SectorGrowthInvestment\_July2024

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# Introduction

What questions does this try to answer?

South Yorkshire (hereafter SY)

# Background

Some key facts from existing literature:

* Several sources cite an achievable ratio of around £1 of public investment to £3 of private ‘crowding in’. [[1]](#footnote-21)
* A recent CBI report on net zero jobs finds investment per new job is around £680,000 [[2]](#footnote-22). A 2019 Department for International Trade report finds FDI investment per new job is around £345,000 [[3]](#footnote-23).

From Labour manifesto: National Wealth Fund “The fund will have a target of attracting three pounds of private investment for every one pound of public investment, creating jobs across the country.” Steel industry 2.5B, green hydrogen, 1.8B for supply chains? Our plan will create 650,000 jobs across the country by 2030 Not all green but… So that’s about a doubling of green jobs if going by CBI report (Green sector “supported 765,700 Full Time Equivalent (FTE) jobs, equal to nearly 3% of total UK employment”) How many in LCREE…? ~270K though (a) error bars are wide and (b) that’s direct, not the 1:2 spillover ratios the CBI mentions.

# Low Carbon and Renewable Energy Economy

The Office of National Statistics survey, ‘Low Carbon and Renewable Energy Economy’ or LCREE, asks businesses what proportion of turnover and jobs are in a range of green activities, and has data going back to 2015.

Linking the LCREE survey to GVA data shows that in the most recent year 1.27% (1 to 1.54% 95% CI) of the economy currently comes from LCREE jobs. The 2024 CBI net zero report finds around the same using Data City data - direct economic impacts of green jobs is 1.3% of the economy - but it also finds economic spillovers triple the GVA impact nationally. [Figure 1](#fig-lcreejobpercent) shows what percentage of jobs in that sector are ‘LCREE’ (showing sectors with the biggest percent). For the majority it is very low, but the key five sectors with substantial LCREE jobs are (in order of percent) power, construction, manufacturing, water, and scientific/technical.

These top five LCREE sectors vary in size: while the power sector has the largest percent of LCREE jobs, it is only 0.5% of total jobs, whereas manufacturing and construction account for 6% and 10% of total jobs respectively.

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| Figure 1: Percent of sector jobs identified as LCREE. 95% error bars. Total jobs in that sector / percent of total jobs in brackets. |

[Figure 2](#fig-itl2gvalcree) links LCREE to GVA data at regional level, and presents an ‘if / then’ scenario: if LCREE GVA and jobs existed in proportion to sector size in each location, what would the likely spread of GVA be? (Note, this is not showing what SY’s actual LCREE job count is.) It includes 95% likelihood range for SY for this if/then scenario. The true concentration of LCREE jobs will not be so even (see the recent Northern Powerhouse report for analysis of this [[4]](#footnote-29)) but it gives an indication of which sectors and what economic scale LCREE jobs could take.

Only 1 to 2% is green GVA anywhere. 2% isn’t tiny. But still. (1.1-1.7% overall in 2022) Genuine LCREE growth in recent years, big upward slope overall – make that point! SY in the middle, if this IF/THEN is right. Broad sectors with Low-carbon / green energy are FEW. That’s pretty key. But they’re also pretty productive sectors generally. SY ICT growth is an interesting case, nothing much that’s green (what prop jobs overall again…?) The relative productivity between sectors (for GB as a whole) has actually stayed remarkably stable over time. Plots from line 340 around there.

The 2024 CBI net zero report suggest LCREE type jobs are 1.6 times more productive than average. While this is likely mostly due to which sectors dominate LCREE jobs, rather than green jobs themselves being higher productivity, it is nevertheless true that investment in LCREE jobs would be on average more productive. In SY, however, two broad sectors that have very few LCREE jobs are ICT and education.

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| Figure 2: If/then estimate of ITL2 region % green (LCREE) GVA by sector, South Yorkshire in caps/arrows (bottom quarter), Grey lines are South Yorkshire 95% CIs |

## The productivity of South Yorkshire’s sectors relative to the rest of the UK

A starting point for thinking about how job investment could change SY’s productivity is being clear on where the region sits relative to the rest of the UK. [Figure 3](#fig-relativeprod) shows this, for broad sectors (combined to match the LCREE survey’s sector categories). Sectors are in each pane, most productive on average left to right. All ITL2 zones are shown in dots, for five years of moving average output per job (expressed as a percent of total GB output so comparisons across time are valid). SY is overlaid in large red dots.

Some of the key facts [Figure 3](#fig-relativeprod) shows:

* The top two green job sectors, manufacturing and construction, have very different productivity per job in SY. Manufacturing has remained at or near the lowest end of all places in the UK. There will of course be firms with much higher productivity, but on average it has been stuck for some time. Construction has been much more typical of the UK as a whole, with some ups and downs. Another important green sector, scientific and technical jobs, while relativelty low, has seen recent relative productivity increases.
* ICT, as well as being a highly productive sector, has seen SY’s output per job rapidly climb into the highest places in the UK.
* Education has been consistently productive in SY, and continues to increase relative to other places in the UK.

What this means for green jobs… ICT cf…

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| Figure 3: Productivity per job, as % of GB total output. Broken down by SIC section, each point is an ITL2 zone. 3 yr moving average shows change over time. SY overlaid in larger dots. |

## Adding a new job in South Yorkshire: what factors determine its economic impact and how we measure it?

This section uses existing output per job in SY to estimate how a *new* job could change the economy on average, given its likely spread of productivity values. As well as the value of the job, the following other factors can be considered: the value of any replaced job, if someone within SY moves to the new post; where in the job landscape the employee came from - from inactive workers, from outside the area, whether commuting.

It is possible to identify two bounds on how much extra GVA a new job will bring to SY. At one extreme, someone already economically active in South Yorkshire gets the job, most likely moving from a lower to higher GVA position - so the net GVA gain for South Yorkshire is smallest. At the other, the new job attracts a new worker to the region, either through inducing a commute, attracting a migrating worker (internal to the UK or not, broadly the same outcome on SY GVA) or drawing in someone from South Yorkshire’s existing pool of inactivity (which could include, for example, a graduate based in the region starting a new job). Each of those has different implications for what the ultimate GVA gains look like, on top of which sector the job is in.

Where on average those numbers fall given any investment depends on the larger pull and push factors at play in the region. For example, there is evidence that SY has an oversupply of workers with L4 skills, often in jobs that do not fully exploit the productivity potential. This would lead to more internal candidates for newly created jobs - increasing productivity but lowering the net gain relative to growing the workforce. There are knock-on effects as job composition shifts (moving jobs creates vacancies; job creation spillovers occur etc) but SY’s low skill equilibrium will tend to mean there is more unexploited productivity locally to soak up, compared to some other places where skills more closely match jobs.

Other economic geography push/pull factors will be considered below.

Starting with the scenario where a new job is taken by a worker already in SY, take as an example a new job in manufacturing. Assume that additional output per job roughly matches its pay. Leaving certain sectors out [[5]](#footnote-39), the likely spread of GVA output per job across *all* SY jobs ranges currently (latest data is 2022) from around £40,000 to £105,000 a year (5% to 95% quantiles from a spread of SY jobs in the main selected sectors) with an average of around £73,000. A credible spread of GVA per job for SY manufacturing around its average output is around £50,000 to £83,000, with an average of £65,000.

If a new manufacturing job is filled from another SY position, assume that the net GVA output (the difference between the old and new job) will always be positive (on the basis that output reflects earnings and the candidate would not move to a less well paying job). Also assume that job is being filled from someone moving from within the range of existing SY jobs (though again, only those with a GVA value below the randomly selected manufacturing job).

Given that, on average, the net GVA gain would be around £14,300 a year per job, stretching to £35,000 at the 95% percentile. That’s an average of around 28% extra GVA compared to the internally displaced jobs.

**The table below repeats these simulations for all broad SIC sections** (matching the LCREE sector categories), ordering by average percent GVA gained per new job if the worker moved from elsewhere in the SY economy. These simulations contain several assumptions, and are aiming to be approximate estimates. Some bullet points on what might be learned from them:

* The first value column - **av new job GVA** - would be the additional GVA from a new job filled by a commuter, a SY graduate, or new migrant (from within or outside the UK) i.e. it wouldn’t be net of GVA from other work within South Yorkshire. **av net GVA** is the estimate if job composition changes *within* South Yorkshire, with **percent GVA gained** showing how much extra GVA proportionally would be gained per job (on average) if internal job composition changed.
* Unsurprisingly, new jobs in higher productivity sectors tend to have higher average proportional GVA gains, if workers with SY move to those jobs.
* As already mentioned, GVA in the top three sectors of power, real estate and mining are perhaps misleading due to the their oversized apparent productivity per worker (based e.g. for power on very high profit rates), and they have very small job numbers overall (see job count and % in table). It would be necessary to more fully understand productivity in power firms to better estimate what role they could play in SY growth and green growth, but in terms of jobs numbers, there isn’t a large base to grow from currently.
* For all other sectors with more straightforward GVA per worker (from ICT to transport) the absolute and percent net gains are higher the more productive the sector is. Built into the assumptions is that a higher productivity job would more likely release a larger chain of spillovers to other jobs within SY, so internal gains should be higher. Compare ICT to transport directly: a new ICT job could add £105,000, netting £35,000 on average if from internal job shifts. Compare to transport: as [Figure 3](#fig-relativeprod) shows, productivity per worker has been dropping, most likely due to the sector’s large recent job expansion into warehousing activities. An average new transport job adds around £37,000, netting only around £3,000 on average if employing from elsewhere - though note, lower pay jobs like this have a higher probability of attracting workers from SY’s pool of inactivity, so the full £37,000 could well be added.
* This data implies that there is an inverse relationship between sector productivity and the ratio of purely new job to net new job value. For example, a fully new job in transport could bring in ten times more GVA than if displacing another SY job. That ratio drops rapidly for higher productivity jobs, with fully new ICT jobs bringing in three times more GVA than if net. But note the absolute amounts are so much larger for more productive posts.

The next section looks more closely at what different scenarios these numbers might imply, looking at the scale and productivity of sectors (see job counts / percents in the table) and how geographical economic forces shape which of these outcomes are more likely from job investment, and considers what role green jobs play in it.

| **sector (jobs 1000s/%)** | **av new job GVA** | **av old job GVA** | **av net GVA** | **percent GVA gained** |
| --- | --- | --- | --- | --- |
| power (0.8, 0.2%) | 199,911 | 73,531 | 126,381 | 171.87 |
| Real est (4.4, 1.1%) | 187,501 | 73,556 | 113,945 | 154.91 |
| Mining (0.2, 0%) | 135,881 | 73,235 | 62,646 | 85.54 |
| ICT (14, 3.7%) | 105,590 | 70,003 | 35,587 | 50.84 |
| Agri (0.7, 0.2%) | 105,031 | 70,039 | 34,991 | 49.96 |
| Water (4.1, 1.1%) | 89,558 | 64,812 | 24,746 | 38.18 |
| Education (35.3, 9.3%) | 86,255 | 63,496 | 22,759 | 35.84 |
| Construction (25.1, 6.6%) | 83,889 | 62,253 | 21,636 | 34.76 |
| Retail (46.6, 12.2%) | 78,558 | 59,378 | 19,180 | 32.30 |
| other (109.4, 28.7%) | 74,486 | 57,176 | 17,310 | 30.27 |
| Manuf (54.5, 14.3%) | 65,544 | 51,222 | 14,322 | 27.96 |
| Scientific (23.9, 6.3%) | 58,906 | 46,921 | 11,984 | 25.54 |
| Admin (30.2, 7.9%) | 43,460 | 37,620 | 5,840 | 15.52 |
| Transport (31.4, 8.2%) | 37,912 | 34,079 | 3,834 | 11.25 |

# STUFF

The balance of where jobs will be filled from will be a function of how attractive it is in comparison to similar roles elsewhere. While some higher productivity manufacturing jobs may attract workers from outside SY (commuting or migrating), the current average spread of manufacturing productivity relative to other places suggests it won’t attract ON AVERAGE

So an argument there for concentrating on solving SY’s own specific manufacturing ‘productivity puzzle’

Once region becomes attractive, self-reinforcing

How much in power of policymakers?

# The factors shaping what mix of jobs and geography could result from jobs and sector investment

## Keeping a focus on ‘good growth’ that grows both GVA and jobs

‘North East arrows’ saw both GVA and jobs increase. North East plus in the darker corner saw GVA increase proportionally faster than jobs, so GVA per job increased. Checking figure cross ref, look at [Figure 4](#fig-manuf-percentchange).

Compare adding say 100 or 1000 manuf jobs, compared to its existing job number base. How would it / could it change the overall average productivity of that sector? Given x or y assumptions? Noting that productivity is largely due to TFP issues, not the people. Can make that point in % change manuf section.

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| Figure 4: MANUFACTURING Percent change GVA and jobs in ITL2 zones, moving average between 2015/17 and 2018/20. South Yorkshire in Blue. See text for full breakdown. |

# BITZSSSZZ

Drop in something on Pathways to work, what investment cost there is https://www.barnsley.gov.uk/services/our-council/barnsley-2030/pathways-to-work-commission/

CBI: £114300 GVA PA for a FTE = £58.615 per hour worked; DIT: £212,000 GVA PA for a FTE = £108.70 per hour worked

But we then want to think about net effects with skills composition / jobs / migration / commuting and what difference those make. Can lay out assumptions and show those differences, including maybe shiny.

Cf. Low skill equilibrium and connected offsetting issues (including investment removing jobs – come up with number for % of GVA increase via job reduction)

Sector questions: why SY lower than other places? Point to larger issues about how productivity differences measured, can we get closer to reality? (The raw GVA per job numbers actually probably are quite close, except that the way the top level GVA numbers are worked out is…?)

Including: digging into facts on the ground, corroborate what the data says…

Picking what we measure: Larger Q here about “growth spreading more widely” e.g. Doncaster worker commutes to Sheffield, resident spending in Doncaster, GVA in Sheffield firm. Ties to geog issues / commuting etc generally.

Investment-wise, what are the marginal gains to trying to improve overall manufacturing productivity (currently low) compared to investing in already high productivity sectors? Noting that manuf productivity has a spread too – only average being shown Investment in clean tech is going to cut across sectors. They support each other. Is very small part of overall GVA though, have to still make that clear.

Imagine some changes in job/sector composition in SY. There are several types here: Sectors grow, more jobs come in Sector composition changes, jobs move around Various other mixes of movement including to/from inactivity (some laid out on paper in front of me here)

That leads to different sets of measures of change: Raw output changes. “SY economy will grow by x% overall if 100 more clean tech jobs in this sector.” Productivity changes. Two types maybe: “Overall GVA per job will increase by x% if job composition changes in this way.”

One approach: Creation of new job in construction: Give it average GVA per FT: Gross effects: Sector productivity doesn’t change Average GVA per FT overall most likely goes up (as does GVA per head) Gross/raw GVA increases Net effects (All net effects are going to do is take some net values from other lower-productivity sectors): If oversupply of local high skill, soaks up some of that If skill lack, draws in commute or permanent role Labour supply/demand has other effects but we then assume perfect market where compensation = marginal productivity!)

Sector linkages - again, need better knowledge of those (cite Coyle on manuf / services?) Prof/scientific/tech: might be foundational to the others and their progress. Investment Q there. How to think about?

Point that most things are a balance, and net result is empirical question and may vary. See e.g. New firm (FDI or not) If oversupply of high qual, new firms soak up some people from here. Net effect of losses to other firms. Interaction with commuting – if not oversupply locally, pull in more externally (commute or permanent move makes a difference to the measures too) Existing firm expands through capital investment; implication for jobs Different starting assumptions on job value compared to FDI right? Upskilling investment (public) … coming up with some ballpark for that would be useful (cf. That Pwells paper, what’s its point?) Capital deepening: inc or dec or shift of jobs?

“Rapid productivity growth in one sector of the economy, reflecting rapid technological progress, can therefore be combined with low overall productivity growth, if freed up labour moves into low productivity growth sectors.” (Wilkes quotes Lord Turner p.27) Opposite of under-utilised labour moving into better work… The raw GVA still shows up in the sector there though. (Although again, spillovers elsewhere, argh.)

1. LSE, Grantham Institute, “Boosting growth and productivity in the United Kingdom through investments in the sustainable economy”, January 2024: This cites a 1 to 3 crowding in ratio. Northern Powerhouse, “Net Zero by 2050: One Plan, Two Objectives - How Green Growth Can Build the Northern Powerhouse”, July 2024, suggests an average crowding in ratio of £1 to £2.65. The Labour Manifesto aims, through its new National Wealth Fund, “three pounds of private investment for every one pound of public investment”. [↑](#footnote-ref-21)
2. CBI, “The UK’s net zero economy: The scale and geography of the net zero economy in the UK”. 2024 [↑](#footnote-ref-22)
3. DIT, “Understanding FDI and its impact in the United Kingdom for DIT’s investment promotion activities and services”. 2021 [↑](#footnote-ref-23)
4. Northern Powerhouse, “Net Zero by 2050: One Plan, Two Objectives - How Green Growth Can Build the Northern Powerhouse”, July 2024 [↑](#footnote-ref-29)
5. FOOTNOTE ON EXCLUDED SECTORS [↑](#footnote-ref-39)