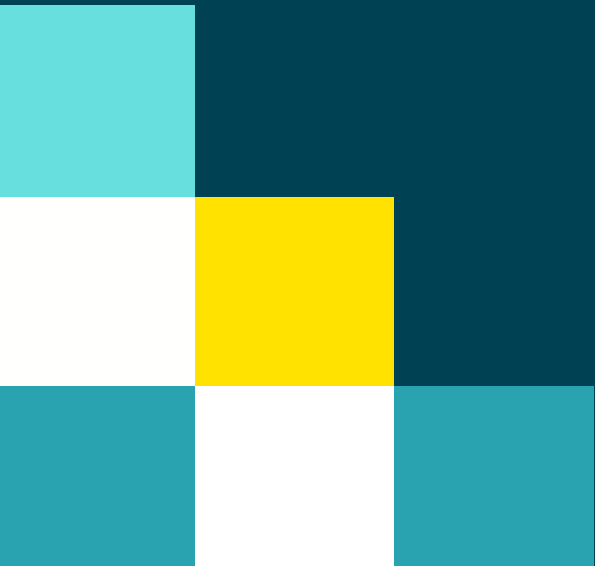




**Wales Centre for Public Policy**  
**Canolfan Polisi Cyhoeddus Cymru**

# Developing skills for a just transition

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# Summary

- This think piece brings together evidence on the ways in which previous industrial transitions were managed, and highlights opportunities to incorporate lessons learnt into policy and regulatory approaches to a just transition to net zero in Wales.
- Decarbonisation will result in an increased demand for both technical and ‘soft’ green skills in new and existing industries, but there is currently a shortage of these skills and limited training opportunities to meet this demand in Wales.
- There is concern that workers in carbon-intensive industries will be reluctant to retrain or upskill, and older workers may seek to retire early, thus limiting the supply of high-skilled labour and, in turn, the growth of green industries.
- Lessons learnt from previous industrial transitions in the UK and internationally demonstrate that to support workers and improve the supply of and demand for high-skilled labour, policy responses should target:
  - Skills development;
  - Fostering business partnerships; and
  - Worker and community support.
- Where policy responses have been successful in managing transitions, effective delivery approaches that were observed include:
  - Strategic planning;
  - Localised and individual delivery; and
  - A collaborative approach.
- Policy responses to manage the transition to a decarbonised economy in Wales will require action and coordination across industry, skills institutions, local authorities, and the Welsh Government.
- Jointly identifying skill needs, assessing skills in the current workforce, developing targeted and relevant training and learning opportunities, and supporting research and innovation to increase demand for high-skilled labour will be important.
- The Welsh Government and local authorities could identify high-risk areas and provide targeted interventions to strengthen communities and regions most impacted by the transition.

# Introduction

The transition to a decarbonised or climate-neutral economy in Wales presents opportunities and challenges for workers and communities, particularly those that are heavily reliant on carbon-intensive industries. There is evidence that net-zero policies and environmental regulation will lead to an increased demand for more technical skills and the creation of more jobs (Valero et al., 2021).

**‘Many of these new jobs are expected to be highly skilled and well paid and will provide opportunities to redeploy employees from traditional industrial sector[s]’ (Welsh Government, 2021d: 11).**

However, many workers and communities in Wales are poorly prepared for the transition to a decarbonised economy; there are high numbers of low-skilled workers, decreasing levels of participation in further education and apprenticeships, and a high risk of job losses resulting from the closure of carbon-intensive industries.

The economic and social implications of the industrial transition in Wales may be understood through a ‘just transitions’ framework (Price et al., 2021). A just transition is also a key theme in the Welsh Government’s Net Zero Wales plan, “recognising this decade of action as a pivotal moment to develop green skills for jobs of the future as well as developing a better understanding of the impacts of change, and how to make sure these are fairly distributed in society” (Welsh Government, 2021d: 4). Newly created green jobs require more technical skills—and therefore more education and training—as well as analytical skills associated with the wider economy (for example, leadership and communication skills) (Valero et al., 2021). It is therefore important to ensure equitable access to training and skills development as well as new labour opportunities, particularly in regions and populations hit hardest by the transition. In addition, revitalisation through social support structures and investment in innovative technologies and research are important to maintain and build resilient communities and labour markets.

This think-piece seeks to identify opportunities to address and mitigate the social and economic impacts on workers and communities associated with the transition to a decarbonised economy in Wales. In particular, this work focuses on the importance of supporting workers and their communities, as well as strengthening the supply of and demand for high-skilled labour. We discuss ways in which previous international industrial transitions have been managed,

and we conclude by highlighting opportunities for skills institutions, industry leaders and representative bodies, the Welsh Government, and local authorities to incorporate lessons learnt into policy and regulatory approaches in Wales.

# Welsh Context

There has been an increasing focus on decarbonisation and the idea of a just transition in Wales, with associated opportunities that may result. However, there are also structural challenges and vulnerabilities within the Welsh economy that mean it will be important to carefully manage the transition.

Wales' economic and human geography are still shaped by the legacy of industrialisation and prior economic transitions: large urban and peri-urban areas in South Wales developed around coal extraction and heavy industry (especially steel), and in North Wales settlements and the landscape have been heavily influenced by slate mining (Healy, 2019). While Wales has largely transitioned away from a resource extraction-based economic model, manufacturing remains a proportionally larger part of the Welsh economy than in the rest of the UK (Henley, 2021). This includes carbon-intensive industry such as liquid natural gas terminals and oil refineries in Pembrokeshire and steelworks in Port Talbot and Newport, and fossil-fuel powered vehicle and aeroplane manufacturing. Wales has several local authorities where such carbon-intensive employment is concentrated. Tables 1 and 2 show Welsh local authorities in the UK top 20 by percentage of the workforce employed in emissions-intensive heavy industry (Table 1) and vehicle manufacturing (Table 2).

**Table 1. Employment in emissions-intensive heavy industry: selected local authorities in Wales**

<b>Local authority</b>	<b>Percent employed in heavy industry</b>	<b>Employment in heavy industry</b>	<b>Rank in GB (out of 387)</b>
Neath Port Talbot	8.7%	4,355	1
Flintshire	3.0%	2,250	12
Vale of Glamorgan	2.3%	970	17
GB total	0.54%	166,000	n/a

Source: Wallace-Stephens (2021a).

**Table 2. Employment in vehicle manufacturing: selected local authorities in Wales**

Local authority	Percent employed in vehicle manufacturing	Employment in vehicle manufacturing	Rank in GB (out of 387)
Blaenau Gwent	4.7%	900	8
Merthyr Tydfil	3.0%	700	13
Bridgend	2.8%	1,600	15
Torfaen	2.4%	900	19
Carmarthenshire	2.2%	1,600	20
GB total	0.5%	156,400	n/a

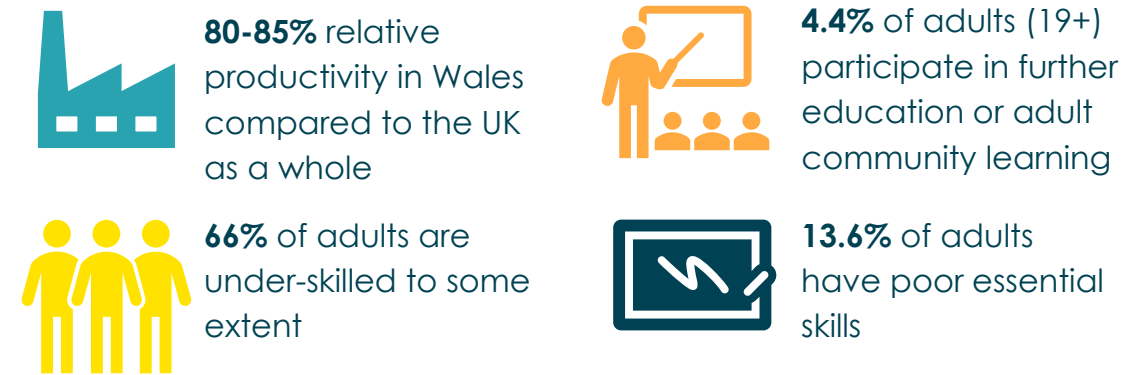
Source: Wallace-Stephens (2021a); SMMT (2021).

Decarbonisation may result in the closure of some industries, and the adoption of low-carbon processes in others, both of which could affect the size of the workforce and the skills required for industry (Wallace-Stephens, 2021a). It is highly likely that some jobs or job types will be replaced while others are created.

Productivity is lower in Wales than elsewhere in the UK, with relative productivity consistently between 80-85% of the UK level (90% excluding London) since 1998 (Henley, 2021). This is lower still in the rural areas of mid and West Wales, with Powys seeing some of the lowest productivity rates in the UK (Henley, 2021). Developing skills is seen as a 'critical productivity driver' (Henley, 2021: 9). However, a high proportion of adults in Wales have low qualifications, with 13.6% of adults having poor essential skills and 66% being under-skilled to some extent (Pember et al., 2021). Adult participation in further education and adult community learning has declined considerably in the past decade, with the proportion of adults (aged 19+) in further education reducing from 7.6% of the total adult population in 2012/13 to 4.4% in 2019/20 (RCU, 2021). There has been a similar drop in total numbers in further education and those starting traineeships, although apprenticeship numbers and first-degree enrolment have remained steady or grown slightly since 2012/13 (Chapman and Kiberd, 2021). It should be noted, however, that younger members of the workforce are more qualified than older members (Welsh Government, 2021c).



**Figure 1: The Welsh skills challenge.**



Source: Henley (2021); RCU (2021); Pember et al. (2021).

To address these issues while ensuring that workers who are affected by decarbonisation are able to transition into new roles which meet their needs, it will be necessary for all those involved to understand the opportunities and challenges which lie ahead and to plan for the skills development that will be needed.

It is likely, given current trends, that some sectors will be affected by and will need to adjust to decarbonisation sooner than others. These sectors are generally those where decarbonised or ‘green’ alternatives are already commercially available and widespread, such as electric vehicles; where political will and priorities lie, such as home efficiency; or where decarbonisation targets are felt to be most pressing, such as clean energy. Research from the Confederation of British Industry (CBI) confirms that these sectors include home efficiency and decarbonisation of heat; the automotive industry; and clean energy (CBI, 2021). In addition, the waste management and construction sectors are also likely to require new skills (Unionlearn, 2020; HM Government, 2020).

The decarbonisation of these industries will create demand for a variety of green skills. These skills could arise either from the creation of new jobs; the substitution of existing jobs with new jobs (e.g. the shift from road-based to rail-based logistics); or from the ‘transformation and redefinition’ of existing jobs (Wallace-Stephens, 2021a: 6). There is likely to be increased demand for processes including manufacturing wind turbines, deploying solar panels, constructing nuclear reactors, installing energy efficient products, producing alternative fuels, and manufacturing batteries and charging points for low-emission vehicles (Wallace-Stephens, 2021c). This would lead to an increase in skilled roles in these industries to meet these needs. At present, however, there

is a mismatch between the skills and training that is available and the needs of these industries (CBI, 2021). In addition, it is likely that there will also be demand for people with broader skills, such as leadership, digital, management, and people skills, which will be important cross-industry skills for the future workforce (CBI, 2021).

In Wales, research suggests that the most prevalent form of 'green' jobs involve the development of additional skills in existing roles rather than new job types, although some 'new' jobs are also present (Valero et al., 2021). This research also finds that green jobs tend to be better paid at lower skill levels and less vulnerable to automation than their non-green counterparts, although at higher skill levels there does not appear to be a pay premium (Valero et al., 2021). This suggests that supporting green jobs could bring broader economic benefits as well as being used to assist workers vulnerable to the effects of the transition.

There will be challenges to supporting green jobs, however. These jobs are often ill-defined making consistent measurement difficult (Harris, 2021). To address this, there is a need to develop better measurement methodologies but this will require further research (Valero et al., 2021). Secondly, the process of transition is likely to interact with other factors including automation, demand change and the long-term effects of the Covid-19 pandemic, which may complicate efforts to retrain workers and mean that new, green jobs may not be sufficient to replace lost jobs.

There are, furthermore, likely to be second-order and indirect effects of decarbonisation on employment and skills in the wider economy. A second-order effect would be the impact of decarbonisation of a sector on wider employment associated with that sector. For instance, while there are 156,400 workers employed in vehicle manufacturing in the UK, there are 797,300 workers in the broader automotive sector including retail and finance (SMMT, 2021). Changes to the makeup of the automotive industry or broader shifts in demand (such as a move away from private car ownership) will have first-order effects on manufacturing but also broader effects on the wider industry. For instance, finance or retail workers could see their roles change or disappear under certain circumstances. Indirect effects would be the impacts of decarbonisation on the broader economy. For instance, the closure of local industry could affect local 'foundational economy' services through reduced demand caused by people moving away to seek employment elsewhere. Conversely, decarbonisation and the green transition could be used to bolster local economies through (re)distributing economic opportunities through renewable energy or sustainable land management projects (Price, 2020). Second-order and indirect effects of

decarbonisation therefore have implications for delivering a just transition and should be understood (and modelled) in order to design and implement appropriate policy responses.

Thought must also be given to the potential for skills shortages to hamper growth in green industries related to the supply of labour. For instance, some research suggests that existing workers in transition-vulnerable industries may be reluctant to retrain, and some may choose to retire rather than acquire new skills (particularly in industries where the workforce has a higher average age) (Watkins, 2022). Additionally, the sectors such as motor vehicle repair have historically been an important source of employment for groups such as young men from working class backgrounds (Watkins, 2022). These sectors have often had low barriers to entry allowing those without formal qualifications to maintain employment. Changes to these sectors including the requirement to acquire more formal qualifications may change the makeup of this workforce; a pattern that will be exacerbated if the costs of retraining fall mainly on workers themselves (Watkins, 2022). It will be important, therefore, to ensure that vocational and work-based learning is made available to affected workers, including through action to tackle barriers to learning for people with lower levels of formal qualifications.

There is some evidence to suggest that private investors have withdrawn investment due to factors such as a lack of emphasis on skills development in South Wales (Wagner, 2021). Tackling these skills shortages is likely to require interventions including providing incentives for apprenticeships and skills development (Chapman and Kiberd, 2021). Development should start in schools, which will be important given the relatively poor academic performance of students in ex-industrial areas in South Wales (Wagner, 2021) School and post-compulsory education curricula should, therefore, encourage and facilitate the development of new skills (Future Generations Commissioner, 2020; Pember et al., 2021). For instance, this be encouraged by vocational streams starting earlier in school progression and employers actively engaging with them (Jones, 2019).

Training offered by employers and industry bodies will also need to change to reflect the new skills needed: to take one example, the construction industry will need to prioritise retrofit and modern methods of construction instead of established new build techniques (Eunomia, 2021). This would help to ensure that there is a pipeline of employees able to take advantage of new opportunities when they arise, although it will be easier to do this where future skills are

already known. In some industries, futureproofing skills in this way will be more difficult.

There are also likely to be disparate impacts across different places and populations with unique challenges for rural and peripheral regions, sectors with large emissions, and low-skilled workers. High risk areas are likely to include Neath Port Talbot, which has the highest percentage of workers employed in heavy industry of all UK local authorities (Wallace-Stephens, 2021a). However, there will be a need to plan for a transition that provides opportunities across Wales, as all sectors are likely to see changes in the skills required to deliver a transition (Future Generations Commissioner, 2020).

Finally, innovation and development may also be a challenge as Wales has struggled to effectively implement clustering and networking strategies that lead to genuine innovation. The capacity to innovate has been restricted by underdeveloped links between business, universities, and policy makers; and has also been heavily shaped by European funding criteria (Huggins and Prokop, 2017; Morgan, 2017; Pugh, 2017). The Cardiff Capital Region (CCR) City Deal has however made good progress in this area. Applying the triple helix model of innovation, it encourages partnerships that are sector focused, aims to connect the private sector and the public sector, and facilitates partnerships with business and universities. This strategy is supported by a strong private sector representation on its Economic Growth Partnership and its investment panel, which assesses funding applications (Tilley et al., forthcoming).

However, regional innovation initiatives vary across Wales. As Wales has a relatively high proportion of micro enterprises and SMEs, there are likely to be other informal types of innovation taking place that are not recorded. This is recognised in the 2014 Innovation Wales Strategy. There is a challenge associated with the take up of R&D tax credits, as Wales is low relative to other regions suggesting that companies are not being supported to access the credits. This untapped potential presents an opportunity for innovative businesses, particularly in high growth sectors and sectors that will be affected by decarbonisation (Barry, 2021).

Taken together, research indicates that although there are significant opportunities to be gained from decarbonisation, there are also challenges in ensuring a just and fair transition. Developing skills and ensuring that the workforce can take advantage of new opportunities will help to support broader economic development and meet business demand (Chapman and Kiberd, 2021).

A key aim for a just transition should therefore be to enable workers who are at risk of redundancy or redeployment to reskill and/or move into other, decent work. Effort will be needed to co-ordinate and plan for local interventions which can offer alternative routes to employment for affected individuals and communities.

# Lessons from previous transitions

The current industrial transition in Wales is being driven by the need to decarbonise the economy, predominantly through a planned and legislated approach to moving towards net zero emissions. In contrast, previous industrial transitions in several contexts were driven by governments' or owners' decisions to close facilities in response to economic and market conditions; for example, opportunities to produce cheaper or better energy services (Fouquet, 2010). While the drivers of the transitions shape their nature, the associated features and responses also play a key role in determining how effectively the economy moves to a new sector and skill structure. Policy responses should take into consideration the nature and levels of government intervention, the role of private-public partnerships and skills institutions, and the breadth of support provided to workers and communities. There is an opportunity to incorporate lessons learnt from the management of previous industrial transitions into the Welsh context.

## Target policy areas

Structural adjustment policies (SAPs) are government plans to mitigate the effects of industrial transitions. The application of comprehensive and effective SAPs to communities that are dependent on high-carbon industries is particularly important as they are more likely to experience high unemployment and a lack of economic and social resources for affected workers and their families. This section discusses three key areas targeted by SAPs to manage industrial transitions, with a particular focus on supporting workers and improving the supply of and demand for high-skilled labour:<sup>1</sup>

- Skills development;
- Fostering business partnerships; and
- Worker and community support.

The discussion highlights these policies in several international contexts, including Australia, Germany, the Netherlands, Singapore, the United States and other UK nations. Lessons from the industrial transition in South Wales are also discussed.

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<sup>1</sup> SAPs as a strategic approach are discussed in more detail below.

## *Skills development*

Skills development policies in several international contexts have sought to ensure the availability of high-skilled jobs and workers by identifying available skills in the current workforce, assessing future skill needs and gaps, and facilitating training and retraining to support workers' transitions into decarbonised industries. In addition to formal training, effective policies have provided a flexible approach to acquiring skills through on-the-job and informal training. Skills audits were conducted in several countries to identify skills that fossil-fuel workers already acquired, strengths of the current skill distribution and gaps that needed to be filled to allow workers to take advantage of new opportunities (Mercier, 2020).

**'This enables a body tasked with transition management to develop a plan for next steps in training and support, tailored to the actual needs of the individual, and with a view to a qualification' (Mercier, 2020: 30).**

In Germany, the Ruhr Coal Vocational Training Society was responsible for assessing current and future skills demand and developing relevant training programmes. The outcomes of these activities helped to set up skills objectives and develop model projects, and workers received qualifications through training and on-the-job certification provided by the coal and steel companies (Mercier, 2020).

During Singapore's second industrial transition in 1979, the People's Action Party introduced a national-level SAP and instituted a high-wage and high-technology framework (Sheldon et al., 2015). This included the reduction of low-skilled employment across sectors to reallocate workers to areas of labour shortages. In addition, the government established a tripartite Skills Development Fund to create a high-skills workforce. As a result, higher skills training became a core priority of Singapore's transitioning industry (Sheldon et al., 2015).

Policy efforts in Scotland provide a good example of effective skills development through assessment of current skills within the workforce and future skill needs to subsequently ensure that appropriate training is available to workers who need to be (re)trained or upskilled. The Scottish Government established the Longannet Taskforce in response to the closure of the Longannet Power Station in 2016 and developed the Economic Recovery Action Plan to promote economic growth and resilience in affected regions. As part of the Taskforce's commitment to workforce support, it helped implement the Partnership Action for Continuing Employment (PACE) initiative. PACE provided 30 types of training for former employees, including training for green jobs such as introduction to wind turbines. Training on core skills was also provided (Longannet Task Force, 2017). Approximately 87% of the former Longannet employees found alternative employment or training through PACE

(Mercier, 2020). More recently, Scotland has developed a Climate Emergency Skills Action Plan identifying priority areas targeting employers, education and individuals to help take advantage of job opportunities emerging from the net-zero transition (Skills Development Scotland, 2020). The plan consists of short- and long-term measures including:

- The establishment of a Green Jobs Workforce Academy to support existing employees and those at risk of becoming redundant to assess existing skills and participate in upskilling or reskilling to secure green job opportunities;
- The establishment of a Green Jobs Skills Hub, which will inform the skills system on the numbers and types of jobs that will be needed over the next 25 years;
- The creation of a Climate Emergency Economic and Investment Leadership Group to manage the alignment of skills investment with broader national economic objectives; and
- Encouraging increased participation in apprenticeships in green jobs.

The UK has established programmes through which the government can provide subsidies to employers to hire and train the unemployed. Through Jobcentre Plus—which also operates in Wales—employers can contact the public employer service and specify their needs. Jobcentre Plus then connects employers with potential candidates and covers the costs of short-term training (OECD, 2019).

The Covid-19 pandemic was a different driver of disruption that had a substantial impact on the labour market and led to increased unemployment rates, presenting similar market and labour challenges to industrial transitions. Lessons learnt from government and industry responses to the pandemic can therefore be applied to future industrial transitions. For example, during the pandemic, the UK government announced in the Plan for Jobs that incentive payments would be paid to employers in England when they accept new apprentices or trainees (Powell, 2021). Similarly, the Welsh Government extended the Apprenticeship Employer Incentive Scheme as part of its commitment to provide support during the pandemic. The scheme includes several incentives to support employers to recruit apprentices, which resulted in 5,500 new apprentices between August 2020 and October 2021 (Welsh Government, 2021b).

In addition, increased opportunities for informal and online training may be an effective policy approach to mitigate the impact of industrial transitions. In response to the pandemic, the UK government launched the Skills Toolkit to provide an online platform with free digital and numeracy courses and to facilitate the development of new skills. The toolkit offered courses in several areas, including maths, computer



essentials, professional development, business and finance and coding. As of August 2021, there were an estimated 46,400 course completions (Powell, 2021).

### *Fostering business partnerships*

Even where transition policies provided funding and support for retraining or upskilling, they had little impact on reducing unemployment or underemployment unless policies that generated demand for skilled labour within regions were also in place (Stroud and Fairbrother et al., 2013). This shortfall was seen in South Wales where policies supported miner transitions to other industries but failed to increase labour demand to support their employment locally.

Policies that create clusters of new industries within regions can promote innovation and generate new employment opportunities for workers in declining industries. Clusters are “geographic concentrations of industries related by knowledge, skills, inputs, demand, and/or linkages” (Delgado, 2014: 1). Clusters have been established in the United States. For example, the city of Pittsburgh developed advanced robotics, information technology, and healthcare industries after suffering a major unemployment crisis after the collapse of the steel industry in the 1970s (Schulz and Schwartzkopff, 2016). The establishment of these clusters was driven by federally-funded research at two local universities and a prioritisation of innovation (Royal Society, 2020). Pittsburgh’s education and technology sectors account for 80% of high-wage jobs. However, this has not been “translated locally into broad-based growth outside the clusters, and in the neighbourhoods in which they are sited” (Royal Society, 2020: 30). Therefore, it is important that cluster policies are implemented to ensure that new employment opportunities are created across skill levels.

Similarly, the Ruhr Valley now has a diverse economic profile that is supported by universities partnering with emerging industries, technology parks, and start-ups to encourage local investment and employment; for example renewable energy manufacturing and high-tech hubs. Here public and private sectors utilised existing skills and institutions at the local level to prioritise and build new initiatives. This was possible through public sector investment in supportive infrastructure and higher education and training (Sheldon et al., 2018). Skills institutions developed close working ties with clusters and attracted investment and highly skilled workers. In addition, cross-sector actors and institutions prioritised the availability of decent work, including for new higher-skilled workers but also for workers with sufficient skills for emerging jobs.

While innovation and partnerships between the public and private sectors attracted new industries and increased new, high-skilled employment opportunities, successful

transitions have also benefited from formal government investment and financial support for new businesses and industries. For example, in Australia the Victoria state government recognised that the region had suffered from high unemployment prior to the closure of the Hazelwood plant and was highly dependent on power generation. Therefore, it established a special economic zone to provide financial incentives for new businesses including exemptions from state and local property and business expansion fees as well as tax deductions for businesses creating jobs for ex-Hazelwood plant workers (Snell, 2018).

A successful example of financial support from a public sector body in Wales is the compound semi-conductor cluster established by the CCR City Deal. The development of the cluster was intended to 'lever £375 million of private sector investment, create up to 2,000 high-skilled jobs, return the investment for use on other regional schemes, and create hundreds more jobs in the wider supply chain cluster' (Office of the Secretary of State for Wales, 2017). Across the South-East Wales region, further education and higher education institutions have worked closely with industrial partners to design courses (from Business and Technology Education Council qualifications to post-graduate courses) aligned to the needs of the cluster (Cardiff Capital Region, 2022b). Evaluation of the cluster has also shown an increase in research and development and innovation activity linked to universities (Cardiff Capital Region Cabinet, 2020). In its first year, the semi-conductor site provided employment for an average of 84 construction workers every week; the majority of the workers were from firms based, or with offices in, CCR, and therefore has supported regional workforces (Cardiff Capital Region, 2019). Enhanced networks and linkages both in and outside the region has attracted investment in the area, including the location of teams from global compound semiconductor firms as well as over £40 million Strength in Places Funding (Cardiff Capital Region Cabinet, 2020).

### *Worker and community support*

Successful industrial transition policies have prioritised a commitment to community and employment revitalisation, particularly after carbon-intensive industries were replaced. One reason why Appalachia's transition was not successful was the lack of perceived societal responsibility for unemployed workers and their families (Sheldon et al., 2018). Beyond green skills development policies, several countries implemented holistic policies that addressed career progress more broadly, recognising that workers in carbon-intensive industries may already possess valuable competencies but face challenges navigating job markets or identifying new opportunities (OECD, 2019).

**‘Moreover, there is evidence that guidance and counselling services increase the effects of financial incentives to invest in skills’ (OECD, 2019: 31).**

End-to-end worker support may include consultations to review CVs, discussions on career opportunities and progress, and advice on job-search and interviewing strategies (OECD, 2019). In Alberta, Canada, on-site career counselling and employment services consist of individual and group meetings to assist workers in identifying how existing skills can transfer to new jobs and how to prepare for interviews (OECD, 2019). In the UK, web 2.0 tools (for example, social networking, user-generated content) were effective in allowing workers to independently identify new career paths and relevant skill training needs (OECD, 2019).

Wage losses due to unemployment or reemployment in lower-skilled jobs that pay less may create barriers to the uptake of training, retraining, or upskilling opportunities. Early retirement may also pose challenges to workers’ financial stability. The German Coal Exit Commission recommended that collective agreements be developed in collaboration with trades unions. Agreements would include compensation for wage losses, cushioning of financial losses or early retirement, and compensation for pension deductions (Mercier, 2020). In the Ruhr Valley, redundancy payments, funded by the Federal government, were granted to qualified miners who lost their jobs (OECD, 2019). Similarly, a relief grant was introduced to provide displaced workers in Alberta, Canada with up to 75% of their previous weekly earnings when combined with employment insurance benefits (OECD, 2019). In addition to payments to support recently unemployed workers have been provided to workers to incentivise the uptake of training in preparation for changing technologies.

In addition to lost wages, unemployment causes stress and can lead to poor mental health, including depression, anxiety and lower self-esteem. Moreover, good mental health increases employability and the chances of finding and remaining in a job (Wilson and Finch, 2021). Successful SAPs often mitigate the negative effects of industrial transitions on workers’ mental well-being. In Australia’s Latrobe Valley, the Gippsland Trade and Labour Council (GTLC) implemented the Worker Transition Service. In addition to upskilling and retraining, the Service uses a peer-to-peer case management model allowing the GTLC to monitor the mental health of displaced workers and provide counselling support on a walk-in, open-door basis (Mercier, 2020). The Service also sources assistance if required and gathers information about worker experiences in retraining programmes, career advancement and placement (Snell, 2018). As of 2019, 1,434 workers and their families were supported through the Service (Mercier, 2020).

As well as building or maintaining a resilient labour market, SAPs in several international contexts have also prioritised the revitalisation of regions and communities. Industrial transitions have a negative effect on communities that have developed around coal, oil, and gas extraction and processing (Snyder, 2018). At the community level, the Latrobe Valley Community and Facility Fund supported projects to improve the quality of life in the Latrobe Valley through the provision of grants for community space upgrades. Within three years of its establishment, 135 community projects were supported through the Community Facility Fund.

In Scotland, the Economic Recovery Action Plan recognised the importance of addressing collective interests across the region. The Plan detailed interventions and initiatives across several areas including community regeneration (Longannet Task Force, 2017). The Community Choices Fund provided small grants to local councils in response to project proposals (Longannet Task Force, 2017). The Scottish Government also resourced several local economic development projects through the Economic Stimulus Fund. Projects supported included the construction of new industrial business spaces, roads, utility network infrastructure, and community enterprise hubs (Longannet Task Force, 2017). Finally, the Scottish Government supported city regions in boosting economic growth and addressing regional economic inequalities to allow communities to prosper (Longannet Task Force, 2017).

## Delivery approach

Where the above policies have been successful in mitigating the challenges and negative impacts of industrial transitions internationally, several effective delivery approaches can be observed:

- Strategic planning;
- Localised and individual delivery; and
- A collaborative approach.

### *Strategic planning*

International evidence suggests that government intervention can play a key role in protecting workers and communities from the adverse impacts of industrial transitions (e.g., unemployment, underemployment, low-quality jobs). Successful transitions have occurred where national governments have implemented coordinated and well-funded SAPs to foster demand for a highly-skilled, high-wage labour force and the supply of highly-skilled, high-wage jobs (Sheldon et al., 2018).

International evidence also suggests that SAPs which address training or re-employment, are most effective when they are developed and implemented in advance of closures and, where possible, when they include opportunities for work experience in the new industry, occupation or organisation (Sheldon et al., 2018). During the Ruhr Valley's second industrial transition in 2007, the German Federal Government decided to phase out all subsidies for coal mining by 2018. Partners to the agreement—the coal company, union, and the Federal and state governments—successfully planned for and staggered mine closures in advance. As a result, mine employees had access to several benefits included within the SAP, such as (re)qualification through training and on-the-job certification as well as opportunities to transfer jobs within the company (Sheldon et al., 2018).

Similar policies were implemented in the Netherlands in advance of the closure of coal mines in the Limburg region from the mid-1960s to 1990. The SAP was successful as it anticipated the decline of the coal industry and managed the impact on workers and the region by promoting innovation, accelerating knowledge transfer, and building regional skills and knowledge capabilities in areas of new potential growth (Gales and Holsgens, 2017). In addition, before the mines closed, employees and young adults not yet in the workforce had access to on-the-job training in new industries.

#### *Localised and individual delivery*

SAPs with top-down coordination and planning by the highest level of government as well as localised approaches, which consider local and regional impacts of industrial transitions, have helped to prevent outward migration and long-term economic decline within regions (Sheldon et al., 2018). National policy makers in countries with successful transitions engaged with local governments to better understand local economic capacity, institutional capabilities, and the skills of the local workforce (OECD, 2016). Evidence from previous industrial transitions suggests that a balance between a top-down national framework and bottom-up engagement is imperative.

For example, during the Ruhr Valley's first industrial transition in the 1980s, design and implementation of long-term planning occurred at the local level, among local actors (Taylor, 2015). By contrast, it is argued that the transition policies implemented in South Wales were not effective because of their failure to “adequately incorporate serious consideration of local and sub-regional economic and geographical specifics into development planning” (Sheldon et al., 2018: 42). In the United States, there was a lack of federal government engagement in planning and coordination in response to mine closures in Appalachia.

**‘A core weakness has been the overall failure to develop a unified regional transition strategy promoting better coordination and use of resources’ (Sheldon et al., 2018: 44).**

Effective SAPs also took an individual approach to training, retraining, and upskilling. “Most useful is where these processes focus on workers’ own needs, interests, existing skills and aspirations in the context of the transitioning of their community’s economy” (Sheldon et al., 2018: 56). For example, older workers may not be confident in their chances of finding new work and may, therefore, be reluctant to retrain or upskill, particularly if they are close to retirement age. In 2005, Germany’s Perspective 50plus programme, which took a targeted population-based approach, was introduced to help reduce the rate of early retirement. The programme was directed toward workers who exhibited demographic characteristics similar to those at risk of being displaced by the transition to low-carbon industries (for example, older employees with low educational attainment and in poor health). Several interventions were adopted including profiling, special training measures, information campaigns, approaches to address transportation problems, and promotion of internships (OECD, 2019).

#### *A collaborative approach*

In planning for the impacts of the transition on workers and the local economy previous industrial transitions demonstrate the importance of collaboration between unions, government, employers and business associations, skills institutions and community or civil society organisations. In countries with stronger traditions of formal and informal institutional collaboration, national transition policies and structural adjustment plans have been much less vulnerable to changing priorities (Sheldon et al., 2018).

Evidence shows that a collaborative approach can help to develop a shared vision for planning and policy approaches. For example, in the Limburg region of the Netherlands, a forum comprised of diverse regional stakeholders was established to define shared regional problems and inform principles for a regional development plan (Sheldon et al., 2018). The forum increased overall participation in the development planning process and a more diverse group of stakeholders later joined; demonstrating the impact that the collaborative approach had on stakeholder buy-in and support (Sheldon et al., 2018).

During the Ruhr Valley’s second industrial transition, the federal and state governments successfully collaborated with municipal governments, employers and unions to lead, coordinate and fund the implementation of SAPs (Sheldon et al., 2018). By contrast, in Appalachia, the lack of collaboration between those leading the

transition (governments, employers and skills institutions) hindered support for education and training policies (Stroud et al., 2013). In South Wales, the UK government's exclusion of unions and mineworkers in favour of commercial interests was detrimental to the success of SAPs (Sheldon et al., 2018).

# Approaches to the transition in Wales

Effective implementation of transition policy responses in Wales will require action and coordination amongst four groups of key organisations: industry, skills institutions, local authorities and the Welsh Government. This section discusses how lessons learnt from previous industrial transitions can be applied to the Welsh context, and highlights opportunities for these organisations to support workers and communities in the transition to a decarbonised economy.

## Working with industry to identify future skill needs

Identifying future skills required for the transition to a decarbonised economy in Wales will be important to respond to changing technologies and industries. Training should be topped-up over time as technical skills considered valuable today are likely to be outdated before the current phase of the transition is complete (CBI, 2021). As highlighted by the previous industrial transition cases, it will be important to assess the current workforce's skills as well as future skill needs *prior* to the closure of carbon-intensive industries. This will ensure that re(training) and upskilling opportunities are relevant and meet green industry demand. The Welsh Government and Business Wales have resources in place that may be used to assess current skills, future skill needs, and provide effective training or upskilling opportunities. For example, the Skills Profile tool and skills development guidance helps businesses identify potential areas where skills are needed and structure training to ensure businesses can adapt to changes in technology, processes and equipment (Business Wales, 2022).

The Welsh Government has prioritised reviewing the skills required for a green recovery and transition to net zero in its Net Zero Wales plan (Welsh Government, 2021d). Industry is well-placed to anticipate technological developments and future skill needs, and coordination between industry and skills institutions may allow for the development and provision of timely training to meet changing industry needs. The Welsh Government has also recognised the important role that industry and businesses will play in skills development and encourages this sector to “be vocal about the demand for new training, especially where none currently exists, ensuring they are proactively upskilling themselves and become advocates for decarbonisation” (Welsh Government, 2021d: 18).



As exemplified by previous industrial transitions, collaboration between organisations such as industry, skills institutions and regional bodies to assess gaps in skills and training opportunities is imperative. In Wales, the newly legislated Commission for Tertiary Education and Research (CTER), established in the Tertiary Education and Research (TER) Bill, is expected to lead this coordination (Welsh Government, 2021e). Industry played a key role in assessing current and future demand for skills and in developing training programmes as part of the Ruhr Coal Vocational Training Society in Germany, therefore industry in Wales may have more capacity and institutional knowledge to lead on skills audits.

In addition, collaboration with trades unions will be essential to ensure that workers' voices are heard and a localised, bottom-up approach is taken in forming transition policies. The Social Partnership and Procurement (SPP) Bill, which was introduced in June 2022, would require public bodies to collaborate with trades unions when they are detailing how they will comply with the Well-Being of Future Generations (Wales) Act 2015 (Welsh Government, 2022). The principle of social partnership means that policymakers take into consideration and understand workers' interests. Workers therefore "have a role in shaping the decisions which impact them and their communities" (Wales TUC, 2022).

The SPP Bill would also establish a Social Partnership Council (SPC) made up of members representing the Welsh Government, employers and worker representatives nominated by the Wales Trades Union Congress (Welsh Government, 2022). There is an opportunity for the SPC to incorporate lessons learnt from the Ruhr Valley transition, by facilitating collaboration and cooperation between these bodies to develop, fund and implement effective SAPs in Wales.

It might also be that facilitating industry investment in skills through grants or procurement incentives will be needed; or that public trials of new technologies could increase private sector interest, investment and commitment. In particular, advancing research and innovation through the promotion of higher education institution participation in bids, strengthening education sector and industry partnerships, and efforts to increase the diffusion of technologies will be important. As learnt from previous industrial transitions, it is imperative that in addition to increasing high-skilled labour, demand for that labour must also be in place and this can be achieved through public and private sector partnerships. For example, these partnerships were essential in the development of research clusters in Pittsburgh and the Ruhr Valley, which attracted new industries and employment opportunities. Similar activities are already happening in Wales, as evidenced by the compound semi-conductor cluster established by the CCR City Deal.

One consequence that should be considered is the likelihood that portions of the workforce will leave employment rather than retrain, and new workers with better matched skills will join the workforce (CBI, 2021). This is also a consideration in light of Brexit and the impact that it has had on immigration. The CBI states that there is “an important role for government to support more fundamental retraining that keeps people in work, and to support transitions between industries” (2021: 3). This highlights the importance of encouraging the demand for and facilitating the uptake of green skills within the current and future workforce. Soft skills such as management, leadership and business networks need to be developed to support a transition to a green economy. Successful policy responses in previous industrial transitions took an individually-focused approach to identifying the (re)training and upskilling needs of workers, often through skills audits, which focused on both technical and soft skills. In particular, the Ruhr Coal Vocational Training Society is an example of effective assessment of current and future demand for skills and development of accessible, on-the-job training programmes. This approach allowed workers to take advantage of and be adequately prepared for future opportunities.

## Role of the education system

The new Curriculum for Wales offers opportunities for building in environmental awareness and skills development – particularly ‘soft’ skills which are likely to be in general demand – throughout compulsory education (Future Generations Commissioner, 2020). This will be important for developing the future workforce. However, it is likely that in the near term and during the transition, supporting the existing workforce to develop new skills, retrain and redeploy (where needed) will be a more pressing task. Anticipating new skills, both technical and soft skills, that will be needed is a challenge as there are many uncertainties about the future net zero economy. For example, over half the heavy industry emissions reductions in 2050 are likely to come from technologies not currently on the market (International Energy Agency, 2021).

Approaches to training may depend on the nature of the skills required and the level of industry adjustment or transition. According to the CBI, private training providers and in-house training will help meet immediate and short-term skills. As stated in the previous section, industry will play a key role in preparing their workforces for change through upskilling and retraining. This is particularly true for industries experiencing only minor adjustments (OECD, 2014). Long-term changes will likely require education and learning across the education system (CBI, 2021).

Efforts to promote lifelong learning such as the TER Bill introduced by the Welsh Government, can help to increase access to and demand for skills training for 16-18

year olds as well as low-skilled adults. Institutions and government should aim to deliver a comprehensive programme that meets the new skills needs of industry and the workforce as the economy transitions. There may be an opportunity to assess if and how more industry qualifications can be brought into the public system. The government can also support institutions to deliver necessary skills training through: increased targeted funding, consistency of message, advocating for education and skills development, and a long term vision; particularly around the transition to a decarbonised economy (Pember et al., 2021). This long-term vision should be informed by industry and institutions who are best placed to determine the needs of the local workforce and anticipate future needs. For example, the UK government's investments in the National Skills Fund provide an opportunity to build the technical education system. This investment seeks to extend eligibility for level 3 qualifications to more adults and expand Skills Bootcamps (Department for Education, 2021)

In addition to formal education at all levels, skills institutions and the government may play a role in implementing higher levels of technical knowledge that can be delivered informally via online courses (CBI, 2021). As with the Skills Toolkit in the UK, there is an opportunity to further develop the free training platform provided by Working Wales, which was rolled out during the pandemic to support online learning for furloughed workers (Welsh Government, 2020). This may involve adding content that supports career guidance and transitions into green industries, and Working Wales should continue to consult with top businesses and educational experts to identify courses and skills that employers need most. Similar end-to-end worker support, which included career counselling and employment services, was successfully implemented in Alberta, Canada.

Regional Skills Partnerships (RSPs) are established to address skills shortages by influencing skills provision within their regions based on labour market intelligence and employer-led insight (National Assembly for Wales, 2019). However, the remit of RSPs is limited to full time further education provision and apprenticeships, which restricts their ability develop and deliver green skills training and education across the education system. Expanding the remit of RSPs to include school sixth-forms, A-levels, and higher education (National Assembly for Wales, 2019) would position them to support and develop lifelong learning in Wales, particularly around green skills.

## **Role of national and local government in supporting high risk areas**

While a definition of 'high risk areas' does not yet formally exist, they may be characterised by high unemployment as a result of the switch from carbon heavy to

green industries, lack of adequate funding from the government's levelling-up policy, and lack of economic and social resources for affected workers and their families. High risk areas may overlap with low-skill trap areas, which involve a "cycle of limited demand for highly-skilled workers, which leads to a low-skilled workforce, which in-turn places limits on innovation and growth, which in-turn perpetuates the limited demand for highly-skilled workers" (National Assembly for Wales, 2019: 18). High risk areas may experience skills mismatches, skills shortages, and underutilisation of the workforce (National Assembly for Wales, 2019).

Policy responses in previous industrial transitions were more effective in supporting workers and communities where local and regional impacts were taken into consideration. During South Wales' previous transition, policies did not consider local economic and geographical contexts and therefore fell far short of their potential. By contrast, strategic planning at the local level with involvement from local actors led to more successful transition policies in the Ruhr Valley. To support the development of a strategic plan for a transition, it is therefore important to have clarity on the location of high-risk areas and their skill profiles, as well as involving communities. This will then enable assessments of how structural changes will impact relative employment patterns within and between industries and geographical areas; an understanding of which is critical for determining the content and level of SAPs.

In Wales, several regions will be hit hardest by job losses resulting from the move to decarbonisation. Pembrokeshire and Cardiff have been identified as two local authorities with the highest share of workers employed in fossil fuels and energy production, 1.8 and 1.7% respectively (Wallace-Stephens, 2021a). Similarly, evidence suggests that the impacts of decarbonisation on emissions intensive industries and vehicle manufacturing will be felt most in several local areas across Wales.

Some areas may have renewable energy capacity, providing opportunities for skills and employment transition. The recent purchase of Aberthaw Power Station by the CCR City Deal provides an example of the redevelopment of an existing coal fired generation facilities into a green energy site with the potential to create 5,000 jobs (Cardiff Capital Region, 2022a). In addition, although Port Talbot has the highest concentration of employment in emissions intensive industry as it is the location of the UK's largest steelworks (8.7%), development of the onshore wind industry may be possible. In 2005, Port Talbot was included within one of the seven strategic search areas capable of supporting large scale wind farms under spatial policy Technical Advice Note (TAN) 8: Planning for Renewable Energy (National Assembly for Wales,

2005).<sup>2</sup> Spatial policy and strategic assessment may be valuable tools to identify those areas in Wales with the capacity to support the onshore wind industry and should be targeted by SAPs, particularly as they will help to revitalise communities.

When assessing potential opportunities, it will be important to consider the impact on employment rates within industries that are less labour intensive, for example electric vehicle production. Electric vehicles have fewer moving parts than internal combustion engine vehicles, and this is likely to have an effect on some component manufacturers (Wallace-Stephens, 2021a). Sectors where production processes are less labour intensive require fewer workers. Therefore, strategic planning is imperative to effectively implement SAPs to address the risk of higher unemployment rates in regions likely to experience growth in green jobs. Strategic planning, as evidenced by previous industrial transitions, is most effective when done in advance of closures, avoiding high unemployment rates.

The replacement of carbon intensive industries, in particular, require a commitment to community revitalisation to ensure a successful transition, as illustrated by Australia's Latrobe Valley Worker Transition Service and Germany's Coal Exit Commission involvement of trades unions. The cases illustrated that workers need resources to better understand career options and to access learning. The CBI recommends turning Job Centres into more holistic 'Jobs and Skills Hubs' to support workers looking to retrain. This moves beyond the need to improve coordination of the public and private sectors to strengthen innovation, and requires linking between tiers of government, industry bodies, skills providers, the workforce, and employers. There is an opportunity for government to work with local authorities, growth hubs, colleges, universities, and businesses to set up 'Jobs and Skills Hubs' in regions and industry sectors at highest risk for job decline and undesirability (CBI, 2021). In particular, City and Growth Deals in Wales were established with the aim of leveraging private sector growth and job creation after initial UK government investment (House of Commons Welsh Affairs Select Committee, 2019). These arrangements offer the potential for inclusive transitions to a decarbonised economy in high risk areas by tailoring investment to local contexts based on analyses of skill requirements in the short, medium, and long term (Williams, 2017).

Alongside top-down SAPs, engaging with local organisations to understand capacity needs and local capabilities is important, as exemplified in the Ruhr Valley. Identifying high risk areas and anticipating associated skills training and investment needs will require effective data collection and engagement with public and private actors at

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<sup>2</sup> TAN 8 was the Welsh Assembly Government's technical guidance for planning authorities when developing Local Development Plans (LDPs) and deciding planning applications for renewable energy developments.

local and regional levels. Data are available on the specific regions in Wales that are likely to be hit hardest by the transition to a decarbonised economy (see Tables 1 and 2).

RSPs, which are tasked with producing Regional Employment and Skills Plans to analyse and provide guidance on the provision of skills based on economic need, could be key partners in assessing high risk areas and identifying priority skills at the local and regional level (Welsh Government, 2019). Regional Employment and Skills Plans are also a key data source, utilising a range of primary and secondary labour market intelligence. For example, in South West and Mid Wales, primary evidence is acquired through industry engagement (such as through skills surveys and telephone interviews) (South West & Mid Wales Regional Learning and Skills Partnership, 2019). Data are collected on economic performance, education and training, demographics and Welsh language skills (South West Wales Regional and Learning Skills Partnership, 2022). The local data are used to “support evidence based policy and decision making” across the region (South West Wales Regional and Learning Skills Partnership, 2022). There is an opportunity to utilise data included in these plans to develop and implement policies targeting local communities and regions that will be most impacted by the transition to a decarbonised economy.

There is also concern that local areas likely to be negatively impacted by job losses from decarbonisation may be disadvantaged by a competitive funding system as they have limited capacity for bidding. In these and all areas, it will be important not to overlook the foundational economy which provides essential jobs for communities, many of which are in transitioning industries such as food, housing, energy, construction, waste and recycling and accounts for approximately four jobs in every ten (Welsh Government, 2021).

# Conclusion

Lessons from previous industrial transitions for successfully managing the transition to a decarbonised economy in Wales illustrate the importance of policy coordination by industry, skills institutions, the Welsh Government, and local authorities. This think-piece highlights key things to consider whilst developing and implementing policy responses. Aspects of the policy responses include conducting skills assessments and training to tailor policies to support increasing the supply of high-skilled labour; stimulating investment and innovation in new industries and research to build demand for that labour; and providing support and resources to strengthen local communities most affected by the transition.

It is recommended that the Welsh Government play a role in actively shaping local labour markets and strengthening the foundational economy through investment and skills training to build resilience and capacity for transformation (RSA, 2021; Welsh Government, 2021a). This would involve providing universal, end-to-end transition services, including information about labour markets, career coaching, and access to training opportunities. This may also require social and economic support to incentivise workers in heavy carbon sectors to seek training for green skills. This is an important consideration, given the prevalence of barriers to lifelong learning. Successful skills development and redevelopment is also likely to attract private investment in transitioning regions, thereby increasing demand for high-skilled labour and creating more resilient communities. This should start in schools, where the pipeline of skills for future industry begins.

Similarly, the European Commission emphasises the role that governments can play in providing a safety net for workers to transition away from previous employment to decarbonised industries (Wallace-Stephens, 2021a).

**‘Investing in social care, childcare, housing, energy and low carbon, and digital connectivity not only address[es] the foundational needs of civilised life in Wales, but can offer meaningful and rewarding careers and [can] be harnessed for economic development’ (Welsh Government, 2021a:12).**

It is imperative that policy responses are inclusive and involve coordination across industry, unions, skills institutions, and local communities. The SPP process is key to providing a framework for the coordination that is needed, but input from workers and community members is also important ensure that the local economic and geographical contexts are embedded in targeted policy responses. To ensure that transition policies are adapted to local contexts, it is recommended that industry, skills

institutions, and all tiers of government utilise the available data to identify high-risk areas and provide tailored, localised support. The subsequent monitoring of implementation to ensure that it is effective will also be critical.



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