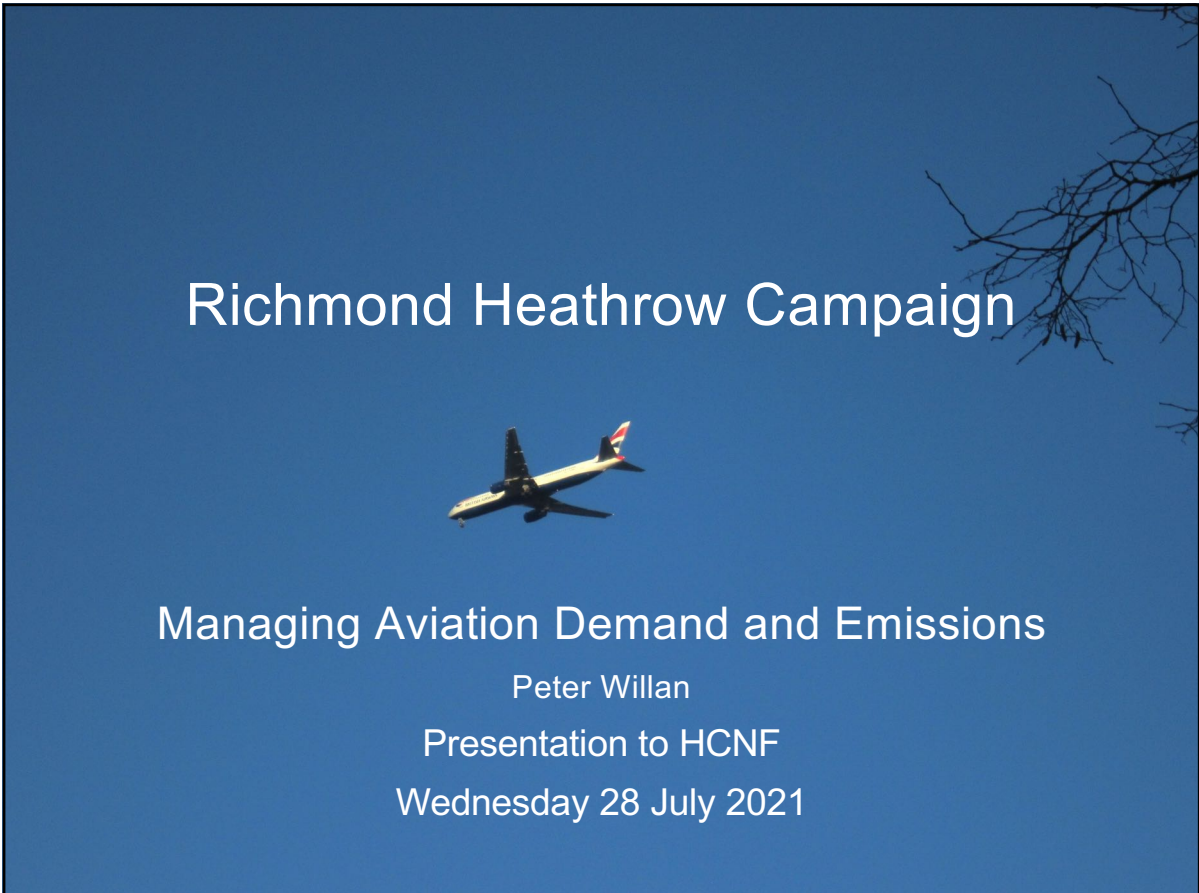


1



Richmond Heathrow Campaign

Managing Aviation Demand and Emissions

Peter Willan

Presentation to HCNF

Wednesday 28 July 2021

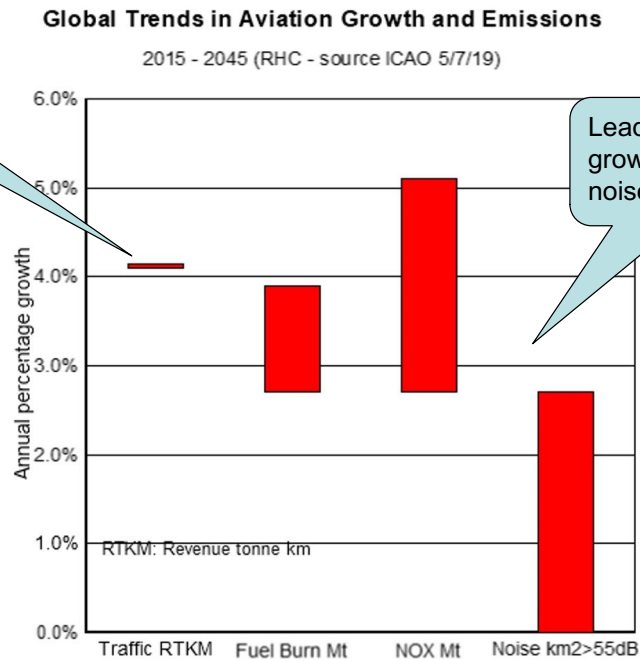
2

Topics

- Global and UK demand trends
- UK Aviation Carbon Budget
- Market Based Schemes (MBS)
- Published Carbon Reduction Scenarios
- Proposed Revision to Air Passenger Duty (APD)
- Proposed Airport Quota Scheme
- RHC Proposals for Achieving Aviation Net Zero Carbon

Global and UK demand trends

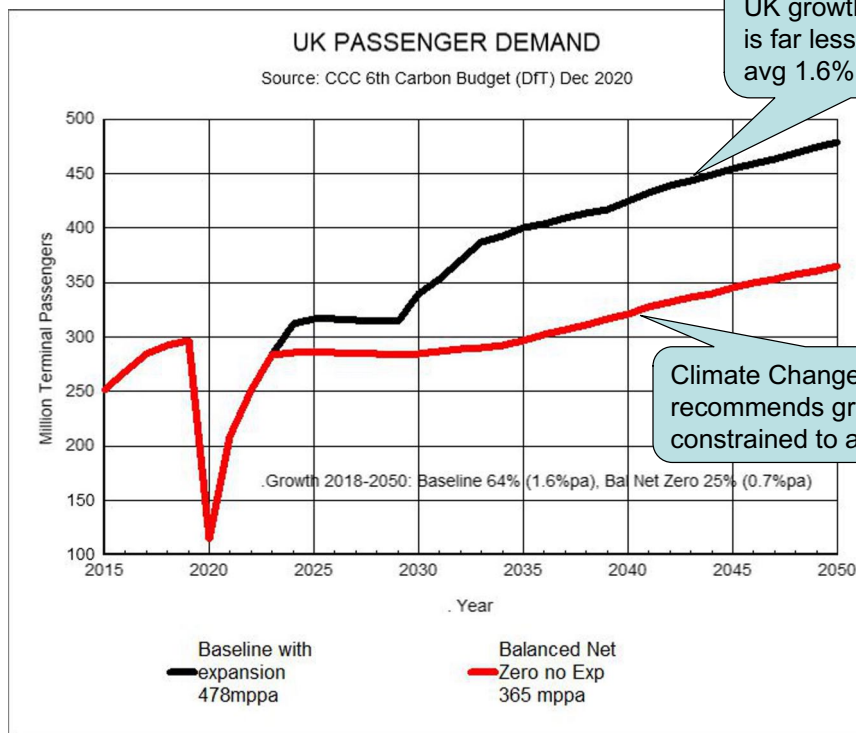
Unconstrained global growth is very high over 30 years



Leading to high growth in air and noise emissions

- Air and noise emissions depend on demand
- Mitigation choices compete, requiring trade-offs

5



Unconstrained UK growth to 2050 is far less than global: avg 1.6% vs ~4% pa

Climate Change Committee recommends growth constrained to avg 0.7% pa

6

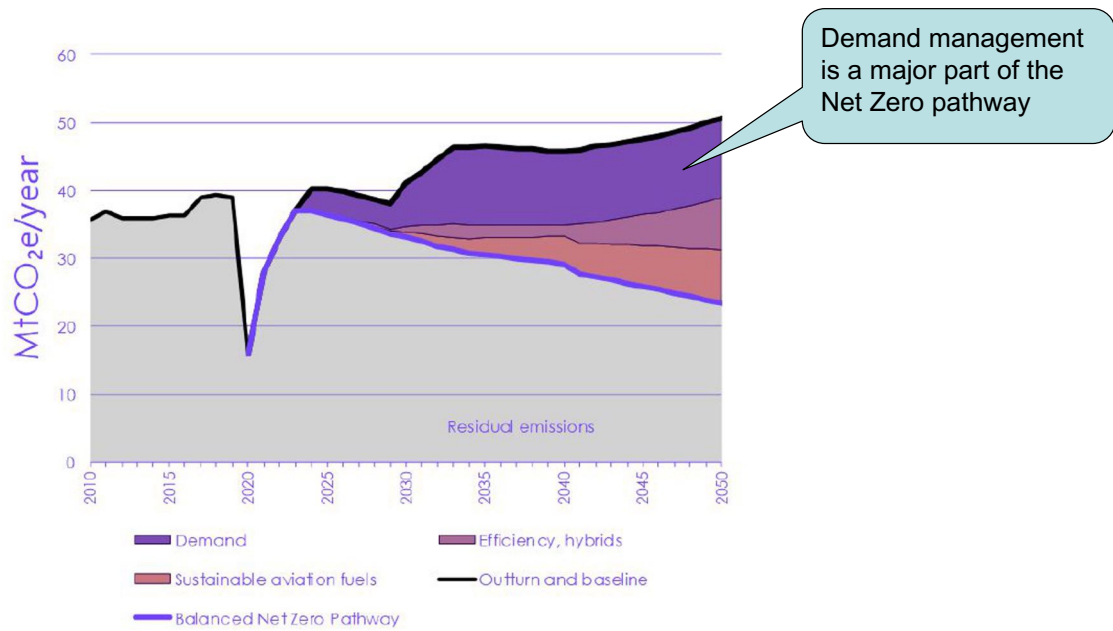
UK Aviation Carbon Budget

7

| | | |
|---------------------------------------|---------------------|-----|
| Aviation Net Zero Carbon 2050 | | |
| Balanced Net Zero no expansion | | |
| | MTCO ₂ e | |
| Unmitigated carbon (478 mppa) | | 51 |
| Demand management | | -12 |
| Constrained demand (365mppa) | | 39 |
| Efficiency & hybrids | -8 | |
| Sustainable Aviation Fuels (SAFs) | -8 | |
| | | -16 |
| | | 23 |
| Removal of carbon from atmosphere | | -23 |
| Aviation Net Zero carbon | | 0 |
| Source: CCC 6th Carbon Budget 2020 | | |

8

Figure 3.7.a Sources of abatement in the Balanced Net Zero Pathway for the aviation sector



Source: BEIS (2020) Provisional UK greenhouse gas emissions national statistics 2019; CCC analysis.

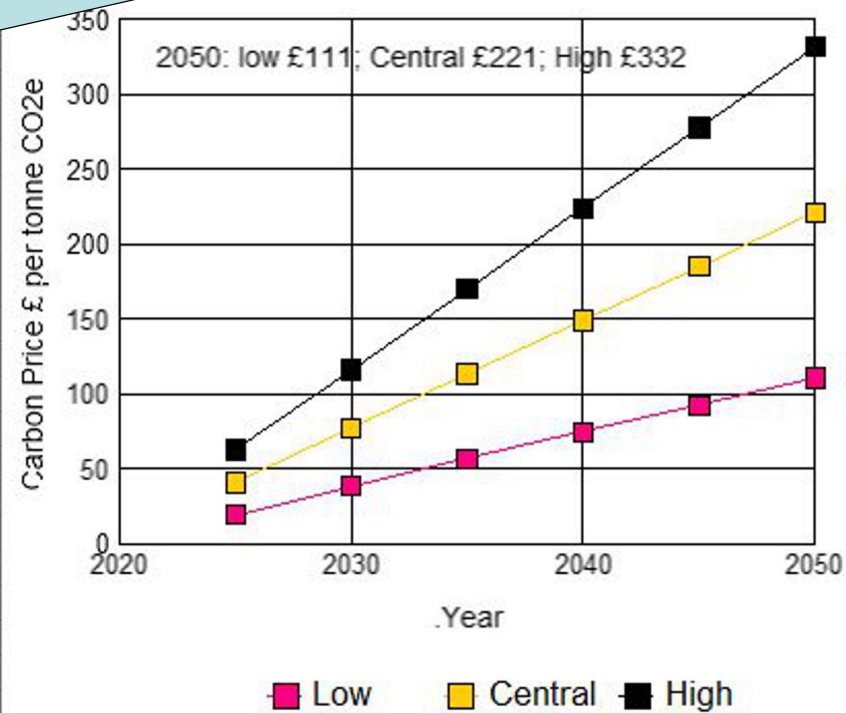
9

Market Based Schemes (MBS)

10

Used by
Market Based
Schemes,
e.g. UK ETS
to trade in
Carbon Credits

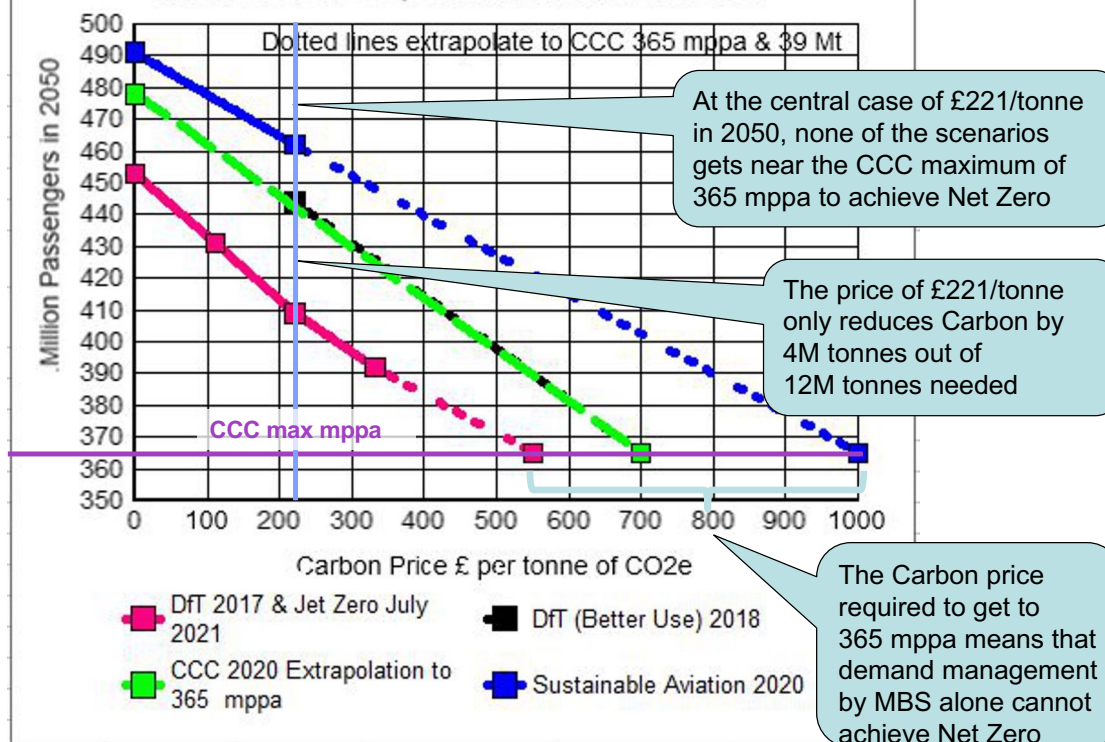
Carbon Price DfT Projections 2017



11

Indicative Demand Sensitivity to Carbon Price in 2050

Source: RHC from DfT, CCC & Sustainable Aviation Data



12

| Indicative Demand Management by Carbon Pricing | | | | | |
|---|---------------------------|---|---------------------------|------------------------------------|---------------------------------|
| Required Price to Achieve CCC's 365 mppa and 39 MtCO ₂ e in 2050 | | | | | |
| Year 2050 | | Dft 2017 & Jet Zero July 2021* | Dft Better Use 2018 | CCC 6th Crbon Budget 2020 | Sustainable Aviation 2020 |
| Unconstrained Growth 2018-2050 | % | 60% | 64% | 64% | 70% |
| Unconstrained Pasengers 2050 | mppa | 453 | 478 | 478 | 491 |
| Constrained Passengers | mppa | 365 | 365 | 365 | 365 |
| Required Carbon Price | £/tonne CO ₂ e | 550 | 700 | 700 | 1000 |
| Airline Revenue pre carbon cost ① | £bn | 39.1 | 39.1 | 39.1 | 39.1 |
| Carbon Cost ② | £bn | 21.5 | 27.3 | 27.3 | 39.0 |
| Carbon cost % Rev ③ | % | 55% | 70% | 70% | 100% |
| Avg Full One Way Sigle Ticket Price ③ | £ | 166 | 182 | 182 | 214 |

① Airline revenue = pre-carbon ticket price of £107* x 365 mppa

② Carbon cost = carbon price x 39 M tonnes of carbon

③ (Airline revenue pre carbon + carbon cost) / 365 mppa

* DFT Estimate 2016

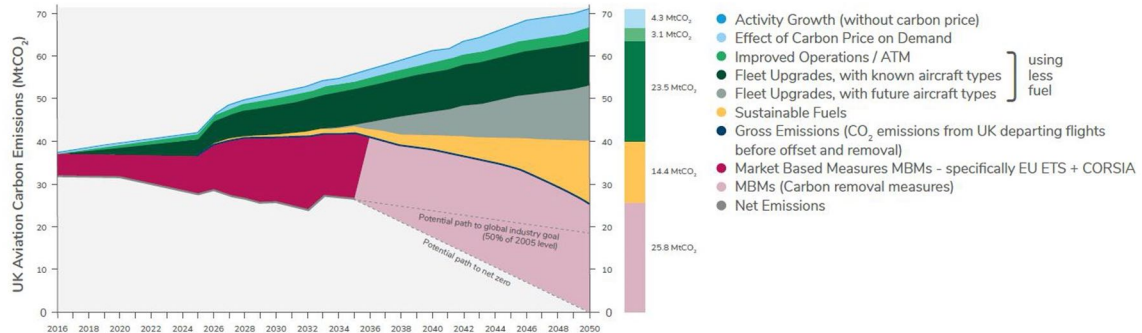
13

Published Carbon Reduction Scenarios

14

Sustainable Aviation 2020

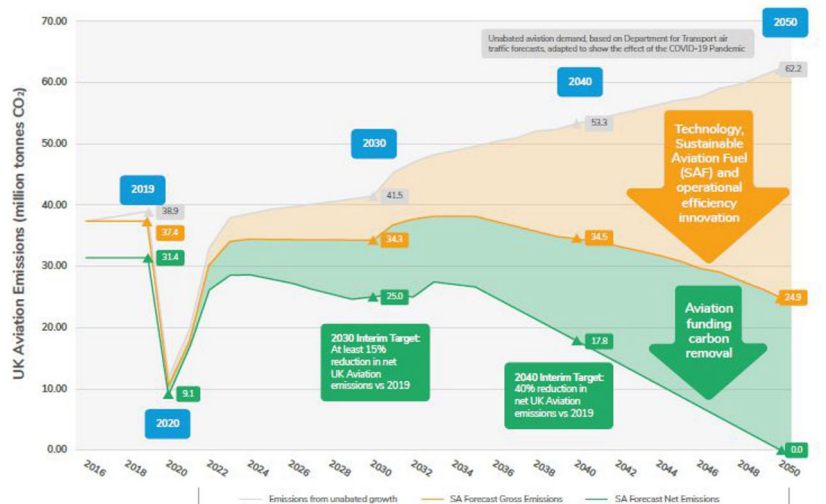
Decarbonisation Road-Map for UK Aviation



| Estimate for 2050 (Mt Carbon) | S.A. | CCC |
|-------------------------------|------|-----|
| Unconstrained Carbon | 71 | 51 |
| Demand Management | -4 | -12 |
| Efficiency, Hybrids, SAFs | -41 | -16 |
| Optimistic? | 26 | 23 |

15

Sustainable Aviation - July 2021 update

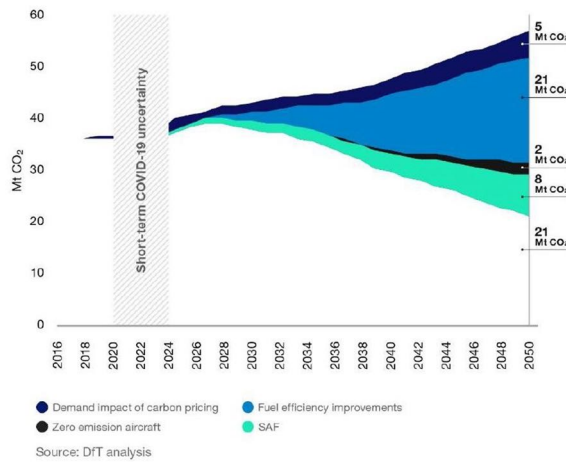


| Estimate for 2050 (Mt Carbon) | S.A. | CCC |
|-------------------------------|------|-----|
| Unconstrained Carbon | 66 | 51 |
| Demand Management | -4 | -12 |
| Efficiency, Hybrids, SAFs | 37 | -16 |
| Optimistic? | 25 | 23 |

16

DFT Jet Zero - July 2021

Scenario 2: High ambition



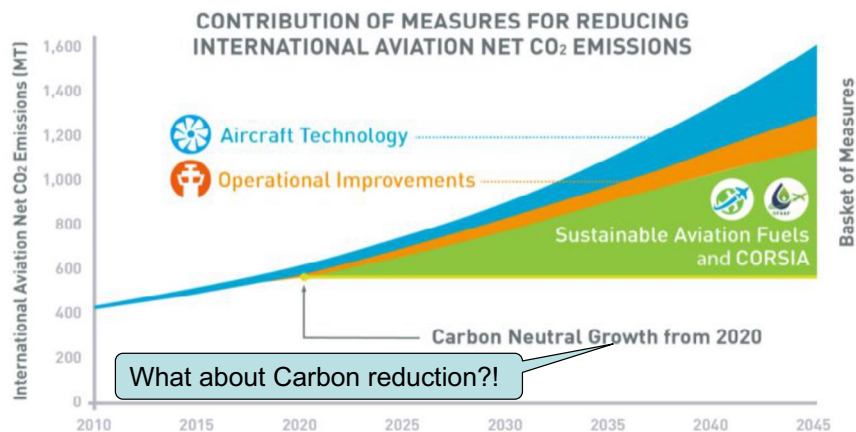
| Estimate for 2050 (Mt Carbon) | Jet Zero | CCC |
|-------------------------------|----------|-----|
| Unconstrained Carbon | 57 | 51 |
| Demand Management | -5 | -12 |
| Efficiency, Hybrids, SAFs | -31 | -16 |
| | 21 | 23 |

Optimistic?

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ICAO Corsia Scheme – Carbon neutral growth (Global international flights)

The Figure below illustrates the contribution of different measures for reducing international aviation CO₂ emissions.



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Proposed Revision to Air Passenger Duty (APD)

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| 2019 Estimate | Current APD Rates | | | APD was established in 1994 as a surrogate for fuel duty and VAT on air fares. |
|---------------|-------------------|--------|--------|--|
| | LHR | Other | Total | |
| Terminating | £ mill | £ mill | £ mill | |
| Long-haul B | 1,299 | 766 | 2,066 | |
| Short-haul A | 175 | 945 | 1,120 | |
| Domestic | 29 | 385 | 415 | |
| | 1,503 | 2,097 | 3,600 | |
| I-I Transfers | Exempt | | | Compared to other sectors, Aviation is significantly under-taxed |
| Long-haul B | 607 | 94 | 701 | |
| Short-haul A | 55 | 8 | 63 | |
| Domestic | 0 | 0 | 0 | |
| | 662 | 102 | 764 | |
| Total | | | | |
| Long-haul B | 1,906 | 860 | 2,767 | APD raises £3.6 Bn per year. |
| Short-haul A | 230 | 954 | 1,184 | |
| Domestic | 29 | 385 | 415 | |
| | 2,165 | 2,199 | 4,365 | |
| | | | | RHC estimates the unjustified under-taxing as £12.2 Bn in 2019. |

20

| 2050 Estimate | RHC Proposed Full & Fair Rates | | |
|---------------|--------------------------------|--------|--------|
| | LHR | Other | Total |
| Terminating | £ mill | £ mill | £ mill |
| Long-haul B | 5,793 | 3,417 | 9,211 |
| Short-haul A | 777 | 4,198 | 4,975 |
| Domestic | 129 | 1,712 | 1,841 |
| | 6,700 | 9,327 | 16,027 |
| | | | |
| I-I Transfers | Exemption removed | | |
| Long-haul B | 2,707 | 418 | 3,125 |
| Short-haul A | 244 | 38 | 281 |
| Domestic | 0 | 0 | 0 |
| | 2,951 | 456 | 3,407 |
| | | | |
| Total | | | |
| Long-haul B | 8,500 | 3,836 | 12,336 |
| Short-haul A | 1,021 | 4,236 | 5,256 |
| Domestic | 129 | 1,712 | 1,841 |
| | 9,650 | 9,783 | 19,434 |

RHC estimates that the removal of exemptions for fuel duty and VAT and for I-I transfers would result in APD of £19.4 Bn in 2050 for the CCC 365 mppa

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Proposed Airport Quota Scheme

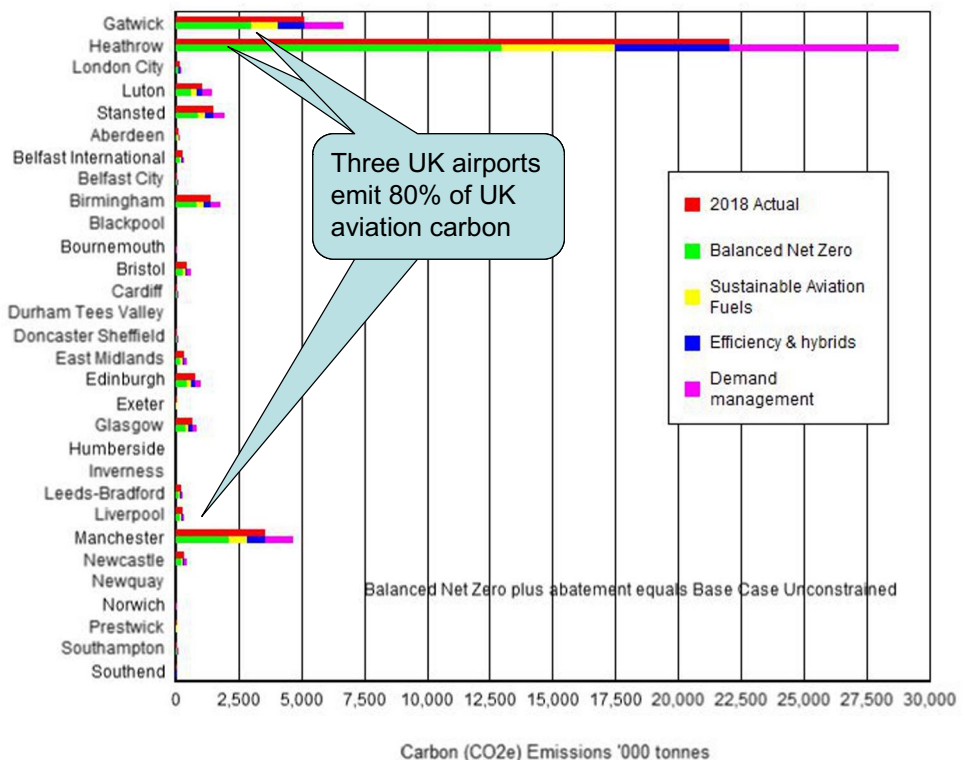
22

RHC Proposed Airport Quota Scheme

| | Carbon CO2e '000 tonnes | | | | | |
|--|-------------------------|-----------|---------|------------|--------|----------|
| | 2018 | 2050 | | | | |
| | Actual | Base Case | Demand | Efficiency | Fuels | Net Zero |
| Gatwick | 5,111 | 6,684 | -1,573 | -1,048 | -1,048 | 3,014 |
| Heathrow | 22,022 | 28,798 | -6,776 | -4,517 | -4,517 | 12,987 |
| London City | 180 | 236 | -56 | -37 | -37 | 106 |
| Luton | 1,095 | 1,432 | -337 | -225 | -225 | 646 |
| Stansted | 1,498 | 1,959 | -461 | -307 | -307 | 884 |
| Aberdeen | 136 | 178 | -42 | -28 | -28 | 80 |
| Belfast International | 263 | 344 | -81 | -54 | -54 | 155 |
| Belfast City | 90 | 118 | -28 | -18 | -18 | 53 |
| Birmingham | 1,392 | 1,820 | -428 | -285 | -285 | 821 |
| Blackpool | 0 | 0 | 0 | 0 | 0 | 0 |
| Bournemouth | 39 | 51 | -12 | -8 | -8 | 23 |
| Bristol | 475 | 621 | -146 | -97 | -97 | 280 |
| Cardiff | 92 | 120 | -28 | -19 | -19 | 54 |
| Durham Tees Valley | 7 | 10 | -2 | -1 | -1 | 4 |
| Doncaster Sheffield | 91 | 120 | -28 | -19 | -19 | 54 |
| East Midlands | 335 | 438 | -103 | -69 | -69 | 198 |
| Edinburgh | 772 | 1,009 | -237 | -158 | -158 | 455 |
| Exeter | 51 | 67 | -16 | -10 | -10 | 30 |
| Glasgow | 660 | 864 | -203 | -135 | -135 | 389 |
| Humberside | 7 | 9 | -2 | -1 | -1 | 4 |
| Inverness | 30 | 40 | -9 | -6 | -6 | 18 |
| Leeds-Bradford | 209 | 273 | -64 | -43 | -43 | 123 |
| Liverpool | 268 | 350 | -82 | -55 | -55 | 158 |
| Manchester | 3,589 | 4,693 | -1,104 | -736 | -736 | 2,116 |
| Newcastle | 356 | 466 | -110 | -73 | -73 | 210 |
| Newquay | 10 | 13 | -3 | -2 | -2 | 6 |
| Norwich | 38 | 50 | -12 | -8 | -8 | 22 |
| Prestwick | 61 | 79 | -19 | -12 | -12 | 36 |
| Southampton | 79 | 104 | -24 | -16 | -16 | 47 |
| Southend | 42 | 55 | -13 | -9 | -9 | 25 |
| CCC 6th Carbon Budget | 39,000 | 51,000 | -12,000 | -8,000 | -8,000 | 23,000 |
| Prepared by RHC: CCC totals allocated to airports pro-rata to 2018 | | | | | | |

23

Airport Carbon (CO2e) Emissions & Abatement 2050



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RHC Proposals for Achieving Aviation Net Zero Carbon

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| Richmond Heathrow Campaign Proposal for Achieving Aviation Net Zero Carbon (MtCO2) | | | | | |
|---|----------------|----------------|----------------|----------------|---------------------|
| Year 2050 | APD | MBS | GGR | Quota Scheme | Total Abatement |
| Primary responsibility | National MtCO2 | National MtCO2 | National MtCO2 | Airports MtCO2 | Carbon Budget MtCO2 |
| <i>Note</i> | 1 | 2 | 3 | 4 & 5 | 6 |
| Unmitigated carbon (478 mppa) | | | | | 51 |
| Demand management | -8 | -4 | | | -12 |
| Constrained demand (365mppa) | | | | | 39 |
| Efficiency & hybrids | | | | -8 | -8 |
| Sustainable Aviation Fuels (SAFs) | | | | -8 | -8 |
| | | | | | 23 |
| Removal of carbon from atmosphere (GGR) | | | -23 | | -23 |
| Aviation Net Zero carbon | -8 | -4 | -23 | -16 | 0 |
| Contingency for Demand and GGR | | | | -4 | -4 |
| | | | | -20 | -4 |
| Notes: | | | | | |
| 1. Full & Fair Air Passenger Duty | | | | | |
| 2. Market Based Scheme assuming carbon price of £221/tonne CO2e in 2050 | | | | | |
| 3. Green House Gas Removal processes (still in early technological stages of development) | | | | | |
| 4. Efficiency improvements from airframe design, propulsion and operations.(Airport Action Plans) | | | | | |
| 5. e.g. Bio fuels | | | | | |
| 6. CCC 6th Carbon Budget | | | | | |

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| RHC Proposal for Achieving Aviation Net Zero Carbon (£) | | | |
|---|-------------|--------------|---------------------|
| Year 2050 | | Ticket Price | Airline Revenue (4) |
| | <i>Note</i> | £ | £bn |
| Ticket price/revenue pre- carbon & APD | 1 | 107 | 39 |
| Full & Fair Air Passenger Duty APD | 2 | 52 | 19 |
| Market Based Scheme (Environment levy) | 3 | 25 | 9 |
| Ticket price/revenue including APD & Env. levy | | 184 | 67 |
| Notes: | | | |
| 1. Average Full One Way Single Ticket Price | | | |
| 2. General tax to fund Govt. fiscal needs | | | |
| 3. Environment levy, e.g. cap & trade or CORSIA | | | |
| 4. Airline Revenue based on 365 mppa in 2050 | | | |

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Summary - where we are

1. No one has presented a realistic process for achieving the CCC targets and in a timely manner
2. No one initiative will achieve Net Zero Carbon
 - a. Carbon pricing on its own will not sufficiently reduce demand
 - b. Full and fair APD on its own will also not sufficiently reduce demand

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RHC Recommendations

1. Use a combination of:
 - a. Carbon pricing e.g. 4M tonne reduction
 - b. Full & Fair APD e.g. 8M tonne reduction
 - c. Airport Quota Scheme with Action Plans to manage efficiency, hybrids and sustainable aviation fuels e.g. 16M tonne plus contingency e.g. 4M tonne
2. Urgent action to convert ambitions into strategy, policy and targets with a timetable, including introduction of Full & Fair APD between 2026 and 2030 and early adoption of an Airport Quota Scheme.
3. UK robust carbon reduction pathways should not be distracted by international measures.
4. Integration of demand, carbon, air pollution and noise decisions.

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Richmond Heathrow Campaign



QUESTIONS?

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