

**Transport for London**

**Projects and Planning Panel**

**Subject: The Future of London's Ticketing Technology**

**Date: 26 February 2014**

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**1 Purpose**

- 1.1 The panel requested an update on the future of London's ticketing technology.
- 1.2 We run the world's most successful smartcard ticketing system. Since its inception in 1998, the Oyster card system has reduced the cost of revenue collection by more than one third and has been central to improving customer service and customer satisfaction.
- 1.3 Advances in technology and the rising expectations of our customers are driving many changes in this area: further development of Oyster; the Future Ticketing Programme; the proposed Fit for the Future – Stations programme; and ITSO, sponsored by the Department for Transport (DfT). This paper provides a summary of the changes.
- 1.4 The Panel is asked to note the paper.

**2 Introduction**

- 2.1 In 1997, the ticketing system comprised life expired equipment, was heavily reliant on staff intervention and was prone to fraud and fare evasion. In the early 1980s, increasing demand and the installation of gates in central London stations had resulted in major congestion, leading to gates being left open during peak periods.
- 2.2 In response, a comprehensive package of changes resulted in the installation of gates at nearly all Tube stations, replacement of 1950s era ticketing equipment on buses and the introduction of the Oyster card system. The Oyster card increased capacity by allowing 40 customers per minute to pass through gates compared to 15-20 with magnetic stripe tickets.
- 2.3 In keeping with investment practices of the time, these changes were procured through a Private Finance Initiative (PFI) contract called "Prestige". The contract was signed in August 1998 with a term of 17 years.
- 2.4 After the creation of TfL, a number of further changes were made.
- 2.5 The Docklands Light Railway and Tramlink became part of TfL and, for the first time, were included in the ticketing system. In parallel, the customer proposition around Oyster was significantly enhanced with the 'pay as you go' and 'capping' proposition that is now the mainstay of the product. Price differentials were introduced between pay as you go (PAYG) and cash fares in order to drive the adoption of Oyster.

2.6 The result is that Oyster is now the principal travel ticket in London. 87 per cent of journeys on TfL’s services are made using Oyster, equating to 12.7 million taps per day.

2.7 Figure 1 shows the growth in Oyster card issuance. Figure 2 shows the adoption of Oyster PAYG on rail and buses.

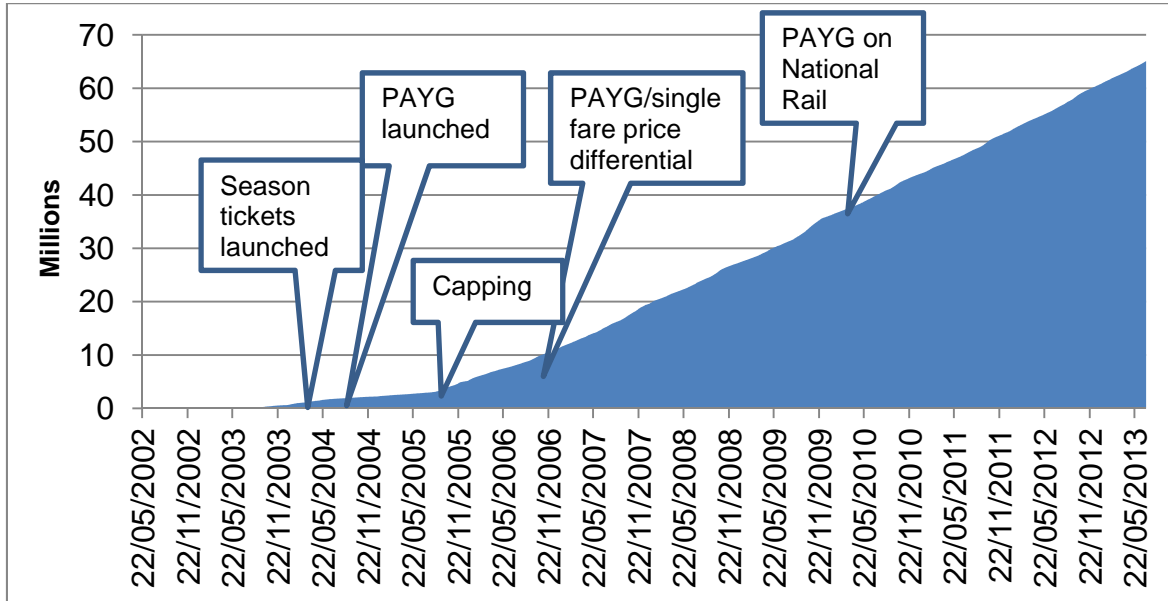


Figure 1: Oyster card issuance

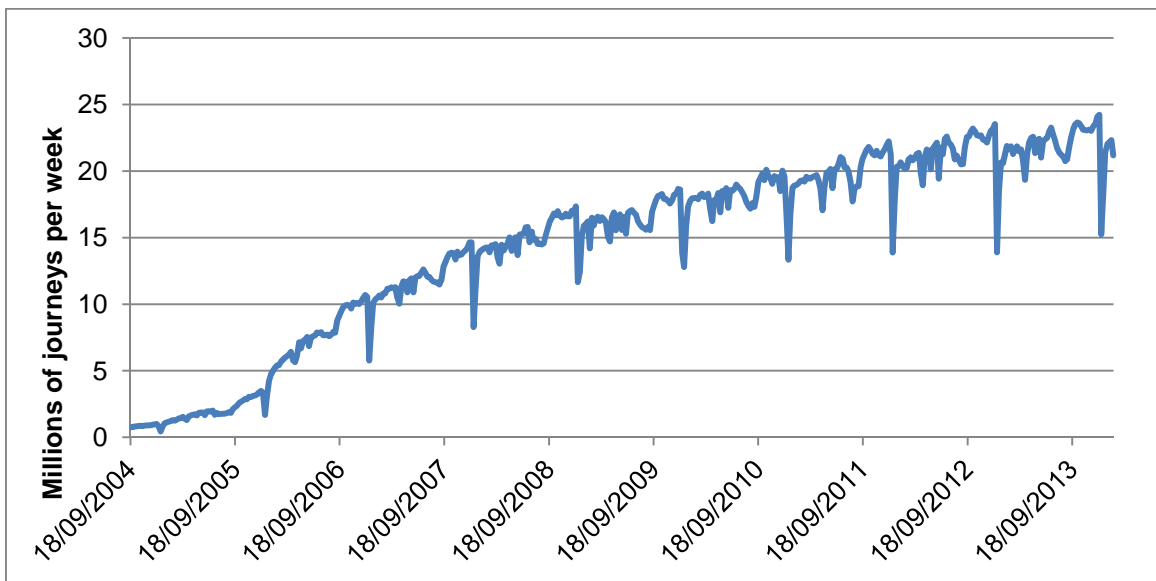


Figure 2: Oyster pay as you go adoption

2.8 With the success of Oyster, there was rising demand from customers for Oyster on services operated by London based train operating companies (TOCs). Progress on this was slow, partly because the TOCs felt unable to participate due to the rights vested in their franchise contracts.

2.9 In 2006, we struck a deal to solve this and between 2006 and 2009 we negotiated with all nine London TOCs to agree the acceptance of Oyster. It was introduced on these services in January 2010.

2.10 Studies undertaken by the Massachusetts Institute of Technology have demonstrated that accepting PAYG has directly increased TOC revenues by 6 per cent in London, or by more than £100m per year.

### **3 Current issues**

3.1 Oyster has delivered a wide range of benefits to us and our customers, including:

- (a) interoperable ticketing accepted across all forms of public transport in London;
- (b) enabling a significant change in customers' purchasing behaviours with only three per cent of Tube journeys now starting with purchase at a ticket office. The number of ticket office transactions has declined from about 7m per period to under 2.5m per period despite a 30 per cent increase in journeys during this period. This trend continues with further reductions seen each period;
- (c) making it easier for customers to self serve, with purchasing choices simplified;
- (d) enabling increased throughput at gatelines, as the transaction time is half that of magnetic tickets; and
- (e) eliminating some ticketing frauds, including ticket touting.

3.2 However, a number of issues remain. Due to the proprietary nature of Oyster and the equipment and systems used, it still has a high cost base and cannot be reprocurd easily on the open market. Furthermore, all pertinent information is held on the card itself. It does not lend itself well to online or mobile transactions. Refunds or corrections to customer accounts are difficult to make as the correction needs to be reflected on the actual card itself.

3.3 In 2005/06, the cost of revenue collection was 14.3 per cent of revenues. We took action to reduce this cost, including terminating the PFI contract and awarding a new contract to Cubic Transportation Systems while bringing in-house some services, where that solution offered better value for money. By 2012/13, this resulted in the cost of collections coming down to 8.8 per cent of revenue. By comparison, benchmark data for other cities shows that New York's costs are around 15 per cent and Paris' around 20 per cent of revenue.

3.4 We have now reached a point where there is limited scope to reduce further the cost of collection, due to the nature of the technology that Oyster uses. The following sections describe the work to deliver further cost efficiency while continuing to enhance the customer experience.

### **4 Programme of change**

4.1 A number of improvements to the ticketing system have already been made, as outlined in paragraphs 4.2-4.4.

4.2 To improve the customer experience:

- (a) Wide Aisle Gates have been installed at most Tube stations, making life easier for customers who are mobility impaired, have a buggy or heavy luggage;
- (b) new self-service ticket machines have replaced those which only issued printed tickets. These now also dispense Oyster cards;

- (c) new rules to enable many customers who accidentally fail to touch out to have an automatic refund of the maximum fare;
- (d) customers with an online account can receive a regular statement of their journey history and fares paid;
- (e) self-service machines have been improved to make them easier for customers to use. Staff can also assist customers so that they do not need to queue at a ticket office;
- (f) over the last 13 periods, device availability has been 98.78 per cent on the Tube and 99.14 per cent on buses, whereas under the Prestige contract the requirement was to achieve availability of 95.5 per cent; and
- (g) a new generation of self-service machines will provide a consistent customer experience at Tube, Overground and Crossrail stations.

#### 4.3 To assist the national rail network:

- (a) We have worked with the DfT on the ability for the Oyster system to accept ITSO cards. This is described in more detail below; and
- (b) We have supported the TOCs by enabling the expansion of Oyster acceptance to Watford Junction, Shenfield, Grays and, from later this year, Gatwick.

#### 4.4 To increase the efficiency in the way that we collect revenue:

- (a) further reductions have been made from improvements in the maintenance processes for the fare collection system; and
- (b) We are currently retendering our full fares collection system, known as project Electra, which will deliver further efficiencies in the existing contract. The procurement is due to be complete by October 2014. This project is the subject of a separate paper on the agenda for this meeting of the Panel.

#### 4.5 In addition to these changes that have already been implemented, a number of other changes are being made to ensure that TfL's fares collection system is fit for the future:

- (a) we are delivering a range of initiatives to support the proposed Fit for the Future – Stations programme. These are described below; and
- (b) the Future Ticketing Programme will revolutionise the way in which customers pay for travel using contactless payment cards.

## 5 Future Ticketing Programme

5.1 The Future Ticketing Programme (FTP) arose out of an analysis of emerging technologies and the work on the cost of revenue collection. A study in 2006 identified the alternatives that might become available to TfL by 2015, of which Contactless Payment Cards (CPCs) and mobile phones enabled with near field communication technology were the most promising. The cost of revenue collection shone a light on the cost of ticket selling, a process that could be radically changed with the acceptance of a payment product issued by the wider payments industry.

- 5.2 The introduction of CPCs was seen as a significant opportunity to find new ways for customers to pay for their travel without the need to get a ticket from us first. This enables us to reduce ticketing costs while also improving the customer experience (compared to Oyster) because information is held in an intelligent back office system rather than on the card itself.
- 5.3 The FTP will:
- (a) make ticket purchase and after sales processes simpler, faster and more accessible;
  - (b) reduce the total journey time, through removing the need to make a transaction prior to making a journey;
  - (c) reduce commission charges through promoting customer self-service as the primary retail channel;
  - (d) reduce the overall cost of revenue collection by moving away from Oyster's proprietary technology; and
  - (e) make refunds and other adjustments easier to deliver.
- 5.4 The FTP is also delivering a new Oyster product for those not wishing to use CPCs. This aims to replicate the benefits of CPC on an Oyster product.
- 5.5 The programme is in five phases:
- (a) **Phase 1** – CPC acceptance on buses successfully launched in December 2012, making CPCs an alternative to cash fares;
  - (b) **Phase 2** – Extending CPCs to TfL's other transport services and also introducing daily and weekly capping. This is in 'live' proving;
  - (c) **Phase 3** – Season tickets on CPCs by mid 2015, subject to Electra procurement;
  - (d) **Phase 4** – A new card platform for Oyster which uses the FTP back office for all ticketing products; and
  - (e) **Phase 5** – Decommissioning of the legacy ticketing system.
- 5.6 The launch of CPCs on buses has been successful with nine million journeys made since December 2012 and up to 50,000 journeys a day using CPCs. Growth in the number of journeys is about five per cent per week. The only significant issue so far has been complaints from customers being charged on the 'wrong' card when they had intended to pay with an Oyster card but presented a CPC instead. Complaints about this average between one and two per day. Figure 3 shows the adoption of CPCs on buses.

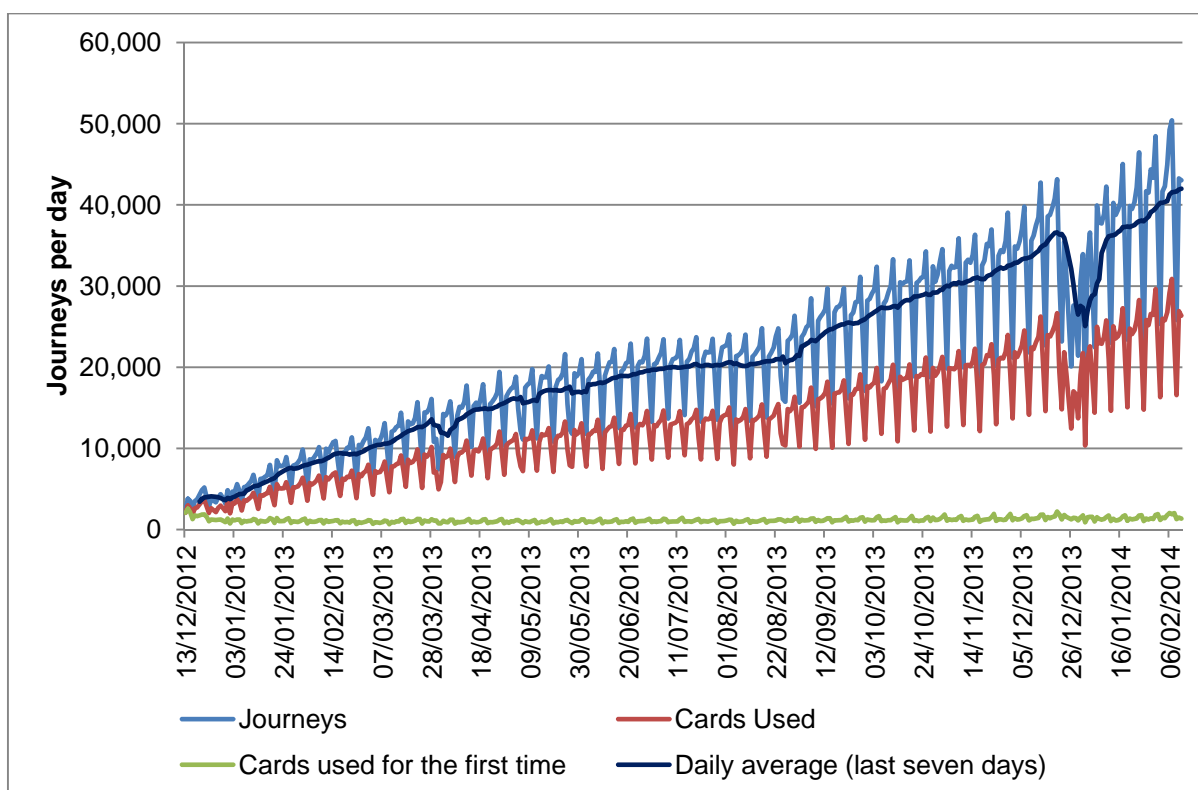


Figure 3: CPC acceptance on buses

- 5.7 Work on Phase 2 – extension to our other services – is now nearing completion and the system has been in live proving since November 2013. The aim is to expand the live proving to a staff and customer pilot followed by a full customer launch later this year. The schedule for Phase 2 has had to be changed significantly due to an agreement with the DfT to support an accelerated rollout of ITSO, as discussed below in section 9. As a result of this change, the launch of Phase 2 was delayed by a year to December 2013. Since then the late changes to the fares revision and the industrial action on the Underground have delayed the launch further. The current plan is to start the staff and customer pilot at the beginning of March followed by a full scale customer launch after results from the pilot are available.
- 5.8 Phases 1 and 2 had an approved capital budget of £74.5m. At present the expected financial cost of these phases is £67.7m. Phases 1 and 2 also had a number of areas of increased operating costs and associated revenue uplifts and savings totalling a net expenditure of £68.1m. Against this the current forecast out-turn is £94.5m. The reason for this variance is largely to do with the current forecast uptake of CPCs. A recent, prudent estimate of the uptake has reduced the forecast, resulting in a decrease in the projected revenue uplift and commission savings, while also reducing the operating costs associated with CPCs. These forecasts will need to be revisited when more evidence of uptake is available later this year.
- 5.9 Work on Phase 3 has started recently. While most of the work will be done in-house some work needs to be procured from our fare collection systems contractor. This work may be affected by the moratorium put in place to allow a transition from our current contractors to a potential new contractor, subject to the outcome of the procurement. The procurement of the fare collection systems is listed separately on the agenda.

## **6 Fit for the Future – Stations**

- 6.1 In addition to the Future Ticketing Project, the ticketing system is being upgraded to enable it to support the proposed Fit for the Future – Stations programme: new functionality for self-service machines; an upgrade to the Oyster Online website; and development of an App for mobile devices.
- 6.2 Self-service machines, known as Passenger Operated Machines (POMs), are being enhanced in the following ways:
- (a) new screen layouts and storyboards to make them easier for customers to use;
  - (b) PAYG refunds of up to £10 (plus card deposit) will be dispensed in cash. This will make it easier for visitors to get a refund of their remaining balance;
  - (c) at the busiest locations, new note dispensers to enable notes to be given as change and for refunds;
  - (d) the coin handling algorithms are being changed so that the instances when they are unable to give change are reduced;
  - (e) the larger multi-fare machines are being fitted with Oyster dispensers so that the functionality is more consistent between devices;
  - (f) more concessionary entitlements will be able to be loaded on to Oyster cards at the devices;
  - (g) staff will be able to assist customers whose Oyster card has failed, by issuing them a replacement card free of charge;
  - (h) it will be possible to obtain an Oyster card and add a monthly season ticket to the card without needing to register the card, although customers will be encouraged to register online; and
  - (i) a large number of additional POMs are being installed at key locations.
- 6.3 The Oyster Online website is being rebuilt on the same platform as the Oyster photocard concessionary schemes. The new system will provide a range of additional functionality:
- (a) enhanced sales capability will allow concessions and some discount customers to purchase online and make online purchasing attractive to more adult customers;
  - (b) refunds directly to the customer's card or bank account, radically simplifying the refunds process;
  - (c) manage failed cards online – e.g. customers will be able to transfer products on failed cards to new cards dispensed at station POMs;
  - (d) change ticket validity online to increase or decrease zones; and
  - (e) manage lost or stolen cards online.

## **7 Mobile App**

- 7.1 We are in the early stages of developing a secure mobile app to help drive channel shift for customer service.

- 7.2 Although 75 per cent of Londoners visit [tfl.gov.uk](http://tfl.gov.uk), only one per cent of ticket sales are made online, due to the constraints of our current systems. The app would allow TfL to:
- (a) provide alerts when a PAYG balance is running low or when a season ticket will shortly expire;
  - (b) improve the purchase process to store payment card details and preferred station for collection, so that customers can make a purchase in just a few presses of a button;
  - (c) allow customers to request a refund on an incomplete journey or on a season ticket; and
  - (d) enable more customers to sign-up to an online account, enabling them to protect the products and money on their card.

## **8 Cashless bus**

- 8.1 In 2000 about 30 per cent of bus journeys used to result in a ticket being sold on the bus. With the introduction of Oyster PAYG, this has now dropped to about one per cent of journeys. As a result, the Mayor has now approved plans for buses to stop accepting cash altogether subject to strengthening arrangements for vulnerable customers. This change will be implemented later this year. In advance of this, new capability will be introduced allowing bus customers to make one further journey when they do not have a sufficient balance on their Oyster card.

## **9 ITSO**

- 9.1 The DfT has funded a £66m project to upgrade the Oyster system to be able to accept ITSO compliant smart ticketing. ITSO is the DfT sponsored smart card, which is intended to allow smart ticketing to be interoperable.
- 9.2 The programme has delivered the capability to allow National Rail singles, returns and season tickets to be introduced on ITSO smart cards, along with the capability to accept English National Concessionary passes electronically on buses. The programme has suffered delays due to the immaturity of the ITSO technology. We have had to take a lead in resolving many known issues with this technology. In order to meet the DfT's expectations for the use of ITSO for national rail ticketing we have had to accommodate a large package of works to make this technology work. In 2011, we agreed to delay the launch of Phase 2 of FTP to allow ITSO to start working on some national rail services by the end of 2012 and to deliver all elements of ITSO capability by the end of 2013.
- 9.3 The first phase is live, allowing TOC products to be accepted at their own gated stations. The card readers on gates at Tube and Overground stations have also been upgraded ready for Travelcard seasons to be accepted when a TOC issues them on an ITSO smartcard. The final elements of capability were demonstrated to the DfT in December 2013 and will be deployed to the live environment later this year when individual TOCs are ready to issue and accept ITSO products. This will also allow ITSO smart cards to be used on readers at ungated stations and on buses. We are now working with the DfT to close out the project.
- 9.4 We are also working with a number of TOCs to enable smart ticketing to be used by their customers travelling in to London from outlying areas. We have worked with:



- (a) Southern to enable point to point smart season tickets to be accepted at Clapham Junction, East Croydon, London Bridge and London Victoria since October 2013;
- (b) Southern to introduce Travelcard season tickets on ITSO smart ticketing for customers travelling from outside the Travelcard area;
- (c) c2c to test smart ticketing products prior to introducing these between Southend and Fenchurch Street;
- (d) South West Trains to identify a programme that will allow their smart ticketing products to be accepted for journeys to London Waterloo; and
- (e) the South East Flexible Ticketing programme within DfT, which is investing in smart ticketing equipment for stations around London, and has a seat on the Programme Board.

9.5 Each of these projects involves significant effort as we resolve implementation issues and different interpretations of the ITSO specification.

## **10 Exploitation of Intellectual Property**

10.1 With the contract restructuring in 2008, we took charge of the ticketing technology and now own the intellectual property over most of our systems. The intellectual property in the smartcard readers has been licensed to Sydney and Vancouver, yielding approximately £3m in royalties.

10.2 There is significant interest from around the world in adopting the account based systems we are building through the FTP, which we are also looking to exploit commercially.

## **11 Conclusions**

11.1 Significant changes have been made to our ticketing systems over the past years and a large volume of change is currently being delivered, including world leading innovations. All of these aim to improve the service we deliver to customers and to drive greater efficiencies for TfL.

## **12 Recommendation**

12.1 The Panel is asked to NOTE the paper.

## **13 Contact**

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