

How to Cite:

Steve Shelley, 'More and better jobs in a low carbon future: provocations and possibilities', 35th International Labour Process Conference, '*Reconnecting work and political economy*', Sheffield, April 2017.

Document Version:

This is the Accepted Manuscript version.

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**More and better jobs in a low carbon future:
provocations and possibilities**

Paper presented to the 35th International Labour Process conference,
University of Sheffield, 4th-6th April 2017
'Reconnecting work and political economy'

Stream:
**'A volatile political economy: Work, climate change and labour: labour
process perspectives'**

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More and better jobs in a low carbon future: provocations and possibilities

1. Introduction

The aim of this paper is to examine the scope for net job creation and improvement in working conditions whilst tackling climate change with far-reaching carbon reduction initiatives. The rationale for the paper comes from a growing sense of the limitations of current political and economic initiatives, and of a disconnect between the discourse and policies of work and employment with those of carbon reduction, environmental science and associated fields. It thus sets out to do the following.

Lay out the extent of carbon reduction required for global sustainability, and the contrasting schools of thought about how to attain such a reduction.

Analyse the extent and ways in which literatures and perspectives on work and employment relate to these carbon reduction schools of thought.

Adopt a provocative stance, to be progressive in the carbon reduction agenda with a more holistic approach across environmental and related societal outcomes.

Explore the nature and extent of altered understandings of work which may be required to follow this provocative position. In particular, the paper is interested in the quantity, location and quality of jobs and of work more widely interpreted. Its provocative position suggests possibilities for improvement in the quality of work.

By the end, the intention is to begin to lay out the possibilities for wide scale change in work and employment, and the challenges in front of us. In particular, in the final section, it seeks to understand how changes to work and employment required for substantial carbon reduction might be enabled through policy changes and activism inspired by a combination of degrowth, basic income and localisation thinking. It is from 'degrowth', and specifically Latouche's (2010) position, that the paper takes the invitation to 'provoke'.

Such changing conceptions of work provide challenges for labour process thinking and for organised labour in such a context.

With the paper positing a future changed scenario, the method used is entirely literature analysis, drawing upon policy documents and position-pieces, and published small scale empirical studies as examples of possibilities.

From a personal perspective, the paper stems from my involvement with the Centre for Alternative Technology (CAT), beginning with my engagement with CAT's 'Zero Carbon Britain: rethinking the future' report (Allen et al, 2013). This led to my contribution to 'Zero Carbon: Making it Happen: multi-disciplinary investigation' initial findings report (Allen et al, 2015) which was taken to COP21 UN Climate Talks in Paris December 2015; and my subsequent contribution to the 'Zero Carbon: Making it Happen' full report (CAT, 2017) published March 2017. The paper presented to this 2017

International Labour Process conference reflects on my previous work, and develops a number of policy, empirical and conceptual challenges to take forward.

2. Carbon reduction aims and approaches

The Climate Change Act of 2008 targets the UK for a reduction in carbon emissions of at least 80 per cent of their 1990 value by 2050 (DECC, 2011; Allen and Varga, 2014). However, there are different paths to low carbon futures (Tonn, 2014). These seem to broadly fall into two categories. Firstly the steady progress scenario, also a production scenario (Neuvonen et al, 2014) featuring work on technical innovation to produce low carbon energy and which may or may not to varying degrees feature maintenance of a mainstream and largely undisturbed view of future lifestyles, society and economy, working on an assumption that we can continue to live pretty much as we do now, but with alternative technologies enabling this. Secondly, proposals that address lifestyle aspects of lower carbon living ie. a consumption scenario (Neuvonen et al, 2014).

Current mainstream thinking suggests that the UK should be planning to meet the carbon reduction target by 2050 but do so whilst pretty much retaining current lifestyles, society and economy (Allen and Varga, 2014; DECC, 2011) by doubling electricity consumption as fossil fuel heating and transport is replaced and by almost total decarbonisation of electricity production by 2030 (Committee on Climate Change, 2012; in Allen and Varga, 2014). The assumption is that that this can be planned and managed by renewable and nuclear electricity production, with Allen and Varga (2014) proposing a model for which generating plants and networks to put where and when in a step-by-step plan to change energy production.

In contrast to such mainstream thinking, research reported in the 'Zero Carbon Britain' (ZCB) report (Allen et al, 2013) by the Centre for Alternative Technology (CAT) has suggested that UK greenhouse gas emissions could be reduced to net zero by 2030. The significance of the ZCB report is two-fold. Firstly, it recognises energy security, high cost, risk and environmental concerns of the mainstream thinking. Secondly, it suggests a more fundamental change than the mainstream reports, as despite its title, ZCB takes a global perspective. It recognises the UK's place and responsibility in the global context, the point here being that as far as ZCB is concerned Western developed countries have to reduce carbon emissions much more substantially and quickly than current plans in a context where developing countries' emissions are likely to keep growing for a number of decades yet. Such plans for carbon emissions peaks and reductions may have moved a step closer in December 2015 at the UN Climate Change conference COP21 in Paris.

In summary, ZCB argues that current plans and models for carbon reduction are not fundamental enough, nor substantial enough quickly enough. It indicates that approximately 82% of all UK GHG emissions come from producing energy, that 90% of our energy comes from fossil fuels, and that a zero carbon scenario could be achieved by reducing energy demand by 60%, by using renewable energy resources instead of fossil fuels and by making changes to agricultural systems and diets. Thus ZCB places emphasis on four aspects of contributions to carbon reduction. 'Powering down'

energy demand and reduced consumption, 'powering up' renewable energy supply, with associated changes in diet and diversified land use (Allen et al, 2013).

Being ambitious, this paper takes a focus on ZCB report, to set this up as a radical, almost provocation end point, in the way it may be seen to offer a holistic and globally-responsible blueprint for carbon reduction and one which will likely mean social, economic and lifestyle change.

3. Work and employment, and carbon reduction futures: connections and disconnections

Current literature on work and employment does not adequately cover this breadth and extent of change, due to issues of relative short-termism, partial insights (limited typically to formal 'green' sectors of the economy), and the way in which employment and carbon reduction policies and literature largely do not engage with each other. This disconnect has been expanded upon in an earlier paper (Shelley, 2015). For brevity, the key points from that paper are summarised here.

What we can term government-business sources include government agencies (the former UKCES) and departments (the former BIS), employer sources particularly the Sector Skills Councils (SSCs), and business oriented academic sources. Despite their titles the UKCES Future of Work report (Beck et al, 2014) and its Futures Programme (UKCES, 2014) only very marginally and partially acknowledge environmental issues. They combine 'resources and the environment' in one of a number of potential 'disruptions' for the future, but place most emphasis on raw material resource scarcity and implications for businesses to be more innovative. A minor mention is made of the construction industry and workers needing to retrain to fit and retrofit new technologies in renewable energy (solar only is mentioned) and buildings' energy efficiency. Although it creates four potential future scenarios for work, one of which it labels 'business as usual' and the other three as more 'radical', all appear to be located within a business-driven context of continued economic growth, industrial production and consumption lifestyle. It is oriented to the government department world of BIS, and then to existing employers' industrial sectors, with no acknowledgment of the more holistic changes proposed by ZCB nor the policies needed to work across government departments (Shelley, 2015).

More detailed planning for workforce development is devolved to employers, specifically their employer representative bodies the Sector Skills Councils (SSCs). Of the 22 SSCs, the work of nine in particular was reviewed because they were regarded as potentially relevant to the types of work likely to change in future zero carbon futures. The nine being Cogent, the Construction Industry Training Board, Energy and Utilities Skills, Improve Ltd, Lantra, People 1st, Semta, Skills for Logistics, Summit Skills. Predominantly any forward planning from these industries is at too general a level, of skill abstraction and classification, to be meaningful in identifying work issues in a carbon reduction scenario, and minor predicated changes in direction are not sufficient to fit with the scale of change required in the ZCB provocation scenario (Shelley, 2015) as pursued by this paper.

From the academic business literature, Gratton (2010) investigates the future of work, but from the perspective of private business. How can companies organise their resources to 'future proof' the company. One of her 'five forces' for change is indeed 'low carbon developments'. However, within this she simply accepts that "the world will have heated up, with sea levels rising and climates

changing” (p.20), together with likely carbon taxes, but her interpretation and indeed the whole thrust of her report is on the nuisance this causes companies as their costs increase or they are forced to look at alternative ways of working. Her tenor is to look at how to enable businesses to carry on doing what they are doing, as profitably as possible.

Gratton’s substantial point for the future of work is there will be a greater emphasis on technology-enabling connectivity and flexibility in terms of networks, teleworking and homeworking. Although focusing more on work and workers’ experience, and less explicitly written from a business agenda, Donkin (2010) gives scant consideration to energy and environmental changes. Similar to Gratton, most work changes envisaged here are as a result of technological change enabling greater automation and time and location flexibility, within a business as usual political economic context. Both Donkin and Gratton seem to address a working world entirely inhabited by professional and digitally-based work and workers, and benign ‘good practice’ employers, largely neglecting manual, face-to-face and service support work and more substantial shifts in work restructuring (Shelley, 2015).

Another source included in Shelley’s (2015) previous paper is The Campaign against Climate Change Trade Union Group’s publication ‘One Million Climate Jobs’ (CaCCTUG, 2014). This multi-union group affiliated to the Campaign against Climate Change campaigns to increase jobs in sectors that will contribute to climate change abatement. Their report particularly highlights the potential for 900,000 new jobs in renewable energy, building retrofitting, and a mass electricity-powered public transport system, plus 100,000 new jobs in industry, training and education, and agriculture and waste.

Insofar as CaCCTUG features an emphasis on powering down energy demand and powering up renewable energy, Shelley (2015) found a degree of similarity with ZCB. However, Shelley (2015) also found differences and contestation within the trade union and labour movement. Where ZCB is non-nuclear and non-fossil fuel, CaCCTUG kept open the options for carbon capture and ‘clean’ coal and gas power stations, and nuclear; in fact it admits that the contributors to the report are of divided opinions on these sources (p.25), echoed by discussion at the TUC conference in November 2014 where it is made clear that TUC policy is pro-nuclear despite the views of many delegates (TUC, 2014a), and placing jobs before planet (TUC, 2014b). Shelley (2015) also found CaCCTUG not nearly as far reaching as ZCB in terms of lifestyle, diet and land use change nor therefore resultant work changes.

Whilst taking an environmental stand, CaCCTUG (2014) is strongly linked to what might be called ‘conventional’ employed jobs, industrial (with a strong emphasis implied on ‘building’ things), employment (and re-deployment of displaced carbon industry workers) in a ‘National Climate Service’ in effect a nationalised industry of direct government employment across the diversity of climate jobs. It suggests a centralised coordinated economy stance, with continued lifestyles as usual, and it places an emphasis on “secure, flexible, permanent jobs..... safe and decently paid” (CaCCTUG, p.5), but without the reach into a wider range of alternative forms of employment, work and income now considered by this paper.

Overall, in the context of the provocation put forward by this paper there is a disconnect between conventional employment policy and literature, and the scale, breadth and timescale of work and employment changes suggested by Allen et al (2013) for large scale carbon reduction. Shelley (2015)

concluded that the environmental and carbon reduction agenda had not entered the mainstream work and employment policy realm in any substantial way, and found only relatively short term planning in place, little evidence of planning for a future labour force restructure around a move to a green economy, and even less (none) for a readjustment to more fundamental life and workstyle changes that may well be required within a future reduced or zero carbon scenario. Business oriented future of work studies also largely do not engage with environmental issues, or do so only as consumer choice business agendas or as issues whose impact business must negate in order to carry on as usual. Where they address issues of work, they are limited to conventional employment.

Shelley (2015) concluded that this is disappointing, but not altogether surprising. Contemporary employment policy is set within a fragmented structure of often competing government departments and industrial sector interests, with many decisions devolved by default to employers. As Klein (2014) has highlighted, the deregulated and neo-liberal political economic context is not best equipped to enable a holistic long term view, beyond relatively short term business and political interests, and in any case the corporate business lobby tends to prevail.

4. An altered understanding of work to achieve carbon reduction

“If managed properly, environmental sustainability can lead to more and better jobs, poverty reduction and social inclusion” (UNFCCC and ILO, in Figueres and Ryder, 2014).

This paper takes a more holistic view to achieve the changes required in the context of a radical carbon reduction approach. It builds on ideas of expanding and changing employment which see the linking of climate change adaptation and mitigation, biodiversity conservation and reduced environmental degradation, and the creation of green and decent jobs (Figueres and Ryder, 2014; Sustainlabour, 2016), but extends this to an altered understanding of work more broadly. This section is divided into three contributions to the debate on job growth and quality, the first beginning with a continuation of a conventional jobs and employment scenario, centralised and formalised and still to some large extent influenced by assumptions of economic growth and adaptation in a business as usual scenario. The second and third sections move further from this to discuss potential contributions from more localised employment, and then from more alternative work and organisation forms. As the paper moves through these sections, assumptions of economic de-growth begin to replace those of growth, and alternative ways of making sense of the value of work begin to emerge.

4.1. Centralised and formal employment solutions

The need for continued job creation and net job gain is predicated on the basis of continued population growth and demographic ageing (IPPR, 2016; UKCES, 2016). Beyond published economic assessments of job growth in formal green sectors (Jaeger et al, 2011), it is not possible to cite exact figures that are not simple future-based speculation, but UNEP (2008) and Martinez-Fernandes et al (2010) are confident that net jobs gains will outweigh losses, identifying four potential types of job change.

1. Additional jobs. For example, manufacturing of pollution control devices added to existing production equipment.
2. Substitution of existing jobs. Shifting from fossil fuel jobs to renewable energy jobs, from road to rail jobs, from waste land-fill and incineration jobs to recycling jobs.
3. Elimination of some jobs without direct replacement. For example jobs lost when production of packaging materials is reduced.
4. Adaptation of existing jobs. Transformation and redefining as existing skills sets and work methods are greened.

Given the scale of change required, it is likely that the types of organisations where jobs will be located and their spatial distribution, will be broader and more diverse. However, centralised solutions will almost inevitably continue to play a large part, influenced by government and industry-led change, featuring and as a result of market forces (including consumer habits and the effect of climate change itself on products and production), and regulatory and stimulus-based interventions in the economy (Martinez-Fernandes et al, 2010). These solutions are largely based on pandemic technologies (Demos Helsinki, 2012; Neuvonen et al, 2014), existing industrial models of production and ownership, and existing assumptions of economic growth and societal lifestyle as usual. Here, we see formal employment in large and medium enterprises, privately-owned but with a potential increased role for nationalised industries (CaCCTUG, 2014).

Net job creation is forecast in the 'deep green' jobs sector (BIS, 2015), "those (jobs) directly involved in manufacturing, installing, and operating the many low carbon technologies involved in the transition" (Jagger et al, 2013, p.44-45), including low carbon electricity; low carbon heat; waste processing, energy from waste and biomass; energy efficiency products; low carbon services (low carbon advice and finance); other low carbon (including low emission vehicles); and manufactured products (Jagger et al, 2013; Aldridge and Simons, 2016). There will be substantial job increases from installation and maintenance of solar PV and solar thermal systems, in retrofitting buildings and waste recycling (UNEP, 2008), with 900,000 new jobs in renewable energy, building retrofitting, and a mass electricity-powered public transport system (CaCCTUG, 2014). The significant emphasis on wind for energy generation will see 236,000 jobs created by 2030 (20,000 for onshore and 216,000 for offshore) (CaCCTUG, 2014). An increased emphasis on a 'circular economy' (The Guardian, 2016) will see design and engineering jobs created in a restorative industrial system geared to designing out waste, preparing for repair, reuse and remanufacture and for better end of life recovery, and in consumer-focused lease contract work (Andrews, 2015).

There is also likely to be significant job creation in 'light green', or 'generic' jobs (Jagger et al, 2013), a much wider range of occupations encompassing sustainability skills for "the ability to problem solve, employ critical thinking and challenge current conventions" (Aldersgate Group, 2016) in "a wide range of jobs that have some green attributes" (Jagger et al, 2013 p.44). These include generic and management skills in industry for resource efficiency, energy efficiency and dematerialisation of products; including building managers, accountants, strategic managers, technology project managers, and other technical jobs involved in adapting products and buildings – skills to support climate resilience (HMG, 2011; in Aldridge And Simons, 2016). In an urban context, job creation is likely in 'Smart Cities', where the use of intelligent technology systems will increasingly provide a digital and physical infrastructure to enhance performance quality and interconnectivity to reduce costs and resource consumption in transport, energy, healthcare and assisted independent living,

water and waste (BIS, 2013). Here, jobs will likely be created in IT and infrastructure planning, development (R&D linked to universities) and maintenance; and in enabling access to services and urban democracy and governance.

The existing private sector will continue to play a large part in providing these activities and jobs, but coordinated activities of regulation, incentivisation and delivery could well involve an expanded state sector of employment to overcome the limitations of market-based approaches (Martinez-Fernandes et al, 2010; CaCCTUG, 2014) involving both national and local level planning and an interaction between governments, communities and private actors. Thus additional jobs could be created in strengthening the role of the training and skills system, through Local Economic Partnerships and training providers in partnership with employers (Aldersgate Group 2010; Jagger et al, 2013; Aldridge and Simons, 2016); through a nationalised buildings and energy conservation delivery organisation (CaCCTUG, 2014); and in state regulatory agencies undertaking macro-level regulatory work to effect economic, consumption, work and lifestyle changes, such as regulation of advertising, legal facilitation of work sharing, establishing caps of natural resource extraction, and changes to transport infrastructure (Sekulova et al, 2013).

In such centralised and formal employment solutions we see forecast growth in high skill and economically-valued work (Neuvonen et al, 2014; BIS, 2015), and continued improvements in gender equality through increases in female full time work (UKCES, 2016). It is possible that state job provision could be part of the work-share Job Guarantee scheme proposed by Alcott (2013), which could be doubly advantageous if it also able to use untapped workers' potential (TUC, 2015), and likely that it will play an important part in enabling a 'just transition' to restructuring the green economy with a net creation of jobs (TUC, 2008; sustainlabour, 2016).

4.2. Localised employment

In more localised solutions, there are likely to be operational and maintenance jobs using pandemic technologies (Demos Helsinki, 2012; Neuvonen et al, 2014), with increasing opportunities for local innovation and endemic technology solutions, where there is a need to up-skill and share innovation (Neuvonen et al, 2014). Pandemic solutions have a reliance on a few globally dominant scalable technologies, and endemic solutions are based on locally-driven innovation systems (Demos Helsinki, 2012). At this level job activities will comprise local low impact and sustainable building construction and housing related work, working with materials with long life, small scale local and collective energy generation and food production, dietary advice and catering linked to diet change, increased emphasis on preventative health care, exercise and leisure, locally-based age and illness care (IPPR, 2016), education, local transport, recycling and up-cycling, and changing land use and land husbandry associated with increased land use for fuel crops and conservation areas (Hopkins, 2008, in Connors and McDonald, 2011; Connors and McDonald, 2011; Tonn and Stiefel, 2014). Increased jobs in sustainable forestry and land and water resource management, linked to conservation and biodiversity and eco tourism as well as food and fuel production, will more than offset jobs lost from reduction in extractive industries (UNEP, 2008; Sanchez and Murillo, 2014). Further, given the increase in UK tourism jobs resulting from economic downturn and 'staycations' (Beatty et al, 2014), the tourism sector has great potential to more than offset job loss in the airline industry.

Jobs will be created in a more spatially distributed, diverse range of organisations, featuring small enterprises, social enterprises, cooperative and other mutual benefit organisations, as part of a decentralised economy and redistributed lifestyles and work. Co-operatives are likely to feature prominently, contributing much to community resilience with an environmental commitment, community and social purpose, and with the innovation and creative energy required for new solutions (Webb and Cheney, 2014). Indeed the increased combination of human-centric along with meritocratic societal organisation (Neuvonen et al, 2014) necessary to share skills and to behave collaboratively, is likely to see a growth in organisational management and governance work to run democratic work organisations and community democracy. Thus skills acquisition and development is required for both personal and community efficacy (Bailey et al, 2010), such as jobs in the operation of Transition Towns (Connors and McDonald, 2011) and cooperative organisations (Webb and Cheney, 2014), local rural and urban food production cooperatives and public-private partnerships (Borowy, 2013; Parham, 2013), and in the cooperative and Trust-based ownership of land and housing in the UK government's recent intentions to facilitate development of new 'garden cities' (DCLG, 2014).

In these scenarios it is likely that the quality of work will be high, as labour becomes more productive in meaningfulness (Sekulova et al, 2013), through workers' closeness to the outcome and use of the product of labour; higher inherent skill; and through enhanced work-life balance of locally-based employment. Locating more work in co-operative organisations has a higher likelihood of good job characteristics, with worker democracy and with stable and secure employment (Webb and Cheney, 2014).

4.3. Alternative work and alternative organisations

The third area of activity is that of unpaid work in the localised economy and in alternative organisational forms, where time is allocated to a more diverse range of productive activities and where the definition of productive itself has potential to take on altered meaning. Within a context of altered expectations towards material goods consumption, paid work becomes a smaller component of redistributed working time which also involves community-based participation and civic duties. For Tonn and Stiefel (2014), this will see a shift from a cash to a collaborative economy, with residents spending about half their working time on the 'amateur economy', the other half on skilled 'professional economy' jobs and innovative money-making activities (Norgard, 2013). Thus we see barter and exchange, gifting, domestic and family-based work, and self-sufficiency becoming more prominent, and work taking place in sports clubs, libraries, community health and fitness centres, local repair and maintenance services, and craft workshops (Norgard, 2013).

Work will also increase in community food schemes as promoted for example by Slow Cities and the Transition Movement (Barnes, 2015; slowmovement, 2016), through from production to distribution and waste recycling; and Community Supported Agriculture schemes providing a share of labour, skills development, produce, wellbeing and environmental benefits (CSA, 2016); with local food production also envisaged to play an increasing part in urban and Garden City developments (DCLG, 2014; Parham, 2016).

Viewing households as small informal communities or social enterprises, domestic settings are likely to contribute more working time associated with reduced consumption, self-sufficiency and of domestic home economics, with the home also likely to be a location for an increasing proportion of

caring work, associated with demographic change and limited state finance, and reduced carbon consumption (Sekulova et al, 2013). This is likely to also need job adjustment in the professional paid economy to support and advise domestic care workers.

Work will also increase in mutual community-based exchange schemes comprising complementary currencies (local economy trading schemes (LETS)) and timebanking (Seyfang, 2004; Barnes, 2015; REconomy, 2016), plus freemarket events and networks, which can both produce and share local products and resources (North, 2016; Barnes, 2015). They also provide value in sharing and developing skills, for example connected with local building, energy and food issues (Pratt (2008). Beyond exchange and reciprocal arrangements, gifting is a way of further developing community (Rehn, 2014), and can be a further way of sharing skills and skills development, as well as products and services, involving self-help groups, and technology-enabled internet-based sharing through social media advice, blogging, skills share websites and workshops, as part of the gift economy.

Other forms of work will see growth in repair, reuse, recycling and upcycling of materials, products, clothing and food, with contributions to product and resource efficiency and also in social outcomes. The work involves technical and manual skills, but also requires organisational and collective skills to organise chains of collection, accumulation, storage, moving on, bartering and distribution, which are required on a scale larger than the individual (Ferrell, 2014), as part of job creation in the 'light green' and 'circular' economies.

All the unpaid forms of work undertaken here underscore the significance of the unrecognised work that is already undertaken in the 'social economy' (Roseland, 2000), emphasising the importance of these locations for skills sharing and development, for production and servicing, developing, adapting and operationalising technological solutions, and for organisation and governance (Brangwyn and Hopkins, 2008; Barnes, 2015) arising through involvement in local mutual forms of organisation (Webb and Cheney, 2014). This is about an extension of domestic work in a definition of community that takes us beyond the household, in the way that Gorz (1989) extends reproductive work beyond (but including) social utility, to autonomous activity, wellbeing and fulfilment.

5. Degrowth, basic income and localisation: enabling the solutions?

As this paper has progressed it has encompassed ever more informal and more geographically dispersed forms of work as part of the scenario for large scale carbon reduction. However, it is unlikely that these changes will occur within a prevailing political economic view of business as usual based on economic growth and a competitive labour market. As an alternative within which to frame this new reduced carbon work scenario, this paper now considers the scope for three overarching policies to foster the conditions within which such changes to work might occur. These are degrowth, a basic income, and localisation. These are covered here in turn, with a view to considering their applicability to the reduced carbon sustainability context, and the coherence of the three sets of ideas.

5.1. Degrowth

Degrowth is a radical alternative to economic growth, though diverse in form (Dimaria et al, 2013) and not so easy to pin down. Latouche (2004) suggests it is not a concept, not a theory of

contraction, but an idea of replacing our current faith system with one of non-growth, or ‘a-growthism’ (as in ‘a-theism’) (ibid p.2); a “ ‘provocative’... political slogan with theoretical implications” (Latouche, 2010, p.519). This is amplified by D’Alisa et al (2014) in their rejection of the ‘illusion of growth’ and move away from the hegemony not only of economic growth but from economism itself (D’Alisa et al, 2015). It emphasises a redistribution of wealth to the benefit of the global south as well as the developed north (Latouche, 2004; Dimaria et al, 2013) and for present and future generations (Dimaria et al, 2013). To others it is “the downscaling of production and consumption that increases human well-being and enhances ecological conditions and equity” (Research and Degrowth Association, 2017), predicated, as Whitehead (2013), suggests, on economic activity that must not exceed the carrying capacity of the biosphere and that should focus on enhancing human well-being and happiness not the avaricious pursuit of wealth. It is “a phase of planned and equitable economic contraction in the richest nations” (Alexander, 2014). Rather than a steady state economy, it requires a contraction through negative investment (Foster, 2011). It is seen as integral to solving environmental problems, including carbon emitting climate change (Latouche, 2004), and in its equality and wealth redistribution aims (Dimaria, et al, 2013) has also been posited as an anti-capitalist project (Foster, 2011; Dale, 2015).

Degrowth has been taken up as an enabler of environmental improvement (Jackson, 2009; Klein, 2014; Dale, 2015), who have blamed the economic growth imperative for carbon emissions and seen growth and a green agenda as incompatible. Attempts to maintain or re-badge growth in a green context (‘sustainable development’, ‘green economy’, ‘green growth’) have been dismissed as a whitewash masking a continuation of a growth-oriented commodified, monetised market system (Klein, 2014; Dale, 2015). A belief that economies can continue to grow whilst reversing environmental degradation by decoupling GNP growth from resource use through increased efficiency has been substantially critiqued by Jackson (2009), although others propose that continued growth, within limits remain sustainable (LLavador et al, 2015). Whether neo-liberalism (Klein, 2014) or capitalism itself (Foster, 2011; Dale, 2015) is at the heart of the growth imperative, this paper invites consideration of how moving from a presumption of growth to one of degrowth could be the highest order policy frame to change for large scale carbon reduction.

Given its focus, this paper identifies three implications of what degrowth means for the context of work and jobs. Firstly, in its suggestion of a strengthening of public ownership (of energy, transport and buildings), Dale (2015) appears to echo the CaCCTUG (2014) call for a nationalised organisation, with conventional employment. However, it appears to stop short of local informal work and cooperative and voluntary community owned organisations, of the localisation considered later in this section.

Secondly, in the way that Dale (2015) critiques ‘green growth’ as continuing to reinforce the process of capital accumulation and thus contradictory to degrowth and environmental sustainability, we can see degrowth being positioned as something different in which there is a need for workers to be more closely and directly linked to the means of production. This could reinforce the suggestion for more localised and community-owned work.

Thirdly, degrowth contains elements of working less, particularly moving away from a pretence that enough jobs can be created for all and that it is “counterproductive to force people to work in jobs that simply fuel consumption” (Klein, 2014, p.94). Central here is the part that unemployment, or

the threat of it, plays in labour markets that provide little alternative to paid employment (Foster, 2011; Dale 2015). Working less is a feature linked to some proposals for guaranteed basic income, with Knight et al (2013) suggesting that a degrowth strategy featuring a reduction in work will enable environmental sustainability, although their take is on work as conventional economic employment, rather than work-share of different forms of work posited by this paper. Mylondo (2008) proposes that a scheme of basic income is both part of and will contribute to, degrowth. It is to a basic income that this paper turns next.

5.2. Basic income

The idea of a basic income has been posited in a variety of forms over the years (Gorz, 1989; McKay, 2007) and is under renewed discussion today (Harris, 2016; Huws, 2016). Known variously as a citizens' income, social wage (Harris, 2016), basic annual income, income guarantee system or Guaranteed Minimum Income (GMI) scheme (Alcott, 2013; Sessa and Ricci, 2014), now being discussed as Unconditional Basic Income or Universal Basic Income (UBI) (Harris, 2016; Huws, 2016; Reed et al, 2016), the concept is of a universal income, individualised and paid to each adult unconditionally (McKay, 2007) and as a political right (Sessa and Ricci, 2014).

Proponents suggest basic income in the field of social security policy reform (McKay, 2007; Harris, 2016), a 'new welfare' scenario (Sessa and Ricci, 2014) to alleviate poverty and social exclusion, and as an alternative to the current benefits system (Reed et al, 2016). In this understanding, income is "paid without reference to patterns of formal labour market participation" (McKay, 2007, p.338). However, other proposals see basic income schemes enabling distribution of paid work, finite within the economy, with all in the labour market 'working less so that all can work' (Gorz, 1989, p.227), an emphasis on full distributive employment and work-sharing (Norgard, 2013), and this idea is gaining increased popularity as the rate at which technology replaces current jobs increases (Srnicek and Williams, 2015). McKay (2007) and Huws (2016) also take a gendered perspective, seeing further opportunities for women's independence. A further emancipatory agenda sees individual choice enabling people to reject poorly paid jobs with poor working conditions (Klein, 2014). These agendas are embraced in the Green Party's policy for a Citizens' Income (The Green Party, 2017).

Nevertheless, although the Green Party's policy is set in the context of ecological sustainability, it falls to this paper to elaborate on the potential benefits of a basic income scheme to a radical carbon-reduction agenda. Based on the solutions of alternative forms of work in section four of this paper, the benefits would appear to be two-fold: to enable more involvement in a range of unpaid and informal work, and to foster the location of that work in community and worker-owned organisations.

As Harris (2016) and Huws (2016) note advantages for social care, and as the Green Party identifies the opportunity to engage people in socially useful work (The Green Party, 2017), income guarantees can give individuals time and can give them choices about how to spend that time (Klein, 2014). If basic income schemes take a non-commodified form which recognises a non-economic welfare value of work as well as a commodified form placing economic value on activities not currently measured (McKay, 2007), there can be a re-balancing of the role of unpaid work with paid employment, and a re-valuation of work as productive time in the context of overall incomes and lifestyles (Norgard, 2013). Freed from the need to continuously work long hours to earn sufficient pay, there is scope for more people to be involved with carbon-reducing and sustainable activities.

The shift to local and community-owned organisations required for such work could be enabled through income guarantee schemes. Although this depends on the form of such schemes, one way incorporates the scheme in a form of market socialism with its main focus being a basic universal income paid to all citizens out of the proceeds of worker-owned cooperatives and publicly-owned enterprises (Marangos, 2004), rather than from taxation.

5.3. Localisation

The concept of localisation appears difficult to pin down, containing variety (Hopkins, 2010) and being as much defined by what it is not, ie. a move away from globalisation (De Young and Princen, 2010). For De Young and Princen (2012) it is based on distributed authority and leadership, sustainable use of nearby natural resources, and community self-reliance and cohesion. This means a different relationship between consumers and producers in local production and consumption, with power and control away from large corporations, with local businesses, employing local workers at decent wages (Shuman, 2000). Mostly, these understandings suggest a holistic approach, and a move away from conventional political-economic business as usual. In this frame of mind, Hopkins (2010) defines localisation as a social movement for social and economic reorganisation from the global to the local, which takes place within a social justice and resource-based critique of globalisation and with sustainability at its core.

However, there would appear to be tensions in the wide-ranging nature of the term, particularly the extent to which it is a radical alternative rather than a relative point on a continuum; the extent and nature of government in its move away from centralised political control; and the extent of fit with a degrowth anti-capitalist perspective. Localisation would appear to be a process rather than an absolute, and a contested one at that.

This paper suggests that localisation can be seen to be a feature of both the tangible examples of changing work in sections 4.2 and 4.3 of this paper (Bailey et al, 2010; Norgard, 2013; Sekulova et al, 2013; Barnes, 2015) and embedded in the concepts of degrowth (Dale, 2015; Kothari, 2015). Indeed D'Alisa et al, (2015) see a move to a more localised economy and lifestyle being embedded in degrowth, as exemplified in the 'radical ecological democracy' of (Kothari, 2015), based on community level decision making, democratic control of local economy, new knowledge systems, and the removal of barriers to inclusion. However, tensions also exist here, for example in Dale's (2015) suggestion of strengthening public ownership implies conventional nationalised employment which appears not to emphasise local and informal work in cooperative and voluntary community owned organisations.

Beyond a spatial re-scaling of work, more thinking needs to be given to the connections of work and employment to localisation. In addition, the links to basic income schemes require further thought. If such a scheme is likely to require regulatory intervention, as in the market socialism of Marangos (2004) there are questions about the location of control, not only of administration and governance but also of currency and value.

6. Conclusion

This paper has focused deliberately on CAT's 'Zero Carbon Britain' report (Allen et al, 2013) because in arguing that current plans for carbon reduction are not fundamental enough, nor substantial enough quickly enough, ZCB is taken as a radical, provocation end point, proposing a holistic scenario for social, economic and lifestyle change, albeit technically within reach, against which to speculate about the future of work.

In this context, it pursues an argument, as posited in CAT (2017) that carbon reduction actions towards a more diverse range of work forms and locations, provides opportunity for net job creation and improved working conditions, creating a double advantage to population and society.

The author's contribution to CAT (2017) does not emphasise one particular form or location of jobs or work over another, but suggests a mix across the range of forms. This increasingly diverse composition of work provides ample opportunity for a net job and work increase, enabled by the broader range of valued activities required for substantial carbon reduction, and supported by an appropriate enabling regulatory system.

This contribution to CAT (2017) is also able to emphasise the potential to increase job quality and improved working conditions. Good jobs offer adequate wages, safe working conditions, job security, reasonable career prospects and worker rights (UNEP, 2008); and the four pillars of the Decent Work Agenda provide full employment; guaranteed labour and trade union rights; social protection; dialogue and participation (sustainlabour, 2016). To overcome contemporary critiques (Green et al, 2013), more effective use and development of skills, and improvements in equality and diversity, and work-life balance, would also be important indicators.

It recognises the potential pitfalls here, for example the failings so far of the formal employment economy to address income inequality (Lawrence and McNeil, 2014) and job-related wellbeing (Green et al, 2013), the critiques of working life in smaller and localised organisational forms (Rainnie, 1989; Wallace and Kay, 2009), and the need to be wary of gender segregation in domestic work settings (Osnowitz, 2005). It is also the case that the labour market and job changes required will affect different industries and workers differently over different timescales (Martinez-Fernandes et al, 2010).

However, the CAT (2017) contribution posits that the forms of work outlined above indicate great opportunities to increase the quantity of high skilled work, for participation in diverse forms of work, and for increased discretion and autonomy over that work mix. The greater flexibility in the variety of forms and locations of productive work outside the household, could well enable both men and women to combine paid employment with household responsibilities (Osnowitz, 2005). It suggests that the nature of work should become more fulfilling, linked to outcomes which in many cases will be not only for economic performance but for a more immediate productive output in use, for social connectivity and affective emotional gain (Norgard, 2013) and for intrinsic satisfaction reward.

Overall, it suggests that the carbon reduction actions outlined in ZCB provide ample opportunity for net job creation and improved working conditions, thus suggesting a double advantage to population and society.

However, such changes need to be enabled by a political-economic shift to a localised way of working and living, built on degrowth and embracing a basic income scheme. The challenges are that this will require fundamental political and societal change. And conceptually the challenges are still to reconcile these three enablers to the point where their combined essence can be clarified and communicated effectively.

Specifically there would appear to be some outstanding questions, conceptual issues and contradictions still to iron out.

The compatibility of degrowth and basic income; and basic income with localisation?

The role and location of government control, democracy and governance – particularly in regulation of new patterns of work.

The continuation of globalisation in its social, networking technological, digital and commodified markets forms.

The fundamental premise of the political economy in which such work and therefore carbon reduction will take place. Notably the extent to which change is enabled through a move away from the current hegemony of neo-liberalism, the prevailing variety of capitalism, and the extent to which this is a socialist anti-capitalist agenda.

The applicability of forms of economy – for example, of market socialism.

The role of organised labour in these new work scenarios – and in effecting change.

The applicability of labour process theory in these new work scenarios. In effecting change. In analysing working conditions in the new work scenarios posited here – where issues of control, capital and ownership may take fundamentally different forms. Is the labour process debate still rather silent on analysis of local and mutual organisational forms, and on informal unpaid work.

Stepping back from my contribution to CAT (2017), the writing of this paper for the 2017 International Labour Process conference reveals emerging challenges – in policy, empirically and conceptually. On the latter, not least are issues to understand better in conceptual analysis the ways in which degrowth, basic income and localisation may or may not be compatible, and the applicability of labour process to examine the emerging forms of work.

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