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Cost Benefit Analysis of the NPA

Supporting Document

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Disclaimer

The estimates, projections and assumptions in this document are what we consider reasonable based on secondary research, primary data gathering and discussions with a representation of banks, FinTech companies, businesses, payment system operators etc.

However, the assumptions used, when averaged or aggregated are subject to variations and may not necessarily reflect the expectations of individual participants in the payments system.

1 Cost Benefit Analysis of the NPA

1.1 About this Paper

In this paper, we set out our analysis of the costs and benefits associated with adopting the NPA to delivering the three End-User Needs (EUN) solutions. We compare this to the costs and benefits of keeping the existing systems separate and carrying out a minimum upgrade of each. We believe this paper will be of most interest to PSPs, PSOs and vendors.

1.2 Introduction

We prioritised three end-user solutions (the 'overlay services'): Request to Pay, Assurance Data and Enhanced Data. This paper looks at the benefits these solutions would deliver, and the costs that would be incurred to implement the NPA to deliver them. We compare these to the costs and benefits of an alternative upgrade that would be a minimum approach in the absence of the NPA, as we believe that to 'do nothing' is not an option. This is largely as a result of the PSR's Infrastructure Market Review, which requires Bacs and FPS systems to upgrade their existing central infrastructure to be ISO 20022 compliant at re-procurement, that is, by 2020.

In this alternative minimum upgrade, we assume that the three EUN overlay services are not delivered. We take this view due to technical limitations, for example, the lack of full end-to-end ISO 20022 compliance inhibiting the delivery of Enhanced Data; and ongoing complexity that would be inherent in a minimum upgrade, which would continue the parallel running of three infrastructures.

The remainder of this paper considers the costs and benefits of the two scenarios. We consider:

- The benefits of adopting the NPA.
- The cost of delivering the NPA.
- The benefits of the Alternative Minimum Upgrade.
- The cost of the Alternative Minimum Upgrade.

1.3 Methodology and Approach

Approach Overview

The CBA framework has been developed based on the perspective of five groups of participants in the payment process. These participants include: end-users (i.e. consumers, businesses and government), PSPs, Payment System Operators (PSOs), Infrastructure Providers and Aggregators.

Our approach to the CBA modelling involved:

- Estimating the current costs of the interbank payments system i.e. FPS, ICS and Bacs.
- Estimating the costs and benefits of the NPA.
- Estimating the costs and benefits of the overlay services.
- Estimating the parallel running costs.
- Estimating the costs and benefits of the alternative minimum upgrade.

Further detail on the assumptions we have taken to model our findings can be found in Appendix 7.1.

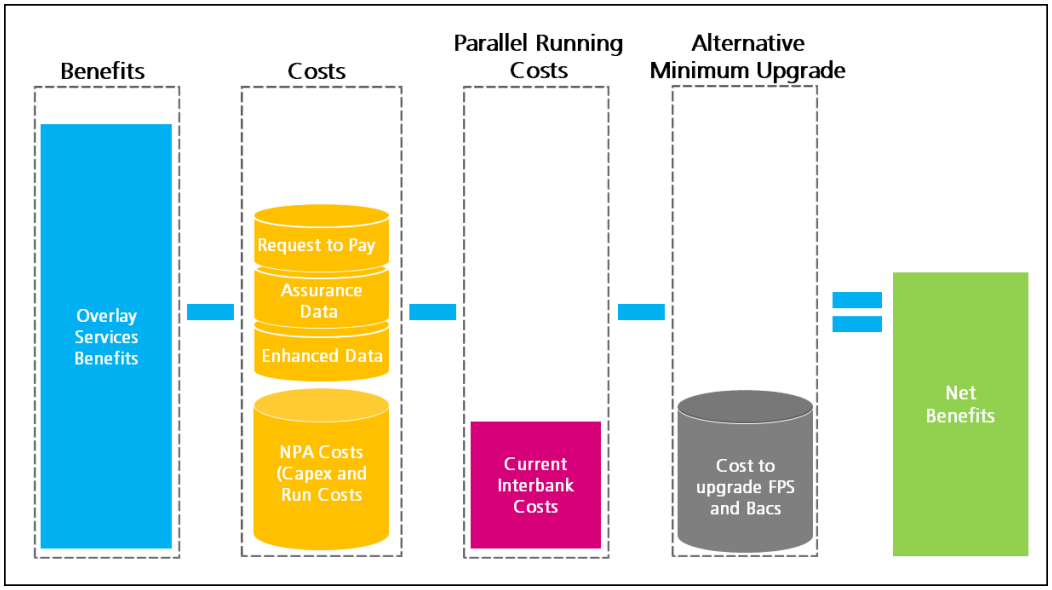

Figure 1.1 CBA Overview

Modelling Parameters

Social Time Preference Rate:

Social Time Preference is defined as the value society attaches to present, as opposed to future, consumption. The Social Time Preference Rate (STPR) is a rate used for discounting future benefits and costs, and is based on comparisons of utility across different points in time or different generations.[1]

The HM Treasury Green book recommends that a 3.5% STPR be used as the standard real discount rate.

Inflation

In this CBA, we have ignored the impact of inflation because the prediction of future prices introduces unnecessary uncertainty into the analysis. This conforms to best practice guidelines as set out in the HM Treasury Green Book where it stipulates that benefits and costs should be expressed at today's price level.

Supporting Information

Our analysis builds on evidence in the work undertaken in the Strategy and is based from the findings of two main evidence gathering processes: desk based research; and a stakeholder engagement programme across the payments industry.

We held discussions with the following types of stakeholders: PSPs of all sizes; Payment Service Users (PSUs), including large and small corporates and public sector organisations; Payment System Operators (PSOs); infrastructure providers and aggregators and; FinTech companies.

Analysis

The main purpose of the CBA is to use the cash flow forecasts attributable to the NPA to calculate suitable net return indicators i.e. the Net Present Value (NPV). We have used the incremental Discounted Cash Flow (DCF) approach. This implies an assumption that only cash inflows and outflows are considered.

[1] The Green Book – Appraisal and Evaluation in Central Government.

2 NPA Benefits

Our analysis shows that there is a gross benefit opportunity of between £11.5 billion and £14 billion associated with the NPA in the period 2019 to 2031. This includes the incremental benefits of the EUN solutions and a continuation of the benefits delivered by the existing Bacs, FPS and ICS services. We include the latter as these services (and their benefit) will continue to be provided through the NPA.[2]

We estimate that the incremental gross benefit of introducing the three overlay services is £7.4 billion – £9 billion.

Details of benefit narratives and estimates can be found in the Appendix. Table 1.1 provides a high-level summary of the range of benefits associated with the implementation of the NPA and overlay services.

There are also significant qualitative benefits that will come from deploying the NPA and the EUN solutions. The NPA, underpinned by the flexible layered architecture and simplified access, will support easier access and more competition between PSPs and other providers relative to existing systems. Less onerous direct access for PSPs is an important qualitative benefit identified by stakeholders. The flexible architecture will also make change easier at both institutional and industry levels. It will enable simpler delivery of new innovative services – future user needs will be more easily met.

For the overlay services, qualitative considerations include the wider societal benefits of the three EUN solutions. Overlay services could improve financial inclusiveness, customer experience and trust in electronic payment systems. For example, Request to Pay aims to give more control to end-users, notably when they have irregular cash flows due to the nature of their work schedule. These particular customers are currently reluctant to adopt a Direct Debit payment plan due to the risk of unarranged overdraft charges and other penalties.

We do not present a quantification of government benefits in this analysis. We understand however, that these solutions will provide benefits to government institutions as one of the major users of payments systems. The drive for a more efficient public sector will undoubtedly be aided by the NPA and these overlay services. Further, the expected greater financial inclusion which will come about from the planned changes will help drive the government's agenda in that area. In addition, the innovative solutions that will be facilitated by the NPA will also help support the government's digital agenda with benefit to the UK as a whole. Therefore, the quantitative benefits attributed to NPA adoption and the EUN overlay services in this study should be interpreted as conservative, with substantial potential for greater financial benefit over time.

[2] We have conservatively assumed the benefit of the Bacs, FPS and ICS services are equal to the current operating costs of these services. This is based on the assumption that Bacs, FPS and ICS as they are currently being run generate benefits that are equal to the costs that participants in the current UK payments system pay to run them. We have also done this for the Alternative Minimum Upgrade benefits.

Solution	Benefit	Benefits (2019-2031)
Enhanced Data	Auto-reconciliation could reduce payees' manual and invoice reconciliation costs.	£3,710m - £4,530m
Assurance Data	The solution would help reduce losses associated with invoice fraud.	£1,300m - £1,600m
Request to Pay	The solution would reduce average unit cost of producing and sending invoices for medium and large businesses.	£850m - £1,030m
Request to Pay	Improvement in liquidity and subsequent reduction in financing costs.	£550m - £670m
Request to Pay	Request to Pay is cheaper for businesses than re-presentation of a failed Direct Debit.	£460m - £560m
Assurance Data	The solution would help reduce the losses to payers associated with misdirected payments.	£420m - £515m
Request to Pay	Request to Pay will make late payment processing for non-Direct Debit customers cheaper for medium and large businesses.	£80m - £100m
Assurance Data	The use of Confirmation of Payee by payers would help reduce the number of misdirected payments and thereby reduce their administrative costs to PSPs.	£45m - £55m
Benefits of Bacs, FPS, ICS services[3]	We have conservatively assumed the benefit of the Bacs, FPS and ICS services are equal to the current operating costs of these services.	£4,040m -£4,940m
Total benefits		£11,455m - £14,000m

Table 1.1 Benefits Summary

2.1 NPA Overlay Services Benefit Narratives and Estimates

Benefits 1-7 set out below are derived from the steps in the Request to Pay and Enhanced Data end-to-end journeys (refer to Section 2.2 and 2.4 in the consultation document respectively for a detailed illustration of the end-to-end journeys). Benefit 8 refers to the Confirmation of Payee end-to-end journey (refer to Section 2.3 in the consultation document).

Benefit 1: Auto-reconciliation could reduce payees' manual and invoice reconciliation costs.

The capability to add more characters or information in a remittance message provides possibilities for e-invoicing to expand.

Currently, due to the limited number of characters that can travel with a payment message, most remittance information must travel separately from the basic payment details, e.g., via accompanying post or email, thereby requiring a costly manual intervention to process and reconcile payments.

[3] As noted above, this has been conservatively assumed to be equal to the operating costs to run the services.

E-invoicing enables businesses to automate their invoice reconciliation processes. We use the 5.5 billion electronic individual C2B and B2B payments made annually[4] as a proxy for the annual number of invoices that could benefit from the implementation of auto-reconciliation solutions.

As with other benefits, we exclude small and microbusinesses due to assumption that their operations are not large enough in scale to invest in the solutions required to realise this benefit. These businesses generate 33% of annual UK business turnover.

It is currently estimated to cost SMEs £2.90 and large businesses £1.58[5] per unit to manually reconcile invoices sent separately from the payment message. This cost is assumed to reduce by 40% if auto reconciliation solutions are adopted by medium and large businesses. This 40% reduction estimate is the average of estimates in the relevant literature we have reviewed.[6]

We estimate that over a ten-year implementation period, the take-up of this solution by businesses would be up to 30%, i.e. up to 30% of the volume of relevant electronic payments would allow the use of auto-reconciliation solutions.

Consequently, these businesses could save between £ 3.7 billion and £4.5 billion in discounted invoice reconciliation costs over the period 2019-2031.

Benefit 2: The solution would help reduce losses associated with invoice fraud.

According to research by Tungsten Network quoted by Experian,[7] SMEs are losing more than £9 billion in invoice fraud every year. As automated credit represents 17% of the volume of payments made annually in the UK, we assume the same proportion of invoice fraud is addressable through Confirmation of Payee, i.e. £ 1.5 billion annually.

Subject to efficient KYC processes, each consumer using Confirmation of Payee when making an electronic payment could reduce the risk of invoice fraud affecting him/her by up to 100%.

We estimate that over a ten-year period, the take-up of this solution by end-users will be up to 18%, i.e. up to 18% of the value of relevant C2B, B2B and C2C electronic payments.

Overall, according to estimates of this study this benefit could generate cumulative discounted savings between £1.3 billion and £1.6 billion in reduced invoice fraud during the period 2019-2031.

Benefit 3: The solution would reduce average unit cost of producing and sending invoices for businesses.

The replacement of paper invoices by electronic invoices is already underway. Request to Pay should help accelerate this process, thereby driving down the cost of producing and sending paper invoices.

18.9 billion[8] non-cash B2B and C2B payments were made in the UK in 2014 and we take this number as a proxy for the number of relevant invoices produced annually in the UK. As with other benefits, we exclude small and microbusinesses due to assumption that their operations are not large enough in scale to invest in the solutions required to realise this benefit. Therefore only 67% of these invoices, i.e. 12.7 billion, are considered.

The cost of producing and sending an invoice is estimated to be £0.26 for a large business and £0.85 for a small business.[9] As large businesses represent 53% of UK turnover and medium businesses 14%, the average cost for producing and sending an invoice for the relevant businesses is £0.38 per unit.

Studies have shown that using Request to Pay as a form of electronic invoice could reduce this cost by 21%.[10]

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[4] The total of C2B and B2B electronic payments (excluding cash, cheques, debit and credit cards) is 5.5bn. The total annual number of non-cash C2B and B2B payments is 18.9bn. Source: Payments UK, 2015

[5] Source: Accenture, the Economics of Request for Payment, 2017

[6] Sources: *AP Automation Survey*, Institute of Financial Operations, 2015 and *The True Cost of Invoicing and Payments*, 2002, Fidesic Corp. These studies forecast respective 37% and 43% cost reductions due to automated invoice reconciliation.

[7] http://www.experian.co.uk/blogs/latest-thinking/smes-losing-9bn-invoice-fraud/.

[8] Source: Payments UK.

[9] Accenture, The Economics of Request for Payment, 2017.

[10] Accenture, The Economics of Request for Payment, 2017.

We estimate that over a ten-year period, the take-up of this solution by end-users will be up to 18%, i.e. up to 18% of medium and large business invoices will be subject to the use of this solution.

Our analysis shows that adoption of Request to Pay could generate discounted cost savings due to a replacement of paper invoices of between £850 million and £1 billion during the period considered.

Benefit 4: Improvement in liquidity and subsequent reduction in financing costs.

The use of Request to Pay could help medium and large business payees improve liquidity via quicker debt collection with the potential impact of a reduction in financing costs.

Adoption of Request to Pay could reduce the current lead time in interacting with business customers. The assumption of this study is that customers who receive automated, instantaneous electronic requests rather than non-electronic requests are likely to settle debts quicker. Improvement in debt recovery will help liquidity (via a reduction in debtor days). As a result, businesses should see improvement in their liquidity and this will decrease the need for them to rely on credit facilities.

Average debtor days for UK businesses was estimated at 52 days in 2016.[11] Total late payment debt owed to businesses represented £31 billion.[12] In order to be conservative, we exclude small and micro businesses from this analysis hence only 67% of this debt is considered, which represents £21 billion. The assumed interest rate for a credit facility is 5% over the base rate, i.e. 5.25%.

This analysis assumes that over a ten-year period, the take-up of this solution by end-users will be up to 18%, i.e. up to 18% of business transactions carried out by medium and large businesses will be subject to the use of this solution.

If Request to Pay reduces average debtors' days by around 5% i.e. 2.6 days, this would mean businesses could save between £550 million and £670 million in discounted financing costs during the period 2019-2031.

Benefit 5: Request to Pay is cheaper for businesses than re-presentation of a failed Direct Debit ('DD').

A Request to Pay can be triggered after the failure of a DD (due to insufficient funds on the account or cancellation by the payer). Currently, the first step taken by payees is to re-present the DD to the payer. This costly re-presentation process (a sample of utilities estimate this at £15 to £20 per failed transaction) could be replaced by Request to Pay notifications, that could cost up to 75% less.[13]

1.8%of Direct Debit transactions fail annually.[14] Excluding those that can be attributed to micro- and small businesses, we assume there are 47 million addressable Direct Debit representations annually.[15]

We estimate that over a ten-year period, the take-up of this solution by end-users will be up to 18%, i.e. up to 18% of Direct Debit failures would be handled with automated Requests to Pay.

Our study shows that these discounted cost savings could reach between £460 million and £560 million in the period considered.

Benefit 6: The solution would help reduce the losses to payers associated with misdirected payments.

The total value of misdirected payments was estimated at around £2.5 billion,[20] 20% of which is never recovered,[16] which would represent a net loss of £500 million to customer or business payers who have made these errors when sending electronic payments.

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[12] Bacs research

[13] Current chasing cost per late £1 is £0.35 (source: http://www.business-money.com/announcements/late-payments-costing-smes-billions). Excluding assumed debt collection agencies costs (£700 million turnover in 2009, source: Experian), this cost is £0.31. We then assume that replacing the current typical chasing process by two business text messages for any late £1 would amount to £0.07, i.e. a 77.4% saving (rounded downwards to 75%).

[14] Source: Bacs.

[15] There are 3.9 billion Direct Debit transactions annually. 33% of them are excluded from the analysis as they are associated with micro- and small businesses' activity.

[16] Based on estimates provided by banking stakeholders.

The adoption of Confirmation of Payee would reduce the risk of misdirected payments, as the payer would be able to check automatically whether the account that is about to be credited is the right one, thereby reducing losses associated with these errors.

We estimate that over a ten-year period, the take-up of this solution by end-users will be up to 18%, i.e. up to 18% of the value of relevant C2B, B2B, and C2C electronic payments would be subjected to a Confirmation of Payee and hence these payments are unlikely to be misdirected.

Based on these assumptions, this benefit could generate between £420 million and £515 million in discounted reduced losses to payers during the period 2019-2031.

Benefit 7: Request to Pay will make late payment processing for customers cheaper for businesses.

Total late payment debt owed to businesses represented £31bn[17] in 2014. We assume that total late payment debt potentially impacted by Request to Pay would represent £21bn.[18]

The current late payment chasing process for customers generally involves phone calls and letters. Sometimes, businesses have to pass the late payment cases to debt recovery agencies or factor certain invoices at a discount for cash.

Overall, Request to Pay could be cheaper (per case) than the current process as it would primarily rely on automated electronic interactions between payer and payee rather than the more expensive non-electronic means (a utility company estimates that one single reminder letter costs £0.38 and this may not even reach the customer who may have moved out).

We estimate that up to 246 million[19] late debt reminders send by post each year could be sent through electronic means instead. As a result, depending on adoption, businesses could therefore save on administrative costs to chase late payments.

We estimate that over a ten-year implementation period, the take-up of this solution by businesses (particularly utility companies) will be up to 18%, i.e. up to 18% of medium and large companies' invoices will be subject to the use of this solution.

According to estimates of this study, these businesses could save between £80 million and £100 million in discounted payment processing costs during the period 2019-2031.

Benefit 8: The use of Confirmation of Payee by payers would help reduce the number of misdirected payments and thereby reduce their administrative costs to PSPs.

We have estimated there were 3 million instances of misdirected payments annually[20], at an average handling cost of £17.50 per incident for PSPs.[21]

The adoption of Confirmation of Payee would reduce the risk of misdirected payments, as the payer would be able to check automatically whether the account he is about to send money to is the right one. The number of such incidents handled by PSPs would therefore be reduced.

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[17] Including debt owed to micro- and small businesses who represent 33% of UK turnover and are being excluded from this analysis due to cost implications.

[18] Excluding the assumed share of debt owed to small and micro-businesses and debt associated with DD failures (which is the object of benefit 4). £22bn worth of regular payments were made by Direct Debit in 2014. Assuming a 1.8% DD failure rate, we therefore exclude a further c. £396 million of late payment debt from the scope of our analysis.

[19] Of the £20.5bn non-DD late debt owed to medium and large businesses, debt attributable to C2B invoices is estimated to be £9.8 billion annually, which we divide by the average monthly consumer utility bill (£41, source: https://www.ovoenergy.com/guides/energy-guides/the-average-gas-bill-average-electricity-bill-compared.html, back-calculated based on the annual energy bill). Non-DD late debt attributable to B2B invoices is estimated to be £10.6 billion, which we divide by the average business utility bill (£2,528, http://www.businessenergy.com/electricity). Overall this leads to a potentially addressable sample of late payment reminders of 246 million annually.

[20] £2.5bn lost annually in misdirected payments and average FPS payment of £820. Source: Payments UK, quoted by the Daily Telegraph http://www.telegraph.co.uk/finance/personalfinance/bank-accounts/11798573/The-pitfall-lurking-in-your-online-banking-that-sets-up-strangers-as-approved-payees.html.

[21] Information provided by one of our PSP stakeholders.

We estimate that over a ten-year period, the take-up of this solution by end-users will be up to 18%, i.e. up to 18% of the value of relevant C2B, B2B, and C2C electronic payments would be subjected to a Confirmation of Payee.

Based on these assumptions, this benefit could generate between £45 million and £55 million in saved administrative costs for PSPs during the period 2019-2031.

2.2 Estimating the Benefits of Bacs, FPS and ICS

We have conservatively assumed the benefit of the Bacs, FPS and ICS services are equal to the current operating costs of these services. This is based on the assumption that Bacs, FPS and ICS as they are currently being run, generate benefits that are equal to the costs that participants in the current UK payments system pay to run them. We have replicated this assumption for the alternative minimum upgrade benefits.

Calculation

Annual run costs per annum are £480m. Therefore aggregating the discounted annual figure across the relevant period will produce an estimate of the benefits of the current interbank payment systems infrastructure (FPS, Bacs, ICS) as per our assumptions.

3 NPA Costs

In this section, we consider the aggregate costs of adopting the NPA faced by PSPs, PSOs, and infrastructure providers. These aggregate costs include the one-off capital costs of the NPA and the three EUN solutions, and the ongoing run costs associated with operating the NPA and the solutions.

Furthermore, costs comprise all required expenditure for the development and maintenance of the new system as well as the costs of maintaining the old systems during the transition period.

The costs estimated can be classified into a number of categories:

1. Capital expenditure of the NPA.
2. Run costs i.e. operating expenditure, of the NPA. This includes voluntary change costs and change costs that will be incurred to comply with regulation.
3. Parallel running costs i.e. running the current systems concurrently with the NPA temporarily until current systems are decommissioned.
4. Costs of overlay services, including capital expenditure and run costs.

The estimates for implementing and running the NPA (the capital expenditure, run costs and parallel running) do not include costs for end-users of the system (e.g. costs for corporate customers to connect to NPA and migrate from FPS and Bacs); these costs are assumed to be absorbed by either TPSPs or suppliers, or as part of the natural upgrade cycle of end-users' systems. We do include end-user costs in our cost estimates of the overlay services to the extent where businesses must incur costs to use the overlay services to be able to realise the associated benefits of them (see section 4 in the consultation document).

3.1 NPA Capital Expenditure

The required capital expenditure will include a number of components: TPSPs & PSPs will be required to build or procure ISO 20022 gateway services for payment initiation, for example to facilitate Direct Debit over the NPA 'push' mechanism; PSPs will be required to receive and process payment files from a TPSP. This will involve ISO 20022 message construction, validation and transmission. In addition, network connectivity will be required to meet standards mandated by the NPSO. Furthermore, PSPs and TPSPs will be required to build the business processes to support these activities.

Finally, capital expenditure will include the resources required to procure and build a Simplified Payment Platform for payments processing.

The estimate of these total costs to deliver the NPA, excluding the three EUN solutions is c. £850 million as shown in Table 1.2.

Layer	Capex Cost
TPSPs	£336m
PSPs	£444m
SPP Clearing	£72m
Total	**£852m**

Table 1.2. Undiscounted NPA Delivery Costs

Assumptions

- Based on stakeholder feedback, in previous payments infrastructure initiatives such as FPS, ICS and Current Accounts Switch Service (CASS), the ratio of central infrastructure capital expenditure to costs to the rest of the industry costs is estimated to be 10:90. As per Table 1.3, our central infrastructure cost estimate is around 8% of the overall cost.
- As part of initiatives to improve the UK payments systems, banks and C&CCC have already invested in the cheques image clearing system. These Image Clearing System capital costs, having been incurred, will be considered as sunk and excluded from the NPA costs.

3.2 NPA Run Costs

In order to estimate the run costs of the NPA (not including the run costs of the overlay services), it is necessary to understand the structure of the current interbank payment systems and the aggregate costs of all participants.

Modelling the run costs of the NPA will require adjustments to be made to the run costs of the current interbank payment system to reflect potential efficiency savings associated with the consolidation of the current schemes.

Run Costs Assumptions

The main assumptions made while estimating NPA run costs include:

- As with the current interbank payment systems, the NPA will have annual run costs to support and maintain the system.
- Subject to adjustments to reflect structural changes, the current systems' run costs are used as a proxy for the run costs of the NPA.

Figure 1.2 shows the parties in the payment infrastructure and the payment flows in and between the participants.

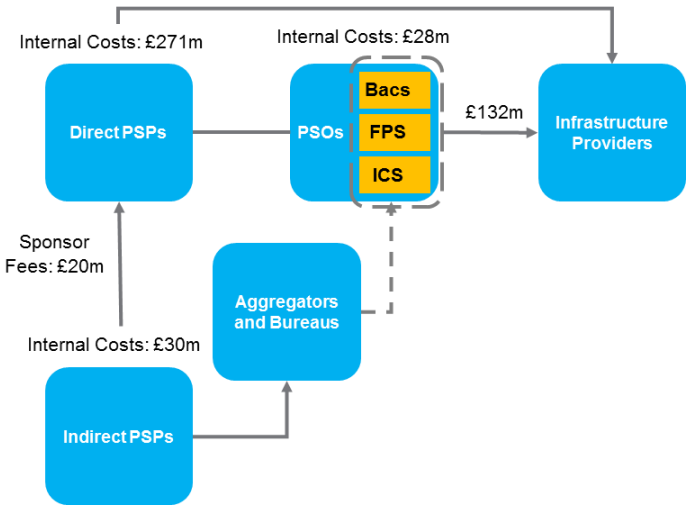

Figure 1.2 Description and Magnitude of Annual Run Costs

The total annual interbank system run cost is estimated to be £480m per annum after adjustment for double counting.

Adjustments to annual current interbank run costs to model NPA

Evidence from stakeholder interviews suggest that a potential reduction in the payment systems annual run costs may occur if the existing schemes evolve into one system. In other words, efficiency savings may accrue as a result of a consolidation of the three existing systems when the NPA is adopted.

Table 1.3 shows the equivalent, estimated annual run cost efficiencies for different participants associated with a transition from the current schemes to NPA.

Cost elements	Current services run costs	Potential cost savings %	Potential cost savings	Adjusted run costs
Direct PSP participants internal costs	£271m	15%	£41m	£231m
Indirect PSP participants internal costs	£30m	10%	£3m	£27m
PSO internal costs	£28m	10%	£3m	£25m
Infrastructure provider costs	£132m	30%	£39m	£93m
Sponsor fees	£20m	N/A	N/A	£20m
Total annual run costs	£481m		£86m	£395m

Table 1.3 Adjustment to annual current interbank run costs as a result of schemes' consolidation

3.3 Parallel Running Costs

This section considers the cost implications of a phased transition from the current interbank systems to the NPA.

The transition assumption is that the current interbank payment systems (Bacs, FPS, ICS) will continue to run temporarily after the NPA goes live. The length of time of this parallel running will influence the magnitude of the parallel running costs.

On the basis of the parallel running assumptions made below, the total estimated parallel running cost is c. £1.9 billion - £2.3 billion.

Parallel running costs assumptions

The assumptions below have been made in modelling parallel running costs. These assumptions include:

- NPA will go live in 2021.
- Each participant in the payment system will have elements of their costs that are fixed and elements that are variable.
- To the extent that the costs incurred by the participants are fixed, they will be wholly incurred in existing systems and the NPA (the same level of fixed costs will be incurred in the current interbank systems as well as the NPA) as they run in parallel irrespective of payment transaction volumes. Variable costs on the other hand will vary with the volume of transactions i.e. these will be incurred on a per unit transaction basis.

Table 1.4 shows the fixed and variable cost proportions of the annual costs of the players.

Cost Element	Current annual run costs	Fixed Element	Variable Element
Direct PSP participants internal costs	£271m	£108m	£162m
Indirect PSP participants internal costs	£30m	£3m	£27m
PSO internal costs	£28m	£8m	£20m
Infrastructure provider costs	£132m	£119m	£13m
Sponsor fees	£20m		£20m
Total	£481m	£239m	£242m

Table 1.4 Cost Behaviour (excludes sponsor fees; annual costs)

During the transition from the existing interbank systems to the NPA, both existing schemes and the NPA will incur fixed costs as these will not vary with the number of transactions, so the aggregate value will be constant throughout the transition period. After the sunset of the legacy infrastructure however, only one set of fixed costs will be incurred. The implication of this is that the longer the transition period, the higher the aggregate parallel running costs will be.

NPA adoption curve assumptions

The assumptions adopted for the transition from the current schemes are:

- FPS and Bacs payment transactions will migrate to the NPA within a 2-year timeframe from when NPA goes live; ICS will migrate by year 4.
- For FPS and Bacs, 75% of transactions will migrate in Y1 and the remaining 25% in Y2.
- A transition solution, as described in Section 3.5 of the consultation paper, will be in place to support the sunset of the legacy infrastructure. This will alleviate the burden of having to immediately change formats for corporate and government end-users.

Figure 1.3 shows the adoption and sunset curves over the four-year time horizon. The initial quick take-up is influenced by the two-year transition of the FPS and Bacs schemes.

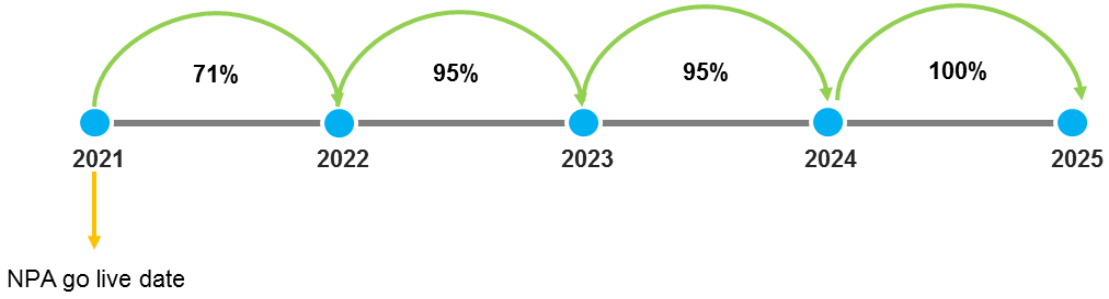

Figure 1.3. Aggregate Transition into NPA

Considering the three schemes of FPS, Bacs and ICS in aggregate, 71% of payment transactions will migrate to the NPA in the first year of NPA going live, and growing to 95% in the second year – at this point all of FPS and Bacs is assumed to have migrated. Finally, ICS payment transactions will commence migration in 2024 and this migration will take 12 months.

4 Overlay Services Costs

In our analysis, we include costs incurred by the NPSO, PSPs and TPSPs. Because we include benefits to corporate, government and charity end-users of the overlay services, we also include the costs these end-users incur with the introduction of the services.

For the purpose of this analysis, we assume that the majority of micro and small businesses are unlikely to invest in solutions to take advantage of the benefits of overlay services, hence we exclude potential overlay services costs and associated benefits of these business groups. The excluded businesses represent 33% of the UK turnover.

4.1 Request to Pay

It is estimated that capital costs across the industry (i.e. NPSO, PSPs and TPSPs) to deliver the Request to Pay solution will be approximately £100m (this excludes the cost to end-users). This cost will be incurred by TPSPs/PSPs on items such as building databases to store requests; user interfaces for consumers and back offices; applications; integration into billing systems etc.

In addition to this £100m, we estimate end-user costs of a further £100m, based on the adoption assumptions of Request to Pay by end-users (as shown in the Appendix).

Cost type	Capital costs	Run costs (annual)
Establishing collaborative rules and standards admin by NPSO	£5m	£0.5m
TPSPs/PSPs	£95m	£9.5m
Total (excluding end-user costs)	**£100m**	**£10m**
End-user costs	£100m	£10m
Total (including end-user costs)	**£200m**	**£20m**

Table 1.5. Request to Pay Costs

The total annual run costs are assumed to be approximately 10% of the capital expenditure to deliver the solution.

4.2 Assurance Data

We estimate the capital expenditure across the industry to deliver the Assurance Data solution to be c.£200m. The cost of this solution has been benchmarked with the cost to deliver other similar initiatives such as Paym, although in due course we may be able to refine this estimate using further analysis of API implementation costs. These capital costs will be incurred on one-off elements such as amending customer data, changing user interfaces, making core channel changes etc.

Unlike Request to Pay, there are no end-user costs associated with this service because it is assumed that an end-user can access this service using their current means of accessing payment services without modification.

The total annual run costs are assumed to be about 10% of the capital expenditure to deliver the solution. This includes maintenance, support and change costs.

Cost type	Capital costs	Run costs (annual)
Central Infrastructure	£20m	£2m
TPSPs/PSPs	£180m	£18m
Total	**£200m**	**£20m**

Table 1.6 Assurance Data Costs

4.3 Enhanced Data

Our analysis assumes the bulk of the Enhanced Data solution capabilities will be provided by the NPA. There will however be incremental costs to TPSPs and PSPs, such as provision of security tokens and implementation costs to include additional data in payment fields. We estimate this additional capex will be up to £100m. In addition to this £100m, we estimate end-user costs of about £200m, based on anticipated adoption costs of the solution by end-users (see Appendix).

Cost type	Capital costs	Run costs (annual)
Central infrastructure	N/A	N/A
TPSPs/PSPs	£100m	£10m
Total (excluding end-user costs)	**£100m**	**£10m**
End-user costs	£200m	£20m
Total (including end-user costs)	**£300m**	**£30m**

Table 1.7 Enhanced Data Costs

4.4 Overlay Service Cost Summary

Table 1.8 provides a high-level summary of estimated capital expenditure and annual run costs for the provision of the three EUN overlay services.

Overlay Service	Capital costs	Run costs (annual)
Request to Pay	£100m	£10m
Assurance Data	£200m	£20m
Enhanced Data	£100m	£10m
Total (excluding end-user costs)	**£400m**	**£40m**
End-user costs (All 3 EUN solutions)	£300m	£30m
Total (including end-user costs)	**£700m**	**£70m**

Table 1.8 Overlay Service Costs Summary

4.5 Adoption assumptions for overlay services

Services	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
Request to Pay	3.1%	3.8%	4.6%	5.6%	6.8%	8.3%	10.1%	12.3%	15.0%	18.3%
Assurance Data	3.1%	3.8%	4.6%	5.6%	6.8%	8.3%	10.1%	12.3%	15.0%	18.3%
Enhanced Data	5.0%	6.1%	7.4%	9.0%	11.0%	13.4%	16.3%	19.9%	24.2%	31.0%

Table 1.9. Adoption Assumptions for Overlay Services

The table above shows the level of adoption assumptions for the EUN solutions by the end-users. The percentages show estimates of the proportion of the large and medium scale business population (on a per transaction basis) that adopt the solutions over time.

5 The Alternative Minimum Upgrade

We believe that to 'do nothing' is not an option, not least due to the end of the current contracts and upcoming re-procurement of FPS and Bacs. Therefore, we have used an Alternative Minimum Upgrade approach as a comparison for the NPA. This is consistent with the PSR's Infrastructure Market Review remedy that requires the schemes (Bacs and FPS) to upgrade to be ISO 20022 compliant at re-procurement.

In this Alternative Minimum Upgrade, we assume that the three EUN overlay services are not delivered. We take this view due to technical limitations, for example, the lack of full end-to-end ISO 20022 compliance inhibiting the delivery of Enhanced Data; and ongoing complexity that would be inherent in a minimum upgrade, which would continue in the parallel running of three infrastructures.

Alternative Minimum Upgrade assumptions

- The central infrastructure for FPS and Bacs will be upgraded to ISO 20022.
- The infrastructure outside the centre for both FPS and Bacs will not be upgraded.
- There will be no overlay services in the Alternative Minimum Upgrade, hence no costs or benefits associated with overlay services are accounted for.

5.1 Alternative Minimum Upgrade Benefits

Our analysis estimates that there is a gross benefit of between c. £4 billion – £4.9 billion associated with the Alternative Minimum Upgrade in the period 2019 to 2031. This is equivalent to the current benefits of the Bacs, FPS and ICS services based on our conservative estimate that these benefits are equal to the running costs of these systems. This is consistent with the assumption that there will be no overlay services in the alternative minimum scenario, hence no overlay services benefits.

It should be noted that the qualitative benefits associated with the Alternative Minimum Upgrade are also significantly less than the NPA as a consequence of the continued running of multiple infrastructures and lack of end-to end ISO 20022 adoption, which would inhibit delivery of Enhanced Data and other EUN solutions, and therefore their wider societal benefit. Furthermore, this would impact simplification of access, innovation, competition benefits, and the ease with which future user needs could be met.

Finally, as with the NPA, there are delivery risks associated with upgrading the current infrastructure to ISO 20022; these delivery risks have been assessed to be similar across both options. The risks are explored in Section 3.4 of the consultation document.

5.2 Alternative Minimum Upgrade Costs

The costs are made up of an upgrade of the current central infrastructure to deliver ISO 20022 capability, and translation services between PSPs/TPSPs and the new central infrastructure. It is estimated that this will be equivalent to the expenditure required for the NPA's central infrastructure of c. £72 million.

Overlay services costs have been excluded from the alternative minimum. This is because this scenario assumes a minimum upgrade and overlay services are not considered to be provided as part of a minimum upgrade.

Layer	Alternative Minimum Upgrade Costs
TPSPs	N/A
PSPs	N/A
Clearing	£72m
Total	**£72m**

Table 1.10. Alternative Minimum Capital Expenditure Costs

We estimate that the run costs of the Alternative Minimum Upgrade would be £480 million per annum. This is based on the assumption that these run costs would be equal to that of the existing systems. The Alternative Minimum Upgrade run costs are expected to be higher than the NPA as more than one system will need to be run and maintained.

The parallel running costs in the alternative minimum are estimated at an aggregate of £1.7 billion - £2 billion during the transition period. This is lower than the equivalent parallel running costs in the NPA as it is assumed that multiple components will not need to be maintained in parallel in the PSPs and the TPSPs.

5.3 Comparison of the NPA to the Alternative Minimum Upgrade

	NPA	Alternative Minimum Upgrade
	Discounted (2019-2031)	Discounted (2019-2031)
Existing FPS / Bacs / ICS Benefits (assumption)	£4.04bn – £4,94bn	£4.04bn – £4.94bn
Overlay services Benefits	£7.41bn - £9.06bn	N/A
Total Benefits	**£11.45bn - £14bn**	**£4.04bn – £4.94bn**
Total costs (excluding EUN)[22]	£4.47bn – £5.47bn	£4.28bn – £5.23bn
Overlay Services Costs	£0.93bn - £1.13bn	N/A
Total costs (including EUN)	£5.40bn – £6.60bn	£4.28bn – £5.23bn
Net Benefits	£6.05bn - £7.40bn	(£0.24bn) – (£0.29bn)

Table 1.11. Comparison of the NPA to the Alternative Minimum Upgrade

[22] While the costs for the NPA and the alternative minimum look similar, there are a number of differences in the components that make up the costs. These include, efficiency savings associated with merging schemes, differences in the assumptions regarding parallel running costs and differences in assumptions regarding non central infrastructure costs.

6 Conclusion

The cost benefit analysis of the two options indicates that an alternative minimum approach of upgrading FPS and Bacs central infrastructure to support ISO 20022 messaging, without delivering EUN solutions, would not deliver the same level of benefit as the NPA – both in quantitative and qualitative terms.

Table 1.10 shows the respective discounted net benefits (gross benefits less costs discounted over 2019-2031) of the NPA and the Alternative Minimum Upgrade options: a positive net benefit of £6 billion to £7.4 billion in the NPA scenario, compared to a negative net benefit of £0.2 billion to £0.3 billion in the Alternative Minimum Upgrade scenario.

The higher net benefit of the NPA compared with the Alternative Minimum Upgrade reflects the benefits of the overlay services, as well as the efficiency savings from the consolidation of the schemes.

Furthermore, the qualitative benefits such as simpler access, increased competition and innovation would also be significantly higher in the NPA compared with the alternative minimum.

The Appendix includes a table with a breakdown of the benefits and costs.

Description	NPA (including EUN)	Alternative Minimum Upgrade
Discounted Benefits	£11.5 billion - £14.0 billion	£4.0 billion – £4.9 billion
Discounted Costs	£5.4 billion - £6.6 billion	£4.3 billion – £5.2 billion
Discounted Net Benefits	£6 billion - £7.4 billion	(£0.2 billion) – (£0.3 billion)[23]

Table 1.12. The Respective Net Benefits of NPA and Alternative Minimum Upgrade

We have also considered risk when conducting the CBA. Both the NPA and the alternative require complex industry change and would need to manage similar risks in respect of the replacement of central infrastructure. The risks are explored in Section 3.4 of the consultation document.

In conclusion, the NPA will deliver significantly greater quantitative benefits compared with the Alternative Minimum Upgrade which would occur absent the NPA, recognising that doing nothing is not an option. Furthermore, there are significant qualitative benefits associated with the NPA that upgrading the existing systems would not deliver.

[23] The overall estimated benefits of the alternative minimum approach do not necessarily represent what we believe to be the overall outcome that may be delivered as a consequence of the IMR remedies as a whole. Furthermore, our analysis does not suggest that doing nothing would be preferable to this Alternative Minimum Upgrade.

7 Appendices

7.1 Implicit Assumptions within the Model

Below is a list of implicit assumptions within the model behind our CBA findings presented in this paper. We have derived these after consulting numerous representatives from corporates, PSPs, PSUs and PSOs on the topic of the NPA and its impact on the UK payments industry.

- Capital expenditure for the overlay services is assumed to be incurred in one year, taking place immediately before benefits begin to accrue.
- Costs for each category (i.e.: internal run costs, sponsor fees, infrastructure providers, and PSO run costs) are allocated across Bacs, FPS, and ICS. The split is determined by the proportion of total costs that each payment type makes up.
- Aggregate End User costs (i.e. costs to businesses, charities etc.) will not be incurred in its entirety from year 1 but will rather be incurred based on an assumptive adoption path.
- The ratio of Bacs to FPS costs in surveyed PSPs is about 2:1.
- In carrying out the analysis, we have excluded the costs and associated benefits for micro and small businesses. Therefore this analysis excludes businesses that make up a third of UK business turnover.
- The analysis excludes any inflation or economic growth impacts.
- The number of Business to Business payments is used as a proxy for the number of business transactions in the UK.
- The number of Consumer to Business payments is used as a proxy for number of consumer to business transactions.
- Unless otherwise stated, annual run costs are estimated at 10% of the equivalent capital expenditure.

7.2 Glossary

Account Information Service: An online service to provide consolidated information on one or more payment accounts held by the Payment Service User with another Payment Service Provider or with more than one Payment Service Provider, and includes such a service whether information is provided.

Account Information Service Provider (AISP): A payment service provider which provides account information services.

Aggregator: An organisation that provides one or more PSPs with technical access to one or more payment systems.

Application Programming Interface (API): A set of functions and procedures that allow the creation of applications which access the features or data of an operating system, application, or other service.

Bacs Payment Schemes Ltd (BPSL): the operator of the Bacs payment system.

Bacs Payment Services (Bacs): The regulated payment system which processes payments through two principal electronic payment schemes: Direct Debit and Bacs Direct Credit. The payment system is operated by Bacs Payment Schemes Limited (BPSL).

Bank of England (BoE): The Bank of England provides the RTGS Service used for settlement in central bank money and is the prudential supervisor of some types of PSPs as well as payment systems with an objective of protecting and enhancing financial stability.

Cheque & Credit (C&C): Payment system providing net settlement of cheques and paper credits between financial institutions. It operates on a three-day cycle and settles net once a day in RTGS.

Cheque & Credit Clearing Ltd (C&CCCL): Operator of the Cheque & Credit Clearing payment scheme.

Competition and Markets Authority (CMA): The CMA is a non-ministerial department of the UK government that promotes competition for the benefit of consumers, both within and outside the UK.

Confirmation of Payee (CoP): it's a capability which will provide a payer assurance that the account to which they are making the payment belongs to the intended payee.

Consumer: A person who buys goods or services for their own use.

Corporate: Relating to a large company.

Current Account Switch Service (CASS): Free to use service that lets consumers and small businesses switch their current account from one participating bank or building society to another. It has been designed to be simple, reliable and stress-free and is backed by the Current Account Switch Guarantee.

Discounted Cash Flow (DCF): A valuation method used to estimate the attractiveness of an investment opportunity.

End-user: Person or organisation that actually uses a product.

End-User Needs (EUN): The functionality of payments infrastructure required for consumers, businesses and Government identified by the Strategy. These are listed as greater control, greater assurance, enhanced data, as well as a reduction in financial crime.

Faster Payments Service (FPS): Faster Payments provides near-real time payments on a 24/7 basis, and is used for standing orders, internet and telephone banking payments. Faster Payments settles net, three times every business day in RTGS.

Faster Payments Scheme Limited (FPSL): Operator of FPS payment system.

Financial Conduct Authority (FCA): A regulatory body for financial services industry in the UK. Its role includes protecting consumers, keeping the industry stable, and promoting healthy competition between financial service providers.

Financial Fraud Action UK (FFA UK): Financial Fraud Action UK (FFA UK) is the name the financial services industry uses to coordinate its fraud prevention activities.

FinTech: Fintech is a portmanteau of Financial Technology that describes an emerging financial services sector in the 21st century and includes any technological innovation in the financial sector, including innovation in financial literacy and education, retail banking, investment and even crypto-currencies like bitcoin.

Image Clearing System (ICS): The proposed new method revolutionising how cheques are cleared in the UK. The cheques will be cleared using a digital image of the cheque rather than via the current paper-based clearing system where the actual paper cheque is transported around the country to be cleared.

ISO 20022: An international standard for the development of financial messages which ICS will be the first UK payment scheme to adopt.

Market participant: A Participant is an entity that has a payments service relationship with the NPSO. It can include settlement Participants, direct Participants, indirect Participants, service Participants, Third Party Service Providers and aggregators.

Net Present Value (NPV): The value in the present of a sum of money, in contrast to some future value it will have when it has been invested at compound interest.

New Payments Architecture (NPA): The NPA Design Hub has been established by the Forum to progress the detailed design of the New Payments Architecture ahead of the handover to the New Payment System Operator (NPSO) by the end of 2017.

New Payment System Operator (NPSO): The new PSO which will be made up of BPSL, C&CCCL and FPSL.

Open Banking: PSD2 sets out the regulatory regime that lays the foundations for open banking, by giving registered/authorised third party providers a 'right' to access a consumers account. As part of the

implementation of this, Open Banking are designing API Standards to create a more effective system for connecting third party service providers and financial institutions.

Payee: A person who is the intended recipient of transferred funds.

Payer: A person who holds a payment account and allows instructions to be given to transfer funds from that payment account, or who gives instructions to transfer funds.

Paym: Paym is run by the Mobile Payments Service Company Limited (MPSCo), a company limited by guarantee. The Paym service is offered directly to customers by Payment Service Providers that are participants in MPSCo.

Payment Assurance: A function that confirms the payee's and payer's identity as well as the status of a payment.

Payment gateway: is a merchant service provided by an e-commerce application service provider that authorizes credit card or direct payments processing for e-businesses, online retailers, bricks and clicks, or traditional brick and mortar.

Payment Initiation Service (PIS): A service to initiate a payment order at the request of the Payment Service User with respect to a payment account held at another Payment Service Provider.

Payment Initiation Service Provider (PISP): A Payment Service Provider which provides Payment Initiation Services.

Payment Institution: A legal person that has been granted authorisation by the FCA in accordance with Article 11 (PSD2) to provide and execute payment services.

Payment method: The way that a buyer chooses to compensate the seller of a good or service that is also acceptable to the seller.

Payment Service Provider (PSP): A Payment Service Providers can be any of the following when carrying out payment services; authorised payment institutions, small payment institutions, registered account information service providers, EEA authorised payment institutions, EEA registered account information service providers, electronic money institutions, credit institutions, the Post Office Limited, the Bank of England, the European Central Bank, and the national central banks of EEA States (other than when acting in their capacity as a monetary authority or carrying out other functions of a public nature), government departments and local authorities (other than when carrying out public functions) and agents of Payment Service Providers and excluded providers.

Payment Service User (PSU): A person when making use of a payment service in the capacity of payer, payee, or both.

Payment System Operator (PSO): A company that operates one or more schemes. All PSOs are regulated by the PSR and additionally certain PSOs are supervised by the Bank of England.

Payments Messaging: A communication channel that facilitates the exchange of non-clearing messages (e.g. reports and adjustments) between the PSP and the clearing function.

Payment Services Directive 2 (PSD2): Directive (EU) 2015/2366 of the European Parliament and of the Council of 25 November 2015 on payment services in the internal market, amending Directives 2002/65/EC, 2009/110/EC and 2013/36/EU and Regulation (EU) No 1093/2010, and repealing Directive 2007/64/EC, published in the Official Journal of the EU on 23 December 2015.

Payments Strategy Forum (PSF): A forum made up of payment industry and end-user representatives with the aim to develop a strategy for payment systems in the United Kingdom. The PSR, the Financial Conduct Authority and the Bank of England attend the Forum as observers.

Payment System Operator Delivery Group (PSO DG): PSO DG was set up by the BoE and the PSR as a response to the PSF proposed consolidation of the three retail PSOs; Bacs, C&CCC and FPS.

Payment Systems Regulator (PSR): The economic regulator of payment systems in the United Kingdom. The PSR aims to promote competition, innovation and interests of end-users of payment systems.

Real-Time Gross Settlement (RTGS): The accounting arrangements established for the settlement in real-time of sterling payments across settlement accounts maintained in the RTGS system.

Request to Pay: A flexible payment and bill management service concept that offers payers more control over bill payments that is initiated by the payee.

Simplified Payments Platform (SPP): Relates to only the clearing and settlement functions within the NPA.

Single Euro Payments Area (SEPA): SEPA is a payment-integration initiative of the European Union with the objective to simplify bank transfers denominated in Euro. As of 2015, SEPA consists of the 28 member states of the European Union, the four member states of the European Free Trade Association (Iceland, Liechtenstein, Norway and Switzerland), Monaco and San Marino. The project's aim is to improve the efficiency of cross-border payments and turn the fragmented national markets for euro payments into a single domestic one.

Small and Medium sized Enterprises (SMEs): Any business with fewer than 250 employees

Third Party Service Provider (TPSP): TPSPs provide services across the payments value chain to facilitate the processing, acceptance, management and/or transmission of payments, as well as provision of information (e.g. technology providers, telecommunication providers, payment gateways/platforms, point of sale terminal providers, fraud management services).

Vendor: A technology provider of payment services. Those that offer clearing and settlement services are also referred to as infrastructure providers.

7.3 CBA Inception report

The inception report attached was produced in April 2017 to document the approach for the Cost and Benefit Analysis. It highlights the activities and methodologies of the Cost and Benefits Analysis exercise which was undertaken to form the basis of our analysis.

It is important to note that the inception report is a point in time document and has been superseded by the information and the content in this paper, and has been included for completeness.

payments strategy forum

Cost Benefit Analysis

Inception Report

Project/Programme Manager:	Becky Clements
Sponsor:	Payments Strategy Forum
Date of Final Approval:	03 April 2017
Approved by:	

Version / Document History

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1.0	15/03/2017	A. Adeniji-Adele	Initial draft
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2.0	23/03/2017	A. Adeniji-Adele	Edits
3.0	03/04/2017	A. Adeniji-Adele	Edits

Table of Contents

1 BACKGROUND AND OBJECTIVES

1.1 Introduction

In August 2016, the Payments Strategy Forum ("PSF") published a UK Payments Strategy for the 21st century.

The scope of the PSF's work included a Business Case Evaluation ("BCE") of the various solutions and the underlying payment architecture options put forward by the Forum to address the identified detriments of the current situation.

This payment architecture involved three scenarios: (1) evolving the current payments infrastructure to accommodate the solutions without changing the underlying payment architecture ("evolving infrastructure); (2) a centralised Simplified Payments Platform ("SPP") and (3) a decentralised SPP.

For the current phase, the PSF wants to revisit this initial BCE in the light of additional information on solution user requirements and capabilities, an exercise which is currently being delivered by various PSF work streams.

1.2 Objectives

The main objective of the Phase 2 CBA is therefore to quantify in light of new information the respective costs and benefits of implementing the overlay solutions as well as the New Payment Architecture ("NPA").

This Phase 2 CBA should cover:

a. The estimated costs of design, build and implementation of the solutions;

b. The costs to the UK and industry of detriments addressed; and

c. The estimated benefits and net benefits that will be generated by the solutions.

The Phase 2 CBA should also apply the lessons learned from Phase 1, in terms of process and approach.

1.3 Design of the CBA

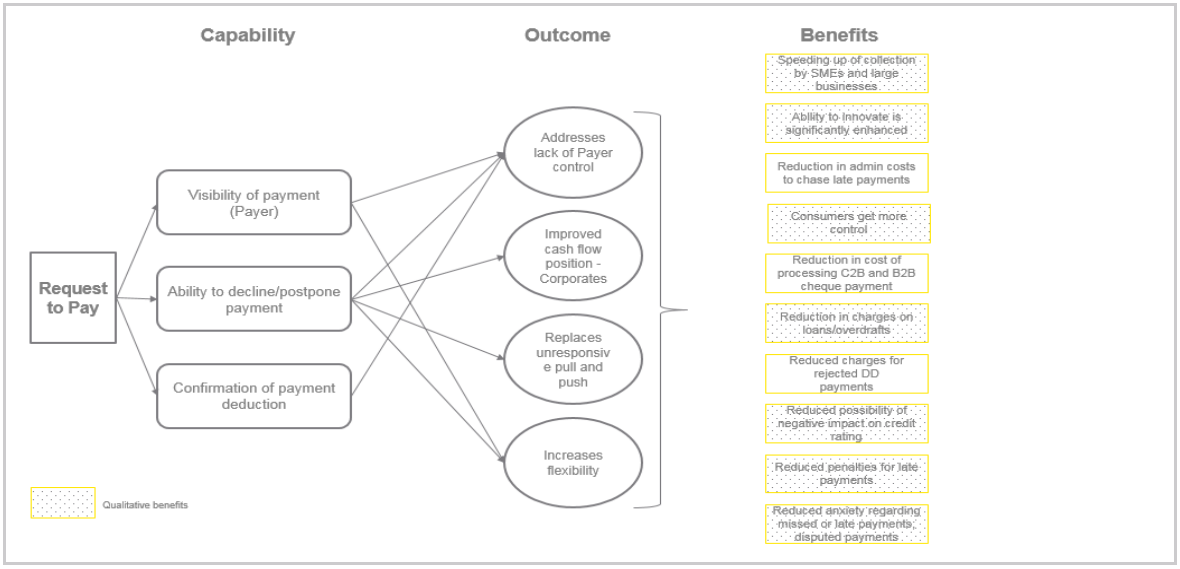
1.3.1 Benefits

The benefits that will be estimated for each solution will be based on the detriments they are designed to address. These will be derived based on the documented user requirements, discussions with the PSF as well as engagement with other industry stakeholders.

Whilst the benefits estimated in Phase 1 will be the starting point, we will review the user requirements as they become available and consult more widely particularly with businesses and market participants to try and obtain a more comprehensive view.

As shown in Figure 1, we will use benefits diagrams to define benefits, categorising each solution into (1) the conceptual capabilities provided by the existence of this solution, (2) the outcomes arising from the deployment of these capabilities, and (3) the benefits statements showing the specific economic benefits derived from these outcomes.

Figure 1: Example of a benefit diagram for "Request to Pay"



The user requirements, meetings, interviews and workshops we intend to have with the PSF and industry stakeholders will inform this categorisation and ultimately the benefits that we estimate. The next step in the benefits quantification process will be to translate the benefits statements into formulae which will be used to derive the estimates. The formulae used will largely be dependent on the availability of data and assumptions adopted. An example of benefit formulae is shown in Figure 2.

Figure 2: Screenshot of benefits formulae from Phase 1 developed for some identified benefits of "Request to Pay"

Benefit	Modelling approach	Baseline	Beneficiaries
Speeding up of collection by SMEs and large businesses	• *N/A*	• N/A	• SMEs, utilities, corporates
Ability to innovate is significantly enhanced	• *N/A*	• N/A	• Other PSPs
Reduction in admin costs to chase late payments	• *Number of late payments per annum **x** cost per late payment **x** inflation **x** expected decrease due to solution*	• Number of late payments per annum • Administrative cost per late payment • Inflation rate • Magnitude of benefit (expected % decrease)	• SMEs
Consumers get more control	• *N/A*	• N/A	• Consumers
Reduction in cost of processing C2B and B2B cheque payment	• *Number of cheque transactions per annum **x** cost per cheque transaction less cost per e-payment transaction, **x** inflation **x** expected decrease due to solution*	• Number of cheque transactions per annum (546m) • Admin cost per cheque transaction • Admin cost per e-payment transaction • Inflation rate • Magnitude of benefit (expected % decrease)	• Large PSPs • SMEs • Corporates

In addition to collecting data and proxies of the impact of these solutions, baseline data will also need to be collected which shows the existing cost to stakeholder groups of the detriments being addressed.

It should be noted that not all benefits will be quantifiable. As a result we will highlight some unquantifiable benefits as required. And even though these unquantifiable benefits will not be measured, they will be given appropriate prominence in our report.

The distinction between quantifiable and unquantifiable benefits will be based on the following criteria:

- Some benefits are by nature qualitative and do not lend themselves to numeric measurement; and
- The prospect of obtaining the relevant data in time to quantitatively estimate some benefits is limited.

1.3.2 Costs

We acknowledge that estimating costs for solutions that have yet to undergo detailed technical specification or gone out to tender will have its limitations. However, that should not preclude being able to provide reasonable estimate of costs for these solutions based on historical precedence, informed judgement from payment architects and where necessary, high-level hypotheses and assumptions.

In costing the solutions, we will be looking to provide estimates for the following cost categories:

- Capital expenditure ("Capex"), i.e. costs associated with building the NPA and solution-specific items;
- Operating expenditure ("Opex"), i.e. costs of running a functional payments architecture (NPA or evolving infrastructure) as well as operational costs related to the implementation of the NPA or the required incremental changes;
- Parallel running costs, i.e. costs of running the existing architecture in parallel to the NPA, to ensure there is no loss of service on the existing schemes whilst the NPA is beginning to take a foothold;
- Transitional costs, i.e. costs that are incurred as part of the transition by PSPs from one system to the other; and
- Decommissioning costs, i.e. costs that are incurred as part of the dismantling of the current payments infrastructure.

1.3.3 Counterfactual

Estimating a counterfactual is a concept that lies at the heart of most CBAs. An approach to conducting the analysis would either involve (1) the gross approach where a baseline will need to be considered to provide net estimates or (2) an incremental approach to considering the net benefits where there will not be a need to consider a baseline. We will explore both of these options and choose the approach based on the time and quality of data available.

The latter option would require quantifying the difference between the NPA scenario and the counterfactual. In that case, the assumed counterfactual would be informed by discussions with the relevant stakeholders. This may lead to a scenario where relevant overlay services are built on the evolved version of the current infrastructure.

1.3.4 Data collection

The selection of instruments that will be used to collect data is an important step in the CBA. Validity and reliability of the collected data and, above all, their potential comparability with data from prior phase will be considered. We will rely on the following methods to obtain data:

- Desktop research;
- 2016 PSR-commissioned solutions' cost study;
- Interviews with market participants;
- Interviews with PSPs and businesses; and
- Focus groups and workshops.

Desktop research

We will use desktop research to obtain publicly available data on the UK payments system. It will also help us define part of our benefits analytical framework based on publicly available research and papers providing useful insights of comparable implementation experiences of new payment systems[1], notably in other countries such as Australia and Canada[2].

PSR Commissioned questionnaire and studies

The PSR commissioned a study in 2016 to understand the economics of interbank payment systems infrastructure and prepare the ground for a future alternative model. Surveying a number of PSPs and PSOs, this study provided useful estimates of costs borne by PSPs to manage payments as well as a useful overview of PSPs' operating costs and recent costs associated with infrastructure change programmes.

The outputs from this study were used during Phase 1 to corroborate some of our calculations. To the extent that we are unable to get more up to date information for elements covered in this study, we will use some of the outputs of this study in this phase.

In addition, a study commissioned by Faster Payment Scheme Ltd ("FPS") on the "Economics of Request for Payment" solution was recently released. This study is expected to provide some insight into the business case of some of the solutions.

Interviews with market participants (e.g. financial technology companies and trade bodies)

Some innovative solutions have been developed by financial technology companies currently existing in the market place that imitate, to a limited extent, some of the capabilities that the overlay services are expected to provide. Though these solutions do not exactly replicate the capabilities of these overlay services, there are elements of the capabilities that these solutions provide that can be used as a basis to provide more insight regarding benefits which will be useful in carrying out the CBA.

During this phase we will look to speak to fintech companies to understand their benefit case, the detriments their solutions address and also the data that informed their business case.
We have identified a number of these fintech companies that we will be looking to speak to. We will engage some of the entities shown in Table 1.

Table 1: Fintech companies and trade bodies to be engaged as part of CBA Phase 2

Entity	Business model/Rationale	Solution	Contact person
Pay360/ Emailpay	Link your email address to your bank account. Pay another subscriber using its email address.	Assurance data/ Enhanced data	*To be determined*[3]

[1] The Global Adoption of Real-Time Retail Payments Systems (RT-RPS), White Paper SWIFT © 2015.
[2] Relevant papers issued by Payments Canada and Australia's New Payments Platform ("NPP") Steering Committee
[3] These entities are not represented within the PSF. They will be approached as appropriate at the beginning of Phase 2.

Entity	Business model/Rationale	Solution	Contact person
Paym	Link your mobile number to your bank account. Pay another subscriber using its mobile number.	Assurance data/ Enhanced data	John Maynard
Pingit	Link your mobile number to your bank account. Pay another subscriber using its mobile number.	Assurance data/ Enhanced data	*To be determined*[3]
Financial Data and Technology Association (FDATA)	Trade body for companies providing innovative financial applications/ services to empower customers to make better decisions and take fuller control of their financial lives.	NPA and future overlay services	Gavin Littlejohn
Emerging Payments Association (EPA)	The EPA is a commercial membership association of payments industry influencers.	NPA and future overlay services	*To be determined*[3]
Prepaid International Forum (PIF)	The PIF is a principal trade association for the prepaid industry.	NPA and future overlay services	*To be determined*[3]
International Association of Money Transfer Networks (IAMTN)	The IAMTN represents money transfer Industry / payment Institutions providing cross border payments across the globe.	NPA and future overlay services	*To be determined*[3]

Interviews with PSPs, businesses and solution vendors

During this phase, we welcome the opportunity to engage with a more diversified audience with a view to getting more insights.

Therefore we intend to engage with the major PSPs, the smaller PSPs, PSOs[4] as well as infrastructure vendors. We will seek to get views on benefits, costs, risks and, if available, data that can be used in the CBA.

With regard to vendors, we will engage some of the organisations listed in Table 2.

Table 2: Vendors engaged as part of Phase 2

Entity	Type	Contact	Target
CGI UK	Solution vendors	Sean Devaney	NPA
Cognizant	Solution vendors	Michael Carrington	NPA/FC
Vocalink	Solution vendors	Simon Newstead	NPA
Sage	Solution vendors	*To be determined*[3]	NPA
SAP	Solution vendors	*To be determined*[3]	NPA
Experian	Solution vendors	Lana Abdullayeva	NPA
ACI	Solution vendors	Paul Thomalla	NPA
Bottomline	Solution vendors	Richard Ransom	NPA

In addition, we will carry out interviews of a select sample of PSF and industry stakeholders in order to understand their perspectives on the solutions and collect data where possible.

[4] Including the new PSO ("NPSO") that is currently being set up.

We will engage some of the organisations listed below:

Table 3: "Business case" interviewees (including corporates, trade bodies and government agencies)

Entity	Type	Contact	Target
Federation of Small Businesses	Trade body	Mike Agate	NPA
Toynbee Hall	Charity	Sian Williams	NPA
Affinity Water	Utility	Caroline Ilett	NPA
British Gas	Utility	Clare Buck	NPA
DVLA	Government agency	Brendan Peillow	NPA
DWP	Government agency	Brendan Peillow	NPA
HMRC	Government agency	Brendan Peillow	NPA
NS&I	Government agency	Brendan Peillow	NPA
FFA UK	Trade body	Katy Worobec	FC
SWIFT	Trade body	Paul Taylor	NPA/FC

Furthermore, we will engage with some of the PSPs shown on Table 4 below. This list is indicative of the range of PSPs we will look to speak to, but in reality a representative sub-set of this list may be adequate.

Table 4: Representative group of PSPs

Entity	Type	Contact	Target
Virgin Money	Other PSPs	Otto Benz	NPA/FC
Coventry	Other PSPs	Neil Lover	NPA/FC
Nationwide	Other PSPs	Paul Horlock	NPA/FC
Metrobank	Other PSPs	Rebecca Clements	NPA/FC
Raphael's Bank	Other PSPs	Mike Smith	NPA/FC
Barclays	Large PSPs	Hilary Plattern	NPA/FC
Lloyds BG	Large PSPs	Russell Saunders	NPA/FC
RBS	Large PSPs	Jane Barber	NPA/FC
HSBC	Large PSPs	Glynn Warren	NPA/FC
Clearbank	Other PSPs	Nick Ogden	NPA/FC
Electronic Money Association (EMA)	Trade body representing innovative PSPs	*To be determined*[3]	NPA

Focus groups

In order to maximise the efficiency of our interaction with Forum members, we intend to use Forum workshops and Focus groups discussions with up to four PSF members around a specific theme on

which they can best contribute. This will help to develop the benefit case, provide further insights into the solutions, provide data and review our methodology and findings.

The themes of these meetings will be discussed and agreed with the CBA Work stream leads.

2 ANALYTICAL FRAMEWORK AND METHODOLOGY

2.1 Cost-benefit analysis – General principles

The quantifiable net benefit of a project is the Net Present Value ("NPV") of relevant cash flows linked to costs and quantifiable benefits associated with this solution.

Identified solution benefits that cannot be quantified due to the lack of available data will be highlighted in the analysis on a qualitative basis.

In order to undertake our work, we need to understand the capabilities the NPA and other overlay services seek to introduce. As shown in Figure 3, we will use the following overarching process in completing our work:

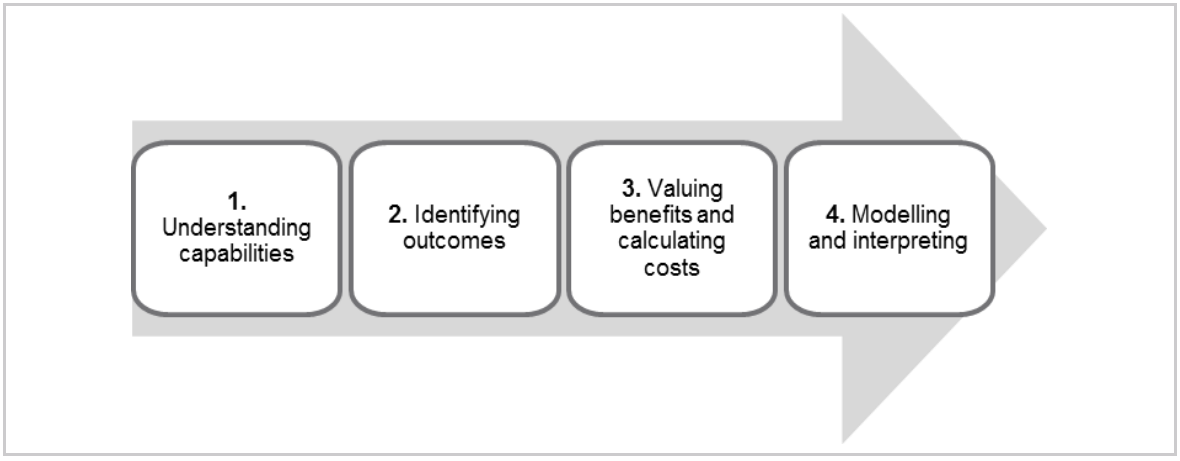
1. **Understanding the solutions and capabilities:** through review of existing evidence from previous phase and new documentation compiled by PSF, and through workshops and meetings with work stream members and other individuals inputting into the process.

2. **Identifying the outcomes**: based upon work undertaken in previous phase, workshop with work stream members and discussions with market participants.

3. **Valuing benefits and calculating costs:** we will use questionnaires, focus groups and interviews to collect data and also undertake research of academic and grey literature, including relevant publications by the PSR, PSF, to develop a net benefit analysis based on a social return on investment methodology. This will be tested and refined through the input of the CBA working group.

4. **Modelling and interpreting:** we will develop an Excel model which projects the benefits and costs of providing the new services over time.

Figure 3: High-level CBA process



2.2 Modelling

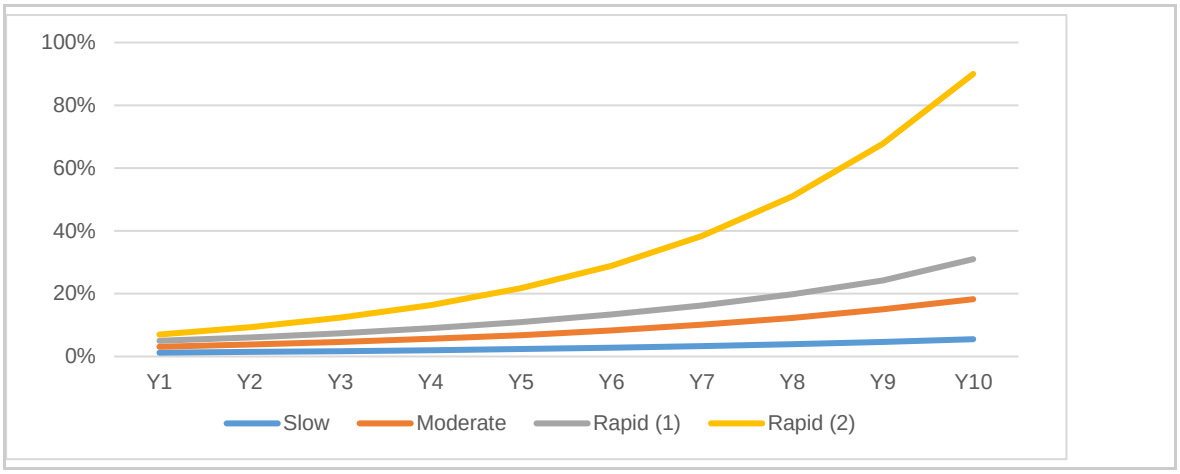
2.2.1 Adoption curves

The timeline for generating the economic benefits of the solutions will be based on how quickly stakeholders (businesses, PSPs, consumers) adopt the solutions. In the previous phase the adoption curve modelled was based on a paper by the Society for Worldwide Interbank Financial Telecommunication ("SWIFT") on the implementation of the Real-Time Retail Payments System ("RT-RPS") in several countries.

These adoption scenarios were adopted for the relevant solutions and adjusted when the original curves were considered inappropriate to describe the likely take-up of some solutions. These adjustments were made on the advice of Forum members.

The adoption curve adopted in the previous phase will be our start point for this phase, this will be adjusted as required based on information from market participants and other relevant stakeholders. Figure 4 shows an example of the adoption curve.

Figure 4: Adoption curve example



2.2.2 Cost phasing

During Phase 1, our phasing of costs on a cash-flow basis was based on the estimated Design-Build and Implementation ("DBI") timelines estimated by the Forum.

These DBI timelines are likely to evolve or over the course of Phase 2 and we will adjust them accordingly. We expect new DBI timelines to be provided by the end of June 2017 and they will then be integrated into our Phase 2 CBA model.

2.2.3 Quantifying future benefits of the NPA

The NPA is a platform that will support multiple overlay services. In estimating the benefits of the solutions, we will be quantifying the benefits of the end user needs overlay services which have been identified as solutions that will be implemented in the next 24 - 36 months. However, it has been highlighted that NPA is capable of, and will support multiple overlay services over the next few years. Whilst it will be quite a challenge to quantify the costs and benefits of yet to be identified overlay services, it will be an under estimation to assume that the end user needs overlay services identified so far will be the only ones that will generate net benefits in the 10 year duration that the CBA will cover.

As a result, using assumptions and benchmarks, we intend to provide some form of estimate of future economic benefits. We will explore a number of options in undertaking this estimation, this may include methods akin to terminal value calculations or adopting an average net benefit approach.

2.3 Risks and challenges

- As with exercises of this nature, obtaining data may be difficult. We intend to exhaust all possible data sources available to us to ensure gaps in data collection are kept to a minimum.

- Some outputs from the other work streams are inputs into the CBA piece of work, and we will need them to keep within timelines set for the CBA work stream to be able to use those outputs and deliver to time and budget. In the absence of such timely inputs, we may need to increase the level of hypotheses / assumptions used.

- We have an extensive stakeholder list that we intend to engage with as documented in this report. Whilst we are keen to engage with as many as possible to get comprehensive feedback, we do not expect to be able to engage with all of them for a variety of reasons such as time constraint and willingness to engage. This may impact the findings of the CBA.

- In the previous phase, public sector benefits had to be excluded at the request of government departments. Though we would look to have an inclusive engagement with the relevant government departments early in the process, the risk still exists that we may be unable to gain their approval to the proposed benefits case.

- We also understand that a validation or sign off of the benefits that accrue to government departments by government may have budget implications i.e. a case for a cut in funding in the departments' budgets to reflect the efficiency savings that the CBA may indicate. For this reason there may be an incentive by the departments concerned not to validate such benefits. In this event, we may need to make our own estimates without official validation and note them accordingly. Discussions will be had with the Forum on how to proceed if this situation occurs.

2.4 Ultimate use of CBA and presentation for consultation.

In the discussions we have had with stakeholders, the question of who the ultimate recipient of the CBA is and how it will be used arose. There were suggestions that the CBA should be conducted in such a manner that the results will provide a business case for the group or entity which is most likely to fund the NPA.

The approach that will be adopted in this phase is to do a CBA with the PSF as the ultimate user and recipient. The implication is, the costs and benefits will, as far as possible, cut across all identified stakeholder groups subject to availability of information.

The draft CBA result is expected to form part of the findings that will go out to consultation, therefore the level of detail that will go out to consultation will need to be discussed and agreed with the PSF. The options include findings at an individual benefit level, a more aggregated total benefit level or listing out the key assumptions and benefit drivers. Any approach taken will have its advantages and drawbacks, so a decision will need to be taken before the consultation period on the preferred form.

3 TIMINGS

3.1 Progress updates

From the beginning of April up to the end of June 2017, throughout the CBA process, we intend to update the Forum on our progress every week, as part of the broader update provided by the project team.

3.2 Workplan

Table 5 below summarises the activities and project milestones we propose to undertake as part of the Phase 2 CBA work.

Table 5: Proposed activities and milestones up to June 2017

Step	Activities and milestones	Description
1	Inception workshop	*Plenary PSF session aiming to formally kick off the CBA process and present CBA methodology.*
2	Literature review/Desktop research	*Review of publicly available analysis and data relevant for the CBA.*
3	Cost and business case interviews	*Interviews with stakeholders identified in Section 1.*
4	Workshops and Focus groups	*Mini-workshops as described in Section 1.3.4.*
5	Data processing, modelling and analysis	*Integration of data collected from public and PSF sources in the new CBA model and analysis.*
6	CBA report drafting	*Drafting of the CBA, early engagement and comments from individual PSF stakeholders.*
7	Finalise findings adjustments	*Adjust modelling cost and benefits assumptions.*
8	Workshop 2: draft interim report validation	*Finalisation of findings through a second plenary PSF session.*
9	Finalise interim report	*Reviews and adjustments of draft interim report.*
10	Delivery of interim report	*The interim CBA report is delivered to the PSF prior to the opening of the consultations period.*

3.3 Summary timeline

A summary timeline of activities and milestones is provided in Figure 5.

This timeline is dependent on WS1 and WS2 to deliver the following:

- High-level design of NPA and solutions in scope by mid-April 2017;
- User stories to refine benefits narratives by end-April 2017;
- Financing costs, based on the adopted funding model by end of May 2017; and
- Detailed DBI timelines for solution by mid-June 2017.

Figure 5: Summary CBA & Implementation timeline