
- In developing the system, "Corporate vs Project", Definition of sustainability, relationship of existing legislation with sustainability, extent of the tool etc.

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Sustainability Evaluation System for Road Infrastructure

- NRA sustainability tool is a project based system covering Project Planning, Project Design, Construction and Operation & Maintenance.
- Pilot studies using the tool has shown that some of the award criteria still needs refinement.
- **CEDR Transnational Energy and sustainability projects (SUNRA)**

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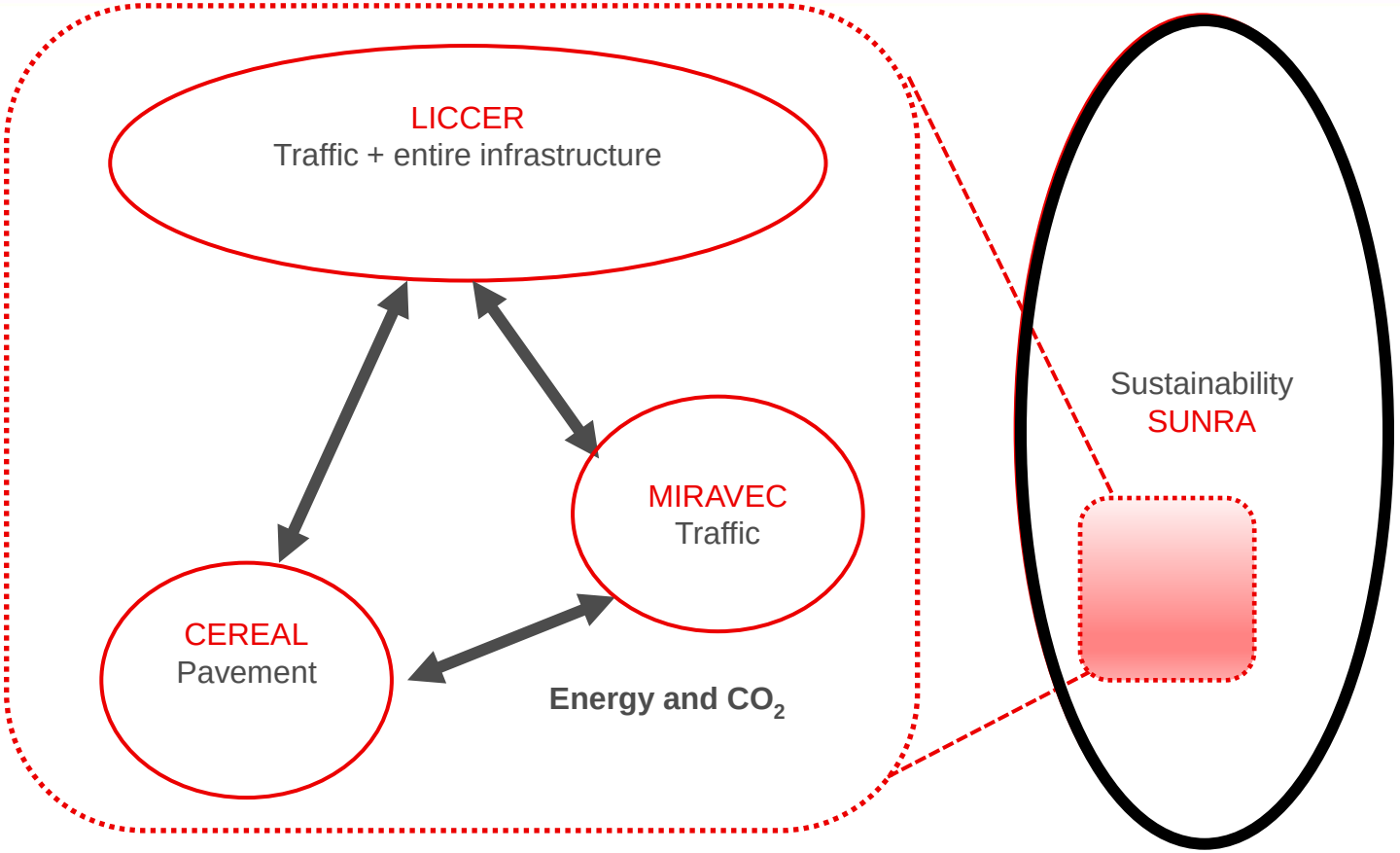
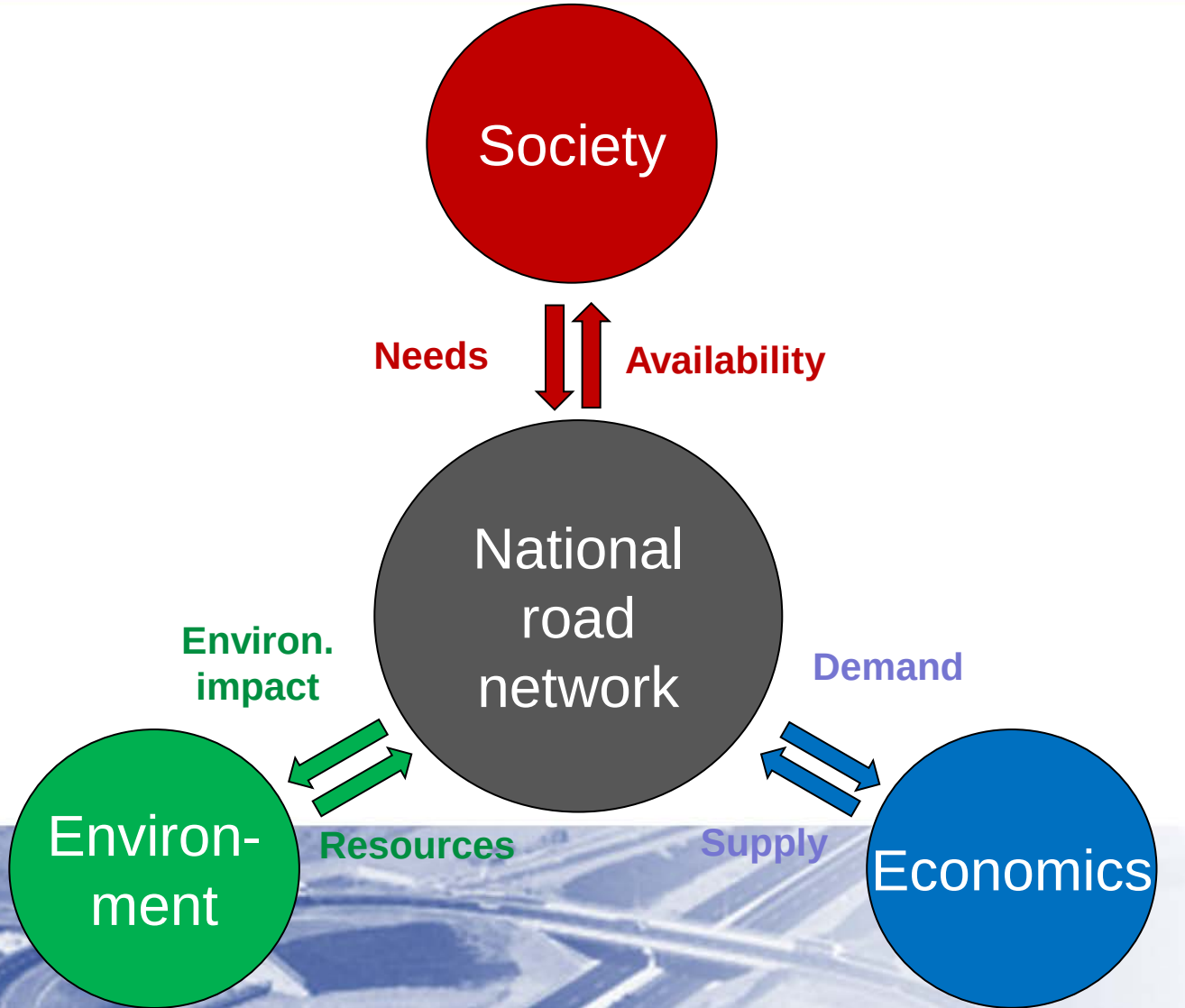
CEDR Transnational Research Programme - Energy and Sustainability



Sustainability from NRA's perspective



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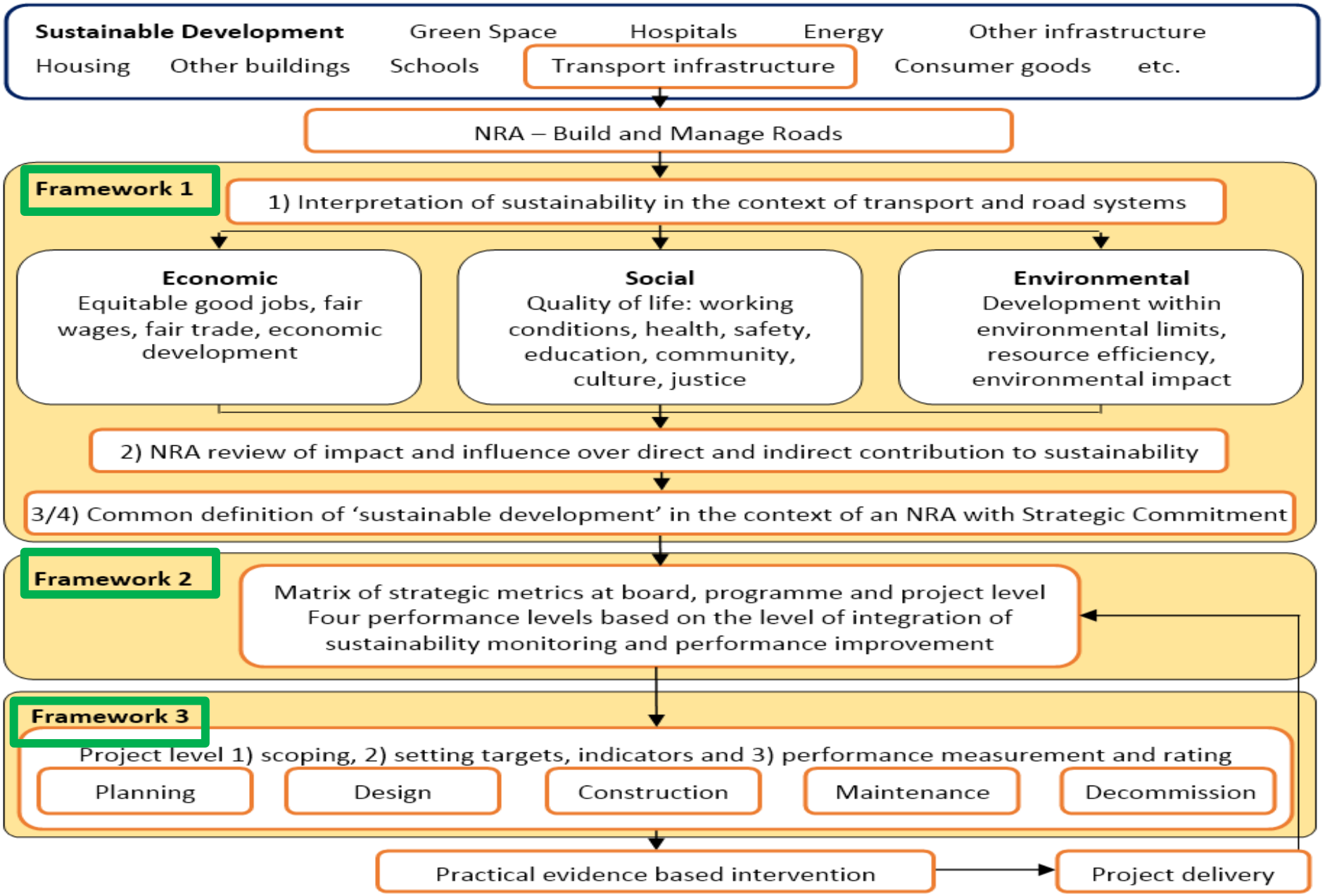
AIMS OF SUNRA PROJECT

- **Define sustainable development (Corporate/NRA Level)**
- **Identify suitable metrics for the measurement of corporate/NRA sustainability performance**
- **Specific tool for sustainability assessment of individual road projects**

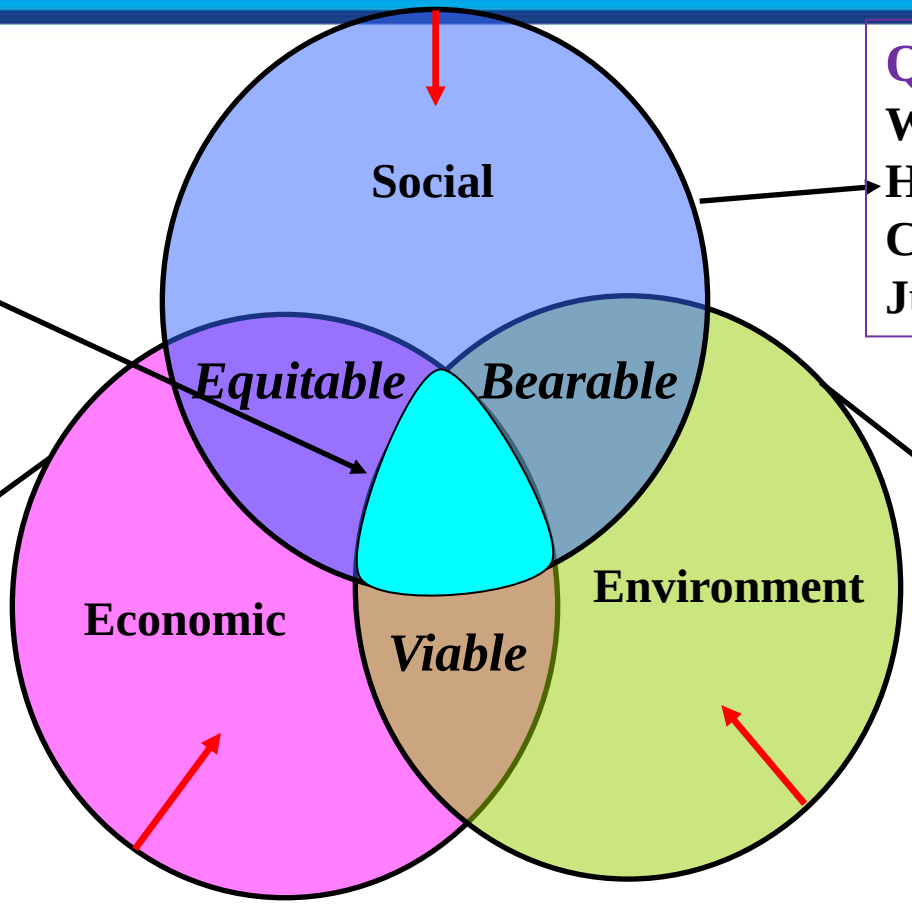
THREE SUNRA FRAMEWORKS



Corporate Sustainability Applied to Transport Infrastructure SUNRA

Framework 1

Sustainability



Quality of Life Issues:
Working conditions, Health, Safety, Education, Community, Culture, Justice

Equitable Jobs
Fair wages, Fair Trade, economic development.

Development within Environmental limits:
Resource efficiency, environmental impacts.

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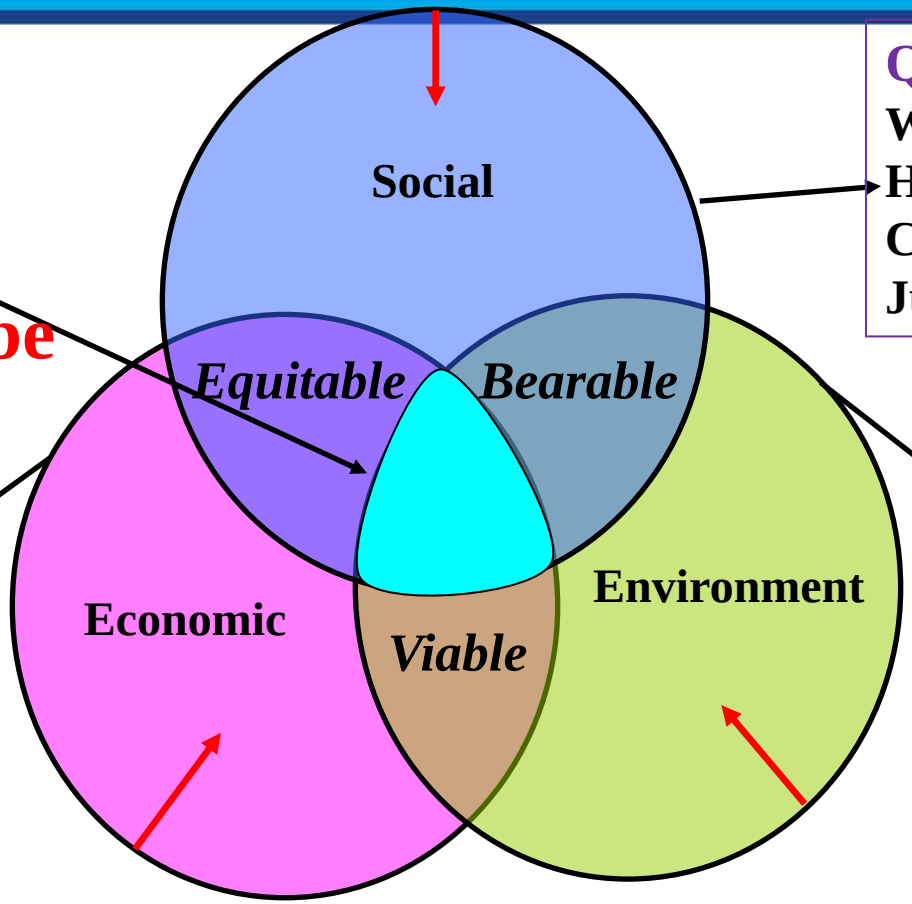
CORPORATE SUSTAINABILITY IS A TRANSITION FORM CURRENT PRACTICES

From:	To:
Thinking about taking action on sustainability	Taking action
Short-term thinking	Long-term thinking
Building in isolation	Integrating nature & social considerations into what you build
A linear flow of resources	A system with finite resources

Corporate Sustainability Applied to Transport Infrastructure SUNRA

Framework 1



Sustainability

How can this be measured?

Quality of Life Issues:
Working conditions, Health, Safety, Education, Community, Culture, Justice

Equitable Jobs
Fair wages, Fair Trade, economic development.

Development within Environmental limits:
Resource efficiency, environmental impacts.

SUNRA tool for individual road projects

- Common ***framework*** for sustainability work at road administrations in Europe
- Must be EXCEL based and not require new data sets,
- Cover a variety of sustainability ***topics***
- Provide guidance on setting sustainability ***goals***
- Identify suitable ***Indicators***
- ***Follow-up*** to assess achievement of sustainability targets

Working with the SUNRA Tool

Choose sustain-ability topics

- Select relevant ***topics*** (26) to work with
- Scoping questions to select relevant ***aspects*** of the topics

Set targets

- Define performance ***targets*** for selected aspects

Identify indicators

- Use suggested ***indicators*** for selected aspects (or define others)

Record sustainability performance

- ***Record performance*** against each target

Intended SUNRA users

- NRA's
- Contractors
- Operation/maintenance
- EIA consultants
- … …

- Procurement of road projects and road maintenance
- Follow-up of sustainability
- Management of sustainable and cost-effective roads

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About

The Sustainability - National Road Administrations (SUNRA) Project Framework provides a tool for scoping project level sustainability topics, setting appropriate targets, selecting indicators and recording results. The purpose of SUNRA is to drive change and an improvement in sustainability performance of national road development and management across Europe.

The tool can be used to set sustainability objectives, targets and indicators and assign responsibility to the client, designer or contractor organisations throughout the project lifecycle; during pre-design, design, construction.

The tool should be used to consider sustainability impacts that occur over the whole life of an asset, including: construction, operation, maintenance and decommissioning/ replacement.

Project and user details

Project name:		
Tool version:		User reference, e.g. if multiple versions of the Framework are completed.
Project start date:		
Date of last update:		

Tool users:

Name	Initials	Organisation name	Organisation type

Sustainability topics

The Framework contains 26 sustainability topics. 20 of these are impact based and can be accessed from the matrix of blue boxes below. For each of these topics scoping questions should be answered, targets set for aspects scoped into the Framework with appropriate indicators and performance recorded.

Six of the 26 topics differ from the others in not being attributable to specific sustainability topics but instead to planning procedures or organisational issues. These six topic are grouped together in the Framework under the heading 'Procedural topics' and can be accessed from the bottom right of the matrix below. Only the scoping stage is completed for these topics.

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Summary | User Guide

Sustainability topics

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Accessibility (to workplaces and other local services)	Air quality	Climate change adaptation	Climate change mitigation	Cultural heritage	Economy (local/ regional)	Energy efficiency
Equality (generation, gender and other social)	Landscape and ecosystem health	Light pollution	Livability of residential areas	Noise and vibration	Resource efficiency	Safety and security
Soil quality	Stakeholder involvement	Sustainability awareness of staff	Sustainable transport modes (facilitating use of)	Waste	Water resources and quality	Procedural topics

Outputs

The Framework will provide summary tables for all aspects scoped in where targets and indicators have been set. Click on the links below to access the summary tables for each 'responsible actor'.

Use the update buttons on each page to refresh the tables (tables are not automatically updated).

Client | Designer | Contractor

Version

Version: This is SUNRA Project Framework version 1, finalised in March 2014.

IMPORTANT! Macros, Save As and Excel version

Macros must be enabled for this spreadsheet to function

ENERGY EFFICIENCY

TOPIC DESCRIPTION

Energy Efficiency is a goal to reduce the amount of energy required to provide a product or service. Energy Efficiency describes energy options at the top of the energy hierarchy to either eliminate the need for energy or reduce the energy intensity per unit of product or service.

Topic aspects:

- Energy reduction – where possible eliminating the need for energy consumption.
- Energy efficiency – delivering the various services of the road network with a reduced energy intensity.
  - For renewable or low-carbon energy and energy/fuel efficiency of road users see the Climate Change Mitigation topic.

Relevance at different asset lifecycle stages:

Pre-Design: Not relevant.

Design: The designer should consider the energy use in lighting and communications equipment to be used on the network (including challenging the need for lighting and other equipment) and also consider the energy intensity of required maintenance (both for hard engineering and the soft estate).

Construction and maintenance: During construction, the contractor should consider the energy efficiency of plant, vehicles and processes (for all site activities) and take measures to improve efficiency and reduce overall energy consumption through decisions taken over the equipment and vehicles used as well as training operatives in best practices operating techniques to reduce energy consumption.

Operation and maintenance: During maintenance activities, the contractor should consider the energy efficiency of plant, vehicles and processes (for all site activities) and take measures to improve efficiency and reduce overall energy consumption through decisions taken over the equipment and vehicles used as well as training operatives in best practices operating techniques to reduce energy consumption.

Decommissioning: Not relevant.

Best practice:

Energy efficiency is in itself a best practice approach to reducing energy demand and where carbon intensive sources of energy are consumed mitigating climate change through eliminating energy demand for reducing the intensity of energy use.

SCOPING KEY TOPIC ASPECTS

The NRA should complete the scoping section below to determine the key aspects for consideration within the SUNRA Project Framework. Based on the scoping response, topic aspects are scoped in or out for performance measurement on the project. Where aspects are scoped in, the framework provides suggestions for targets and indicators. Alternatively, users can set targets and indicators of their own.

No.	Scoping question	Scoping response	Considerations for setting targets. Suggested indicators	Comments
7.1	**EU/ NATIONAL POLICY & LEGISLATION:** Does European or national policy or legislation set objectives, minimum standards or targets for energy efficiency on road projects?			
7.2	**NRA POLICY:** Does client (NRA) policy set specific objectives, standards or targets for energy efficiency on road projects?			
7.3	**SITE SPECIFIC ISSUES:** Are there site specific issues -			

Scoping response

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SUMMARY

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Project name:	
Tool version:	
Project start date:	
Date of last update:	

Client | Designer | Contractor

Scoping progress summary and performance summary

Percentage of scoping questions answered

Breakdown of project performance

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SUMMARY

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Progress through the Framework

TOPICS	SCOPING			TARGETS AND INDICATORS		PERFORMANCE				
	Aspects scoped in	Aspects scoped out	Scoping questions not answered	Targets set	Indicators identified	Recorded	Target exceeded	Target achieved	Target more than 50% achieved	Target less than 50% achieved
Accessibility (to working places and other local services)	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%
Air quality	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%
Climate change adaptation	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%
Climate change mitigation	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%
Cultural heritage	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%
Economy (local/ regional)	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%
Energy efficiency	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%
Equality (generation, gender and other social)	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%
Landscape and ecosystem health	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%
Light pollution	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%
Livability of residential areas	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%
Noise and vibration	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%
Resource efficiency	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%
Safety and security	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%
Soil quality	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%
Stakeholder involvement	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%
Sustainability awareness of staff	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%
Sustainable transport modes (facilitating use of)	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%
Waste	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%
Water resources and quality	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%
Procedural topics	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

QUESTIONS????

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