

ECONOMIC REGULATION OF TERMINAL EXPANSION

A report prepared for Heathrow

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EXECUTIVE SUMMARY

In June 2017, the CAA released a consultation on the economic regulation of expansion at Heathrow, inviting stakeholders to propose potential improvements to the regulatory framework.¹ Various responses so far have included proposals for ‘competitive arrangements’ to be introduced into the delivery of new terminals at Heathrow. This would represent a departure from the current regulatory framework where Heathrow Airport Limited (HAL) has full ownership and responsibility for designing, building, financing and operating new terminals.

The CAA has encouraged stakeholders to develop their proposals in more detail, alongside a general comment that it “is in favour of competitive arrangements where they can be shown to be in the interests of consumers”.

Frontier Economics has been commissioned by HAL to comment on the relative pros and cons of introducing competition into the provision of new terminals.

Introducing competition should be viewed not as an outcome in its own right, but rather as a means to help achieve positive outcomes for passengers. To this end, we first need to define what successful outcomes look like in the context of new terminals at Heathrow, and then we consider whether introducing competition is the best way to achieve these outcomes.

At a high level, we consider that successful outcomes at each step in the value chain are as follows:

- **Design:** A new terminal should be designed in a way that best serves the needs of the passengers and airlines that use it – with regard to potential future users too – and it should be well-integrated with the rest of the airport.
- **Build:** Given the design, the construction of the new terminal should be smooth cost efficient, and delivered on time.
- **Finance:** Given the design and build, the terminal should be financed at the lowest feasible cost.
- **Operate:** The terminal should be operated efficiently, including coordination with the rest of the airport.

These are the main outcomes regardless of whether HAL or a third party is responsible for delivery.

In principle, a third party could take responsibility for one or all or a combination of the different parts of the value chain outlined above. And from a practical perspective, we cannot dismiss this idea out of hand as being not possible. Most airports do tend to be operated by one vertically integrated operator, but there are some examples of airports with alternative arrangements. For example, at JFK in New York, terminals are operated by airlines with the exception of one terminal which is operated by a subsidiary of Schiphol Airport (Amsterdam). This is not to say that such an approach is ‘better’ than the current model at Heathrow, but rather that it can be done.

Introducing competition at Heathrow could require substantial changes to the regulatory framework – and it is not unrealistic to think that this could delay expansion. The precise nature of these changes would depend on the nature of the competitive arrangement. In this report we refer to three high level options for a new entrant at Heathrow:

¹ <http://publicapps.caa.co.uk/docs/33/CAP1658EconomicregulationofcapacityexpansionatHeathrow.pdf>

- **Option 1:** A non-airline terminal operator that does not compete with HAL on airport charges (effectively just outsourcing).
- **Option 2:** A non-airline terminal operator that does compete with HAL.
- **Option 3:** An airline operates the terminal and self-provides its terminal services, and it could also potentially compete with HAL if it has spare capacity.

In this report we do not comment in detail on any potential legal issues. However, there could be challenges. A recent protracted attempt to introduce a new entrant at Copenhagen airport ultimately failed on legal grounds. Also, a 2009 investigation by the Competition Commission into introducing terminal competition at BAA's UK airports noted that this would require redefining existing legal structures and the role of the regulator.² Given these regulatory and legal issues it is not unrealistic to think that introducing such models could delay expansion at Heathrow, and increase uncertainty would could increase financing costs, both of which are negative outcomes for passengers.

The key question is whether introducing competition is the best way to achieve positive outcomes for passengers, and whether the benefits from competition would be enough to compensate for the various practical, regulatory and legal issues that it would create. Below we summarise our findings on how such models compare against the status quo across each phase of the value chain.

Design

The designer of a new terminal at Heathrow (HAL or a new entrant) must strike a balance between providing a terminal suited to the needs of particular airlines, which may not be suited to the needs of other airlines, or a 'one size fits all' approach. It is not clear why a new entrant would be able to strike a better balance than HAL.

A new entrant, if responsible for a single terminal only, could have an incentive to 'optimise' the design of its terminal in isolation. In the case of an airline-owned terminal, it might choose a design which specifically restricts the access of competitors. HAL has more of an incentive to design a terminal which is multi-purpose and well-integrated into the rest of the airport as a system. This is crucial at a busy hub airport like Heathrow which serves transfer passengers. Coordination and integration could be mandated in the terms of reference of the new entrant, but to do so undermines the rationale of introducing a new player to achieve more innovation in design. Additionally, HAL already has processes embedded in its regulatory framework which ensure the involvement of airlines, passengers and independent experts in the design and construction phases of new terminals³. It is not clear whether a third party would also be subject to these processes.

Looking to Ofgem's experience in the energy sector with respect to Offshore Transmission Owners (OFTOs), we find that new entrants bidding to finance and operate these projects have avoided the responsibility of designing and building them. As such the model of third-party build & design has yet to be realised, so any perceived benefits are still only theoretical.

² https://webarchive.nationalarchives.gov.uk/20140402212103/http://www.competition-commission.org.uk/assets/competitioncommission/docs/pdf/non-inquiry/rep_pub/reports/2009/fulltext/545_10_11.pdf

³ These include Constructive Engagement, the Gateway project management process, the Independent Fund Surveyor, Capex Triggers, the Consumer Challenge Board, the Heathrow Community Engagement Board, the Joint Expansion Board (JEB), the Airlines Working Group (AWG), and the Cost and Benefit Working Group (CBWG).

Build

Under current arrangements, all large construction projects are put out to tender by HAL, which already introduces competition into this part of the value chain. We expect that a new entrant would follow the same process, meaning that under an alternative model the build phase would look broadly similar to the status quo. That said, HAL may be able to achieve synergies which a third party may not, by being able to coordinate the build of a terminal alongside the build of the runway. As noted above, HAL already has various processes which protect the interest of customers, including capex triggers which ensure that HAL effectively lowers its airport charges if project milestones are not met. A third party may not be subject to these processes.

Finance

A successful outcome for financing could be achieved if a third party had lower financing costs than HAL. There are precedents of third-party financing in the water and energy sectors, including Ofwat's experience with the Thames Tideway Tunnel and Ofgem's experience with OFTOs, amongst others.

A first glance suggests that competitive procurement may be able to achieve financing at a lower cost than that incurred by the incumbent. However a careful examination of these examples suggests that these 'lower costs' were in fact largely the result of the third parties facing much more favourable regulatory conditions, rather than competition as such. Third parties were guaranteed returns over a longer timeframe, and faced less risk by not being responsible for the design & build phases. Additionally the cost of capital for a specific project taken on by a third party at a given moment in time compared against the regulatory WACC is not a like-for-like comparison. The WACC is an average, and also embeds historical costs. As a result, it is not clear that customers have actually benefitted from these alternative delivery models in the form of lower prices.

Ofwat and Ofgem have also been very clear that such alternative delivery models should be considered only in instances where the infrastructure is 'passive', has few interfaces with the rest of the network, and has limited economies of scale with the rest of the network. A new terminal at Heathrow does not appear to satisfy these criteria.

Operate: Regulatory issues

Under **Option 1**, operation is effectively outsourced to a third party. Benefits could potentially arise by introducing competition for the market. But we note that HAL could already implement this model today as we see no reason why it would not be allowed under its current regulation. The fact that it can implement this model (as a means to outperform its cost allowance) but chooses not to suggests that the benefits could be limited.

Under **Option 2**, the potential benefits are from competition *between* terminals, whereby airlines can switch between terminals. Significant changes to the regulatory framework would be required, including regulated wholesale charges for access to the runways and surface access, etc. along with the deregulation of airport charges with respect to terminal services. In addition to the extensive costing exercise that would be required, and the scope for margin squeeze, this would introduce issues similar to those that Oftel and Ofcom have experienced with BT / Openreach. To remove the scope for the incumbent to discriminate against third parties, structural separation between the terminals and the rest of the airport may be required. This would result in the loss of the benefits of having a vertically integrated operator. Also, to actually allow airlines to switch between terminals, the terminals would need to have significant (and possibly excessive) spare capacity.

Under **Option 3**, where the terminal is operated by an airline there is unlikely to be a competitive dynamic between terminals, because the new terminal may not be available to competing airlines (unless there is significant spare capacity). Therefore regulated wholesale charges would be necessary, as under Option 2, in addition to the continued regulation of terminal charges.

In order for a competitive model to deliver benefits to passengers, the efficiencies gained from competition would need to outweigh the losses from reduced integration (with practical issues discussed below). Also, who would bear the residual risk if the new terminal operator fails?

Operate: Practical issues

Under the status quo, HAL acts as a single vertically integrated operator of the surface access, terminals, apron, taxiways and runways, in a busy system which operates at full capacity and which requires inter-terminal connectivity. An alternative model would introduce a third party into this busy system. We carried out a series of workshops with HAL's operational experts to understand better how this could work in practice and what issues could arise.

We note that none of these issues are insurmountable, but they require actions, interfaces and decisions – and therefore risks – that are not required today. A few themes emerged:

- **The benefits of centralised operations:** Adding an extra operator to the system would introduce additional frictions into the chain of management. This effectively goes against the main recommendation of the 'Begg Report' in 2011:

In December 2010, HAL was criticised for how it responded to heavy snowfall which led to severe cancellations and disruptions. The 'Heathrow Winter Resilience Enquiry', chaired by Prof David Begg, highlighted several areas of poor coordination between parts of the airport and recommended that HAL take more of a centralised approach, including establishing 'a single airport command/control centre'. In response, HAL introduced its 'Airport Operations Centre' (APOC). Alternative models could effectively undo this and expose Heathrow to risks.

- **Behaviours around interfaces:** A line would need to be drawn between where the third party's responsibilities lie and where HAL's responsibilities lie. This can lead to inefficiencies and unintended consequences around these boundaries, for example responsibilities for security, and special assistance for passengers of reduced mobility.

Ultimately, the introduction of a new operator would result in a loss of centralisation benefits. It introduces additional interfaces and frictions between the different parts of Heathrow's operations.

Conclusion

In many markets, competition helps to achieve positive outcomes for consumers, such as lower prices, improved service quality, greater choice and innovation. We believe that it is possible to introduce competition into the delivery of new terminals at Heathrow. However, introducing competition should not be viewed as an outcome in its own right, but as a means to help achieve positive outcomes – and clearly competition does not work in some markets as well as in others.

To introduce a competitive model various regulatory, legal and operational interfaces need to be created between HAL and the third party. These are interfaces that do not need to exist today. Introducing a third party operator and moving away from the current centralised model of operation at Heathrow can only increase the risk of lapses in coordination. When considering whether to introduce competitive arrangements, any possible benefits have to be weighed against the risks associated with a largely untested alternative model.

Figure 1 Summary

	Option 1	Option 2	Option 3
Owner / operator:	Non-airline	Non-airline	Airline
Competitive arrangement:	No competition (this effectively amounts to outsourcing)	The operator competes with HAL on airport charges and service quality	The airline self-provides its own terminal services. If it has spare capacity it can offer it to other airlines and compete against HAL
■ Design	HAL has a greater incentive to design the terminal as part of a hub (with multiple terminals) compared to an operator with one single terminal		
	There is always a trade-off between providing a terminal tailored to a specific airline, or a 'one size fits all' terminal. Why would a third party be better at striking this balance than HAL?		An airline could design the terminal in a way which does not suit its competitors (and future users) and it could restrict competitor access
■ Build	This would be similar to the status quo because airport operators (HAL or otherwise) typically outsource construction to contractors. HAL is already subject to expert and airline scrutiny (e.g. capex triggers, Gateway process, IFS). A third party may not have these. HAL can coordinate terminal construction with runway construction.		
■ Finance	Recent regulatory precedents suggest that third parties could finance projects at lower cost than incumbents' WACCs. However, examining the details, this may have only arisen due to them benefitting from more favourable regulatory conditions and limited risk than the incumbents. In light of the other concerns (above and below) greater risk could increase financing costs.		
■ Operate: Regulatory framework	No changes required to the regulatory framework	The regulatory framework would need to be revised considerably (which could delay expansion), with the introduction of regulated wholesale charges and possible deregulation of terminals. To remove HAL's scope to engage in abuses such as margin squeeze and discrimination, structural separation may be required. But this may lead to a loss of the benefits of vertical integration.	Similar to Option 2, except there would still be regulated terminal charges
	Who would be responsible for the terminal if the third party fails?		
■ Operate: Practical Issues	Loss of centralisation benefits and economies of scale from having a single vertically integrated operator (and likely worse under Options 2 & 3 as there would be less coordination between parties). This would be a move away from the recent trend of having more centralised operations (the main recommendation of the Begg report)		
Conclusion	It is unclear that how third party ownership and operation can be expected to result in lower prices for passengers or improved service quality		

1 INTRODUCTION

1.1 Background

Heathrow Airport Limited (HAL) has been given permission by the Government to build a third runway. While the public discourse centres on the runway, the expansion entails new supporting infrastructure within and around the airport, including the development of new terminal facilities.

In June 2017, the CAA released a consultation on the economic regulation of expansion at Heathrow, inviting stakeholders to propose evolutions to the regulatory framework.⁴

There have been various responses so far, including proposals that ‘competitive arrangements’ could be introduced in delivering new terminals. Rather than HAL having full ownership and responsibility for the design, build, financing and operation of new terminals:

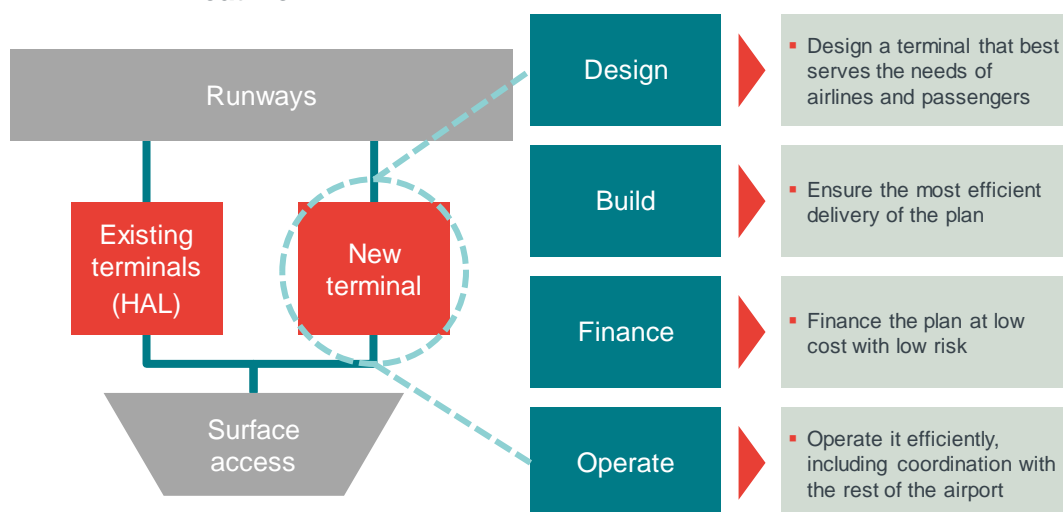
- Some airlines have suggested that a separate company (‘BuildCo’), made up of HAL, airlines and other stakeholders, should be set up to build and finance new terminals. They have argued that this arrangement could help deliver terminals which are more directly aligned with customer requirements;
- Arora Group has proposed its own plans to design and finance a new terminal, arguing that it can deliver expansion in a more efficient and timely manner than HAL;
- Other stakeholders have suggested that the CAA should consider issuing a licence to a new entrant to design, construct, own and operate a new terminal at Heathrow.

The CAA has not endorsed any of these suggestions, but it has nevertheless indicated that it “is in favour of competitive arrangements where they can be shown to be in the interests of consumers” and has encouraged stakeholders to develop their plans further.

As the CAA implicitly acknowledges in the quote above, introducing competition at any possible point in the airport supply chain should not be viewed as an outcome in its own right: rather competition is a means to help achieve positive outcomes for consumers. To this end, we need to define what successful outcomes look like in the context of new terminals at Heathrow, and then whether competitive arrangements are the best way to achieve them.

⁴ <http://publicapps.caa.co.uk/docs/33/CAP1658EconomicregulationofcapacityexpansionatHeathrow.pdf>

Figure 2 What does success look like in the context of new terminals at Heathrow?



As illustrated in the figure above, in providing new terminal capacity there are opportunities to improve outcomes for airport users at a number of stages, in particular in the design, build, finance and operation phases. New competitive arrangements could in principle be introduced at any or all of these stages. The key question is: at which points in this value chain could competition result in better outcomes for passengers? And to what extent are these improved outcomes contingent on changes to the regulatory framework? Introducing competition would likely imply significant change to the system of regulation for Heathrow. Unless this is done carefully there is a risk that any competition created could be on an artificial basis, reflecting failings of the regulatory regime rather than competition genuinely likely to enhance consumer welfare.

It is worth reminding ourselves that Heathrow is the busiest airport in Europe. A new terminal would be a crucial piece of infrastructure requiring close interaction and communication with the whole of the airport including air traffic control (ATC), the apron, taxiways, runways and the other terminals, in a busy system which handles around 80 million passengers and 480,000 flights a year. A third runway is planned to increase capacity by around 50% with a significant likelihood that this capacity will be very largely taken up within only a few years of the runway opening. Therefore, the risks associated with implementing a largely untested alternative model are material, and all the more so if the model is not well designed and if the objectives that the model is intended to achieve are not clear.

1.2 The scope of this report

We have been commissioned by HAL to consider how competitive arrangements could be introduced at different levels of the value chain with respect to the design, build, financing and operation of new terminals at Heathrow, and to then evaluate these options from a regulatory perspective. As part of this review, we draw upon precedents from other regulated network sectors as well as examples of competitive arrangements in the airport sector.

The rest of this report is structured as follows:

- In **Section 2** we start by laying out a conceptual framework for thinking about how competition could in principle lead to benefits to customers at different points in the airport value chain.
- In **Section 3** we describe how competitive arrangements could be introduced into the **design and build** of new terminals.
- In **Section 4** we evaluate options for introducing competitive arrangements with respect to **financing** new terminals.
- In **Section 5** we set out how competitive arrangements could be introduced with respect to **operating** new terminals, particularly the changes to the **regulatory framework** that would be needed and implications for operational efficiency.
- In **Section 6** we comment on the **practical issues** that could arise under any of the competitive operating models outlined in Section 5. Assuming these alternative models could work from a regulatory perspective, are there issues which may limit their effectiveness in practice?
- In **Section 7** we provide our overall **conclusions**.

2 CONCEPTUAL FRAMEWORK

2.1 An airport is not a single indivisible entity

The idea of introducing competitive arrangements into the delivery of new terminals challenges the notion of an airport being a single indivisible entity. It looks at the different functions provided to airlines and passengers at an airport and asks: are there alternative ways we can organise this activity?

The Ground Handling Directive in airport regulation provides a good example of how third parties can be introduced into a particular part of the airport value chain.⁵ Historically, ground handling services at many airports used to be provided exclusively by the airport operator. Now, under EU rules, there is competition for many ground handling services at larger airports. This has resulted in airlines having a choice of ground handling providers, and for airlines to self-provide their own ground handling requirements. As noted by the EC, this has led to lower prices and improved service quality for airlines, and passengers, as well as reducing the need for regulation.

The Ground Handling Directive highlights an important point: an airport does not have to be operated by one single vertically integrated airport operator. The proposal to have some form of independent involvement in terminal provision is simply an extension of the same point. But the fact that competition works in one part of the supply chain does not necessarily mean it will work in another.

Furthermore, in pursuing any such proposal we need to be clear about the nature of the competition in order to consider how the benefits may arise:

- *Competition in the market*: This is where a new entrant enters and competes against the incumbent provider to supply services to the consumer, so that customers face a choice between multiple providers. The Ground Handling Directive is an example of introducing competition in the market.
- *Competition for the market*: This is where a single firm still provides the underlying service, but there is a competitive process for tendering the licence to be the sole provider. In this regard, firms compete against each for the right to be the sole provider.

There are examples from other regulated network sectors where regulators have introduced competition for the market, which we describe in more detail in the rest of this report.

In the airport sector, we note there are numerous examples of what appear to be independent airport terminals, but we need to be careful in understanding in what sense they are independent and from where the economic benefits of such arrangements are expected to derive. Outsourcing of construction and even operation of facilities are common practices in many service sectors. But outsourcing and ‘independence’ are very different concepts as we discuss in more detail in the next section.

⁵ https://ec.europa.eu/transport/modes/air/airports/ground_handling_market_en

Finally, there could be practical challenges to introducing independent terminals. The unsuccessful attempt to introduce a new third-party owned and operated terminal at Copenhagen airport illustrates this point clearly.⁶ Initially, the Danish competition authority was open to challenging the idea that terminals have to be operated by a single indivisible entity. However, the transport ministry argued that separating out terminal operation posed a security risk. In this case, the Danish courts ultimately sided with the transport ministry, but more for the reason that Danish law does not conceive that airports can be divided, and hence the transport ministry was within its rights to close down the discussion.

But we must bear in mind that in principle it is possible to separate out terminals. We know this because it has already been done at some airports around the world. Perhaps the most famous example is JFK in New York, where the terminals are each operated by different airlines or consortia of airlines, while one terminal is managed on behalf of JFK by a subsidiary of Schiphol Airport (Amsterdam).

Assuming that airports all face broadly the same technical and security issues, it is clearly logically possible to address the problems of separate terminal ownership and/or operation, or these examples would not exist.

This is not to say that the airports are “better” or run more efficiently as a result of the separation of a terminal, or that airlines and/or passengers are better served this way. All it means is that it is technically feasible.

In this report we do not comment in detail on any potential legal issues and simply assume that they are feasible. However, there could be challenges. A recent protracted attempt to introduce a new entrant at Copenhagen airport ultimately failed on legal grounds. Also, a 2009 investigation by the Competition Commission into introducing terminal competition at BAA’s UK airports noted that this would require redefining existing legal structures and the role of the regulator. Given these regulatory and legal issues it is not unrealistic to think that introducing such models could delay expansion at Heathrow which would be a negative outcome for passengers.

2.2 Why independent terminals?

In many markets, competition leads to lower prices, improved service quality, greater innovation and more choice for customers. However, in others, barriers to entry result in there being little to no competition. If a firm does not face any competition, its incentive to lower prices and improve service quality is less strong than it would be if it did face competition. It is for this reason that regulators intervene and subject companies with significant market power to economic regulation as an artificial proxy for competition, with the intention that regulation can help mimic competitive outcomes.

⁶ <http://www.supremecourt.dk/supremecourt/nyheder/pressemeldelser/Pages/CopenhagenAirport.aspx>

In the case of Copenhagen, a new entrant attempted to buy land from the incumbent airport operator to build a new terminal in competition with the existing terminals. The airport rejected the offer. The new entrant then appealed to the competition authority who sided with the new entrant and obliged the airport to sell the land. However, the airport regulator then argued that this could interfere with security obligations. The case went to the Supreme Court, which ultimately decided against the new entrant on the grounds of security.

However, regulation is not a perfect substitute for competition. It comes at a cost to the sector and regulators lack perfect information to estimate how efficient regulated firms can be. Therefore, even within a regulatory regime, regulators still try to identify opportunities to introduce competition into individual parts of the value chain, and thereby reduce the need for regulation over that element, e.g. the Ground Handling Directive.

Because competition is not an end in itself, but rather a means to an end, we need to define what the positive outcomes are that we are trying to achieve by introducing competition. In the context of delivering new terminals, at a high level, the outcomes are:

- **Design:** A design that best serves the needs of airline customers and passengers, including integrating well with the existing infrastructure;
- **Build:** A smooth and efficient construction process;
- **Finance:** Given the design and build, achieving the lowest feasible cost;
- **Operate:** Ensure the efficient operation of the terminal, including coordination with the rest of the airport.

These outcomes also need to be viewed in the context of the overall regulatory regime. Ideally, the above can all be achieved in a way which results in reducing the need for regulation and does not lead to a situation whereby the success or failure of such a regime depends heavily on the precise regulatory inputs – and therefore where there is scope to get inputs wrong. At one extreme, a poorly implemented regime could result in a new entrant finding that it cannot compete profitably, resulting in its exit from the market which would lead to significant disruption at the airport.

2.3 Outline of the models we are considering

In principle different organisations (whether it is HAL or a third party) could be responsible for each of the steps above, although in practice it may make sense for some of them to be combined.

At various stages in the value chain HAL could, and in fact often does, contract out part of these functions. We note these points in our report and consider them to be relatively uninteresting, because they do not imply anything new in terms of the regulatory framework.

When it comes to greater competition, the essential model we are considering is not one of contracting out, but rather one where a third party, other than HAL, owns and operates a new terminal building (although ownership and operation can be separated in theory, so one could in principle have the benefits of third party finance and maintain coordinated operation by HAL). We discuss the benefits of independent involvement in terminal design, although realistically this is only likely to occur in the context of independent ownership, as you would expect the body responsible for design to have a commercial interest in the outcome of that design.

With a third party owner, there are three high level models for competitive arrangements at the design, build and operation stages. These combine the primary questions of importance from a regulatory perspective which are: (i) is the third party in competition with HAL? (ii) is the competitive third party an airline or

another non-airline entity? Combining these two questions, the three models are outlined below.

- **Option 1:** Non-airline owner/operator, which sets the same airport charges as those set by HAL at the existing terminals. Independent ownership and operation does not automatically imply competition between terminals: this model effectively amounts to outsourcing. It would not require any changes to the existing regulatory framework, and indeed there is nothing currently to stop HAL contracting a third party to operate a new terminal at Heathrow on its behalf, if it believed this would deliver better service or value for money. But under this option there is no competition per se.
- **Option 2:** Non-airline owner/operator which actively competes with HAL. Under this model the independently run terminal would have greater freedom to set charges and service standards to try to attract airlines, including attracting airlines away from the other terminals. This would result in a different set of regulatory issues and could also have impact on capacity requirements, i.e. having enough spare capacity to actually attract extra business to its terminal.
- **Option 3:** The independent terminal is owned and/or operated by an airline. Airline ownership and/or operation of the terminal moves the point of vertical integration in the supply chain so that the airline is now vertically integrated with its terminal. The terms under which this is done and the options available to other airlines clearly have an impact on inter-airline competition at the airport.

In Section 3 we discuss introducing competition into the design and build phases. Within these phases, the identity of the third party owner (an airline or a non-airline) is relevant because an airline can design a terminal specifically suited to its own needs, whereas a third party, like HAL, would have to weigh up different options suited to different types of customers.

In Section 4 we discuss the finance phase. The regulatory implications and potential competitive benefits depend less on the identity of the owner/operator and more on the details of the competitive process. We discuss these financing options with reference to relevant precedents from other utility sectors: these could in principle apply to any of the above options.

In Sections 5 and 6 we discuss the operate phase (split out between regulatory and practical issues respectively). Operational success depends partly on the vertical integration and degree of coordination between the terminal operator and other parts of the airport. Heathrow terminals are currently vertically integrated with an operator responsible for surface access, terminals, and the apron, taxiways and runways. The idea of introducing third parties at the level of terminals challenges the view that there are benefits to having vertical integration.

3 DESIGN & BUILD

3.1 Introduction

This section discusses how competitive arrangements could be introduced into the design and build of new terminals at Heathrow. We have grouped these two phases together because the design and build phases are already contracted out under the existing arrangements so it may appear that there is nothing very new in these arrangements. However, new light is thrown on the issues of competition for design and build once we open up the possibility that finance and operation may also be separated from the existing airport operator, which we discuss in subsequent sections.

3.2 What outcome would the CAA want to achieve?

At a high level, a successful outcome for the design and build of a new terminal at Heathrow (irrespective of who is responsible for delivering it) is as follows:

- **Design:** The new terminal is well-designed and innovative and suits the needs of airlines and passengers. It integrates with the existing terminals at Heathrow to maintain the capacity to deliver as a hub airport. It strikes a balance in terms of the needs of different groups, e.g. network carriers and low cost carriers (LCCs).
- **Build:** The plan is delivered smoothly within budget and without delay.

3.3 Are competitive arrangements the best way to achieve this?

As discussed earlier, a new terminal could be designed by HAL, an independent non-airline entity, or an airline/group of airlines.

In Section 3.4, we describe in more detail how HAL already has processes embedded within its regulation that protect the interests of passengers and airlines with respect to the design and build of new terminals. In this subsection we consider whether a third party could improve upon this approach. We discuss design and build in turn.

3.3.1 Design

Under current arrangements HAL is responsible for designing a new terminal. However, this does not mean that it would go about designing a terminal without reference to the interests of its customers or that all design tasks are carried out by HAL staff. Clearly, if HAL is the ultimate owner of the terminal then it has a strong incentive to make sure that it builds a terminal that its customers want to use. But this is not without complication. The terminal designer needs to strike a balance between airlines with different needs and wants, and between current and prospective future customers. Ultimately it may not be possible to satisfy the needs of all interested airlines at the same time.

However, unlike (say) a water company, an airport can discriminate between its customers by providing different facilities to different airlines. It could, for instance, provide a “full service” terminal for network carriers like BA, including allowing for inter-terminal connections for passengers and bags, separate point-to-point facilities for full service carriers that do not need connecting services (e.g. other network carriers using Heathrow as a spoke on their network) and “low cost” facilities to no-frills carriers. Similarly, it could develop piers suitable for any aircraft type, or separate piers with wide spacing and multiple air bridges suitable for long haul wide bodies like A380s and B777s, and alternative facilities in a denser configuration with air bridges which suit low cost carriers.

An airport is always faced with the choice between developing a “one size fits all” approach to very general terminal facilities which maximise long term option value, and facilities very specific to their current (or prospective) customers, which may prove less flexible in the long run if the mix of customers were to change. And this is virtually certain to happen: under current slot allocation rules, half of the new slots made available at Heathrow following expansion would be reserved for incumbent airlines (mostly network carriers), and half would be reserved for new entrants. In other words, new entrants who may well have different preferences to the current incumbent airlines, will be present at Heathrow in the future.

This is a generic issue that airports face regardless of the way in which ownership and operation of separate facilities is divided up. But as a provider with significant market power, albeit regulated, it can be argued that at present HAL’s incentives may be slanted somewhat in favour of a risk averse solution, which is likely to mean solutions that favour higher option value (i.e. slanted more towards the one-size-fits-all solutions).

Therefore the design test for an alternative provision is: is it likely to provide terminal capacity better suited to the needs of customers in general or to the needs of specific customers? This is difficult because these needs may be in conflict with each other. Individual (incumbent) airlines will always want to develop terminal capacity that exactly fits their own business model and may even favour terminal designs that specifically do not suit their rivals. So the airline’s design incentive differs from that of the airport and there is no simple way of resolving which, if either, is “better”.

It is important to note that the recommendation and subsequent decision to expand Heathrow was largely based on the fact that it is a hub airport. A key feature of hubs is that network carriers and alliances attract transfer passengers (including inter-terminal transfers) which increases the total demand for flights and in turn makes it easier for airlines to add new long haul connections. A new entrant, if it was responsible for one single terminal only, could have an incentive to ‘optimise’ the design of its terminal in isolation and without regard for the rest of the airport, whereas HAL would have an incentive to design a terminal which is well integrated into the rest of the airport as a system.

If design and ownership are paired together, then to a greater extent the financial risks are aligned: the body responsible for design has an incentive to try to maximise the value of what they design for themselves. Hence an airline-owned terminal would be designed with its specific needs in mind, but to the neglect of the interest of other airlines. But a non-airline-owned terminal would likely find itself in

a situation similar to the one that HAL faces. It will have to make the decision how much to meet specific needs and how much to provide a one-size-fits-all solution. For the non-airline option, it is not clear why a third party would be able to strike this balance “better” than HAL. This is especially the case because if HAL continues to own and operate the other terminals, it has an incentive to think about the design of terminals at the system level – e.g. enabling transfer passengers – whereas a new entrant may only consider its own terminal in isolation. For example, at one extreme, the terminal may not provide for connecting passengers. On the one hand, this could still be a successful terminal in that there could well be enough demand to fill it. But in our view it could be seen to be undermining the decision to expand Heathrow (a hub) in the first place.

Under an airline-designed model, there could be a loss of option value to the airport as a whole. Airlines may design terminals to suit their own needs. This solution could worsen the provision for other airlines, including new entrants, and undermine inter-airline competition.

In the next sections on finance and operation we set out precedents from others sectors where third parties have financed and operated assets which historically would have been the responsibility of the incumbent operators. In these examples, the third parties have not been responsible for designing the assets themselves.

For example, Thames Water had the responsibility to plan and design the Thames Tideway, with a separate entity being responsible for building, owning, and operating it. In the case of OFTOs in the energy sector, Ofgem allowed for ‘early’ and ‘late’ OFTOs, whereby the former is responsible for the design and build of the assets and the latter is not. Not only have bidders preferred to avoid design, they have also preferred to avoid building too. Looking forward, new schemes may try to oblige third parties to design the assets (e.g. Ofgem’s CATOs) or they may continue to give them the option (e.g. Direct Procurement for Customers (DPCs) in Water can be ‘early’ or ‘late’). As such the ‘early’ model has yet to be realised in practice, so benefits are still only theoretical.

3.3.2 Build

At a high level, there is nothing new about the idea of having third parties building terminal facilities. HAL does not actually build its own infrastructure anyway. All this work is contracted out to construction companies through competitive procurement processes. HAL does however use capex triggers in its regulation to add extra incentives to ensure the smooth delivery of projects. Capex triggers can be added to large capex projects whereby if project milestones – including final delivery – are not met in a timely manner, HAL pays a rebate to airlines.⁷

However, it seems clear that the organisation responsible for the build phase should be the ultimate owner of the terminal in order to ensure that incentives are aligned. Through competitive processes, the owner can attempt to contract away some of the construction cost and delivery risk, but ultimately the residual risk still comes back to the owner, whether that owner is the airport or an independent operator.

⁷ <https://www.caa.co.uk/WorkArea/DownloadAsset.aspx?id=4294975881>

Also, the owning entity will have supervisory and oversight responsibilities for the construction process. In this capacity HAL has more of an incentive than a third party to ensure that the process is smooth and the project is delivered on time, because this will minimise disruption with the rest of the airport. HAL may also have more capability to coordinate the work on the shared parts of infrastructure, for example facilities that connect the new terminal to the existing terminals and indeed the new runway, in a way that reduces any breaks in service from the existing terminals.

3.4 Provisions that protect airport users in the design and build phases under current regulatory arrangements

We have discussed above that the airport operator has a strong incentive to design new terminal facilities to suit the needs of airlines (and passengers) but those needs may not be simple or homogenous.

At this point we think it merits comment that current regulatory processes also provide additional protections to airlines to ensure that HAL's decisions on design and build result in efficient outcomes that benefit airport users.

First, Heathrow's current approach to capital expenditure⁸ (which covers both the design and build phases), alongside its mandate for Constructive Engagement, already involves collaboration with airlines as well as construction/engineering experts. The approach was introduced for the first time at Q6 (meaning that it is relatively new and indeed the CAA commissioned a review of the approach in April 2017⁹) and was designed to overcome limitations identified during Q5. In particular, in its final decision on Q5¹⁰, the CAA recognised concerns expressed by HAL and airlines that the approach during Q5 was too inflexible, and airlines also expressed concerns that in their view HAL had limited incentives to deliver new investment projects on time and on budget.

The new approach lead to the introduction of:

- The Independent Fund Surveyor (IFS): this is an independent group made up of construction/engineering experts, with the intention that it can scrutinise plans and costs and mediate between the airport and airlines;
- The Gateway process: this is a project management process which requires HAL and airlines to sign off on all capex projects. The process is structured as follows:
 - Proposal, planning and approval for all capital expenditure go through a "gateway" process that formalises each of the steps in realising a capital investment. The process is tightly linked with Constructive Engagement and ensures that the appropriate levels of transparency, collaboration and agreement take place at each stage of investment.

⁸ The process for governing capital expenditure in the Q6 period is captured in the Capital Efficiency Handbook

⁹ https://publicapps.caa.co.uk/docs/33/1563e_H7_Capex_Governance_report_by_CEPA.pdf

¹⁰ Economic Regulation of Heathrow and Gatwick Airports 2008-2013 CAA decision. CAA, 2008

Figure 3 Q6 Gateway Process



Source: Heathrow Capex Efficiency Handbook

- The figure above shows that Gateways G0 through G3 cover the strategic justification, design and planning of each capital project. In these stages, Heathrow justifies to the airline community the need for a given project, the options available to pursue and the final budget and delivery plan for investment.
- At G3, the critical investment decision (whether to go ahead with the project or not) is made with the full consensus of the airport and airline community. Projects that have established strategic need and design may not go ahead once reaching G3, as needs may have changed or the value to airlines has diminished. Plans may be put on hold or altered to achieve agreement instead of passing through to implementation, but all investments must be accepted through this process.
- Subsequent gateways (G4 to G8) cover the delivery, completion and evaluation stages of each capital project. This includes beginning and finalising of construction, transition to regular operation and *ex post* reviews of performance and implementation. These stages of capital investment are expected to be undertaken in keeping with the plans agreed during the development stage – the budget, timeline and scope – and are supervised by both the regulator and the airlines. This gateway approach brings clarity and commitment on HAL to deliver an investment by an agreed date.

Similarly, 'Capex Triggers' can be added to projects to ensure that HAL lowers its airport charges if project milestones are not met.

Heathrow is also subject to outcome-based regulation, for example its Service Quality Rebate and Bonus scheme (SQRB). HAL pays rebates to airlines if performance slips below predefined thresholds, for example if queue times exceed an agreed standard. HAL will therefore bear these standards in mind when designing new terminals, or in other words, the service quality HAL will need to deliver terminals that can meet these service quality targets.

The CAA in partnership with HAL and the airline community has also established a Consumer Challenge Board (CCB), already common in the UK water sector. The CCB is responsible for engaging with Heathrow over its business plans to ensure a focus on passenger priorities and delivering good outcomes.

These processes therefore already provide an established process for introducing airline collaboration and expert scrutiny into the design and build phases, or at the very least a new process which can be built upon.

3.5 Conclusion

With regard to introducing competition into the design and build phase of terminal development, what is clearly most important is not which organisation actually performs the design and construction tasks, but rather who takes ultimate control of those processes and is subject to financial risk if they are not well delivered.

Under existing arrangements, HAL is fully responsible for the design and construction phases, although both will in practice be largely or wholly contracted out to independent specialist companies whose job it is to execute what HAL wants.

With respect to designing terminals, there is an inevitable trade-off between providing a tailored terminal designed to specifically meet the needs of individual airlines, and providing a 'one size fits all' terminal to enable all airlines and new entrants to compete on a level playing field. In our view it is not clear why a third party would be better at managing this overall process than HAL. And given that HAL owns and operates other terminals at Heathrow, it could well have a stronger incentive to think about the design of the new terminal within the context of that wider network.

By contrast, an independent operator seeking to design a new terminal may have a bias towards a specialist facility serving a very definite customer base (or specific airline). This may have certain benefits for that airline, but leaves the wider airport with the residual issue of providing terminal capacity for the general present and future airport user. And while there is a theoretical argument that introducing third party input into the design phase may boost innovation and creative design, third parties' reluctance to do so in other sectors, for example as with Ofgem's OFTOs, suggests this may not occur in practice. While an independent owner/operator of a terminal could be interested in engaging in the design phase also, independent operation does not *require* the third party to be involved in design, all the more so if third party operation amounts to a contracted-out operation of a terminal within a coordinated system.

With respect to the build of new terminals, this ultimately comes down to a question of procurement as HAL does not actually build anything itself, and rather it puts out construction projects to tender.

We note that with Constructive Engagement, the Gateway process, the introduction of the IFS, and capex triggers – amongst others – HAL already has an established process which introduces collaboration with airlines and expert scrutiny into the design and build phases. These processes were introduced into the regulation at Q6 meaning that there could be scope to refine them for future use.

4 FINANCE

4.1 Introduction

The purpose of this section is to describe how competitive arrangements could be introduced into the financing and ownership of new terminals at Heathrow.

4.2 What outcome would the CAA want to achieve?

At a high level, a successful outcome would be to achieve the lowest 'efficient' financing cost for the new terminal.

4.3 Are competitive arrangements the best way to achieve this?

There are recent regulatory precedents from other sectors where third parties have financed large projects that historically would have been financed exclusively by the incumbent private network or infrastructure operator. And the financing costs of the third parties appear to have been lower than those the incumbents would have been able to achieve as measured by the incumbent's regulatory Weighted Average Cost of Capital (WACC).

At first glance, this suggests these alternative delivery models lead to the exact outcome regulators want to achieve. However, a more detailed review suggests the lower financing costs observed have been, in large part, the result of more favourable regulatory conditions, rather than competition per se, and comparisons made with the WACC are not an appropriate like-for-like comparison.

The most recent examples of the introduction of competition can be found in the energy and water sectors. Ofgem and Ofwat have been particularly active in seeking to open up the delivery of large-scale projects to third parties. As described in the previous section, third parties have chosen *not* to take on responsibility for the design of new assets. The opportunity to finance these new projects has attracted the most third-party interest.

The Thames Tideway Tunnel (Water)

The Thames Tideway Tunnel is a large sewage tunnel, currently under construction, which will run for 16 miles under London. The tunnel is designed to collect excess sewage from Central London's sewage network and carry it directly to the Lee Tunnel, which will then carry it onwards to the Beckton Sewage Treatment Works.

The tunnel will run at depths of between 30m and 70m below ground, and will follow the path of the River Thames for much of its course. It is designed to carry off excess sewage in cases where high rainfall causes London's sewage network to reach full capacity. The current sewage network, designed in the mid-19th century by Joseph Bazalgette, discharges excess sewage into the River Thames in order to avoid backing up and flooding roads and buildings. This means that

sewage is discharged into the Thames roughly 60 times every year, resulting in 39 million cubic metres of untreated waste water flowing into the Thames. This leaves the UK in violation of the European Union's Urban Waste Water Treatment Directive, and therefore at risk of incurring significant fines. The Thames Tideway Tunnel will address this situation by carrying overflow waste water directly to treatment works rather than having it discharged into the Thames.

The project will cost an estimated £4.2 billion, which will be paid for by Thames Water by increasing the bills of its customers.¹¹ Thames Water will itself spend about £1.4 billion of this cost, with the infrastructure provider spending the remaining £2.8 billion. However, because of concerns about the ability of Thames Water to cope with a project of this scale, Ofwat has chosen to adopt an innovative financing model. While Thames Water will plan the project and fund it, a special corporate entity known as the 'infrastructure provider' has been created to build, own, and operate the Tunnel. The infrastructure provider is responsible for financing the construction of the Tunnel and is licensed and regulated by Ofwat. The infrastructure provider has contracted a number of construction companies to carry out the construction of various aspects of the Tunnel.

The framework for the financing model was set out in legislation. Defra used the Water Industry (Specified Infrastructure Projects) Regulations 2013 to create a special corporate entity referred to as the 'infrastructure provider'. This works under powers conferred by the Water Industry Act 1991. Under the regulations, a project can be 'specified', meaning that the project must be put out for tender, and a separate Ofwat-regulated infrastructure provider finances and delivers the project. The regulations allow a project to be specified if it is of a size and complexity that threatens the existing water company's ability to provide services for its customers, and/or if specifying the project is likely to result in better value for money than if the project were not specified.

The licence for the infrastructure provider was awarded through a competitive tender process, where bidders specified their required weighted average cost of capital (WACC) at which they would meet the costs of financing and operating the tunnel. The licence guarantees revenues until 2030. The tender was won by Bazalgette Tunnel Limited (BTL), a consortium of investors composed of Allianz Infrastructure, Dalmore Capital, INPP, DIF, and Bazalgette Investments Limited. BTL won with a WACC of 2.497%, significantly lower than Ofwat's indicative point estimate of 3.29% as presented in its draft guidance on the economic regulation of the Tunnel.¹² BTL will also be responsible for the construction of the new asset, along with financing (but not design).

The most likely alternative to this model would have been Thames Water financing and building the tunnel itself.

Offshore Transmission Operators (Energy)

The UK Government is aiming to generate 15 per cent of the UK's energy from renewable sources by 2020. Estimates by the Department for Energy and Climate

¹¹ National Audit Office, *Thames Tideway Tunnel: early review of potential risks to value for money*.

¹² Oxera report, *The Thames Tideway Tunnel: returns underwater?*

Change¹³ predicted that offshore wind turbines could supply 8 to 15 per cent of UK electricity by 2020. To achieve this, the Government aims to encourage the development of offshore wind farms.¹⁴

Offshore wind farms are built and operated by electricity generators. Carrying power generated on offshore wind farms to the onshore grid requires an expensive infrastructure of transformers, cables, and onshore substations: these are the offshore transmission assets.

Transmission assets normally consist of:

- Offshore platforms with transformers and control equipment where power from wind turbines is collected and transformed into high voltage for transmission to the shore.
- Cables to transport the power at high voltage from offshore wind farms to onshore substations.
- Onshore substations to transform the power from the wind farms into the correct (lower) voltage for onshore transmission through the National Grid.

The Gas and Electricity Markets Authority developed a regime whereby companies could bid for licences to operate, or build and operate, transmission assets. The Authority grants offshore transmission licences on the basis of auctions where bidders tender based on the annual payment they require in order to provide the transmission assets. A control is then imposed on the amount the licence-holder can charge for transmission, incorporating the amount tendered by the winning bidder into the licence. National Grid then pays the licence-holder the amount specified in the licence for its transmission services. The companies holding the licences and owning the transmission assets are called Offshore Transmission Operators (OFTOs).

At the time of writing, Ofgem is preparing for a 6th tender round for 3 new transmission assets, expected to be worth in excess of £2 billion.¹⁵ To date, 21 assets have been awarded through this process. During the tender process, new entrants will bid for a stream of regulated revenue over a 20 year period, and the lowest bid wins.¹⁶ Since round 4, bidders have also been able to bid for construction rights (an 'early' bid, relative to the standard 'late' one). As discussed in the previous section, bidders have, so far, elected not to select this option.

Were the competitive processes successful?

Overall, these projects appear to have resulted in lower financing costs, relative to a counterfactual in which the incumbent (National Grid or Thames Water respectively) would have financed the project by adding it to the company's regulatory asset base and financing it according to the regulatory WACC.

- The Gas and Electricity Markets Authority claims that savings of £350 million for consumers were achieved from the first round of OFTO licensing. The

¹³ This department no longer exists as its responsibilities were handed over to the newly formed Department for Business, Energy, and Industrial Strategy.

¹⁴ National Audit Office, *Offshore electricity transmission: a new model for delivering infrastructure*.

¹⁵ <https://www.ofgem.gov.uk/publications-and-updates/ofgem-s-information-event-ofto-tender-round-6>

¹⁶ Providing the bid also met a number of compliance criteria.

National Audit Office (NAO) believes that this figure is very sensitive to assumptions about the counterfactual, and not reliable. The estimated savings on financing costs include £161 million that would arise from lower tax payments by licence-holders relative to the counterfactual. These savings will have imposed an equivalent cost on taxpayers.

For the initial four licences, costs of debt were 2.1 to 2.2 per cent above the 'risk free' rate of 2.8 to 4.1 per cent represented by 15-year UK gilt yields. The NAO considers this to be a competitive cost of debt. Equity returns priced into the winning bids were in the range of 10 to 11 per cent in nominal terms. Compared with returns for other transmission companies of between 10.3 and 11.3 per cent these are potentially somewhat high. This is because other transmission companies (because of the different regulatory regime) are more exposed to construction risk and market volatility, so arguably should be making higher returns.

In a report commissioned by Ofgem, Cambridge Economic Policy Associates believe that the savings from the OFTO financing model adopted were in the order of 19-31% (depending on the specific counterfactual assumed).¹⁷

- Similarly, BTL's winning Weighted Average Cost of Capital (WACC) was 2.49%, significantly lower than both Ofwat's indicative (pre-bid) estimate of 3.29% and Thames Water's WACC of 3.60% in the PR14 price control.¹⁸

Recent regulatory developments in the water and energy sectors

In part based on the apparent success of OFTOs and TTT, Ofgem and Ofwat are exploring options to broaden the application of this competitive delivery model.

- **Competitively Appointed Transmission Operators (CATOs):** Ofgem has been developing draft guidelines for CATOs since 2011. In theory, these would function similarly to OFTOs but will be put in place for connecting large *onshore* generation plants to the rest of the grid. Ofgem was also keen to make CATOs an 'early' delivery model. Initially, Ofgem hoped to deliver the Hinkley-Seabank (HSB) project, connecting the nuclear power plant Hinkley Point C to the rest of the network, through this framework. However, legislation needs to be amended to allow Ofgem to implement the model, and this has not been forthcoming. Ofgem has been forced to explore alternative options as a result.
- **Proxy Competition (PC):** Ofgem proposed this model (and the SPV model described below) out of concerns with the legislative delays surrounding the CATO model. This model does not require a change in legislation so Ofgem can apply the model immediately and indeed Ofgem confirmed in July 2018 that this will be the delivery model for HSB.¹⁹ Under this framework, the incumbent (National Grid) will still deliver the project but it will receive a specific, separate, revenue allowance for this project. This will be set on the basis of what Ofgem *expects* would have been the outcome of a competitive tender

¹⁷ <https://www.ofgem.gov.uk/ofgem-publications/99546>

¹⁸ <https://www.oxera.com/agenda/the-thames-tideway-tunnel-returns-underwater/>

¹⁹ <https://www.ofgem.gov.uk/publications-and-updates/hinkley-seabank-decision-delivery-model>

process. The allowed revenue will be set over the period of its construction and 25 years of operation.

- **Special Purpose Vehicles (SPV):** Along with the PC model, Ofgem developed this as an alternative to CATOs. Ofgem ultimately chose to select the PC model over the SPV one for HSB. In this model, the incumbent will run a tender to appoint a third party (the SPV), who in turn, will finance and deliver the project on its behalf. An SPV can be 'early' or 'late'. As in the PC model, the allowed revenue will be set over the period of its construction and 25 years of operation.
- **Direct Procurement for Customers (DPC):** Ahead of PR19, Ofwat has obliged water companies to determine whether any of their large-scale projects (with a value greater than £100m) could be put out to tender. This is most similar to the SPV model in energy as water companies will be responsible for running the tender, supervising construction and operation, and paying the third party. Ofwat has stated that water companies should aim to secure long term contracts, between 15 and 25 years. Again, bidders can optionally chose to design the new asset (an 'early' model).

Water and Wastewater companies submitted their business plans to Ofwat for PR19 in September 2018. We have reviewed the business plans with a focus on the proposals around DPC. Companies have followed an approach of filtering their investment projects by a 'size test' and a 'discreteness test' to determine which might be suitable for DPC. The size test is based on the £100m totex threshold. The discreteness test applies Ofwat's criteria that the project should have limited economies of scale, and be 'passive' in the sense of having simple or limited interfaces with other parts of the operating network. A common theme is that while many of the projects due to begin over the next Asset Management Period pass the size test, few are discrete enough to be considered suitable for DPC. Some examples are provided below.

- **Anglian Water²⁰:** Anglian identified four projects which passed the size test. Two of them however were deemed not to pass the discreteness test, in which it scored the projects across six dimensions including: interfaces, degree of high level control required, and risks to the customer in the case of asset failure. The projects which pass are those which can be isolated from the rest of the system in the case of failure, and are relatively simple in operations. In contrast, a smart metering program was disqualified based on its multiple interfaces with the rest of the operations network, and the unsuitability of a long term DPC contract to a program where developing technology could render the assets outdated or redundant before the end of the contract.
- **Thames Water²¹:** Thames reports reviewing over 775 individual projects from its investment plan, many of which exceed the totex threshold. Of these only four were considered sufficiently discrete. DPC is considered to

²⁰

https://www.anglianwater.co.uk/assets/media/11c%20Anglian%20Water%20Direct%20Procurement%20for%20customers_DPC%20Eligibility%20Assessment%20KPMG%202018.pdf

²¹

<https://www.thameswater.co.uk/-/media/Site-Content/Thames-Water/Corporate/AboutUs/Our-strategies-and-plans/PR19/Appendix-8-Making-use-of-markets.pdf>

have potential to deliver value in these cases because of their “ability to be unbundled into discrete construction and operational service contracts”. The projects failing the discreteness test include a sewage treatment works which “has many operational interfaces and in itself is not a service which can be contracted in a way that adds value to customers over and above a more conventional D&B approach”.

- Severn Trent²²: Four projects were identified as of sufficient size to potentially benefit from DPC (applying a lower £80m threshold) but only one, the East Midlands raw water scheme, passed the discreteness test, based on it being a “standalone asset with limited integration with wider network”, with manageable risks and relatively simple interfaces. Other projects were disqualified based on assessments such as “asset failure would have significant and direct impact on SVT [Severn Trent’s] customers” and “significant physical and informational interfaces required between a number of parties”.

Possible implications for the regulatory framework of terminal expansion

As is apparent from the list above, the regulatory framework surrounding the appointment of third parties is still in its infancy, and existing impact assessments are only partial (or entirely theoretical in the case of models yet to be implemented). Still, there are two common themes that are consistent across models.

- First, all of these models result in a regulatory framework that is substantially different from the one in which the incumbents operate. To the degree that these models have (or could) result in lower costs, a large part of the reduction in costs can be attributed to (a) a lower cost of debt, and (b) more certainty on both the risks and rewards attached to each project. Neither of these two effects requires the introduction of competition, as illustrated by the ‘proxy-competition’ model.
- In addition, these two effects will not necessarily lead to lower costs *overall*, rather they lead to a reallocation of risk across from the third party to other stakeholders (such as the incumbent). It is unclear whether this is beneficial from the perspective of the final customer.
- Finally, Ofgem and Ofwat have only considered implementing these models in a very limited set of circumstances, for projects relating to assets that are very costly but also *passive*, and requiring no active management.

Prior to the introduction of these models, incumbents would have financed the assets in question through their capex allowances. In both the water and energy sectors, these investments would enter the incumbent’s regulatory asset base (RAB), on which it earns its pre-determined return, the regulatory WACC. In the third party financing models described above, competitors bid on the basis of the minimum WACC level they think they will need to finance the project, and the bid with the lowest WACC wins. It is through comparisons of the winning bid WACC and the incumbent’s regulated WACC that assessments have concluded that third

²² https://www.stwater.co.uk/content/dam/stw/about_us/pr19-documents/sve_appendix_a6_embracing_markets.pdf

party models are cheaper. And it is primarily through lower debt costs that they have outperformed the incumbent's regulated WACC.

A third party bidder will finance its debt at current market rates, rates that have declined quite significantly since the economic crisis of 2008. By contrast, a regulated WACC is set such that the cost of debt reflects the fact that some of the incumbent's debt is embedded (the debt was incurred in the past, and is set at a fixed rate). In the case of National Grid, Ofgem uses a 10-year trailing average to set the cost of debt.²³ In the case of water companies, Ofwat set a fixed cost of debt at the beginning of PR14, and applied a 75:25 ratio between embedded and new debt.²⁴

In both the case of OFTOs and TTT, third parties' ability to secure debt at market rates largely accounts for their lower WACC levels. In the case of TTT, it is possible to account for almost all the difference between BTL's winning WACC of 2.5% and the regulated WACC of 3.6% in PR14 through differential costs of debt. The real cost of debt faced by the bidder would have been in the range between 1.1% and 1.6%, by contrast to Ofwat's embedded debt cost figure of 2.65%. Holding all other assumptions for the calculation of the PR14 WACC constant, we estimate an alternative WACC between 2.26% and 2.57%, roughly in line with BTL's winning bid.

Ofgem's recent impact assessment of the potential benefits of the PC and SPV models similarly highlights the lower cost of debt as the primary mechanism through which cost savings will be achieved. Specifically, Ofgem states that applying either model ensures that:

"The historically low cost of debt currently available in the market is reflected in the charges consumers face. This low cost of debt can be locked in for the length of construction, and then the full 25-year operational period of the project."²⁵

In sum, access to a lower cost of debt is a big part of the reason why these alternative models have, in the recent past, resulted in cost savings, relative to delivery within the price control.

The other important factor that likely helped reduce financing costs under these alternative delivery models is regulatory certainty. Under these alternative models, third parties typically benefit from more favourable terms than the incumbent. In particular, they have more certainty on:

- Their future revenue streams: bidders have been guaranteed a fixed revenue stream over a much longer period of time (15-25 years depending on the model). By contrast, under the network price control RIIO-T1, Ofgem has set National Grid's allowance for 8 years, until 2021. For water companies, allowances are set for 5 years. The current period, PR14, will end in 2020. Increased certainty on the revenue side diminishes the risk associated with the investment.

²³ <https://www.ofgem.gov.uk/ofgem-publications/53602/4riiot1f financedec12.pdf>

²⁴ http://webarchive.nationalarchives.gov.uk/20150604030339/http://www.ofwat.gov.uk/pricereview/pr14/pap_pos201307finalapproach.pdf

²⁵ https://www.ofgem.gov.uk/system/files/docs/2018/09/impact_assessment_2018_final.pdf

- The risk incurred: in the models applied to date, OFTOs and TTT, the risks taken on by the third parties were significantly reduced, relative to those the incumbent would have had to take on.
 - In the case of OFTOs, third parties have not, to date, taken on any construction risk. Even when they were given the choice to opt for an 'early' model, bidders elected not to. If third parties are also responsible for operating the asset, its passive nature means this operating risk is minimal. Ofgem has also selected assets with only minimal interaction with the rest of the network, meaning interface risk is also minimal, a point we return to below.
 - Similarly for TTT, operating and interface risk is minimal. And though BLT will bear construction risk, this risk is contained: as part of the tender process, HMT has agreed to provide additional funding if build costs exceed expectations (at a pre-agreed threshold).

In other words, the risks and rewards offered up to potential bidders were more attractive than those an incumbent would typically face when delivering new assets under the price control. By stripping out large components of the risk of the projects, Ofwat and Ofgem have enabled investors to achieve higher gearing ratios (a measure of the relative contribution of debt and equity to total financing costs), further reducing their finance costs.

The combination of reduced risks and access to lower debt costs largely account for the cheaper headline cost achieved by these alternative models. Both could be achieved without the introduction of competition. On the cost of debt, the regulator could simply set the regulated WACC to reflect current market rates, while on the risk side, the regulator could isolate the project financing from up or downstream risks. To a large extent, this is exactly what Ofgem is trying to do with the PC model.

Rather than introducing competition, Ofgem will simply apply a project-specific regulated WACC, with a gearing ratio that solely reflects the risks attached to the specific project and debt costs set at the current market rates. Comparing delivery through this model to delivery through a third party would better isolate the impact of competition itself. While the PC model has yet to be implemented, Ofgem's preliminary assessments suggest savings are broadly comparable across the SPV and PC models (i.e. in a third party vs incumbent delivery model), but that those delivered through SPV are more likely to vary.²⁶

In sum, replicating the lower costs observed in the case of OFTOs and TTT could be done with or without the introduction of competition. Much will depend on the exact regulatory design of the alternative delivery model. But whether or not it *should* be done, in the case of terminal expansion especially, is unclear.

While the regulatory amendments described above could achieve lower project finance costs, it is unclear whether these will result in lower costs overall, at least from the perspective of the final customer. The models above allow the bidders to reallocate risk (to the offshore generator and National Grid in the case of OFTOs

²⁶ In Ofgem's middle scenario, the SPV model will deliver savings of 4.1-10%, relative to delivery through the price control, but rising to 13-18.7% if it is implemented 'efficiently', while the PC model will deliver savings of 10.9-12.1%. Assuming the SPV model will, on average, deliver savings between those two estimates and the savings levels are similar across the two delivery model.

and HMT in the case of TTT). If HAL bore all the construction, interface and operational risk even while a third party financed a new terminal, those risks would have to be taken into account in HAL's revenue allowance. Ultimately, these risks will be passed on to the final customer. From their perspective, it is not clear why either option is preferable to the other. Should things gone wrong, they will have to fund cost overruns in either scenario.

Furthermore, should HAL finance the new terminal itself, there is no reason to believe that it could not also acquire debt at current market rates. And this should be reflected in its regulated WACC. Under the existing price control, the regulated WACC should reflect the complete portfolio of assets and investments the incumbent has made to date. While it should, at least in part, reflect the cost of embedded debt (as incumbents must be compensated for past investments), it should also reflect current ones. In other words, you would expect HAL's regulated WACC to be lower in a scenario in which it funds the new terminal itself, and higher if it is funded by a third party. Again, from the final customer's perspective, it is unclear that one scenario is necessarily better than the other.²⁷

In addition, the lagged nature of the rate gives customers some protection from future increases in debt costs. Whether or not customers will be better off in the long term if regulators put more weight on the current cost of debt is hard to say, and will depend on the timing of investments, relative to fluctuations in the cost of debt. In fact, Ofwat's preliminary proposed regulatory WACC for PR19 is 2.4%, below BTL's winning bid. In the long run then, BTL's allowed return may not necessarily be cheaper than that which would have been achieved using the regulated WACC.

Finally, it is worth noting that developing these new models is not cost-free. The National Audit Office estimated that cumulative transaction costs of OFTOs, for winning bidders, generators, and the Authority were £7-8 million per deal, representing 7.5 to 21.1 per cent of the value of assets transferred.²⁸ Although the costs have reduced from one tender round to the next, the first implementation of a new model is always likely to be expensive.

Assessing these models from the perspective of the final customer, once all risks, regulatory adjustments, and implementation costs have been accounted for, it is less clear whether any of the alternative delivery models described above will result in lower costs in the long term.

But even if a stronger case could be made, and the overall benefit of past cases was large, it is not clear that these models could be applied to the development of a new terminal. As described above, both TTT and OFTOs involve passive assets, assets that require no active management, and have low maintenance costs. Not only are these assets passive, but they also have minimal interaction with the rest of the network. In fact both Ofgem and Ofwat have set out that these alternative schemes should *only* be applied to these types of assets. In its guidelines on DPCs, Ofwat states that, to be considered, projects should:

²⁷ In the case of TTT, Thames Water's regulated WACC is set at the industry level so it would have been harder for Ofwat to adjust the regulated WACC appropriately if Thames Water had delivered the project itself. However, as HAL's regulated WACC is regulated individually, there is no reason to think the adjustment could not be made.

²⁸ <https://www.nao.org.uk/report/offshore-electricity-transmission-a-new-model-for-delivering-infrastructure/>

- “have limited economics of scale and scope with the rest of the network;
- be simple or limited, with well understood and manageable interactions with rest of network; and
- include more ‘passive’ assets, that are not actively managed as part of overall system.”²⁹

And indeed, water companies’ recently published business plans suggest that while many projects meet the £100million threshold, far fewer meet these additional criteria. For example, Thames Water notes that “although we have many other large schemes proposed in our programme which meet the totex threshold, they are generally not sufficiently discrete to meet the market’s need to offer a solution or service back to Thames Water.”³⁰ Other water companies have made similar comments.³¹ On the face of it, a new terminal satisfies none of these criteria and it is unlikely that a similar type of project would have been considered eligible in the water and energy industry.

4.4 Conclusion

In the last few years, there have been examples of third party tenders for the financing of large-scale projects which have resulted in lower financing costs than would be achieved by the incumbent. But a more careful examination of these examples suggest these lower costs are, in large part, the result of a more favourable regulatory regime, rather than the competitive process itself. While regulatory precedent suggests there are ways in which the existing regulatory regime could be amended to drive down the cost of specific projects, it is unclear whether these will translate into lower overall costs for customers.

In past cases, these reduced costs were partly achieved through the reallocation of risk from the project to other stakeholders. This isn’t obviously beneficial to customers. In addition, past comparisons of winning bid WACCs to the incumbent’s regulated WACC have implicitly assumed that the incumbent’s would remain unchanged if they delivered the project themselves. And yet, if HAL can finance the project making use of today’s lower debt costs, then this should be reflected in its regulated WACC, likely reducing it. Conversely, third party financing would mean HAL’s WACC would be either unchanged, or even increase if they bear a significant part of the risk. Again, it isn’t clear that the third party financing option would result in a net benefit to customers.

Finally, all past cases where third parties have successfully bid to finance large-scale projects have involved passive assets, with minimal interaction with the rest of the network. Regulators in both the water and energy sectors have indicated that a competitive tender process is only appropriate for these types of assets. On the face of it, a new terminal would not qualify.

²⁹ <https://www.ofwat.gov.uk/wp-content/uploads/2017/12/Final-methodology-1.pdf>

³⁰ <https://corporate.thameswater.co.uk/-/media/Site-Content/Thames-Water/Corporate/AboutUs/Our-strategies-and-plans/PR19/Our-plan-2020-to-2025.pdf> (p89)

³¹ See, for example, Anglian’s assessment. https://www.anglianwater.co.uk/_assets/media/PR19%20OurPlan%202020-2025%20Website.pdf (p134)

5 OPERATE: REGULATORY ISSUES

5.1 Introduction

The purpose of this section is to describe how competitive arrangements could be introduced into the operation of new terminals at Heathrow.

5.2 What outcome would the CAA want to achieve?

Ultimately, any new terminal needs to be operated efficiently including coordination with the rest of the airport, in terms of other terminals (enabling for transfer passengers) and air traffic control, the apron, taxiways and runways.

5.3 Are competitive arrangements the best way to achieve this?

As discussed in Section 2.3, we consider three high level models for competitive arrangements under a third-party owner:

- **Option 1:** Non-airline operator, but no inter-terminal competition on airport charges;
- **Option 2:** Non-airline operator which competes with HAL in terms of airport charges and service quality;
- **Option 3:** An airline operates its own terminal and competes with HAL's existing terminals.

The regulatory considerations differ under each of these models because the identity of the third party operator and the degree of competition with HAL determines how operations are integrated and organised. We discuss these implications in more detail below, with reference to international experiences of terminals operated under Options 1 and 3.

A further point to bear in mind is that we have assumed under all our analysis that each of these options would be feasible from a legal perspective. In practice, Options 2 and 3 would require substantive changes to the regulatory framework and possibly new legislation, so there would be a significant lag in implementing a new system. The 2009 Competition Commission investigation into introducing terminal competition at UK airports³² notes two important points:

- In the situation of a lack of spare capacity which requires continued regulation to ensure non-discriminatory access for the new operator to the airport's facilities, "it may be [...] that the regulatory regime under STOD [separate terminal operation and development] would be as onerous as under the current system".

³² https://webarchive.nationalarchives.gov.uk/20140402212103/http://www.competition-commission.org.uk/assets/competitioncommission/docs/pdf/non-inquiry/rep_pub/reports/2009/fulltext/545_10_11.pdf

- As compared to the status quo, the report notes that “the legal framework is currently a major impediment to the implementation of STOD at any BAA airports”.

This is not to say that it would be impossible to implement a competitive model, but altering current legislation presents an additional obstacle, and we may have to anticipate an increased role for the regulator under this scenario and accompanying regulatory costs. We can draw a parallel here with the legal barriers which have so far obstructed Ofgem’s attempts to implement Competitively Appointed Transmission Operators (CATOs) (see Section 4.3).

5.3.1 Option 1

Option 1 involves a non-airline entity operating the new terminal, for example an experienced operator from a different airport. Under this option we also make the assumption that there is no inter-terminal competition. By this, we mean that HAL continues to set uniform airport charges across all terminals.

Under this approach there is, in no sense, competition between the independent terminal and the existing ones. This arrangement effectively amounts to a form of outsourcing.

We note that such an approach has already been implemented at some airports, meaning that it is technically feasible. (However we note that the examples below all relate to publicly owned airports):

- Riyadh, Saudi Arabia (publicly owned): Dublin Airport Authority (daa), which owns and operates Dublin airport and Cork airport, operates T5 at Riyadh for domestic connections whereas the incumbent airport operator operates international connections.
- Haneda Tokyo, Japan (publicly owned): two private operators operate the terminals, one handling international traffic and the other handling domestic traffic.
- Antalya, Turkey (publicly owned): ICF (Fraport) operates all three terminals.

For this approach to be implemented there would need to be a contract between the airport and the terminal operator for the mutual provision of services. The terminal would have to guarantee certain capacity so that the rest of the airport could plan accordingly, and the airport would have to guarantee access to apron and runway services. This approach is broadly consistent with the approach envisaged for DPCs in the water sector.

While there is no inter-terminal competition as such under this approach, there could still be benefits from these arrangements. For instance, the CAA could have access to a new benchmark of cost information. If the new operator is more efficient at operating the terminal, this could be used as a benchmark to apply downwards pressure to HAL’s cost forecasts in other terminals for subsequent regulatory periods.

However, various issues could arise with this approach. The main issue relates to a loss of communication, managerial oversight and vertical integration: this approach introduces an extra entity into the busiest airport in Europe. At the

moment, HAL manages all terminals and the runway infrastructure and has the option to be flexible during busy periods and severe weather events. Given that this approach effectively involves outsourcing, the new terminal operator could still work in a collaborative way with HAL and other terminals. But it would still ultimately be more challenging to manage these busy periods. (As described below, JFK airport has attracted negative press attention for the way in which it deals with severe weather events and busy periods).

We note that in the case of OFTOs, CATOs, and DPCs, Ofgem and Ofwat have been clear to ensure that such approaches are used only for passive pieces of infrastructure which have limited interfaces with the rest of the network. A busy terminal with shared access to runways is obviously not a passive piece of infrastructure.

Assuming the new terminal charges the airport for the provision of these services, are these charges regulated (subject to periodic review) or fixed by contract and treated as a cost pass through item? The latter is how DPCs are envisaged. But this requires the licence holder, in this case HAL, to prove that the long term contract with the terminal operator is efficient and value for money. This raises questions about long term sustainability. For example, as with Private Finance Initiatives, such contracts can lead to a material loss of flexibility in the long run if circumstances change.

5.3.2 Option 2

Option 2 implies the presence of inter-terminal competition. In particular, the new terminal operator would compete with the existing terminals to attract airlines. Airlines would therefore be faced with a choice between a HAL-operated terminal (which would remain vertically integrated with the rest of the airport) and the new terminal. The benefit of this approach is that competition could lead to lower airport charges and improved service quality at all terminals. This could result in lower air fares for passengers and an improved customer experience. However, we note that these benefits should be considered theoretical because as far as we are aware, this model is not implemented at any major airport.

This approach would require a significant change in regulation at Heathrow. In particular:

- The introduction of wholesale regulation: the new entrant would still require access to Heathrow's surface access, ATC, apron, taxiways and runways. Wholesale charges would need to be introduced to ensure that the new entrant compensates HAL for the cost of providing this infrastructure and the associated services, and these would need to be regulated to ensure that HAL does not exploit its market power by setting excessively high wholesale charges;
- The deregulation of terminals: logically this model also requires that terminal charges (the charges levied by the terminals to airlines to recover the cost of the terminal-based infrastructure and services) are deregulated.

The relative size of the wholesale charges (for access to the essential facilities) and the retail charges (those levied by the terminals to airlines) would therefore

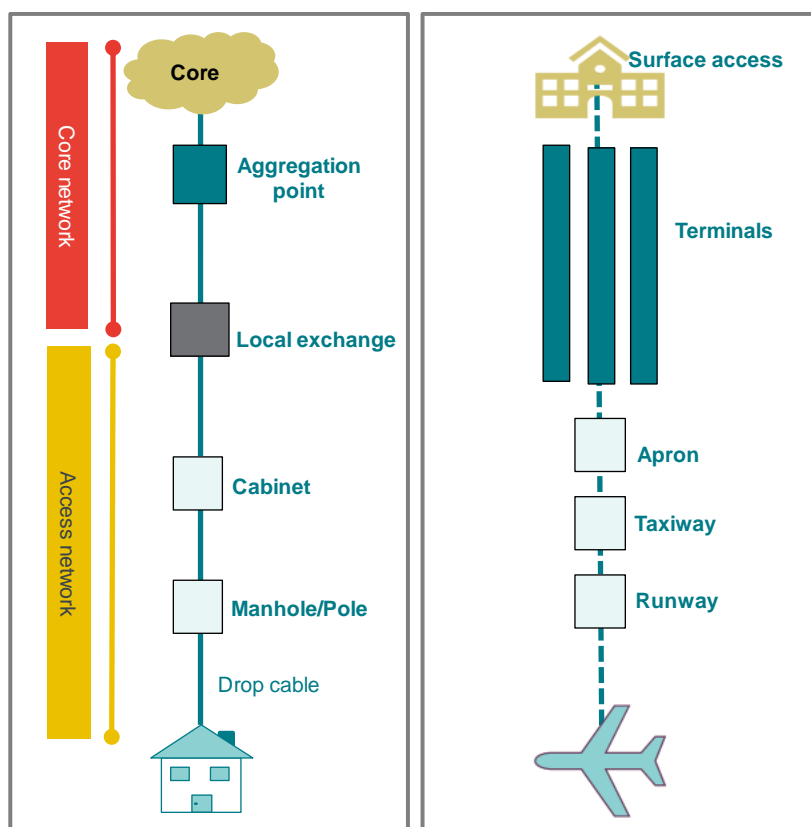
have a significant impact on the extent to which competition can actually work effectively.

This approach is analogous to competition in the UK fixed line telecoms sector. BT was historically the sole provider of fixed line telecoms services in the UK, operating a large network made up of two main components:

- The access network: this is the segment of the network which connects the customer premises to the local exchange;
- The core network: this is the segment of the network which aggregates and reroutes traffic over the network.

A high level illustration is provided below, alongside a high level illustration of an airport, which we will refer to below.

Figure 4 The UK telecoms network



Due to the nature of aggregation in the telecoms network, the access network is the most costly component. This is because each customer premises (around 30 million in the UK) has its own cable connected to the local exchange, with an average distance of around 3.5 km per subscriber.³³ The core network is much shorter in length, as traffic from millions of individual subscriber lines is aggregated at a much smaller number of local exchange buildings (around 6,000).

In 2000, Oftel (now Ofcom) determined that competition could be introduced into the retail market by obliging BT to grant access to its access network to third parties

³³ https://www.ofcom.org.uk/_data/assets/pdf_file/0017/54116/line-length-cost.pdf

in exchange for a wholesale charge. This meant that third parties (such as Sky and Talk Talk) could pay a wholesale charge to BT to rent the subscriber line in the access network and then self-provide its own core network. In this way, access-seekers could compete with BT in the retail market.

Comparing this approach to the situation at Heathrow, the essential facility in BT's network, the access network, is akin to the surface access, ATC, apron, taxiways and runways at Heathrow. And the core network is akin to the terminals. This means that third parties could compete with HAL to provide services to airlines by buying access to those other essential facilities and then self-providing its own terminal services.

The 'in principle' benefits behind the access-based wholesale regime are clear. Competition can be introduced into a market for the first time. However, we consider there to be various issues with this approach. Oftel and Ofcom have encountered various issues along the way, many of which were not envisaged in their entirety at the time when the regime was introduced:

- Costing issues: First, there is a considerable costing exercise to estimate the appropriate wholesale charges. This involves estimating how much it costs the incumbent to provide the underlying infrastructure and wholesale service. However, regulators need to contend with various costing issues, many with ambiguous answers.

At Heathrow, this would involve an exercise to isolate the cost of non-terminal services and infrastructure, as distinct from the airside infrastructure and surface access. This could lead to issues about the delineation/border between the regulated and deregulated businesses. The inputs into the regulatory process can have a significant impact on the market. If wholesale charges are set too high or too low, the regulator may have introduced competition in the retail market on an uneven playing field, whereby HAL may not be able to recover its costs or where the new entrant cannot compete profitably. At an extreme, if the new entrant cannot compete profitably it may decide to exit the market, causing significant disruption in a busy system.

There is an issue about residual risk. If an independent terminal operator fails, then who bears the risk of taking over the terminal? Under the current model, this risk ultimately lies with HAL.

- Margin squeeze: Similarly, the incumbents may be able to engage in margin squeeze, i.e. attempting to overstate the fair wholesale charge and/or lowering its retail prices to the extent that the access-seeker cannot compete profitably in the retail market. Regulators need to develop ex ante and ex post margin squeeze tests to ensure that the incumbent is not engaging and has not engaged in margin squeeze: once again the 'correct' approach can be ambiguous.
- Discrimination/refusal to supply: Vertically integrated incumbent providers can discriminate against access-seekers. For example, in telecoms, incumbent providers if unchecked can introduce lengthy and overly burdensome administrative processes that access-seekers have to go through in order to switch over retail customers from the incumbent's network to its own. Similarly, in the event of a fault on multiple subscriber lines, the incumbent is often

responsible for maintenance and repairs, and it has an incentive to repair the lines of its own retail subscribers first.

At Heathrow, this could involve HAL giving preferential treatment to its own terminals. For example, in the event of significant disruptions, it could give priority access to the runways to its own terminals ahead of the new entrant's.

- Separation: To try to combat the issues of discrimination, Ofcom moved towards a more formal separation of BT between its access network and the rest of the business. This started with functional separation, and the introduction of Openreach to operate the access network independently, and then structural separation. The purpose was to ensure that BT's retail business was not given any preferential treatment with respect to the access network compared to access-seekers. However, separating the businesses leads to a loss in various benefits associated with having a vertically integrated operator.

Under the vertically integrated model, operators may be able to benefit from synergies and economies of scope. One investment made across multiple parts of the value chain could be more valuable and efficient than separate investments made within individual parts of the value chain. And this is especially the case if the different parts of the value chain are operated by separate entities who cannot coordinate their approaches.

- Stifling investment: If HAL were to operate its terminals as well as the essential facilities (surface access, apron, taxiways and runways) then it may have less of an incentive to invest in or upgrade the essential facilities. This is because any improvements will also benefit the new entrant. With respect to option value, HAL may have to bear the cost in full of any unsuccessful investments, but then share the benefits of successful investments with the new entrant.
- Infrastructure-based competition: Following on from the above, by stifling investments, the performance of the network may improve at a slower rate than under the status quo. And this would hamper competition with infrastructure-based competitors and other networks: BT's network already faces some competition from Virgin's cable network and mobile networks, and Heathrow already faces competition from other London airports.
- Slot allocations: An additional point to note is that, based on our conversations with Heathrow, we understand that current slot guidelines allocate runway slots to airlines with reference to a particular terminal. Under a model where terminals compete to attract airlines, this would be an extra complication in deciding how to regulate the charges that a new terminal would pay HAL for access to the runway services. While this problem is not insurmountable, it presents an extra regulatory obstacle.

All the points above suggest that while there may be in principle benefits to introducing a competing terminal, there are various regulatory hurdles to overcome. There may then be a trade-off between introducing separation to ward off issues with discrimination and losing the benefits of having a vertically integrated operator.

As discussed in more detail on the section on the technical feasibility of these alternative models, there are also various factors which may limit the effectiveness of such an approach in the airport sector:

- **Excess capacity:** For such a model of competition to work, whereby airlines can switch to a terminal which sets lower airport charges and/or has better service quality, all terminals would need significant spare capacity, as was noted by the Competition Commission in 2009³⁴. After all, if all terminals were full then switching is not a possibility. This is less of an issue in the telecoms sector whereby operators can switch customer lines at relatively low cost.
- **Capacity constraints in a deregulated market:** For such a model to work, airport charges relating to terminal services would need to be deregulated, in order to give terminals the scope to change their airport charges to attract new business. However, if Heathrow were to become constrained (either in aggregate or even just during peak hours) then the terminals may be in a position to increase their airport charges during these periods to choke off excess demand. Given that airport charges are currently regulated it is plausible therefore that airport charges could actually be higher under this model.
- **Flexibility and maintenance schedule:** Under the status quo, HAL is able to use all terminals as a system to deal with shocks. In principle, this could involve switching aircraft to different terminals during severe weather events, or during times of planned maintenance. However, the ability to do so would be lessened if one terminal is operated independently.

Some of these operational issues could be overcome by implementing a System Operator (SO) model, where the SO has overall responsibility for coordinating the use of the network and to try to achieve efficiencies. For example, in the GB electricity sector, National Grid is the SO and is responsible for ensuring the system is operated within safe limits, and for ensuring that the pattern of supply and demand is consistent. HAL could take on the role of the SO. However, as shown in the case of BT/Openreach, this would create scope for discrimination and may ultimately lead towards separation and the loss of benefits.

5.3.3 Option 3

A new terminal could be operated by an airline or group of airlines, either directly or through a contract with a third party. For example, a third party could operate the terminal and sign a contract with an airline or group of airlines giving them access to a significant share of capacity at the terminal.

This approach effectively represents a transfer of vertical integration from the airport to the airline: instead of the terminal being vertically integrated with respect to the rest of the airport, it would become vertically integrated with respect to the rest of the airline. In principle, this can lead to benefits in that the airline can provide a more tailored end-to-end service which could bring benefits to passengers. The airline may also be able to achieve a cost advantage relative to other airlines at

³⁴ https://webarchive.nationalarchives.gov.uk/20140402212103/http://www.competition-commission.org.uk/assets/competitioncommission/docs/pdf/non-inquiry/rep_pub/reports/2009/fulltext/545_10_11.pdf

Heathrow who do not operate terminals. This could therefore increase the competitive pressure on HAL to be efficient in its own terminal provision and operations.

From an operational perspective, the issues that impact on Option 2 above also impact on this option, because in both instances the terminals are operated independently and without full coordination with the other terminals.

As an example from the UK rail sector, the Office of Road and Rail (ORR) produced an independent inquiry into the major disruptions that were brought about by the May 2018 timetable restructuring.³⁵ In its report, the ORR outlined a number of failings that it believed contributed to the widespread disruptions to the GTR (Thameslink, Southern, Great Northern) and Northern Rail networks following a major timetable restructuring. One of its findings was that the current governance system in the railway industry means that there is no single body with sufficient oversight and authority to identify and flag the risks from dependent projects and manage risks.

While we understand there are no examples of Option 2 being implemented at major airports, there are examples of Option 3, mostly notably at JFK in New York. The model of operation at JFK regularly attracts negative media attention and criticism from the Port Authority of New York and New Jersey (PANYNJ). For example, following a severe weather event in January 2018, the airport experienced significant disruption. A lack of coordination and communication between the independently operated terminals added to the issues, which included two planes colliding with each other on the apron. PANYNJ commented:

“With respect to this storm, the Port Authority will aggressively examine the coordination and preparation by airlines, terminal operators, and Port Authority staff to assure, in particular, that international flights not experience international gate congestion similar to what occurred this weekend... What happened at JFK was completely unacceptable and we will investigate what went wrong and prevent it from happening again.”³⁶

There are also examples of failed independent terminal operators, such as at Brussels Airport. The private company Brussels Airport Terminal Company (BATC) was created to build and operate a new passenger terminal, which opened in 1994, but in 1998 BATC merged with the Belgian Airways Agency to bring all the airport infrastructure under one owner.³⁷ The reasoning for this move was on efficiency grounds and because of the different incentives at play for the terminal operator versus the airfield operator³⁸, which speaks to the obstacles that would have to be confronted in order to design the regulation of an independent terminal in a way that promoted effective competition.

³⁵ http://orr.gov.uk/__data/assets/pdf_file/0018/39042/inquiry-into-may-2018-timetable-disruption-september-2018-findings.pdf

³⁶ https://www.panynj.gov/press-room/press-item.cfm?headLine_id=2862

³⁷ <https://www.brusselsairport.be/en/our-airport/about-brussels-airport/history/modernising-brussels-airport>

³⁸ https://webarchive.nationalarchives.gov.uk/20140402212103/http://www.competition-commission.org.uk/assets/competitioncommission/docs/pdf/non-inquiry/rep_pub/reports/2009/fulltext/545_10_11.pdf

There is a question around whether the airline terminal operator is the only user of its terminal, or whether it also gives access to other airlines. If it does not, the new terminal is not in competition with the other terminals because it is not trying to attract other airlines to its terminal. With respect to regulatory issues, there are differences between Option 2 and this model. Under Option 2, the model requires that we:

- introduce regulated wholesale charges (for access to the runways etc.); and
- *deregulate* retail charges (the airport charges that the terminals levy to airlines).

However, under this option, we would need to:

- introduce regulated wholesale charges (the same as Option 2 above); but
- *continue* regulating retail charges, to ensure that HAL does not charge excessive prices to the airlines using its terminals.

This model could therefore have a greater regulatory burden in that both wholesale and retail charges would need to be regulated. It should also be noted that any model that required substantive changes to the regulatory framework could not be implemented overnight, and as a result there could be delays to delivering new capacity.

If the airline terminal operator *did* allow other airlines access to its terminal, it raises an additional question with respect to the charges that it levies to those other airlines. Would these be regulated retail charges specific to its terminal or the same charges as those in the other terminals?

Considering wholesale charges, a costing exercise would be needed to set charges for access to the runways and other shared infrastructure. If the access charges are too low then the airline would hold an extra cost advantage (on top of any other cost advantages that it can achieve) in the retail market. And if the access charges are too high then it runs the risk that the airline pulls out of the terminal. Again, this highlights the issue about residual risk. If an independent terminal operator fails, then who bears the risk of taking over the terminal?

Clearly the risk profile of airport infrastructure is quite different to that of an airline, and as a result many airlines may not be interested or able to take on the financing of major terminal infrastructure. This model could be better suited to network carriers (as in the case of the US) where integration between the hub airport and hub airline operations may be more valuable. But such integration raises other competition issues: if the airport becomes designed around the interests of its hub carrier this may reduce competition between air services at the airport. Market power issues may be more likely to arise even though the airport itself is regulated.

5.4 Conclusion

In principle, third parties could operate a new terminal at Heathrow, and such an approach does exist at some airports. The precise model can vary in terms of whether the operator is an airline or not, and also whether there is actually inter-terminal competition, i.e. whether terminal operators compete with other to attract airlines, e.g. by competing on the level of airport charges and/or service quality. The set of regulatory issues differs under each case.

The main downside to such an approach is that introducing a third party into a busy system may lead to a loss of coordination at the airport level: this is an issue that Ofgem and Ofwat have been keen to avoid in ensuring that only passive assets are opened to competition.

On top of this, in order to facilitate inter-terminal competition the regulator would first need to define wholesale access prices, which is not without complication. To remove the scope for the incumbent to engage in anti-competitive practices such as margin squeeze, refusal to supply and discrimination, the regulator may then need to move towards a general model of separation of terminals from other airport operations. However, this at the same time comes at the cost of the airport losing the benefits associated with having a vertically integrated operator.

Even if these regulatory inputs can be defined accurately, it is not clear whether the terminals at Heathrow would have sufficient spare capacity to actually allow for airlines to freely switch between terminals. And if there is not enough spare capacity, terminals may actually increase their airport charges in order to choke off the excess demand, which undermines the very purpose of introducing such a model in the first place.

Finally, there is a question with respect to residual risk. If an independent terminal operator fails, then – aside from the operational issues this would cause – who would bear the risk of taking over the terminal? A similar point relates to asset lifetimes. Terminal infrastructure typically has a long asset lifetime. If a new entrant were to exit Heathrow before the end of this asset lifetime (e.g. suppose it had a 20 year licence), then it may have limited incentive to maintain infrastructure with lifetimes greater than its licence period. For example, BA has a lease with PANYNJ to operate T7 at JFK until 2022, with an option for a three-year extension. Some terminal assets may have longer lifetimes than BA's licence period.

The issues of residual risk and asset lifetimes are less of an issue for HAL under the current regulatory framework as it effectively expects to operate Heathrow in perpetuity.

6 OPERATE: PRACTICAL ISSUES

6.1 Introduction

In the previous section we commented on the extent to which different competitive arrangements could be introduced into the operation of new terminals at Heathrow. This analysis focussed on the pros and cons of the different options largely from a regulatory perspective.

However, we note that Heathrow is the busiest airport in Europe and there may well be practical, technical and operational reasons which could in reality limit the success of such options. We carried out a series of workshops with operational staff at Heathrow to understand better how such approaches could work in reality.

The issues we describe in this section are not enough to dismiss the idea of introducing competition out of hand. They are not insurmountable but they are obstacles which would need to be overcome, and issues which would not arise under the status quo where HAL continues to have full responsibility for delivering new terminals.

Each of the three alternative operating models identified in the previous section opens up a different set of regulatory issues. However the practical considerations under each alternative model are similar. In each scenario the airport system experiences a loss of vertical integration between the terminal and the rest of the airport infrastructure including the surface access, apron and runways.

We have identified two high level issues with such an approach:

- There are benefits to centralising some operations and generally having one operator with full oversight. These benefits could be lost or lessened if one terminal is not fully integrated into the system;
- A line would need to be drawn between where the third party's responsibilities lie and where HAL's responsibilities lie. This can lead to inefficiencies and unintended consequences around these boundaries.

We discuss these points below.

6.2 Benefits of centralisation

In the water sector, Ofwat's guidance for DPCs state that candidate projects should "have limited economies of scope and scale with the rest of the network; be simple or limited... include more 'passive' assets". A terminal that sits at the centre of the airport network and requires active management does not meet these criteria.

The reasoning for such criteria is that in complex and interdependent systems a single vertically integrated operator might be able to provide services more efficiently than a network of independent operators. These efficiency benefits can then be passed on to customers/passengers. We identified multiple areas of terminal operations where passengers receive better outcomes because of centralisation:

- Resilience: In December 2010, heavy snowfall led to severe cancellations and disruptions at Heathrow over several days. The airport was criticised for its slow return to normal capacity, and for poor communications during the crisis. The Heathrow Winter Resilience Enquiry, chaired by Professor David Begg, produced a report highlighting several areas of poor coordination between parts of the airport system as contributing to the extent of the disruption and impact on passenger welfare. The recommendations for improvement included:
 - Communications: BAA to have control of flight information in terminals during emergencies to establish one authoritative source of information. Communications infrastructure to be centralised under one unified Airport Communications and Control Centre;
 - Command and Control: The Capacity Constraints Group (CCG) to have the lead on restoring flow rate to the airport, through joint decision making with the airlines, chaired by a BAA official;
 - Preparation and planning: BAA to work together with airlines and NATS to review the snow plan and invest in de-icing processes. In the case of a snow event, BAA to hold a crisis meeting together with stakeholders to plan their response.

The common themes of the Enquiry's recommendations include the need for centralisation of operations and decision making in times of crisis. Centralised communications would have lessened the loss of passenger welfare due to uncertainty about cancellations. Adding an external operator to the system introduces additional frictions in the chains of management and responsibilities put in place for responding to crisis events, which goes against the direction of the recommendations made in the Resilience Enquiry. This is supported by the experience of inter-terminal competition at JFK, which attracted negative press coverage for how it dealt with severe weather events.

This is also similar to the UK rail sector experience and the May 2018 timetable disruption. The ORR outlined a number of failings that it believed contributed to the widespread disruptions. One of its findings was that the current governance system in the railway industry means that there is no single body with sufficient oversight and authority to identify and flag the risks from dependent projects and manage risks.

During busy periods, severe weather incidents, and external shocks (such as the 2017 BA IT system failure), a system with multiple operators could be placed under pressure.

- Airport Operations Centre (APOC): Established in 2014, APOC monitors operations across the entire airport with the aim of reducing delays at each stage of passengers' end-to-end journey, and has responsibility for responding to emergencies. Such an operation requires the centre to have monitoring and operational control over each stage of the airport and enables different teams to collaborate, which would not be possible without vertical integration of the terminals.
- Common IT infrastructure standards: Heathrow Airport's Information Technology Common Infrastructure Policy (October 2010) lays out a strategy

to adopt as much common IT infrastructure across existing and new facilities as possible, with the aim to “reduce costs and complexity and maximise flexibility, re-use and share resources.” Having a third party would create the need for an interface which does not need to exist under the current regulatory regime. This interface is not insurmountable but it could create a vulnerable weak spot. The 2017 BA IT system failure provides a recent example of the potential disruptions brought about by IT failures.

- **Duplication:** An external terminal operator would almost inevitably lead to duplication in some parts of the business, including head office costs, as well as larger pieces of infrastructure. Therefore while there may be benefits to competition, these are at least in part offset by duplicated costs.
- **Service quality:** HAL wants all passengers to receive a good customer experience, and indeed various metrics included in its service quality regulation (e.g. SQRB) measure average performance across all terminals. This means that there are currently processes in place which incentivise HAL to improve service quality in all terminals. HAL may have no control over an independently operated terminals, which could in principle decide to provide a no-frills terminal service.
- **Stakeholder engagement:** HAL engages with many different stakeholders and can adopt policies which impact over the whole airport. This could be compromised if a third party entered. For example, in its Heathrow 2.0 strategy HAL has made a number of commitments to support sustainable growth, for example operating zero carbon infrastructure. Implementing these commitments will require coordination between all parts of the airport and each terminal, and there is no guarantee that a third party would uphold the same standards as HAL.
- **Business development:** HAL occasionally supports airlines from time to time by relocating them next to partner airlines, which enables smoother connections for passengers. If HAL does not operate all terminals, its ability to do this is weakened. We note that alliance affiliations and code-share agreements do change from time to time.

In principle, some of the points above could be dealt with by designing wholesale access charges, for example a central IT system is deployed by HAL and the entrant pays for use of these services. However there are two issues with this approach. Firstly, including a large proportion of the terminal services in the wholesale access charge reduces the size of the value chain over which the entities are competing. This raises a question over the size of the potential benefits from competition if the total size of the market is only a fraction of the airport charge. Secondly, in practice the different areas of the airport infrastructure are not clearly delineated which could make it more difficult or costly to define which entity has responsibility over each part. This is discussed in the next section.

6.3 Boundaries

With an external operator running the terminal there would need to be either a contract between the external operator and HAL for the mutual provision of services (Option 1), or regulated wholesale charges for access to these services

(Options 2 and 3). A line would need to be drawn between where the third party's responsibilities lie and where HAL's responsibilities lie. However in practice the line is not always clearly delineated. This can lead to inefficiencies and uncertainty around these boundaries. Again, these issues are not insurmountable but they would not arise under the current model of regulation, and they present risks which detract from the potential benefits of competition. Based on discussions with HAL we identified the following issues:

- **Baggage:** Heathrow uses an integrated baggage handling system which coordinates baggage transfers between terminals, including a £270m tunnel linking Terminals 1, 3 and 5. In principle a new terminal could have its own infrastructure terminal-side and pay charges for access to the 'shared' section of the baggage handling system, but in practice it would be difficult to define which parts of the infrastructure are shared and which are new-terminal-only. Similarly, if passengers have the right to claim compensation for delayed, lost or damaged bags, then in some instances it may not be clear which operator was responsible for bags lost in different parts of the system.
- **Passengers with Restricted Mobility (PRMs):** Heathrow reported that 1.2 million PRMs passed through the airport in 2016. These passengers are entitled to special assistance from their arrival at the airport through to travelling through their destination terminal. Having a third party terminal operator breaks up the responsibility for this service in the middle of the system. HAL would be responsible for the passenger's journey through the surface access, and the transit on the apron side, whereas the terminal operator would be responsible for the transit through check-in and security. This adds two additional interfaces to a system where a good passenger experience involves a seamless transition between each stage.
- **Security:** HAL ultimately has overall responsibility for security at Heathrow. Introducing a third party introduces a new separate point of access to various sensitive areas which are managed by the third party but where HAL has the ultimate responsibility.
- **Large aircraft:** We understand that even if a terminal has the gates to serve a large wide-bodied aircraft, the operational constraint may lie in the apron/taxiways, i.e. they may need to be widened. If HAL had responsibility for the taxiways and the third party had responsibility for the terminal, then who would be responsible for the cost of expanding the capacity?

6.4 Conclusion

International experience has demonstrated that it is feasible to introduce competition. However our analysis raises examples of practical obstacles that would need to be dealt with if any such alternative model were to be put into practice at Heathrow. Primarily these involve the loss of centralisation benefits such as economies of scale from having one operator, and the problem of delineating the parts of the airport infrastructure to enable a third party to coordinate with the existing system at Heathrow. Introducing a competitive third party also introduces additional interfaces and frictions between the different parts of Heathrow's operations. In such a complex system, where delivering a good

service to passengers requires each component part to work efficiently together with the other parts, such frictions could involve significant costs. This could erode the margin of any benefits from competition delivered to the passengers using Heathrow's services.

7 CONCLUSION

We have been commissioned by HAL to comment on the relative pros and cons of introducing competition into the delivery of new terminals.

First, it is important to note that introducing competition should not be viewed as an outcome in its own right, but rather competition is a means to help achieve positive outcomes. To this end, we need to define what successful outcomes look like in the context of new terminals at Heathrow, and then we can consider whether introducing competition is the best way to achieve them. At a high level, we believe that successful outcomes at each step in the value chain are as follows:

- **Design:** A new terminal should be designed in a way that best serves the needs of the passengers and airlines that use it, as well as ensuring that it is well-integrated with the rest of the airport;
- **Build:** Given the design, the construction of the new terminal should be smooth and efficient, and delivered on time;
- **Finance:** Given the design and build, the terminal should be financed at the lowest feasible cost;
- **Operate:** The terminal should be operated efficiently, including coordination with the rest of the airport.

We believe that these are the key high level outcomes with respect to new terminals and this remains the case whether it is HAL or a third party who is responsible for delivering them.

To introduce a competitive model various regulatory, legal and operational interfaces need to be created between HAL and the third party. These are interfaces that do not need to exist today. Introducing a third party operator and moving away from the current centralised model of operation at Heathrow can only increase the risk of lapses in coordination and communication, especially during busy periods and severe weather events. Therefore, the risks associated with implementing a largely untested alternative model are not immaterial, and all the more so if the objectives that the model is intended to achieve are not clear. When considering whether to introduce competitive arrangements, any possible benefits have to be weighed against the risks associated with a largely untested alternative model.

