

Joint Regulators' Group

**Project Splice: Workstream 3:
Benchmarking and efficiency**

**Summary of approaches and
considerations for further joint work**

December 2012

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1. Introduction

Purpose of this document

- 1.1 This document summarises the current state of play (as of October 2012) in benchmarking and efficiency analysis for regulatory purposes in the UK. This report is produced by ORR in its capacity as coordinator of the JRG Workstream 3 (JRG3) working group on benchmarking and efficiency analysis. Other members of the working group are: Ofwat, Ofcom, Ofgem, CAA and UREGNI. We are very grateful for the support and contributions from all involved. The work carried out and the preliminary conclusions reached are based on ORR's understanding of the current situation, following discussion with the wider working group. It is produced to provide an overview of current thinking and a basis for further discussion and ongoing collaboration.
- 1.2 The information contained in it is based on contacts with UK network regulators, and on the documentation we gathered from them and their consultants as part of JRG3 on benchmarking and efficiency analysis. The purpose of the document is to:
 - (a) Summarise the approaches to ensure a clear and common understanding by JRG3.
 - (b) Set out considerations for possible further collaborative work by JRG on benchmarking and efficiency analysis.
- 1.3 A first draft of the document was prepared for the JRG3 workshop on 21 October 2011 and has been updated following the workshop.
- 1.4 The Terms of Reference for JRG3 are provided in appendix A.

Structure of this document

- 1.5 This document is structured as follows:
 - (a) Chapter 2 provides some background and summarises the responses by the regulators to the eleven questions used as a basis for this report.
 - (b) Chapter 3 sets out the conclusions and areas for possible further work, based on the survey and the JRG3 working group engagement, particularly at and following a workshop on 21 October 2011.
 - (c) Appendix A contains the Terms of Reference for JRG3.

- (d) Appendix B provides lengthier summaries of the answers we received from regulators to our email questionnaire and follow-up discussions on approaches to efficiency analysis.
 - (e) Appendix C provides a summary of the main recent consulting reports and internal documents produced by UK regulators on efficiency assessment.
- 1.6 Neither appendix B or C are included in this version of the report – but can be provided if necessary.

2. Background and survey

Background: approaches to benchmarking and efficiency assessment

- 2.1 Undertaking benchmarking and assessing efficiency is recognised as a core task for economic regulators. Benchmarking is typically used by regulators as a means of mimicking the competitive environment and through assessing the efficient level of historical and planned expenditure of regulated companies on an ongoing basis and, in particular, as part of a price control review.
- 2.2 There are a number of approaches to benchmarking used by regulators. They typically tend to use a mixture of top down (statistical) benchmarking and bottom up (process or activity) benchmarking. The skills required for these benchmarking activities are not the same. Each regulator involved in JRG3 uses a slightly different mix of economic, accounting and engineering skills.
- 2.3 Economic models being used tend to be:
 - (a) Statistical or econometric.
 - (b) Accounting-based (simple ratios).
- 2.4 Engineering models tend to be:
 - (a) Based on unit costs of individual processes.
 - (b) Based on ideal/virtual network models.
 - (c) Based on expert engineering judgment about particular core activities in each network industry.
 - (d) Based on statistics, such as age-based or survivor models.
 - (e) Based on asset information, such as asset condition and risk data.
- 2.5 Methodological cross-checking using different techniques are often claimed. However, the full results of cross-checked measurement techniques are not always published in detail. The increased focus on asset management issues over the last decade (ageing assets, investment cycles, increased lumpiness of capital expenditure) has reinforced the coordination problem between top down and bottom up benchmarking (and between economic and engineering approaches).
- 2.6 The preponderance of economics-based, top-down efficiency benchmarking has been challenged during the past decade by industry and practitioners

because of either the existence of special factors or atypical expenditures, or because the capital-intensive nature of most network industries makes total cost top-down benchmarking problematic. The nature of investment cycles and the need to replace network assets installed many decades ago introduces asset management (engineering) considerations into traditional (top down) regulatory benchmarking.

- 2.7 The complexity of coordinating economic approaches with bottom-up engineering ones has pushed some regulators to reconsider their traditional approach to top down benchmarking. More complex models, including the definition of secondary outputs and the benchmarking of business plans into the future and at interim reviews, have either been introduced or are being considered by a number of network regulators. Building-blocks benchmarking (so for example separate estimation of operations, maintenance, and renewals) might be replaced, at least in some cases, by total expenditure (totex) benchmarking, as also observed in other jurisdictions throughout the EU. However this does not solve the problem and how to deal with enhancements.
- 2.8 The end-game is not clear yet, but it is obvious that, in future, if total cost benchmarking is indeed desirable, econometric or statistical analysis will have to go hand in hand with engineering methodologies (asset management, whole life cost modelling, ideal networks, and standard costing). For instance, one could examine the use of engineering models as inputs to define the “right” expected cost drivers in statistical models. Alternatively, one could run economic and engineering models in parallel – entailing the need for strong regulatory judgment throughout the price control process to eventually set network efficiency targets. Some regulators are now using mixed approaches.
- 2.9 Ofgem has recently reviewed its approach to efficiency assessment as part of its new RIIO (2010-11) framework. Ofwat is undertaking a similarly broad review encompassing, inter alia, efficiency analysis (“Future Price Limits”: 2011-12). CAA is reviewing its approach and other regulators (such as Ofcom) might view benchmarking as becoming less important in future because of the technological developments experienced by some of the industries they regulate (although postal services are still a strong candidate for on going benchmarking). Other industries, such as water in Scotland and Northern Ireland, will continue to benefit from all-UK or even international benchmarking, and newly created regulators (such as Monitor) might expand into benchmarking publicly funded sectors such as health care provision.

ORR, in this regard, currently faces the problem of benchmarking a company with no domestic comparators, and has prioritised international benchmarking (not without difficulties) since 2006.

Questionnaire survey

2.10 We asked the six participating regulators in JRG3 (CAA, Ofwat, Ofcom, UREGNI, Ofgem and ORR) 11 key questions:

1. How do you benchmark opex, capex, totex and individual capex projects?
2. How do you benchmark/cost-challenge individual “special” projects, e.g. major capex?
3. When benchmarking these individual special projects, do you, as a regulator, question the costs of the project?
4. How many people work on top down and bottom up efficiency benchmarking (comparative efficiency analysis) in your organisation?
5. Who owns, validates, and controls the datasets that are used?
6. Is the benchmarking that is undertaken by you, domestic and/or international, and is it within sectors or across sectors? Do you benchmark particular functions of regulated utilities against similar functions in other industries, or do you stick with the same industry in all cases (both top down and bottom up)?
7. What is the relevance of bottom-up, process/activity benchmarking? For instance using engineering modelling and analyses?
8. Are any “competitive” benchmarks used? Or are all comparators monopolists themselves?
9. How do you deal with frontier shift quantification? Is the frontier shift dealt with separately from catch up or simultaneously with it? If so, how are the two effects distinguished?
10. Is there any specific adjustment for exogenous factors and are input prices viewed as fully controllable by the regulated entity? If not, then how much of any change in them is 100% passed through?
11. Together with RPI, is CPI used/planned to be used in efficiency targeting and are there any specific input/output price indices that are being used, such as IOPI or COPI? What is your view about the future regulatory use of explicit input price adjustment/indexation and on the use of sectoral input/output price indices? For instance do you believe that such indices are completely uncontrollable by regulated entities?

General themes from regulators' responses

Question 1: How do you benchmark opex, capex, totex and individual capex projects?

2.11 The general theme from the responses was that the majority of regulators undertake opex benchmarking, either using a top down approach or a mixture of top down and bottom up approaches, and a few regulators benchmark capex, again with a mixture of top down and bottom up approaches. Ofgem is currently benchmarking totex, which was one of the decisions that came out of its RIIO strategy decision document which they published in March 2011. Ofwat and UREGNI are however still considering whether to benchmark totex.

Question 2: How do you benchmark/cost-challenge individual "special" projects, e.g. major capex?

2.12 All of the regulators, with the exception of Ofcom, benchmark individual projects. Ofwat are developing their approach to benchmarking individual projects. Ofgem when assessing large projects, analyse the justification of the needs case for the project and then assess the efficient costs of the project. The approaches used by Ofgem for assessing offshore and onshore network vary to reflect differences in the regulatory framework. Regarding cost challenge, Ofwat and UREGNI use comparators to benchmark unit cost data, whilst ORR generally uses a bottom up approach for individual enhancement projects but also applied some top down analysis (frontier-shift and portfolio efficiency) and the CAA base their cost challenges on individual project costs rather than the package as a whole.

Question 3: When benchmarking these individual special projects, do you, as a regulator, question the costs of the project?

2.13 Regarding questioning the costs of individual special projects, UREGNI, Ofgem, Ofwat and ORR all take action to question the costs of individual special projects. Ofgem also look at timing, resources, and engage with stakeholders. Ofwat not only questions the cost of projects but also the scope, timing and resources of the project, along with the support and project costs required to deliver the output. The CAA is different from the other regulators, as their view relies on consultants and airlines through "enhanced stakeholder engagement". Ofcom regulates to provide incentives for the adoption of new technology where and when it is efficient to do so, which may mean that price controls reflect older technology costs for a time, rather than always being set

to bring charges into line with latest technology costs, which can be difficult to estimate with accuracy.

Question 4: How many people work on top down and bottom up efficiency benchmarking (comparative efficiency analysis) in your organisation?

2.14 Typically the regulators employ between 1-4 members of staff and 0.5FTE to 3FTE plus consultants (although it is important to note that these numbers have not been normalised for the different scopes of work undertaken). Ofwat also uses an external advisor, as does ORR. Ofcom generally outsource their benchmarking almost completely to consultants. Generally regulators will undertake varying degrees of consultancy on benchmarking at periodic reviews.

Question 5: Who owns, validates, and controls the datasets that are used?

2.15 The CAA uses datasets which are owned by TRL (Transport Research Laboratory), ATRS (Air Transport Research Society) and Eurocontrol. Ofgem and Ofwat both own and validate their datasets. Ofcom own some of their data and also have consultants who own, collect and validate data for analysis and the ORR owns its own data and has (for international top down benchmarking) used data provided by the International Union of Railways.

Question 6: Is the benchmarking that is undertaken domestic and/or international, within sectors or across sectors? Do you benchmark particular functions against other industries or do you stick with the same industry?

2.16 The majority of regulators use domestic comparators, with the exception of Ofcom and, to an extent, ORR, who have no direct domestic comparators. CAA uses a combination of domestic, cross sector and international benchmarking. Ofwat mainly uses domestic comparators; however they have temporarily suspended direct benchmarking whilst the data is reviewed and the "Future Price Limits" project is completed. Consultants hired by Ofcom have used international benchmarking and cross-industry benchmarking. UREGNI benchmark against the UK as a whole and have used cross sector data to look at efficiency catch-up experience and maximum efficiency delivery precedents. Ofgem use mainly domestic benchmarking but do also carry out cross-sector and have carried out international totex benchmarking for gas and electricity transmission. In its last periodic review ORR put a lot of focus on international comparisons, both top down and bottom-up, but it also commissioned work on trends in Real Unit Operating Expenditure across other utilities in the UK (for opex) and specific bottom-up domestic studies

were undertaken on opex (e.g. labour costs, HR benchmarking, procurement function benchmarking).

Question 7: What is the relevance of bottom-up, process/activity benchmarking? For instance using engineering modelling and analyses?

2.17 Regarding bottom-up, process/activity benchmarking is only used on a consistent basis by a few regulators, although all of them have used or considered it at some point. CAA in the last periodic review carried out some process benchmarking. Ofwat only use the cost base bottom up techniques alongside UREGNI. Ofcom commissioned top down analysis which was more accounting than engineering based. Ofgem use activity level cost benchmarking as part of their toolkit, as well as age-based modelling, load related models, loading indices, and network analysis and modelling, consistently with their output-based RIIO framework combining top down economic and bottom up asset management considerations. ORR use engineering benchmarking for the majority of their analysis.

Question 8: Are any “competitive” benchmarks used? Or are all comparators monopolists themselves?

2.18 The majority of regulators don't seem to use “competitive” benchmarks, with the exception of the CAA which uses “competitive” benchmarks in their cross sector benchmarking analysis. Ofwat in the last price review used only monopolist comparators. For NATS, international benchmarking was limited to air traffic control systems by definition (CAA). Ofgem have used competitive sector benchmarks for indirect costs for many years, which has been recognised in work carried out by Deloitte and LECG on HR, IT and property costs benchmarking. UREGNI and ORR are looking into the possibility of using competitive benchmarks within their analysis.

Question 9: How do you deal with frontier shift quantification? Is the frontier shift dealt with separately from catch up or simultaneously with it? If so, how are the two effects distinguished?

2.19 Regarding catch-up and frontier shift; Ofwat, Ofgem, Ofcom to some extent, UREGNI and ORR all estimate catch-up and frontier shift separately. The CAA does not identify a clear distinction between catch-up and frontier shift and so for NATS (National Air Traffic Services) there was no separate catch-up and frontier shift estimation. Ofcom's Openreach analysis made separate assumptions. For instance, NERA for Ofcom used Stochastic Frontier

Analysis (SFA) to estimate the catch up separately based on international data.

Question 10: Is there any specific adjustment for exogenous factors and are input prices viewed as fully controllable by the regulated entity? If not, then how much of any change in them is 100% passed through?

2.20 Ofwat, Ofgem and UREGNI seem to be the only regulators who make adjustments for differences in regional factors, with Ofgem also adjusting for company specific differences as well. The CAA allows airports to pass on 90% of costs, imposed by increased security standards, and NATS allows up to 100% of cash pension contributions to be passed on with any capital expenditure to be passed on to users through RAB. Ofwat's pass on amounts range from 0% to 100% when they assess efficiency. Ofcom and ORR model input prices separately, with the ORR also allowing a 100% pass through of non-controllable factor costs in its last periodic review (this is now being revised). UREGNI allows additional opex to be passed on but only if it passes the regulators tests for exogeneity and newness. For uncontrollable costs, Ofgem have pass-through arrangements such as licence fees, network rates and requirements for armed guards at many key network sites.

Question 11: Re input price adjustments

2.21 All six regulators use RPI, with the majority of regulators having looked into CPI but disregarded it due to a number of disadvantages, mainly due to the absence of a liquid traded market for CPI-indexed bonds in the UK. Ofwat and UREGNI are the only regulators who use COPI, whereas ORR prefers to use IOPI (this is being reviewed in the current access charges control). Ofcom is the only regulator which disregards the use of sub-indices completely, as they believe that the regulated network operator could influence sub-sectorial indices directly.

Commonalities and differences

2.22 The table below shows the key commonalities and differences observed in the efficiency analysis strategies of the six regulators and their practical approaches to benchmarking efficiency. Three main areas where we can assess commonalities and differences between regulators are:

- General approach
- Issues faced
- Data problems

	ORR	Ofgem	Ofwat	CAA	Ofcom	UREGNI
Approach	Top down and bottom up benchmarking. Substantial use of bottom up analysis in ORR's asset management approach.	Mixed "toolkit" approach, where top down and bottom up benchmarking are balanced throughout, however they are also making substantial use of asset management information in bottom up analysis.	Mixed approach to benchmarking, currently under review.	CAA undertake top down benchmarking, but find it less crucial than in other industries due to the nature of the aviation and airports sector. CAA adopts a bottom up approach sometimes for cost challenges.	Top down approach to benchmarking with some recent bottom up, activity based initiatives.	Top down benchmarking, however informed by UK wide considerations including bottom-up challenges, for instance based on Ofwat's work.
Issues	Use international comparators to benchmark against.	Use domestic comparators. Looking at international	Use domestic comparators in their benchmarking, with	Use international comparators, like ORR, however, due to airports	Use international comparators such as US LECs or comparable	Relatively similar to Ofwat and Ofgem. They undertake NI and UK-

JRG Workstream 3: Summary and recommendations

	<p>Network Rail has weak efficiency incentives due to its corporate governance and structure.</p>	<p>comparisons in electricity transmission and gas transportation (TSOs).</p>	<p>some elements of international benchmarking (for instance, against Dutch utilities).</p>	<p>being highly commercialised, benchmarking is more highly powered because of stronger efficiency incentives. Air traffic control traditionally benchmarked as a natural monopoly and public good.</p>	<p>functions in UK firms in other sectors.</p>	<p>wide benchmarking.</p>
<p>Data</p>	<p>All datasets used by the 6 regulators are currently different, so the data is not comparable across industries.</p>					

3. Conclusions and considerations for further work

JRG3 discussion on potential areas of collaboration

- 3.1 On 21 October 2011, ORR convened a workshop to discuss an earlier draft of this document and for the regulators to discuss issues regarding the workstream and ideas for any collaborative work that could be undertaken. There was good discussion and interest in doing joint work to take forward JRG3, although the participants recognised various challenges in doing this. Key opportunities identified are:
- 3.2 **Data sharing.** One idea proposed was that regulators could look to share data more fully and formally, in particular, but not necessarily exclusively, on staff costs and input prices and ongoing efficiency/frontier shift assumptions. (expenditure areas where there is a degree of commonality).
- 3.3 **Specific benchmarking projects.** There was interest in identifying a small number of specific projects where joint cross-sectoral benchmarking could be undertaken by the regulators utilising existing data. It was considered that in the first instance such a study (or studies) could focus on support functions such as IT, HR or finance functions.
- 3.4 A joint piece of joint work on estimating frontier shift was proposed – with frontier-shift estimates being of interest to all regulators and the techniques and substantive issues being similar in each sector. It was noted that there may be timing issues with such joint work as each regulator is likely to need up to date results when making its price review decisions. Also each regulated industry will have a differing mix of costs, such as labour or mechanical equipment, and so the weightings used to inform frontier shift will necessarily be dependent upon individual industry characteristics.
- 3.5 A follow-up suggestion was that a series of smaller joint pieces of work which are co-funded or carried out jointly by a few regulators whose price review needs are aligned may be of better value.
- 3.6 **Methodologies.** As an alternative, or in addition, to undertaking specific studies it was suggested that there could be more merit in doing joint work on methodological issues to avoid the risk of specific studies not being usable. Potential candidates for this are:
- (a) Building blocks versus totex benchmarking.

- (b) Top down versus bottom up benchmarking: how to rationalise the use of regulatory judgment throughout price control reviews.
- (c) Frontier-shift measurement and to what extent can frontier shift be objectively estimated separately from catch up?
- (d) Input prices, both how they are treated (as well as specific measurement discussed above), given that there will be common inputs to different sectors such as steel and copper.
- (e) Building on consideration of input prices, the extent to which costs (and inputs) are controllable or uncontrollable and how regulators decide between the two categories.

3.7 **International comparisons.** Deeper understanding of international issues and comparisons of costs in the UK compared to international peers, e.g. building on the IUK work.

Next steps

3.8 The work on JRG3 highlights areas of common interest and the possibility for regulators to share information and datasets and to do joint work.

3.9 As an immediate next step, further discussion is necessary to confirm the priority areas for further work, shape specific areas of collaboration and obtain commitment for working on a small number of specific projects during 2012-13.

Appendix A: Terms of Reference

Joint Regulators Group – Project Splice: Enhanced Collaboration Terms of reference for Splice work stream 3: Benchmarking and Efficiency

Background

JRG has agreed to undertake a more structured programme of collaborative work, building on previous approach of largely ad hoc collaboration on specific issues. Enhanced collaboration can help individual regulators to deliver their statutory remits better through more efficient use of resources and by learning from each other. Clearer understanding of the different regulatory approaches applied and, where appropriate, wider application of common approaches can also underpin greater confidence by investors and others.

Splice work stream 3: Benchmarking and efficiency

Project Splice work stream 3 covers benchmarking and efficiency. It will specifically consider the techniques/approaches to/uses of benchmarking by each regulator and the pace of efficiency improvement. This may have a link to the cost of infrastructure in the UK compared to other European countries. It will cover all areas of opex and capex and encompass 'frontier-shift' as well as 'catch-up' efficiency benchmarking and improvement.

The objectives of work stream 3 are to:

- identify consensus on what techniques are appropriate in what circumstances;
- enable convergence on techniques used by various regulators; and
- identify where further joint studies on particular issues and/or data sharing between regulators would contribute to these goals.

Members of the group

The initial participants in Splice work stream 3 are:

Paul McMahon, ORR (chair)

Gian Carlo Scarsi, ORR

Helen Twelves, Ofwat

Tony Wickes, Ofcom

Iain Osborne, CAA

Chris Watt, Ofgem

The work stream will be carried forward by this group, engaging with an involving other regulators as appropriate.

Phase 1

The first phase of Splice 3 will be carried out up to spring 2012 when progress and the terms of reference will be reviewed. In this phase, as a first step to develop further collaboration, the work stream will address the question: *How does each regulator assess efficiency and why do they use the approach (es) they do?*

In assessing this question the following will be considered:

- the constraints and opportunities in each sector, e.g. the number/availability of domestic comparators
- each regulators views of the advantages and disadvantages of the approaches adopted
- the choice between methods and the use of multiple methods (e.g. top-down, bottom-up, domestic, international)
- data availability
- confidence levels/accuracy required in analysis/results
- the resources (internal and external) used in benchmarking
- lessons that can be learnt individually or jointly and identify candidates for joint work

Next steps

An initial report will be produced, based on a desk based review of existing reports and discussions with regulators (with ORR taking the lead on this). This will be the basis of a workshop in mid/late October, following which the report will be finalised. Further phases of work will be considered after this, which may include joint studies on common issues, opportunities for sharing data between regulators and across industries, consideration of the effects of the wider regulatory framework on efficiency improvement (e.g. treatment of RPI and input prices), and wider comparisons of UK cost/efficiency levels to international peers.

ORR, updated 31 August 2011

Appendix B: Answers to the questionnaire

Appendix can be supplied on request.

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Appendix C: Summaries of Relevant Regulatory and Consultancy Reports

Appendix can be supplied on request.