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Institution of Civil Engineers

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ice 200 | WFEO / FMOI 50 YEARS | ASCE AMERICAN SOCIETY OF CIVIL ENGINEERS | CEC Commonwealth Engineers' Council | CSCE CCGC | European Council of Civil Engineers

Global Engineering Con

>2500

>80

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SUSTAINABLE DEVELOPMENT KNOWLEDGE PLATFORM

HOME | HIGH-LEVEL POLITICAL FORUM | STATES | SIDS | SDGS | TOPICS | UN SYSTEM | STAKEHOLDER ENGAGEMENT | PARTNERSHIPS | RESOURCES | ABOUT

Sustainable Development Goals

SUSTAINABLE DEVELOPMENT GOALS

1 NO POVERTY

2 ZERO HUNGER

3 GOOD HEALTH AND WELL-BEING

Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

5 GENDER EQUALITY

6 CLEAN WATER AND SANITATION

7 AFFORDABLE AND CLEAN ENERGY

8 DECENT WORK AND ECONOMIC GROWTH

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

10 REDUCED INEQUALITIES

11 SUSTAINABLE CITIES AND COMMUNITIES

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

13 CLIMATE ACTION

14 LIFE BELOW WATER

15 LIFE ON LAND

16 PEACE, JUSTICE AND STRONG INSTITUTIONS

17 PARTNERSHIPS FOR THE GOALS

World Federation of Engineering Organizations
Fédération Mondiale des Organisations d'Ingénieurs
50th anniversary

WFEO Engineering 2030

A Plan to advance the achievement of the UN Sustainable Development Goals through engineering

https://sustainabledevelopment.un.org/

Embedding sustainability and ethical construction in HE (civil engineering) curricula

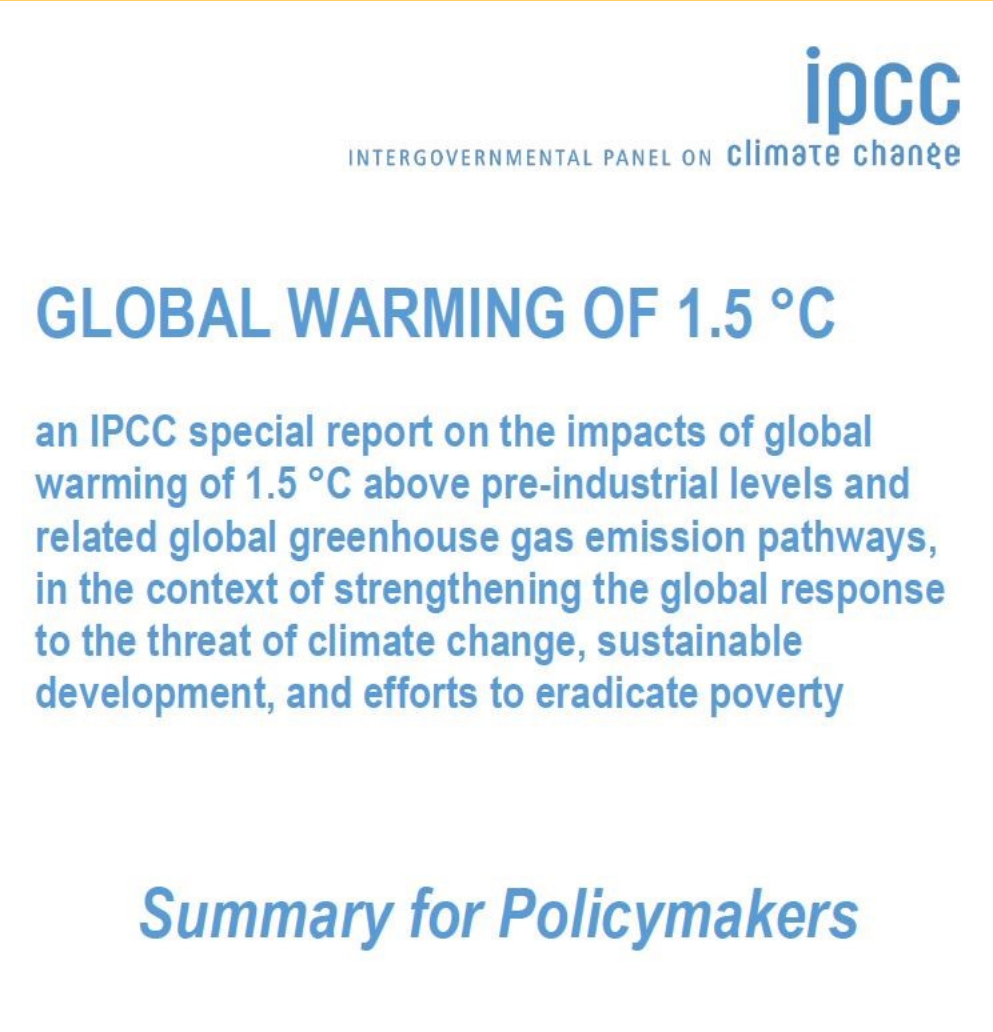
- Roger Venables
- Consultant & speaker on Sustainability & Infrastructure
- Former lots of things, but especially
  - Led team creating CEEQUAL + 10 yrs Chief Exec
  - 2001 - 3rd ICE Brunel Lecturer ‘Delivering SD’
  - RAEng VP in Engineering for Sustainable Development at Queens Belfast
  - VL at City on MSc in Construction Management – Module on CSR, Environment & Sustainability
  - Contracting background
  - 15 years at CIRIA

GEC, IPCC, SDGs and Academia – 1

- Providing an excellent framework for promoting adopting, pursuing and delivering the sustainability agenda
- Providing a common language for engineers and governments to discuss positive action

GEC, IPCC, SDGs and Academia – 2

- IPCC Special Report on Global Warming of 1.5 °C
- By 2030 CO2 emissions need to 'falling rapidly'
- Therefore, carbon reduction agenda needs dramatic acceleration
- So what should academia do?


ipcc
INTERGOVERNMENTAL PANEL ON climate change

GLOBAL WARMING OF 1.5 °C

an IPCC special report on the impacts of global warming of 1.5 °C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty

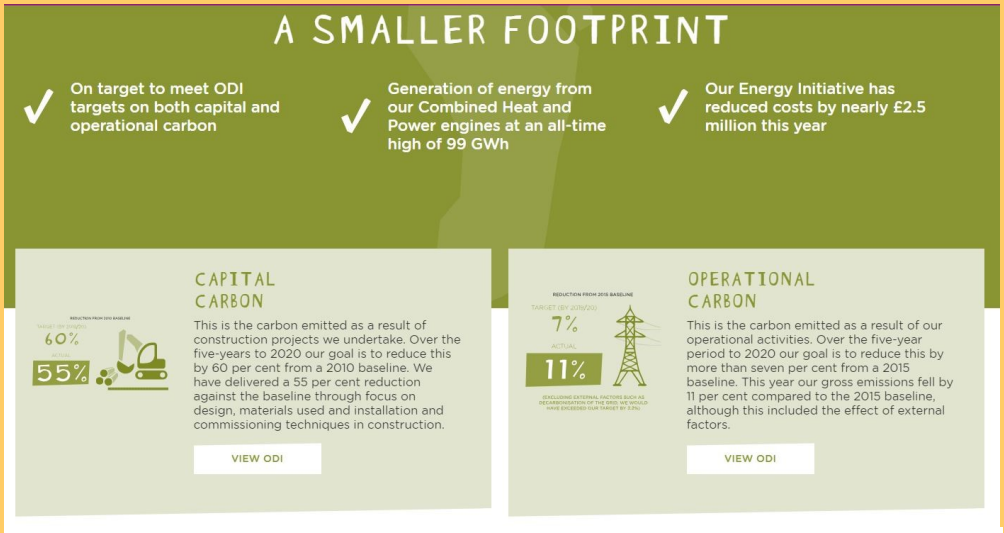
Summary for Policymakers

GEC, IPCC, SDGs and Academia – 3

- A timeline if we are successful at the carbon reduction agenda …
  - 2018 to 2030
  - 1/10th of the total action needed *every year*
  - So who needs to take the action?
  - Already qualified engineers. GEC said 28–40 year-olds were key
  - So a Masters student starting next September can take action from June 2020 and will have some influence
  - A fresh graduate from an amended course in 2023, 24 or 25 will be entering an already-changed world

GEC, IPCC, SDGs and Academia – 3

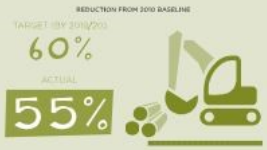
- So we need four strands of action in a resourced-strapped department to strengthen
  - Staff CPD
  - CPD Courses
  - Masters Courses,
  - *then* UG courses
- We need to teach UGs to deal with uncertainty and to take on things not invented before they graduated … more than once



Tackling the 2030 challenge
Anglian Water and Carbon Reduction

A SMALLER FOOTPRINT

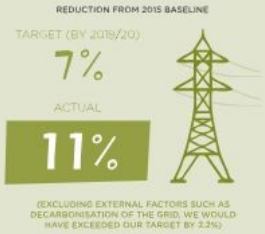
- ✓ On target to meet ODI targets on both capital and operational carbon
- ✓ Generation of energy from our Combined Heat and Power engines at an all-time high of 99 GWh
- ✓ Our Energy Initiative has reduced costs by nearly £2.5 million this year



CAPITAL CARBON

This is the carbon emitted as a result of construction projects we undertake. Over the five-years to 2020 our goal is to reduce this by 60 per cent from a 2010 baseline. We have delivered a 55 per cent reduction against the baseline through focus on design, materials used and installation and commissioning techniques in construction.

VIEW ODI



OPERATIONAL CARBON

This is the carbon emitted as a result of our operational activities. Over the five-year period to 2020 our goal is to reduce this by more than seven per cent from a 2015 baseline. This year our gross emissions fell by 11 per cent compared to the 2015 baseline, although this included the effect of external factors.

VIEW ODI

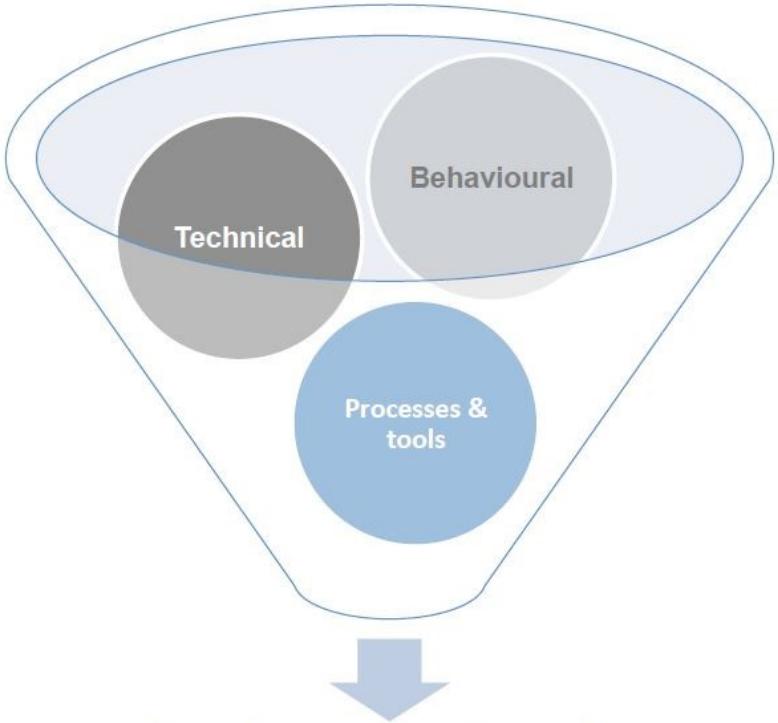
Tackling the 2030 challenge
PAS 2080

Recognising the ingredients of carbon reduction

Low carbon solutions in projects and programmes of work

Technologies, materials, design practices, programme rationalisation

Revising technical specifications



Culture and competence

Leadership

Challenge

Ownership

Training

Embedding processes & tools in business as usual

Embedding in investment process

Assigning gate deliverables

Identifying responsible people

Carbon reduction

GEC, IPCC, SDGs and Academia – 3

- And the socio-political agenda, ethics and CSR have progressed: but not yet where they should be
  - Framing project scopes for maximum social benefit and a fair distribution of +ves and -ves
  - Proper *consultation* not just information flows
  - Need for decent compensation for those who bear the negative impacts for nationally important projects
  - Anti-bribery and corruption
  - Diversity, inclusion and fairness
  - *Really equal* opportunities

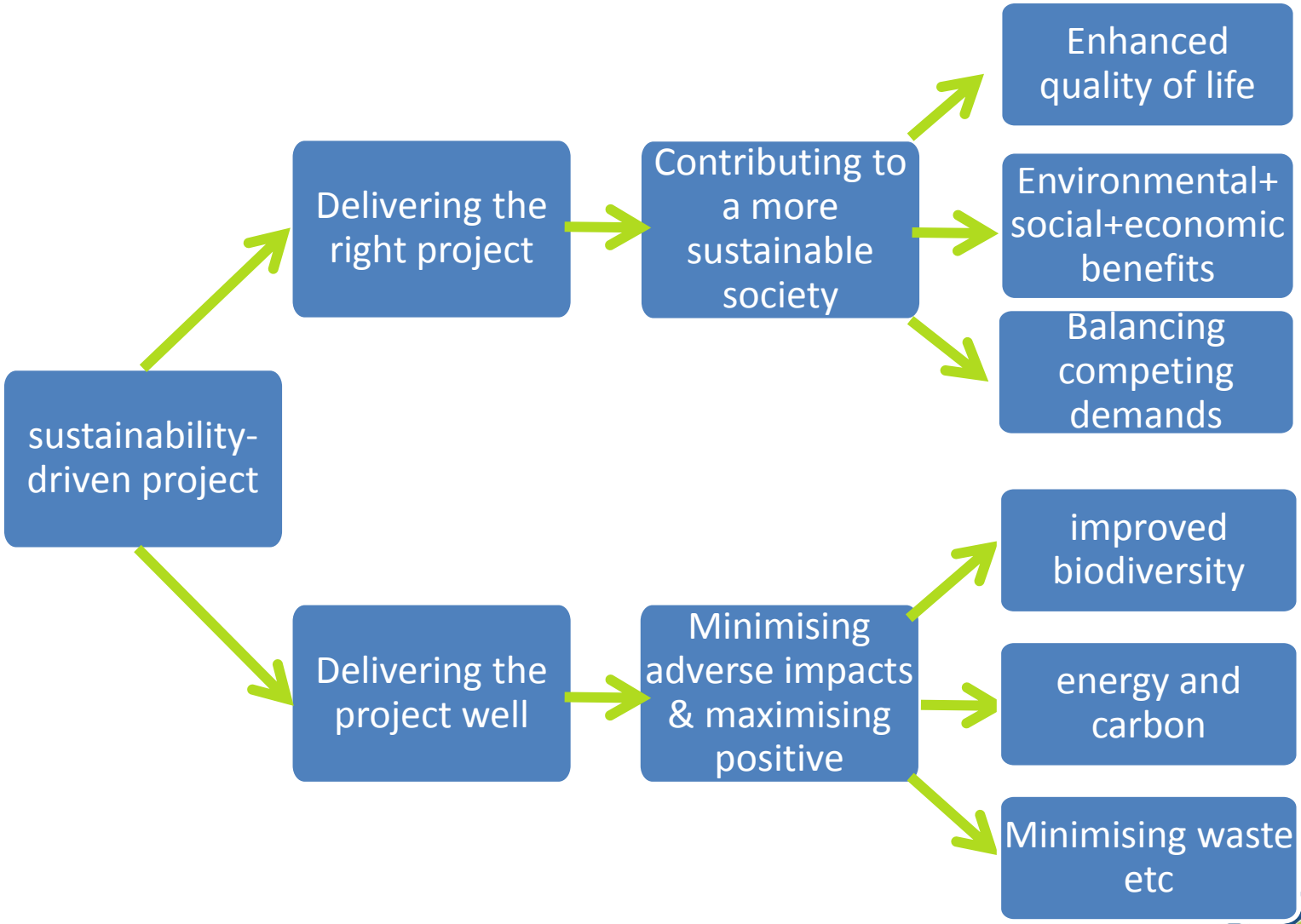
GEC, IPCC, SDGs and Academia – 4

- So what to add and how, then ‘embed’?

- Find a way to use the SDGs
  - for clarity on what sustainability is about
  - for engagement of the students
- Enhance your coverage of the low-carbon agenda, add use of carbon calculators and then add this to the assessment options
- Use the multitude of resources now available
- *Sustainability-driven* projects in 3rd & 4th years

- Debate about embedding cf specialist VLs or VPs

Sustainability-driven projects



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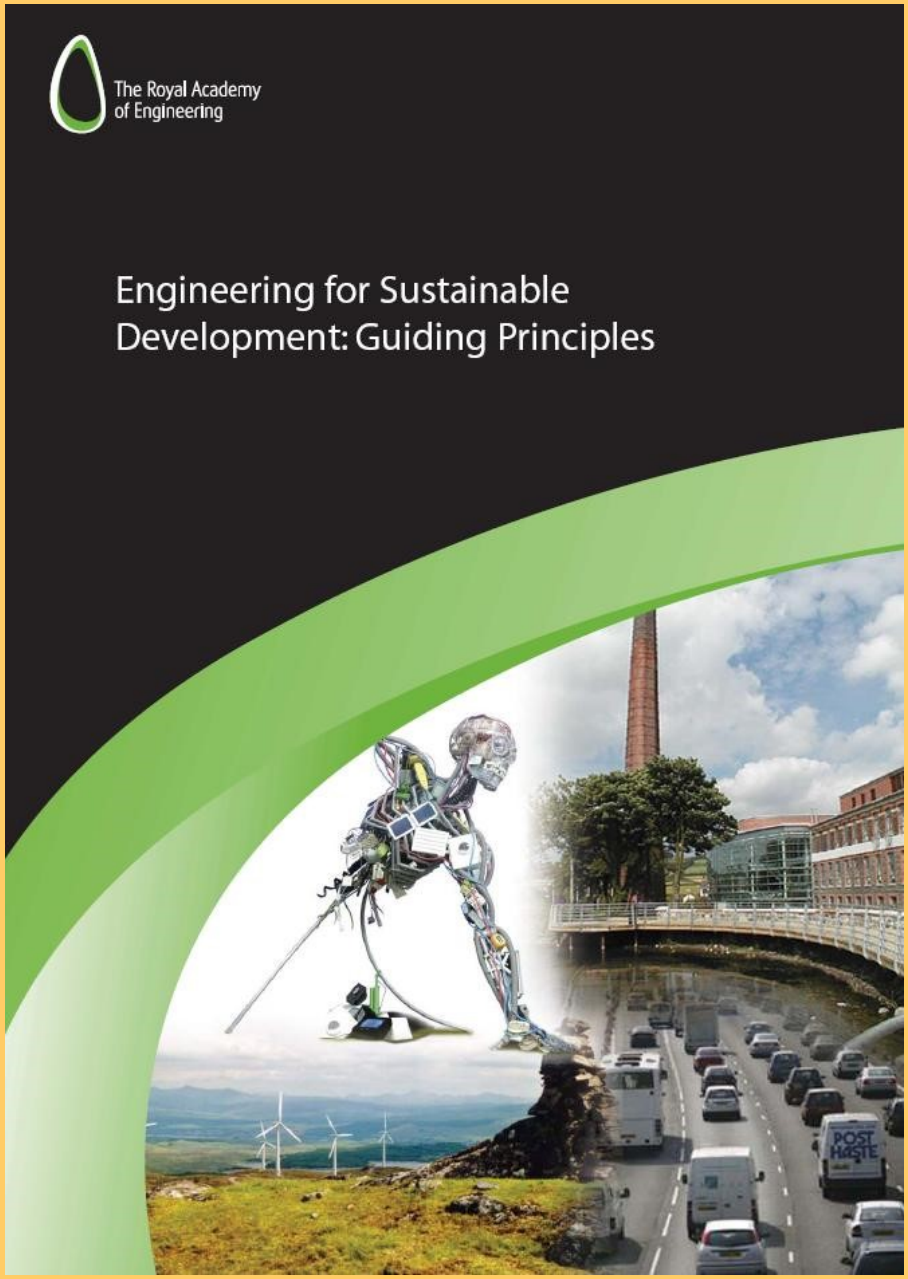
GEC, IPCC, SDGs and Academia – 5

- And how to assess 'Knowledge, skills and behaviour??
  - Specific and sound ethics, environmental or sustainability-framed Coursework Assignments can be created, be stretching and differentiate between different levels of knowledge and understanding. Essays based on research.
  - Exams – now some good multi-stage examples
  - An important element of 3rd and 4th yr Projects

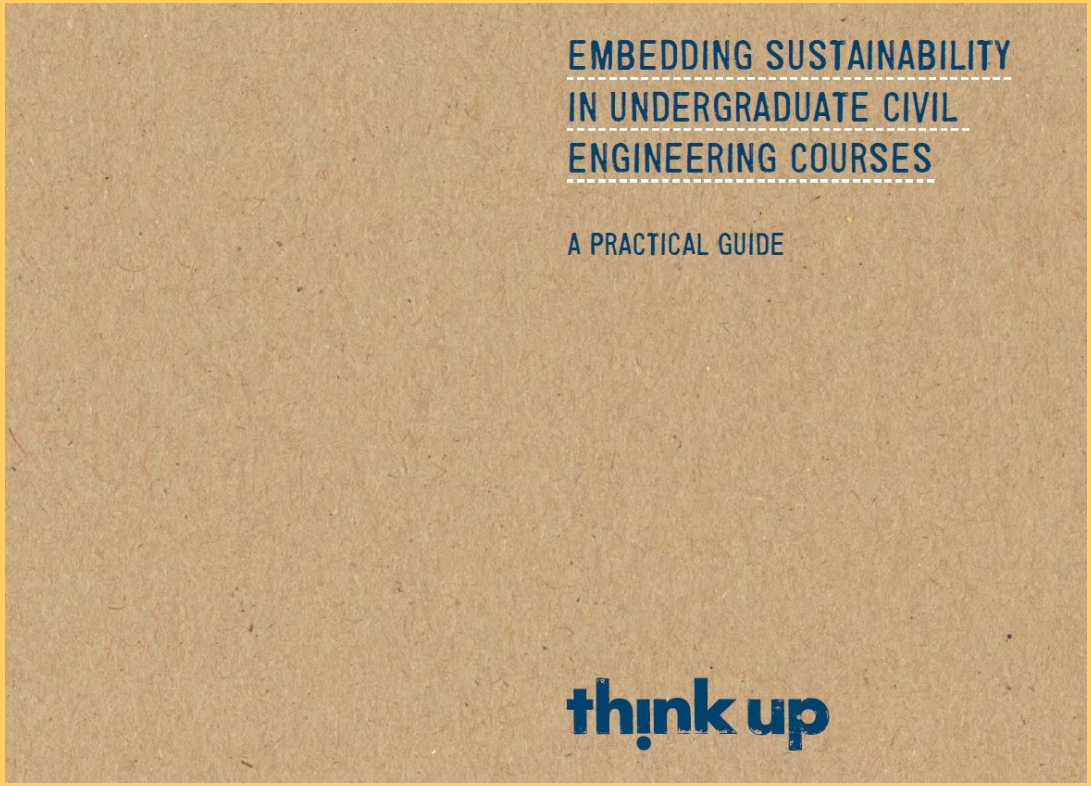
Coursework idea

- Critique of the guide
- Web research on a topic that should be updated or included in a new version
- ≈1500 words in two roughly equal parts
- Despite being 13 years old, still largely relevant, but also illustrative of change in values and progress in understanding
- A new version proposed but so far not agreed



Exam ideas

- List five reasons or concerns why …
- For three of these, explain what makes them important and challenging to tackle
- For one of those three reasons, explain how a two-year programme of development work could be set up to deliver a XX% improvement in performance



Conclusion

- Academics' contribution to following up the GEC and SDGs
- Your own & colleagues' CPD if needed
- CPD Courses to help current practitioners to improve their skills
- Strengthen MSc Courses
- Re-shape UG courses to future-proof the graduates skills – equip them to tackle large-scale uncertainties and inevitable large changes in practice

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