Appendix A20

Regional Economic Impact

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1. Introduction

1.1. Context

In June 2005, responsibility for the distribution of gas to homes and businesses in Great Britain was changed; dividing the single natural monopoly owned by National Grid into eight regional distribution networks.

National Grid continues to operate four of these regional networks, with the remainder now the responsibility of Southern Gas Networks, Wales and West Utilities, Scotland Gas Networks and Northern Gas Networks (Figure 1). Given their monopoly position within each region, Ofgem provides active regulation of the industry to ensure the prices charged and services offered, represent the best value to customers. The rules by which these businesses operate are set down in the Gas Transporter Licence issued by Ofgem and the contracts between the network companies and users of their networks.

Figure 1: Gas Distribution Networks

Northern Gas Networks (NGN) services the north of England; an area covering East, North and West Yorkshire, the North East and northern Cumbria. Its Distribution Network (DN) is fed from 23 offtakes from the National Transmission System (NTS), with approximately 37,000 km of pipes, providing gas to 6.54 million people and approximately 2.6 million homes and businesses. NGN distributes gas on behalf of 'shippers', who are responsible for original purchase of the gas, who pay for its distribution prior to onward sale to suppliers and ultimately to business and domestic consumers. NGN's business is driven by the requirement to manage and maintain its network infrastructure; to deliver its product and services safely, cost effectively and with due regard for its environmental impact. As a result, NGN is a substantial regional investor. Planned operational and capital expenditure of approximately £300m per year is designated for the forthcoming period 2013-2021 (NGN, 2012).

1.2. This analysis

This report examines the impact of NGN's operational and investment activities upon the economy of its region of operation. The analysis is prefaced with an illustration of the regional socio-economic context. In the light of the prevailing economic conditions, the objective has been to quantify how NGN's activities contribute to the region's economic development through its trade linkages with local suppliers and through its employment of a large regional workforce.

The analysis uses a 'local multiplier' approach to identify the extent to which NGN expenditure and investment is 'retained' within the regional economy, rather than 'lost' to other geographical markets within or outside the UK. In addition to the publically-available demographic and economic statistics, the main data sources for the analysis have been: a comprehensive listing of suppliers (by value and location) providing products and services to NGN; an indication of the residential distribution and disposable income associated with NGN employees. All data has been processed and presented in this analysis in an anonymised form.

2. Regional socio-economic context

2.1. Area of operations

NGN's area of operation covers a significant proportion of the north of England, including; the major urban concentrations of West Yorkshire, Teeside and Tyne & Wear, Hull and York; plus the more rural areas of North Yorkshire, Northumberland and northern Cumbria (Figure 2). With a total population of just over 6.5 million, NGN is responsible for gas distribution to 12.5% of the population of England. Total business and household gas consumption was estimated at 77,300 GWh in 2010; 11,800 KWh per head of population in the region (DECC, 2012; NGN estimates).

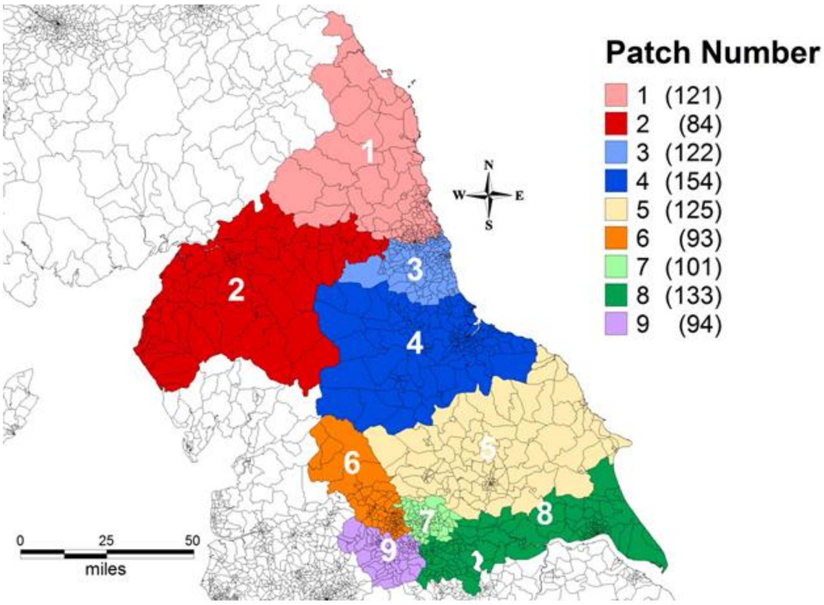


Figure 2: NGN area of operations *(Source: NGN)*

Operational activities are organised around 9 geographical territories, known as 'patches', which range in population from the 0.36 million in Cumbria, to over 1 million in the extended Wakefield & Hull area (Figure 3). Since 2001, the region has grown by over 0.25 million (4%) with a particular concentration of population growth in and around Leeds and Bradford. The most recent official forecasts of population growth suggest a further 1 million people could be added to the North East and Yorkshire regions over the next 25 years (ONS, 2012a).

Patch		Population (million)
1	Newcastle & Northumberland	0.73
2	Cumbria	0.36
3	Sunderland & Durham	0.94
4	Tees Valley	0.96
5	North Yorkshire & York	0.63
6	Bradford	0.56
7	Leeds	0.72
8	Wakefield & Hull	1.01
9	Halifax & Huddersfield	0.61
	All Patches	6.54

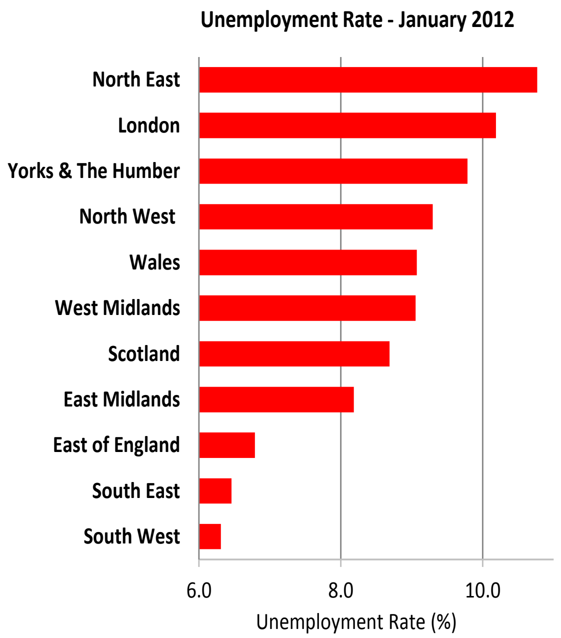
Source: ONS

Figure 3: Patch populations

2.2.Economic profile

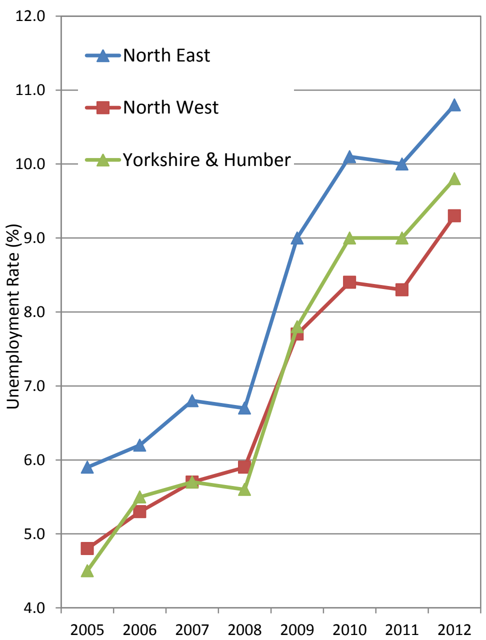
In January 2012, UK unemployment stood at 2.7million, its highest level since 1995 (ONS, 2012b). The economic outlook suggests that the total could approach 3 million by the end of 2012. Householders continue to feel the economic squeeze, with average pay just 1.9% higher than at the beginning of 2011, less than half the rate of inflation. To make matters worse, in the last six months of 2011, public sector job losses continued to outstrip private sector job creation by more than 10:1.

With an average UK unemployment rate of 8.4% at the beginning of 2012, significant regional variations are inevitable. NGN's core areas of operation, in the North East and Yorkshire, are experiencing some of the worst impacts of the recession (Figure 4). Since 2005, the unemployment rate has almost doubled in each of the regions covered by NGN's distribution activities, with no sign of an immediate shift in the trend (Figure 5). Despite a slight recovery in 2011, claimants for Job Seekers Allowance continue to rise, exceeding 6% of the economically active population in Yorkshire and the North West and almost 8% in the North East.



Source: LFS

Figure 4: Regional unemployment rates – Jan 2012



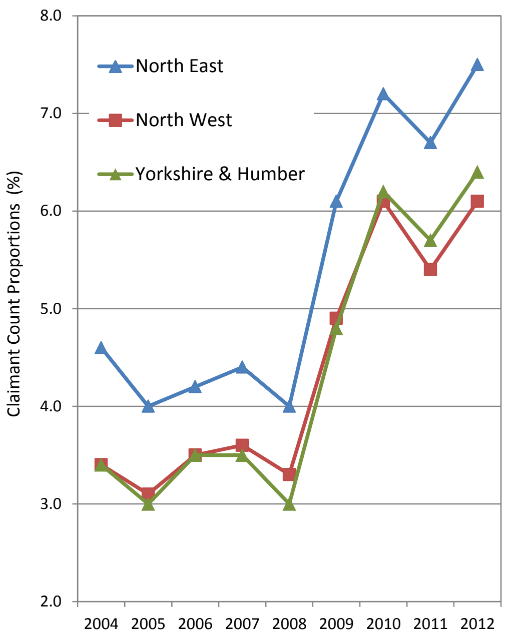
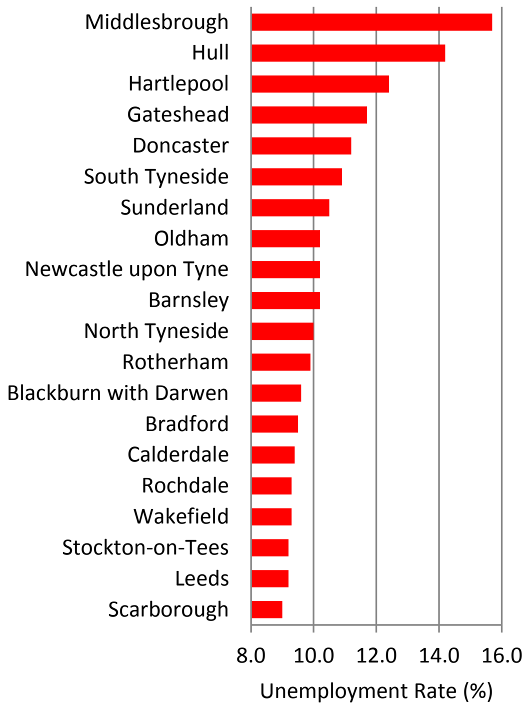


Figure 5: Unemployment and JSA claimant rate *(Source: NOMIS)*

As conditions across Europe have continued to worsen during 2011 and in to 2012, the UK's northern regions are set for an extended period of economic uncertainty. Manufacturing industries have long been in decline in the north, replaced by a service sector that is itself struggling in the aftermath of the banking crisis. Public sector job cuts will have a particularly sharp impact upon those communities which have previously benefited from the decentralisation of government departments. The construction industry shows no sign of immediate recovery, although new planning legislation has been introduced in an attempt to kick-start the housing market - a critical component of the economy. Retail and leisure businesses will continue to suffer as consumer incomes reduce in real terms with stagnation in salaries combined with a rising cost-of-living.

Those northern communities that have traditionally been hit hardest during previous economic recessions are once again at the sharp end; Middlesbrough, Hull, Hartlepool, Gateshead, Doncaster, South Tyneside, Sunderland are at the top of the unemployment league table, with rates in excess of 10% during 2011, 14% in the case of Middlesbrough and Hull (Figure 6). Youth unemployment is a particularly acute issue in these areas. Cuts in public expenditure and the lack of alternative opportunities within the public sector are accentuating the employment issues in these increasingly economically-deprived localities.



Source: NOMIS

Figure 6: Local unemployment rates – Top 20, 2011

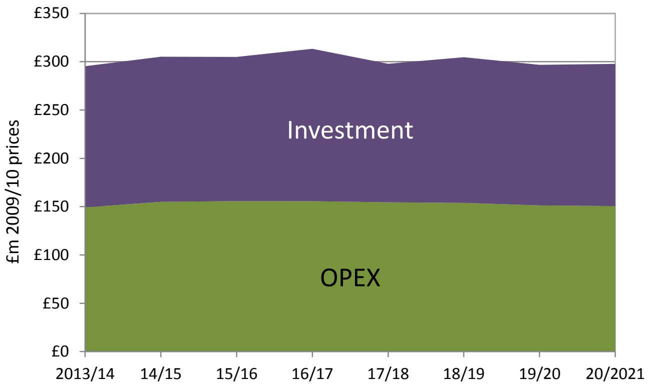
In the face of this bleak economic picture, the activities of relatively 'recession-proof' industries such as the energy infrastructure industry are now an even more critical component of the region's economy. Well-targeted and large-scale, planned investment in regional jobs and infrastructure can provide an important catalyst for economic growth. Many large organisations make substantial and obvious investments in the northern regions but may well make equally large investments elsewhere. Supermarket chains, for example, invest across the UK regions, even those with origins in a specific region. Water companies and gas and electricity distribution companies, in contrast, are amongst the most regionally-focussed organisations in the UK, yet most of their investment is hidden from the public. The more people and businesses spend money on other people and businesses in the local economy, the more income will be generated for people in that economy, thus strengthening local economic sustainability. It is the strength of the regional economic linkages between organisations and their supply chains that will determine the true ‘multiplier’ effect of any local investment and expenditure (NEF, 2005).

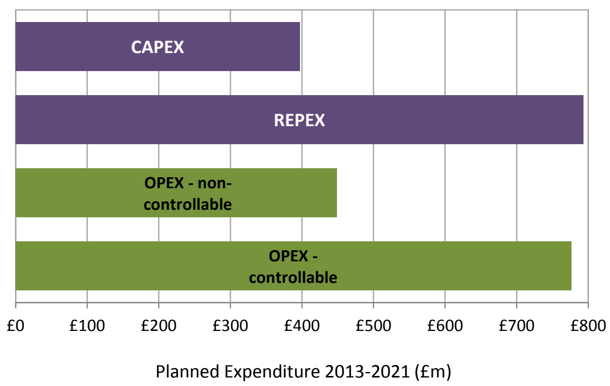
3. NGN activities

3.1.Regional investment

As the pressure on non-renewable resources continues to intensify, the electricity and gas industries will require substantial investment to secure sustainable energy supplies for an alternative, low-carbon economy. At the same time, the price that consumers pay for their energy needs to be kept as low as possible, particularly given the deteriorating economic conditions and the rising cost-of-living. The gas industry faces particular challenges as reserves are depleted and as the requirement for alternative, renewable sources of energy becomes increasingly more prevalent. In anticipation of the investment imperatives, Ofgem has introduced a new regulatory structure for the energy networks (Ofgem, 2010). The RIIO framework (Revenue = Incentives + Innovation + Outputs) is designed to regulate business investment against performance targets, rewarding innovation and cost efficiency in the process.

NGN is required to balance the scale of its charges with the highest standards of safety, customer service and an ongoing investment programme to maintain, enhance and build new facilities for gas distribution. The key drivers of all NGN's investment decisions are the management and health of its network assets; 37,000 km of gas distribution pipelines. Over the next eight years, NGN will invest approximately £2.4 billion in the development of its business (NGN, 2012); 50% of this as operational expenditure, 50% as capital investment in asset infrastructure; Repex being the renewal component (Figure 7).





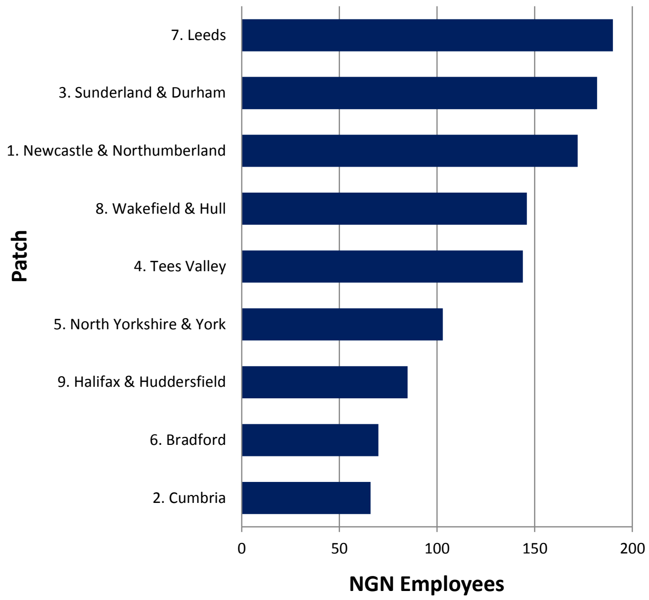
Source: NGN

Figure 7: NGN: Opex, Repex and Capex proportions

The majority of operational expenditure is 'controllable' and in line with Ofgem's requirement for continued business efficiencies, NGN has reduced this component of its running costs by 18% in real terms since 2005. The planned £1.2 billion of capital expenditure includes a significant proportion of 'replacement' investment, with NGN just 10 years into a 30-year programme, replacing iron gas mains with plastic alternatives. Leakage accounts for just 0.7% of supply but leakage reduction is a key element of NGN's strategy to reduce its environmental impact; since 2005 pipeline replacement plus the treatment of pipeline joints and seals have contributed to a 10% reduction in gas leakage, approximately 185,000 tonnes of carbon equivalent.

3.2. Regional employment

NGN is a major employer within its area of operations. There are over 1,200 staff directly employed in the delivery of its business. These staff are located throughout the northern region with the largest concentrations in Leeds, Sunderland & Durham, Newcastle and Wakefield & Hull (Figure 8). Over 95% of employees both live and work within the NGN region, with only 5% resident elsewhere; commuting to the NGN workplace from Lancashire, Greater Manchester, Scotland, and South Yorkshire.



Source: NGN

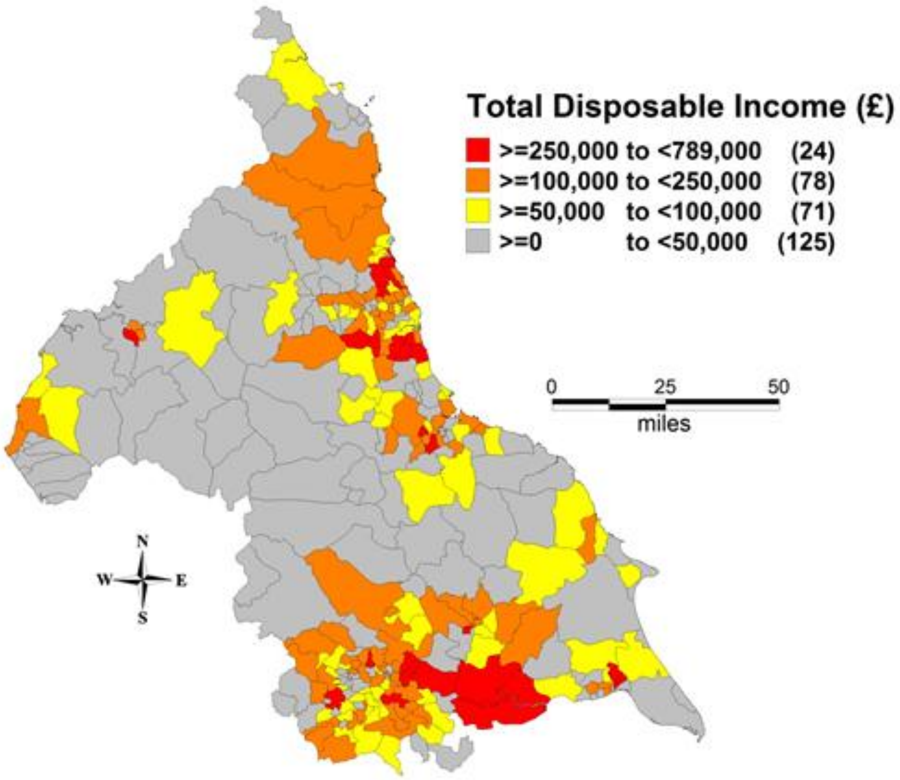
Figure 8: Employee distribution by patch

Using information from NGN's accounting systems in combination with regional statistics from the latest Family Spending Survey (ONS, 2011) an average gross income per employee and a likely level of 'disposable income' associated with this gross figure has been generated. In aggregate, it is estimated that a total expenditure of approximately £37 million is associated with staff costs (excluding any bonuses and contributions) which equates to a total annual disposable income of in excess of £31 million. Accounting for the 5% of NGN staff who reside outside the region, suggests a total of almost £30 million of the £37 million expenditure on staff costs which can be identified as 'disposable income' within the NGN area of operations.

When this total is distributed based upon the local residence of employees (postal districts) the concentration around the major centres of employment is clear with the darkest areas indicating over £0.25 million per year contributed in disposable income to each geographical area (Figure 9).

NGN, though its staff, is making a major contribution to the spending power of local communities across the extended northern region.

Note: mapped areas are postal districts

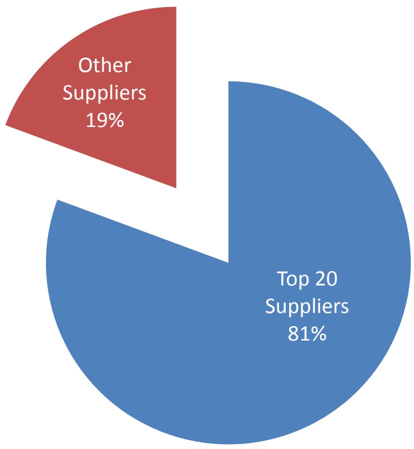


Source: NGN

Figure 9: Disposable income distribution, NGN employees

3.3. Regional expenditure

To facilitate the evaluation of NGN as a regionally-focused business, this analysis has been provided with access to financial information (from the 12 month period to March 2012) on the scale and distribution of its business expenditure with supplier organisations. To support its operational activities and capital investment projects, NGN's annual expenditure with suppliers is approximately £174 million.



Source: NGN

Figure 10: NGN expenditure distribution

Using a detailed analysis of supplier names and business addresses from NGN's contracts database, it was possible to identify a total of 680 individual vendors distributed across the UK. Of these 680, just 20 accounted for over 80% of NGN's total expenditure of £174 million (Figure 10). In the northern region, including a proportional allocation of larger contractors to individual patch areas, a total of 305 businesses are providing products and services to NGN (Figure 11). Despite there being a larger number of supplier organisations located outside NGN's area of operations, businesses within the region accounted for an estimated annual expenditure of £111 million, out of the £174 million total.

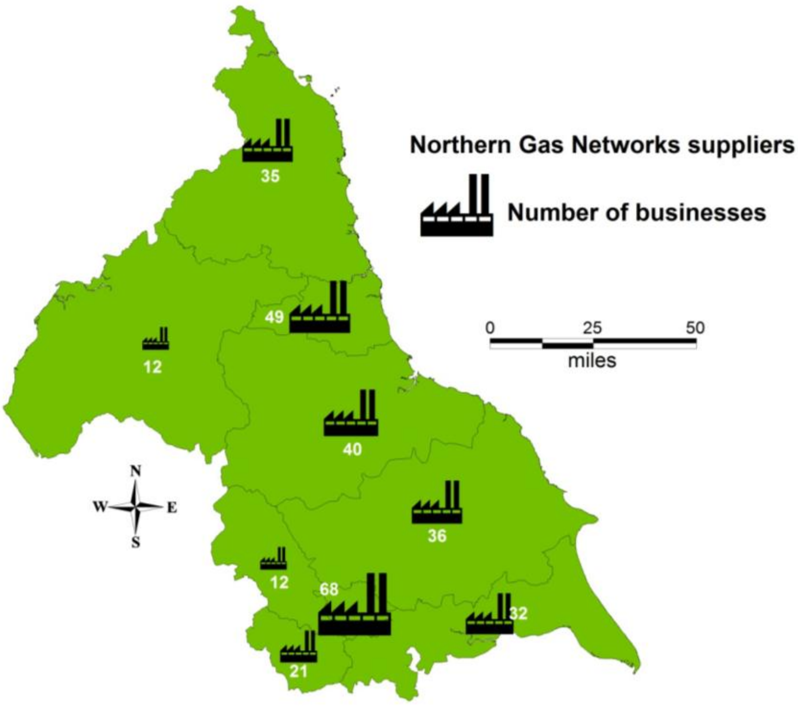


Figure 11: Distribution of NGN Suppliers within its region *(Source: NGN)*

Again, within the region there are a small number of very large supplier contracts matched to a large number of relatively small contracts. The distribution of supplier locations compared to value suggests a concentration of expenditure with businesses in Leeds, Sunderland & Durham and Tees Valley. (Figure 12).

Note: Figure 12 lists patches using patch number and allocated patch name, ranked by share of suppliers.

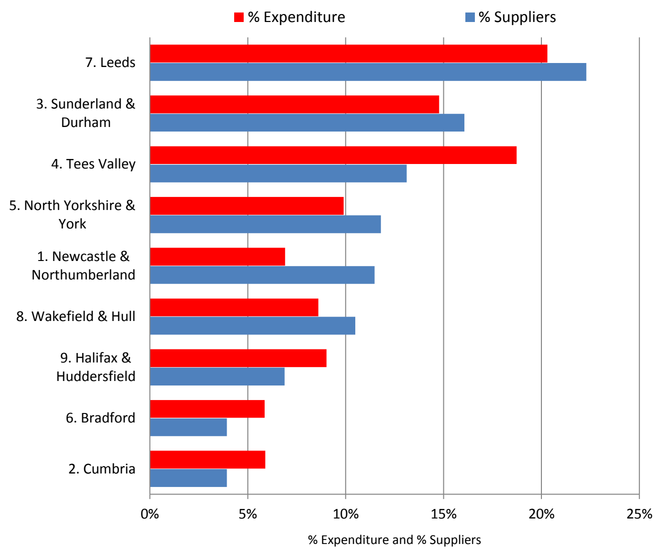


Figure 12: Suppliers: distribution and expenditure *(Source: NGN)*

4. Ripple effects

4.1. The Multiplier Concept

The multiplier effect is a Keynesian theory that has been widely accepted as the basis for evaluating the economic impact of investment and trade. The general concept is one in which the net impact of an investment is greater than the original sum invested due to the circular flow of income; one organisation's expenditure is another's income, stimulating further rounds of spending. The government uses the multiplier principle at a macroeconomic level to stimulate aggregate demand; investing money to create employment, increasing disposable incomes, boosting consumer expenditure, thus benefiting local businesses and so on. The principle is equally applicable at a regional level where, for example, investment in a new infrastructure project will generate business for local construction companies, opportunities for service providers, wages for builders and other employees and a stimulus to consumer demand. As a regionally-focused business, NGN's substantial programme of planned infrastructure investment will have an important impact; a ripple effect upon local economies, within which businesses operate and people live and work.

The selected approach to the evaluation of NGN's impact upon the regional economy uses a 'local multiplier' (LM3) methodology that has been developed specifically to facilitate the evaluation of regional and local economic impacts (Sacks, 2003; Sacks & Hodge, 2008). The '3' refers to the three levels at which regional expenditure 'retention' is evaluated, from initial investment (level 1), to its allocation to regional suppliers and staff (level 2), through to the regional spend of these suppliers and staff (level 3). The economic multiplier or LM3 ratio is derived through an aggregation of the three rounds of spending, expressed as a ratio to the initial investment; the extent to which the initial investment circulates within the local economy.

The LM3 methodology is quick and easy to implement relative to other forms of economic evaluation but it does not make any attempt to assess any additional social or environmental impacts. Its 'level 2' evaluation is relatively straightforward given access to company information on supplier contracts and staff costs that have been provided for NGN's business. However, to produce the most detailed 'level 3' analysis ideally requires intelligence on supplier procurement practices and staff expenditure profiles, conducted, for example, through sample surveys and questionnaires. The analysis presented here uses a simplified version of the 'level 3' approach, using a 'range' of scenario alternatives to evaluate potential levels of expenditure retention.

The LM3 methodology has been applied to a number of local economic situations. For example, in 2004 Northumberland County Council (NCC) initiated a project to evaluate the economic impact of its £245 million food supply procurement budget (NEF, 2005). A small team of economists applied the LM3 methodology, revealing that local suppliers re-spent 76% of their NCC contracts with local people and businesses whereas suppliers based outside the county re-spent only 36% locally. An LM3 score of 2.19 was calculated representing the average of 2.76 (local suppliers) and 1.36 (non-local suppliers). For every £1 spent from NCC's food supply budget a further £1.19 was being generated in the local economy.

4.2. NGN's local multiplier

The derivation of an LM3 multiplier for NGN requires that three levels of business expenditure 'retention' are identified. The first level is the total annual investment or expenditure made by NGN itself; the second level is the amount of this level 1 spend that is retained within the region; the third is the amount of the level 2 spend that is subsequently also retained within the region.

NGN expenditure	£m
Supplier expenditure	£174
Salary expenditure	£37
Total expenditure	£211

Source: NGN

Figure 13: NGN Level 1 expenditure

NGN's level 1 expenditure is measured in terms of how much it spends with its suppliers and how much it pays its staff in salaries. In total, based on data for the 12 months to March 2012, these equate to an annual figure of £211 million (Figure 13)

The analysis of supplier expenditure revealed that a relatively small number of vendors were responsible for a large percentage of NGN annual spend; the top 20 suppliers accounted for 80% of the total. For this reason the 'level 2' component of the LM3 analysis has identified this group of suppliers separately and they reveal a very different pattern of retention compared to the more numerous but smaller-value suppliers (Figure 14).

Suppliers	Within Region	Outside Region	Total	Level 2 Retention
Top 20 Suppliers (£m)	£100.1	£40.5	£140.6	71%
Other Suppliers (£m)	£11.4	£22.3	£33.7	34%
Total	£111.5	£62.7	£174.3	64%

Figure 14: NGN Level 2 supplier expenditure *(Source: NGN)*

Over 70% of NGN's expenditure with its top 20 suppliers is allocated to businesses within NGN's region of operation, compared to just 34% for all other suppliers. There is a long list of smaller suppliers providing products and services to NGN in the north of England but whose businesses are located outside NGN's area of operations.

In terms of staff salaries, the level of retention is higher, with the large majority (95%) of employees living and working within the NGN region. The level 2 retention figure is calculated based upon 'disposable income', reducing the total salary expenditure not just by the amount associated with employees outside the region but also by a percentage that is consistent with the amount of money that households have available for spending and saving after tax and national insurance have been accounted for (ONS, 2011). This gives a retention figure of 80% for NGN salaries (Figure 15).

Salaries Paid (£m)

Staff	Within Region	Outside Region	Total
No of employees	1,158	65	1,223
Salaries Paid (£m)	£35.4	£1.8	£37.2

Staff	Within Region	Outside Region	Total	Level 2 Retention
Disposable Income (£m)	£29.6	£1.5	£31.1	80%

Figure 15: NGN Level 2 staff expenditure *(Source: NGN)*

To progress the LM3 analysis to level 3 is a little more problematic as further evidence is required on how this retained expenditure is itself spent within or outside the region. This evidence is more difficult to obtain in an accurate and robust form. LM3 methodological guidance suggests that the most appropriate methodology to consider is a random sampling approach, investigating the expenditure profile of a selection of suppliers and staff through survey and interview (Sacks, 2003). Further research for NGN may enable this type of investigation but the analysis presented here adopts a more pragmatic approach, evaluating the 'potential' for level 3 retention based upon a number of alternative 'scenario' outcomes; a 'range' of expenditure profiles which indicate the likely value of the final LM3 statistic.

In a previous LM3 analysis completed for Yorkshire Water, an assessment of the amount of subsequent level 3 spend of its main suppliers retained with the supply area, revealed a crude estimate of approximately 50%. Accepting the large potential margin for error in this estimate, 'level 3' retention for the analysis of NGN's local multiplier is expressed as a low-medium-high value, with 50% as a 'high' estimate, with alternative values ranging from 30%-50%. This results in a level 3 retention for the top 20 suppliers of between £30- £50m (Figure 16).

Within the Yorkshire Water analysis, smaller suppliers were deemed to have a much higher rate of re-spend into the local economy, albeit from a smaller base expenditure**.** On this basis, the low-high range of level 3 retention for NGN suppliers has been set at 50%-70% for this group. This results in an additional retention of between £6 - £8m from smaller suppliers.

The amount of employee disposable income that is retained within the region is even more difficult to accurately quantify but it is assumed that a relatively large percentage of consumer spend is undertaken within local economies, where people live, work and spend the majority of their retail and leisure time. A larger range of values is used to illustrate potential level 3 retention, from 50%-80% of the level 2 total. This results in an additional expenditure of between £15 - £24m.

	Level 1	Level 2 retention	Level 3 retention		
			Low	*Medium*	*High*
Largest 20 suppliers (80% of total)	£174		*30%*	*40%*	*50%*
		£100	£30	£40	£50
			Low	*Medium*	*High*
Other suppliers (20% of total)			*50%*	*60%*	*70%*
		£11	£6	£7	£8
			Low	*Medium*	*High*
Staff			50%	65%	80%
	£37	£30	£15	£19	£24
Total	**£211**	**£141**	**£51**	**£66**	**£82**

All values are £ million

Figure 16: LM3 calculations for NGN

The LM3 multiplier is calculated by summing the original 'investment' (supplier spend plus staff costs), the amount of level 2 retention and the amount of level 3 retention, all expressed as a ratio to the original sum. Given the range of retention statistics presented at level 3, low, medium and high multipliers are derived. Using the low-medium-high calculations this produces a range of multipliers from 1.91-2.06 (Figure 17)

$$\textbf{Low LM3} = \frac{\textbf{(£211 + £141 + £51)}}{\textbf{£211}} = \textbf{1.91}$$

	LM3
Low	1.91
Medium	1.98
High	2.06

Figure 17: LM3 alternatives for NGN

The mid-range LM3 suggests that for every £100 of NGN expenditure on suppliers and staff costs a further £98 of expenditure is generated within the regional economy.

5. Concluding comments

Economic conditions in the UK are worse than they have been for almost 20 years and the short-term outlook suggests recovery is likely to be slow and painful. Yorkshire and the North East of England, NGN's geographical heartland, are being hit especially hard as public expenditure cuts, rising unemployment (particularly amongst the young) and an increased cost-of-living, impact upon communities that have, historically, been the most vulnerable to deteriorating economic conditions. Businesses in the north, across most industry sectors, are suffering, with construction still to begin its recovery and public sector job losses exceeding any anticipated private sector growth. The demographic backdrop to this economic landscape is a trend for continued population growth; up to 1 million in Yorkshire and the North East by 2035.

Given these economic conditions, the activity and long-term commitment of NGN, a major investor in the north, is a very significant component of the region's economy. NGN's business plan has earmarked up to £150 million per year for capital expenditure on the replacement and development of its asset infrastructure; a similar sum is estimated for operational activities associated with the day-to-day running of its business. Using detailed financial information for a 12 month period ending March 2012, this analysis has demonstrated how important NGN's investment and expenditure is to the economic health of its area of operations; not just in terms of the total amount spent but crucially in terms of the extended 'multiplier' effect upon businesses and people in the north of England.

The analysis presented here has used a relatively simple but effective methodology to assess NGN's potential multiplier effect. The LM3 calculation, using detailed statistics on the salary costs of employees, plus annual spend with suppliers, provides an indication of the importance of NGN's investment and expenditure within the north of England. The level 1 and level 2 analysis of regional 'retention' has used the geographical location of businesses and employees to estimate expenditure activity within and outside the region. Level 3 assessment has been completed in a relatively crude manner, estimating retention based upon a 'range' of potential outcomes, recognising the large margin for error in this assessment. A detailed analysis of the re-spend of a random sample of NGN's suppliers and its employees would provide a more accurate account of level 3 impacts, so this could provide the basis for further research and investigation. In addition, the LM3 assessment presented here assumes that there is no level 3 retention by employees and suppliers located outside the region; another area for future methodological improvement.

However, the results do provide a valuable insight into NGN's impact upon the regional economy and do provide a preliminary benchmark from which the company might wish to evaluate future procurement practices. Although regional sourcing preferences do need to be balanced against European Union procurement rules, value for money and the availability of appropriate skills within the local economy. By way of illustration, if NGN were to increase the total value of 'local ' supplier procurement from its smaller suppliers from 34% to 50%, that could release an additional £9 million to boost regional economic development, raising its mid-range LM3 from 1.98 to 2.02. Just a small change in the level of local sourcing with its largest suppliers could have an even more significant effect.

NGN is a relatively low profile business providing critical services to businesses and households across the north of England. Unlike most businesses, NGN's activities are defined by its geographical area of operations. It has an enviable, monopoly position but in a highly regulated industry that insists upon the highest standards of safety and cost efficiency and which seeks increasingly low-carbon impacts upon the environment. As a result, NGN has a long-term plan for investment in its business, replacing and maintaining its network infrastructure, developing its assets, products and services to meet the forthcoming challenges of the UK's energy industry.

The analysis presented here has estimated that for every £100 million of investment and expenditure by NGN, approximately £98m could be generated as a result of the 'ripple' effect upon the regional economy. In aggregate, assuming investment plans and employee numbers are maintained over the strategic plan period, 2013/14-2020/21, the Ripple Effect of NGN's activities could equate to over £2.6 billion; a financial impact on the north of England economy of over £330 million per year (Figure 18).

	Eight-year business plan 2013/14 - 2020/12
	(£million)
OPEX - controllable	£776
OPEX - non-controllable	£449
REPEX	£793
CAPEX	£397
	£2,416
Salaries (8 year)	£296
Total	**£2,712**
Ripple (LM3 @ 1.98)	£2,657
per year (8 year)	£332

Note: OPEX, CAPEX & REPEX @ 2009/10 prices

Note: Salaries @ 2011/12 prices

Figure 18: NGN – aggregate Ripple Effect

As a regionally-focused organisation, with a long-term outlook, NGN plays a critical part in the economy of the north of England; an important investor in the region as it seeks to recover its economic well-being.

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