Response to GTS's and TenneT's comments on Oxera's ongoing efficiency study for ACM

Note prepared for ACM

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1 Introduction

In January 2016, Oxera published its study on ongoing efficiency for Dutch gas and electricity transmission system operators (TSOs) (hereafter referred to as 'Oxera (2016a)').[1] Following consultations, a slightly revised report was published in April (hereafter referred to as 'Oxera (2016b)'), in which some minor mistypes were corrected.[2] The report formed the basis for the draft decision published by ACM in April.[3] In response to this, Gasunie Transport Services (GTS) and TenneT have raised some queries, which we have been asked to consider. The questions addressed in this note concern the following six issues:

- the representativeness of the telecoms sector in the comparator set;
- the weighting method used to aggregate the sector-specific results;
- the role of specialisation of the comparator sectors;
- the length of the analysis period;
- the nature and degree of 'uncontrollable' costs of the comparator sectors and in the academic studies;
- the use of ISIC Revision 4 categories for comparator selection.

[1] Oxera (2016a), 'Study on ongoing efficiency for Dutch gas and electricity TSOs', January, prepared for Netherlands Authority for Consumers and Markets (ACM), available at: https://www.acm.nl/nl/publicaties/publicatie/15537/Agendapunt-5-Study-on-ongoing-efficiency-for-Dutch-gas-and-electricity-TSOs/.

[2] Oxera (2016b), 'Study on ongoing efficiency for Dutch gas and electricity TSOs', April, prepared for Netherlands Authority for Consumers and Markets (ACM), available at: https://www.acm.nl/nl/download/publicatie/?id=15701. See Footnote 3 of the report for changes made in that version compared with the earlier version.

[3] ACM (2016), 'Ontwerpmethodebesluit TenneT Transport 2017-2021', April, available at: https://www.acm.nl/nl/publicaties/publicatie/15655/Ontwerpmethodebesluit-TenneT-Transport-2017-2021/.

2 Representativeness of the telecoms sector in the comparator set

GTS/TenneT's specific questions on this issue are as follows:

> Telecommunications is not representative to be included in the comparator set because TSOs are unable to attain the same level of productivity change as the telecom sector. TenneT argues that the telecom sector has high levels of productivity because of considerably shorter depreciation periods of assets and therefore quicker replacement by new generation assets.[4]

We examine these points below.

2.1 The telecoms sector has played an increasing role as a driver of productivity for TSOs

As noted in Oxera (2016b), the telecoms sector provides an important input for many TSO activities, such as market facilitation, system operations, grid maintenance and grid construction.[5] In particular, telecoms is a major input (along with IT) for two significant TSO activities: market facilitation and system operations. These two activities effectively involve:

- gathering information in real time from a variety of sources (for example, energy flows and market prices);
- processing that information—for example, to identify system stresses or any requirements to adjust flows on the network, and to decide which market adjustments will make those flow adjustments;
- feeding the information back to adjust the system set-up or inform market participants to adjust their flows.

This real-time information processing requires integrated telecoms and IT systems: telecoms systems to gather and disseminate information and instructions; and IT systems to process the information and inform operator decisions. According to Sumicsid, in its 2009 report on international benchmarking of electricity TSOs, these two activities alone accounted for more than 50% of the share of OPEX in 2006 across a sample of 22 European TSOs.[6,7]

Indeed, many of the productivity improvements in the energy sector in Europe over the last 20–30 years have arisen due to a combination of advances in telecoms and IT.[8] Finally, it is worth noting that telecoms productivity figures[9] capture OPEX- and CAPEX-related efficiencies, thereby accounting for relevant CAPEX- and OPEX-related TSO activities. This is particularly relevant since ACM sets a TOTEX target.

[4] ACM (2016), 'Request for additional offer on the Study on ongoing efficiency for Dutch gas and electricity TSOs', June.
[5] Oxera (2016b), op. cit., section 4. The original version of the report contained the same discussion. Oxera (2016a), op. cit., section 4.
[6] Sumicsid (2009), 'International benchmarking of electricity transmission system operators', E[3]Grid Project – Final report, September, Table 7-1. Sumicsid does not provide a CAPEX split by activity.
[7] While Sumicsid's study focuses on electricity TSOs, as a *share* of the TSO OPEX, its figure with respect to market facilitation and system operations of electricity TSOs could be comparable to gas TSOs. However, this is an empirical issue that requires further examination.
[8] See the discussion on this aspect on p. 20 of Oxera (2016b), op. cit.
[9] As well as other sectoral productivity figures considered in our analysis.

2.2 The telecoms sector does not present timing issues

The shorter depreciation period of assets in the telecoms sector is not an issue, as productivity improvements from the telecoms sector flow through into sectors that use telecoms technology at around the same rate over time. The telecoms sector is likely to see the benefits of productivity improvements first, but it also incurs product developmental costs, unlike purchasers of its technology. As long as the averaging period over which the productivity analysis is based is long enough, any timing difference/shorter depreciation periods[10] in terms of differences in telecoms and IT-related assets purchased at different points in time,[11] possibly representing different technologies, should not matter.

Not only do we consider that the averaging period is sufficiently long, but also that timing is unlikely to be a problem for TSOs.

- First, IT and telecoms assets used by transmission companies in their business processes are turned around relatively quickly. Any new assets that the transmission company acquires (and any adjusted business processes) will incorporate the latest available IT and telecoms productivity advances. This will allow transmission companies to harness related productivity improvements relatively quickly.
- Second, our base analysis period is over 17 years, with the last year of analysis in 2008; as such, we consider a sufficiently long period of time over which one could expect the productivity of the telecoms sector and the productivity of the telecoms share of the transmission sector to be similar.
- Finally, we note that for telecoms services bought in from specialists, we would expect OPEX and CAPEX productivity benefits to flow through procurement costs (i.e. procurement efficiencies).

For these reasons, shorter depreciation periods are not a barrier to gaining the productivity benefits. In fact, this is how advances in the telecoms and IT sectors, and their associated productivity improvements, flow through into TSOs' productivity improvements.

2.3 Core results are confirmed by sensitivity analysis without the telecoms sector

The comparator set with telecoms developed by Oxera leads to similar estimates to those that would be derived with the comparator set used in the previous decision without telecoms, as shown in Table A2.3 of Oxera (2016b).[12]

3 Weighting method used to aggregate the sector-specific results

TenneT and GTS mention that telecoms activities account for only a small part of their total costs. Based on Oxera (2013) and its own internal analysis,[13] GTS argues that telecoms represents only 3% of its total costs:

[10] While telecoms and IT-related assets could have relatively short depreciation times, TSOs undertake periodic investment owing to network needs and/or as part of investment cycle and price reviews; as such, advances in technology that lead to increased productivity can potentially be realised in sectors (such as transmission) that use these technologies.
[11] For example, due to different replacement cycles or investment decisions.
[12] Oxera (2016b), op. cit., section A2.
[13] Oxera (2013), 'The potential for frontier shift in electricity distribution', prepared for Electricity North West Limited, June.

> TenneT and GTS mention that telecom activities only result in a small part of their total costs. According to GTS, telecom represents only 3% of their total costs, whereas an unweighted average results in a 12,5% part. Therefore, GTS proposes weighting of the sectors according to their share in the total costs of a TSO.[14]

In addition to the points made in section 2, we note the following.

The Oxera (2013) report was developed for a UK electricity distribution network operator (DNO), which is a poor proxy for a gas transmission operator in certain respects. For example, DNOs generally operate relatively passive networks that allow energy to flow without real-time system and market adjustments. This means that there is limited emphasis on market facilitation and system operation activities and, as such, productivity improvements due to new technologies in these areas will have less of an impact relative to the impact on TSOs.[15] In contrast, for transmission companies, market facilitation and system operations are key components of the business deliverables. Therefore, there is no direct read-across between the two papers.

As noted in Oxera (2016b),[16] in the previous method decision, selected industry productivity estimates were aggregated using unweighted averages. As we did not have access to company-specific data, we followed the same approach in our analysis. Since GTS/TenneT have made the point with respect to the telecoms sector, we note that the productivity estimates are broadly similar under the comparator set used in the previous method decision, which did not include the telecoms sector (see section 2.3).

Lastly, as will be explained in section 4 below, the comparator sectors identified undertake a number of activities with potentially common functions. For example, all the comparator sectors (and companies classified within these) can be expected to undertake back-office tasks that rely on IT services to varying degrees. Conversely, there may be other transmission activities that represent specific sectors more closely (see, for example, the discussion on market facilitation and system operations in section 2.1 above). As we have not undertaken a one-to-one mapping of transmission activities to specific sectors in the economy, and did not have access to company data, we have weighted the sector-specific productivity growths equally.

4 Role of specialisation of the comparator sectors

GTS mentioned that:

> the productivity figures of companies included in the comparator set are based on their main activity and it is not clear whether these same productivity levels can be attained by a TSO if this activity forms only a small part of total TSO activities. This implies that specialization brings no advantages and results in an overestimation of productivity growth for GTS.[17]

First, we note that in National Accounts, companies are classified into industries based on their main activity, but the total output (and input) of all activities,

[14] Based on email communication from ACM to Oxera on 25 May 2016. The questions were also mentioned in the Request for Proposal document from ACM. ACM (2016), 'Request for additional offer on the Study on ongoing efficiency for Dutch gas and electricity TSOs', June.
[15] In future, as SMART grids and meters become more prevalent, this situation might be expected to change.
[16] Oxera (2016b), op. cit., section 4.5.
[17] ACM (2016), 'Request for additional offer on the Study on ongoing efficiency for Dutch gas and electricity TSOs', June.

primary and secondary, is included in the respective industry classification. Eurostat states:

> The principal activity determines the activity class in ISIC to which the enterprise belongs. It is important to realise that once this assignment has been made, the whole enterprise – including output for other activities – will belong to this class, even if some of the other output belongs to a different class.[18]

As such, the notion that the productivity estimates derived from National Accounts represent the productivity performance of a fully specialised industry is not true. That is, those comparator sectors selected potentially undertake activities that are not included in the formal industry definition. (As noted in section 3 above, the comparator sectors could also be undertaking some common functions.) However, data on the proportion and classification of non-primary activities of organisations included in the National Accounts is not generally available.

The telecoms sector (and possibly other sectors in the comparator set) is arguably characterised by highly complex and integrated processes.[19] Thus, this sector may capture a number of ancillary activities that are relevant to TSOs, such as book-keeping, storage, purchasing or maintenance.[20] The productivity estimated from the telecoms sector could be capturing the contribution of these activities as well.[21] As such, the relevance of the sector is not restricted to one activity, but several, all of which could shed light on the productivity growth of TSOs.[22]

Second, even if the comparators are considered as specialists (which is not the case), it is not clear that specialist sectors result in greater productivity. In order to answer this question, it would be necessary to compare the extent of economies of scope[23] available to the comparator sectors versus the potential for such economies for a TSO.

Lastly, another, potentially related, issue is the impact of economies of scale—i.e. efficiencies that can be achieved as the scale of operations increases. Again, there is little direct evidence on the potential economies of scale for the comparator group. Giraleas (2013)[24] finds that, in the long run, scale efficiency change did not materially affect the productivity performance of the whole Dutch economy.[25]

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[18] Eurostat, 'Building the System of National Accounts - basic concepts', available at: http://ec.europa.eu/eurostat/statistics-explained/index.php/Building_the_System_of_National_Accounts_-_basic_concepts.

[19] 'Some activities separately identified in ISIC are *simple processes* that convert inputs to outputs, such as dyeing of fabric, while other activities are characterized by *highly complex and integrated steps*, such as automobile manufacturing or computer system integration'.[emphasis added] UN Statistics Division (2016), 'Detailed structure and explanatory notes, ISIC Rev. 4 code 61', January, p. 13.

[20] UN Statistics Division (2016), op. cit., p. 13.

[21] Separating ancillary activities is difficult in complex sectors. The UN recommended that 'statisticians not make extraordinary efforts to create separate establishments for these [ancillary] activities artificially in the absence of suitable basic data being available'. UN Statistics Division (2016), op. cit., p. 14.

[22] It should be mentioned that it is difficult to focus on specific activities within a sector when measuring productivity, for two main reasons. First, the data required for analysis at the more disaggregate level is not available. Second, measurement issues at the more disaggregate level would compromise the accuracy of productivity estimates calculated at such levels.

[23] In essence, economies of scope are efficiencies (increased output or cost savings) that can be achieved when a company is producing more than one distinct good or service; these efficiencies would not be available if said outputs were produced separately. Diseconomies of scope, on the other hand, are inefficiencies that result solely from the joint production of separate goods or services.

[24] Giraleas, D. (2013), 'The measurement and decomposition of economy-wide productivity growth. Assessing the accuracy and selecting between different approaches', Aston University, Section 5.

[25] Approximately 0% scale efficiency change in the 1978–2007 period using ISIC v2 data.

5 Length of the analysis period

ACM has requested further views about the analysis period considered:

> GTS mentions that the choice of a shorter period (2 business cycles instead of 4) is not accurately motivated. In the years 1978-1988 there was a (strong) negative productivity development which is also what we are seeing from 2008 onwards. So a period of low growth is particularly relevant. GTS also points out that the gain from using the KLEMS update is not apparent as Oxera questions whether the second business cycle ended at 2007 or 2008.[26]

Therefore, we explain below why we chose our preferred dataset, which covers the period 1989–2009, and consider sensitivity analysis to show that it does not affect our conclusions.

5.1 Better accounting standards from the latest dataset

Our analysis is based on the latest dataset available for productivity analysis. With this dataset, it is possible to conduct TFP or OPI analysis from 1988 to 2009. This version is to be preferred in light of the improvements in data collection and accounting standards. For example, the United Nations Statistics Division states that:

> This fourth revision of ISIC (ISIC, Rev.4) is the outcome of a review process that spanned several years and involved contributions from many classifications experts and users around the world. This process resulted in an ISIC structure that is more detailed than the previous version, responding to the need to identify many new industries separately. […] Moreover, the relevance of the Classification has been enhanced with the introduction of new high-level categories to better reflect current economic phenomena. A new section entitled "Information and communication" […] is one such innovation[27]

On the number of business cycles considered, it is indicative that national and international statistical agencies no longer provide estimates for productivity data necessary to conduct TFP analysis prior to 1988.[28] We have aimed to produce a long-run estimate of the productivity growth over the available period of analysis, taking into account both economic downturns and the recovery periods that follow. The full dataset using the ISIC revision 4 classification built by Oxera considered the longest time period available, namely 1989–2009, to construct the long-run average in output and productivity growth from which it was possible to identify business cycles.

5.2 Relevance (or lack thereof) of the 1978–88 period

In addition to a lack of up-to-date productivity data over the period 1978–88, we consider that this period may not be useful in informing long-run productivity growth for the Dutch TSOs. In Oxera (2016b), based on a review of regulatory precedents across different sectors and jurisdictions, we identified the following criteria for selecting the appropriate period for analysis:

[26] Based on email communication from ACM to Oxera on 25 May 2016. The questions were also mentioned in the Request for Proposal document from ACM. ACM (2016), 'Request for additional offer on the Study on ongoing efficiency for Dutch gas and electricity TSOs', June.

[27] United Nations (2008), 'International Standard Industrial Classification of All Economic Activities (ISIC), Rev. 4', August.

[28] See, for example, EU KLEMS (2009), 'EU KLEMS Growth and Productivity Accounts: Data in the ISIC Rev. 4 industry classification'.

- the main rationale is to cover *complete* business cycles, not maximise the length of the time period.[29] In our analysis, we have identified two full business cycles, thereby meeting this criterion;
- a very short timeframe (in particular covering *one incomplete* business cycle) may not be appropriate. Not only do we consider two complete business cycles, we consider 17 years of data, which exceeds the threshold period proposed in some jurisdictions;[30]
- older data may be less informative for determining the scope for future productivity growth.[31] This is consistent with our analysis, where we use data from 1988. The earliest observation in the old productivity dataset was recorded 38 years ago, which may not be of indicative importance in informing future productivity potential;
- in some instances, earlier data should be discarded if there is evidence of structural breaks or atypical fluctuations that introduce bias in productivity estimates. This point informed our decision to exclude the period starting from 2009 (due to the financial crisis). However, we noted that, in the Netherlands, the privatisation and deregulation process in the utilities sector started in 1989, which may indicate that it is more appropriate to consider data since that time.[32]

5.3 Considering alternative analysis periods does not lead to different conclusions

Regarding the second point made by GTS, we note that, in Table 5.4 of Oxera (2016b), we clarified that the end of the second business cycle was 2008.

The results presented in Table 5.1 below show that both points raised by GTS have no effect on the final estimates.

[29] For a discussion, see Oxera (2013), 'The potential for frontier shift in electricity distribution', June, available at: https://www.enwl.co.uk/docs/default-source/enwl-wjbp-2014/enwl-140317-annex-15---the-potential-for-frontier-shift-in-electricity-distribution.pdf?sfvrsn=2; and Oxera (2008), 'What is Network Rail's likely scope for frontier shift in enhancement expenditure over CP4?', prepared for Office of Rail Regulation, March, section 5.2, available at: http://orr.gov.uk/__data/assets/pdf_file/0009/4887/pr08-oxerafs-270308.pdf.

[30] For example, Australian Energy Market Commission (2011) suggests that a minimum of *eight years* of robust and consistent data is sufficient to derive TFP estimates. Australian Energy Market Commission (2011), 'Review into the use of total factor productivity for the determination of prices and revenues', June.

[31] See, for example, First Economics (2011), 'First Economics report on productivity: A report prepared for Northern Gas Networks', August; and First Economics (2012), 'The Rate of Frontier Shift Affecting Water Industry Costs', December.

[32] See Hulsink, W. and Schenk, H. (1998), 'Privatisation and deregulation in the Netherlands', pp. 242–57 in D. Parker (ed.), *Privatisation in the European Union: Theory and Policy Perspectives*, Routledge.

Table 5.1 Productivity growth for Oxera's comparator set and economy-wide estimates

Measure; analysis period	1992–2007 (2008 excluded from the analysis)	1992–2008 (two complete business cycles)	1989–2009 (longest available period)
TFP (GO)	0.4%	0.4%	0.2%
OPI (GO)	-0.5%	-0.5%	-0.5%
GO-based input price inflation relative to CPI inflation	-0.1%	-0.1%	-0.3%
TFP (GO) less input price inflation relative to CPI	-0.5%	-0.5%	-0.5%

Note: In this table, a negative OPI estimate indicates a fall in output prices, and a positive number indicates an increase in output prices (relative to the consumer price index, CPI). Based on NACE 2 classification standards.

Source: Oxera analysis using EU KLEMS and OECD data.

Even if 2008 were to be excluded from the analysis, the core estimates would be unchanged. Second, even if, consistent with the previous decision, the longest time period available were to be chosen, the empirical estimate would be 0.5%, based on the TFP (including GO-based input price inflation relative to CPI inflation) and OPI measures.

6 The nature and degree of 'uncontrollable' costs

Both GTS and TenneT argue that the proposed cost reductions resulting from productivity improvements should apply only to their 'controllable' cost base—i.e. they should exclude activities and input-related costs that the TSOs have no direct control over. In particular, both TenneT and GTS specifically mention energy costs as being 'uncontrollable'.

> TenneT mentions that the importance of the acquisition costs for energy and power in de sectors of the comparator set and by using the academic studies is not taken into account. Therefore these costs are not accounted for, while that should have been done according to TenneT. Besides, GTS mentions that applying the frontier shift on costs that are out of the control of GTS is only possible if GTS is compared with identical companies which have the same type and level of incontrollable costs.[33]

First, both TSOs have available to them a degree of pass-through for certain uncontrollable costs, since their tariffs and revenues are linked to a price index (CPI) that accounts for changes in energy prices. In particular, 'housing, water and *energy*' accounts for about 22% of the total basket of goods or services that form the Dutch CPI. Energy costs could be reflected in other items considered in the basket as well (such as transport, 12%; hotels, restaurants, cafés, bars, pubs, 4.4%).

More importantly, in the current context, while the non-controllable costs for each comparator sector could be different, these will be reflected in the *productivity growth* and *input price inflation* observed in these sectors, and in the contribution of those sectors to the overall dynamic efficiency estimate. As noted in section 2.2, productivity improvements from the comparator sectors must flow through

[33] Based on email communication from ACM to Oxera on 25 May 2016. The questions were also mentioned in the Request for Proposal document from ACM. ACM (2016), 'Request for additional offer on the Study on ongoing efficiency for Dutch gas and electricity TSOs', June.

into sectors that purchase their technology at around the same rate over time. TSOs benefit from such productivity improvements through diffusion of innovation and reduced input costs (which potentially represent both quantity and price effects). As we have averaged the *productivity growth* and *input price inflation* over a long period for a number of comparable sectors that also incur uncontrollable costs, such as energy costs, we do not consider that this is a material issue.

In terms of academic studies considered in our review, one of these (Economic Insights (2011)) follows a similar framework as above. From the remaining studies, as they use company data over time in the analysis directly, it is not clear whether and what non-controllable costs of the assessed entities have been included; if energy costs have been excluded; and/or the materiality of such inclusions/exclusions for the results. As noted in Oxera (2016b), we developed a number of guiding principles to identify *relevant* academic studies and regulatory determinations of dynamic efficiency assessment of transmission operators. In informing the productivity potential of the Dutch TSOs, we thereby consider the dynamic efficiency estimates from the studies identified to be relevant.

7 Use of ISIC Revision 4 categories for comparator selection

TenneT believes that having 'IT and other information services' and 'telecommunications' is problematic:

> TenneT signals that the sectors in the comparator set relate in different ways to the ISIC major categories. Especially having multiple sectors stemming from one ISIC major category is considered problematic when an unweighted average is applied to these sectors. For instance, the ISIC major category 'Information and communication' relates to two sectors in the comparator set ('Telecommunications' and 'IT and other information services'). Therefore, TenneT proposes weighting of the sectors according to their share in the total costs of a TSO.[34]

It is not clear why having sectors from the same ISIC category would lead to estimation problems. While it would be problematic to have a sector from an ISIC major category and a sub-category within that, we have considered two sub-sectors from the same major category.

Indeed, 'Telecommunications' and 'IT and other information services' make separate contributions towards the total output of the economy.[35] The UN Statistics Division confirms that 'all categories at each level of the classification are mutually exclusive'.[36]

Finally, there are methodological reasons for including both sectors. The methodology for selecting the comparators is not based on one-to-one mapping of selecting one industry for each TSO activity. Rather, we develop a framework for identifying sectors based on all relevant TSO activities.[37] Based on our

[34] Based on email communication from ACM to Oxera on 25 May 2016. The questions were also mentioned in the Request for Proposal document from ACM. ACM (2016), 'Request for additional offer on the Study on ongoing efficiency for Dutch gas and electricity TSOs', June.

[35] While the 'telecoms' sector is defined according to the definitions in category 61 of the international industrial classification, 'IT and other information services' is based on categories 62 and 63. As such, no overlap in the quantification of output (or separate inputs) is present. See UN Statistics Division (2016), 'Detailed structure and explanatory notes, ISIC Rev. 4 code 61', January.

[36] United Nations (2008), 'International Standard Industrial Classification of All Economic Activities (ISIC), Rev. 4', August, p. 4.

[37] As explained in section 4.2 of Oxera (2016a), op. cit.

assessment, ‘Telecommunications’ and ‘IT and other information services’ are both relevant to TSO operations. These two sectors capture different activities, with potential overlaps, as shown in Table 7.1.

Table 7.1 Candidate industries for TSOs: ‘Telecommunications’ and ‘IT and other information services’

Industries	Relevant activities
IT and other information services	Market facilitation activities System operations Grid metering
Telecommunications	Market facilitation activities System operations Grid maintenance Grid construction

Source: Oxera analysis in Oxera (2016b), op. cit., p. 19.

For example, while ‘IT and other information services’ can be used to capture grid metering, ‘Telecommunications’ can be used for grid maintenance and construction. ‘Telecommunications’ and ‘IT and other information services’ are therefore not mutually exclusive.

8 Conclusion

Having reviewed the six queries from GTS and TenneT on our report, we conclude that the arguments they put forward under these queries do not have an impact on our conclusions.