
AN EQUAL AND JUST TRANSITION TO TO NET ZERO

SUMMARY REPORT OF THE MAINSTREAMING EQUALITY AND JUST TRANSITION EVIDENCE PANEL

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Contents

INTRODUCTION	3
<i>NET ZERO</i>	4
<i>MAINSTREAMING EQUALITY IN A JUST TRANSITION</i>	5
<i>ECONOMIC TRANSITIONS</i>	6
NET ZERO JOBS AND SKILLS ESTIMATES	8
SUPPLY SIDE: EXISTING LABOUR MARKET INEQUALITIES	12
<i>INEQUALITIES IN EDUCATION AND TRAINING</i>	13
<i>WORKPLACE INEQUALITIES</i>	18
DEMAND SIDE: EDUCATION, TRAINING AND CAREERS PLANNING FOR NET ZERO IN WALES	20
DISCUSSION	23
RECOMMENDATIONS: AN EQUAL AND JUST TRANSITION	24
<i>CARBON LITERACY FOR ALL</i>	25
<i>NATIONAL CLIMATE PROGRAMME</i>	27
<i>CHANGING WORKPLACE CULTURES</i>	29
<i>JOB REDESIGN</i>	31
<i>GREENING CARE</i>	32
CONCLUDING REMARKS: A SENSE OF URGENCY	33
<i>REFERENCES</i>	34
<i>APPENDIX ONE - MAINSTREAMING EQUALITY AND JUST TRANSITION EVIDENCE PANEL</i>	38

INTRODUCTION

This is the summary report of research undertaken in 2022 to test the mainstreaming equality policy development model. The project, funded by the Welsh Government, set out to reassess the model's capability to centre the promotion of equality and well-being in Welsh policy development.

To test the model the research took as its policy focus the significant economic and social transitions underway to address the impacts of climate change. Specifically, it examined how tackling inequalities could support efforts to acquire the skills needed for a Just Transition to Net Zero.

An equalities evidence panel with members drawn from equality and sustainability organisations, business, the trades union movement, academia, policy think tanks and policymakers, worked collaboratively through the equality mainstreaming evidence gathering and solution finding processes.¹ The panel heard expert evidence from educators and training providers.

The findings and recommendations on how to embed the equality mainstreaming model in policy development are available in a separate report (Parken et al., 2022a). This report summarises the substantive findings in the policy area - jobs and skills (Parken et al., 2022b) - and is published to provide supporting information for the Welsh Government's call for evidence on a Just Transition.

Economic transitions do not guarantee economic growth (Brown, 2019), and the social impacts of previous transitions have entrenched existing inequalities (Brynjolfsson and McAfee, 2014). Existing social and economic inequalities in education, training and the labour market will make the transition to Net Zero more challenging.

The economy is undergoing both digital/AI and Net Zero transition, and the impacts will be economic, social, environmental, and cultural. In the labour market, there may be job growth but also displacement and replacement. The increase in precarious working may negatively impact on worker's ability to access training or upskilling. All job roles may change, and all have the potential to be 'green' or at the very least 'greener'. The effects of transition to Net Zero will go beyond decarbonising industries and could offer the opportunity to tackle entrenched inequalities in skills, training, progression, and pay.

There is both opportunity and uncertainty. There is also a paradoxical concern that given existing labour market inequalities, opportunities to benefit may be limited to a narrow group of workers but that without greater diversity in decarbonising industries and in new renewables, there will not be enough workers to fill the new or retrained jobs predicted by

¹ Members of the Equalities Evidence Panel and organisations who gave evidence are listed at Appendix 1. See also Welsh Government call for evidence information: <https://www.gov.wales/sites/default/files/consultations/2022-12/just-transition-q-and-a.pdf>

decarbonising and biodiversity sectors (National Grid 2021, Learning and Work Institute 2022, Data Cymry 2022). Therefore, the equalities evidence panel set out to address the following question:

How can we ensure that existing labour market inequalities are not sustained and reproduced in the transition to the net zero economy?

The panel recommended significant interventions for consideration to promote equality and diversity. These include carbon literacy education for all, addressing existing inequalities in the workplace, Welsh Government direct investment in employment in renewables and retrofit, and job redesign support for employers. These recommendations were suggested with the intention to unlock the demand for Net Zero skills, retain the value generated in Wales and promote Fair Work. These actions should contribute to producing the diverse, trained or upskilled employees and entrepreneurs who are needed to meet Wales' ambition for a Just Transition.

The panel further recommended that sectors such as social care, education and health should be fully included in efforts to decarbonise the economy, and that their role in underpinning employment in the transition should be acknowledged and valued.

The report begins by defining Net Zero, Just Transition and the equality mainstreaming method, followed by the presentation of the evidence base which underpins the recommendations.

NET ZERO

The Welsh Government declared a climate emergency in 2019 and has since followed the Climate Change Committee's recommended focus on the most highly emitting sectors and consequent skills requirements. This announcement has been followed by two low carbon budgets (Welsh Government 2019, 2021).

The term 'Net Zero' refers to a situation where as much carbon is being taken out of the atmosphere as is created. It reflects a longer-term sustainable goal to reduce the overall amount of carbon in the atmosphere by reducing its production.

Achieving this goal requires the transformation of existing high carbon intensive industries and a simultaneous growth in low carbon alternatives, along with widespread behavioural change across society and the economy. We will all need to learn to live and work in different ways. This kind of collective effort is reflected in the Welsh Government's 'Team Wales' approach:

We need every citizen, community, group, and business in Wales to embed the climate emergency in the way they think, work, play and travel (Welsh Government, 2022a p.6)

There are multiple definitions of a Just Transition². These sit on a continuum between a focus on outcomes for the economy, jobs, and future skills at one end, and processes creating justice and human rights at the other end (Cabr  and Vega-Ara jo, 2022; McCauley & Heffron 2018).

MAINSTREAMING EQUALITY IN A JUST TRANSITION

A Just Transition approach calls for a societal transformation to accompany a reduction in fossil fuels and the achievement of Net Zero targets. This is a societal transformation that prioritizes ‘more fairness and a search for equitable solutions coupled with the achievement of equality and inclusiveness’ (Heffron, 2021). The intent is to ‘not leave anyone behind’.

The Welsh Government describes a ‘a socially just transition’ in *Net Zero Wales Carbon Budget 2 (2021 -2025)*, as process leading to ‘a cleaner future...avoid[ing] the burden of change falling on the shoulders of those least able to pay’ (p.34).

In the call for evidence on a Just Transition, the Welsh Government intends that the Well-Being of Future Generations Act 2015 (WBG Act) will provide a framework to

Avoid undesirable impacts, maximise the opportunities of transition, and provides a legislative basis for embedding principles of equity and fairness into decarbonisation efforts (Welsh Government, 2022b)

There are synergies between the equality mainstreaming policy development model and the ‘five ways of working’ codified in the WBG Act. Mainstreaming recognises that organisations, systems, policies, and processes can be informed by androcentric, colonialism and body ableism norms. These assumptions, in policy, practice and in cultural norms (in education, health, housing, welfare, employment etc), can reproduce inequalities in successive generations.

² Several definitions of a ‘just transition’ emphasise the social conditions that enable communities to thrive, along with the need to recognise the role of existing inequalities, and prevent new ones: ... an economy-wide, participatory process involving companies, communities, unions, and governments to design an economy where GHG emissions are net zero, people have decent jobs and poverty is eradicated and communities thrive (The B Team, 2018).

A just transition creates decent work opportunities for all and ensures that social protection exists where needed. It also includes mechanisms for social dialogue from the private sector and workers’ unions throughout policymaking processes at all levels.” (UN, 2021)

A good example of mainstreaming equality is the normalisation of flexible working. This could remove the premium for full time permanent working, mainly enjoyed by men who hold over 60% of all such jobs in the economy and which is the premium contract type for higher pay and progression in employment (Parken and Ashworth, 2019). Default flexible working would increase access to work for young, older, and disabled people, and women (EHRC, 2021).

The equality mainstreaming model brings together equality organisations, and in this instance sustainability organisations, policymakers, business, the trades union movement, and academics to work collaboratively on a policy problem.³ The participatory methodology works to prevent inequalities being reproduced over the long-term and integrates evidence and solutions across policy areas (Parken 2010, Parken et al., 2019a and b, 2022a).

Prior to the research on Net Zero skills and jobs, the model was used in research for the Office of the Future Generations Commissioner and Public Health Wales to examine the potential for future policymaking to entrench or ameliorate inequalities in work, demography, and climate change (MacBride-Stewart and Parken, 2021).

As the effects of climate change emissions are unevenly distributed across people and places, inequalities are exacerbated when communities and businesses have different access to economic, knowledge and skills resources needed to deliver Net Zero. The report concluded that people in the lowest social economic groups, who have contributed least to climate change, and who have the least resources to cope with climate change impacts and policies to address them, would be most negatively impacted (ibid).

ECONOMIC TRANSITIONS

Economic and societal transitions do not guarantee economic growth (Brown, 2019), and previous industrial revolutions have exacerbated inequalities (Brynjolfsson and McAfee, 2014).

Research has shown us that past transitions have widened labour market inequalities as those already advantaged in the workforce are in a better place to acquire new knowledge and skills. For example, women's employment in low-paid precarious work increased during the transition to the knowledge economy during the early 2000s, while men acquired the majority of the newly created high-skilled well-paid positions (Parken and Rees, 2011). So, while industry has acknowledged the need to diversify the workforce, existing inequalities will make the skills transition to the Net Zero economy more difficult.

³ The membership of the Evidence Panel is provided at Appendix One.

The research also showed that all the parts of the knowledge economy innovation system were dominated by men in universities and economic development agencies, and in the businesses that received new ideas and funding from the other two partners, to synthesise and commercialise the knowledge (Parken and Rees, 2011)⁴ Further, the way that innovation was defined, had the effect of excluding sectors and industries where most women were working (ibid). Such a closed decision-making system reproduces and sustains inequalities.

Brown, reviewing the concurrent shift to a digital economy, anticipates the same inequalities will be reproduced in the move to Net Zero unless policy and delivery aims are focused on creating fair working practices and designing inclusive workplaces for the future (Brown, 2019). There is also some tension between these predictions and the promise of new jobs in the 'green economy' and protecting workers in decarbonising industries:

The net zero transition won't repeat the job destruction of deindustrialisation, but 4 per cent of UK workers in brown jobs - as well as another 13 per cent in green jobs - face direct change in the nature of their work (Broome, et al. 2022, p.4).

New highly skilled well-paid jobs must be widely distributed but existing levels of job segregation and segmentation in high emitting sectors mean that recruitment from the existing, narrowly defined pool of workers will be insufficient to meet skills requirements, as well as sustaining inequitable labour market outcomes. Therefore, our question must be:

How can we ensure that existing labour market inequalities are not sustained and reproduced in the transition to the Net Zero economy?

Addressing this question involves taking this unique opportunity to meet the policy goal by promoting equality in education, training, and skills, in both new jobs, and jobs that will undergo change, to incorporate new knowledge and skills on decarbonisation.

The next section of the report considers the sectors in view for transition, the skills required and the evidence panel's typology for the transition to Net Zero jobs and skills.

⁴ Triple Helix typology of an innovation system (Etzkowitz and Leydesdorff, 1995).

NET ZERO JOBS AND SKILLS ESTIMATES

Much of the literature on the changing employment landscape delineates between ‘green jobs’ (renewables/biodiversity), and ‘brown’ jobs (industrial/ high emitting sectors) (Nesta, 2020, Learning and Work Institute 2021).

The Welsh Government’s Net Zero plan follows the Climate Change Committee’s focus on the most highly emitting sectors and consequent skills requirements, depicted in Table 1.

Table 1. Net Zero Priority Decarbonisation Sector and Skills

CCC Sector	Specific pathways for Wales	Skills examples
Surface Transport	Transport/Planning; Electrification; Travel Behaviour	Policy; data/ digital; vehicle production & maintenance (all types); 'drivers'
Electricity Supply	Alternative electricity forms; decommissioning; production; distribution; storage	Policy; R&D; logistics; engineering; monitoring
Aviation	Flight/Airport planning & demand (International and domestic)	Maintenance; ‘Pilot; production; Travel and goods industry etc.
Shipping	International and domestic	Fuel supply;
Residential and non-residential buildings	Low-carbon, heat, and energy efficiency/measures inc. retrofitting and new builds	Retrofitting; new builds; services (heating/water); fabrication/insulation; waste; evaluation design/survey/trades
Manufacturing/Fuel Supply/Construction	Emissions reduction	Supply; Materials; Waste; Engineering; Trades

Source: adapted from the CCC reports (2020-2021)

Predictions shows some stability for the types of skills and jobs required but less stability on whether predicted numbers imply new jobs or retrained workers. This reflects uncertainty on the demand side, a significant issue that we return to later. Table 2. shows current predictions.

Table 2: Wales: Net Zero Transition Jobs estimates

Source	Sector	Total	Occupation	New/Retrained
CITB Wales	Construction	12,000 (by 2028)	Project Managers, Plumbers, Building Envelope	New but training focus is on building not retrofitting
Regional Skills Partnerships (Data Cymru, 2022)	Construction	25,000 (by 2050)	Construction, waste, health and safety, environmental planning, engineering	Unclear
	Manufacturing, Transport, Energy	No. overall estimates		
Wales TUC (2020) ⁵	Construction and retrofits	27,000	Construction workers, plumbers,	Unclear
	Transport Energy, manufacturing, broadband, Agriculture	18,000 9,000 5,000 (2021-24)	electricians, renewables, and broadband engineers, biodiversity and forestry workers	
National Grid (2020)	Energy	25,100	Engineers and middle skills, project management, data analysis etc	40% new/60% retrained

Predictions for jobs by region are rarely available, save for the Data Cymru (2022) report produced for the Regional Skills Partnerships, which suggests 64,000 potential new energy jobs in the North Wales Region (dependent on investment). This report surveys the current ‘green’ workforce and uses vacancy postings to assess the growth in ‘green’ job vacancies. Increasing vacancies are noted for environment professionals, environmental officers, environmental health and safety managers and officers, wind turbine, construction, and

⁵ Dependant on £6n investment between 2021-2024. The New Economics Foundation and Office of the Future Generations Commissioner (2021), arrive at a similar number but offer a more detailed occupational breakdown: <https://www.futuregenerations.wales/wp-content/uploads/2021/05/FINAL-ENG-Green-Skills-6-pager.pdf>

renewable energy engineers, refuse and salvage occupations, and recycling workers, and managers.

Estimates of job losses or gains are just that, estimates, that therefore carry uncertainty. The actual numbers will depend on investments, and more particularly whether we are successful in attracting and retaining talent in Wales across specialist and 'middle skilled' occupations, at a time when every other country is seeking these skills.

Throughout the evidence gathering sessions, the panel also heard from expert witnesses in further and higher education, regional skills partnerships, and the careers service who, supported by the literature, reported that 'middle-skills' such as project management, data analysis, problem-solving, and creative thinking will be in greater demand - in a similar way as for the digital transition (Brown, 2019). The panel was clear that a Just Transition to Net Zero could not only focus on technical and specialist skills.

However, the Welsh Government's low-carbon budgets and subsequent funding statements on a Just Transition have been focused on investment in the decarbonising sectors (Welsh Government, 2022c) and do not always reflect an emphasis on ensuring that funding and opportunities are used to embed Fair Work and promote equality in the transition across all industries and sectors.

The evidence panel considered new jobs, jobs that we will need more of, and jobs that will change, therefore drawing a wider pool of workers into training, reskilling/upskilling for the Net Zero transition. This sits in contrast to the displacement/replacement discussion that is focused on decarbonising industries. The panel drew on the work of the Scottish 'Climate Emergency Skills Action Plan' (2021), to categorise jobs and skills transition and adaptation, in the following ways:

- 1) **New and emerging jobs** directly related to the move to Net Zero, for example: Fuel Cell Technicians, Carbon Monitoring Technicians, Hybrid Tech Engineers
- 2) Jobs affected by the transition **requiring new skills/knowledge**: Architects/Surveyors/Environmental Consultants/Transport manufacturing and engineers.
- 3) Existing Jobs that will be **needed in greater numbers**: Designers industrial and product, Plumbers, heating and ventilation, renewable energy engineers, Control System Engineers, Biodiversity and Land Management (Scottish 'Climate Emergency Skills Action Plan' (2021)⁶

To this typology, the panel added:

- 4) Sectors not automatically considered as having 'Green Jobs'
 - a. Social care and childcare (currently low emitting and needed to support those in education, training, upskilling)

⁶ Data Cymru (2022) use a similar typology in their report 'The Labour Market of Tomorrow';

- b. Education (new research and teaching across all disciplines),
- c. Health (innovation - new products (e.g., less aerosols) and new surgical processes)

Category 4 is necessary in view of an ageing population, and to provide foundational support for the transition. Investments in social infrastructure could produce greater job growth multipliers than 'shovel ready projects' (Women's Budget Group, 2021). Without such public sector supports, the transition risks creating new divisions between those already in a position to benefit from new education and training opportunities, and those who are constrained by caring commitments. In addition, the history of job evaluation demonstrates the need for caution when establishing new job categories (Deakin et al., 2015). There is an evident danger in placing a premium (through status or pay) on jobs typed 'green' that could devalue other forms of work not included in this category, e.g., social care, where work is already typified by low working hours and low pay without routes to progression (Webb et al., 2018).

From the evidence reviewed and drawing on their own experiences in advocating for equality, the panel considered that all jobs could become 'green' (Kite Insights, 2022), if everyone is supported to apply new knowledge on sustainability in their communities and in work, across all sectors and occupations. This observation led the panel to argue for an inclusive 'carbon literacy strategy for all', to facilitate equitable inclusive approaches to learning and upskilling opportunities.

Having established the breadth of the transition, the evidence panel considered and contributed to evidence gathering on existing inequalities in Wales's labour markets. Evidence which demonstrates that without significant intervention, the opportunities to change existing labour market inequalities will be lost and the transition to Net Zero could further entrench inequalities.

SUPPLY SIDE: EXISTING LABOUR MARKET INEQUALITIES

The Welsh economy is often characterised as still suffering from the effects of the last economic transition, deindustrialisation.⁷ Gross Valued Added (GVA) has been historically low in Wales, in keeping with other deindustrialised areas such as Northeast England, and has fallen further since Brexit and the COVID 19 pandemic:

In real terms, Wales saw the largest decrease amongst the 12 UK countries and English regions in GDP of -11.2% between 2019 and 2020 (Statistics Wales, 31st May, 2022a).

During the COVID-19 pandemic, people working in lockdown sectors were at greater risk of loss of employment, and this risk adhered particularly to those in low paid sectors on insecure employment contracts - disproportionately women, single parents, young people, and members of some ethnic minority groups (British Academy 2021a). The COVID-19 generation of young people (Gen C) are also more likely to be subject to long-term labour market scarring from unemployment (British Academy 2021, in MacBride-Stewart and Parken, 2021, p.27).

Wales has lower-than-average rate of skilled jobs compared to other parts of Great Britain (Felstead et al. 2013), while part time jobs, over 80% of which are worked by women, tend to be the lowest skilled of all jobs. More concerning for our focus on Net Zero skills is the evidence that the intensity of training shows a continuing decline (in both requirements to learn at work and capacity to learn from others) (Felstead et al. 2013)

Significant challenges exist globally to recruit skills for Net Zero which will leave Wales competing for specialist skills. The National Grid summarise the challenges within the UK:

- Loss of existing talent due to a baby boomer retirement crunch
- Competition for skilled workers from other sectors, such as finance and technology
- Limited pipeline of young people choosing science, technology, engineering, and mathematics (STEM) qualifications
- Lack of diversity (National Grid, 2020, p 4).

Almost all the reports on preparing for the skills needed for the transition to Net Zero acknowledge the need to diversify to meet the skills challenge. The ‘hope’ expressed in these reports is based on a number of surveys which show that young people, particularly women, want to work in jobs and careers that will contribute to protecting the climate (Learning and Work Institute, 2022, National Grid, 2020, Data Cymru, 2022).

⁷ Deindustrialisation – the decline of the previously dominant manufacturing and industrial sectors – particularly impacting the South Wales Valleys areas and communities.

However, the decarbonising sectors are characterised by an ageing, white male workforce and workplace cultures which are not known for welcoming diversity. The equalities evidence panel heard from academic colleagues that employment in carbon intensive industries is decreasing and while existing workers are a valuable workforce resource for new energy systems, recruitment practices currently rely on local and familial transmission of jobs (Stroud et al. 2020). This suggests that a reproduction of the currently homogenous workforce for new energy supply is likely. But there are simply not enough people in the existing narrow demography to satisfy demand which means worker diversity will be required from a business case, as well as from a social justice perspective.

Companies will need to demonstrate genuine sustainability, equality, diversity, and inclusion credentials to recruit talent from across different population demographics.

On the supply side, existing inequalities will make acquiring the required skills more challenging. The landscape for inequality in Wales within education, apprenticeships, further and higher education and employment was summarised for the Future Generations Commissioner's report on Future Inequalities in relation to the digital and automation transformation (MacBride-Stewart and Parken, 2021 p.17-28).⁸ Extracts from the evidence are reproduced here.

INEQUALITIES IN EDUCATION AND TRAINING

Existing skills gaps and mismatches in the workforce, and pre-existing inequalities in sectoral and job segregation will make the transition to Net Zero more challenges:

... the engineering construction workforce is ageing, with nearly 40% of the workforce nearing retirement⁹ Additionally, the workforce is overwhelmingly male (86.2%) and white (96%)¹⁰ There are not enough young, female, non-white workers entering the workforce to compensate for these upcoming retirements (ECITB Census, in Data Cymru, 2022, p.20)

The equality mainstreaming evidence panel reviewed current inequalities within education, further and higher education and vocational training in Wales, and considered what will be needed to ensure fair transitions to changed and future occupations.

⁸ Inequality in a Future Wales: <https://www.futuregenerations.wales/wp-content/uploads/2021/11/Inequality-in-a-Future-Wales-full-report-ENGLISH-UPDATED.pdf>

⁹ Data Cymru (2022) source reference: <https://www.ecitb.org.uk/wp-content/uploads/2021/10/Census-Report-1.pdf> p24

¹⁰Data Cymru (2022) source reference <https://www.ecitb.org.uk/wp-content/uploads/2021/10/Census-Report-1.pdf> p21/22.

EDUCATION

Variations in attainment and subject choice by equality grounds are important for the future workforce. However, significant data gaps for ethnicity and disability remain. Just over half of school pupils attain the equivalent of five GCSEs at grades A*-C including English or Welsh and Maths (Social Mobility Commission 2021). In 2018/2019, girls' attainment was 10% higher than boys on this measure (Statistics Wales 2019). Boys, looked-after and disabled children are less likely to reach this landmark, which can open the gateway to further learning, better employment opportunities and higher earnings. At least it should do, but for women this can be counteracted by sector and occupational segregation. Ogbonna's report on the nexus between socio-economic inequalities and ethnicity concludes that:

Some members of the BAME communities have continued to succeed in education and employment, with Indian and Chinese children achieving high attainment rates. Black pupils have lower attainment than white British pupils during early years' education. This attainment gap narrows at GCSE level with, for the latest period (2017-2019), 57.7% of black pupils achieving the Level 2 Inclusive threshold compared to 56.5% of white British pupils. However, for other BAME groups this gap is not narrowing; only 11.1% of Gypsy/Gypsy Roma pupils will meet this threshold. (Ogbonna 2020).¹¹

Boys continue to outperform girls at the highest A-level grades (Statistics Wales 2021b). The Social Mobility Commission report on Wales finds that only 4 out of 10 Year 11 pupils study A levels at school with half going on to study in further education (2021).

Gender segregation by subject remains, with 387 entries for ICT from boys compared to 120 from girls in 2019/2020; 1,427 boys studying Maths, compared to 901 girls; 50 girls studying Economics compared to 137 boys; and 771 boys taking Physics compared to 224 girls (Statistics Wales 2021b). Boys were 89% and 76% of entries for Computing and Physics respectively (Arad Research 2020), and girls were 78% and 62% of Psychology and Biology A-level entrants respectively (Arad Research 2020).

Physics is particularly important given that Physics A-level is required to study Computer Science degrees and is not available to study at further education colleges (research interview). Such gateways continue to privilege academic study over the vocational qualifications we may need for transition to Net Zero and digitisation.

¹¹ At Key Stage 4, level thresholds represent a volume, or 'size', of qualifications at a specific level on the National Qualifications Framework. The 'Level 2 inclusive' threshold represents a volume of qualifications at Level 2 equivalent to the volume of 5 GCSEs at grade A*-*—C, including English Language or Welsh First Language and Mathematics or Numeracy. See Welsh Government (2020b).

FURTHER EDUCATION

There are now 13 further education institutions in Wales following rationalisation. Of the 120,000 learners in 2018/2019, young people aged 16-19 were the majority of full-time students taking A-levels, initial vocational qualifications or access programmes.

As expected, older learners favour part-time pathways, taking a range of courses including basic learning, and vocational qualifications, often in health and social care, business administration and ICT qualifications (Buchanan et al. 2020).

On broad subject categories and at NVQ Level 3 or equivalent, Engineering and Manufacturing Technologies are the most popular subject areas for boys (19% of boys' studies), Science and Mathematics (14%), followed by Construction, Planning and the Built Environment (11%) (Statistics Wales 2021c).¹² For girls, the most popular subjects at NVQ 3 are Health, Public Services and Care (28% of girls), Science and Mathematics 12%, Business Administration and Law (11%) (Statistics Wales 2021c).

APPRENTICESHIPS

The need to address gender segregation and the under-representation of ethnic minorities and disabled people undertaking apprenticeships has long been recognised. As has the priority governments should give to addressing these inequalities (National Audit Office, 2019). The British Academy report on renewal post-COVID-19 provides a simple summary:

Apprenticeships at all levels are a more common pathways for boys, people from lower socio-economic backgrounds and white people. (British Academy 2021b)¹³

The number of women starting apprenticeships has been growing, particularly at the lower levels, since the range of study was expanded into traditionally female occupations (National Audit Office 2019). However, women find it harder to attain employment at the end of an apprenticeship compared to men, and immediately experience a gender pay gap due to gendered clustering within sectors and occupations (TUC 2018).

- Chwarae Teg's report on 'green' skills, found that just 1.6% of Construction and 3.1% of Engineering apprentices are women (Turkman, 2022), while they are 96% of Childcare apprentices.

¹² The figures include all those studying preparation for work and life at foundation and next level; this is the most populous group for all students but has been excluded from these calculations to highlight specific vocational subject areas.

¹³ The four main apprenticeship, types are Intermediate (Level 2), Advanced (Level 3), Higher (Foundation Degree and above) and Degree (Bachelors or Masters).

- The greatest gender difference was seen within higher apprenticeships e.g., in engineering there was 65 women compared to 1105 men, and NO women in Higher Apprenticeships in Engineering.¹⁴
- In 2021/22 Q1, 9.4% apprentices declared a learning difficulty and/or disability (LLDD) compared to 5.8% in 2016/17 (Statistics Wales, 2022b).
- In Q1. 21/22, 3.67% of apprenticeships learners were from Black, Asian, and Minority Ethnic backgrounds (BAME). This is 250 of 6810 total apprentice starts in Q1, 21/22.

Brown (2019) noted that just 50 women were in apprenticeship training in the fields of IT, software, web, and telecoms in Wales in the 2017/2018 academic year, compared to 505 men, reinforcing the concern that Wales 4.0 is an industrial transformation for men.

HIGHER EDUCATION

There is a substantial literature on how inequalities in education and training lead to unequal access to higher education and subject clustering:

Attainment gaps are also evident at higher education level. While there is an overall increase in participation in higher education, white British students in Wales have an attainment lead of 8.5 percentage points over BAME students. (Ogbonna, 2020)

The Welsh Government's Women and STEM (science, technology, engineering, and mathematics) Board continue to oversee progress on the Women and STEM Inquiry (2016a). A recently commissioned data review finds that women's enrolment in science courses increased between 2013/2014 and 2017/2018 in STEM subjects but that gender divisions persist (Arad Research, 2020).

Women are 14.7% of Engineering and Technology students, 15% of Computer Science students but encouragingly 40% of Physics and 39.1% of Maths students (Arad Research 2020).

On the accepted understanding of gender balance as 60/40 ratio, the latter two subject areas are now in gender balance. However, further interventions will be needed across equalities areas to create a diverse workforce that can offer the different perspectives needed to create an inclusive 'green' and digital future (Wajcman 2020).

Source and references: MacBride-Stewart and Parken, 2021.

¹⁴ Supplemental evidence for apprenticeships and Welsh environment policy supplied by Curop students Nawajesh Khan and William Flynn. Data compiled from: [Apprenticeship learning programmes started: interactive dashboard | GOV.WALES](#)

Currently, it is ‘boys, people from lower socio-economic backgrounds and white people’ (British Academy, 2021b), who are most likely to view apprenticeships as a worthwhile route to training and employment. However, the share of apprenticeship starts among young people from lower socio-economic is declining, whilst there is growth in young people from non-deprived areas (Sutton Trust, 2022). People from low-income families can be locked out of training by transport costs and loss of free school meals post 16 (Bevan Foundation, 2020).

Recent data on apprenticeship starts shows poor take up and occupational segregation among women, some ethnic minorities, and disabled people. The TUC finds the gender pay gap begins during apprenticeship training, and that women have more difficulty in attaining secure paid work post training (TUC, 2018). This is associated with their training in poorly paid sectors that tend to be over associated with precarious work (care, leisure, retail etc). This information should be a transparent part of career service discussions.

There is work to do to persuade learners of all ages that apprenticeships are for them, as well as encouraging/incentivising a change in subject choice. However, in keeping with the mainstreaming equality approach, the focus should not only on behavioural ‘nudges’ to change learner ‘choice’ but also on the system of recruitment and creating equitable organisational cultures for learning and employment,

Recent reports from the Wales Centre for Public Policy note concerns with the operation of the apprenticeship levy, continued underperformance in relation to qualifications and essential skills, and that over half of workers in the lowest socio-economic groups have not received any training since leaving education (WCPP, 2021). The report calls for lifelong learning in Wales to be a right for all ages, backed by a vision, sufficient funding, and improved infrastructure.

This would seem to indicate that step change in intervention is required in education and workplace training if we are to meet the Net Zero targets by providing training and retaining for new ‘green’ jobs in Wales, as well as protecting workers who are at risk as sectors decarbonise:

Regarding industry, 20% of Welsh jobs are exposed to the green transition, 150,000 jobs are ‘transitioned aligned’ on the green economy, and 140,00 require reskilling (Data Cymru 2022). The traditional sectors include Construction (30%), manufacturing (17%), and transport (26%), which account for 73% of the jobs in need of reskilling (Data Cymru 2022) ¹⁵

¹⁵ Data Cymru (2022) Construction: 30% of jobs in need of reskilling and construction employs 73,300 people in Wales. Manufacturing: 17% of jobs in need of reskilling, problems in skilled workers reaching retirement age (40%) and lack of diversity (96% of workers are white). Transport: 26% of jobs in need of reskilling and transitions could directly impact 120,000 jobs. Agriculture: Agriculture in Mid Wales accounts for 13.6% of all workers in the region, making it the third largest sector in terms of jobs.

Beyond education and training, those with protected characteristics continue to face inequalities in the workplace. The equalities evidence panel shared their evidence and insights on inequalities that may prevent wider participation in Net Zero training and jobs, and in so doing, prevent Wales from acquiring the required skilled workers.

WORKPLACE INEQUALITIES

The equality evidence panel provided further insights into current workplace inequalities, which will need to be addressed to meet the Net Zero targets and ensure a Just Transition.

Age

The Children's Commissioner's Office argued for a focus on young people including information on what jobs will grow; and ways for young people to access information on how jobs will change/new jobs/ green career pathways, incorporating learning from emerging approaches - for example. 'Climate Scotland: Developing the Young workforce' (2021). Many young people cannot take part in formal training as their earnings are needed to support the household. Adequate compensation/financial incentives and access to free travel/lunches etc. may be needed to widen participation. Young people must be imaginatively engaged in the road-testing of ideas.

Age Cymru provided a summary report on the position of older workers in the labour market now, and what will be needed for their inclusion in the Net Zero transition. Recent labour market data highlight that over 50s are falling out of the workforce following the end of the furlough scheme, with 180,000 fewer in work than before the pandemic (ONS 2021, in Age Cymru 2022).

Older workers are more likely to be living with long term health conditions, and/or are more likely to have caring responsibilities, particularly older women. Age Cymru's recent survey shows 31% of older people, who responded, currently look after, or give unpaid help or support to someone. Of these unpaid carers, 55% had increased the amount of care they provide in the prior three months (Age Cymru, 2002). A number of these carers reported that they had reduced their working hours or left their job due to their caring responsibilities. A lack of flexible working options creates labour market disadvantage (Age Cymru, 2022).

Further, lack of life-long learning and training options for ages 25+ will contribute to an inability to meet the reskilling needs of a transition to Net Zero (Age Cymru, 2022).

Disability

Disability Wales highlighted the recent report calling for greater inclusion of disabled people in decision-making and 'return to work' measures to address the high unemployment rate for disabled people in Wales, exacerbated by effects of COVID-19 pandemic (Foster and

Disability Task Force, 2021). The disability@work project has demonstrated employers are unsure about how to use the reasonable adjustment legislation to proactively recruit disabled people or adjust working arrangements for existing employees. If the focus on Net Zero jobs is technical, specialist and manual, there is a danger that disabled people will likely lose out.

Mainstreaming equality into the design and delivery of apprenticeship training is long overdue. The growth in the requirement for 'middle-skills' offers a potential route in to new and changing job roles for many disabled people. Remote/hybrid working during the pandemic increased access to work for some disabled people – reasonable requests for flexible working should be encouraged by employers.

Ethnicity

EYST argued that there is an urgent need to tackle poverty, including fuel poverty, within urban ethnic minority communities (cf. lack of space, pollution, and occupational hazards during COVID-19). Besides access to jobs and skills, some of the poorest communities' participation in education and low-paid employment may decrease due to the cost of living, due to the cost of transport to work for example. A Just Transition must address existing inequalities, and this must include engagement projects and programmes at a local level that can lead into education and training opportunities – ones that lead to increased earnings.

Some ethnic minority communities' distrust conventional education and training institutions and employers. Fearing discrimination, a rational choice can be made to avoid such institutions/businesses. Current approaches to diversity and inclusion are not transforming workplace cultures. These will need to change to attract talent from ethnic minority communities, who will need to be convinced that these institutions have an inclusive approach.

Gender

Chwarae Teg's (2022) report noted the poor representation of women in STEM and in the seven industrial sectors which are the focus of transition (Turkman, 2022). On the transforming economy, their evidence suggests women are at greater risk of job displacement/replacement due to automation and will miss 'green' job opportunities if they are narrowly focused on technical and specialist roles.

The current underemployment of disabled women and the disproportionate number of Black women in low-paid precarious work was noted, as was the increasing qualifications and employment gains for Indian and Chinese women (Turkman, 2022). Chwarae Teg, argued that a focus must be retained on interaction of gender and socio-economic inequalities across all equalities grounds. This should include research on unpaid work regarding managing Net Zero transitions in the home, which may increase women's time poverty and exclude them from training and retraining opportunities.

Chwarae Teg presented the Women's Budget Group research (2020) on a care-led recovery, arguing there is, and will continue to be, increasing demand in this low-emitting sector. Care support will be even more needed to underpin opportunities for women in the transition to Net Zero. Better-quality jobs, progression opportunities and fair pay will be needed to attract staff, and that we must avoid jobs typed 'green' leading to the devaluation of existing much needed social investments in care.

LGBTQ+

Much of the discussion on trust and the need to transform workplace cultures applied to LGBTQ+ people as well. Again, the concern re current workplace cultures was emphasised. It is essential that this becomes more inclusive to attract talent. Linking work and home, it was suggested that current LGBTQ+ advocacy on housing and rights could helpfully contribute to understanding housing needs of communities affected by climate change.

Religion

Cytûn noted data deficits and that information on religion is often conflated with ethnicity in datasets. There is some evidence of a 'climate change denier' stereotype being applied to Christians in recruitment. There is also awareness of a stereotype that some religious groups are less interested/involved in climate change but evidence from experience suggests some religious groups are self-organising around the issue; preferring not to join in with institutionalised organising/projects. Engagement will be key to including this expertise and opening avenues to providing access to carbon literacy/ employment opportunities. The Church in Wales is investigating insulation/retrofit for its historic buildings and has struggled to source expert energy audit assessors in Wales.

DEMAND SIDE: EDUCATION, TRAINING AND CAREERS PLANNING FOR NET ZERO IN WALES

Recent 'green' skills surveys show that employers and young people agree that decarbonising, nature restoration, and sustainability skills will be important for future careers, but neither are certain that the education system is providing the education and skills required (Learning and Work Institute, 2022, p. 7).

The equalities evidence panel invited further and higher education providers, the careers service, regional skills partnerships, and academics, preparing for the transition to Net Zero to give evidence to the panel by addressing the following questions:

1. How is Wales and your organisation preparing for Net Zero?
2. What is the requirement for training/upskilling for new skills/jobs?
3. How is equality being addressed?

Short briefing documents were provided by participants. In summary:

Regional Skills Partnerships (RSPs)

The key skills required are softer skills, including project management and digital skills. The Data Cymru (2002) report for the RSPs provides data on green jobs by listing current green businesses, decarbonisation projects and 'green' courses already being offered in further education in energy, construction, and electric vehicle maintenance.

RSPs are working with 9 industry sector groups who report skills shortages but also worries regarding the reduced availability of people, skills gaps/unfilled vacancies. They reported a desire to retain young people in the region and emphasised there are good opportunities for degree apprenticeships in Wales, but more work is needed on careers guidance/career paths. A number of STEM events in schools are underway, working with school heads.

Universities Wales

A long-term vision of Wales's skills requirements is required. There are opportunities for degree apprenticeships especially in STEM. Personal Learning Accounts will need to be expanded; funding commitments are needed for research to assist planning for new qualifications/retraining etc.

Universities could be advocates for learning in 'middle skills' and leadership that supports Net Zero equality, including strategic planning, trailing economic models and regulation.

Coleg Sir Gâr

Skills competitions are well established and a proven route to widening participation. There is concern about insufficient skill in the education sector in Wales to develop new qualifications - as part of the main curriculum that will include Net Zero in a flexible modular learning approach. New entrants in the field, for example charities that provide green classrooms and apprenticeships need support so they can help shape the qualifications landscape.

There is a knowledge gap between what business organisations need and young people's knowledge of opportunities, jobs, and careers.

Welsh Government Apprenticeship Programme

A Green Skills and Provision Audit is underway, which includes assessing what is already 'light/medium/dark green'. There are five emerging themes:

- Environment and Bioscience including National Nature Service
- Circular Economy
- Decarbonisation including retrofit
- Renewables – including transitions in energy /gas
- Digital Innovation

The intention is to create a skills plan for these areas including new apprenticeships and adapting existing apprenticeships. Full and part time routes will be available. The Personal Learning Accounts Budget is £27m, £3m of this is focused on green skills. Work is underway on Net Zero within the Employability Plan, and WG is funding 2 roles within Colegau Cymru to map and co-ordinate FE provision.

The Welsh Government view is that 'green' skills and equality should cut across industries. However, greater access, availability and visibility of opportunities is needed, including increasing digital learning provision.

Careers Wales (CW)

Careers Wales (CW) is working with FE/HE to develop labour market intelligence (LMI) and is creating an influencer programme, working with parents and teachers to discuss new knowledges/skills requirements.

There will be a new website for jobs/careers information. A Brighter Futures vision/strategy is being prepared with the principle of 'leave no-one behind' – equality in jobs and skills. Year 8-9 group sessions are being provided challenge gender stereotyping. CW intends to target 50-year-old+ women for Apprenticeship Programmes

Colegau Cymru (CC)

Colegau Cymru argued that there were many separate conversations taking place on the transition to Net Zero but there was an urgent need for a need for a coherent approach. Welsh Government has an important coordinating role here. There is uncertainty about whether to focus on future skills or upskilling as needs arise in existing industries (changes to existing jobs/job redesign). It can be difficult to persuade industry to provide working time to focus on future skills needs. This has been the case for some time but in addition businesses are now dealing with staff shortages, unfilled vacancies, recovery from pandemic and addressing current skills needs.

Upskilling the existing workforce in plumbing is underway. The current workforce is predominantly comprised of men in their fifties and there is significant gender, ethnicity, and disability occupational segregation which, in addition to ageing workforce issues present an urgent need for diversity. The changing curriculum in design, architecture might attract a wider pool of workers.

Previous Positive Action initiatives in STEM have not solved these issues, so inclusive programmes must be designed and scaled up/embedded in current institutions. Changing job role titles can assist – e.g., technician is less associated with 'dirty work in manufacturing/construction. More examples of 'what works' were called for.

The panel also heard from Dr Dean Stroud and Professor Phillip Brown on their work on the transition in steel and the digital economy, respectively. These contributions confirmed that since the existing workforce in these industries evidenced extreme gender segregation (over

85%) there was some certainty that inequalities would increase in the transition unless specific actions are undertaken.

CONCLUSION

The conclusions from this evidence are concerning. They suggest that it might be possible to provide the skills required for Net Zero 2050 targets but that there is insufficient time to address inequalities for the staging points of the Net Zero targets (2030, 2035, 2040).

On the other hand, it was argued that without addressing inequality and widening the pool of potential trainees and labour, meeting the timescale for transition is much more challenging.

It is clear from the evidence from expert witnesses that some 'green' training/re-skilling provision exists, but the evidence panel heard from witnesses in further, higher education, regional skills partnerships, and the careers service, that there is currently insufficient relevant learning in current programmes, and insufficient urgency, communication, and coordination to enable training providers to meet skills targets.

There is enthusiasm for the challenge of re-skilling/upskilling from providers and advisors but no clear demand. Lack of demand is thwarting action- providers do not want risk educating and training people for jobs that may not exist. Government intervention is needed to create demand.

DISCUSSION

Preparing for Net Zero is much more than an economic transition- society and culture will change alongside the environment. We will all learn to live and work differently and will need to be enabled to be involved in, and contribute to, the transition. As meeting the Net Zero targets will not avoid the consequences of the climate damage already done, support will be needed to build resilience for individuals and communities. The evidence panel heard many examples of people's willingness to be part of the transition, as well as frustration at not knowing how to be involved.

Net Zero skills training and retraining is needed beyond the 'highest emitting' sectors identified in the CCC reports (2021). Sustainability knowledge is needed in all education and training, and current job roles. New pathways will be needed for sustainable employments in the future. The replacement of workers can be avoided through valuing employee participation.

The transition in skills is as much about middle skills as specialist skills (across all sectors), and this provides shorter term opportunities to diversify the workforce, while the longer-

term project of tackling occupational segregation is underway. Leadership education is vital so that leaders know what is required of their organisation to enable a Just Transition.

Our conclusion from the evidence provided by equality and sustainability organisations, policymakers and providers, and academics, is that efforts are underway to provide skills training but in a piecemeal and uncoordinated way.

Uncertainty about which skills will be needed and in what numbers is stalling the rapid transformation required. Intervention to stimulate demand and practical methods of turning sentiment on equality into action is needed and a sense of urgency is required.

The evidence suggests the following contradictory propositions. The choices policymakers make now regarding education, skills training and retraining and widening participation, will determine which outcomes are most likely:

- The transition to Net Zero will provide growth and new jobs which will help to address current labour market inequalities.
- Existing education and labour market inequalities will make the transition to Net Zero harder.
- Meeting the targets in the timescale is possible but not if we want to address equality and inclusion - we might have to move the targets or accept inequalities will increase.
- We cannot meet the targets unless we widen participation/inclusion as not enough of the occupationally dominant demographic is available.

With a view to ensuring that the transition does address current inequalities, the evidence panel suggested the following five key policy development recommendations for consideration. These are designed to promote equality and secure a Just Transition to Net Zero by widening participation in education and training, leading to Fair Work.

RECOMMENDATIONS: AN EQUAL AND JUST TRANSITION

The evidence review suggests that we will not meet Welsh Government's Net Zero or equality ambitions, such as an Anti-Racist Wales, unless there is significant investment in intervention programmes to upskill workers in Wales through an approach centred on increasing diversity, and ensuring that decent green jobs, are underpinned by Fair Work principles.

The evidence panel concluded that the route to building capacity was through advancing equality. Further, that there is potential for all employees, whatever their role, to contribute to the transition. The panel developed the following recommendations to increase inclusion; address workforce capacity; enable the Welsh Government to promote equality; address demand side problems; and instil a sense of urgency for action.

CARBON LITERACY FOR ALL

The idea of carbon literacy is not a new one, which means that there is a body of evidence assessing its effectiveness with different groups including children (Satchwell 2011) and those with low literacy (Horng et al. 2013). There is also research that informs how carbon literacy can be used effectively in specific contexts to improve practices (Chappel et al. 2020) and to inform knowledge and decision-making (Dósa and Russ 2022).

A review of the research literature reveals a recent shift away from an approach that targets those perceived to have the least amount of knowledge, to a more inclusive approach that involves all groups and sectors in society. The rationale for a ‘carbon literacy for all’ approach is based on emerging evidence that perceived knowledge does not coincide with actual knowledge (i.e., those who rate themselves as having the greatest levels of literacy overestimate their knowledge relative to others who rate their knowledge as less or lower (Kite Insights 2022)).

Furthermore, an international survey on carbon literacy (Russel et al. 2022) reported that carbon literacy is most effective in bringing about social change when implemented as a systemic approach that supports and involves all citizens. An ‘education for all’ approach builds important coalitions for example between current and future professionals and is part of the process of ensuring all groups in society transition away from contributing negatively to our climate emergency.

It is in this context that the equalities evidence panel members proposed a ‘mass’ carbon literacy programme that:

- i) makes use of existing community-based programmes, such as the Manchester model
- ii) comprises a ‘short and sharp’ education programme about the climate emergency and what Net Zero means
- iii) is ‘free and factual’
- iv) is available to all
- v) prioritises uptake by people who a) are employed by SMEs or not employed, b) not in education
- vii) where uptake is low, offers incentives to encourage participation by people from priority communities (phase these incentives by community to identify what works/ doesn’t work)
- viii) leads to an active commitment to contribute to the transition to Net Zero.

Such an approach could prompt a natural expansion of the definition of Net Zero jobs and skills, as each person enrolled will shape understandings of the way that every job can and should contribute to decarbonisation. The current sectoral approach creates a silo for carbon literacy and application.

The carbon literacy programme should: i) link participants to entry level projects that build experiential understanding of climate change (whether local community organising, grow your own etc); ii) signpost to new jobs/skills and/or to training and job redesign services iii) provide further advice, information, and links to resources on how to participate in Net Zero projects iv) provide equality resourcing and information. The panel recommended that the Government should:

- Enable Welsh citizens to understand how their jobs and lives create emissions and enable them to be involved in making changes and identifying their skills needs.
- Resource and learn from existing carbon literacy ‘start ups’ and harness activity from those citizens already engaged through, for example, Climate assemblies and community hubs, local volunteer groups such as Women’s Institutes, to develop a Wales wide programme.
- Create co-learning opportunities i.e., intersectional, diverse experiences that ensure accessibility (inc. cost) *e.g.*, peer-led climate action, and use engagement and experience rather than top-down education to enhance literacy. For example, engage community elders in approaches that cascade learning (a train the trainer approach, possibly termed “carbon carers”).
- Learn from WTUC training of green and equality representative regarding co-working; draw on learning from the use of the Wales Union Learning Fund (WULF) and draw on research being done with the Steel industry and on homeworking impacts.

Monitoring and evaluation measures for such programmes vary. The Carbon Literacy Programme Manchester, for example, measures behavioural change as one of its outcomes through an approach that commits participants to two pledges to reduce carbon emissions. Sustain Wales, ‘Train the Trainer’ approach to carbon literacy, which is used by many public services in Wales to build communities of practice, assesses whether organisational champions follow up on their planned actions. An overall data strategy needs to be part of any action plan that implements a carbon literacy for all approach (Nesta, 2022).

While carbon literacy is not a new solution for Welsh Government, the panel made specific recommendations to move beyond a pledge for individual public bodies (see All Wales Plan 2021-25 Working Together to Reach Net Zero, Welsh Government 2022) and integrate a carbon literacy programme with the National Climate Programme (below) through a media and social media campaign that avoids conveying a top-down approach.

NATIONAL CLIMATE PROGRAMME

Our evidence showed that a sense of urgency is needed to gain the skills required to meet the Net Zero decarbonisation targets:

To meet the net zero targets by 2050, the Construction Industry Training Board (CITB) states that 50,000 homes in Wales will need to be retrofitted with green home technologies and systems from 2020 onwards. (Data Cymru, 2022, p17).

The RetroFit programme has been highlighted by the UK Climate Change Committee as being vitally important in reducing carbon emissions in Wales. There is also excellent research, intelligence, and data available as outlined in this report. The data confirms that the skills demand associated with RetroFit could become urgent in a very short time scale. (Data Cymru 2022, p.64).

The task is made more challenging by a lack of demand, hesitancy on the part of business to invest. Within the evidence the mainstreaming equality panel considered a report by the Campaign Against Climate Change (2014).¹⁶ The report argues that to meet the required pace of change, and an estimated one million UK jobs that could be created in retrofit, renewables, electrification, decarbonising heavy industry, a National Climate Service (or programme) should be established.

This idea is similar to the United States' approach to investment and skills building recently outlined in the Green New Deal which includes a Civilian Climate Corps. Echoing Roosevelt's Conservation Corps of the 1930s, state governments were given 90 days to set out plans to mobilize the next generation of conservation and resilience workers (Rosa-Aquino, 2021). This is similar in its premise to the Natural Nature Service and has synergy with it but is entirely different in size and scope.

Findings from a number of surveys evidence young people's determination to work in jobs and careers that will contribute to decarbonisation and environmental, economic, social, and cultural change. The Learning and Work Institute UK research for World Skills finds that:

Most young people surveyed feel inspired to pursue a career that can help the UK to reach net-zero and are strongly motivated by a desire to combat climate change. (Learning and Work Institute (LWI, 2022, p7).¹⁷

¹⁶ And see follow up reports: <https://www.campaignccc.org/>

¹⁷ See also National Grid report as above, and

<https://www.bbc.com/worklife/article/20220225-how-climate-change-is-re-shaping-the-way-gen-z-works>

<https://www.renewableinstitute.org/youth-and-the-climate-crisis-exploring-opportunities/>

<https://www.businessinsider.com/climate-change-crisis-generation-z-sustainability-focused-careers-report-2021-9?r=US&IR=T>

Kite Insights (2022) undertook 7,000 interviews with people aged 18-65 (including the UK, US, Brazil, and India), across 15 major industries to assess employees' knowledge on climate change and its impact. They found that 83% of employees said they are ready and willing to support climate action in the context of their work (p.5).

The Evidence Panel recommend that the Welsh Government takes a giant leap-forward by directly investing in and employing workers for renewables, retrofit, and transport electrification. Direct investment also provides the opportunity for value retention of renewables in Wales.

Transport for Wales is already in public ownership (Transport for Wales Ltd and TfW Rail), paving the way to investigate how to establish public public-private partnerships/ social enterprises in retrofitting and renewables. Welsh Government is scoping the different schemes needed for alternative housing stock and a system of grants or loan to householders, or tax incentives to encourage social and private sector landlords to make home and public building energy efficient (and energy producing through wind and solar) (Nesta Podcast with Julie James MS 060722).¹⁸ But it needs to take a lead and 'kick-start' the retrofitting process, which would build skills, boost entrepreneurial activity after the first waves of trainees are qualified, and give businesses the confidence to invest in retrofit, renewables, new household and community energy systems, and in the skills of their employees.

The proposed National Climate Programme for Wales would integrate existing job, skills, and training programmes such as the employability programme, apprenticeships and the Youth Guarantee programme, and investment funding from the Development Bank (to lever further investment) enabling a direction of focus, training pipelines and career trajectories, and would enable diversity. This approach would help to foster equality in opportunity and retain benefits in Wales, while ensuring we make the progress we need within the short and medium term to meet our Net Zero targets.

Whether constituted as a new programme or enterprise, the Welsh Government would be the employer, perhaps through a wholly owned subsidiary. This would give Welsh Government direct control over widening participation and the ability to establish equitable and inclusive workplace cultures through recruitment, selection, and induction. Social partnership and collective bargaining arrangements would be applied to embed Welsh Government Fair Work principles.

Evidence shows that highly skilled Gen Z employees increasingly consider the equality and sustainability attributes of a company when choosing an employer (Ro, 2022). By integrating these standards WG would be able to compete for employees and set a standard that Welsh employers will need to match.

¹⁸ <https://www.nesta.org.uk/event/thenest-how-quickly-can-we-decarbonise-homes-in-wales/>

Creating a National Climate Programme will ensure that the education, training, and advice sector can provide services for existing employees that unlock their desire to incorporate sustainability in their work.

The panel recommended that this proposal should be fully scoped. Such a programme could provide the step-change urgently required to meet the Net Zero targets and by retaining control over the employment process, Welsh Government can embed and ensure cultures of equality and inclusion in fair and sustainable work: setting a standard for other employers to model.

Inequalities in existing workplaces and training organisations also need to be addressed to overcome the mistrust by minority or disadvantaged groups discussed by the panel. A cultural change programme for existing colleges and businesses is recommended.

CHANGING WORKPLACE CULTURES

Demonstrating a clear commitment to equality, diversity and inclusion has long been seen as an ethical duty and a key strategy for attracting talent (Pearn and Kandola, 1996). However, data of all kinds demonstrate that, to date, these strategies have not resulted in workplaces that are representative of society and communities.

There has been a collective failure to overcome entrenched workplace inequalities and deliver more equitable working conditions, career and pay progression through workforce diversity plans. McKinsey's rolling workplace survey finds that while some large companies are making progress, the majority have stalled or are going backwards since 2014 (McKinsey, 2020). In response, inclusion has been added to the mix, in a recognition that recruiting a diverse workforce can result in lack of retention if workplace cultures do not also change.

To entice atypical workers into the seven main decarbonizing sectors, workplaces need to work harder to demonstrate their genuine equality credentials, while also demonstrating their sustainability bona-fides. [The LWI research on Net Zero skills](#) found that:

Corporate sustainability and social responsibility strategies, demonstrating how a company is having a positive impact on the environment, are vital in attracting young people into employment. (2022, p. 7).

As we heard from our Evidence Panel, a fear of bad treatment, discrimination, being undervalued or just not being able contribute by being actively heard, creates a set of 'chill factors'. These create barriers to working in a wide range of organisations, but particularly in STEM or energy and construction industries. Existing workplace cultures urgently need to be reformed, and new workplaces need to be vigilant to ensure these patterns are not replicated in the renewables, biodiversity, and circular economy sectors.

Evidence shows that this is a growing danger as skills and job enhancement programmes currently being scoped continue to be dominated by white men as owners, employees, and trainers. An 'energy diversity gap' (Pearl-Martinez and Stephens 2016) is apparent in the energy industry in Wales where existing jobs, and new jobs in renewables employ a majority of white, abled-bodied men, which can lead to reproducing the narrow and exclusive cultures of existing energy industries (Emmons Allison et al 2019). The role of social partnerships in making change are vital for a Just Transition. From a restorative justice perspective, providing women or marginalised groups with access to a Net Zero job training or reskilling may not be enough. If workplace cultures and structures are androcentric, green projects may reinforce inequality (Lund Rasmussen et al 2021).

There is no shortage of ambition among organisations that recognize the needed for diversity in the transition. For example, RWE - the largest renewables energy supplier in Wales - has the ambition 'for a cultural diversity approach and intersectionality (gender, disability, age and sexual orientation) that reflects people's privileges...promotes equality [includes a] women's network and LGBT+ network [and supports] disabled employees via an inclusion action plan...offer[ing] young people with disabilities sustainable barrier-free provision and participation in the workplace' (RWE 2022). However, support for challenging workplace cultural norms is needed.

The Evidence Panel provided an important resource for information about different approaches to address the paradox of 'access for all' type programmes where despite talent and engagement being evenly distributed across social groups, opportunities to get involved are not shared in the same way. Organizations such as Babbasa in Bristol are working with industry partners to lead the way <https://babbasa.com/>. The evidence panel recommended that Welsh Government partners work with community organisations in Wales to support them to act as a trusted gateway to training providers and workplaces that already have positive (anti-racist etc) workplace cultures in place. The support extends to coaching and mentoring when in employment.

As discussed above, almost all the skills prediction reports acknowledge the central importance of greater diversity. How to achieve this is less well understood. Involving social partnerships, and particularly SMEs given their significance in the Welsh economy, the equalities evidence panel recommend further research to:

- Identify the specific issues social groups experience regarding access to training and learning, in and out of the workplace, across the life course.
- Scope workplace and training provider organizational cultures in Wales
- Estimate the extent of occupational segregation in Wales' workplaces and apply learning from best practice examples of working with employers to tackle this - job switching/positive action programmes/mainstreaming equality into education and workplace systems and practices.
- Learn from good examples such as the Aberystwyth University agriculture courses which are now dominated by women.

Existing employees and those whose jobs may be under threat as heavy emitters transition out of dependence on fossil fuels or who, in any sector, are in danger of job losses as new knowledges or skills are required, will need support to stay in work. One method of achieving this is by offering employers support with job redesign.

JOB REDESIGN

Using the Evidence Panel's typology (see expanded definition above), support for job redesign may be needed to audit, scope, and identify skills requirements in:

- 1) New and emerging jobs**
- 2) Jobs affected by the transition requiring new skills/knowledge:**
- 3) Existing Jobs that will be needed in greater numbers:**
- 4) New sectors not automatically considered as having Green Jobs**
 - a. Social care (including the redesign of cities and transport systems to support societal changes)
 - b. Education (new research and teaching),
 - c. Health (innovation - new products (e.g., less aerosols) and surgical processes.

As education, skills and processes change, employers will need support to scope new job roles. The evidence panel's concern for equality is related to avoiding job displacement/replacement, and ensuring accessible in-work training, and opportunities for progression.

Previous research with a local authority in Wales, showed there were over 1250 job titles, many of which were obsolete and had been forgotten or replaced over time in a piecemeal way (Parken and Ashworth, 2019). When jobs are not systematically redesigned opportunities for inequality in skills and task identification, and consequently pay, can creep in. Job redesign should work with job re-evaluation processes and skills audit to avoid discrimination, ensure fair pay and reward and that jobs not typed 'green' are not devalued. Access to such expertise is limited.

With regard to workers in steel, coal and oil energy and manufacturing who are at risk of being displaced from the labour market in the transition, we have drawn on the TUC's (2021) proposal for a 'furlough' period for employees. The example given is of closure of an 'old' energy power plant, with the proposal that prior to closure an alternative low carbon economy function is identified. Employees are then furloughed while they assist management to scope new processes, work flows etc., and retained and retrained for the new function of the plant.

Workers in category 4, will all need carbon literacy training, communications, team-working and problem-solving, to harness their existing skills, for innovating sustainable change. As jobs change to encompass new knowledges, job redesign can assist employers to consider and ways of working including when, where and how the tasks can be best completed.

The draft South Wales Industrial Cluster plan for clean growth notes the need for a comprehensive skills audit for decarbonisation and the need to include equality, diversity, and inclusion expertise:

Recommendation 1: For industry in the South Wales region, it is recommended that a single point of contact is identified for conducting an independent audit of skills needs to meet decarbonisation. The result of the audit should be discussed by an expert panel involving key stakeholder representatives (e.g., employers, trade unions, government, sector organisations, education, and training providers), including climate-change groups and EDI representatives, with the results reported to government for actioning (SWIC 2022, p.5)

Workforce and organisational development specialists will also need to be involved to redesign work content and processes. This is also an opportunity to include default flexible working practices and improve opportunities for horizontal and vertical jobs progression (Webb et al., 2018). A specialist job redesign support service could be a tremendous asset in ensuring Wales has the requisite skills, improve working practices and support workplace culture change.

GREENING CARE

Panel members noted that the health and care sectors comprise many unpaid, and part-time paid workers who are often in precarious and unstable employment. It is largely women who take up household-level measures to address decarbonisation in their own homes and care facilities. This role in the day-to-day management of care is overlooked in a sectoral approach.

The Evidence Panel recommended broadening out the green skills approach to include home care as part of its recommendation that Net Zero skills become valued across society and are not limited to traditional male-dominated occupations. Chwarae Teg (2022) makes a similar point when they state:

both paid and unpaid care work are at the heart of a green transition, and that the care sector is already a low carbon sector. The formal care sector not only creates jobs for many but is also fundamentally embedded to the wellbeing of us all. Despite this, many green economy plans overlook care entirely (Turkman, p.15)

Furthermore, care demands will need to be met or women's opportunity to train, career switch and retrain for the transition, will be restricted. In addition, social investments can stimulate economic growth and employment. Evidence from Women's Budget Group

modelling, shows (2020) that investing in care to the same extent as the UK's 'shovel ready projects, would:

... produce 2.7 times as many jobs as an equivalent investment in construction:
6.3 times as many jobs for women and 10% more for men" (p.15)

The Women's Budget Group notes that the care economy still has the potential to be made greener, more equitable and more valued. Their report cites recent examples from procurement decisions in the NHS, the role that the NHS has in providing well-paid jobs in Wales, and the role that health and social care played in the Covid pandemic (WBG 2020).

The 'green potential' of this sector was especially important for the evidence panel given the post-Covid-19 acknowledgements that the large numbers of women, people from minoritised ethnic communities, and low paid staff employed in this sector contribute in ways that may be previously invisible or unacknowledged (British Academy, 2021a).

Including social care in the transition aligns with the recent plan for social and health care in Wales (Wales NHS 2021) which includes the intent to deliver more localised health and social care services, involving primary care, but also strategic planning, hospital transport and infrastructure/buildings etc. As health and care services are devolved, the panel recommends that the Welsh Government takes this opportunity to include and revalue the health and social care sector as part of a whole system transition to Net Zero.

CONCLUDING REMARKS: A SENSE OF URGENCY

The equality evidence panel's work shows that to meet Net Zero targets, grow green technologies in Wales, and retain the benefit of new skills, existing inequalities need to be reduced. Wales needs a radical set of interventions focused on widening participation.

The potential benefits for Wales are clear: a just and equitable transition to Net Zero and an engaged and effective transition with clear societal, economic, and environmental benefits for current and future generations in Wales. The urgency of achieving Net Zero goals is now being driven by both consumers and business. The public sector risks being left behind, despite its own potential to tailor and shape unique solutions to whole society engagement (Guidehouse 2022).

While acknowledging the proactive and progressive approach in Wales, the equality evidence panel urges the Welsh Government to set out a realistic plan, centred on the principle that proactively promoting equality is the essential route to meeting the Net Zero goals within the timescale of the transition.

The Evidence Panel has proposed creative solutions for an integrated societal, economic, and environmental (sustainable development) equal and just transition to Net Zero.

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APPENDIX ONE - MAINSTREAMING EQUALITY AND JUST TRANSITION EVIDENCE PANEL

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Jessica Laimann - Women's Equality Network

Andrew Charles - Welsh Government

Christopher Hare - Welsh Government

Emma Edworthy - Welsh Government

Heather Davidson - Welsh Government

Laura Price - Welsh Government

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