

Dr Grant Allan and Dr Andrew Ross

Fraser of Allander Institute, Department of Economics, University of Strathclyde

The low carbon transition calls for '[system change](#)' as Greta Thunberg, the 16-year-old Swedish climate activist, puts it so eloquently. Despite of the progress made, e.g. the phasing out of coal, a 100% low-carbon energy future is still a [long way off](#) for the UK. It is clear, however, that changes in energy supply in the coming decades are likely to have major economic implications.

[In our research, we examine](#) the scale as well as the skill characteristics of employment related to current energy activities in the UK. This helps to understand the possible employment consequences of this transition.

By evaluating the level of employment directly in three energy activities - Oil & Gas Extraction, Electricity, and Gas - as well as employment supported by these activities in the rest of the economy - we make a number of important observations.

- We identify the employment in and supported by existing energy activities in the UK
- We capture the occupation and skill characteristics of this employment
- The system-wide demands for skills can change the pattern of labour market needs
- This has implications for labour market planning in the low carbon transition.

First, employment in the three identified energy activities is relatively small as compared to other key sectors of the UK economy. However, the number of jobs supported throughout the economy by these energy activities is a significant multiple of the employment in these sectors.

For the 'Electric power generation, transmission & distribution sector'[1] almost 7 jobs in the wider economy are supported by each 1 in that sector, with this ratio being even higher for 'Oil & gas extraction' - in part due to that sectors strong connections to other sectors of the economy.

This reinforces the important economic role of energy activities in the UK, and their embeddedness in the UK economy through highly developed supply chains.

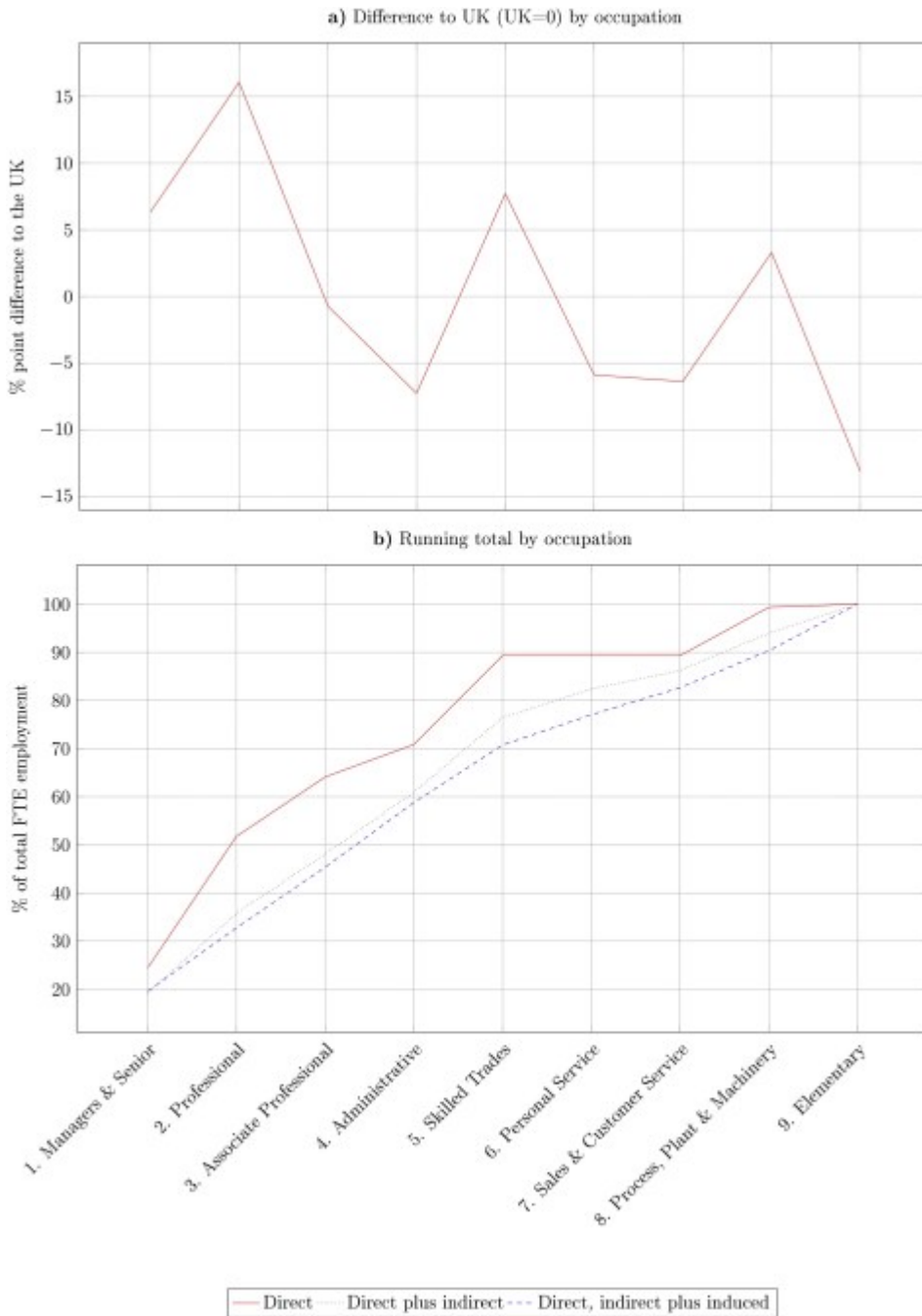
Second, we show the spectrum of occupation types and educational qualifications within - and supported by - activities in each sector. We can see for instance how the Oil & gas extraction sector has a significant share of direct employment at higher occupation categories.

*Fig. 1a* gives an illustration of this by reporting the proportion of each occupation type in that sector relative to overall UK employment as a whole. In the Oil & gas extraction sector, the proportion of people employed in Manager & Senior occupations (Category 1) is eight percentage points greater in that sector as compared to the UK. Employment in the sector is also “over-represented” relative to the UK average at ‘Process plant and machinery’ and ‘Skilled trades’ occupations.

Similar results for other sectors suggest that a more nuanced message around the skills classification of particular sectors would be useful.

**Figure 1:** Direct, indirect, and induced employment by occupation for the Oil & gas extraction sector.

## The transition to a low carbon energy future and its employment implications



Third, we identify the occupation and educational qualifications supported elsewhere in the economy by individual sectors. Critically, we show that there are significant impacts across employment by occupations and educational qualifications through the rest of the economy. We demonstrate, for instance, sectors with higher representation at upper and lower occupation categories lead to changes across all occupation types once the economy wide effects are captured.

*Fig. 1b* illustrates this by giving a running total, summing up the shares of total supported employment in total direct (i.e. the sector itself) and direct + indirect, and direct + indirect plus induced employment, capturing the economy wide impacts. The graph shows that around 50% of total direct employment is covered by the first two occupation types - Managers & senior, and Professional occupations. Similarly, around 90% of total direct employment is covered by the first five occupation types.

An important policy recommendation follows from this point. Changes in the level of activity in energy activities will have important consequences for the demand for labour throughout the economy, not only in the energy sector.

Our analysis also suggests that there will be important links between the level of labour demand and the need for different 'skill' levels, taking into account sectoral characteristics of employment. It is evident that the system-wide demands for skills - including not only the direct, but also knock-on effects across the economy - can change the pattern of labour market needs, which have implications for labour market planning in the low carbon transition.

As such, it is important to consider the employment consequences of the low carbon energy transition now rather than later as it will require significant foresight by policy makers to identify and meet future labour market requirements.

The paper in *Energy Economics* is accessible from <https://doi.org/10.1016/j.eneco.2019.03.017> and the previous discussion paper is available from <https://strathprints.strath.ac.uk/65671/>.

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[1] We cannot currently go below this level of aggregation with existing economic accounts to, for instance, individual technologies, e.g. offshore wind generation.

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