



Broken Promises and Offshored Jobs

STUC report on employment in the low-carbon and renewable energy economy

Broken promises and offshored jobs: an STUC report on employment in the low-carbon and renewable energy economy

This report looks at the past promises of employment in the low-carbon and renewable energy (LCRE) economy and how this has not translated into the jobs boom promised. By analysing the current make-up of employment in the low-carbon economy and a number of recent renewables projects, it considers the implications of a failure of industrial policy.

In presenting this report, the STUC are not criticising the LCRE economy per se. Indeed the STUC is absolutely committed to building a low-carbon economy and meeting climate change targets. However, we are criticising the failure of industrial policy to ensure that workers, businesses and Government in Scotland benefit from Scotland's natural resources. Without a domestic industrial base for the LCRE economy, not only will workers in Scotland miss out, but there are serious implications in terms of tax, transparency, economic democracy and meeting climate targets.

Job promises

Over the past fifteen years, Scottish Government Strategies, from a number of political parties, have promised significant numbers of jobs in renewables. For example

- ***Harnessing Scotland's Marine Energy Potential (2004)*** - 7,000 direct jobs in the marine industry by 2020.ⁱ
- ***Renewables Gap Chain Analysis (2004)*** - 17,000-35,000 jobs by 2020.ⁱⁱ
- ***Low Carbon Economic Strategy (2010)*** – annual growth of 4% a year to 130,000 jobs by 2020 (and 5% of the overall workforce). Of the 60,000 new jobs to be created between 2010-2020, 26,000 in renewables; 26,000 in low-carbon tech; and 8,000 in environmental management.ⁱⁱⁱ
- ***2020 Routemap for Renewable Energy in Scotland (2011)*** – 40,000 jobs in renewables by 2020.^{iv}

- **Scotland's Energy Strategy** (2017) – 4,000 jobs per annum in energy efficiency programmes.^v

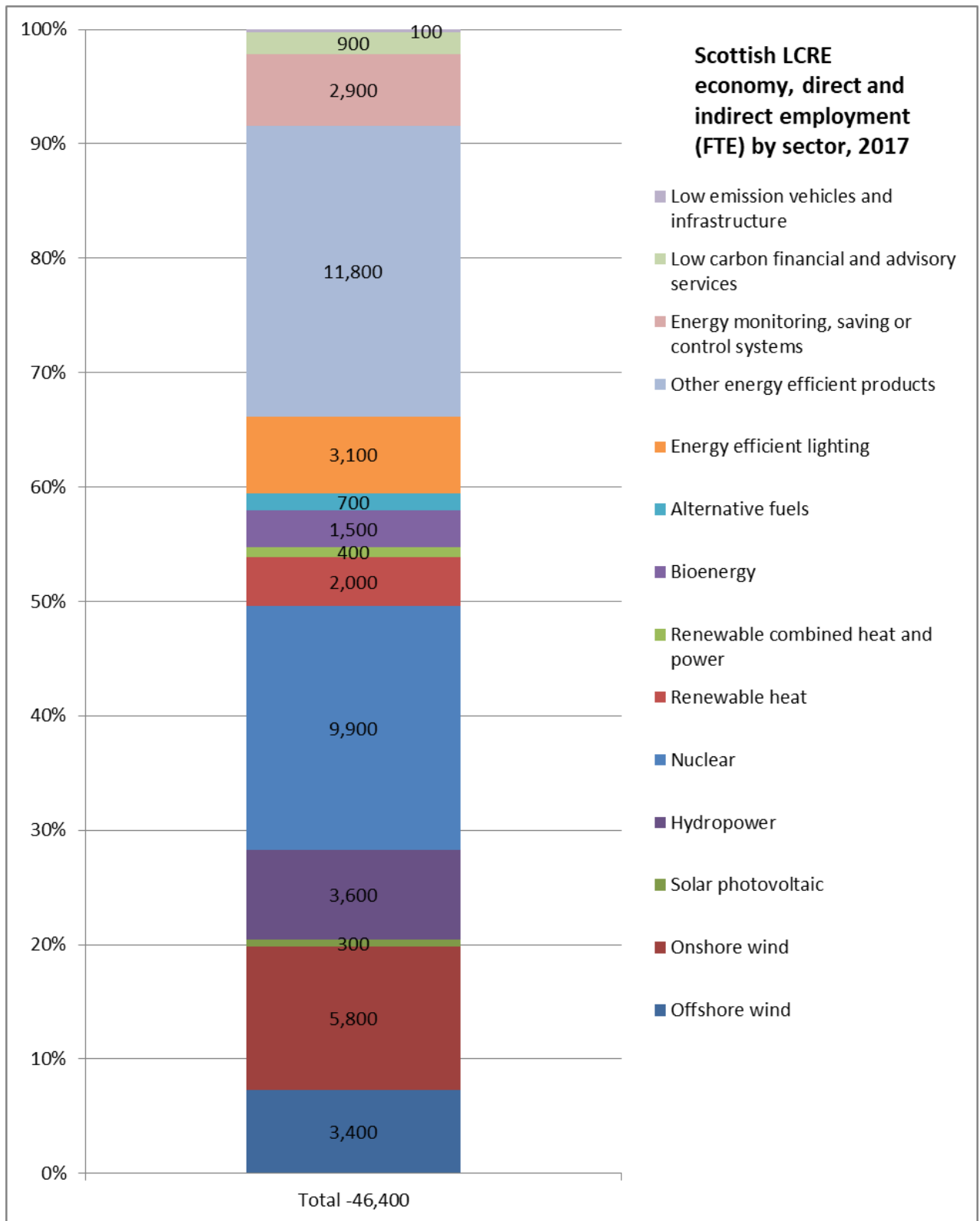
While it isn't possible to aggregate these estimates into one proposed figure, taken together, they represent a substantial and progressively increasing number of jobs in the LCRE economy. Below we look at how this compares with the current reality.

Current jobs

Starting in 2015 (for reporting year 2014) the Office for National Statistics (ONS) 'Low Carbon and Renewable Energy Survey', is the primary source of official information on the LCRE economy.^{vi} It includes estimates of direct and indirect full-time equivalent (FTE) employment.^{vii} While there are issues with the quality of the estimates,^{viii} the latest figures released in January 2019 estimate 21,400 direct full-time equivalent (FTE) jobs in the LCRE economy in 2017.^{ix} This is a fall from 23,900 the previous year. The ONS estimate a further 25,000 indirect jobs in 2017, taking the total number of direct and indirect jobs in Scotland to 46,400.^x This was a fall from 50,500 in 2016, but slightly higher than 45,800 in 2015.

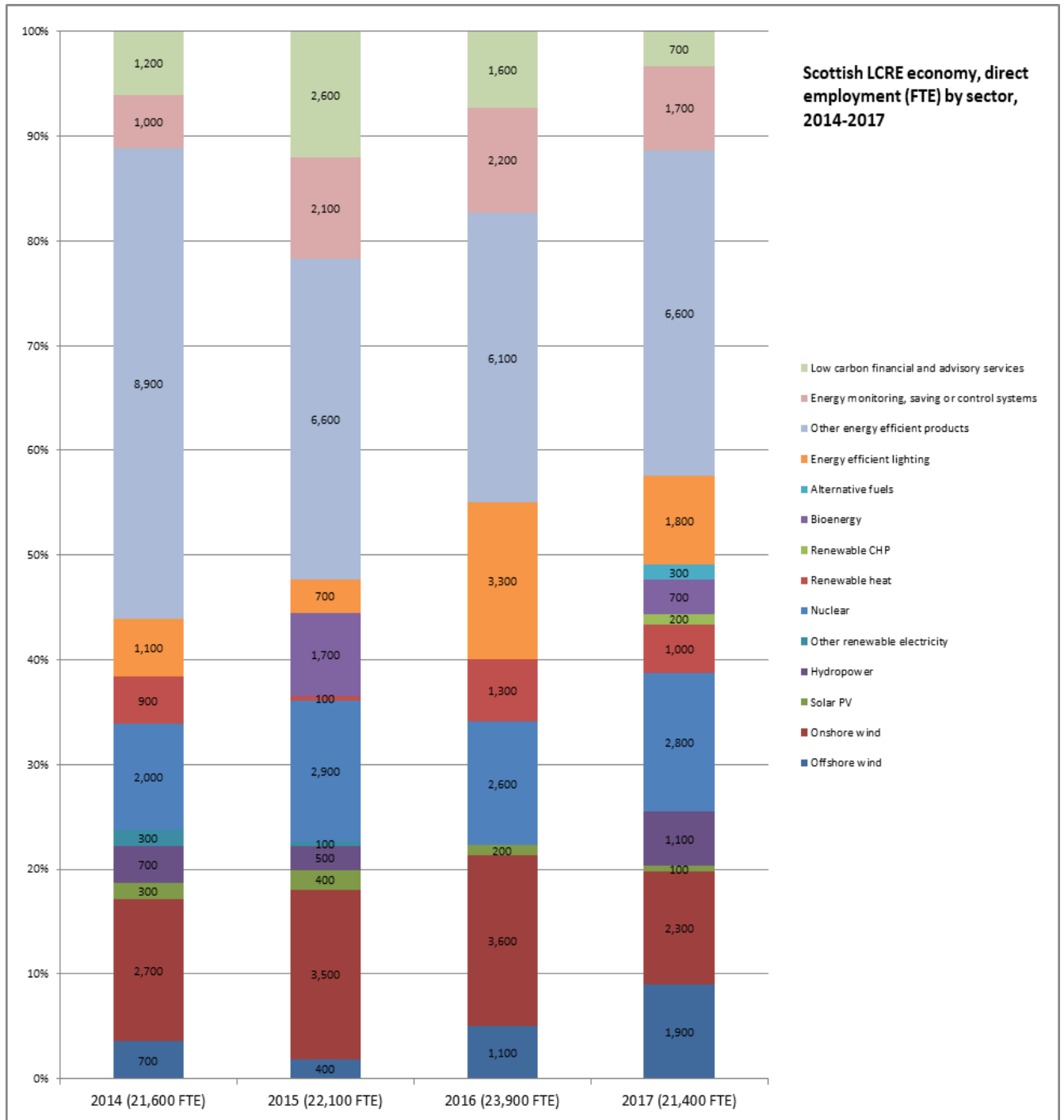
It should be noted that the methods used to calculate indirect activity are experimental and changes between years should therefore be treated with caution. For these reasons, when comparing changes between years (below) we use direct employment figures.

The table below details total (direct and indirect) FTE employment within the LCRE economy for Scotland in 2017, by sector.



Source: Author's graph based on ONS data

The table below shows direct FTE employment by sector for Scotland in 2014-2017.^{xi}



Source: Author's graph based on ONS data

Both tables show a significant amount of employment in energy efficiency products, systems and lighting, which accounts for 17,800 FTE (10,100 direct) and more than a third of total LCRE employment.

Onshore wind accounts for 5,800 FTE, although direct employment has fallen from 3,600 (in 2016) to 2,300. The accompanying report to the dataset states:

“the majority of the decrease was within the manufacturing and construction industries, which includes installation of wind turbines...[and] the cut in government feed-in tariffs for installing wind turbines may be contributing to the reduction in turnover and employment seen within this sector as a whole.”^{xii}

Offshore wind stands at 3,400 with direct employment increasing from 1,100 in 2016 to 1,900 in 2017. While this suggests offshore wind may be a growth sector, this figure has a coefficient of variation of 35% and is therefore subject to a particularly large degree of uncertainty.^{xiii} In addition, a number of workers at BiFab have lost their jobs since 2017, so the 2019 figure may well be lower.

Hydropower sustains 3,600 FTE (1,100 direct); renewable heat and renewable CHP 2,600 (1,200 direct); bioenergy 1500 (700 direct) and alternative fuels 700 (400 direct).

Taken together renewable energy (onshore wind, offshore wind, hydropower, renewable heat and CHP, bioenergy and alternative fuels), accounts for more than 17,600 FTE (7,600 direct) and more than a third of total LCRE employment.

Nuclear continues to sustain 9,900 FTE (2,800 direct), representing more than 20% of total LCRE employment (13% direct).

Overall however, with growth in the LCRE economy having flatlined in the last three years, we have not seen the scale or the growth in LCRE employment that Governments have predicted.

Why the difference between predictions and reality?

Perhaps as a forewarning to the disjoint between Government predictions and the reality of job creation in the low carbon economy, in 2005, the then Scottish Executive’s Forum for Renewable Energy Development in Scotland (FREDS) stated:

“A number of studies have previously been undertaken and it is clear from these that, given uncertainties about the extent and nature of the various technologies involved, this is very difficult to forecast with any degree of accuracy. Some tentative conclusions emerge, however. For instance, it appears that most jobs are generated in the construction phase of development. The key point about employment impacts, though, is that much depends on the extent of domestically produced inputs. Technology sourced locally would have a considerably higher domestic employment impact than imported technology. Employment generated would also be higher to the extent that Scottish-based firms were able to export their technology.”

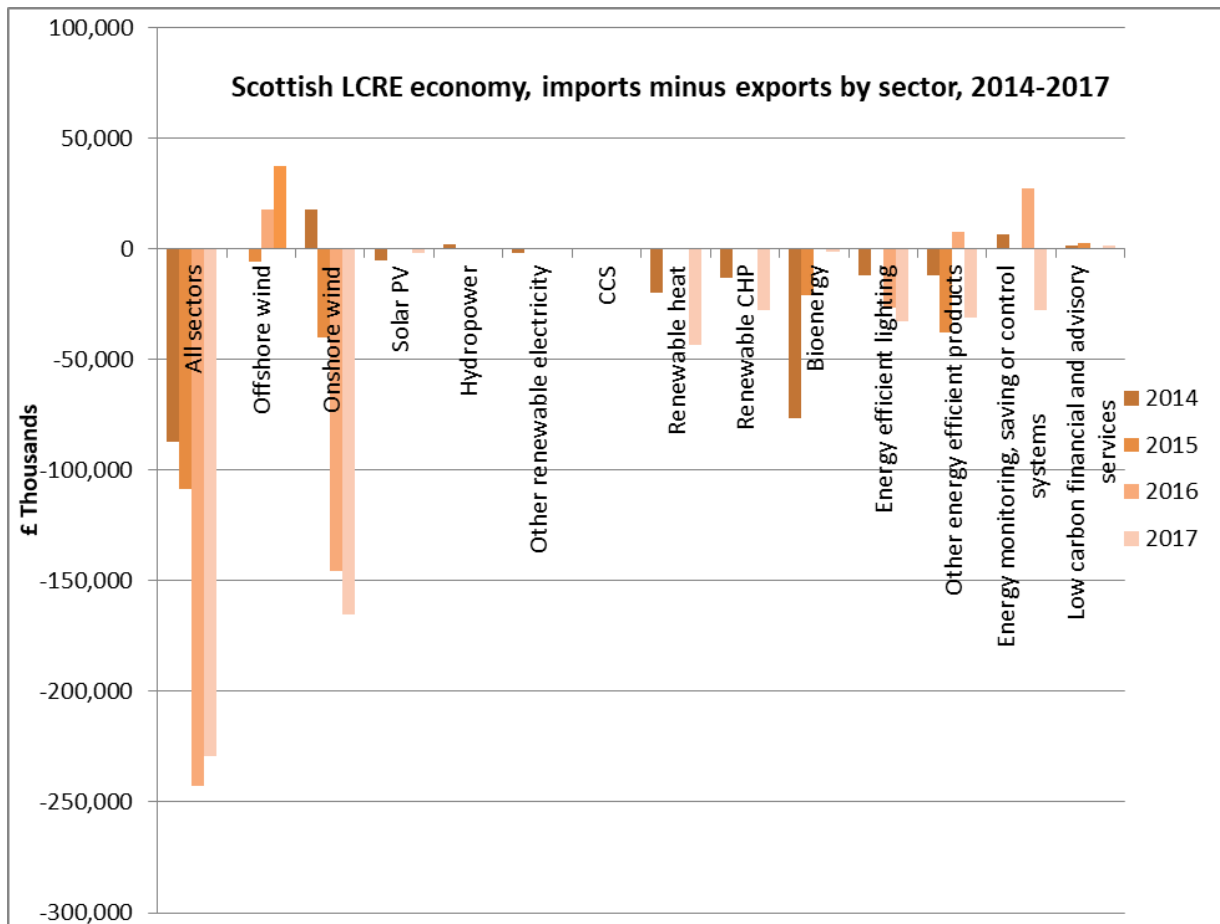
They went on to state:

“We believe that there is a need for a better understanding of these potential economic impacts and recommend that the Scottish Executive looks into the feasibility of commissioning further work to look at how Scotland can maximise economic benefits from all of the technologies.”^{xiv}

Similarly, in 2011 Audit Scotland said:

“It is difficult to identify the number of jobs in the renewable energy sector and projections of future employment are optimistic... To ensure sustained economic benefits, there needs to be a network of Scottish companies capable of supporting the renewable energy sector (a supply chain)”.^{xv}

The above statements indicate the importance of being able to build a Scottish supply chain through producing, and ideally exporting, domestic content rather than importing content from overseas. Yet, as illustrated in the table below, the most recent ONS data indicates that the Scottish LCRE economy imports significantly more in goods and services than it exports; to the tune of -£229 million.



Source: Author's graph based on ONS data

The table shows that the trade balance fell from minus £89 million in 2014 to minus £229 million in 2017. This is largely due to increasing imports/decreasing exports in the onshore wind sector (minus £165 million, import/export balance). Only offshore wind (plus £37.5 million) and low-carbon financial and advisory services (plus £1.5 million) exported more than they imported in 2017. Whether this positive trade balance for the offshore wind sector remains the same in 2019 is unclear given a number of recent offshore wind contracts which have been won by overseas firms over firms such as BiFab which employ workers in Scotland.^{xvi}

Current projects illustrating continued failure

A number of current renewable energy development projects illustrate the failure to build a domestic industrial base and an over-reliance on imported goods and services. The projects below give a flavour of the web of financial interests which leads to overseas state-protected, loss making industries gaining an uncompetitive advantage within Scotland's LCRE economy, while simultaneously driving down working conditions.

Moray East Windfarm

100 turbines off the coast of Caithness are being built by a consortium involving Portugal's main energy firm EDPR, French utility Engie and Diamond Generating Europe, a subsidiary of Japanese firm Mitsubishi Corporation.^{xvii} The blades are being built by Danish company, MHI Vestas Offshore Wind – a joint venture between Vestas Wind Systems and Mitsubishi Heavy Industries. MHI Vestas have a plant in the Isle of Wight that employs 300 people.^{xviii} Under the previous ownership of Vestas the Isle of Wight plant was closed in 2009, leading to the loss 425 jobs (and a high profile 18 day blockade by workers and activists).

The wind turbine jackets are being handled by a 'first tier' Belgian procurement contractor called Deme. Deme awarded the contract for 45 jackets to Lamprell – a company in the United Arab Emirates.^{xix} Lamprell made a 98m dollar loss on its contract for 60 jackets for Scottish Power Renewables, developer of the East Anglia One wind array,^{xx} suggesting it does not have a great track record in wind turbine jackets.

It is understood that the windfarm's operations and maintenance base will be located in Fraserburgh, while Invergordon's Port of Cromarty Firth will be used for storing parts for construction.^{xxi}

Kincardine Offshore Wind Limited (KOWL)

A joint Spanish venture involving Navantia, who build warships for the Spanish navy, and wind company Windar, were recently awarded the contract to build platforms for a trial floating windfarm south-east of Aberdeen, being developed by Kincardine Offshore Wind Limited (KOWL).^{xxii}

KOWL is majority-owned by Spanish company, Cobra Wind. It contracted SENER, a Spanish engineering firm, familiar with Navantia, to handle the procurement and production. State-owned Navantia has made substantial losses while diversifying into offshore renewables, suggesting that the contract award has not been made based on a strong record. In 2018, it was estimated to be 390m euros in the red.^{xxiii}

Floating wind turbine technology has the potential to be a major growth area in offshore renewables, so this contract could put Navantia at a competitive advantage, demonstrating skills and know-how in future bids.

Beatrice Offshore Windfarm Limited (BOWL)

In October 2018, an investigation by the Guardian found that a number of migrant workers on the £2.6 billion Beatrice offshore windfarm development in the Moray Firth were being paid less than the minimum wage.^{xxiv}

The project team is a joint venture led by owners SSE (40%) along with Copenhagen Infrastructure Partners (CIP) (35%) and Red Rock Power Limited (25%), the European subsidiary of Chinese company SDIC Power. SSE subcontracted part of the construction to Seaway Heavy Lifting (SHL), a subsidiary of Subsea 7 (a company registered in Luxembourg with operational headquarters in London).^{xxv} SHL issued contracts to Russian and Indonesian workers for 12-hour days, seven days a week at a rate of between £58-68/day (e.g £4.83-5.67 an hour, significantly lower than the national minimum wage).

Initially brought into the country on seafarer identity documents which are intended for crew leaving UK waters immediately, a number of Russian workers were detained by immigration officials at Aberdeen airport in April 2017. The Home Office subsequently gave a six-month, time-limited waiver to the windfarm industry to use non-EEA workers. This has since been extended twice and is valid until April 2019. The Home Office said it:

“agreed to grant a concession as a temporary arrangement, outside of the immigration rules, to workers deemed to be essential to the construction and maintenance of wind farms within territorial waters. This temporary arrangement was put in place to give the industry the opportunity to regularise its arrangements for their employees. The continued need for the concession is kept under review.”^{xxvi}

Afton Windfarm

In January 2018, Ronnie Alexander, a 74-year-old security guard employed by CSM Facilities, died after being caught in heavy snow at Afton Windfarm, which was under construction near New Cumnock in East Ayrshire. Construction firm Farrans was the principal contractor of both sites, with overall responsibility for health and safety, and the BBC reported that the incident was being investigated by the Health and Safety Executive (HSE) and that the family wanted answers.^{xxvii}

The Afton windfarm was bought by InfraRed Capital Partners in 2016 from the energy giant E.ON who had secured full planning consent.^{xxviii} It has since been sold to Red Rock Power, the European subsidiary of Chinese company SDIC Power.^{xxix} The turbines were built by Spanish company Gamesa and the power is sold under a 15-year agreement with the Danish trading house NEAS (a 100% subsidiary of the Centrica Group). Red Rock also have a 25% stake in the Beatrice Offshore Windfarm,^{xxx} and are proposing an offshore windfarm 15 km off the Angus coastline.^{xxxi}

Health and Safety

The incident at Afton followed the deaths of 37-year old Joao Da Silva Linares, from Portugal, following an accident inside a turbine at Kilgallioch windfarm and the death of a 32-year old Spanish worker who fell from a turbine at Whitelee windfarm in March 2017.^{xxxii}

G+, the global offshore wind health and safety organisation, reported that in 2016 in the UK offshore wind industry there were: 737 reported incidents; 23 total lost work day incidents; 3 incidents reported under RIDDOR; 9 incidents resulting in an emergency response or medical evacuation; 516 incidents occurred on operational sites; and 219 incidents occurred on project site.^{xxxiii}

Decommissioning

While not strictly part of the LCRE economy, decommissioning is an increasingly important part of the offshore oil and gas and renewables industries. 250 platforms, nearly 2,500 wells, connected by 7,800 kms of pipeline in the UK sector, have been earmarked for decommissioning by 2025 at an estimated cost of £17 billion. Most of this will be met by the taxpayer under generous tax relief schemes for oil and gas companies' infrastructure clean-up costs.^{xxxiv} Yet standards in the decommissioning sector are deeply concerning with reports of sub-minimum wage pay rates on specific projects, and non-compliant training standards. Rigs have been towed to Bangladesh and Indian beaches where there are serious concerns around environmental and labour regulatory standards.

In 2018, three drilling rigs stacked at Cromarty Firth were prevented from moving by the Scottish Environment and Protection Agency (SEPA) following concerns about the safety of their destination and disposal.^{xxxv} The rigs were sold by Diamond Offshore to GMS, an American company with links to India and Bangladesh.

Chinese ships subsequently sat for a month at Cromarty Firth awaiting permission to transport these rigs, despite capacity existing at local facilities in Scotland, including Cromarty Firth, Invergordon, Methill and Dundee.^{xxxvi}

The examples above illustrate that a clear over-reliance on overseas financial interests in the LCRE economy. They also illustrate that where low carbon jobs have been created, too often these have been poor quality and non-unionised. This chimes with academic studies showing that green jobs are particularly insecure and prone to the volatility of the market.^{xxxvii}

The role of policy

While climate change is seen as primarily a left-wing or progressive issue as it impacts on the poorest most, the policy response has not necessarily been left-wing or progressive. As well as the industrial issues outlined above, Macron's fuel tax rise which triggered the rise of the Gilet Jaunes, points to the risks when environmental policies are pursued within a neoliberal agenda where the costs are passed onto the working class. In the UK, an evidence review for the Joseph Rowntree Foundation in 2014 found that lower-income groups pay the most towards certain climate change policy responses, as a proportion of income, and benefit least from those policies.^{xxxviii} It is crucial that public policy does not simply pass on the costs of climate action to workers and citizens, while letting corporations off the hook.

Energy policy

In recent years energy policy towards the LCRE economy can be described, at best, as uncertain, and at worst, actively damaging.

Contracts for difference are the UK Government's main mechanism for supporting low-carbon electricity generation.^{xxxix} This involves Government auctioning off renewable projects to private developers who enter into a private law contract with the Low Carbon Contracts Company (LCCC), a government owned company, to produce energy for fifteen years. The LCCC pays developers the difference between a 'strike price', reflecting upfront project costs for investing in a low-carbon technology, and a 'market price', reflecting the average market price of electricity.

Under this scheme, generators are paid for the electricity they sell, and they are also paid the difference between the value of the electricity sold and the available capacity.

The Government says this incentivises investment in renewable energy while protecting consumers. The reality however is a complicated market-based system where the Government pays to take electricity generation and pays to refuse it. As Trade Unions for Energy Democracy (TUED) state:

“By locking in both volume and price for sales of new low-carbon generation at non-market prices, for fifteen years, these agreements effectively established a long-term, guaranteed, risk-free, publicly subsidised income stream for producers.”^{xi}

What’s more, the contracts push risk down the supply chain, to sub-contractors and ultimately workers. Significant volumes of work in the LCRE economy is based on driving down labour costs and limiting direct employment.

Besides contracts for difference, the Government pay power stations ‘capacity payments’ not for energy generation but energy capacity. They also pay renewable generators ‘constraint payments’ in order to not produce power when it is not needed. The result is an expensive, marketised energy system which doesn’t deliver the infrastructure needed for decarbonisation and doesn’t protect consumers. Contracts for difference are funded entirely through a levy on consumers’ bills rather than through general taxation, disproportionately impacting on low-income households.

While much of the primary responsibility for energy policy sits at UK Government level, the Scottish Government has proposed establishing a Publicly-Owned Energy Company.^{xii} This could play an important role in developing renewable energy while capturing value from the LCRE economy. However current plans for a white-label retail supplier are far too timid and will do little to change the generation mix or the nature of ownership within the LCRE economy.^{xiii}

Industrial strategy

In the early 1980s, James Howden & Co Ltd in Glasgow was at the forefront of wind turbine manufacturing, supplying the UK’s first wind turbine in the utility industry.^{xiiii} However, the company lost Government support and stopped producing turbines in 1989.

The main beneficiaries were the Danish manufacturing industry, who were also early adopters and heavily backed by Government.

There is a need for much greater state-led research and development funding. Public investment has led to the successful development of unproven technologies before, and must do so again.

A sustainable industrial strategy must also address the offshoring of emissions. While much is made of Scotland's progress on climate change, with emissions having fallen by 49% since 1990, our emissions associated with consumption (e.g emissions generated at home and abroad in the production and transport of the goods and services that we consume) have only reduced by 8.6% between 1998 and 2014.^{xliv} Emissions reductions which come about through deindustrialisation and globalisation are not sustainable or socially just for Scotland or for the rest of the world. There is clear need to build an industrial base and ensure that Scotland maximises the domestic supply chain benefits in the LCRE economy.

The Scottish and UK Government both support 'maximising economic recovery' for oil and gas reserves, yet neither seem to have a policy of maximising economic benefit from the LCRE economy. While much of the primary responsibility for industrial policy sits at UK Government level, the Scottish Government has also heralded inward investment into the LCRE economy without the requisite focus on socio-economic benefit for workers and communities. It is now time for the Scottish Government to look at the powers it has in relation to procurement, planning, licencing and a number of other areas to ensure that LCRE developments bring far greater socio-economic benefit to communities.

One area that should be explored further is energy consents. Currently the Scottish Government gives consent to certain energy infrastructure applications, including electricity generating stations over 50MW. While a number of consents contain requirements about local construction and socio-economic benefit, in practice these requirements are often not upheld, with the Scottish Government claiming the requirements are not legally enforceable in Scotland. One way around this may be to include requirements relating to the carbon footprint of construction. There are also issues with the resourcing of Local Authorities who, due to cuts, often lack capacity to effectively process renewable energy project planning applications which they are responsible for.

Investment

Last year, the House of Common's Environmental Audit Committee reported that green energy investment in the UK has collapsed.^{xlv} The current system is not driving the investment needed to meet climate change targets.

While the Scottish Government's monetary powers are limited, their plans for a Scottish National Investment Bank provide an opportunity for public investment to build and capture value from the LCRE economy.^{xlvi} However current proposals are far too timid given they do not include: full borrowing powers, the ability to lend to the public sector, or a built-in focus on climate change, inequality, and fair work.^{xlvii}

Ownership

A lack of concern about ownership leads to a plethora of overseas financial interests within the Scottish economy. This leads to the offshoring of jobs and tax revenues; limits transparency and lessens the accountability that workers, communities and Government hold over multinational companies.

There are clear risks associated with allowing nationally important energy assets to be shaped and controlled solely by private interests. There are also lessons to be learned from recent experience in the fossil fuel industry where large multinational companies and individuals responsible for nationally important assets have leveraged increased tax payer investment using the threat of disinvestment and offshoring. The LCRE economy is vital to Scotland's energy and climate change strategy, it is therefore equally vital that the Scottish Government regains control of its future direction.

Positive examples

There are, however, a number of examples of socially just climate action in the UK including: community-owned renewables in many parts of Scotland, retrofitting housing stock Kirklees,^{xlviii} Nottingham Council's Robin Hood energy company; and London's congestion charge (which was coupled with increased investment in public transport and active travel to ensure it disproportionately benefited low-income households). In other parts of Europe, nationally owned energy companies; energy efficiency regulation; and regional investment banks all promote more socially just climate policies.

When developed effectively public policy can direct action against climate change in a socially just manner.

Conclusions

Past predictions of employment in the LCRE economy have not translated into the jobs boom promised. The LCRE economy is characterised by overseas financial interests, a limited industrial base and precarious work.

This is a failure of industrial policy that means workers, businesses and Government in Scotland do not benefit from Scotland's natural resources. It has serious implications not only in terms of jobs but also in terms of tax revenues, transparency, and economic democracy.

Scotland can do better. A proper industrial policy considering procurement, planning, licencing powers, public ownership and investment must be pursued if we are not to repeat the mistakes of the past.

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References

ⁱ Scottish Executive (2004) 'Harnessing Scotland's Marine Energy Potential, Marine Energy Group (MEG) Report'

<https://www.webarchive.org.uk/wayback/archive/20180518072540/http://www.gov.scot/Publications/2004/08/19742/41046>

ⁱⁱ Department of Trade and Industry in partnership with Scottish Executive, Highlands and Islands Enterprise and Scottish Enterprise (2004) 'Renewable Supply Chain Gap Analysis'

<https://webarchive.nationalarchives.gov.uk/+http://www.dti.gov.uk/files/file15401.pdf>

ⁱⁱⁱ Scottish Government (2010) 'A Low Carbon Economic Strategy for Scotland: Scotland - A Low Carbon Society'

<https://www.webarchive.org.uk/wayback/archive/20170701074158/www.gov.scot/Publications/2010/1/15085756>

^{iv} Scottish Government (2011) '2020 Routemap for Renewable Energy in Scotland'

<https://www2.gov.scot/Publications/2011/08/04110353/0>

^v Scottish Government (2017) 'Scottish energy strategy: Scotland's Energy Efficiency Programme (SEEP)'

<https://www.gov.scot/publications/scottish-energy-strategy-future-energy-scotland-9781788515276/>

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- ^{vi} ONS (2019) 'Low carbon and renewable energy economy, UK: 2017'
<https://www.ons.gov.uk/economy/environmentalaccounts/bulletins/finalestimates/2017>
- ^{vii} Businesses are asked which sectors they operate in and then how many full time equivalents (FTEs) work in this sector. It include all employees paid directly from payroll(s).
- ^{viii} The survey sample size was reduced from around 40,000 in 2014 to around 14,000 in 2015-17. This has increased the coefficient of variation (CV) of many estimates. The CV is a measure of the standard of error of an estimate, with smaller CVs being more accurate than larger CVs. A rough guide to CVs is: less than 10% is very good, 10% is good, 20% is acceptable. CVs that are greater or equal to 20% should be used with caution. CVs in the Scottish data used in this report range from 7% to 35%. For more information see ONS (2016) 'Low Carbon and Renewable Energy Economy (LCREE) Survey QMI'
<https://www.ons.gov.uk/economy/environmentalaccounts/qmis/lowcarbonandrenewableenergyeconomy/lcreesurvey>
- ^{ix} ONS (2019) 'Low carbon and renewable energy economy final estimates'
<https://www.ons.gov.uk/economy/environmentalaccounts/datasets/lowcarbonandrenewableenergyeconomyfirstestimatesdataset>
- ^x ONS (2019) 'Low carbon and renewable energy economy indirect estimates'
<https://www.ons.gov.uk/economy/environmentalaccounts/datasets/lowcarbonandrenewableenergyeconomyindirectestimatesdataset>
- ^{xi} ONS (2019) 'Low carbon and renewable energy economy final estimates'
<https://www.ons.gov.uk/economy/environmentalaccounts/datasets/lowcarbonandrenewableenergyeconomyfirstestimatesdataset>
- ^{xii} ONS (2019) 'Low carbon and renewable energy economy, UK: 2017'
<https://www.ons.gov.uk/economy/environmentalaccounts/bulletins/finalestimates/2017#exports-from-the-uk-low-carbon-and-renewable-energy-economy-grew-to-50-billion-in-2017>
- ^{xiii} All figures come with what are called 'coefficients of variation' CV which estimate the accuracy of the figure. The higher the figure, the more subject to error it is. The 1,900 figure has a 35% CV, which is particularly poor. Anything over 20% should be used with caution.
- ^{xiv} FREDs (2005) 'Scotland's Renewable Energy Potential: Realising the 2020 Target'
<https://www.webarchive.org.uk/wayback/archive/20180519015759/http://www.gov.scot/Publications/2005/09/09144010/40137>
- ^{xv} Audit Scotland (2013) 'Renewable Energy' http://www.audit-scotland.gov.uk/docs/central/2013/nr_130912_renewable_energy.pdf
- ^{xvi} See for example Fraser, D (7 March 2018) *BBC Scotland* 'BiFab 'loses out' on 'vital' wind farm contract' <https://www.bbc.co.uk/news/uk-scotland-scotland-business-47478083>
- ^{xvii} <https://theenergyst.com/engie-signs-15-year-ppa-moray-offshore-windfarm/>
- ^{xviii} MHI Vestas (2018) <http://www.mhivestasoffshore.com/mhi-vestas-launches-major-recruiting-effort-at-isle-of-wight/>
- ^{xix} Lamprell growth strategy appears to be focussed on Saudi Arabia and it has recently teamed up with Asyad Holdings <https://www.offshoreenergytoday.com/lamprell-taking-steps-to-qualify-as-contractor-to-saudi-oil-gas-giant/>
- ^{xx} Fraser, D (10 March 2018) *BBC Scotland* 'Offshore wind offshored' <https://www.bbc.co.uk/news/uk-scotland-scotland-business-47511310>

-
- ^{xxi} BBC Scotland (6 December 2018) 'Moray East consortium places order for 100 wind turbines' <https://www.bbc.co.uk/news/uk-scotland-scotland-business-46467373>
- ^{xxii} Wind Power Offshore (25 February 2019) <https://www.windpoweroffshore.com/article/1562734/worlds-largest-floating-site-foundation-contract-awarded>
- ^{xxiii} Fraser, D (10 March 2018) *BBC Scotland* 'Offshore wind offshored' <https://www.bbc.co.uk/news/uk-scotland-scotland-business-47511310>
- ^{xxiv} Guardian (2018) <https://www.theguardian.com/uk-news/2018/oct/21/migrants-building-beatrice-windfarm-paid-fraction-of-minimum-wage>
- ^{xxv} Seaway Heavy Lifting <https://www.seawayheavylifting.com.cy/our-tradition>
- ^{xxvi} Guardian (2018) <https://www.theguardian.com/uk-news/2018/oct/21/migrants-building-beatrice-windfarm-paid-fraction-of-minimum-wage>
- ^{xxvii} BBC Scotland (March 2018) 'Family want answers over death in snow on wind farm' <https://www.bbc.co.uk/news/uk-scotland-glasgow-west-43099751>
- ^{xxviii} The Herald (September 2016) 'InfraRed buys Afton Wind Farm from E.ON' https://www.heraldscotland.com/business_hq/company_news/14754477.infrared-buys-afton-wind-farm-from-eon/
- ^{xxix} RENEWS.BIZ (November 2018) 'Red Rock makes onshore move' <https://renews.biz/50045/red-rock-makes-onshore-move/>
- ^{xxx} Insider (November 2018) 'Red Rock Power appoints Guy Madgwick as chief executive' <https://www.insider.co.uk/appointments/red-rock-chief-afton-windfarm-13589058>
- ^{xxxi} Inch Cape Offshore Limited, <http://www.inchcapewind.com/about-the-project>
- ^{xxxii} IOSH Magazine (2017) 'Windfarm safety criticised after two workers killed in a fortnight' <https://www.ioshmagazine.com/article/windfarm-safety-criticised-after-two-workers-killed-fortnight>
- ^{xxxiii} G+ (2016) 'UK Offshore wind health and safety statistics 2016 report' https://publishing.energyinst.org/_data/assets/file/0007/330964/UK-Offshore-wind-health-and-safety-statistics-2016-report.pdf. Note: more recent data is behind a paywall
- ^{xxxiv} The GMB estimate total decommissioning costs to be more than £100 billion, with the UK Government liable for 50-75% of the cost of this. *CRF Consultants for the GMB* (2016) 'Status Capacity and Capability of North Sea Decommissioning Facilities' <http://www.gmbscotland.org.uk/newsroom/gmb-calls-for-government-investment-in-north-sea-decommissioning>
- ^{xxxv} STV news report (2018) 'Oil rigs barred from leaving port by environment watchdog' <https://stv.tv/news/north/1406267-oil-rigs-barred-from-leaving-scotland-amid-fears/>
- ^{xxxvi} The Press and Journal news report (2018) 'Heavy lift transport ship sails without cargo' <https://www.pressreader.com/uk/the-press-and-journal-north-east/20180213/281621010799666>
- ^{xxxvii} Connolly, K et al (2016) The evolution of green jobs in Scotland: A hybrid approach <https://www.sciencedirect.com/science/article/pii/S0301421515301725>
- ^{xxxviii} JRF (2014) 'Climate change and social justice: an evidence review' <https://www.cse.org.uk/projects/view/1237>
- ^{xxxix} UK Government (2019) 'Contracts for Difference' <https://www.gov.uk/government/publications/contracts-for-difference/contract-for-difference>

-
- ^{xi} Trade Unions for Energy Democracy (2017) 'Preparing a Public Pathway: Confronting the Investment Crisis in Renewable Energy' http://www.rosalux-nyc.org/wp-content/files_mf/tuedworkingpaper10.pdf
- ^{xii} Scottish Government 'Public Energy Company' <https://www.gov.scot/policies/home-energy-and-fuel-poverty/public-energy-company/>
- ^{xiii} See for example STUC (2018) Response to the Economy, Energy and Tourism Committee call for views on a Publicly Owned Energy Company https://www.parliament.scot/S5_EconomyJobsFairWork/Inquiries/EEFW-S5-18-POEC-17-STUC.pdf
- ^{xiii} <https://www.howden.com/en-gb/about/timeline>
- ^{xiv} Scottish Government 'National Indicator: Carbon Footprint' <https://www2.gov.scot/About/Performance/scotPerforms/indicator/carbon>
- ^{xv} Environmental Audit Committee (2018) 'Green finance: mobilising investment in clean energy and sustainable development' <https://www.parliament.uk/business/committees/committees-a-z/commons-select/environmental-audit-committee/news-parliament-2017/green-finance-report-published-17-19/>
- ^{xvi} STUC (2018) response to the Scottish Government consultation on the Scottish National Investment Bank https://consult.gov.scot/economic-policy-unit/scottish-national-investment-bank-1/consultation/view_respondent?uuld=561412938
- ^{xvii} Scottish National Investment Bank Bill (2019) <https://www.parliament.scot/parliamentarybusiness/Bills/111153.aspx>
- ^{xviii} Webber, P et al (2015) 'The impacts of household retrofit and domestic energy efficiency schemes: A large scale, ex post evaluation' <http://eprints.whiterose.ac.uk/90726/1/1-s2.0-S0301421515001706-main.pdf>