

Investigating the Impact of COVID-19 Disruption on the Decarbonisation Agenda at Airports: Grounded or Ready for Take-off?

Supplementary Material S2: Graphical Representation of results (questionnaire responses)

Peter Hemmings ^{1,3,*}, Michael Mulheron ², Richard J. Murphy ¹ and Matt Prescott ³

¹ Centre for Environment and Sustainability, University of Surrey, Guildford, Surrey, U.K.

² Department of Civil and Environmental Engineering, University of Surrey, Guildford, Surrey, U.K.

³ Carbon Strategy, Heathrow Airport Ltd., Hounslow, Middlesex, U.K.

* Correspondence: p.hemmings@surrey.ac.uk

Table S1. Opportunities identified for emissions reduction - results from questionnaire.

Opportunity Theme	Opportunity	Perceived Longevity
Pace; Funding	<ul style="list-style-type: none"> “Due to the scenario of less operational activity we have the opportunity to implement some innovative and pilot projects that in a busier situation could not be implemented.” “The current new policies due to the COVID crisis better for promoting the sustainability recovery based on economical funding from the government” 	Somewhat likely
Scope 3 - Business Travel	<ul style="list-style-type: none"> “The price for buying SAF corresponding to the company’s business travel with aviation is now affordable.” 	Somewhat likely
Scope 3 – Aircraft, Passenger Surface Access; Scope 3 – Colleague access; Methods of working	<ul style="list-style-type: none"> “The reduction in aircraft movements and the reduction in the circulation of passengers in cities, have been significantly reduced, with a consequent positive impact in terms of carbon emissions.” “COVID helped the development acceleration on technologies associated with teleworking and allowed companies to have a greater perception of their advantages.” 	Extremely likely
Pace	<ul style="list-style-type: none"> “With a bit of a slowdown in capital projects, we have an opportunity to influence embodied carbon and other building-related sustainability considerations that might have been passed over to get a project delivered faster.” 	Somewhat likely
Scope 1 emissions –Vehicles.	<ul style="list-style-type: none"> “Less fuel using for internal transport vehicles” 	Somewhat likely
Scope 3 emissions – Aircraft; Scope 1/3 – Ground Support Equipment (GSE)	<ul style="list-style-type: none"> “Renewed focus on minimizing aircraft APU operations and GSE electrification” 	Extremely likely
Reduced occupancy	<ul style="list-style-type: none"> “It is easier to renovate some locations since there are less passengers.” “It was easier to do the proof of concept (LTO emission reduction project) because of less flight movements (although proof of concept was planned, timing hasn’t changed. However, we could do more missions)” 	Somewhat likely

Scope 1 – Energy; Scope 3 – Colleague access; Methods of working	<ul style="list-style-type: none"> “The majority of airport employees have been telecommuting since March, so that has greatly reduced emissions from employee commute. Almost no business travel as well - conferences, meetings have been held virtually. With very few employees working onsite, I think that has reduced building energy use significantly. Also, this has led the airport to further digitize our business operations - use of e-signatures, going paperless...” 	Extremely likely
Scope 3 – Aircraft, Passenger Surface Access; Scope 1 - Energy	<ul style="list-style-type: none"> “Reduced ground movements and improved efficiency” “Closing areas of the terminal and outbuildings so reviewing settings and reducing the need for heating/cooling” “Increasing the passenger drop off charge but including a discount for electric vehicles” 	Somewhat likely
Scope 3 – Colleague Surface Access; Methods of working.	<ul style="list-style-type: none"> “Home office solution for employees (travelling to the office)” 	Extremely likely
Scope 1 – Energy; Scope 1/3 – GSE; Scope 3 – Surface access	<ul style="list-style-type: none"> “Reduced electricity consumption” “Reduced GSE usage” “Reduced landside access emissions” 	Somewhat unlikely

Table S2. Barrier to implementation identified - results from questionnaire.

Barrier Theme	Barrier
Financial	<ul style="list-style-type: none"> “The main barrier is the situation of low revenues that airports are having in this crisis, that’s why we are working in searching for economical funding that can help us to promote the developing decarbonization actions in our airports”
Financial	<ul style="list-style-type: none"> “Financing effective measures for decarbonisation”
Financial	<ul style="list-style-type: none"> “Funding reduced or eliminated for several carbon reduction programs and projects in fiscal year 2021”
Financial	<ul style="list-style-type: none"> “Suspended some projects and investments”
Financial	<ul style="list-style-type: none"> “Need for financial incentives to accelerate our decarbonization efforts”
Financial	<ul style="list-style-type: none"> “Mostly to do with funding of projects”
Financial; Project Delay/Pause	<ul style="list-style-type: none"> “Pause to airspace modernisation” “Pause to airport development programme which would bring in some renewable energy” “Lack of funding for future projects”
Financial	<ul style="list-style-type: none"> “Timing of some investments is postponed”
Financial; Change in priority	<ul style="list-style-type: none"> “The major barrier is funding and funding priorities. Our budget is in a very precarious situation right now, so we don’t have a lot of funding available to pursue many sustainability projects. We also have to prioritize making the airport clean and safe for our employees and passengers first”
Financial; Waste; Energy	<ul style="list-style-type: none"> “Sanitary reasons (single-use plastic, 100% fresh air)” “Deferral in the use the forecast budget until end of COVID”
Financial; human resources	<ul style="list-style-type: none"> “Limited funds available”
Financial; Human resources	<ul style="list-style-type: none"> “Reduced staff and third-party resources due to redundancies and furlough”
Financial	<ul style="list-style-type: none"> “Allocation of financial and human resources”
Financial	<ul style="list-style-type: none"> “Reduced access to funds for carbon reduction policy initiatives”
Financial	<ul style="list-style-type: none"> “Cash and financial problems”

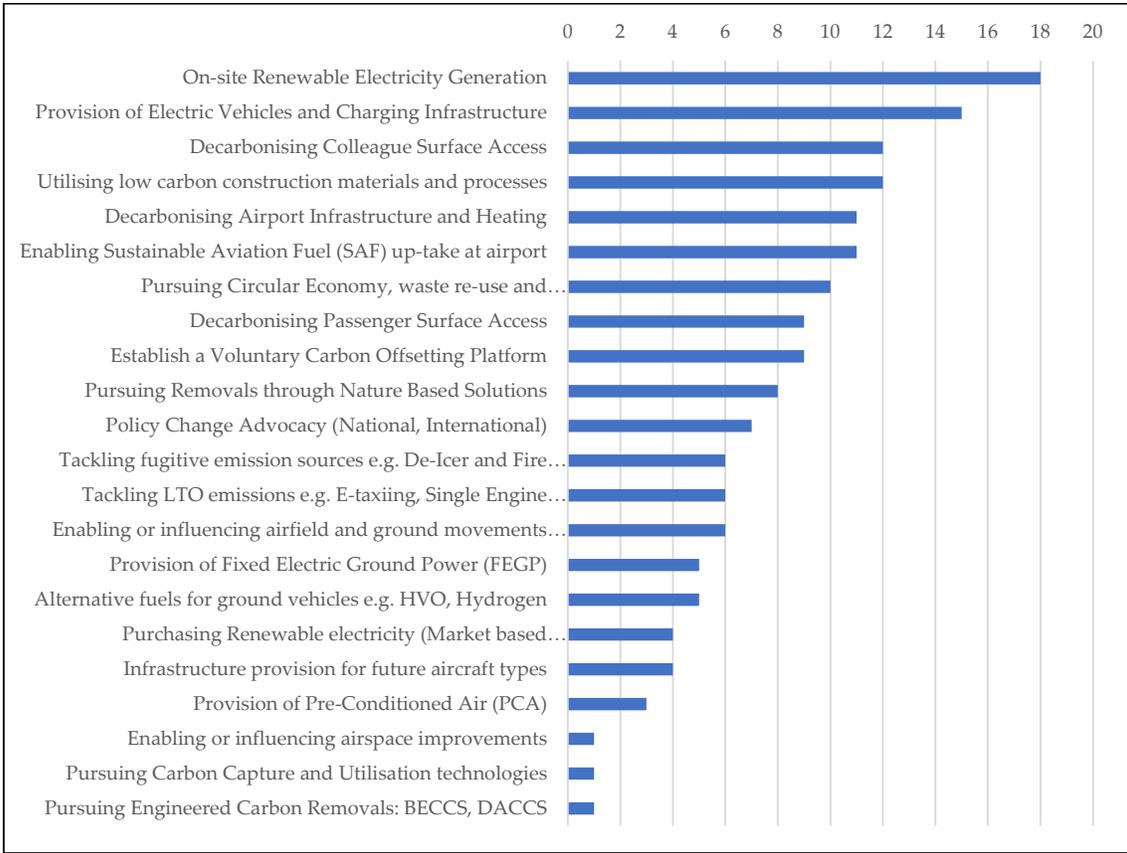
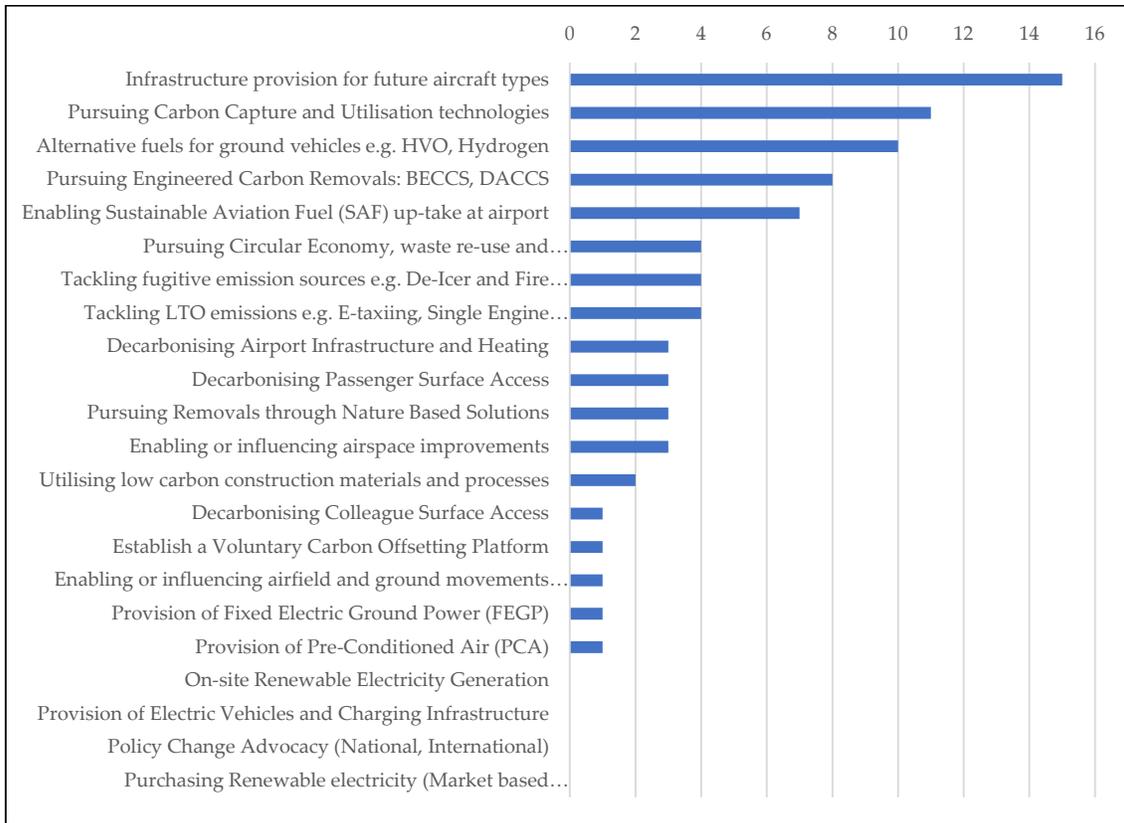


Figure S1 a. Interventions planned 2020 to 2030. Length of bar indicates number of responses.



S2, Figure S1 b. Interventions planned 2030 onward. Length of bar indicates number of responses.

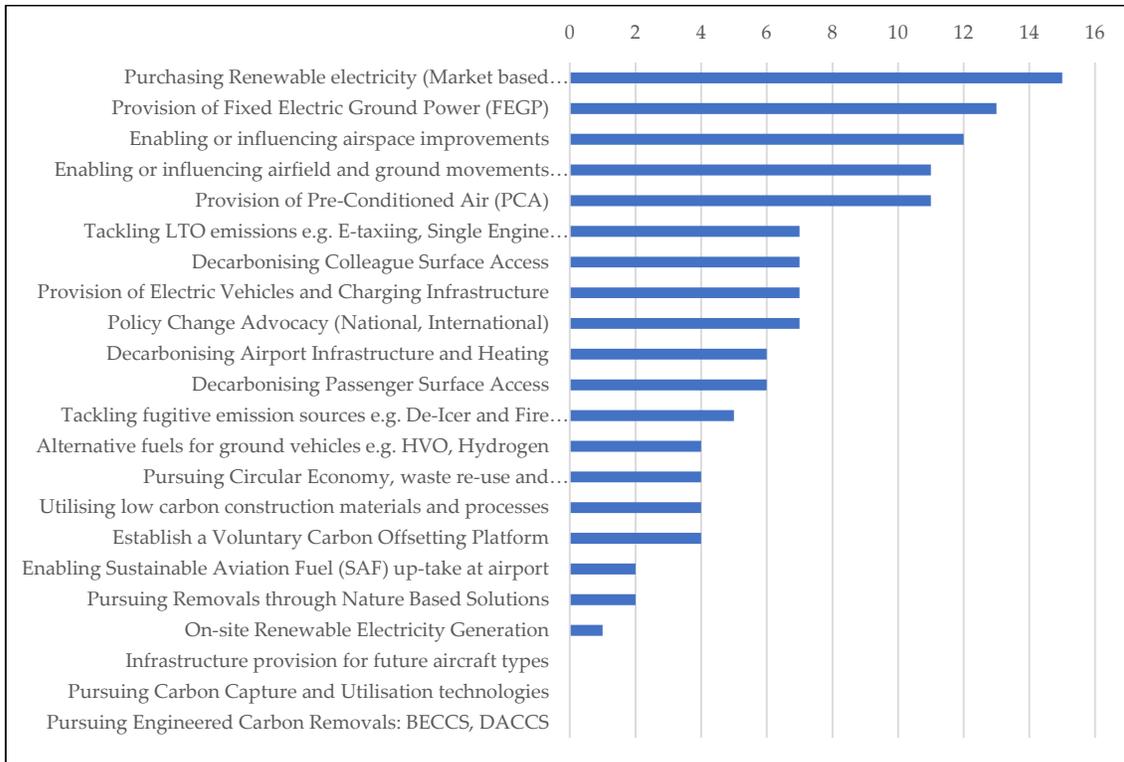


Figure S1 c. Responses for "We already do this". Length of bar indicates number of responses.

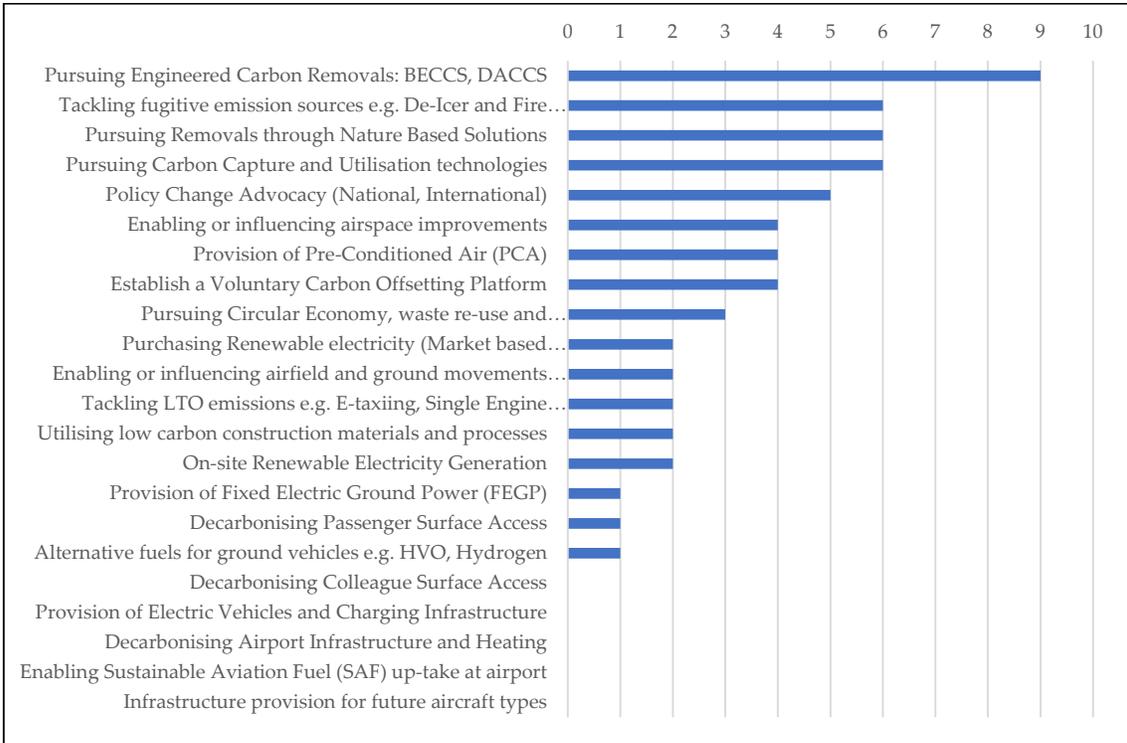


Figure S1 d. Responses for “We don’t intend to pursue this”. Length of bar indicates number of responses.