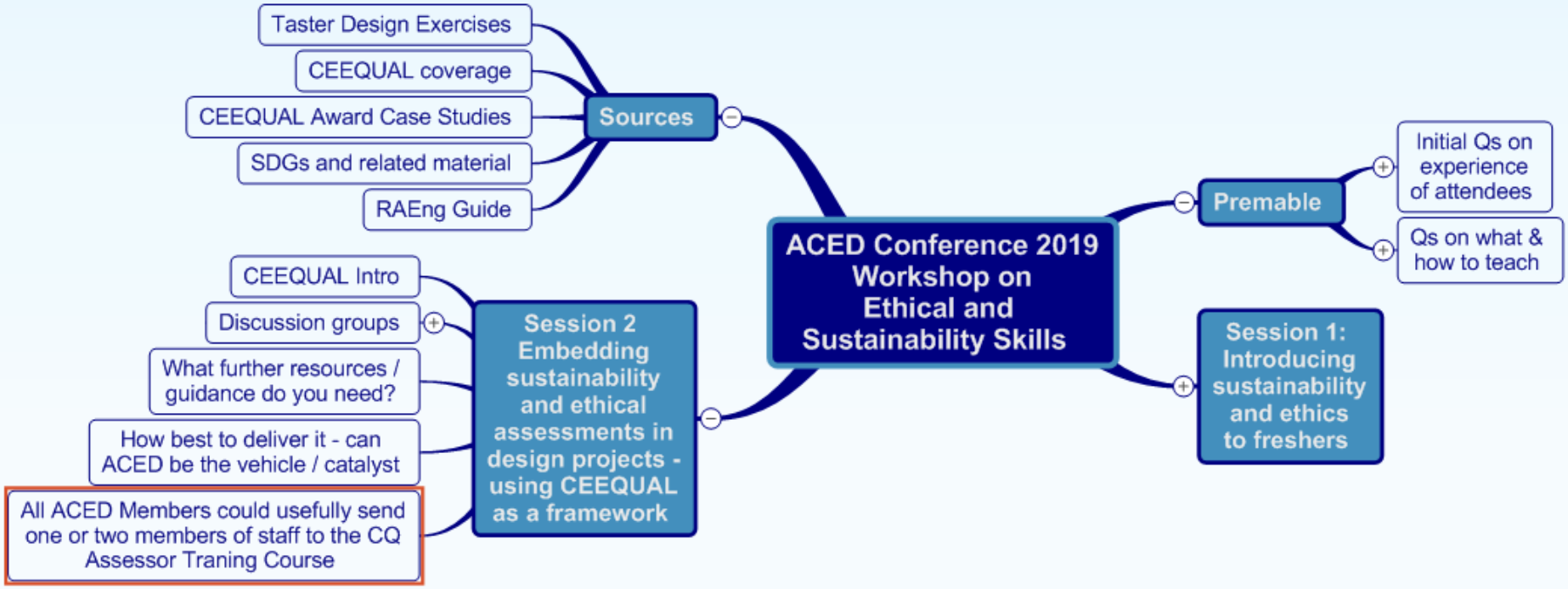
# *ACED Conference 2019*

## *Ethical and Sustainability Skills Workshop: A contribution on introducing sustainability to Freshers of all kinds*


**Roger Venables**

*Independent Consultant, Sustainability & Infrastructure*

*Visiting Lecturer and Academic Mentor for Degree Apprenticeships, Coventry University*

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# *Preamble: Some initial Questions*

- **How many of you were here last year?**
- **How many are expressly engaged in teaching the sustainability strand?**
- **How many are teaching freshers the fundamentals of the sustainability connections to civil engineering and vice versa?**
- **How many of you are linking your teaching actively to the sustainability agenda/guidelines even though yours is not a 'sustainability subject'?**

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# *Preamble: Some initial Questions*

- **In relation to the JBM guidelines (Sustainability should be embedded throughout the taught curriculum), many feel a need to still teach it separately, at least to get the basics across.**
- **RKV feels strongly that an introductory session is needed early in the first year or start of an MSc, to link Sustainability to Civil Engineering and vice versa, to give them context to the whole degree, and links for other lecturers to tie in to.**
- **The next 24 slides provide an example of that introductory session**

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# *An Introduction to Sustainability, Ethics and Civil Engineering – Connections in both directions*


**Roger Venables**

***Independent Consultant, Sustainability & Infrastructure***

***Visiting Lecturer and Academic Mentor for Degree Apprenticeships, Coventry University***

# *Sustainability, Ethics and Civil Engineering – Connections in both directions*

- **Congratulations for choosing the course you have!**

- **.. Whatever sector of engineering you enter …**

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**Planet Earth provides us with**

**Air**

**Water**

**Food**

**Energy**

**Waste disposal**

**…**

**Recreation**

**…**

**Human well being**

***For too long, the human race has taken from Planet earth without our considering whether it has the capacity to continue supplying us.***

IN 1974 THE WORLD POPULATION WAS
4 Billion
SURP!
WORLD
RESOURCES
BY 1987 IT HAD GROWN TO
5 Billion People...
SURP!
IN 1997 IT WILL
BE 6 BILLION!
SURP!
By THE YEAR 2025 IT WILL REACH
8.5 BILLION!
YOU CAN
DRAW YOUR OWN CONCLUSION
KAL
PENCIL ENCLOSED

# *So what is sustainability… A very generic term*

- **Sustainability**
  - **A state**
  - **The capacity for continuance**

- **Sustainable Development**
  - **The process for achieving sustainability**
  - **Also used to describe a building or civil engineering asset with particular characteristics**

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# … 'translated' into a multitude of phrases

Ethical Trade
Responsible Business
Sustainable Living
Fair Labour
Sustainability
Corporate Social Responsibility
Local Sourcing
Sustainable Procurement
Responsible Sourcing
Environmental Sustainability
Transparency
Fair Trade
Sustainable Society
Corporate Responsibility
Supply Chain Management
Traceability
Responsible Procurement

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# *Derived from a common philosophy*

***'Humanity has the ability to make development sustainable – to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs.'***

***Brundtland, UNEP 1987***

**"A better Quality of Life for everyone, now and for generations to come."DEFRA**

***"Not cheating on your kids"***

***Living off Nature's interest; not its capital***

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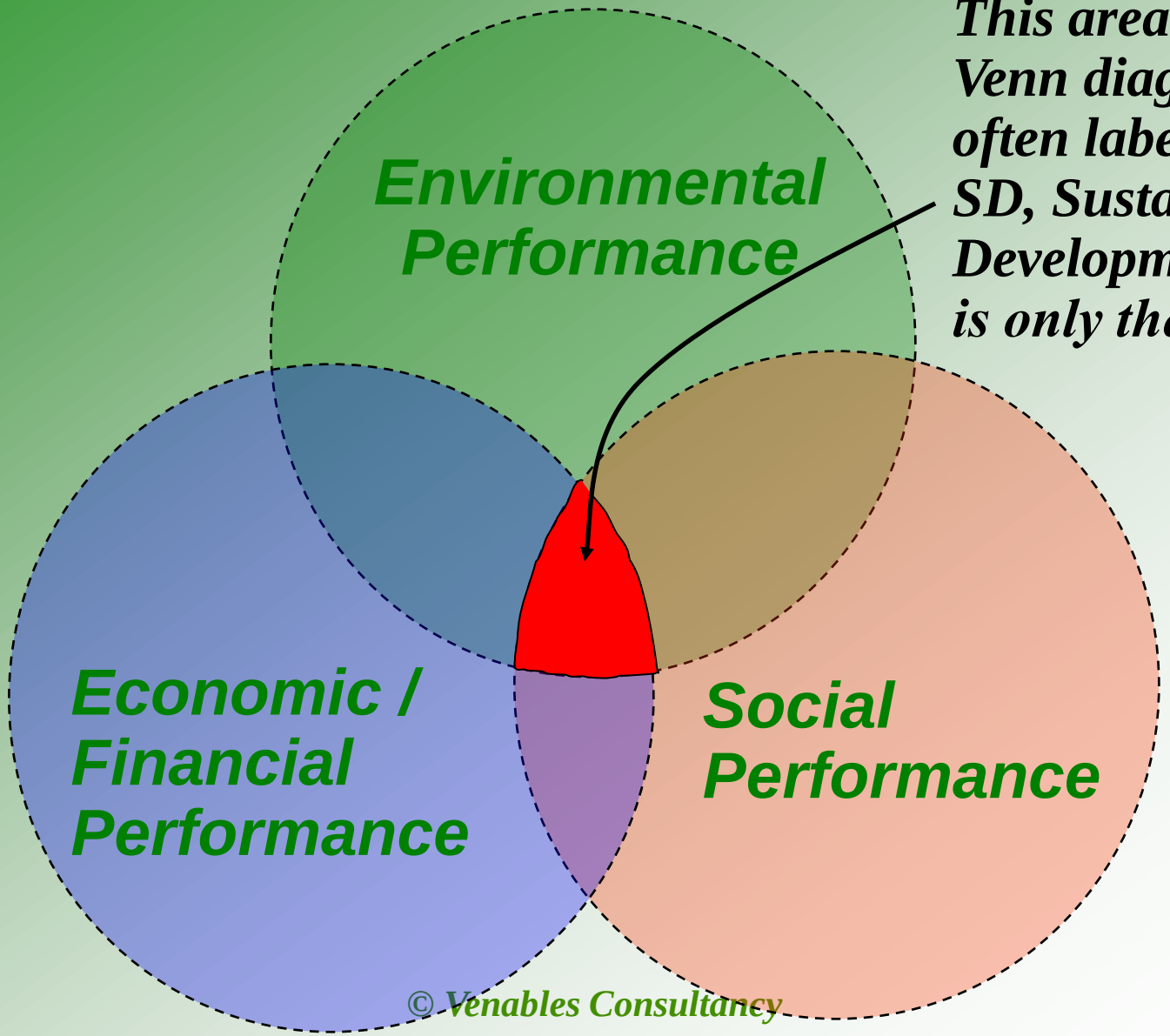
# *Triple Bottom Line – the standard view*




***This area of this Venn diagram is often labelled as SD, Sustainable Development but it is only the start …***

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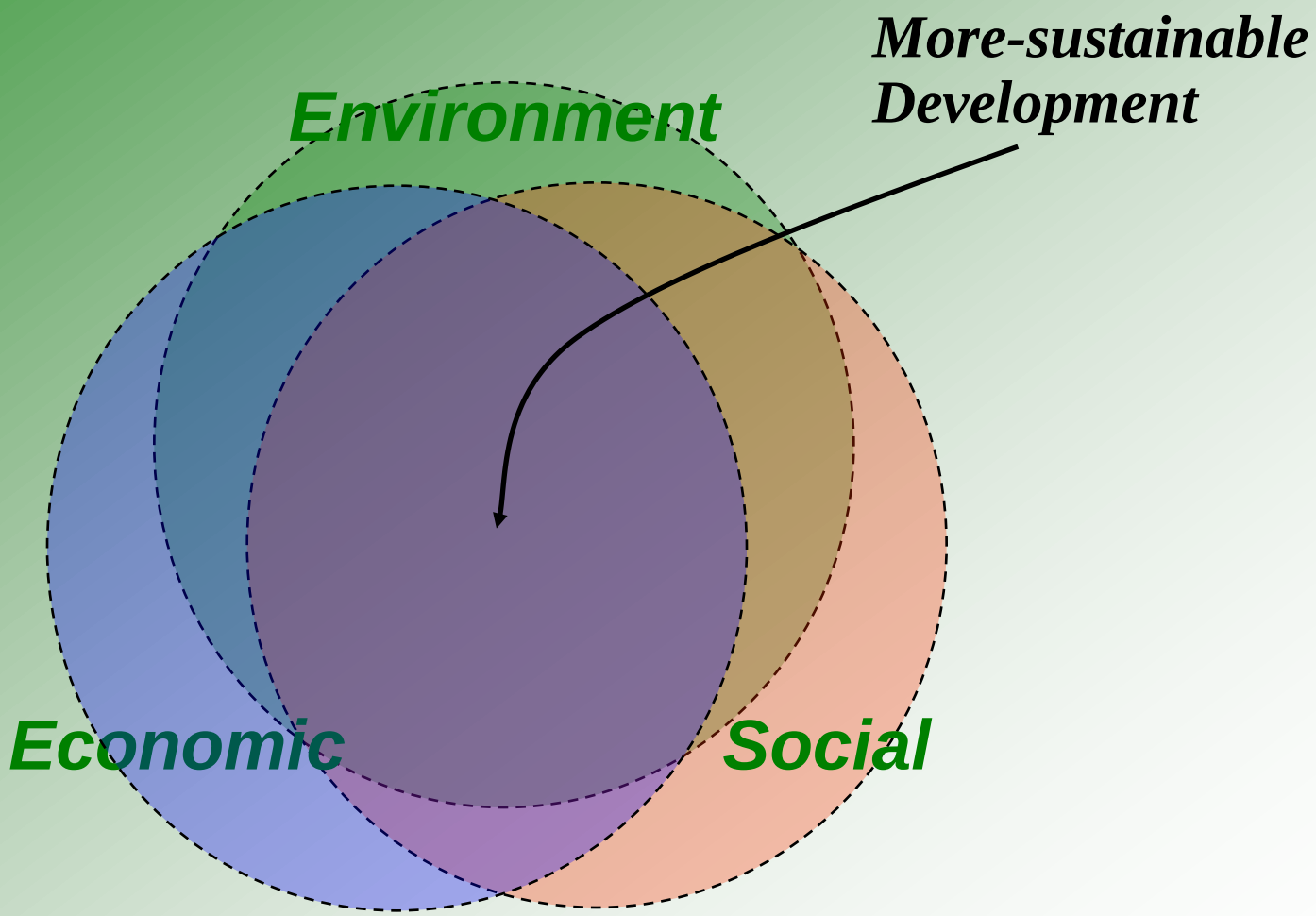
# *Triple Bottom Line – progressing to full Sustainable Development*

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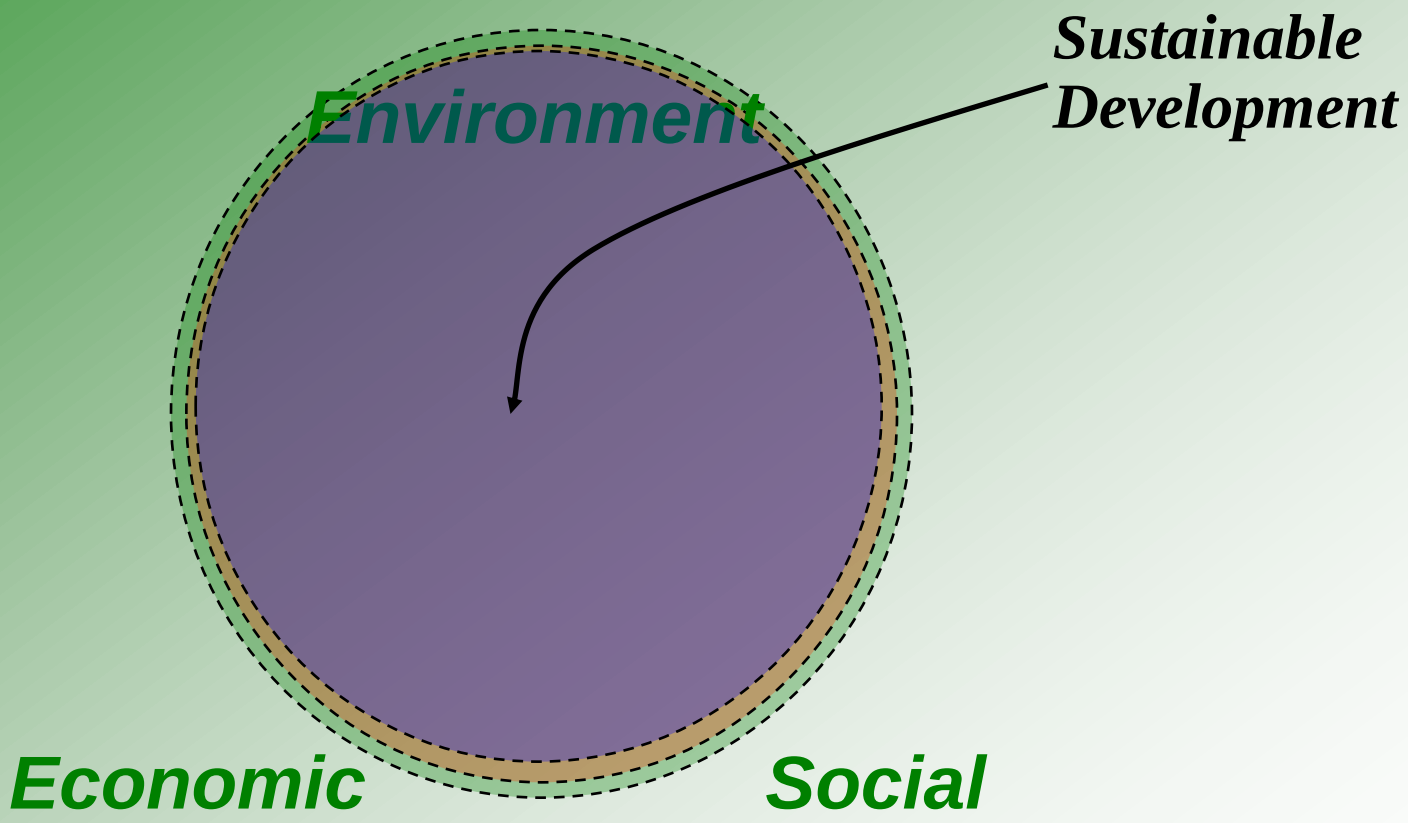
# *Triple Bottom Line – achieving full SD?*

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# Putting it in Context

All the earth's systems and resources – they are naturally sustainable

Human interaction is making them unsustainable:

- Climate change
- Local pollution
- Use of non-renewable resources
- Wildlife etc.

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# *Putting it in Context*

***The interfaces humans and all species have with the environment***

***Everyone should be able to share in the benefits that accompany a good quality of life. including a healthy, safe, clean and diverse environment.***

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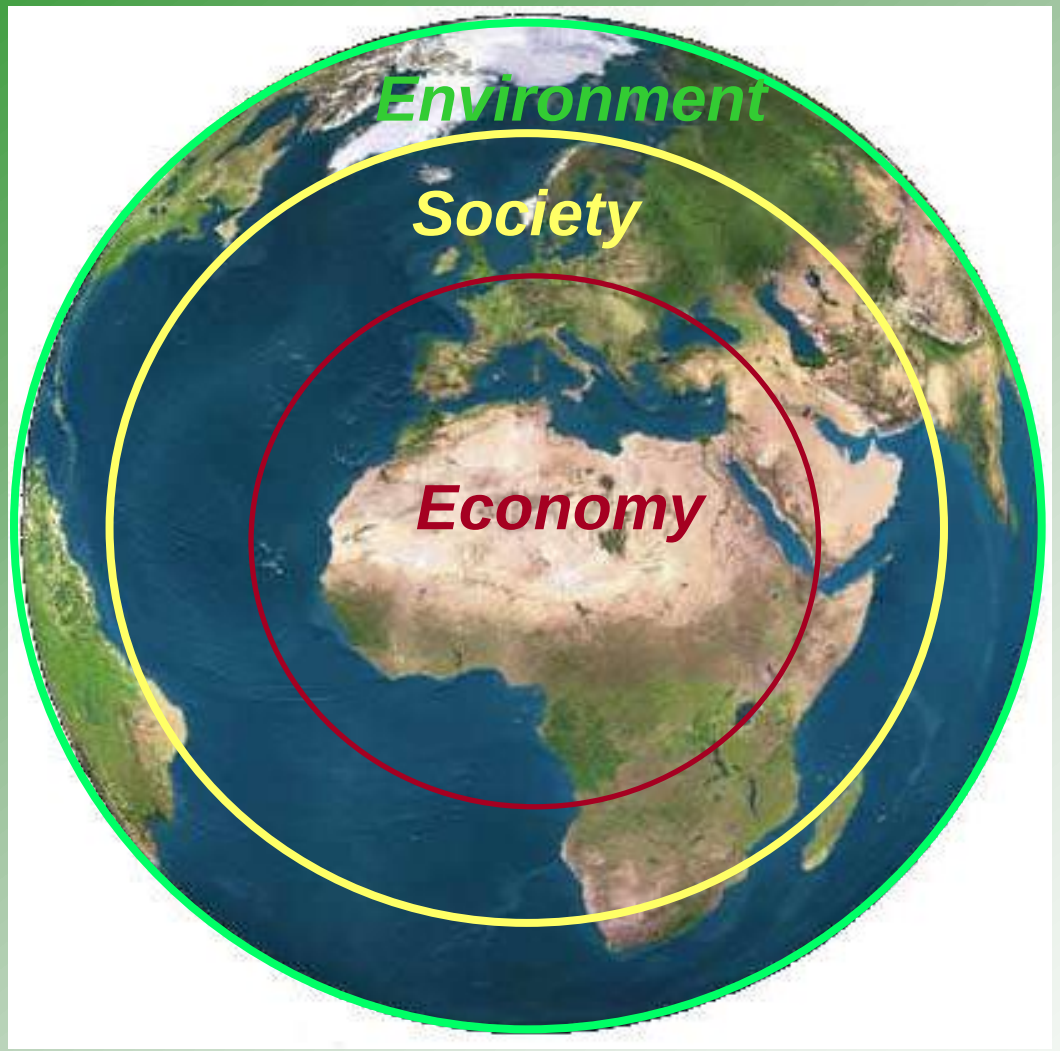
# *Putting it in Context*

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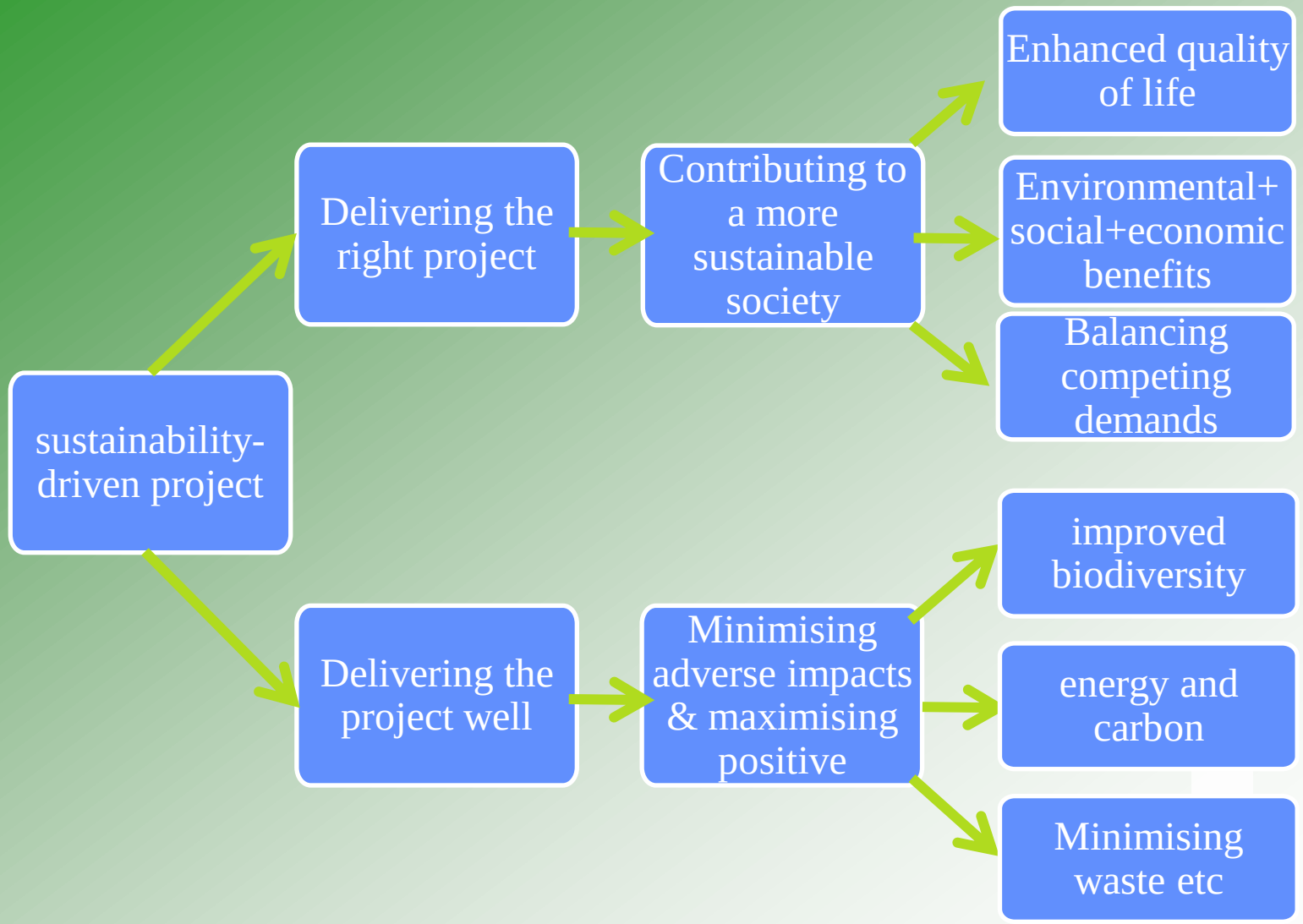
***Economy is Society's mechanism for achieving Quality of Life.***

***Everyone should be able to share in good living standards and job opportunities.***

***Also remember the needs of people in less developed countries.***

# *A model of Sustainability-driven projects*

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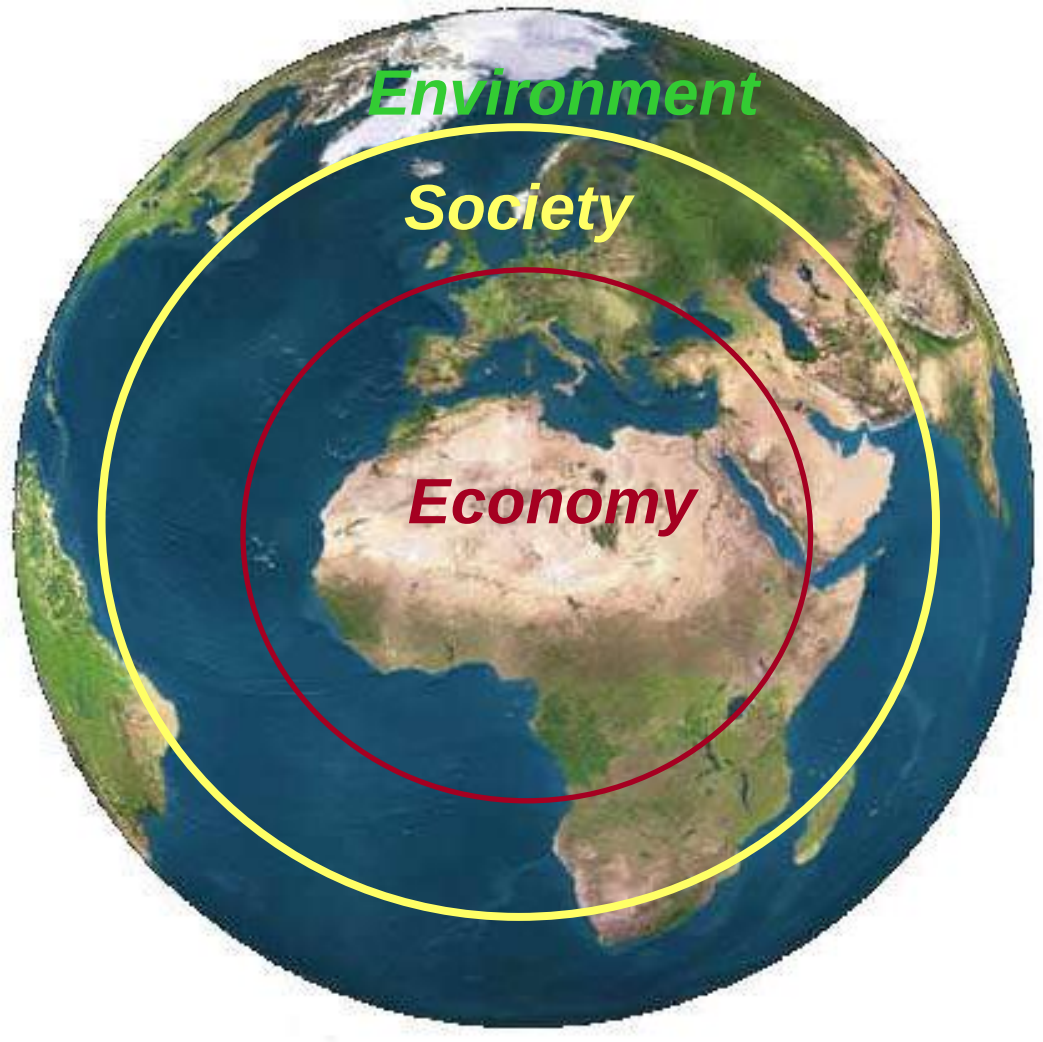
# *Putting it in Context*




***…and if we don't have an environment where does that leave us?***

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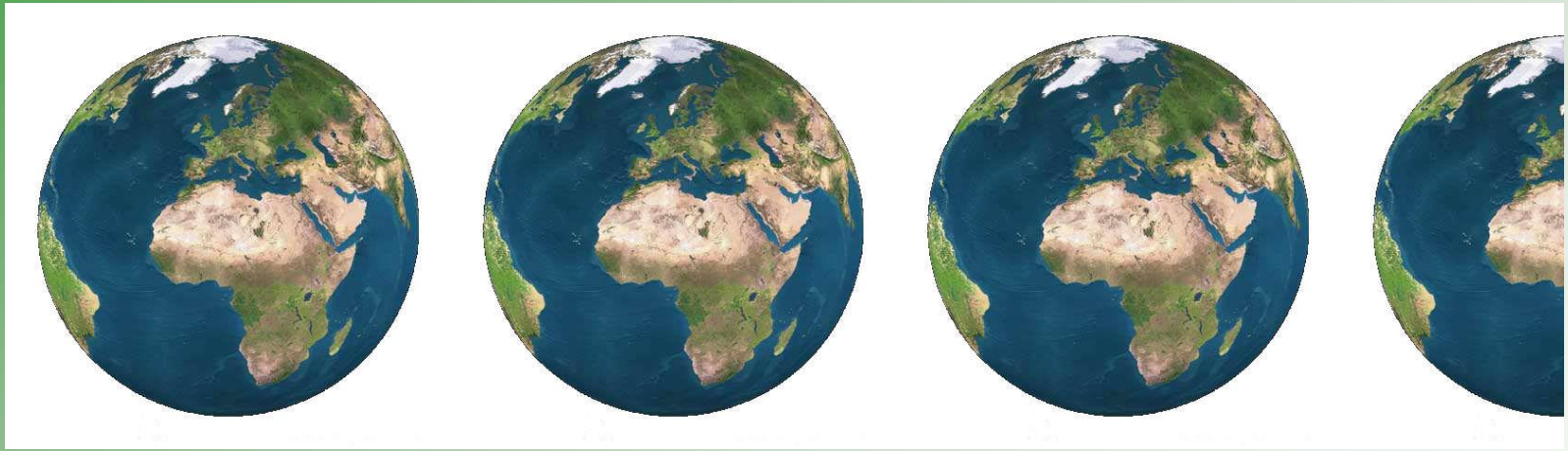
# *The current reality…*



***How many planets we need if everyone in the world lives as the average UK citizen.***

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# *But obviously…*

**We only have one!**

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- **That's the 'Why' of 'enhanced sustainability'**
- **So now we need to address the**
  - **What**
  - **How**
  - **Where**
  - **Who by and**
  - **When?**
- **BREEAM, CEEQUAL and other Sustainability Assessment & Rating schemes provide us with a framework to address these Questions**

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## *But …We need to remember that*

- **‘Sustainability’, ‘a sustainable society’ or ‘sustainable living’ are the goals**

- **‘Getting there’ requires ‘sustainable development’, a process or journey to move us forward from where we are now towards a more-sustainable or less-unsustainable future**

- ***Actually* getting there may be impossible but gives a target to aim at, a route to follow.**

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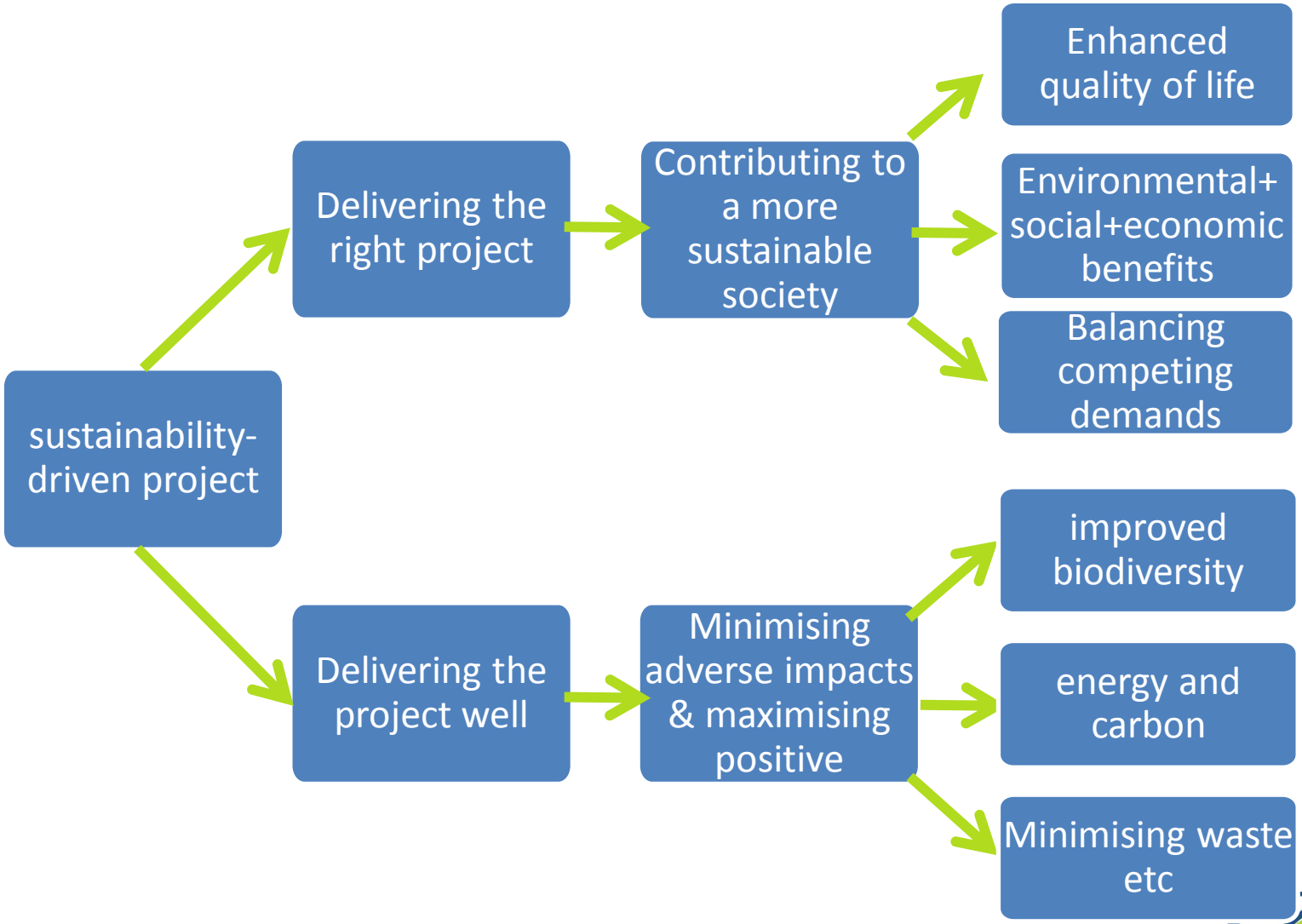
# A model of Sustainability-driven projects




© CEEQUAL Ltd 2002-2016

- **Next some slides to introduce CEEQUAL to Civil engineering Students undertaking a design project**

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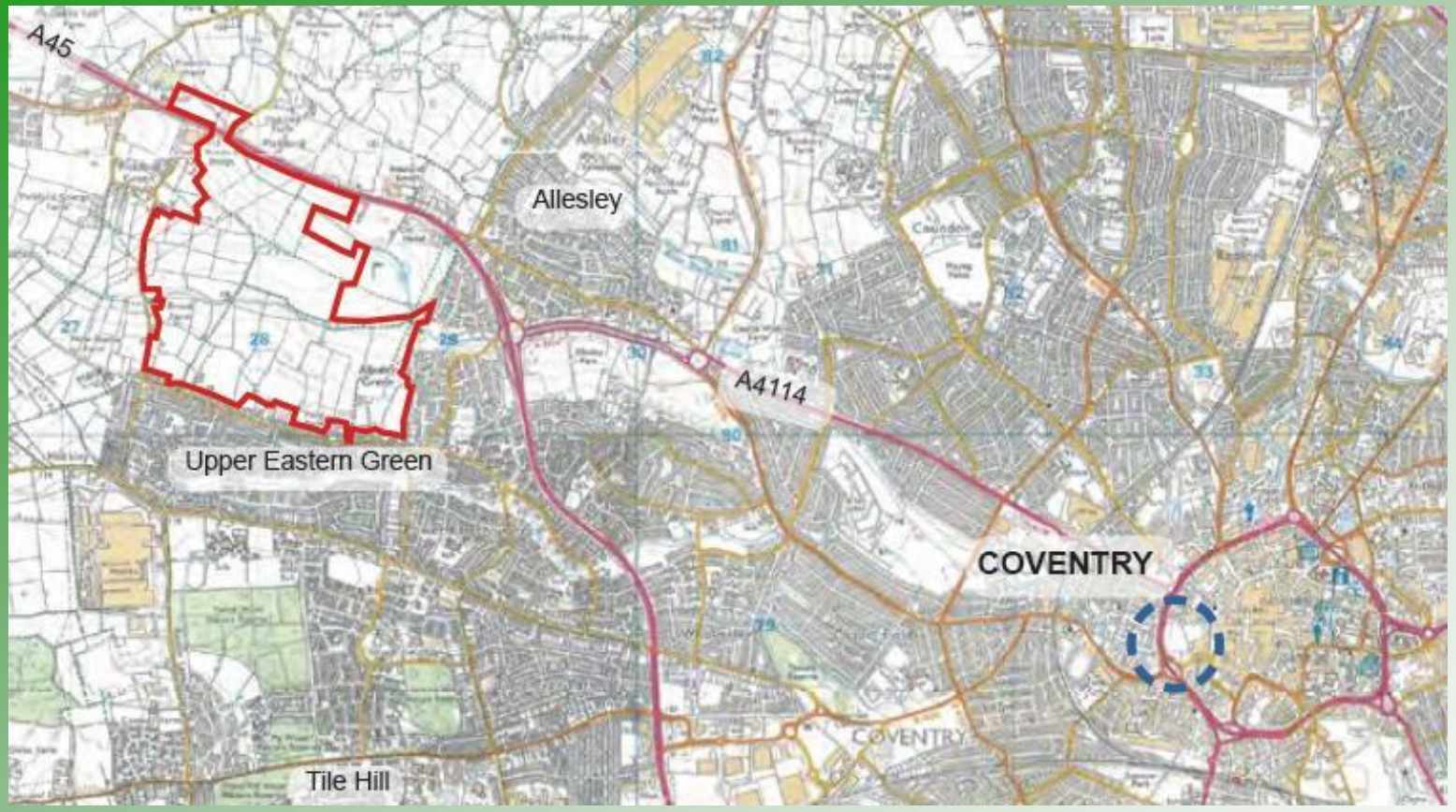


# Enhancing Sustainability in Infrastructure Projects – Why, What, How, Where, Who by and When?

## Coventry University, 7 February 2019

**Roger Venables CEng CEnv FICE MCIM FCGI FRSA**
**Independent Consultant, Sustainability & Infrastructure**

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# *Enhancing Sustainability in Infrastructure Projects*

- **Your Project brief might say:**
- **… enhanced sustainability measures of the alternative scheme will address the public and shakeholders' concern of environmental impact to the green belt.**
- **So …**
- **What could be done? And**
- **How do we decide what to do?**
- **And why is 'enhanced sustainability' a good idea anyway?**

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- **Influencing and assessing how well a Project Team can do / has done**
- **Rating systems can be very helpful**
- **Let's examine CEEQUAL as an example**

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# What is CEEQUAL?
# ICE's original objective in 1999

**Improve the environmental quality of civil engineering**

- What is it now?
  **The sustainability assessment, rating and awards scheme for civil engineering, infrastructure, landscaping, and works in public spaces**

EXCELLENT

**Incentive of an Award Scheme**

**Project & Process improvement**

**www.ceequal.com**

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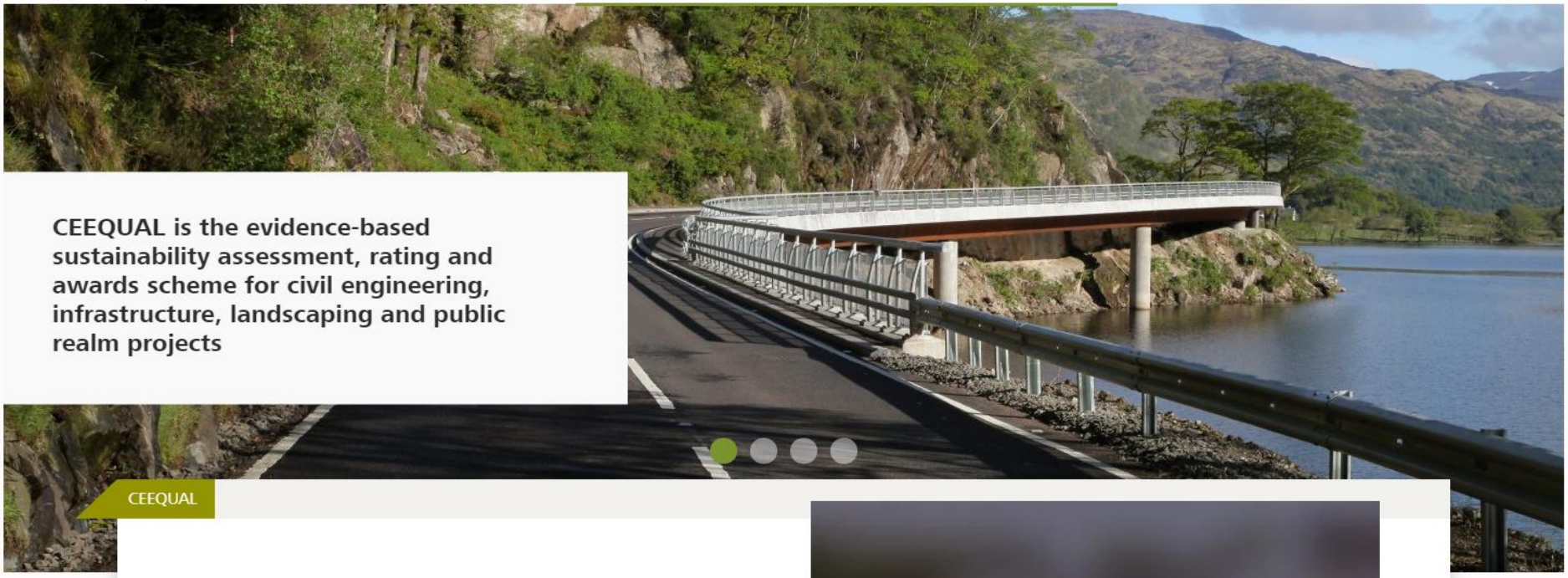
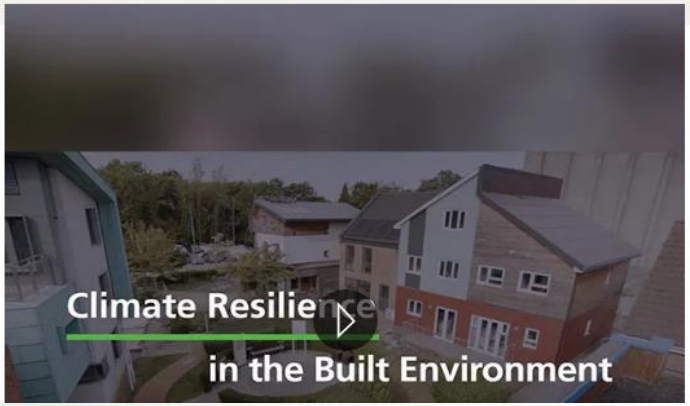


**CEEQUAL is the evidence-based sustainability assessment, rating and awards scheme for civil engineering, infrastructure, landscaping and public realm projects**

CEEQUAL

## Climate Resilience in the Built Environment

Climate resilience is an important consideration within the built environment. How can the construction industry mitigate our contribution to, and prepare for the impacts of a changing climate?

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www.ceequal.com

- "CEEQUAL is the evidence-based sustainability assessment, rating and awards scheme for civil engineering, infrastructure, landscaping and public realm projects
- The objectives of CEEQUAL are to:
  - Create a climate of sustainability awareness – and of continuous improvement
  - Promote the importance of setting and delivering a sustainability-driven strategy for the project or contract being assessed.
  - Promote improved sustainability performance in project or contract specification, design and construction.
  - Recognise and promote the attainment of high economic, environmental and social performance."

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www.ceequal.com

- "CEEQUAL is the evidence-based sustainability assessment, rating and awards scheme for civil engineering, infrastructure, landscaping and public realm projects
- The objectives of CEEQUAL are to:
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    being assessed.
  - Promote improved sustainabili
    project or contract specificatio
    construction.
  - Recognise and promote the att
    economic, environmental and

| Assessment type |
| --- |
| Whole Project |
| Strategy & Design |
| Design only |
| Design & Construction |
| Construction only |

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# *What is Infrastructure Rating?*

CEEQUAL® delivered by bre

- A system of rating criteria
- Influencing tool …
- Improving sustainability through best practice
- Team-based self-assessment
- Evidence-based
- Independent verification + Award

**Selected users in UK; Sweden; Hong Kong; Qatar, + Trials in other areas**

***In the UK:***
***Clients:***

**Crossrail ; NI Department of Rural Development; Environment Agency; Highways Agency; Network Rail; Port of Dover**

***Designers:***

**Aecom/URS; Arup; Atkins; Capita Symonds; Halcrow/CH2; Jacobs Engineering; Mouchel; Mott Macdonald; Parsons Brinckerhoff**

***Contractors:***

**Amey; Balfour Beatty; BAM Nuttall; Carillion; Costain; Kier Group; Laing O'Rourke; Morrison; Skanska; Volker Stevin**

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# *The 8 Sections of CEEQUAL Version 6*

| Section | Topics |
|---|---|
| Management | Sustainability Leadership, Environmental management, Responsible construction management. Staff and supply chain governance, Whole life costing |
| Resilience | Risk assessment and mitigation, Flooding and surface water run-off, Future needs |
| Communities and stakeholders | Consultation and engagement, Wider social benefits, Wider economic benefits |
| Land use & Ecology | Land use and value, Land contamination and remediation, Protection of biodiversity, Change and enhancement of biodiversity, Long-term management of biodiversity |
| Landscape and Historic Environment | Landscape and visual impact, Heritage assets |
| Pollution | Water pollution, Air, noise, and light pollution |
| Resources | Strategy for resource efficiency, Reducing whole life carbon emissions, Environmental impact of construction products, Circular use of construction products, Responsible sourcing of construction products, Construction waste management, Energy use, Water use |
| Transport | Transport networks, Construction logistics |

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# The 9 Sections of CEEQUAL Version 5

| Section | Topics |
|---|---|
| Project Strategy | Economic, Social and Environmental Assessments, Resources strategy, Climate Change, Contribution to more-sustainable living, Construction strategy |
| Project Management | Sustainability management, Contracts, Performance Delivery, Communications |
| People & Communities | Stakeholders, Effects on Neighbours, Monitoring, Continuing engagement and its effectiveness, Human environment, Aesthetics & Employment |
| Land use & Landscape | Principles, Dealing with contamination, Flood risk, Legal requirements, Implementation, Management, aftercare |
| Historic Environment | Baseline studies, Legal requirements, Conservation & enhancement, Information dissemination, Public access |
| Ecology & Biodiversity | Principles, Legal requirements, Conservation & enhancement, Habitat creation, Monitoring & maintenance |
| Water Environment | Principles, Legal requirements, Protection of the freshwater & marine environments, Enhancements |
| Physical Resources | Principles, embodied impacts, Resource Efficiency, Energy consumption, Carbon emissions, Water use, Responsible sourcing, Hazardous waste, Waste management & minimisation |
| Transport | Principles, Operational transport, Construction transport, Workforce travel |

# What CEEQUAL questions cover or prompt

Avoidance (of adverse impacts)

Reduce, minimise & mitigate

Enhancement (of positive impacts)

Inclusion of amenity & environmentally beneficial features

Stakeholder involvement

Resource efficiency

Legal compliance (a few)

⇨ Beyond legal compliance

Consider/Assess

↓

Plan

↓

Implement

↓

Monitor/ Performance

# An example: CEEQUAL Version 6 Criteria on Reducing whole-life carbon emissions

## Aim: To drive the assessment, reporting, and reduction of whole-life carbon emissions throughout the project's planning, design, delivery and future management.

### Credit summary

| Assessment criteria | Strategy | Design | Construction |
|---|---|---|---|
| 7.2.1 Carbon management | 18 (up to) | 18 (up to) | 18 (up to) |
| 7.2.2 Independent third-party certification of carbon management | 9 | 9 | 9 |
| 7.2.3 Achieving carbon reduction targets | 27 (up to) | | |
| 7.2.4 Exemplary level: Net zero carbon | 1% (exemplary) | | |

### Assessment criteria

#### 7.2.1 Carbon management (fixed)

7.2.1.1 A carbon management approach has been adopted during the strategy, design, or construction of the project that fully or partially conforms with PAS 2080 as indicated in the table below.

| Str | Des | Con |
|---|---|---|
| 18 (up to) | 18 (up to) | 18 (up to) |

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# Relationship with EIA, EMS and legislation

## EIA

- Completed at planning stage
- CEEQUAL: assesses what is actually constructed
- CEEQUAL: good checklist for projects that don't require an EIA

## EMS

- Tend to be company wide
- Procedural systems
- CEEQUAL: project specific & assesses performance
- Can use CEEQUAL as a checklist in an EMS

## Legislation

- CEEQUAL goes beyond legislation
- Tests some legal compliance
- Penalises failure to comply

# Motivations and benefits for using CEEQUAL

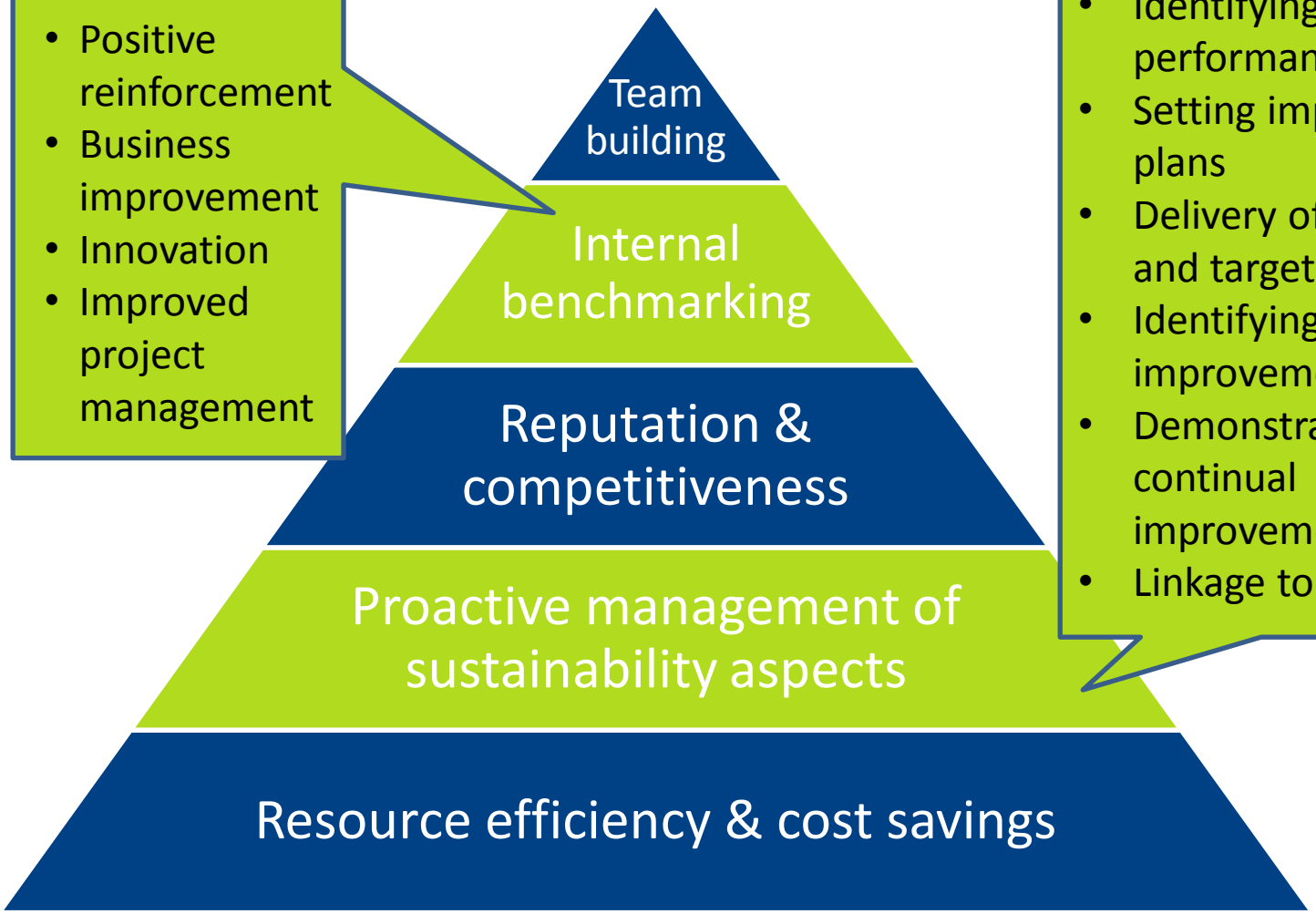
Public recognition and public relations

Improvements to projects, cost savings and best practice

Team reward and team building

# Benefits Summary

- Positive reinforcement
- Business improvement
- Innovation
- Improved project management




- Identifying current performance
- Setting improvement plans
- Delivery of objectives and targets
- Identifying areas for improvement
- Demonstrating continual improvement
- Linkage to ISO14001

# Motivations and benefits: Improvements to projects and best practice

Trigger actions that improve performance & bring cost savings

- whole-life costing
- waste minimisation
- energy consumption reduction
- water consumption reduction
- minimising complaints
- minimising costs of environmental incidents
- ethical outcomes

CEEQUAL Case studies are at https://www.ceequal.com/case-studies/

- **How do we decide what to tackle?**
- **We need to identify the 'significant' issues and impacts and concentrate on those**
- **How do we judge what *is* significant?**

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- **Significance: Judged by a range of factors:**
  - How often it occurs
  - How big the impact is
  - How much it will cost or save
  - Whether it is a legal requirement
  - How sensitive the site and/or its neighbours are

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- **Significance: This means we concentrate on:**
  - **Legal requirements**
  - **High impact issues**
  - **High volume materials and/or wastes**
  - **High value materials, wastes and/or opportunities**

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- **SO, what might you consider on your project?**
- **The same significant issues:**
  - **Legal requirements**
  - **High impact issues**
  - **High volume materials and/or wastes**
  - **High value materials, wastes and/or opportunities**
- **… because you *cannot address everything***

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# *Sources of information and guidance*

- CEEQUAL is at https://www.ceequal.com
- Version 6 downloadable in return for your name and email address at https://www.ceequal.com/version-6/
- ISCA (Australian ≡ of CEEQUAL) is at https://www.isca.org.au/Get-Involved/IS-Ratings
- Envision (USA ≡ of CEEQUAL) is at https://sustainableinfrastructure.org/envision/
- PAS 2080 Carbon Management in Infrastructure is available at https://www.bsigroup.com/en-GB/our-services/ and search for PAS 2080
- https://www.ice.org.uk/about-ice/what-we-do/sustainability-guidance-panel

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# *Concluding remarks*

- **Enhancing sustainability of infrastructure projects**
  - **Doing the right kind of project, AND**
  - **Doing the project in the right kind of way**
  - **It's not about not building; It's about building …**
    - the right kinds of project
    - in the right place, with low environmental and social impact, high social and environmental benefits, and economically positive outcomes
  - **Projects need careful framing, inspired design, excellent planning and careful construction, meticulous commissioning and thorough handover**
  - **Rating systems provide an excellent framework for guiding and considering those challenges**

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# *Concluding remarks*


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