

# THE LANCET Planetary Health

## Supplementary appendix

This appendix formed part of the original submission and has been peer reviewed.  
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Supplement to: Jennings N, Fecht D, De Matteis S. Mapping the co-benefits of climate change action to issues of public concern in the UK: a narrative review. *Lancet Planet Health* 2020; **4**: e424–33.

## Appendices

### Appendix A. Search string used on Web of Science

TS=((co-benefit\* OR 'secondary benefit\*' OR 'co-impact\*' OR 'ancillary benefit\*' OR 'side benefit\*' OR 'collateral benefit\*' OR 'associated benefit\*' OR 'ancillary effect\*' OR 'ancillary impact\*' OR 'side effect\*' OR 'health benefit\*' OR 'co-control\*' OR 'ancillary carbon benefit\*' OR 'reduction benefit\*' OR 'synergy\*' OR 'adverse side effect\*' OR 'spillover\*' OR 'trade-offs' OR 'distributional aspect\*' OR 'distributional effect\*' OR 'mortality impact\*' OR 'conflict impact\*' OR 'social stability\*' OR 'co-harm\*') AND ('climate change\*' OR 'greenhouse gas\*' OR 'GHG emission\*' OR 'carbon emission\*' OR CO2 OR 'carbon dioxide' OR Decarbonisation) AND ('United Kingdom' OR UK OR 'Great Britain' OR GB OR England OR Scotland OR Wales OR 'Northern Ireland') AND (Health OR Education OR Poverty OR Inequality OR Crime OR 'Common Market' OR 'European Union' OR Economy OR Defence OR 'Foreign Affairs' OR Immigration OR Immigrants OR Migration OR Housing OR Unemployment OR NHS OR hospital OR school OR law OR order OR 'common market' OR Brexit OR terrorism OR security OR employ\* OR job\* OR Transport)) NOT TS=(cataly OR reaction OR bioreact OR biocontrol OR temperature OR metaboli OR metal OR sediment OR therm OR insulation OR nano OR chemi OR biochemical OR laser OR aneshe OR hyperoxia OR thoracoscopic OR batter OR foam OR pyrolysis OR fluid OR ventilation OR radar OR dilute OR polyphenols OR slurry OR belowground OR host OR DNA OR psychology OR antioxida OR chemotherapy OR oxidation OR acidosis OR aerosol OR theophylline OR plasticity OR photosynthesis OR Cournot OR palm oil OR warehouse OR antagonistic OR robust decision-making OR hypochlorite OR flux OR manure OR RRE OR amine solvents OR phenolog OR long-haul OR pareto OR RES-E OR bioethics OR abscisic OR bombus OR triazole OR shadow pricing OR flood probability OR South Tyrol OR CAFE OR postglacial OR palaeolakes OR malaria OR Landsat OR NDVI OR BMP OR DMM OR Rana sylvatica OR reroutes OR D-Allulose OR SDMs OR GWT OR analgesic OR Houtaomuga OR enzymes OR butterfly OR allometry OR arbuscular OR canopy OR PEB OR ECLSS OR Goldman Sachs OR DSM OR Free-Air OR Ketosteroid OR ANOVA OR Holocene OR weather-indexed OR vouchers OR clone OR Apostichopus OR anthocyanin OR VCAPS OR colonoscopy OR mutualism OR SDM OR cellular OR cod OR STIRPAT OR Salt-Marsh OR EnergyViz OR albedo OR salmon OR backburn OR lactate OR trend line OR MS-DCC-GARCH OR ontogeny OR Drosophila OR allele OR NPD OR Phenotypic OR Stringybark OR Counting carbon OR aflatoxin OR Arthritis OR SCE-UA OR epiphytic OR PFTs OR inter-temporal OR lemurs OR pastoral OR EEDS OR CSCL OR naturalness-based corridor models OR VPSA OR SLA OR biogeochemical OR lake eutrophication OR Brassicaceae OR CART OR pleiospermum OR DBS OR MSFD OR dual-membrane OR catastrophic threats OR Delphi technique OR Sebastes melanops OR EOR OR WCPO OR trait loci OR range-edge OR Invasive syndrome OR bulk-scale OR Cartography OR EETGs OR Dinkelbach OR HAR-RV OR riparian plant OR EUPHAUSIA-SUPERBA OR Peromyscus leucopus OR Evolutionary games OR SimSphere OR Rana dalmatina tadpoles OR utero OR hormone OR Mercury in the Arctic OR Ensemble Kalman Filter OR K-selection OR exanthems OR kelp bed OR Paleoanthropology OR porcine OR Shoo OR Perla grandis OR Magnesium silicates OR NDWI OR FRMD OR WRF-Chem OR Mountland OR co-adoption OR RESCs OR HNS OR Yasuni-ITT OR SAGSO OR ITSFCPP OR metaheuristic OR polychaete OR Opioids OR FSTs OR tied ridges OR audience relevance OR pledge-and-review OR Nutrition-sensitive OR Shower flow limiter OR Re-exports OR Med-CORDEX OR KPIs OR FRAPP OR mediator OR MABs OR backtracking OR Angiosperms OR apoptosis OR hedgerows OR allopathic OR MEB OR pistillata OR fear appeals OR cyclodextrin OR APS OR tipping points OR dyschezia OR fatty-acid OR mosaic OR lipid OR ALM OR OMB OR Pinus pinea OR pasture-crop OR Canadensis OR illuminances OR CFLP OR NAMEA OR GARCH OR AUC OR sorghum OR entry deterrence OR Inter-Movement OR UNDP OR AFB OR xerophytic OR SE4ALL OR crystal OR papyrus OR NMBP OR agave OR Ktzi OR erythropoietic OR GLOBIS OR Insurers OR alkalinity OR UPRIS OR matrix architecture OR Safety-Kleen OR armaments OR Birch OR ILIs OR electrolyzer OR cryospheric OR NFM OR Mendocinian OR palatability OR EAF OR Rasch OR MaxSEM OR functional fit OR SPM OR DLDD OR rigs-to-reefs OR ESG OR M&E OR EUA OR AST OR ILUC OR PICs OR graspable OR phylloclades OR MDP OR WETWin OR post-Annapolis OR syndemics OR HFNC OR RCTs OR LDCF OR OSI OR NOAH OR KPMG OR LCDS OR MS4 OR tridactyla OR HadGEM1 OR CUI OR DAF OR PEMS OR Aalborg OR CompasSus OR TLCAM OR IMSP OR FIEC-HYGARCH OR Q18 OR sanguine OR Rummy OR artisanal OR NPP OR CaCl2 OR ENMs OR polymorphic OR macro-fauna OR Antarctic OR SP-FL OR refugia OR ESMs OR kraft OR MEMS OR phlegmatic OR carrier and shipper OR Zayandeh-Rud OR BRMP OR physico-economic OR Epthianura albifrons OR LCFS OR Spatial institutional spillover OR trade sanctions OR HABs OR lignocellulose OR LMWH OR FEAT OR rhythmanalysis OR DRR OR cataract OR LCP OR IWT OR cofiring OR VEPs OR Class-E OR faucets OR NCDs OR Semang OR turf-forming algae OR EMSs OR Intellectual Property OR Exchanging Goods and Damages OR Adaptive delta management OR Cyprus OR Zostera noltii OR learning coefficients OR beetles coleoptera carabidae OR cultural heritage OR collaborate decision making OR Telecoupled World OR Kirschbaum OR contrails OR inhaled corticosteroids OR polylactide OR gene flow OR AME OR re-contextualize OR GHGV OR SimCLIM OR Woodpecker OR whelk OR tristan-da-cunha OR WWTPs OR PCA OR EPP OR GSP OR OLG OR fungal OR IUCN OR Cobb-Douglas OR Strategic Theory of Regime OR facial rejuvenation OR folivore OR ZIS OR micro-cogeneration OR Type-approval OR POCP OR Brine production OR Kaya-Porter identity OR temporospatial change OR abalone haliotis-rubra OR IAASTD OR GeoMIP OR IAEA OR aEuro OR triage OR Nursery Habitat Availability OR Crustose OR pentagon OR FRM OR MRI OR Pardosa lapponica OR MGLP OR Knightian OR Coweeta LTER OR dimethyl OR pinus-resinosa OR eddy viscosity OR frivolous OR Rio+20 OR HES OR TBL OR IMACLIM-R OR JNPT OR Chicken game OR

diarrheal OR Precalcination OR CAAA OR ARDL OR Precautionary principle OR kerala OR WhC OR Erysimum OR growth dilution OR VGI OR individual MPAs OR Ayrshire OR pig-biogas-fish OR academic urbanism education OR democracy promotion OR EPANET OR Krishna OR small-scale fisheries OR time-tested OR grant competition OR SVCA OR food sovereignty OR WASP-IV OR Elk OR semiconductor OR ungulate OR suckler cow OR SMES OR GSMPI OR Risk-averse individuals OR Smart licensing OR cohesive principle OR anticonvulsants OR blackouts OR illustrative guide OR Simpsons paradox OR FCC spectrum auctions OR Clique OR Utsira OR FCV OR risk-tolerant strategies OR Biorefineries OR pathogen virulence OR membrane materials OR FORTRAN OR output-based allocation OR NW Pacific OR Inconsequentialism OR EACH-FOR OR flood risk dilemmas OR coal beds OR mesocarnivore OR carbonaceous fly-ash OR thromboangiitis OR estuarine biotic invasions OR Oxyfuel OR Livestock genetic diversity OR Puget Sound OR Closed-loop chains OR re-greening OR Ku-ring-gai OR hypoxia OR Mombasa OR EBM OR WDM OR ELECTRE OR NGCC OR dermatology OR interwoven OR power asymmetries OR hazard-prone OR CEAP OR CGIAR OR BPS OR additive effects OR mccarthys OR D+D+D OR Tasmania OR powerful concept OR deltoidesxPopulus OR Seguimiento OR gill nets OR titania OR MAP-EVI OR Tranquillity OR UWS OR lenient OR cutting parameters OR PES-adaptation OR concrete-encased OR Ecohealth OR institutional inertia OR Cactus OR INRA-Theix OR steppe OR wildlife-friendly OR GOTILWA OR NRLP OR Loktak OR digital media OR subsidiarity OR caveats OR RF OR FTSE OR Rio Conventions OR Geotextiles OR EEA OR Intermediate disturbance hypothesis OR CLIFFS OR horizon scanning OR phenotype evolution OR Avian influenza OR Poignant OR co-delivery OR Succulent OR integrative science OR FESP OR T21 OR WDSs OR OBT OR radiotelemetry OR genetically-modified foods OR Business Ethics OR Comparative Physiology OR AGRRA OR Generalization errors OR IPAT equation OR priori beliefs OR CIESOL OR RSI OR HFCs OR plume stabilization OR Ruzi grass OR Formicidae OR Catchment Management Agencies OR LF OR SICA OR CFC OR Lankford OR Nephrology OR epistemic communities OR Larval connectivity OR patchy OR Denbury-Encore OR IFM OR activist groups OR mine-mouth OR Cryotherapy OR radiosonde OR Collaborative monitoring OR AD-DICE OR UIC OR Severity factor OR PBL OR Torres OR trampling OR Tchernobyl OR WEAP OR STACO OR Tourist types OR affirmative-action OR IDS OR Orkney OR acid mine drainage OR RUK OR cardiopulmonary bypass OR statistical expected values OR Cucurbita pepo OR iomass OR stratosphere OR endocrinology OR Chaetodon OR chlorine OR HAM OR pseudoscientific OR phosphorus surpluses OR trigeneration solutions OR downplaying OR below-optimal OR lead poisoning OR WTO-accession OR BII OR telomerase OR herpetology OR triple-track OR relonics OR RTD OR Yukon OR Helms OR hedonic OR soft systems analysis OR Carraro OR Flavorcrest OR Quaternary conundrum OR Rio Grande Basin OR IPM OR deployable sensor OR AHP OR IPA OR edge effects OR laparoscopy OR Genomes OR dimorphism OR nasal OR ENTICE model OR WIAGEM OR hysteresis OR SSAB OR rice-fish OR SAV OR BTF OR Eigenvalue OR USDA OR UVR OR Ashmole OR substantive dialogue OR in-stream OR TGCs OR nutrition ecology OR Sepik OR Converging paradigms OR butterbur OR PTFs OR thalidomide OR pneumatic OR FOS OR Europeb OR West Nile OR surfactant OR citalopram OR holiday expenditure OR euthanasia OR Bhubaneswar OR prokinetic OR demethylation OR Eatwell OR 33 LAC OR FRMSs OR prelood OR grapevine OR Libyan OR In Vitro OR tala OR metamorphosis OR Juglans)Databases= WOS, BCI, CABI, KJD, MEDLINE, RSCI, SCIELO Timespan=1950-2018

Search language=Auto

**Appendix B. Organisations who provided feedback on the co-benefits literature review, dates of meetings/correspondence and the nature of the feedback.**

<b>Organisation</b>	<b>Date of meeting or correspondence</b>	<b>Nature of engagement and key area of discussion</b>
Her Majesty's Treasury (HMT)	July 2018	In-person meeting to discuss the relevance of climate co-benefits to UK decision-making
Department for Business, Energy and Industrial Strategy (BEIS)	October 2018	In-person meeting to discuss the relevance of climate co-benefits to UK decision-making. Literature review shared via e-mail beforehand and feedback provided on the paper at the meeting.
Ministry of Housing, Community and Local Government (MHCLG)	February 2019	In-person meeting to discuss the relevance of climate co-benefits to UK decision-making. Literature review shared via e-mail beforehand and feedback provided on the paper at the meeting.
Office for Low Emission Vehicles (OLEV)	August 2018	Telephone discussion of the model used by OLEV and potential relevance to how co-benefits could be better incorporated into UK decision-making
Housing Associations Charitable Trust	May 2018	Telephone discussion on the co-benefits of energy efficiency in housing
Greater London Authority	October 2018	In-person discussion with the GLA Fuel Poverty leader to discuss evidence base around the health and educational benefits of energy efficiency
Ashden's Liveable City network	October 2018 and January 2019	October: Workshop presentation to around 20 council representatives from across the UK on the concept of co-benefits. Informal discussions during the day on how co-benefits could be better incorporated into regional decision-making. January: presentation to representatives from 10 Combined Authorities on the co-benefits literature review followed by a discussion of how co-benefits could be better incorporated into regional decision-making
E3G	January 2019	E-mail correspondence providing feedback on the co-benefits literature review and potential policy recommendations
Clean Air Fund	July 2018	E-mail correspondence providing feedback on the co-benefits literature review and potential policy recommendations.
Green Alliance	July 2018	E-mail correspondence providing feedback on the co-benefits literature review and potential policy recommendations

**Appendix C. An example of the approach to stakeholders for a meeting/feedback and the question list prepared ahead of the meeting to help guide discussion – in this case to the Office of Low Emission Vehicles (OLEV)**

Sent: 27 July 2018 11:02

Subject: RE: OLEV and climate change co-benefits

Dear XXXX,

I work at the Grantham Institute at Imperial College London and I'm currently writing a briefing paper on the co-benefits of climate change mitigation (e.g. for air pollution, public health, productivity). One of the recommendations I'm considering including in the paper is for a "Public Health and Environment" fund to support projects that cut across the remit of different government departments (BEIS, Defra, HSC, DfT). I met with a couple of representatives from [REDACTED FOR ANONYMITY] who suggested that OLEV might be an interesting model to look at as a team working across government departments – hence why I am getting in contact.

Would you be able to spare 20-30mins over the next couple of weeks for a quick chat – either over the phone or in person? I'm interested in a quick overview of how OLEV works in practice, particularly in bridging between different departments, how well the model has worked so far, how the effectiveness could be further improved and any thoughts you may have on how other cross-departmental challenges can be addressed.

Many thanks

Neil

**Questions prepared for telephone discussion**

- Can you provide an overview of how OLEV works in practice, particularly in bridging between different departments?
- How well do you think the model has worked so far?
- How do you think the effectiveness of OLEV could be further improved?
- What are your thoughts on how other cross-departmental challenges can be addressed?
- What are your thoughts on the concept of a 'Public Health and Environment' fund to encourage cross-departmental collaboration?