

PROJECTING THE FUTURE

A big conversation about the future of the project profession

CHALLENGE PAPER 2

CLIMATE CHANGE, CLEAN
GROWTH AND SUSTAINABILITY

SEPTEMBER 2019

#projectingthefuture

ABOUT THIS PAPER

HOW DOES THE PROJECT PROFESSION THRIVE IN A CHANGING WORLD?

That's the question at the heart of Projecting the Future.

This is the second in a series of short Challenge papers published by APM as part of a 'big conversation' throughout 2019-20 about the future of the project profession. It follows our first Challenge paper – on the fourth industrial revolution and the impact of new technology – and the discussion paper which launched Projecting the Future in June 2019.

That launch paper identified six key questions for the future of the profession, and our aim throughout the conversation is to work with you, whatever your stake in the project profession, to develop answers to those questions. But each of these Challenge papers raises its own important questions too. To help answer those, we outline some of the opportunities and challenges that lie ahead, and their potential implications for the project profession. It is only with your input – whether you are contributing as an individual project manager, an employer, or an expert in the field – that these critical questions can be answered.

When it comes to climate change, clean growth and sustainability, the questions are particularly challenging. The threat posed by climate change is real, urgent, and increasingly worrying. But as Tim Banfield, chair of APM's Projecting the Future Group, wrote in our launch paper: "The future could look daunting, but for the project profession, it shouldn't – because projects are the way that successful change happens."

The project profession is a confident, optimistic profession. We will be at the centre of the immense changes that lie ahead, tasked with leading complex projects that deliver transformative change; and while we should be proud of the profession's development to date, we have the potential to be so much more.

Projecting the Future aims to build a picture of how the project profession as a whole can realise that potential, as a true leadership delivery profession. We look forward to your input.

JOIN THE CONVERSATION

We hope you will share your views, ideas and answers to our discussion questions (see page 9) with us and other project professionals on LinkedIn, Facebook or Twitter.

   #projectingthefuture

You can also email your thoughts and comments to: ptf@apm.org.uk

We are particularly keen to hear about case studies of projects that are making innovative adaptations to achieve net zero carbon emissions, reduce environmental impact and embed sustainability.

We recommend reading the Projecting the Future discussion paper alongside both this Challenge paper and the first Challenge paper on the fourth industrial revolution. The papers can be found at: www.apm.org.uk/projectingthefuture

THE BIG ISSUES

It is a challenge like no other. The effects of climate change are both global in reach, and local in impact. They could spell disaster for millions of people in the decades ahead. Building a 'clean' and sustainable carbon-free economy will be far from simple.

For many years, climate change seemed an abstract concept: visible to scientists in remote parts of the world, perhaps, but unseen by most people. That has changed. In the UK, recent years have been the warmest on record,¹ while powerful storms have caused millions of pounds' worth of damage to homes and businesses. Extreme weather has been evident around the world: from hurricanes, floods and fires in the US, to the South Asian floods that affected over 45 million people in 2017,² to wildfires in the Arctic circle in summer 2019. Globally, the last four years were the four warmest on record,³ while evidence continues to mount showing accelerations in the retreat of polar ice caps, deforestation, species loss, and ocean acidification.

Climate change has been thrust into the limelight in 2019 like never before. Schoolchildren's strikes have made Swedish student Greta Thunberg a global figure. Extinction Rebellion's protests and political demands, summed up in their book *This Is Not a Drill*, have caused disruption – and generated headlines – around the world. At the same time, there have been significant steps in UK government policy, not least the adoption in June 2019 of a target for net zero greenhouse gas emissions by 2050.

Significant as that is, targets are not solutions. The UN has warned of "an enormous gap between what we need to do and what we're actually doing".⁴ The UK's own independent Climate Change Committee warned in July 2019 that "actions to date have fallen short of what is needed for the previous targets and well short of those required for the net-zero target".

Clean growth – that is, low-carbon or carbon-free growth – is one of the four Grand Challenges identified in the government's industrial strategy. Whether in energy generation, in its consumption by industry and in homes, or for travelling, there are significant technical, financial and regulatory challenges to be resolved. And, as the strategy acknowledges, energy use is not the only pressing dimension of sustainability: the world will need 60% more food by 2050, for example, while demand for water is rising.⁵ Land and resource use are critical topics, and there are deep concerns about the vulnerability of eco-systems around the world and the impact on biodiversity.

Efforts to achieve clean growth are given added urgency by powerful countervailing trends around the world. The growth of the global population creates upward pressure on emissions, compounded by economic development that offers increasing numbers of people access to living standards previously enjoyed only by the minority in the global North – a trend likely to drive per capita emissions higher.⁶

The climate change challenge is genuinely global in scale, yet it is also rooted firmly at a local level. It involves complicated, complex, interrelated systems, both natural and human. Solutions rely on changes in economic activity, in individuals' behaviour, in technology and in international politics alike. It does not fall to the project profession to provide all the answers – but if humanity is to successfully respond to the challenges posed by climate change, the project profession will have a vital role to play.

"We are the first generation to feel the effect of climate change and the last generation who can do something about it."

Barack Obama, September 2014

IN NUMBERS

1.5°C

THE LEVEL OF GLOBAL WARMING
GENERALLY REGARDED AS SAFE

3-5°C

THE LIKELY RISE BASED ON
CURRENT TRENDS

THE UK HAS ADOPTED A

NET ZERO

TARGET FOR GREENHOUSE GAS EMISSIONS BY 2050

SOURCES OF UK CARBON EMISSIONS



TRANSPORT

27%



ENERGY SUPPLY

24%



BUSINESSES

17%



RESIDENTIAL

15%



AGRICULTURE

10%

WASTE
MANAGEMENT

4%

OTHER

2%

2M

'GREEN COLLAR' JOBS COULD BE
CREATED IN THE UK BY 2030

UK BUSINESSES COULD SAVE

£6BN

A YEAR BY IMPROVING
ENERGY EFFICIENCY

FEEL THE HEAT

2015, 2016, 2017 AND 2018 WERE THE FOUR WARMEST
YEARS GLOBALLY SINCE RECORDS BEGAN IN 1850

THE 10 WARMEST YEARS IN THE UK
HAVE ALL OCCURRED SINCE

2002

OPPORTUNITIES AND CHALLENGES

Promoting clean growth

The UK government identifies clean growth as one of the four 'grand challenges' in its Industrial Strategy. The Strategy pledges support for developing smart systems to deliver cheap and clean energy; for transforming construction techniques to dramatically improve efficiency; for making the UK's energy-intensive industries competitive in the clean economy; for moving to high-efficiency agriculture; and for the UK to become a global standard-setter for finance that supports clean growth.^{xiii}

Savings and benefits

Green policies could have significant economic benefits, according to some forecasts. Two million 'green collar' jobs could be created by 2030, generating up to £170bn in exports.^{xiv} And businesses could save some £6bn annually^{xv} by improving buildings' energy efficiency – including by fitting better insulation, smarter energy controls, and eliminating electricity waste – and making everyday changes in how employees work.^{xvi}

Business commitment

Board-level buy-in is an obstacle to investing in energy efficiency for 38% of firms, according to one survey.^{xvii} However, the UK's Corporate Governance Code, and the Financial Reporting Council's Guidance on the Strategic Report, now indicate that climate-related risk should be addressed in company reporting where it is material to long-term company performance. The government's 2019 Green Finance Strategy, meanwhile, aims to 'green' the financial system to support clean, sustainable growth, and help UK firms capture the resulting opportunities.^{xviii}

Making a start

The UK can claim to have made some progress in cutting greenhouse gas emissions – they were 43% lower in 2017 than in 1990 – but future cuts will be harder to find, since 'low hanging fruit' have already been taken. While government policy promotes clean growth, some campaigners question whether the notion of growth itself is sustainable and argue for a 'one planet economy'^{xix} or 'steady state' economics.^{xx}

Achieving net zero

Hitting net zero emissions could cost the UK economy £1 trillion between now and 2050, according to some estimates.^{xxi} While the numbers are hotly disputed, the scale of change implied by net zero is clear. As Rob Leslie-Carter, director at Arup, puts it: "Think of the UK

delivering 17 HS2s in parallel, except net zero involves far broader project workstreams across power and hydrogen, buildings, industry, surface transport, aviation and shipping, agriculture, waste, F-gas emissions, and greenhouse gas removals. It's ubiquitous." Of course, the costs of action need to be weighed against those of inaction. Lord Stern, who produced a landmark review on the topic in 2006, has argued that action on emissions would cost 1-2% of GDP; damage from climate change could cost between 5% and 20% of GDP.^{xxii} Stern has since said he regards his original estimates as under-stating the risks.^{xxiii}

Renewable energy

Energy generated from renewables overtook nuclear power for the first time in 2017 and provided ten times as much power as coal, despite being behind coal just five years ago.^{xxiv} In June 2019, National Grid said that it expects 2019 to be the first year that more of the UK's energy comes from low-carbon or 'clean' sources – hydro, nuclear, solar and wind – than from gas and coal.^{xxv} Improving battery technology to store energy and manage the inconsistency of renewable sources is a priority.

Nuclear future?

The UK government has committed to a new generation of nuclear technology, for example at Hinkley Point C, while major projects are also under way to decommission the earlier generation of nuclear power stations. Nuclear fusion technology is regarded as a possible 'get of jail free' card for the world's energy needs as it is 'clean' compared to fission – but it remains years away from deployment.^{xxvi} One of the most significant developments in nuclear fusion research is Iter, the EU-led project near Toulouse, although what role the UK will play in Iter after Brexit is unclear.^{xxvii}

Reshaping the UK

Flooding and coastal erosion in the face of rising sea levels could jeopardise large swathes of the UK, including heavily populated areas like London. In May 2019 the Environment Agency started consulting on a new strategy to improve resilience to these threats, warning that "we can't win a war against water". Two thirds of properties in England today are served by infrastructure in areas that are at risk of flooding, so the proposed strategy sets out an aim of making all infrastructure resilient to flooding and coastal change by 2050. In addition, all new house-building developments should be resilient against flooding and coastal erosion – although it is estimated that some 5m people's homes in England are already at risk.^{xxviii}

THE GLOBAL PICTURE

The global framework

The 2015 Paris Agreement aims to keep global warming well below 2°C, and seeks to limit it to 1.5°C, the level seen as being relatively safe. Every country owns its own targets and is responsible for making progress to cut emissions as soon as possible. The 2018 Katowice Agreement put in place an international "rulebook" for implementing Paris, setting out how countries will measure and report their emissions from 2024: while hailed by negotiators as a historical breakthrough some issues were left unresolved, prompting activists to warn that global leaders remain in a "state of denial" about climate change.^{xxix}

Quicker progress needed

The World Meteorological Organization has warned that the world is on track for warming of around 3°C by 2100.^{xxxii} The UN has called on governments to triple their efforts to cut emissions, if warming is to be limited to 2°C.^{xxxiv}

Climate change and population displacement

Climate change could lead to large scale flooding on one hand and desertification on the other. The results could be crop failure, species extinctions, and large-scale human migration. This affects the UK too: the Environment Agency has warned that demand for water could outstrip supply in many parts of the country by 2050.^{xxxv} Globally, as many as 143m people could be displaced by 2050, according to one World Bank study.^{xxxvi}

Land use

The Intergovernmental Panel on Climate Change has called for a renewed focus on how land is used and greater efforts to create genuinely sustainable farming. At present, it says, land use, including agriculture, accounts for some 23% of global emissions.^{xxxvii} Critics suggest that even this figure is a huge underestimate of the true impact of human land use, since natural land forestation and soil systems typically store carbon, reducing atmospheric levels.^{xxxviii}

A mass extinction?

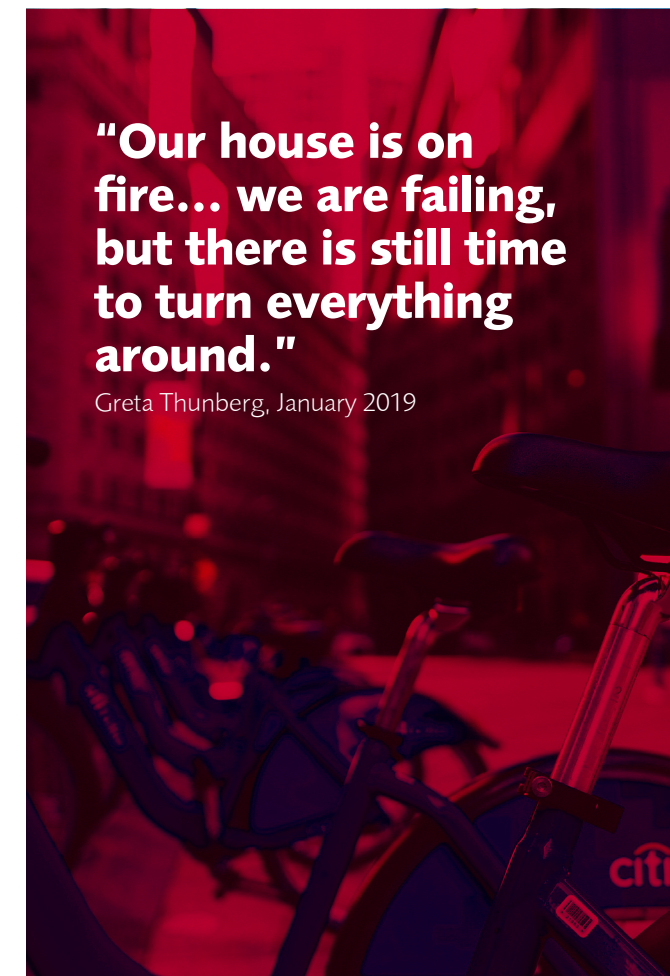
Some scientists argue that we are in the midst of the Earth's sixth mass extinction event, reporting alarming declines in wildlife levels caused by humanity's impact on the planet. It has been calculated that the number of wild animals on Earth more than halved between 1970 and 2012;^{xxxix} the last mass extinction, 65 million years ago, marked the end of the dinosaurs.

Technology: help or hindrance?

Technological advances will be essential to achieving clean growth and sustainability, for example in the growth of renewables and battery technology in energy production and management. (See also the first Projecting the Future challenge paper, on the fourth industrial revolution.) Yet technology can also throw up unexpected challenges: increased computing power demands increased energy. One study has forecast that information and communications technology could use 20% of all electricity and emit up to 5.5% of the world's carbon emissions by 2025.^{xxix} Another has suggested that the energy used in Bitcoin mining alone could tip the world past a 2°C warming point within two decades.^{xxx}

UK housing

Emissions from homes account for 15% of total UK emissions and rose between 2016-17, but need to be almost completely eliminated if the UK is to meet its targets. The Committee on Climate Change says that action is needed on compliance with building standards; design and construction skills; retrofitting existing homes; building new homes; and finance for new low-carbon home heating systems.^{xxxi}



"Our house is on fire... we are failing, but there is still time to turn everything around."

Greta Thunberg, January 2019

THE IMPLICATIONS – A PROJECT PROFESSION VIEW

The climate change challenge will touch every area of the economy and society in the years ahead. It will affect all professions, and the project profession more than most. The work that our profession delivers will have a huge bearing on humanity's success in cutting carbon dioxide emissions, achieving clean growth and delivering sustainability, in the UK and around the world. Actively engaging with these challenges is an absolute necessity.

The size of the climate challenge can seem daunting, but it is worth remembering that some progress has already been made in reducing emissions. Change can be achieved. The changes that still lie ahead, though, will affect all sectors – in some cases, in transformative ways. Today's biggest sources of emissions include transport, energy supply, industry, residential and commercial property, and agriculture. Many major projects in these industries (and others) in the coming years will serve as mitigation against the climate change threat, reducing emissions and helping move the world to a more sustainable footing. Others will help with adaptation, preparing homes, businesses and whole nations for the effects of a changing climate, seeking to limit the harm it might cause. And it is likely that there will be 'crisis' projects, in response to situations where mitigation or adaptation have proved inadequate.

So where might the influence of the project profession be greatest? It could be when shaping a project, programme or portfolio; scope is critical. It may also be felt in procurement, in stakeholder management, in finance, speed, and risk. Do we need to think about what 'sustainable project management' looks like? Delivery will be critical too: many major projects are bedevilled by time and cost over-runs, and for climate-critical projects, the environmental cost could also be significant.

There is even an argument that professional project expertise could help deliver quicker global progress on cutting emissions. A 2017 APM paper by Peter W.G. Morris,

emeritus professor of construction and project management at University College London, explored the case for applying project governance principles to the international climate change effort. Could a single point of authority (SPA) approach – whether at national or international level – be a solution to drive change? And a project, or programme, management office (PMO)? For all the debate about the outcomes needed from climate change policy, there has been very little debate about governance or the mechanisms employed to achieve better delivery of outcomes.

The Morris paper for APM was in some ways ahead of the curve. Campaigners today are lobbying UK authorities and institutions to declare a state of 'climate emergency' – something now done by more than half of UK local authorities^{xi} – and Morris addressed the question of urgency by highlighting how differently the climate challenge is handled in comparison to war. Climate change has not been seen as an immediate threat; with no armies massed at a border or fleets at sea, it is hard to identify the 'enemy' and difficult to evaluate victories and defeats. Yet the severity of the threat is comparable. As Morris pointedly asks: "Is 'too difficult' acceptable as a conclusion?"^{xii}

That question is at the heart of the debate. As a profession, are we clear that 'too difficult' is *not* an acceptable answer? The project profession cannot be indifferent to climate change. We need to confront the implications of our projects for the climate. We have to consider the responsibility of the profession – and the individual professional – to drive change within individual projects and organisations. With greater recognition for the project profession comes greater responsibility, to challenge and 'call out' poor practice, so that project professionals are the dynamic heart of change in organisations.

How we can best do that is where the profession's collective expertise is required – and where your views, practical insights and examples of how project professionals are already achieving change really count.

DISCUSSION QUESTIONS FOR THE PROJECT PROFESSION

Throughout Projecting the Future, we want to explore the questions that matter about the future of the project profession.

We want to hear from you: from individuals, teams, departments, organisations, institutions and communities. We want your views, ideas and evidence relating to these questions – and we are keen to hear about case studies that show how the project profession is starting to adapt to these challenges.

1. How do you expect climate change to affect the project profession over the next 5-10 years?

2. What are the major sources of greenhouse gas emissions in your sector? How could projects be delivered to reduce these emissions?

3. What other impacts does your sector have on the environment, and how could they be reduced?

4. In your experience, are climate change and sustainability currently given sufficient consideration in the way that projects are defined, designed, developed and delivered? How could they be given greater consideration? Should they have greater prominence in, for example, statements of requirements, in reports, in monitoring – and/or in other aspects?

5. What are the climate change and sustainability responsibilities of project sponsors, end users, and project professionals in your sector? How can the project profession influence other stakeholders to move climate change and sustainability up the agenda?

6. Do existing professional standards give sufficient prominence to climate change and sustainability or should this be strengthened? If so, how?

7. Should addressing climate change and sustainability be considered an ethical obligation for project professionals?

8. What sustainability standards are applied in your organisation? How effective have they been in driving change and could they be made more effective?

9. How can the project profession help drive national or international progress on climate change? Could the principles of good project governance – single point accountability, or a dedicated project management office – help drive progress?

10. What change could you make tomorrow to improve the climate change impact and sustainability of your work?

11. How can the project profession help drive national or international progress on climate change? Could the principles of good project governance – single point accountability, or a dedicated project management office – help drive progress?

12. Finally – is there anything else that we, as a profession, need to be discussing in relation to climate change, clean growth and sustainability?

See page 2 for details of how you can join the big conversation.

FIND OUT MORE: FIVE TOP SOURCES

- APM's 2017 report with UCL, *Climate Change and what the project management profession should be doing about it*, looked at options for energy policy and highlighted the weakness of governance in climate change policy. Prof. Peter W.G. Morris suggested that international policy makers should learn from the project profession if they want to give greater coherence to global efforts to reduce emissions. www.apm.org.uk/resources/find-a-resource/thought-leadership/road-to-chartered-series/climate-change-and-what-the-project-profession-should-be-doing-about-it/
- The Committee on Climate Change is the independent advisory body to government on climate change. It monitors the UK's progress on cutting carbon emissions, and in preparing for the likely impacts of climate change. www.theccc.org.uk
- The Clean Growth Strategy of 2017 builds on the UK government's Industrial Strategy and sets out the policy approach to cutting carbon. It argues that "Clean growth is not an option, but a duty we owe to the next generation." Sections are dedicated to policy relating to improving efficiency in business and industry and supporting clean growth; reducing domestic emissions; accelerating the shift to low carbon transport; delivering clean, smart, flexible power; the use of natural resources; and the role of the public sector. www.gov.uk/government/publications/clean-growth-strategy.
- The UN Environment Programme takes a global view of efforts to reduce emissions and achieve sustainability. It provides updates on developments in global policy and research. www.unenvironment.org
- The UN Sustainable Development Goals provide powerful aspirational targets for addressing interconnected global challenges, including climate change, environmental degradation, prosperity, poverty and inequality. The Goals, and the potential contribution of business to achieving them, are explained here. www.unglobalcompact.org/sdgs/17-global-goals

REFERENCES

- ⁱ Met Office, press release (31 July 2019). 'Top ten UK's hottest years all since 2002'. <https://www.metoffice.gov.uk/about-us/press-office/news/weather-and-climate/2019/state-of-the-uk-climate-2018>
- ⁱⁱ UNICEF, press release (2 September 2017). '16 million children affected by massive flooding in South Asia, with millions more at risk'. https://www.unicef.org/infobycountry/media_100719.html
- ⁱⁱⁱ World Meteorological Organization, press release (29 November 2018). 'WMO climate statement: past 4 years warmest on record'. <https://public.wmo.int/en/media/press-release/wmo-climate-statement-past-4-years-warmest-record>
- ^{iv} UN Environment, press release (27 November 2018). 'Nations must triple efforts to reach 2°C target, concludes annual review of global emissions, climate action'. <https://www.unenvironment.org/news-and-stories/press-release/nations-must-triple-efforts-reach-2degc-target-concludes-annual>
- ^v HM Government (2017). *Industrial Strategy: Building a Britain fit for the future*. Via <https://www.gov.uk/government/topical-events/the-uks-industrial-strategy>
- ^{vi} McGrath, M (21 September 2014). 'China's per capita carbon emissions overtake EU's'. BBC News. <https://www.bbc.co.uk/news/science-environment-29239194>
- ^{vii} World Meteorological Organization, press release (29 November 2018). 'World simply 'not on track' to slow climate change this year: UN weather agency'. <https://news.un.org/en/story/2018/11/1026981>
- Committee on Climate Change (2019). *Reducing UK emissions: 2019 Progress Report to Parliament*. Via <https://www.theccc.org.uk/2019/07/10/uk-credibility-on-climate-change-rests-on-government-action-over-next-18-months/>
- ^{viii} HM Government, press release (27 June 2019). 'UK becomes first major economy to pass net zero emissions law'. <https://www.gov.uk/government/news/uk-becomes-first-major-economy-to-pass-net-zero-emissions-law>
- ^{ix} National Statistics, HM Government (2019). 'Final UK greenhouse gas emissions national statistics: 1990-2017'. Statistical summary via <https://www.gov.uk/government/statistics/final-uk-greenhouse-gas-emissions-national-statistics-1990-2017>
- ^x Ricardo Energy and Environment (2017). 'UK business opportunities of moving to a low-carbon economy (supporting data tables)'. Committee on Climate Change. <https://www.theccc.org.uk/publication/uk-energy-prices-and-bills-2017-report-supporting-research/>
- ^{xi} HM Government (2017). *The Clean Growth Strategy: Leading the way to a low carbon future*. <https://www.gov.uk/government/publications/clean-growth-strategy>
- ^{xii} Met Office (2019)
- ^{xiii} HM Government (2017), *Industrial Strategy*.
- ^{xiv} Ricardo Energy and Environment (2017).
- ^{xv} HM Government (2017). *The Clean Growth Strategy*.
- ^{xvi} Green GB. <https://greengb.campaign.gov.uk/>
- ^{xvii} Cited by Green GB. <https://greengb.campaign.gov.uk/>
- ^{xviii} HM Government (2019). *Green Finance Strategy: Transforming Finance for a Greener Future*. <https://www.gov.uk/government/publications/green-finance-strategy>
- ^{xix} WWF. <https://www.wwf.org.uk/what-we-do/projects/one-planet-economy>
- ^{xx} Center for the Advancement of the Steady State Economy. www.steadystate.org
- ^{xxi} Pickard, J (5 June 2019). 'UK net zero emissions target will 'cost more than £1trn''. *The Financial Times*. <https://www.ft.com/content/036a5596-87a7-11e9-a028-86cea8523dc2>
- ^{xxii} See https://en.wikipedia.org/wiki/Stern_Review
- ^{xxiii} McKie, R (6 November 2016). 'Nicholas Stern: cost of global warming 'is worse than I feared''. *The Guardian*. <https://www.theguardian.com/environment/2016/nov/06/nicholas-stern-climate-change-review-10-years-on-interview-decisive-years-humanity>
- ^{xxiv} Gabatiss, J. 'Wind and solar overtake nuclear as source of UK electricity for first time ever'. *The Independent*, 30 March 2018. <https://www.independent.co.uk/environment/wind-solar-overtake-nuclear-electricity-source-uk-first-time-renewable-energy-a8281656.html>
- ^{xxv} Thomas, N. 'UK power from green energy set to surpass fossil fuels in 2019'. *Financial Times* (21 June 2019). <https://www.ft.com/content/0ae5464e-9348-11e9-aea1-2b1d33ac3271>
- ^{xxvi} Morris, PWG (2017). *Climate Change and what the project management profession should be doing about it*. APM. <https://www.apm.org.uk/resources/find-a-resource/thought-leadership/road-to-chartered-series/climate-change-and-what-the-project-profession-should-be-doing-about-it/>
- ^{xxvii} Merrick, R. 'Theresa May says UK will pay to save links with EU nuclear agency, prompting accusations of another U-turn'. *The Independent* (21 May 2018). <https://www.independent.co.uk/news/uk/politics/brexit-theresa-may-uk-euratom-eu-nuclear-agency-policy-talks-a8361876.html>
- ^{xxviii} Environment Agency (2019). *Draft National Flooding and Coastal Erosion Risk Management Strategy for England*. Via www.environment-agency.gov.uk
- ^{xxix} Climate Home News (11 December 2017). 'Tsunami of data' could consume one fifth of global electricity by 2025'. *The Guardian*. <https://www.theguardian.com/environment/2017/dec/11/tsunami-of-data-could-consume-fifth-global-electricity-by-2025>
- ^{xxx} Mora, C, Rollins, RL, Taladay, K, Kantar, MB, Chock, MK, Shimada, M, & Franklin, EC (2018). 'Bitcoin emissions alone could push global warming above 2°C'. *Nature Climate Change*, 8. <https://www.nature.com/articles/s41558-018-0321-8>
- ^{xxxi} Committee on Climate Change (2019). UK Housing – *Fit for the Future?* <https://www.theccc.org.uk/2019/02/21/uk-homes-unfit-for-the-challenges-of-climate-change-ccc-says/>
- ^{xxxii} Harvey, F (15 December 2018). 'Progress and problems as UN climate change talks end with a deal'. *The Guardian*. <https://www.theguardian.com/environment/2018/dec/15/progress-and-problems-as-un-climate-change-talks-end-with-a-deal>
- ^{xxxiii} World Meteorological Organization (November 2018).
- ^{xxxiv} UN Environment (November 2018).
- ^{xxxv} Speech by Sir James Bevan, Chief Executive of the Environment Agency (19 March 2019). 'Escaping the jaws of death: ensuring enough water in 2050'. <https://www.gov.uk/government/speeches/escaping-the-jaws-of-death-ensuring-enough-water-in-2050>
- ^{xxxvi} Rigaud, KK, de Sherbinin, A, Jones, B, Bergmann, J, Clement, V, Ober, K, Schewe, J, Adamo, S, McCusker, B, Heuser, S, & Midgley, A (2018). *Groundswell: Preparing for Internal Climate Migration*. World Bank. Via <https://www.worldbank.org/en/news/press-release/2018/03/19/climate-change-could-force-over-140-million-to-migrate-within-countries-by-2050-world-bank-report>
- ^{xxxvii} Intergovernmental Panel on Climate Change (2019). *Climate Change and Land*. Via <https://www.ipcc.ch/>
- ^{xxxviii} Monbiot, G (8 August 2019). 'We can't keep eating as we are – why isn't the IPCC shouting this from the rooftops?' *The Guardian*. <https://www.theguardian.com/commentisfree/2019/aug/08/ipcc-land-climate-report-carbon-cost-meat-dairy>
- ^{xxxix} WWF Living Planet Index. https://www.wwf.panda.org/knowledge_hub/all_publications/living_planet_index2/
- ^{xl} Climate Emergency UK, press release (29 July 2019). 'Half of UK Local Authorities Declare a Climate Emergency in Just Eight Months'. <https://www.climateemergency.uk/blog/half-of-uk-local-authorities-declare-a-climate-emergency-in-just-eight-months/>
- ^{xli} Morris (2017).



Association for Project Management

Ibis House, Regent Park
Summerleys Road
Princes Risborough
Bucks, HP27 9LE

Tel (UK) 0845 458 1944
Tel (int) +44 1844 271 640
ptf@apm.org.uk
apm.org.uk



#projectingthefuture