

Annex 5

Indicative Findings from Top-Down Benchmarking

GD17

Draft Determination
15 March 2016



About the Utility Regulator

The Utility Regulator is the independent non-ministerial government department responsible for regulating Northern Ireland's electricity, gas, water and sewerage industries, to promote the short and long-term interests of consumers.

We are not a policy-making department of government, but we make sure that the energy and water utility industries in Northern Ireland are regulated and developed within ministerial policy as set out in our statutory duties.

We are governed by a Board of Directors and are accountable to the Northern Ireland Assembly through financial and annual reporting obligations.

We are based at Queens House in the centre of Belfast. The Chief Executive leads a management team of directors representing each of the key functional areas in the organisation: Corporate Affairs; Electricity; Gas; Retail and Social; and Water. The staff team includes economists, engineers, accountants, utility specialists, legal advisors and administration professionals.

Our Mission

Value and sustainability in energy and water.

Our Vision

We will make a difference for consumers by listening, innovating and leading.

Our Values

Be a best practice regulator: transparent, consistent, proportional, accountable, and targeted.

Be a united team.

Be collaborative and co-operative.

Be professional.

Listen and explain.

Make a difference.

Act with integrity.

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1 Introduction

- 1.1 For GD17 the Utility Regulator has undertaken benchmarking on Northern Ireland's GDNs' operating costs (opex), involving a variety of benchmarking techniques typically adopted by economic regulators. These techniques involve Pooled Ordinary Least Squares (POLS) regression analysis as well as the more advanced estimation method of Random Effects (RE) modelling.
- 1.2 The UR was initially advised in the development of its benchmarking models by Cambridge Economic Policy Associates (CEPA). The UR and CEPA met the NI Gas Distribution Networks (GDNs) on 25 February 2015 to discuss the likely way forward for opex benchmarking in GD17 and beyond
- 1.3 Deloitte LLP have assisted in refining the UR models for the GD17 draft determination and have published the model results in Annex 4: Deloitte LLP - GD17 Efficiency Advice – Relative Efficiency of Northern Ireland's Gas Distribution Networks.
- 1.4 In parallel, the UR has also been receiving expert advice on the more advanced econometric modelling techniques by Dr Alan Fernihough of Queen's University, Belfast.

Why benchmark companies?

- 1.5 In a fully competitive market, customers will be free to choose from a number of companies who compete on price and quality. As the gas distribution companies are natural monopolies, there are unlikely to be cost benefits of allowing direct competition as it would lead to duplicate networks being laid. Regulatory benchmarking may therefore be necessary to drive down costs and improve quality of service in the absence of competitive pressures.
- 1.6 Benchmarking is essentially the process of comparing a firm's costs and performance to the industry best or best practices from other similar companies. For the Utility Regulator this effectively means comparing the relative performance of Northern Ireland GDNs to those GDNs who operate in Great Britain (using Ofgem data).
- 1.7 Such approaches have been adopted by regulators around the world. In Great Britain, regulators such as Ofgem, Ofwat, ORR, WICS etc have undertaken comparative benchmarking since their incorporation as regulators of their various utility sectors. In Northern Ireland, the Utility Regulator has undertaken econometric and unit cost benchmarking of NI Water for a number of its price controls.
- 1.8 The Competition Commission (CC), now termed the Competition and Markets Authority (CMA), has undertaken comparative benchmarking using a number of econometric modelling approaches, including the benchmarking of NIE for the RP5 price control.
- 1.9 It is important to note that with any type of efficiency benchmarking analysis, we are dealing with estimates and approximations of real-life effects. There will be a margin of error associated with any resulting point estimate of relative efficiency. Any analysis is dependent on the data inputs, the statistical estimation technique employed and any assumptions used in building the models.

1.10 The established GDNs in Northern Ireland are largely supportive of the principle of benchmarking, providing that it conforms to best practice. PNGL in their June 2014 Business Plan submission on benchmarking stated that:

“UR has set out its intentions to review PNGL’s capex and opex cost drivers and long-term business plan as part of the GD17 price control review process. UR’s benchmarking analysis will inform this review. These benchmarking comparisons can be useful in helping PNGL to identify best practice and understand the drivers of cost and performance.

PNGL runs a lean and efficient business in line with industry-leading standards for cost efficiency.”

1.11 Firmus Energy, in their Business Plan submission welcomed the idea of benchmarking, but did express some caution as to how it was undertaken methodologically speaking:

“Although the Utility Regulator’s approach to GD17 in terms of benchmarking firmus energy against the GB GDNs and Phoenix in Northern Ireland is understandable, we believe it is a potentially problematic approach in which the sheer number of adjustments required in order to compare the companies meaningfully could call into question its overall value. We welcome the idea of benchmarking for GD17 in principle as a qualitative check on whether there is a reason to doubt that a utility’s costs are efficient and reasonable, but would caution against a purely quantitative process.”

1.12 SGN have cautioned against top down benchmarking, citing a number of issues which they believe would make the use of such analysis inappropriate in Northern Ireland.

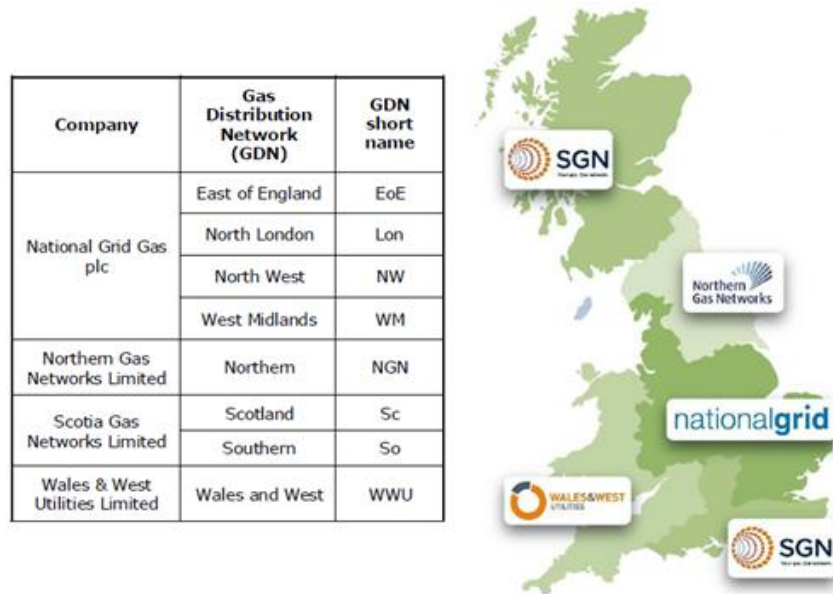
1.13 In order to ensure that our benchmarking models are robust a number a number of checks and sensitivity analyses have been undertaken. The UR has undertaken a number of data exclusions and adjustments to ensure that the data is as like-for-like as possible.

1.14 For model results and further detail please see Annex 4: Deloitte LLP - GD17 Efficiency Advice – Relative Efficiency of Northern Ireland’s Gas Distribution Networks.

2 Data

- 2.1 In Great Britain, there are eight GDNs which own and operate network assets within a defined geographical area. They transport 541 TWh of gas per year from the National Transmission System to the homes and businesses of around 22 million consumers. GDNs are responsible for the operation, maintenance and extension of the network and for providing a 24-hour gas emergency service.
- 2.2 Where these companies are situated, as well as details of their parent companies, are shown in the table and map below.¹

Figure 1: Map of GB GDNs



- 2.3 In terms of number of customers, the eight GB GDNs currently range from approximately two million to four million customers. We are grateful to Ofgem (the Regulator of the gas and electricity industries in Great Britain) for providing the UR with data which allows us to undertake our benchmarking analysis on operational costs.
- 2.4 PNGL has around 170,000 customers i.e. a tenth of the GB GDNs roughly speaking. FE has around 20,000 customers, which is approximately a hundredth of the GB GDNs' customer base. One notable feature of the NI GDNs, is that they are growing much faster (in overall percentage terms) than the more mature GB GDNs, in terms of customers, volumes and network length.

¹ Table and map from Ofgem: https://www.ofgem.gov.uk/sites/default/files/docs/2015/03/riio-gd1_annual_report_2013-14-final.pdf

- 2.5 SGN NI are set to supply gas to the west of Northern Ireland. They do not have any years of actual operational data as yet; therefore we have excluded them from this 'top-down' modelling approach.
- 2.6 In order to facilitate as like-for-like a comparison as possible, it is necessary to make a number of data exclusions and adjustments to both the GB GDN data and the NI GDN data. This will allow a spectrum of similar cost activities to be compared. As the Utility Regulator's Regulatory Instructions and Guidance (RIGs) are similar to Ofgem's, with similar categories of disaggregation, we can undertake this exercise relatively straightforwardly.

Network and business characteristics

- 2.7 While all GDNs undertake the same activity of gas distribution, each company varies in its customer numbers, volumes, network length, topography, location and maturity. All of these characteristics (as well as other factors) may have some impact on operational costs and relative performance.
- 2.8 In terms of customer density, both PNGL and FE have a lower number of customers per network main than the eight GB GDNs. As customers continue to connect to these new networks, these numbers have increased steadily and are expected to increase further into the medium term. Due to serving a more rural network, even once it reaches maturity, it is likely that FE will have a relatively low customer density.
- 2.9 Volumes of gas per km of main are currently higher in the FE area than in the PNGL area and energy density (measured in terms of average volumes per customer) is also higher in the FE area than in the PNGL area, attributable to its large I&C customers. PNGL is slightly below the GB average figure with regards to average volumes per customer.
- 2.10 The Northern Ireland GDNs are newer than the GB GDNs. PNGL's licence was awarded in 1996 and FE's licence was awarded in 2005, whereas the GB GDNs are much longer established.

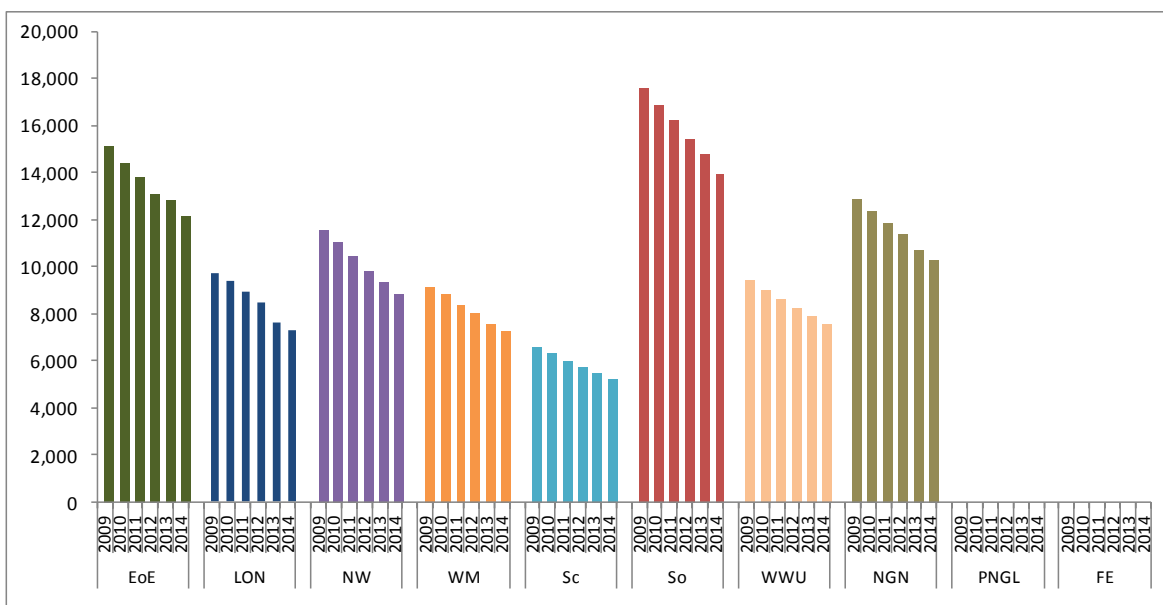
Iron mains

- 2.11 Data taken from the Health and Safety Executive (HSE) shows that while steadily decreasing, the quantity of iron mains in GB gas distribution networks remains significant.² The graph below shows the absolute level of iron mains remaining in each GDN's network.
- 2.12 These figures include iron mains removed due their condition or as part of other network maintenance or upgrading activities, as well as those decommissioned as part of the iron mains risk reduction programme. This Safety Performance Indicator (SPI) from the HSE is widely reported and is of strategic importance to the GDNs.³

² <http://www.hse.gov.uk/pipelines/annual-report13-14.pdf>

³ It should be noted that each company will have a different total network length so such data does need to be normalised into the proportions of a network which consists of iron. This would show a more comprehensive picture, but such data is not available publically.

Figure 2: Iron mains remaining (km) across GDNs (2009-2014)



- 2.13 Older iron mains (still evident in Great Britain), would be more likely to leak, due to the effects of corrosion, than the more modern polyethylene pipes which have been installed in Northern Ireland. According to research undertaken by CEPA for the HSE for example, there would be substantial ongoing savings associated with the GB repex scheme – these have been estimated over the next 20 years to potentially amount to billions of pounds (£bn) of operational savings for the GB GDNs.⁴
- 2.14 GDNs in Northern Ireland, who are without these iron mains (see graph above) are at an advantage as they should have relatively less workload levels (impacting on emergencies, repairs and maintenance) than in GB as a result of their more modern network. The UR and Deloitte LLP have therefore controlled for this in some of our regression models.⁵
- 2.15 Where we have not controlled for iron mains, we anticipate developing a rounded special factor allowance for each NI GDN, including both a negative special factor for new networks as well as any other counterbalancing positive special factors.

Company comments on benchmarking and company-specific issues

- 2.16 We requested that the companies attempt to undertake their own benchmarking assessment of their own cost and performance within the submission of their business plans. We also requested that the GDNs submit special factor and atypical claims and any other information which they considered relevant for our analysis. A short summary of what was received in the company business plans is summarised below for each company.

⁴ <http://www.hse.gov.uk/research/rrpdf/rr888.pdf>

⁵ The adoption of an iron mains variable has been used in Australia. <https://jemen.com.au/documents/price-reviews/gas/our-revised-regulatory-proposal/appendices/appendix-05-02-economic-insights-updated-productiv>

PNGL

- 2.17 PNGL undertook some benchmarking reviews of various aspects of operational activities such as staff turnover, absenteeism, health and safety and customer service.
- 2.18 Within their business plan submission, PNGL stated that benchmarking can be useful in identifying best practice and the drivers of costs. They did highlight some areas which should be taken into account in any benchmarking exercise however:
- “In any benchmarking exercise of PNGL it is important to understand the context and historical development of the business. The efficiency of PNGL’s costs and activities must be assessed in light of the specific history and present stage of PNGL’s development; and in consideration of the size of the business. This is particularly important when comparing PNGL against more established, larger GB companies. The relative size, location, and historical context of PNGL must be taken into account in the benchmarking models in an appropriate way.”*
- 2.19 PNGL also stated that they looked forward to engaging closely with UR on the development of any benchmarking models for GD17 to help identify any data/comparability issues; understand the proposed benchmarking techniques; and ensure that any results are interpreted and applied robustly, and in line with good regulatory practice.

FE

- 2.20 FE’s consultants Oxera undertook some benchmarking of opex on both a unit cost and econometric basis using Ofgem RIIO GD1 coefficients. FE stated that they are forecasting increasing efficiency and productivity over the six years of GD17 on a number of metrics.
- 2.21 FE have also highlighted aspects of their business which they would like to be taken accounted of in the benchmarking. FE highlighted that in being such a small size, even the smallest GB GDN has 100 times more customers.

“At this size it can be expected that the GB GDNs have some very significant cost advantages based on economies of scale. This must certainly apply in the case of general procurement of goods and services as well as to network operations carried out by contractors. Also, corporate overhead costs are spread across a large organisation and vast networkIt would not be reasonable therefore, on the basis of economies of scale alone, to expect firmus energy to achieve the same basic costs profile as those experienced by the GB GDNs.

The fundamental differences between firmus energy and the GB GDNs go beyond considerations of scale. The GB GDNs are also mature businesses with well-developed networks and higher customer densities. Inevitably this lower density implies higher costs for both investment and network operations. Of primary concern are the differences between firmus energy, SGN NI and Phoenix where the latter is at a much more mature stage of development and has its operations concentrated in a densely populated urban area.”

- 2.22 FE's consultants Oxera, outlined how they were a sparse and rural network and contended that this may lead to the firm incurring higher unit costs to maintain its network and resource staff to attend to emergency calls.
- 2.23 FE also outlined what they considered to be differences in scope between GB GDNs and NI GDNs. These included metering obligations, Pressure Systems Safety Regulations, treatment of controlled/uncontrolled gas escapes and facilitation of customer switching and relationships with shippers/suppliers. They also pointed out that they were undertaking a new build capex programme, compared to the replacement expenditure undertaken by GB GDNs.

SGN

- 2.24 In their business plan submissions, SGN made a number of references to benchmarking, but primarily they outlined what they believed were the difficulties of benchmarking NI GDNs with each other and the GB firms.

“The GB gas market serves over 20m gas consumers. This drives very different investment strategies and different efficiencies as well as a different focus and approach to issues such as customer service, stakeholder engagement and incentives;

The three networks are at significantly different levels of maturity and therefore have different cost bases, organisational structures, business priorities and investment decisions. This would mean great difficulty in analysing the networks by way of direct comparison as the necessary adjustments would be extremely challenging to accurately calculate.”

- 2.25 As noted earlier however, SGN NI do not have any years of actual operational data as yet; therefore we have excluded them from this ‘top-down’ modelling approach. We have noted their comments on benchmarking however.
- 2.26 The UR welcomes this opportunity to develop our models with further input from the Northern Ireland GDNs.

Data exclusions

- 2.27 In order to ensure that costs activities are comparable across the GDNs in the dataset, we make a number of exclusions.
- 2.28 A summary of the costs which are included / excluded is shown below.

Table 1: Breakdown of modelled opex

Cost Activity		Included in Modelled Opex	
Work Management	Asset Management (Including Network Policy)	✓	Included
	Operations Management (Including Contract Management)	✓	Included
	Customer Management (including Customer Call Centre) & Network Support (Include System Mapping)	✓	Included
	System Control	✓	Included
Work Execution	Emergency	✓	Included
	Metering	X	Excluded – only applicable in NI
	Repairs	✓	Included
	Maintenance	✓	Included
	Independent Networks	X	Excluded - only applicable to GB (namely Scotland)
	Other Direct Activities (inclusive xoserve)	✓	Included
	xoserve	-	A GB-only regime – we exclude 75% of xoserve from ODAs
Business Support	R&D	✓	Included - only separately apportioned in GB 2009-2012.
	IT & Telecoms	✓	Included
	Property Mgt	✓	Included (network rates are excluded however)
	Insurance	✓	Included
	HR	✓	Included
	Finance, audit and regulation	✓	Included
	Procurement	✓	Included
	CEO and Group management	✓	Included
	Stores & logistics	✓	Included
	Training & Apprentices	X	Excluded – not comparable
Advertising & Market Development	X	Excluded – not comparable	

- 2.29 Xoserve is GB entity that is jointly owned by the gas distribution network companies and National Grid's transmission business, providing one consistent service point for the gas shipper companies. Xoserve was founded on 1st May 2005, and is an integral part of the restructured gas distribution market in Great Britain. Xoserve costs are included within the Other Direct Activities (ODA) opex category.
- 2.30 NI GDNs do not face xoserve costs. However, the UR is mindful that some of the activities undertaken by xoserve may be performed internally by the local GDNs. We therefore have decided to exclude 75% of xoserve costs from ODAs. As we only have actual xoserve data for 2014 and 2015, we have backcast for the 2009 to 2013 years, based on costs within GB GDNs Regulatory Reporting Packs (RRPs). These adjustments should make the modelled opex more comparable we consider.
- 2.31 The Training and Apprentices category covers (i) the costs of any operational training and (ii) the cost of training any employees engaged on approved formal training or apprentice programmes (either operational or non-operational). We believe that this excluding this cost category from modelled opex should improve the comparability of the data as there are differences in approach to Training & Apprenticeships between the GDNs in Northern Ireland and Great Britain.

- 2.32 Advertising & Market Development is not part of the regulated business of GB GDNs. We believe that this exclusion should improve the comparability of the data.
- 2.33 In addition to the above, we also exclude the following items from the GB GDN data to facilitate greater comparability of activities between GB and NI:
- Gasholder decommissioning
 - Environmental costs
 - Land remediation
 - Smart Metering
 - Streetworks (Traffic Management Act (TMA) or equivalent)
 - Physical Security Upgrade Programme (PSUP)
 - Other uncertainties
 - Non-controllable costs (licence fees, network rates etc)
- 2.34 Deloitte LLP have assisted the UR in assessing whether these exclusions were appropriate and we believe that excluding these costs should improve the comparability of the data. It is important to note that whilst the NI and GB regions are subject to slightly different regulatory arrangements with respect to gas distribution, the two regions operate within the same national economy and use pound sterling as the currency.
- 2.35 Some atypical expenditure has also been removed from NI GDNs' modelled costs⁶, so as to ensure a comparable profile of opex spend for the Northern Ireland firms over time.
- 2.36 We welcome further discussion with our GDNs during the consultation stage, where will also expect a more detailed assessment of special factors (both positive and negative) to be applied to our preferred model specifications.

Regional Wage Adjustment

- 2.37 In order to ensure that companies are not unfairly advantaged by being situated in a low-cost region for labour or disadvantaged by being situated in a high-cost region we undertake a regional wage adjustment (RWA) for each GDN, for each year being assessed 2009-2022.
- 2.38 Regional wage and price variations are taken into account by a number of economic regulators of network companies (including Ofwat (PR14) and Ofgem (RIIO GD1) for example). The Competition Commission determination of NIE for RP5 made a wage adjustment between the various Distribution Network Operators (DNOs), including NIE.
- 2.39 In PC15, in assessing NI Water's capex programme, the UR undertook a regional price adjustment which took into account lower procurement prices in Northern Ireland than in England and Wales. For our opex efficiency models, we implemented a negative special factor upon NI Water to take account of lower wage levels in PC10, PC13 and PC15.
- 2.40 For this gas distribution top-down analysis, we have undertaken our own analysis using ONS ASHE private sector median gross full-time weekly wage differentials between regions. We use median wages as they are less liable to be skewed than using the mean. Each GDN's opex has been adjusted by this differential, using the assumption that 52% of opex relates to labour, therefore the index only applies to around half of opex. Private

⁶ Such as historic CC costs for PNGL.

sector median wages have been preferred over all employee jobs due to the fact that the firms are private enterprises.

- 2.41 We have matched one or more of the twelve UK government office regions used by ONS to each respective GDN and weighted the regional wage by population. We treat Northern Ireland as a single region in our analysis.
- 2.42 From 2009-2015, private full-time weekly wages in Northern Ireland were around 82% of the UK average, leading to a differential of around -18%. We assume that only 52% of opex relates to labour, so for 2017-22 we adopt a regional wage adjustment of -9.2% for Northern Ireland (i.e. opex costs are 9.2% lower for Northern Ireland due to effects of lower wages). This is an average of the historic ASHE figures and has the effect of adjusting NI GDNs' modelled costs upwards for the purposes of benchmarking. It is important to note that in the recent historical years, the regional wage relativities have been very stable (around -18% in Northern Ireland), only varying by a small margin year-by-year.

3 Advantages of the CSV approach

- 3.1 All of our preferred models use a Composite Scale Variable (CSV) of customer numbers, volumes and network length. A CSV is used instead of separate explanatory variables so as to avoid multicollinearity, which can occur when two or more predictors are highly correlated with each other.⁷ The precise specification of the various models are laid out in more detail in Annex 4: Deloitte LLP - GD17 Efficiency Advice – Relative Efficiency of Northern Ireland’s Gas Distribution Networks.
- 3.2 Multicollinearity, in extreme cases, can lead to coefficient estimates that are unstable, the wrong sign and can make it hard to isolate each variable’s impact. A correlation matrix undertaken on the three variables shows they have a very high positive correlation – as would be expected. A CSV approach is warranted in our view.
- 3.3 With the CSV, the cost relationship is such that modelled costs are estimated based on the scale and ‘size’ of the company. A company with more customers, volumes of gas delivered and/or longer network length than another will have higher costs according to the models.
- 3.4 Such an approach is likely to be somewhat ‘fairer’ to the Northern Ireland GDNs than if we for example applied models based on a company’s workload and activity levels. Although difficult to state categorically (in the absence of running the models themselves), these models may be unlikely to predict similar levels of costs than the CSV approach due to the reduced workloads of opex activity in Northern Ireland’s more modern gas network.⁸

Precedents

- 3.5 Composite Scale Variables of various metrics have been used by a number of regulators to assess cost relationships. The UR used a similar CSV variable in its water distribution model for its efficiency assessment of NI Water in PC15, combining connected properties, distributional input (ML/d) and mains length (km) into one variable.⁹
- 3.6 The UR and the Competition Commission used a CSV of customer numbers, units distributed (MWh) and line length (km) in its assessment of Northern Ireland Electricity’s (NIE) relative efficiency for RP5.¹⁰
- 3.7 Ofgem have used the CSV approach using various elements (such as customer numbers and external condition reports in their emergency model) in RIIO GD1. Ofgem have also adopted CSVs in their RIIO ED1 regression models.

⁷ Explanatory variables would be correlated to some degree with each other. Problems arise when such correlations are moderate or strong.

⁸ Ofgem models predict costs based on drivers such external condition reports etc, which are not as applicable in Northern Ireland.

⁹ http://www.uregni.gov.uk/uploads/publications/UR_PC15_FD_Annex_R_-_Calculation_of_the_Opex_Efficiency_Gap_0200.pdf

¹⁰ https://assets.digital.cabinet-office.gov.uk/media/535a5768ed915d0fdb000003/NIE_Final_determination.pdf

Chosen weights

3.8 The CSV variable acts as a proxy measure of company size, therefore we have decided to adopt CSV weights which we believe are best reflective of the scale and size of a company. Our *a priori* and statistical judgement based on the data has settled upon the weights of 50%, 25% and 25% for customer numbers, volumes and network main respectively. The formula to calculate the CSV is shown below:

$$CSV = \ln(\text{customer numbers}^{0.5} * \text{volumes of gas}^{0.25} * \text{network length}^{0.25})$$

3.9 The rationale for adopting these particular weightings for customers, volume and network length is as follows:

- It can be difficult to untangle any opex cost impact of a particular element (customer numbers, volume and network length) in causal terms. All elements are correlated with modelled opex and so the composite should have sizeable weightings attributed from all elements.
- As the three variables are highly correlated with each other, weight can be placed on our *a priori* judgement of what ratios are sensible.
- Customers should influence nearly all the opex cost categories in our view (within Direct and Business Support) to varying extents; the other two variables of network length and volumes perhaps less so.
- Some of the literature points toward customer numbers being a key variable in such regressions, thus indicating that it should have a high ratio.¹¹ Ofgem have used customer numbers in their various models over the years.
- Our consultants Deloitte LLP have undertaken a large number of regressions¹² on the data, varying the weights each time, and have indicated that our chosen weights are close to the optimal in terms of model fit, although it should be stressed that the differences in model fit are marginal between the various potential models.

¹¹ <https://www.ofgem.gov.uk/sites/default/files/docs/2007/07/ngg---response---section-3---non-confidential.pdf>

¹² See Section 4.3 of Annex 4 (Deloitte LLP Report)

4 Interpretation of Top-Down Results

- 4.1 Details of the model coefficients and catch-up results can be found in Deloitte LLP's benchmarking paper at Annex 4: Deloitte LLP - GD17 Efficiency Advice – Relative Efficiency of Northern Ireland's Gas Distribution Networks. We have interpreted the results and have set out our main findings below.

Upper quartile benchmark

- 4.2 The analysis has compared the NI GDNs' historic and forecast opex costs to the 3rd best company in each regression sample. We regard this as being equivalent to the upper quartile benchmark. The upper quartile is used as opposed to the frontier in order to recognise the uncertainty of the models, including estimation error. The upper quartile benchmark was adopted by Ofgem in RIIO ED1 and GD1 and by Ofwat in PR14.
- 4.3 The UR has used the upper quartile and the frontier company(s) in its benchmarking of NI Water for both capex and opex.
- 4.4 Monitor, the Regulator for Health, adopted the upper decile in its assessment of the NHS Acute Sector; however, this more challenging benchmark was largely possible due to the relatively large sample size involved. Ofcom have used upper decile in both the post and telecommunications sectors.

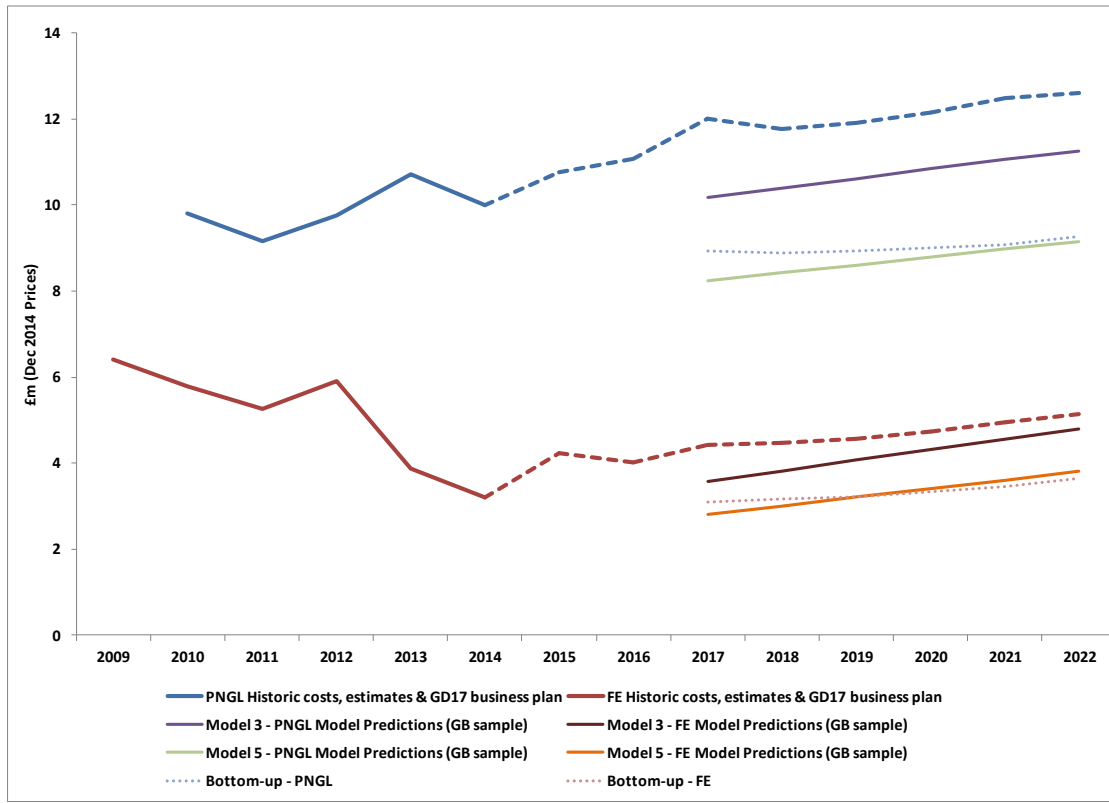
Draft findings from the total modelled opex models

- 4.5 In Table 4 of their Report, Deloitte LLP have set out the estimated catch-up efficiency results to the upper quartile benchmark for each company. We regard the POLS Models 3 and 5 to be the best models in terms of both economic theory and statistical performance, so we will use the results from these models to estimate the efficiency of both current (largely 2014 year) and forecasted costs (in GD17).
- 4.6 When we interpret the results from Model 3 (CSV + time trend), which does not control for network age, we consider that the top-down approach indicates that:
- Based on PNGL's total modelled opex costs from 2010-2014, the company is reasonably close to being an upper quartile performer, but an efficiency gap does exist (estimated to be around 7% to 8% in 2014).
 - We have used the model results to forecast efficient opex levels up to 2022. We consider PNGL's forecast costs within their Business Plan as being less efficient than their current levels, with levels of opex higher than those estimated by the model. This model indicates that PNGL's business plan opex costs should be reduced by around 12% to reach what Model 3 would forecast as efficient cost.
 - FE have made some efficiency improvements since 2009, but a gap remains to the upper quartile benchmark (estimated to be around 8% to 10% in 2014).

- We consider that FE's forecast costs within their Business Plan are less efficient than even their 2014 levels during the earlier years of GD17, but relative performance does improve somewhat by 2022 according to the model. This model indicates that FE's business plan opex costs should be reduced by around 11-12%.
- 4.7 The UR considers Model 3 as being a very conservative approach given that it does not take into account the reduced workload levels in Northern Ireland associated with its more modern network. We regard the above efficiency estimates from Model 3 as being underestimates of what could be achieved by the companies.
- 4.8 When we control for iron mains in Model 5 (CSV + time trend + iron mains %), the estimated efficiency gap increases quite markedly; however, we are mindful that no special factors have been formally quantified and determined on as yet. Our main findings are as follows:
- When Model 5 is applied to PNLG's business plan opex (2017 to 2022), indications are that business plan opex could be reduced by up to 29% overall.
 - When Model 5 is applied to FE's business plan opex (2017 to 2022), indications are that business plan opex could be reduced by up to 30% overall.
- 4.9 We recognise that there are some advantages and disadvantages of the two models. For example, while Model 3 may suffer from omitted variable bias by not taking into account network age, the iron mains variable in Model 5 is not conclusive in terms of coefficient significance. Therefore we consider that it is likely that opportunities for efficiency lie within the 12% to 30% range.
- 4.10 This top-down analysis supports the findings of the bottom-up approach¹³ (please see chart below).

¹³ For comparability we have only included cost categories from the bottom-up analysis which align to our modelled opex analysis (i.e. excluding metering, network rates, advertising & marketing, training & apprentices etc)

Figure 3: Range of forecasted modelled opex (£m) at draft determination ¹⁴



4.11 We will reassess NI GDNs’ relative efficiency in the final determination once special factor and atypical requests have been assessed, along with other comments and feedback on the models. We will also further examine and look at relative performance on Direct and Business Support costs (including econometric regressions and unit cost analysis - see below).

Indicative findings from disaggregated approach

4.12 The UR has also undertaken a top-down analysis of direct and business support costs separately, although our findings are draft in nature. Of the total modelled opex costs, it appears that PNLG’s performs better on its Direct costs (work management and work execution) than on its Business Support costs. These findings hold for both historic and forecasted opex costs. These results align with the findings of the bottom-up approach which has identified scope for savings on the forecasted Business Support costs as set out by PNLG in their business plan for GD17.

4.13 On the top-down approach, as FE’s forecast business support opex costs are held relatively constant in real terms as the business grows, this improves their relative efficiency over time on the business support category. Overall however, indicative findings identify

¹⁴ For comparability we have only included cost categories from the bottom-up analysis which align to our modelled opex analysis (i.e. excluding metering, network rates, advertising & marketing, training & apprentices etc). Figures are in December 2014 prices.

efficiency opportunities in both of the main opex categories (Direct and Business Support) during GD17.

- 4.14 For the draft determination, we have taken a holistic approach to total modelled opex for the 'top-down' analysis. Any company that is relatively efficient in one cost area can offset this to some extent against cost areas where they are less efficient. An alternative approach where the UR was to specifically target areas of inefficient opex on a top-down disaggregated basis would likely increase the scope for further efficiencies.
- 4.15 It should be noted that our disaggregated analysis will be further refined for the final determination.

5 Next Steps

- 5.1 The UR requests that the companies consider the models which have been developed and submit any comments they feel are appropriate. Specifically, during the draft determination consultation period the companies are free to submit any request for special factors or atypicals which they deem relevant. It should be noted that these special factors should be restricted to such factors which the company believe are not taken into account of within the model specifications.
- 5.2 As the UR models were not fully developed at the business plan stage, the companies were unaware of the exact functional form of the models, so were unable to quantify the magnitude of any special factor. In any response to the draft determination consultation, it is now important that the companies **quantify** the value of any special factor and / or atypical as per our original guidance included to the NI GDNs as they were drafting their business plans.

Special Factor Assessment Criteria

- 5.3 The means by which the Utility Regulator shall assess the company's submission will include examination of each claim against the following criteria:
1. What is different about the circumstances that cause materially higher cost claims which amount to greater than 1% of total opex?
 2. Why do these circumstances lead to higher costs?
 3. What is the net impact of these costs on prices over and above that which would be incurred without these factors? What has been done to manage the additional costs arising from the different circumstances and to limit their impact?
 4. Are there any other different circumstances that reduce the company's costs relative to industry norms? If so, have these been quantified and offset against the upward cost pressures?

Treatment of Atypical Operating Costs

- 5.4 You may wish to declare some "one-off" opex expenditure analysed as "exceptional" within your consultation response. We can then consider making adjustments to exclude them from our modelling and benchmarking analysis.

Annual cost reporting

- 5.5 As part of its annual cost and performance report for gas distribution, the Utility Regulator is minded to publish an estimate or estimates of the relative efficiency performance of each GDN.
- 5.6 This annual cost reporting is likely to encompass a range of assessments, including ones based on the models adopted at GD17 final determination, but updated for latest GDN data. Any efficiency estimate will be subject to a similar special factors and atypical assessment

as adopted by the Utility Regulator following a number of price controls of NI Water¹⁵, including PC10 and PC13 and subsequently for PC15.

¹⁵ http://www.uregni.gov.uk/uploads/publications/final_Cost_and_Performance_Report_for_PC13_-_embargoed_until_1200_26th_Nov_2015_final_v.pdf