

# Agenda

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## Grounded? Assessing whether a new UK hub airport would need public subsidy

The South East of the UK has an aviation capacity problem. The Mayor of London and others have suggested that a potential solution would be the construction of a new hub airport. The Transport Committee of the House of Commons asked Oxera to review the prospects for commercial viability of a hub and to indicate whether it was likely to need public subsidy

Where and how the UK's aviation capacity should be expanded is a long-running debate.<sup>1</sup> All manner of proposals have been put forward since the mid-1960s, including expanding existing airports, building new ones, and no expansion at all. Recently, a number of proposals have focused on the construction of an entirely new hub airport, including several suggesting an offshore hub (notably, one—'Boris Island'—named after the Mayor of London, Boris Johnson).

The construction of such an airport and its associated infrastructure would be a major project and could create a step change in the UK's aviation capacity. The idea raises many questions about issues such as the engineering involved and the environmental impact. However, there is also the question of whether it (or any other new airport) would be a commercially viable proposition—ie, would anyone be prepared to invest in it?

### Scenarios

In order to undertake a viability assessment, Oxera's analysis used scenarios covering:

- policy factors/design—the impact on existing airports, the airport and surface access construction costs (to connect the airport with transport infrastructure overland), and landing charges;
- external factors—growth in demand, changes at other airports.

The wide range of proposals for a new hub include onshore proposals in locations such as Kent, Oxfordshire and Berkshire, and offshore proposals in the Thames Estuary. The location of some of the proposals relative to existing major airports and urban

areas is shown in Figure 1 overleaf. Oxera's work for the Transport Committee focused only on the overall rationale for the concept of a new hub, not on the detail of any of these proposals. This means that, in Oxera's analysis, estimates for both revenues and costs were calibrated using broad conceptual numbers, rather than proposal-specific estimates. It is important therefore that this analysis of a new hub is not considered on a stand-alone basis, but within the context of wider UK aviation policy, in line with the Committee's inquiry.

### Demand

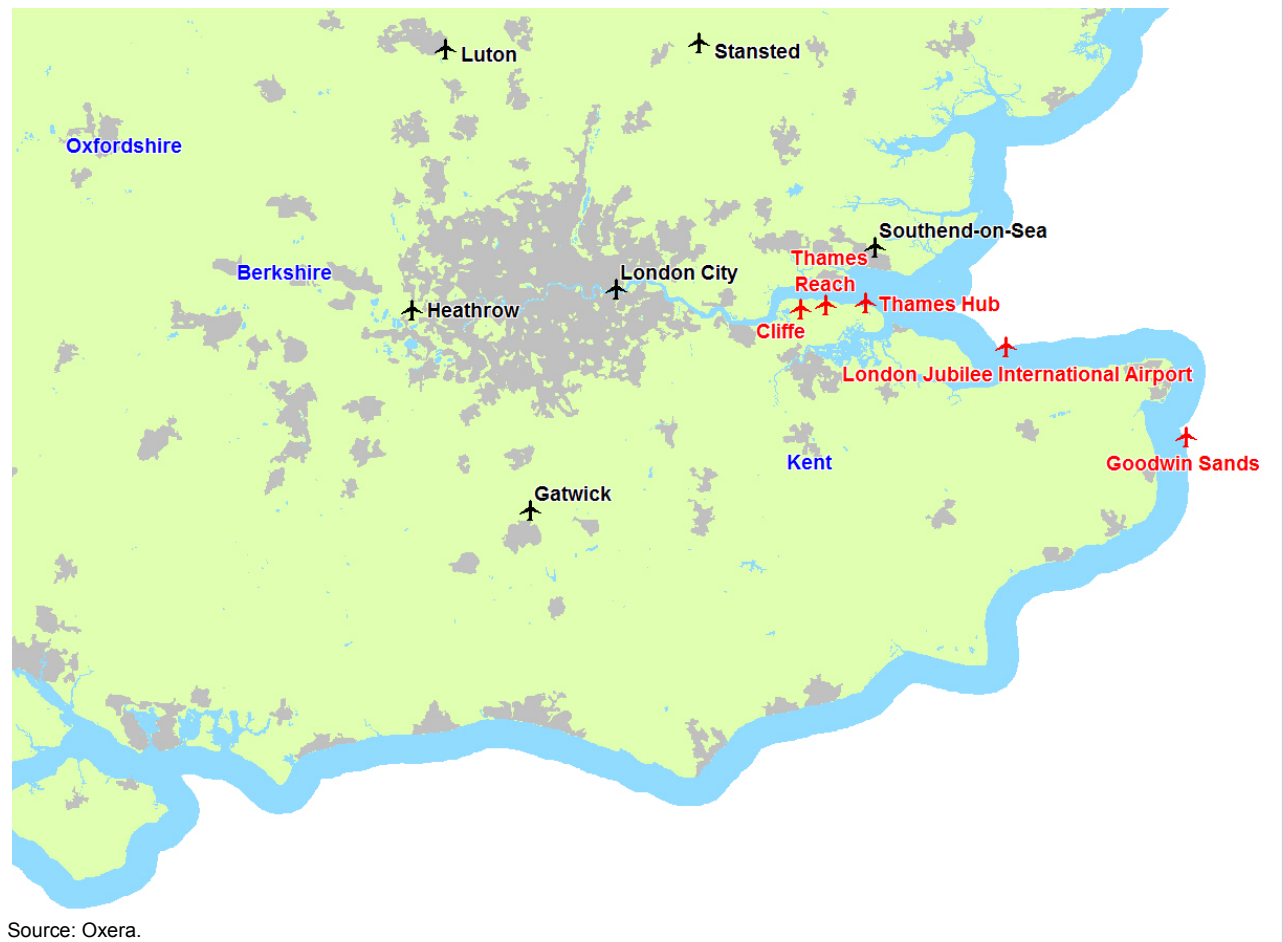
In assessing whether a new hub airport would be commercially viable, the first consideration is the extent of future demand from passengers (and, to a lesser extent, freight) for air travel. Demand forecasts are needed in order to estimate the revenue that could be earned from a new airport, and hence the expected cash flows. There will be a relationship between outturn demand and the prices charged by the airport.

The degree of available demand can initially be based on the demand that is expected to be limited by current capacity constraints. The UK Department for Transport (DfT) publishes official projections of constrained and unconstrained future UK aviation demand. Published in January 2013, the latest edition showed that forecasts for traffic had been lowered substantially since 2007.

In addition to providing services to currently constrained traffic, if all traffic that would otherwise have used Heathrow Airport were to be transferred to a new airport, there would be an additional 85m passengers per annum (mppa) available for the new hub in 2050 (assuming 100% transfer, and dependent on the demand scenario). In Oxera's analysis, scenarios where Heathrow is closed assume 100%

This article is based on Oxera (2013), 'Would a New Hub Airport be Commercially Viable?', report prepared for the Transport Committee, January 24th, available at [www.oxera.com](http://www.oxera.com).

Figure 1 Existing and proposed airports in London and the South East



Source: Oxera.

transfer from Heathrow to the new hub, while if Heathrow remains open no transfer is assumed.

There may also be some abstraction from Gatwick and Stansted Airports, which together are expected to serve 70mppa in 2050, although full abstraction from Gatwick, Stansted and elsewhere is unlikely. Oxera's base-case scenario has been to assume that there is no abstraction from these airports, and, in a high-case scenario, that there is abstraction of traffic from full-service carriers at Gatwick (30%) and Stansted (3%) that will transfer to the new hub.<sup>2</sup> These assumptions should cover the full range of likely outcomes, with the outturn level of traffic transfer likely to be somewhere in between.

The degree of competition from other UK and European hub airports has a significant impact on the viability of a new hub. The willingness of passengers and airlines to move between airports is linked to the choice of policy for the location and design of the new airport.

## Costs

The likely cost of a new airport will vary depending on the precise proposal (for example, in terms of location or number of runways). A range of recent proposals was reviewed, and their cost estimates are collated in Table 1 overleaf (adjusted for inflation where necessary).

On the basis of the most recent estimates presented in the table, a new airport would probably cost in the range of £20 billion to £50 billion. In general, the offshore proposals are expected to cost more than the onshore proposals. The wide range of cost estimates is also driven by the differing estimates of surface access costs. Proposals put forward at the time of the 2003 Aviation White Paper<sup>3</sup> suggested surface access costs in the region of £0.3 billion to £2.2 billion (in 2012 prices).<sup>4</sup> More recent proposals have indicated costs of up to £30 billion for surface access and associated infrastructure, although in at least one case this is inclusive of extensive surface access (in the form of a London Orbital railway)—although it is not clear whether this would be essential for the scheme, or a 'nice to have'.<sup>5</sup>

**Table 1 Simplified collation of cost estimates (£ billion, 2012 prices)**

New hub	Design	Airport construction	Surface access (new)	Surface access and infrastructure (existing)	Total
London Jubilee International Airport <sup>1</sup>	Five runways	24	22	3	49
Thames Hub <sup>2</sup>	Four runways	20	20	10	50
Cliffe <sup>3</sup>	Four runways	14.2	2.2	–	16.4
Thames Reach <sup>4</sup>	Two runways	9.5	0.3	–	9.8
Goodwin Sands <sup>5</sup>	Three runways	24.8	11.4	3	39.2
Indicative range					10–50

Note: Forecast costs are adjusted to 2012 prices using the Office for National Statistics CPI (consumer prices index).  
 Source: <sup>1</sup> Testrad (2012), 'London Jubilee International Airport', November. <sup>2</sup> Foster and Partners, Halcrow and Volterra (2011), 'Thames Hub: An Integrated Vision for Britain', November, p. 30. <sup>3</sup> Helsey, M. and Codd, F. (2012), 'Aviation: Proposals for an Airport in the Thames Estuary, 1945–2012', House of Commons library, July 20th, p. 8. <sup>4</sup> Halcrow Group (2003), 'SERAS: Review of Thames Reach Airport Proposal', December, p. 7. <sup>5</sup> Beckett Rankine (2012), 'Cost Estimate for Goodwin Airport', December, available at: [http://www.goodwinairport.com/?page\\_id=510](http://www.goodwinairport.com/?page_id=510).

Since many of the proposals outlined above are indicative only, it is unclear whether they account for 'optimism bias'—the systematic tendency for business planners to underestimate the costs that will be incurred in delivering a project.<sup>6</sup> The impact of such bias on cost projections is not trivial—cost overruns in the order of 50% in real terms are common for major infrastructure, and overruns above 100% are not uncommon.<sup>7</sup> A recent example is provided by the new Berlin Brandenburg Airport, which required a capital injection of €1.2 billion from its public owners to cover construction cost overruns (on an initial budget of around €3 billion).<sup>8</sup> It may therefore be appropriate to include an optimism bias adjustment in the assessment of the plausible range of costs. Based on the UK Treasury's Green Book guidance, such an adjustment could be in the range of 6–66%.<sup>9</sup>

Such optimism bias can also affect the timing of the opening of a new airport. Unanticipated delays relating to environmental, operational and even archaeological factors can all result in longer delivery times, which further reduce the returns on investment in today's terms. Indeed, in addition to cost overruns, Berlin Brandenburg Airport has seen its scheduled opening date slip from 2011 to 2014 following several delays.<sup>10</sup> Oxera's analysis assumes that a new UK hub airport would open and be fully functional in around 2025, which, from the proposals to date, appears to be a reasonable base case, although it is likely that a staged opening would occur in practice.

One aspect on which many of the proposals have provided only few details is compensation. If Heathrow is forced to close, there may need to be substantial compensation to existing airport owners/users. The current value of Heathrow's regulatory asset base (RAB) is around £13 billion, and past estimates have

suggested that total compensation for the closure of Heathrow could be as high as £20 billion when accounting for compensation to airlines.<sup>11</sup> Additional compensation may be needed where a new airport adversely affects nearby residents. This is unlikely to be the case for the Thames Estuary proposal, but this location does have the potential to incur costs relating to environmental issues.

## Charges

Having assessed expected revenues and costs, the next step is to estimate the likely level of charges at a new airport. This is a complex process, since it interacts with the expected level of demand and will, in turn, determine the revenues that an investor may be able to recover.

A reasonable base-case scenario may be to assume that the prevailing charges levied at other UK or European airports could be charged at a new airport. These charges appear to be sustainable in the aviation market, since they are currently levied and the airports in question are utilised.

However, as Heathrow is a regulated entity, it is not appropriate to interpret its charges as the maximum level that the market could bear (if they were, there would be no need for regulation). Indeed, it might be that the market could bear higher charges, but that the current levels are deemed sufficient to provide investors with an adequate return as determined by the Civil Aviation Authority's (CAA) regulatory reviews.

Charges at a new airport could therefore potentially be higher than the existing level at Heathrow, subject to constraints from other UK airports and European hubs, and a policy desire to limit the market power of a new hub and existing UK airports.

There is an interaction between the level of charges and the level of demand. If higher charges are required in order for a new airport to recover its investment, it is not sufficient simply to say that charges must rise to a particular level. This is because such an increase may lead to a decline in demand and hence have an offsetting effect on revenue. Proposals to increase charges will be constrained by what other airports charge. As an overall guide, should the charges be significantly different between UK and European hub airports, it is unlikely that a UK hub airport will be able to obtain the higher demand forecasts associated with significant hub expansion.

## Implications

The above assessment of revenues, costs and charges is sufficient to give an indication of the commercial returns that may be available from the project.

The assessment of costs and returns that follows takes account of both their magnitude and their time profile. The analysis below considers the net present value (NPV) of the projected revenues and costs of an airport. The NPV represents the amount at which a commercial investor would value the potential investment in an airport today. Using an indicative scenario:<sup>12</sup>

- the **value of a new airport** is calculated by estimating the revenues from forecast passengers, assuming that each pays the forecast charges net of operating costs. These revenues are then calculated in today's money using a 'discount factor' that reflects the time value of money between now and the period over which the airport is operating (ie, between now and the assumed opening date of 2025).<sup>13</sup> This results in a **value of £15.6 billion**;
- the **cost of the new airport** is then calculated on a comparable basis by taking a cost estimate for a four-runway hub described above of £70 billion (including compensation). This cost is then calculated in today's money using a discount factor, assuming an investment programme over ten years to 2025 and compensation after the new airport becomes operational. This results in a **cost of £43.7 billion**;
- the **value of the investment** (the NPV) is then calculated by subtracting the costs from the airport value. Given that the costs are significantly higher than the value, the net value of the investment is

significantly negative, implying that a commercial investor would be unlikely to undertake the investment.

This means that the combined investment in a new airport plus associated infrastructure is unlikely to be a commercial investment—ie, the total cost of building the airport would exceed the value of the airport that exists at the end of the build phase. It might be possible to finance the investment in the new airport infrastructure of around £20 billion alone, but only through injection of substantial levels of public subsidy and investment for the surface access and compensation, which would comprise around 60–75% of the total investment cost.

## Grounded?

Does the conclusion about the likely need for public support for a new airport halt development of plans for its construction?

Not necessarily. A commercial viability test is specific and narrow. From the perspective of government, a wider social cost–benefit analysis would be appropriate before taking any decision on the appropriateness of public subsidy. The subsidy could be justified if the government concludes that the wider social and economic benefits of an airport outweigh the public investment costs. Additionally, the government will generally give more weight to longer-term benefits when evaluating the public policy benefits of an investment. This is often done within a cost–benefit analysis by using a lower discount rate of 3.5%,<sup>14</sup> rather than a commercial rate of return, as would be required by a commercial investor.

A social cost–benefit analysis would include wider social and economic benefits created by the infrastructure investment, net of the associated social and environmental costs. If such benefits in net terms could be equal to around £8 billion per annum (using the base-case assumptions in this report), this would offset the investment cost in commercial terms.

The evaluation of the options for aviation capacity expansion will continue under the government-appointed Davies Commission. The Commission is tasked with recommending the best way forward for expansion, and as part of this it is expected to conduct a wider welfare analysis and to report back with interim findings by the end of 2013.<sup>15</sup>

<sup>1</sup> See, for example, Toms, M. (2012), 'UK Airports Policy: What Won't Happen and What Should', *Agenda*, June.

<sup>2</sup> Civil Aviation Authority (2012), 'Airport Statistics'.

<sup>3</sup> Department for Transport (2003), 'The Future of Air Transport', December.

<sup>4</sup> Department for Transport, Local Government and Regions (2003), 'SERAS Stage Two: Appraisal Findings Report', December.

<sup>5</sup> Foster and Partners, Halcrow and Volterra (2011), 'Thames Hub: An Integrated Vision for Britain', November, p. 30.

<sup>6</sup> For example, Flyvbjerg (2009) found that, of a sample of 258 transport infrastructure projects, 90% had cost overruns. Flyvbjerg, B. (2009), 'Survival of the Unfittest: Why the Worst Infrastructure gets Built—and What we can Do about it', *Oxford Review of Economic Policy*, **25**:3, pp. 344–67.

<sup>7</sup> *Ibid.*, p. 346.

<sup>8</sup> European Commission (2012), 'State Aid: Commission Approves Capital Injection to Finalise Construction of Berlin Brandenburg Airport', press release, December 19th.

<sup>9</sup> Using the range for Non-standard Civil Engineering projects recommended in HM Treasury (2003), 'Supplementary Green Book Guidance', Table 1. The Green Book is 'HM Treasury guidance for Central Government, setting out a framework for the appraisal and evaluation of all policies, programmes and projects'. See HM Treasury (2011), 'The Green Book: Appraisal and Evaluation in Central Government', available at [http://www.hm-treasury.gov.uk/data\\_greenbook\\_index.htm](http://www.hm-treasury.gov.uk/data_greenbook_index.htm).

<sup>10</sup> Berlin Brandenburg Airport (2013), 'Re Berlin Brandenburg Airport', press release, January 7th.

<sup>11</sup> Helsey, M. and Codd, F. (2012), 'Aviation: Proposals for an Airport in the Thames Estuary, 1945-2012', House of Commons library, July 20th.

<sup>12</sup> Based on an indicative scenario of a four-runway hub costing £50 billion, with Heathrow closed, assuming that 30% of Gatwick and 3% of Stansted traffic transfer to the new hub, and assuming charges and operating costs equivalent to Heathrow's current level.

<sup>13</sup> This is a commercial assessment based on an assumed discount rate of 9% applied to pre-tax cash flows. It is assumed that tax can be ignored, as the very significant investment costs mean that no tax is likely to be paid until late in the project's life, if at all. If HM Treasury's recommended social discount rate of 3.5% is used then many of the scenarios are found to have a positive NPV. Furthermore, if a full social assessment is conducted, the addition of wider economic benefits and other factors will also affect the calculated NPV.

<sup>14</sup> HM Treasury (2011), *op. cit.*, Annex 6.

<sup>15</sup> Airports Commission (2012), 'Commission Operating Protocol', November. See also [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/11177/operating-protocols.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/11177/operating-protocols.pdf).

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