

# **Just Transition Call for Evidence Synthesis**

## **Final Report**

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# Contents

<b>1</b>	<b>Introduction</b>	<b>7</b>
<b>2</b>	<b>Context</b>	<b>8</b>
2.1	<b>Policy Context</b>	<b>8</b>
2.1.1	Emissions Pathways	9
<b>3</b>	<b>Methodology</b>	<b>10</b>
3.1	Response inventory	10
3.2	Synthesis approach	10
3.3	The organising framework and analysis categories	11
3.4	Process learning analysis	13
3.5	Quality assessment	14
3.6	Limitations	14
<b>4</b>	<b>Overview of the Call for Evidence and Responses Received</b>	<b>16</b>
4.1	Responses received	16
4.2	Respondents	17
<b>5</b>	<b>Process Learning</b>	<b>19</b>
5.1	Introduction	19
5.2	Respondents	19
5.3	Responses received	20
5.3.1	Response type	20
5.3.2	Quality of evidence	22
5.4	Content of the evidence	23
<b>6</b>	<b>Findings: Governance</b>	<b>24</b>
Q1.	Evidence to show how the Well-being of Future Generations (Wales) Act 2015 has, or could be, used to inform a Just Transition	24
Q2.	Examples of decision-making processes or guiding principles that could be used across public, private and third sectors to plan for and ensure a Just Transition	26
Q3.	How the public sector equality duty can be fulfilled in pursuing a Just Transition and evidence that demonstrates the role of finance and/or social infrastructure in facilitating or delivering a Just Transition	28
<b>7</b>	<b>Findings: Impacts and Opportunities</b>	<b>32</b>
7.1	<b>Electricity and heat generation</b>	<b>32</b>
7.1.1	Sector and spatial impacts and opportunities	33
7.1.2	Who is impacted	34
7.1.3	Timelines	35
7.1.4	Evidence gaps identified by the responses	36
7.2	<b>Transport</b>	<b>37</b>
7.2.1	Sector and spatial impacts and opportunities	37
7.2.2	Who is impacted	39
7.2.3	Timelines	41

7.2.4 Evidence gaps identified by the responses .....	42
<b>7.3 Residential buildings.....</b>	<b>44</b>
7.3.1 Sector and spatial impacts and opportunities.....	44
7.3.2 Who is impacted .....	48
7.3.3 Timelines .....	52
7.3.4 Evidence gaps identified by the responses .....	53
<b>7.4 Industry and business.....</b>	<b>55</b>
7.4.1 Sector and spatial impacts and opportunities.....	55
7.4.2 Who is impacted .....	56
7.4.3 Timelines .....	57
7.4.4 Evidence gaps identified by the responses .....	58
<b>7.5 Agriculture .....</b>	<b>59</b>
7.5.1 Sector and spatial impacts and opportunities.....	59
7.5.2 Who is impacted .....	64
7.5.3 Timelines .....	66
7.5.4 Evidence Gaps .....	67
<b>7.6 Forestry and land use.....</b>	<b>69</b>
7.6.1 Sector and spatial impacts and opportunities.....	69
7.6.2 Who is impacted .....	71
7.6.3 Timelines .....	72
7.6.4 Evidence gaps identified by the responses .....	73
<b>7.7 Waste and circular economy .....</b>	<b>74</b>
7.7.1 Sector and spatial impacts and opportunities.....	74
7.7.2 Who is impacted .....	76
7.7.3 Timelines .....	77
7.7.4 Evidence gaps identified by the responses .....	77
<b>7.8 Public sector .....</b>	<b>78</b>
7.8.1 Sector and spatial impacts and opportunities.....	78
7.8.2 Who is impacted .....	80
7.8.3 Timelines .....	80
7.8.4 Evidence gaps identified by the responses .....	80
<b>8 Findings: Support.....</b>	<b>82</b>
<b>Q13. Evidence to identify and develop required Net Zero skills.....</b>	<b>86</b>
<b>Q14. Evidence to demonstrate the additional support and information needed to identify and develop required Net Zero skills.....</b>	<b>86</b>
<b>Q15. Any particular gaps in supporting a Just Transition? .....</b>	<b>90</b>
<b>Q16. Evidence to show effective involvement of people, communities, and organisations to enable their participation in developing and implementing a Just Transition. Including, enabling participation that fully represents the perspectives of diverse communities in Wales and specifically those with protected characteristics. ....</b>	<b>90</b>
<b>9 Conclusions and recommendations .....</b>	<b>92</b>
<b>9.1 Conclusions .....</b>	<b>92</b>

<b>9.2 Recommendations</b> .....	<b>93</b>
<b>Annex A: List of external references</b> .....	<b>95</b>

### List of figures

<b>Figure 3.1: Organising Framework for Call for Evidence Thematic Analysis</b> .....	<b>12</b>
<b>Figure 7.1: The share of workers whose main work is in the agriculture sector, 2011</b> .....	<b>61</b>

### List of tables

<b>Table 3.1: Analysis Categories</b> .....	<b>13</b>
<b>Table 4.1: Breakdown of responses by question and topic</b> .....	<b>16</b>
<b>Table 4.2: Overview of respondents, by organisation type</b> .....	<b>17</b>
<b>Table 4.3: Overview of respondents, by Emission sector</b> .....	<b>17</b>
<b>Table 4.4: Breakdown of umbrella and third sector organisations, by sector</b> .....	<b>18</b>
<b>Table 5.1: Proportion of responses addressing just or fair dimensions of transition</b> .....	<b>21</b>
<b>Table 5.2: Proportion of responses by quality category</b> .....	<b>22</b>

## List of abbreviations

ADR	Administrative Data Research Wales
AGM	Annual General Meeting
BECCS	Bio-energy with carbon capture and storage
BEIS	Department for Business, Energy & Industrial Strategy
BUS	Boiler Upgrade Scheme
CBI	Confederation of British Industry
CCC	Climate Change Committee
CCUS	Carbon Capture, Utilisation and Storage
CITB	Construction Industry Training Board
COPD	Chronic obstructive pulmonary disease
CRE	Community Renewable Energy projects
CSA	Community Supported Agriculture
ECITB	Engineering Construction Industry Training Board
ECO	Energy Company Obligation Grants
EDI	Equity, diversity, and inclusion
EPC	Energy Performance Certificate
GHG	Greenhouse gases
HGV	Heavy goods vehicle
HVAC	Heating, Ventilation, and Air Conditioning
HVO	Hydrotreated Vegetable Oil
ILO	International Labour Organisation
LPG	liquid petroleum gas
LULUCF	Land Use, Land-Use Change and Forestry
MEES	Minimum Energy Efficiency Standard
NHS	National Health Service
PHW	Public Health Wales
PSED	Public Sector Equality Duty
RDP	Rural Development Programme
SAIL	Secure Anonymised Information Linkage
SME	Small and medium-sized enterprises
STEM	Science, technology, engineering, and mathematics
SWIC	South Wales Industrial Cluster
WWF	World Wide Fund for Nature

# 1 Introduction

This report presents the findings of the Call for Evidence Synthesis, commissioned in March 2023, and conducted by Ipsos UK and Sarah Toy, University of Bath. It summarises findings from Welsh Government's Call for Evidence on a Just Transition to Net Zero.

The Welsh Government has committed to Net Zero and a Just Transition away from the fossil-fuelled economy of the past to a new low carbon future. Achieving a just transition to Net Zero is essential and this is why it is the first policy in Net Zero Wales. This commitment recognises the importance of understanding the implications of this transition and how it may impact all members and groups in Welsh society. To inform Wales's decarbonisation pathway to Net Zero and develop a Just Transition Framework, the Welsh Government initiated a Call for Evidence (herein referred to as the Call). This Call aimed to gather evidence and insights from a wide range of stakeholders, including local businesses, third sector organisations, government agencies, industry experts, community representatives, and other key actors.

The focus of the Call was to gain a comprehensive understanding of the governance, support, impacts, and opportunities associated with the transition to a Net Zero economy in Wales. The goal was to explore potential challenges that may arise, identify areas for intervention, and highlight opportunities. Through the Call, the Welsh Government aimed to collect data and evidence that would serve as the foundation for establishing an evidence base for a Just Transition to Net Zero. By engaging various stakeholders and gathering their perspectives and insights, the Government sought to ensure that the transition is fair, inclusive, and accounts for the needs and concerns of all segments of Welsh society. The evidence collected through the Call will be used to help inform Wales's decarbonisation pathway and the development of a Just Transition Framework. It will provide valuable insights into the potential implications and impacts of the transition, as well as the opportunities and challenges that may arise during this transformative process.

Ipsos, working with Sarah Toy, University of Bath, was commissioned by the Welsh Government in April 2023 to conduct a synthesis of the evidence presented in the Call. The objective was to assess the evidence in the Call; conduct synthesis against key themes and analysis categories; and develop recommendations for the Welsh Government's pathway to a Just Transition. The synthesis produced by Ipsos, and set out in this report, will also contribute towards the evidence base that will be used by the Welsh Government to inform the development of a Framework that will set out the key actions required to coordinate a Net Zero transition that maximises opportunities and minimises negative impacts for all individuals and groups in Wales.

For an outline on the methodology section please see Section 3. There are a number of limitations and caveats around the data submitted, including who responded, the scope of responses, and the reliability of the data. Therefore, when reading the report, the findings should not be considered representative, and the limitations should be taken into consideration.

## 2 Context

The transition to Net Zero in Wales is enabled by several key pieces of legislation, which provide a comprehensive framework for achieving the Net Zero goal. A notable feature of each of these pieces of legislation is the emphasis placed on the notion of a Just Transition to Net Zero. This chapter situates the Call for Evidence synthesis into the wider legislative and policy context.

### 2.1 Policy Context

Part 2 of the Environment (Wales) Act 2016, and subsequent regulations in 2018, introduced a set of emission reduction targets for Wales. In March 2021, following advice from the Climate Change Committee (CCC), the Senedd revised these targets to formally commit Wales to achieving Net Zero emissions by 2050. Alongside the Net Zero target, the Senedd also updated the interim targets and second Carbon Budget, and set the third Carbon Budget, as follows:

- Carbon Budget two (2021-25) – 37 per cent average reduction (without the use of international offsets)
- Carbon Budget three (2026-30) – 58 per cent average reduction
- 2030 – 63 per cent reduction
- 2040 – 89 per cent reduction
- 2050 – at least 100 per cent reduction (Net Zero)<sup>1</sup>

This legislation signifies a comprehensive commitment to addressing climate change and setting the stage for ambitious actions and policies to achieve Net Zero emissions.

The UK Climate Change Act 2008 and 2050 Target Amendment Order 2019 similarly set the legally binding target for the UK to achieve Net Zero greenhouse gas emissions by 2050. This UK legislation is important as the CCC assessed that by 2050, around 60 per cent of the changes needed in Wales were influenced by powers mostly reserved to Westminster.

Net Zero Wales Carbon Budget two (2021-25)<sup>3</sup>, acknowledges the urgency in addressing climate change and outlines the actions and strategies required across emission sectors to reduce emissions and achieve the Net Zero goal. It encompasses emission sectors over the period of Carbon Budget two and sets the trajectory for Net Zero. These sectors are Electricity and Heat Generation; Transport; Residential Buildings; Industry and Business; Agriculture; Land Use, Land Use Change and Forestry; Waste Management; and Public Sector. Building on the first Plan, Prosperity for all: a low carbon Wales<sup>2</sup>, Net Zero Wales (the Carbon Budget two plan) identifies that there is a need for a ‘decade of action’ to address the climate and nature emergency. Net Zero Wales also highlights the importance of achieving a Just Transition, as it is the first policy within the Plan. Additionally, it also emphasises the importance of ensuring that no one is left behind during the transition to a greener, fairer, better future. Net Zero Wales also recognises the opportunities that may arise out of the transition to Net Zero and acknowledges that these opportunities need to be available to all, and the importance of taking collective action to achieve this goal.

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<sup>1</sup> Welsh Government, 2021, [Second All Wales Low Carbon Delivery Plan \(2021-2025\)](#)

<sup>2</sup> Welsh Government, 2019, [Prosperity for All: A Low Carbon Wales](#)



The Well-being of Future Generations (Wales) Act 2015 is pioneering legislation that requires public bodies in Wales to consider the long-term impacts of their decisions on the well-being of future generations<sup>3</sup>. It establishes seven well-being goals:

1. A prosperous Wales
2. A resilient Wales
3. A healthier Wales
4. A more equal Wales
5. A Wales of cohesive communities
6. A Wales of vibrant culture and thriving Welsh language
7. A globally responsible Wales

By integrating sustainability principles into decision-making processes, the Act has climate change at the heart of its goals and duties aimed at ensuring a sustainable future for Wales.

In addition, the Public Sector Equality Duty (PSED) is a legal obligation which was introduced in 2010<sup>4</sup>. It requires public sector organisations to actively promote equality in their day-to-day activities, including policy shaping and service delivery. This also places an obligation on public sector bodies to consider advancement of equality when considering a transition to Net Zero, ensuring that no individuals or groups are left behind in the transition,

The above legislation and policy creates a robust and integrated framework to support a Just Transition to Net Zero in Wales. The legislation establishes ambitious greenhouse gas emission reduction, emphasise long term considerations and sustainability, promote social equity, and align with broader Net Zero ambitions. In addition, the development and promotion of emissions pathways (described below) provide a clear roadmap for Wales' emissions reduction journey, setting out the required actions needed to achieve Net Zero emissions.

### 2.1.1 Emissions Pathways

Emissions pathways refer to projected trajectories of greenhouse gas emissions over time. These pathways play a crucial role in the transition to Net Zero by providing a roadmap for emissions reduction, that support Carbon Budgets. To ensure a Just Transition the Welsh Government wants to understand the impact and opportunities for businesses and communities across the emission sectors mentioned above and as outlined in the Call. The Welsh Government's starting point for Net Zero pathway development is the CCC's balanced pathway for Wales. These cover Electricity and Heat Generation; Transport; Residential Buildings; Industry and Business; Agriculture; Land Use, Land Use Change and Forestry; Waste Management; and Public Sector<sup>5</sup>.

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<sup>3</sup> Welsh Government, 2015, [Well-being of Future Generations \(Wales\) Act](#)

<sup>4</sup> UK Government, 2012, [Public sector equality duty](#)

<sup>5</sup> Climate Change Committee, 2020, [Sixth Carbon Budget](#)

## 3 Methodology

This Chapter sets out the methodology deployed for collating, categorising, and synthesising the responses to the Call for Evidence. It also details the quality assurance approaches adopted and sets out how recommendations were identified.

### 3.1 Response inventory

Ipsos received the responses to the Call from the Welsh Government in May 2023. The responses were logged and reviewed by the Ipsos research team, and a response inventory was created. The inventory recorded the number of responses, the number in English and Welsh, and the number of additional reports provided as links or additional documents for review. Initial analysis was conducted to identify the types and sectors of organisations that responded to the Call, as well as the specific questions they answered. An overview of this information is set out in Chapter **Error! Reference source not found.**

During this stage, a rapid preliminary review was also conducted. This review helped identify key sub-themes that align with the overarching themes within the Organising Framework, ensuring that these themes remained appropriate for analysis.

### 3.2 Synthesis approach

A qualitative and pragmatic approach was adopted for the evidence synthesis, which included all relevant source material rather than just peer reviewed, academic literature. This is because the Net Zero commitment and plan for a Just Transition is a relatively new area, and therefore the number of academic, peer reviewed reports on the subject are likely to be limited. In addition, it is appropriate to consider all types of evidence, including grey literature and examples from community and campaign groups, due to the Call seeking responses from all types of organisations and the public, as well as due to the nature of the subject itself, adhering to requirements for procedural justice.

In addition, whilst the focus is on a Just Transition in Wales, a very small number of responses were provided from organisations outside of Wales. Evidence provided relating to Just Transition issues elsewhere in the UK or internationally were included as these may provide examples of good practice elsewhere that could be adopted in Wales, however caution should be exercised when applying UK evidence to Wales, as the evidence does not necessarily transfer.

To ensure a systematic analysis, a three-stage approach was followed.

1. **Analysis of Individual Responses:** The analysis of individual responses was structured around the three main themes of the Call and the Organising Framework. These themes covered Impacts and Opportunities, Governance, and Support for a Just Transition. The evidence provided in the responses was categorised and analysed using NVivo<sup>6</sup>. The responses were explored and categorised within the context of the main themes and further grouped into sub-themes during a second round of review.
2. **Synthesis of Key Themes:** The next stage involved synthesising key themes emerging from the analysis across multiple responses. This synthesis aimed to identify common patterns,

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<sup>6</sup> NVivo is a qualitative data analysis software designed to help researchers organize, analyse, and gain insights from qualitative or unstructured data. NVivo allows users to code, annotate, and categorize data from various sources such as interviews, surveys, documents, audio recordings, and videos. It also provides tools for visualizing and exploring data, identifying patterns and themes, and generating reports.

challenges, opportunities, and gaps in the evidence that may not have been explicitly addressed in the initial Call specification. The identified themes and sub-themes were based on the analysis conducted using NVivo. Once the responses had been coded, these were then analysed individually by looking at each of the separate codes. The software allowed for the categorisation and sorting of responses based on various attributes, including the types of responders and the types of evidence provided. A qualitative approach was taken, and the data within the codes was reviewed to extract any themes within the coded responses.

3. **Internal Workshop:** The final stage of analysis included an internal online workshop in July 2023 attended by the entire project team and representatives from the Welsh Government. Prior to the workshop, the research team prepared a slide deck presenting the key findings. The workshop served as a collaborative platform to discuss and calibrate the evidence, assess any outliers or conflicting themes, and address any further analysis required. The Welsh Government highlighted the need for as many good practice examples as possible to be identified within the synthesis and also agreed that the process learning aspects from the Call (such as any gaps in expected respondents or the contents of responses) should be included as useful learning for the future. Additionally, the workshop discussed recommendations for informing the Welsh Government's approach to developing decarbonisation pathways and a Just Transition Framework for Wales. This workshop also facilitated planning for the final report, ensuring that the findings would be effectively integrated.

In summary, the methodology involved conducting an analysis of individual responses, synthesising key themes, and holding an internal workshop to discuss and refine the findings. This approach was intended to ensure a comprehensive and systematic examination of the Call responses.

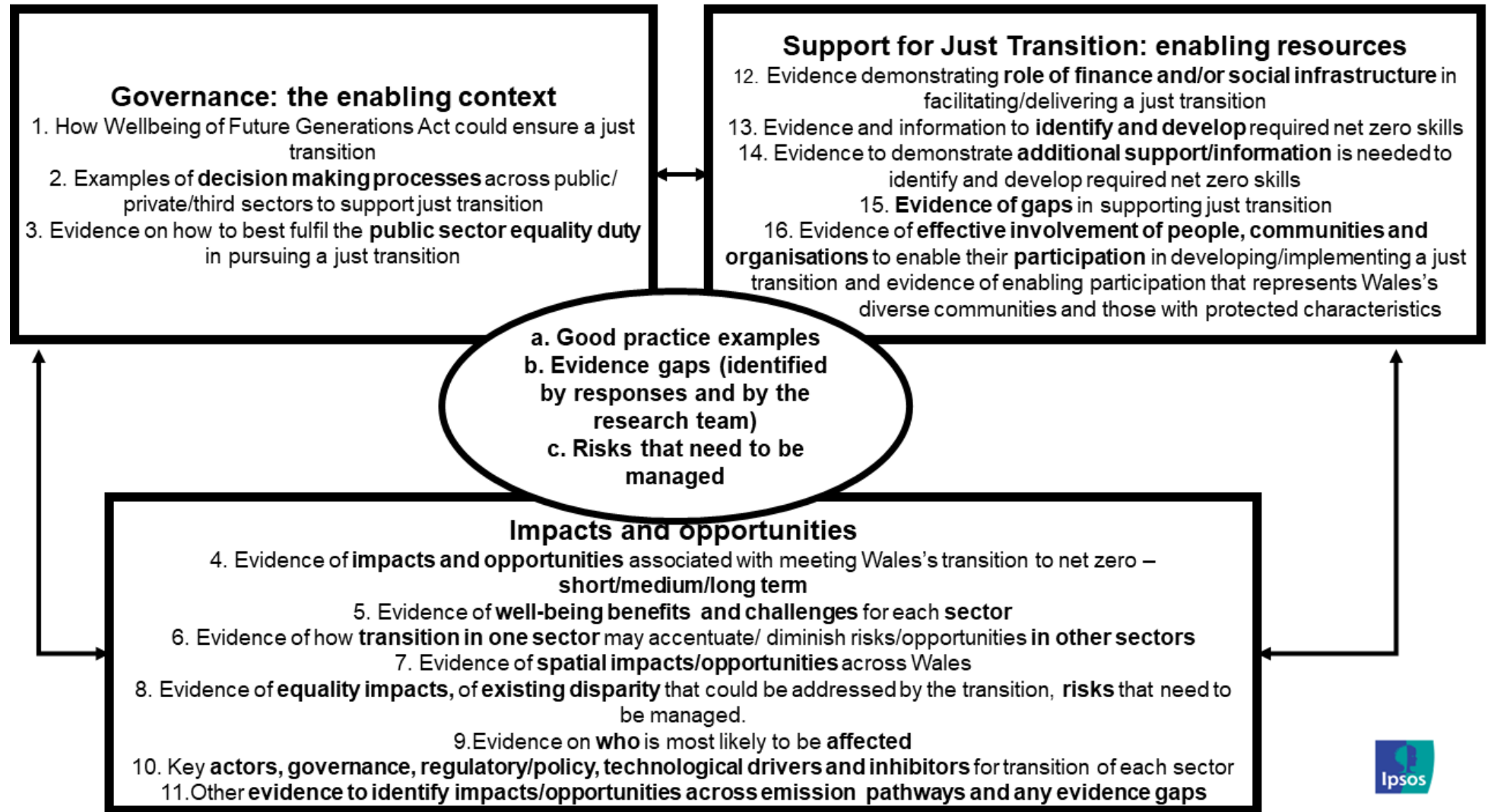
### 3.3 The organising framework and analysis categories

As previously mentioned, analysis was based on an organisational framework (0) which 0aligns with the structure outlined in the Call questions. This framework highlights the impacts and opportunities of the Net Zero Transition for various societal groups and emission sectors and the enabling factors which can help to facilitate a Just Transition, including policy, institutional, and governance contexts, as well as financial resources, skills, and engagement.

Additionally, the framework includes cross-cutting issues which were explored across all responses. These comprise evidence of good practice, supported by examples whenever possible; evidence gaps identified in the responses; and gaps identified within the responses. The process learning analysis also provided the research teams' view on evidence gaps in terms of areas where there may be less information provided regarding the impacts on certain protected characteristics or regions, as well as areas where evidence may be less detailed compared to others.

Furthermore, the framework also acknowledges the importance of managing risks associated with the Net Zero Transition. While the Call addresses evidence gaps and risks in relation to specific aspects, we suggested that these should be considered across all questions to ensure comprehensive coverage.

**Figure 3.1: Organising Framework for Call for Evidence Thematic Analysis**



In addition to the overall themes and research questions identified in the Organising Framework, Ipsos conducted sub-analyses against the categories set out in Table 3.1: Table 3.1. These were discussed with the Welsh Government client contact and a number of additional groupings were identified and have been included; these additions are presented in italics.

**Table 3.1: Analysis Categories**

Enabling factors	Protected characteristics	Individual vulnerabilities	Business / employment vulnerabilities	Spatial impacts	Time periods
Skills	Age	Transient groups <sup>7</sup>	<i>Business size (turnover and no. employees)</i>	<b>Welsh regions:</b>	2025
Social infrastructure	Disability	Housing tenure		North Wales	2030
Finance	Gender reassignment	Income	<i>Business location</i>	Mid and West Wales	2035
	Marriage and civil partnership		<i>Business sector</i>	South Wales West	2040
	Pregnancy and maternity			South Wales East	2045
	Race			South Wales Central	2050
	Religion			<b>Other:</b>	<i>Beyond 2050</i>
	Belief			Urban / rural	
	Sex			Inland / coastal	
	Sexual orientation				

The themes and sub-themes were laid out in NVivo, and the team uploaded the response documents to the platform, which were then coded against each sub-theme. Sorting the data allowed for continual analysis, as well as for members of the team to return to the platform and conduct further, more in-depth analysis of the data in these sub-themes where needed. The use of this platform also enabled the study team to see which document quotes and sections come from, allowing for cross-analysis against different sources and for a picture to be built on how views differ between specific stakeholders.

### 3.4 Process learning analysis

Prior to the presentation of the analysis, Chapter 5 sets out the wider learning from the synthesis of the evidence submissions covering the stakeholders that responded and the type, quality and content of evidence submitted. This analysis was conducted by our experts, Sarah Toy, University of Bath, and Rachel Brisley, Project Director, after the completion of the individual analysis. In each instance the findings are considered within the context of the Call publication, content, and presentation to assess whether there were any characteristics of the Call that may have contribute to unexpected outcomes:

<sup>7</sup> Transient communities refer to people who move regularly and only stay in one location for a short amount of time such as Gypsies, Roma, and Travellers and recently arrived migrants.

- **Stakeholder mapping and gapping analysis:** this involved identifying the respondents that were anticipated and those that responded to identify gaps.
- **Quality of evidence:** the responses were assessed independently from the qualitative analysis by Sarah Toy to give a comparative measure of each response according to the following criteria:
  - Evidence categorisation (verifiable, justifiable, lived experience, views)
  - Supporting data (yes, no – list of data sources included in Annex A)
- **Degree to which responses focused on a Just Transition:** all responses were assessed to identify the degree to which they focused on the ‘just’ element of the Net Zero transition using a weak/medium/strong assessment.
- **Content of evidence:** this assessment involved a more qualitative assessment, similar to the stakeholder mapping and gapping analysis, to identify whether the types of themes expected by our experts (Sarah Toy and Rachel Brisley) were evidenced in the responses and whether there were any gaps or unexpected content.

### 3.5 Quality assessment

Ipsos has a dedicated coding team that conducted the coding of the responses into categories using NVivo software. The coding outcomes were then quality assured through the following approaches.

- **Random review of coding of 14 responses:** 14 responses (10 per cent of the total) were selected for quality review. This involved the Ipsos Project Director, Rachel Brisley, checking that the individual question responses and issues highlighted had been categorised appropriately and, where not, advising re-coding. It had originally been intended that our academic expert, Sarah Toy, would conduct this task but due to challenges with secure transfer from NVivo to an external organisation, this was not possible. Rachel Brisley had no other involvement in the coding or analysis meaning that independent quality assurance was achieved.
- **Review of theme categorisation:** prior to analysis, our research team checked that all the responses to individual questions that had been grouped into themes correctly addressed that theme and advised re-coding where these were not correct.
- **Review of stakeholder categorisation:** the Ipsos Project Director, Rachel Brisley, reviewed the categorisation of stakeholders and identified where some had been incorrectly categorised requiring changes. Several of the trade associations that responded, for example, had been incorrectly identified as trade unions which was rectified.

### 3.6 Limitations

While the methodology deployed provides many strengths, such as the comprehensive three-stage approach to the synthesis, the approach is qualitative, bringing in a certain degree of subjectivity based on the interpretations of those analysing the responses. The Ipsos team worked to minimise this by including the QA process detailed in Section 3.5 and maintaining a small, expert analysis team.

In addition, whilst the report presents the findings from a systematic analysis of the evidence submitted to the Call, this report cannot be viewed as a systematic review of the evidence available on a Just

Transition. This is because it does not present any evidence which is available outside of that which was presented by respondents to the Call for Evidence.

Furthermore, the data submitted as part of the Call were from those who chose, or were able, to respond. Therefore, they will not represent the full range of views of all communities and interests in Wales, particularly those who might not be able or willing to respond such calls. Therefore, while the evidence provides valuable insights, due to the qualitative nature of the Call, the findings should not be considered representative.

The decision to include a range of sources such as grey literature and input from community and action groups provides valuable perspectives that may not emerge from traditional academic literature; however, these inputs may also carry biases reflecting these groups' specific interests or agendas.

Additionally, grey literature, unlike peer reviewed academic sources, will not have undergone a rigorous quality assurance process. This could potentially lead to the inclusion of information that is not well-supported by evidence or accurately portray an issue. Furthermore, the quality of grey literature varies significantly. It can range from highly professional and accurate reports to less reliable opinion pieces or lived experiences. While lived experience and anecdotal evidence can provide vibrant and valuable qualitative insights, it is crucial to adopt a principled approach to evidence quality appraisal and apply rigorous critical analysis skills when sorting and prioritizing the evidence. Further discussion on the quality and verifiability of the data can be found in Section 5.3.2, Quality of evidence.

Where possible references to published material has been included, however the inclusion of the links should not be seen as an endorsement by Wesh Government of a particular perspective. Due to the nature of the Call, where no links have been provided as part of the submission, the statistics included in this report should be viewed as broadly illustrative. To provide insight into the quality of the evidence submitted in each section, a caveat has been added to the beginning of each section.

These limitations highlight the complexity and challenges inherent in conducting such a comprehensive qualitative synthesis. However, they do not necessarily undermine the value of the work, and awareness of these potential limitations can inform future improvement and research strategies.

The findings presented in this report are based on responses provided to the Call for Evidence. Unless otherwise specified, the views expressed in this report are those of Ipsos and may not necessarily reflect the views of the Welsh Government.

## 4 Overview of the Call for Evidence and Responses Received

The Welsh Government issued a Call for Evidence for a Just Transition to Net Zero which was open for responses from 6 December 2022 to 15 March 2023. The purpose was to ensure that the plans for decarbonisation and achieving Net Zero in Wales by 2050 are based on solid evidence, and that key groups had an opportunity to provide their views on how to facilitate a Just Transition. The evidence obtained, along with other bodies of work, will inform the development of Wales's decarbonisation pathway and contribute to the creation of a Just Transition Framework.

The Call had three key aspects:

1. identify best practice, wherever that may be found, for the implementation of a just transition in Wales;
2. identify the impacts and opportunities across our society and economy;
3. identify the infrastructure and support we need to ensure a just transition.

### 4.1 Responses received

Prior to the Call it was anticipated that around 50 responses would be received from various stakeholders, based on previous similar publications. However, the Welsh Government received a total of 117 responses. These were provided to Ipsos in May 2023 and an evidence repository was created where all responses were saved. The research team conducted initial data cleaning which identified that of the total 117 response submission three were blank, and 11 entries were multiples from the same organisations. Five organisations submitted multiple responses to the Call, one of which submitted three times. Multiple responses from the same organisation were received provided additional supporting information such as round table meeting notes and focus group transcripts.

In total, this means there were 114 response submissions, from 108 respondents available for synthesis. Each of the submissions has been analysed individually, irrespective of whether they are from the same respondent.

The Call consisted of 16 open-ended questions divided into three areas: Governance (questions 1 to 3), impacts and opportunities (questions 4 to 11) and supporting resources (questions 12 to 16). Responses covered each of these three areas, with the highest level of response on average being in the governance sector (average 44 responses), followed by impacts and opportunities (average 41 responses) and then support resources (average 34 responses). A breakdown is in Table 4.1:

**Table 4.1: Breakdown of responses by question and topic**

Question	Governance			Impacts and Opportunities								Support Resources				
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16
<b>No. responses</b>	50	48	33	54	44	48	34	48	32	42	23	35	37	29	36	32



## 4.2 Respondents

Of the 108 individual respondents, there was a mixture of organisation types, with umbrella bodies and trade associations being the largest group of respondents, followed by third sector and charity organisations, and individual businesses. Just three responses were received from local authorities (LAs), two of which were the views of individual councillors rather than a collective response from the LA. An overview of the respondent organisation type is presented in Table 4.2.

**Table 4.2: Overview of respondents, by organisation type**

Organisation types	Number of respondents
Umbrella body	35
Third sector / Charity	22
Individual Business	14
Academia	11
Local Authority / Government Body	10
Trade Union	7
Individual	5
Consultancy	2
Banking / Financial	1
Other	1
<b>Grand Total</b>	<b>108</b>

There was a broad representation from across the various emission sectors, with the most common being energy, followed by industry and business, research, and sustainability. Table 4.3 shows breakdown of respondents per emission sector, with the following groupings relating to the more generic and social focus of the organisations that responded.

**Table 4.3: Overview of respondents, by Emission sector**

Sector	Number of respondents
<b>Emissions pathway</b>	
Energy and Heat Generation	19
Transport	5
Residential Buildings	5
Industry and Business	19
Agriculture	6
Forestry and Land Use	6
Waste Management	0
Public Sector	6
<b>Other</b>	
Communications	1
Disability	2
Gender	3

Sector	Number of respondents
Health	2
Older people	2
Poverty Alleviation	1
Religion	1
Research	10
Skills	4
Sustainability	8
Third sector	2
Youth	1
N/A	5
<b>Grand Total</b>	<b>108</b>

The Ipsos team sub-categorised the two main types of respondent organisation: umbrella organisations/ trade associations and third sector organisations due to the number of responses received for each. The majority of umbrella respondents were from the Industry and Business, and Energy and Heat Generation sectors. The third sector organisations were more diverse and covered a range of categories such as Youth, Black, Asian and Minority Ethnic, heritage, and health. Table 4.4:

**Table 4.4: Breakdown of umbrella and third sector organisations, by sector**

Umbrella Organisation	Third Sector Organisations
Industry and Business – 13	Sustainability – 5
Energy and Heat Generation – 9	Skills – 3
Residential buildings – 3	Gender – 3
Agriculture - 3	Older people – 2
Transport – 2	Disability – 2
Third sector – 2	Agriculture – 1
Public sector – 1	Energy and Heat Generation – 1
Religion – 1	Forestry and Land Use – 1
Sustainability – 1	Industry and Business – 1
	Poverty alleviation – 1
	Transport – 1
	Youth – 1
<b>Total: 35</b>	<b>Total: 22</b>

# 5 Process Learning

## 5.1 Introduction

This chapter sets out the wider learning from the synthesis of the evidence submissions covering the stakeholders that responded and the type, quality and content of evidence submitted. When considering these issues, the Call's publicity, presentation, and content were taken into account. The learning set out in this chapter should be of use for policy and decision-makers in interpreting the findings from the Call as well as providing useful information to inform recommendations for similar future Calls and in wider planning and preparation to achieve a Just Transition.

## 5.2 Respondents

As part of the analysis, the research team conducted light touch stakeholder mapping and gap analysis. Prior to reviewing the Call, Sarah Toy, Academic Expert, and Rachel Brisley, Project Director, brainstormed the key stakeholder groups that they would anticipate responding to the Call. They did this by considering four questions for each sector (third, public, private) in each decarbonisation pathway:

1. Who has most to gain or lose in the Just Transition?
2. Who are the leaders, followers, and resisters in the Just Transition?
3. Who will need the most support to engage in the Just Transition?
4. What spatial differences will impact the Just Transition for different organisations operating across (and beyond) Wales?

A long list of stakeholder archetypes for Wales that would ideally be expected to respond to the Call was developed using those guiding questions. The ideal stakeholder archetypes expected to respond were mapped in a four-by-four interest/influence matrix where interest related to those that could potentially be impacted by the Net Zero transition or have a wider interest in a Just Transition, and influence related to those that have the capability and capacity to influence the Net Zero transition to be more or less just. The ideal matrix was compared with a similar matrix which mapped actual stakeholder response. This enabled gaps in stakeholder engagement to be identified. **Error! Reference source not found.**

The responses were dominated by three groups – umbrella bodies, third sector organisations and businesses that submitted around two thirds of the responses. The response rate from LAs was very low with only three submitting evidence, two of which provided the individual views of councillors rather than a LA wide view, although an umbrella body for local authorities also provided a response. A good spread of academic organisations submitted evidence but just two consultancies responded.

The majority of respondents were from the Energy and Heat Generation, Industry and Business, and sectors, which is unsurprising considering the nature of the Call. 24 of the 36 Umbrella Bodies that submitted responses were from the Industry and Business, and Energy and Heat Generation sectors whilst the respondent types for Third Sector Organisations were more mixed across a range of interest areas (energy, agriculture, industry, land use, poverty alleviation and transport) and protected characteristics (sex, disability and age).

In addition to the low response rate from LAs, lower than expected submissions were provided from natural environment organisations, national parks, transport organisations and the NHS and other social

care organisations. No responses were received from regulators, community organisations (local organisations such as tenants and residents organisations, or geographically focused), credit unions or third sector organisations focusing on Black, Asian and Minority Ethnic communities, health, and heritage issues.

The Welsh Government focused their communications on gathering input from stakeholders across the eight emissions sectors but also targeted those with stakeholders with specific expertise and interest in a Just Transition. The response rate varied across sectors with a particularly high response from the Industry and Business sector. This is likely to have been resulted, in part, from Business Wales actively encouraging businesses to provide evidence<sup>8</sup>. It can be challenging to engage businesses in public sector consultations showing that the awareness raising with this sector was beneficial. Around one in ten of the responses submitted were from agriculture and land use organisations but just two responses from transport representatives (one port and one government respondent) showing a need for more awareness raising with the transport sector. Finally, the lack of community level responses suggest that the Call has engaged more professional organisations than individuals and community groups. This may be because of the request for evidence rather than views, although as discussed in Section 5.4 many of the responses provided were views rather than evidence.

### 5.3 Responses received

This section sets out our assessment of the responses provided covering: the type, quality, and coverage of the evidence.

#### 5.3.1 Response type

Response type covers the spread of evidence provided against the Call questions, the additional data provided with the evidence and the degree to which responses focused on a Just Transition.

##### Spread of evidence

As detailed in Chapter 3, the questions that received the most responses were Q4 (54 responses), Q1 (50), Q2 (48) and Q6 (48) with the lowest number of responses for Q11 (23), and Q14 (29).

Q4 focuses on the main impacts and opportunities associated with meeting the transition to Net Zero; this is the fundamental essence of the Call so it would be expected that most respondents would provide information relating to this question. The high number of responses to Q1 (relating to the degree that the Well-being of Future Generations Act can be used to inform a Just Transition) and Q2 (regarding decision-making and guiding principles to support planning for the Just Transition) show how the Well-being of Future Generations Act is well embedded in decision making in Wales, which is also noted in the findings section. Q6 focuses on how transition in one sector may accentuate or diminish risks or opportunities in other sectors. The number of respondents to this question highlights how the Just Transition has impacts across and between sectors reflecting the interdependencies that need to be addressed to progressing towards this goal.

Both Q11 and Q14 received less than 30 responses. Q11 is a final question in the Impacts and Opportunities section of the Call asking for any additional evidence that has not already been provided relevant to this section; as a 'wrap-up' question it is to be expected that less responses would be provided than for other questions. Q14 is similar in that it asks for evidence regarding any additional

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<sup>8</sup> Business Wales, [Just Transition to Net Zero Wales](#)

support and information needed to identify and develop required Net Zero skills, but the preceding Q13 focuses on skills so respondents may have felt that they provided most of the relevant evidence there.

### Data provided

A summary of the main data sources included in the evidence submissions is listed in Annex A. A total of 29 responses were found to contain data, or references to data, that could help to plan future pathways to support a Just Transition to Net Zero. The qualitative Lived Experience data from 10 organisations may be useful to develop Just Transition stories that can help to build the narrative for future Just Transition public engagement activities. Many respondents referred to the work already being carried out by the Scottish Government on their Just Transition to Net Zero as a source of data and inspiration for best practice.

### Focus on a Just Transition

The responses were also reviewed to assess the extent to which they had addressed the issue of a *Just Transition*, as opposed to focusing on the transition to Net Zero more generally. Three categories were identified and responses attributed to them:

- Weak – no reference to fairness or justice in evidence submitted
- Medium – reference to fairness or justice in some elements of evidence submitted
- Strong – reference to fairness or justice throughout evidence submitted

Table 5.1 highlights that whilst almost half of the responses had a strong focus on a Just Transition, a quarter of respondents did not address fairness or justice in their submission.

**Table 5.1: Proportion of responses addressing just or fair dimensions of transition.**

Focus on Just Transition	Number of responses	Proportion of all responses
Strong	49	45 per cent
Medium	32	30 per cent
Weak	27	25 per cent

Overall, analysis of the responses indicated that, while nearly half had a strong focus on the Just element of the transition, nearly a quarter (27 responses) had a weak focus making little or no reference to the Just element. This may be attributed to the fact that, after a strong introduction, the Call used the phrase Just Transition without further emphasising the importance of the focus on fairness. Questions 4, 5, 6, 7, 10, 11 do not refer to Just and so could be answered without mentioning it (and frequently were). The responses to the section on Support (12-16) were heavily focused on skills though Just was not always mentioned in this context.

Of the 27 responses with a weak focus on a Just Transition, nearly half (13) were from the Energy and Heat Generation, and Industry and Business sectors. However, over a fifth of the responses with a medium or strong focus on justice (18 out of 82) were from these same sectors. This would indicate there is a diversity of views, attitudes and approaches across these sectors which will be important to achieving a Just Transition.

Three LAs responded to the Call, two of which were from councillors. The LA that provided a response on behalf of the authority submitted strong and justifiable evidence, but the other responses provided individual views and did not refer to the Just element of the transition. Academia and umbrella organisations typically provided evidence with a strong focus on a Just Transition and high quality, verifiable evidence.

In many responses, the lack of focus on a Just Transition may be a simple issue of not answering the question. Most respondents were keen to share what they are doing to meet the Net Zero target. This meant that many respondents detailed their decarbonisation activities and plans without referring to them being Just. It could also be the case some organisations do not consider it their responsibility to deliver ‘social justice’. Alternative wording such as fair or equitable might have drawn different responses.

### 5.3.2 Quality of evidence

Each piece of evidence submitted was reviewed in full and categorised according to the following quality criteria:

- **Verifiable:** evidence is backed up by reference to peer-reviewed articles or professional reports, use of verified statistics, reference to Welsh Government Policy documents or national/international standards. Data presented are from authorised sources with representative sample sizes
- **Justifiable:** evidence refers to supporting documents from organisations, data presented are transparent and from reliable sources, examples or case studies area offered based on own operations
- **Lived experience:** evidence presented is qualitative and based on first-hand, every day experience reported by members or representatives of the organisation or sector
- **Views:** presented is qualitative and based on individual or organisational opinions, no data are not offered to support the position being presented

Evidence from a total of 108 respondents was reviewed after five blank responses and four duplicate responses had been excluded. The number of responses in each quality category is shown in Table 5.2:. The responses were evenly distributed between Verifiable, Justifiable, and Views with far fewer responses (10) offering Lived Experience perspectives.

**Table 5.2: Proportion of responses by quality category**

Quality category	Number of responses	Proportion of all responses
Verifiable	37	34 per cent
Justifiable	29	27 per cent
Lived Experience	10	9 per cent
Views	32	30 per cent

The highest quality (verifiable) responses were well-distributed across sectors and organisations but, as would be expected, a high proportion were from academia (22 per cent) and umbrella organisations representing their members (27 per cent). The high proportion of views submitted (30 per cent of all

responses submitted) were also distributed across sector and organisation types but it is worth noting that nine of these were from individuals or individual businesses.

## 5.4 Content of the evidence

This section sets out any obvious gaps in the evidence or unexpected findings. The analysis was conducted by our experts, Sarah Toy and Rachel Brisley and is based on their previous experience and professional judgement.

- **Governance:** the positive references to the Well-being of Future Generations Act and the PSED identified how embedded these have become providing an excellent foundation to support the Just Transition. However, it was surprising that no reference was made to UN Sustainable Development Goals<sup>9</sup>. Similarly, there was little reference by or to businesses' role in good governance, Corporate Social Responsibility, accountability, and transparency, which would align well with Just Transition.
- **Impacts and opportunities:** the evident gaps within this section, which focuses on the findings in relation to the Welsh Government's identified emissions sectors, relate to waste management and the transition to a circular economy, new homes delivery and the impacts for Black, Asian and Minority Ethnic communities and transient communities. It was interesting to note the positive outlook regarding job creation and safeguarding as a result of the transition. The important focus on housing tenure is also useful evidence highlighting the need for social and private rented landlords as well as their tenants to be supported through the transition. Finally, the role of education in increasing knowledge and awareness amongst young people was an obvious gap as was the overall lack of responses from youth organisations (just one was received).
- **Support:** in the responses relating to support for a Just Transition there was a lack of reference to the critical role of LAs in setting local policy direction and showing leadership in delivering change with citizens, which was also reflected in the lack of responses from LAs. Also, only one transport related organisation responded with no responses from transport operators. This had led to an overall gap with regards to the role of transport operators via initiatives such as public transport, demand responsive transport, micro-mobility, ride/car sharing and low emission neighbourhoods that will all play a critical role in the transport decarbonisation pathway.

As part of their submissions, some respondents drew attention to a range of sources that they deemed relevant. Not all respondents submitted additional materials, or links, and respondents did not necessarily submit or link to sources they had commissioned themselves, or connected to their own operations. As such organisations and bodies identified in additional material should not be interpreted as having necessarily contributed to the Call. A full list of published sources can be found in Annex A.

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<sup>9</sup> United Nations, [Sustainable Development Goals](#)

## 6 Findings: Governance

The findings from the synthesis are set out against the key areas of the Organising Framework presented in Chapter 3. These are: governance, support, and impacts and opportunities.

### The questions in the Call for Evidence which referenced the governance for a transition to Net Zero were:

**Q1.** Do you have any evidence to show how the Well-being of Future Generations (Wales) Act 2015 has, or could be, used to inform a Just Transition?

**Q2.** What examples do you have of decision making processes or guiding principles that could be used across public, private and third sectors to plan for and ensure a Just Transition?

**Q3.** Do you have any evidence on how we can best fulfil the public sector equality duty in pursuing a Just Transition? What evidence do you have that demonstrates the role of finance and/or social infrastructure in facilitating or delivering a Just Transition?

The Call for Evidence sets out three governance related questions which focus on the wider institutional, legislation and policy framework supporting the implementation of a Just Transition.

As outlined in Section 3.6, the perspectives and evidence in this report represent a synthesis of submissions to the Call. It is not possible to ensure that the statistics and points raised within submissions adhere to the rigour of Welsh Government standards. As such, unless accompanied by a published source, figures and statistics should be viewed as illustrative. There was a mix of evidence types submitted to the Call and relate to governance. Of the 70 responses which answered this part of the Call, 24 were deemed to be verifiable, 19 were deemed to be justifiable, 19 were deemed to be views and eight were deemed to be lived experience.

### Q1. Evidence to show how the Well-being of Future Generations (Wales) Act 2015 has, or could be, used to inform a Just Transition

The Well-being of Future Generations Act was referenced 58 times by the responses to the Call. Umbrella bodies referred to the Act the most commonly (27), followed by third sector (22) and LAs (9). Responses received suggested that the Well-being of Future Generations Act<sup>10</sup> provides a strong framework for achieving a Just Transition to a low carbon economy in Wales. It does so by aligning the principles and framework of the Act in a manner which is uniquely Welsh in nature and allows for measurement of equitable impact. Overall, there were limited examples of how the Act has been used to inform a Just Transition, but rather, responses focussed on how the Act could inform a Just Transition. There was one example given by an academic body which illustrated how the Wales Centre for Public Policy points out that the Well-being of Future Generations Act provides the core principles for the approach to ensure a Just Transition. Another example was provided of the Transport sector. Here, the decision to reject the Newport M4 relief scheme on the basis of its future sustainability was seen to be a clear example of the Act in operation.

An umbrella body provided evidence of how it integrates the Act's seven well-being goals and five ways of working from the inception of product development through operational delivery. This integration is

<sup>10</sup> Welsh Government, 2015, [Well-being of Future Generations \(Wales\) Act](#)



intended to ensure a fair, inclusive, and long-term approach, promoting accountability through practices such as publishing well-being statements and annual reports. In addition, the organisation's coordinating framework used the Act to integrate delivery values, investment strategy and objectives through its '2022/27 Corporate Plan and Annual Report and Statements'.

The same organisation also explained how the Act guides its financial endeavours by embedding principles from fund development to operational delivery. Financial inclusion, responsible practices, and social justice form integral components of this approach, contributing to unlocking economic potential while adhering to the Act's directives.

The responses recognised long-term planning as a key principle of the Act. One umbrella body emphasised that there is often an absence of a long-term vision in work conducted by the Welsh Government and in Local Authority planning. The response asserted that the Future Trends Reports provide a promising starting point, but there was a lack of systematic integration of these reports into the decision-making processes of both Welsh Government and local authorities. It was suggested that to enhance this integration, there is a need for a more concise presentation of potential future scenarios, such as 'Policing 2040', along with a preferred pathway<sup>11</sup>. The response also suggested that this approach would enable greater understanding of scenarios to be avoided and support a more substantial foundation for effective behaviour change communication.

For another umbrella body, conducting risk analyses related to specific pathways was identified as a crucial step that could be taken at both national and regional levels. It was noted that this strategic endeavour, however, requires dedicated time and resources. Current processes were seen as often rushed, and therefore impeding the thoroughness of such analyses. The response cited the Wales 2037 visioning process, where a short notice period of two weeks prevented key individuals and organisations from participating due to scheduling conflicts. Additionally, there has not been subsequent communication detailing the progress of this endeavour. Similarly, the process of developing the Regional Economic Framework could have been more substantively rooted in comprehensive future scenario analyses.

Overall, the Act was seen to form a broad framework for consensus building. One energy organisation pointed to the diversity of demands within the Welsh market, which necessitates flexible interventions. It was seen that the Act's principles encourage tailored interventions that address the unique needs of each community. By collaborating with key stakeholders and using a long-term view, interventions can align with the economic goals of each area while ensuring inclusivity.

Many of the responses reflected on how certain groups and regions are disproportionately impacted by policy decisions. For one umbrella body, the Act's approach of formalising tacit knowledge ensures that these often-marginalised perspectives are integrated into decision-making. Moreover, the response illustrated how the Well-being Impact Evaluation tool showcases how well-being considerations can be integrated from the outset in infrastructure projects. It was seen that by analysing the impact of the built environment on community well-being, the tool aims to ensure that community impacts are quantified and incorporated into project business cases. This integration is intended to promote consensus by involving stakeholders and the community in the design process, leading to a more inclusive and holistic approach to decision-making. The response cites the Hirwaun Public Transport Accessibility Study as a specific example<sup>12</sup>. The tool aided in identifying how social and economic factors are interconnected with

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<sup>11</sup> College of Policing, 2020, [Policing 2040](#)

<sup>12</sup> Welsh Government, 2022, [National Transport Delivery Plan](#)

transport infrastructure. By involving stakeholders and communities, the study illustrated how sustainable transport options could bring long term benefits. This collaborative effort not only gained recognition through awards, but also showcased the importance of involving stakeholders in decision-making processes.

## **Q2. Examples of decision-making processes or guiding principles that could be used across public, private and third sectors to plan for and ensure a Just Transition**

The Well-being of Future Generations Act is intended to play an important role in decision making by helping to prioritise projects which align with sustainability and well-being considerations. Of the 157 references to decision making processes and the Act, third sector/charities referenced this the most (43), followed by umbrella bodies (42) and individual businesses at 22. The responses emphasised the importance of collaboration between different sectors and stakeholders in decision making processes. This approach was seen to be vital to avoid duplication of effort and to ensure consistency of information. Responses provided identified the need for public bodies to work together with civil society, Third Sector Organisations and Trade Unions to collectively drive the principles of the Well-being of Future Generations Act and sustainability in practice at a community level.

Respondents cited a variety of methodological toolkits used for decision making processes. For example, evidence was provided that the doughnut economics approach is being integrated into decision making processes at different levels, from Local Authorities to National Park authorities. One public body stated that the approach enables decision makers to consider the long-term impacts of their choices on future generations and promotes a holistic and collaborative approach to sustainable development. The response highlighted that local authorities have adopted this approach which is now being used to analyse and evaluate large intergenerational projects such as Tidal Range and Pumped Storage Hydro. The response also noted that by adopting this methodology, decision-makers can better understand how these projects will impact future generations' well-being and the environment. The response stated that this approach can help decision makers to consider the needs of residents, visitors, and the global community. The model was seen to encourage decision-makers to weigh various challenges, opportunities, and interrelations before embarking on solutions that minimise trade-offs and maximise co-benefits. The response highlighted that once the relevant evidence had been gathered using this model, five missions were adopted to shape the future of one National Park Authority within the limits of the planet's boundaries and in line with the Sustainable Development Goals.

One transport organisation highlighted how its 'Decision-Making Tool' supported the aims of a Just Transition. The response has mandated its use to ensure that authors of the Board/Committee papers engage in a comprehensive risk assessment across a range of dimensions. Aligned with the Well-being of Future Generations Act, the tool evaluates how decisions impact climate change mitigation and prompts mitigation plans if needed. According to the response, the Decision-Making Tool also considers socio-economic consequences, aiming to ensure that decisions align with sustainable development goals. This systematic approach is intended to promote equitable, environmentally conscious, and informed decision-making in line with the principles of a Just Transition.

For one umbrella organisation, to foster a Just Transition, the adoption of a 'Think Small First' Model stands as a guiding principle for decision-making processes. This model champions policies, which comprise:

- Establishing frameworks, networks, and infrastructure that allow for information sharing, innovation, diffusion, and adoption.
- Providing consistent and accessible information.

- Cutting public procurement contracts into small enough pieces so that small and medium-sized enterprises (SMEs) can apply.
- Reducing regulation for small businesses with less than 50 employees for example.
- Providing suitable and equitable access to finance for small businesses<sup>13</sup>.

Additionally, the integration of a 'Fairness Test' reinforces principles like practical feasibility, coordinated governance, empowerment, inclusivity, and affordability. The response from an umbrella body highlighted the need to recognise the significance of small businesses in Wales. Understanding their contributions, such as pioneering insulation and measuring carbon footprints, warrant acknowledgment and support. The response stressed that there is a need for tailored policies to support small businesses in navigating challenges associated with the transition and enabling them to contribute effectively.

Responses from third sector organisations illustrated that governance frameworks can be further enhanced to include a human rights approach. This could be achieved by for example, requiring businesses to carry out human rights and environmental due diligence across supply chains, and ending subsidies that encourage activities that degrade ecosystems and shifting to sustainable production and consumption. One third sector organisation articulated that this rights-based approach could improve the active involvement of those whose lives, well-being and rights could be impacted by a proposed action in the decision-making process. The response argued that this approach prioritises the needs of vulnerable and disadvantaged communities, while also promoting accountability, supporting the Public Sector Equality Duty. The response highlighted that utilising this legislation should ensure that in the transition to Net Zero, government, businesses, and individuals all bear responsibility for ensuring all rights are respected.

A recurrent theme expressed in the evidence provided was that a Just Transition requires community based collaborative decision-making processes and guiding principles that span public, private, and third sectors. Responses to the Call stated that to achieve collective and representative decision-making, it is essential to understand the needs of those at risk through qualitative and quantitative data gathering, co-production, and by applying the five Ways of Working from the Well-being of Future Generations Act. These five ways of working are: involvement, integration, long term, collaboration, and prevention. It was stated that implementing these principles effectively will necessitate time and resources<sup>14</sup>. One third sector organisation indicated that innovative measures, such as reaching out to communities and individuals through non-traditional and hyper-local channels, can improve the involvement of individuals with protected characteristics.

The responses provided a range of examples that illustrated the importance of localised and inclusive involvement within the decision-making process. One example was the collaborative decision-making processes in Community Renewable Energy projects (CRE). Central to this decision-making framework was the establishment of mechanisms for stakeholder engagement, such as the Annual General Meeting (AGM) and the adoption of a 'one-member-one vote' approach. These structures enabled shareholders, regardless of their investment levels, to actively participate in the management of CRE projects, ensuring a democratic and inclusive decision-making process. Furthermore, the projects demonstrated a commitment to generating positive social impacts by adopting a Benefit Community (BenComs) mode<sup>15</sup>. This model focused on delivering community benefits that aligned with local priorities, addressing a

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<sup>13</sup> No published source provided

<sup>14</sup> Welsh Government, 2015, [Well-being of Future Generations \(Wales\) Act](#)

<sup>15</sup> No published source provided

spectrum of social and environmental objectives determined by the needs and aspirations of the community.

According to an engineering umbrella body, the success of CRE projects has paved the way for the formulation of new sustainable endeavours. Notably, one CRE project capitalised on its initial solar farm by establishing a battery storage facility, thereby contributing energy to the Swansea area. Similarly, the Awel Co-Op project<sup>16</sup> which introduced a solar initiative, expanded photovoltaic installations in community facilities across Wales. At a local level, the Ynni Ogwen project<sup>17</sup> initiated another initiative, installing solar panels on community buildings, alongside the Green Valley project, which targeted transportation, rural development, and fuel poverty reduction.

Public sector bodies asserted that an important component of governance related to the Well-being of Future Generations Act is the requirement to undertake an impact assessment of well-being goals and consider the potential for integration. In ensuring an equitable transition to Net Zero, public sector responses highlighted the importance of understanding the demographics of the sectors targeted for transition. This understanding would become the starting point for delivering the transition with full cognisance of the potential impact on individuals with protected characteristics.

A response from one public body highlighted that the organisation meets the legal duties of the Equality Act 2012<sup>18</sup> and the Welsh Public sector Equalities Duties 2011<sup>19</sup> and Welsh Language measure. Its approach to decision-making involves assessing proposed policies and changes against the General Duty, ensuring no inadvertent discrimination, and promoting equality and social cohesion through Equality Impact Assessment. Besides the General Duty, the response organisation has adopted the Socio-Economic Duty and is testing an integrated assessment approach that combines Equality Impact Assessment, Health Impact Assessment, Environmental Impact Assessments, and the Children's Rights approach. This integration offers a deeper understanding of potential impacts on well-being, with a focus on vulnerable groups.

### **Q3. How the public sector equality duty can be fulfilled in pursuing a Just Transition and evidence that demonstrates the role of finance and/or social infrastructure in facilitating or delivering a Just Transition**

The Public Sector Equity Duty (PSED) is a legal requirement in the UK which requires public bodies to consider how to eliminate discrimination, advance equality of opportunity, and foster good relations between different groups. It includes a well-being assessment tool, which is used to assess the impact of policies and actions on the well-being goals outlined in the Act. The responses suggested that this tool is utilised to evaluate how policies and actions, linked to the transition to a Net Zero future, affect both individuals and communities, particularly those most impacted. Adopting a comprehensive approach that factors in the specific requirements and perspectives of various groups was seen as crucial to meeting the responsibilities of the public sector equality duty.

One business umbrella organisation suggested the importance of considering whether equal access alone will achieve desired equality outcomes within the required time. Its response suggested that prioritising equal outcomes through Positive Action could speed up change. For instance, aiming for a 50:50 male-to-female ratio in Science, Technology, Engineering, and Mathematics (STEM)

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<sup>16</sup> Welsh Government, [Awel Co-op: Mynydd y Gwrhyd Wind Farm](#)

<sup>17</sup> Partneriaeth Ogwen, [Ynni Ogwen](#)

<sup>18</sup> UK Government, 2010, [Equality Act](#)

<sup>19</sup> Welsh Government, 2011, [Public sector Equalities Duties](#)

apprenticeships might mean investing 90 per cent of funding in supporting girls, and similarly for under-represented sectors like male primary school teachers. Responses referred to a report titled ‘Promoting Gender Equality: A Systematic Review of Interventions’<sup>20</sup> to evidence this reasoning.

Responses highlighted that the transition to a Net Zero society could provide opportunities to enhance diversity within industries. In order to capitalise upon these opportunities, collaboration between organisations, stakeholders, and local communities is required to create a diverse workforce that mirrors society's make up. It was seen by one trade organisation that promoting the participation of individuals with protected characteristics in key economic sectors can lead to a workforce that is more diverse and inclusive. The responses suggested that it was the Welsh Government's responsibility to take proactive measures to promote collaboration between industries and collectives or communities that share similar or relevant protected characteristics. Moreover, some charities went further, to suggest that in addition to consulting and co-producing plans for a Just Transition where possible, the Welsh Government should examine various forms of evidence regarding the potential effects of distinct pathways towards achieving a Net Zero transition, particularly on individuals with diverse protected characteristics.

One response highlighted the importance of scrutinising the projected consequences of the transition on individuals with protected characteristics. For instance, Chwarae Teg's publication ‘Towards a Gender Equal Wales: Responding to a Transforming Economy’ could offer valuable insights<sup>21</sup>.

One public body response referenced a recent collaborative initiative named the ‘Climate Change and Inequalities’ project<sup>22</sup>. This project, involving Public Health Wales (PHW), and Futures Literacy through Narrative (FLiNT) sought to gain fresh insights into the challenges faced by marginalised communities. The strategies highlighted the effectiveness of a collaborative approach that engages these communities to capture their aspirations, concerns, and future prospects, as documented in the Public Health Wales report. This endeavour, aligned with PSED guidelines, suggested a pathway towards a Just Transition could adopt a similar approach.

The responses from trade unions spoke in depth of how the PSED could assist workers in adapting to a Net Zero society. In particular, one trade union highlighted research which suggested groups of workers with protected characteristics face a higher likelihood of disadvantages due to digitisation, underscoring the importance of employers adhering to the PSED<sup>23</sup>. They note that the PSED mandates that public entities consider the requirement to eliminate discrimination and promote equal opportunities among diverse worker groups. This principle would be relevant to employees necessitating upskilling within the framework of decarbonisation. It will be of equal significance to utilise the PSED as a mechanism to guarantee that marginalised public sector workers have access to the same retraining prospects as their counterparts engaged in more stable and higher-paying occupations.

Umbrella bodies often referred to the need for Net Zero upskilling to adhere to the PSED to assure that no one is left behind. In 2021, an Engineering Construction Industry Training Board (ECITB) census revealed that 35 per cent of the workforce in Wales falls within the 50 to 59 age bracket, emphasising the urgency to bring in younger recruits to balance the age distribution. The engineering workforce in Wales is predominantly male (96.6 per cent) and white (99.8 per cent), necessitating substantial efforts to align

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<sup>20</sup> Guthridge, et al., 2022, [Promoting Gender Equality: A Systematic Review of Interventions](#)

<sup>21</sup> Chwarae Teg, 2022, [Towards a Gender Equal Wales](#)

<sup>22</sup> FLiNT, the Office of the Future Generations Commissioner for Wales, and Public Health Wales, 2022, [Communities and Climate Change in a Future Wales](#)

<sup>23</sup> TUC, 2022, [Opportunities and threats to the public sector from digitisation](#)

more closely with the diversity of society. The ECITB is actively engaged in equity, diversity, and inclusion (EDI) initiatives, spearheaded by the Inclusion, Diversity, Equality, Action task group, which guides the organisation's actions related to equality<sup>24</sup>.

Responses cited the importance of collaboration to fulfil the PSED. The ECITB asserted that collaboration with entities like Equal Engineers and the formulation of training standards in areas like unconscious bias are integral components of this effort. During the transition, it was deemed crucial to highlight and implement the business benefits associated with a diverse workforce. For the ECITB, it was seen that early commitment from client organisations and contractors, robust monitoring systems, prioritising data collection to identify any systemic recruitment trends, and enabling targeted interventions to attract under-represented groups towards transition-related opportunities would be conducive to aligning with the Public Sector Equality Duty.

The response from a public body illustrated how they utilised the International Labour Organisation (ILO) guidelines for a Just Transition Towards Environmentally Sustainable Economies and Societies as a framework for facilitating a Just Transition. Although published in 2015, this was seen as a valuable resource incorporating sustainable development principles<sup>25</sup>. Adopting a 'health in all policies' strategy was also advocated, utilising the Public Health Outcomes Framework's<sup>26</sup> overarching indicator, 'Wider Determinants of Health,' to evaluate the potential effects of their work on the well-being and health of the Wales population. According to the response, this approach is applied to various endeavours, including the Grants Programme, statutory consultation for Planning, and Flood Risk schemes. There are ongoing efforts to integrate the 'health in all policies' approach into internal policies and procedural guidelines within Natural Resources Wales.

### Key points raised by the evidence submitted:

- The Well-being of Future Generations Act provides a strong framework for achieving a Just Transition to a low carbon economy in Wales. Highlighted in many responses and examples provided of how it supports a Just Transition in practice.
- Long term strategic decision-making on Just Transition needs appropriate resources and time to be invested. It is also essential that disproportionate impacts on different groups from the outset in strategy planning.
- Collaboration between public sector, businesses and communities is a fundamental principle for all decision-making regarding the Just Transition.
- Evidence was provided of a variety of methodological toolkits used for decision making processes; these differ between sectors, but all have collaboration, equality and local influence as key principles.
- Responses highlighted the importance of impact assessments with public sector bodies assessing policies against the Well-being of Future Generations Act, the Equality Act and the Welsh PSED.

<sup>24</sup> ECITB, 2021, [Workforce Census 2021](#)

<sup>25</sup> International Labour Organisation, 2015, [Guidelines for a just transition towards environmentally sustainable economies and societies for all](#)

<sup>26</sup> Public Health Wales, 2023, [Public Health Outcomes Framework](#)

- Multiple responses highlighted that meeting the requirements of the PSED will support the Just Transition by requiring policies that eliminate discrimination, promote equal opportunity, and ensure fair community relations.
- Using Positive Action to achieve equal outcomes was highlighted along with the crucial importance of collaboration and diverse workforce engagement.
- Focused financial support and development of social infrastructure were identified as key to a Just Transition including financial support for community sustainability ventures, workforce training, community engagement and support for local initiatives.

# 7 Findings: Impacts and Opportunities

**The questions in the Call for Evidence which referenced the impacts and opportunities of a transition to Net Zero were:**

**Q4.** What evidence do you have on the main impacts and opportunities associated with meeting Wales' transition to Net Zero? Please provide evidence (or identify evidence gaps) for the short (2022 to 2025), medium (2026 to 2035) and long term (2036 to 2050).

**Q5.** Do you have any evidence to show what the well-being benefits and challenges for each sector could be?

**Q6.** What evidence do you have on how the transition in one sector may either accentuate or diminish a risk or opportunity in another sector?

**Q7.** What evidence do you have on the spatial impacts and opportunities across Wales?

**Q8.** What evidence do you have on the equality impacts of the transition? Where is there existing disparity which could be addressed via transition? What are the risks which need to be managed?

**Q9.** What evidence do you have on who is likely to be most affected by the transition?

**Q10.** Who are the key actors, governance, regulatory/policy, and technological drivers and inhibitors for transition of each sector?

**Q11.** Do you have any other evidence that will help identify the impacts opportunities across our emission pathways or are there evidence gaps?

The responses in relation to these questions were reviewed against each of the Welsh Government's identified emissions sectors set out in the Call for Evidence<sup>27</sup>. Any responses relating to circular economy as a cross cutting theme have been included as part of each emissions sector as required.

The Responses have been grouped under headings per emission sector:

- Sector and spatial impacts and opportunities
- Who is impacted
- Timelines (impacts over short medium and long term)
- Evidence gaps identified by the responses.

## 7.1 Electricity and heat generation

The Call document stated that the electricity and heat production sector in Wales accounted for 16 per cent of emissions in 2020. The majority of emissions came from power stations generating power from fossil fuels, with a small portion attributed to power stations using gas from sewage treatment works, municipal solid waste, and landfill sites<sup>28</sup>.

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<sup>27</sup> Welsh Government, 2023, [Just Transition to Net Zero Wales: Call for Evidence Consultation Document](#)

<sup>28</sup> Climate Change Committee, 2020, [Sixth Carbon Budget](#)



Net Zero Wales<sup>29</sup> sets out two broad areas of mitigation for Carbon Budget two and reaching net zero by 2050. Firstly, decarbonising electricity production from fossil fuels, and secondly, increasing the production of electricity from low carbon and variable renewables.

### 7.1.1 Sector and spatial impacts and opportunities

55 responses to the Call mentioned energy, electricity and/or heat generation in some capacity. Much of this discussion overlapped with other emission pathways, most commonly transport and residential and buildings. The responses type was mixed, although umbrella bodies were the most likely to reference energy, followed by trade unions and charities. However, it was less common for responses to discuss the impact on a Just Transition.

As outlined in Section 3.6, the perspectives and evidence in this report represent a synthesis of submissions to the Call. It is not possible to ensure that the statistics and points raised within submissions adhere to the rigour of Welsh Government standards. As such, unless accompanied by a published source, figures and statistics should be viewed as illustrative. The majority of the submitted evidence related to this section was deemed to be verifiable, consisting of 25 verifiable responses, 15 presenting views, 11 justifiable responses, and three presenting lived experiences.

In terms of decarbonising energy, typically responses noted that reaching Net Zero and delivering a decarbonised power system will require innovation and the development of a number of emerging technologies including hydrogen and CCUS. Overall, 19 responses noted the role of carbon capture processes in aiding a transition to Net Zero, while 14 noted the role of hydrogen. Most of these responses coming from businesses and umbrella bodies within the energy and industry and business sectors.

Most responses that highlighted CCUS considered it was essential to meeting Net Zero. One business noted the impact that CCUS processes could have on reducing GHG emissions using an example of a refinery in the USA. The example was showed that large-scale carbon sequestration projects can be implemented successfully. The refinery has been capturing over one million tonnes of carbon dioxide each year. The project also plans to capture high-concentration CO<sub>2</sub> streams produced in the fermentation process at their U.S. ethanol plants, which has the potential to reduce the carbon intensity of ethanol by more than 40 per cent and increase its value in low carbon fuel markets. This highlights the potential of carbon capture to contribute to lower carbon emissions and promote the use of cleaner energy sources although recognising site specific information needs to be considered.

When it came to hydrogen, although responses welcomed the development of hydrogen technologies, no hard evidence or statistics were provided which demonstrated the capacity of hydrogen to achieve Net Zero. Some responses did provide examples of locations where hydrogen technology was already being developed. For example, one public body presented the example of Milford Haven: Energy Kingdom, a £4.5 million project exploring the vital role hydrogen could play in a decarbonised energy future<sup>30</sup>. This includes the creation of an architecture to deliver a smart local energy system. The response argues that this is a great template for other areas, as it incorporates all players in the hydrogen economy, from generation and storage, transport, import, export to the end users and everything in between.

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<sup>29</sup> Welsh Government, 2021, [Net Zero Wales Carbon Budget 2 \(2021-25\)](#)

<sup>30</sup> Pembrokeshire County Council, [Milford Haven: Energy Kingdom](#)

Concerns were raised in the responses about the grid capacity in Wales and its impact on the transition to Net Zero. One response from an energy business emphasised the need to enhance the grid network to achieve the renewable energy growth targets set by the Welsh Government for both 2030 and the more recent targets outlined in the January 2023 Review. This issue is particularly important in mid and north Wales. Additionally, another response from a public sector organisation suggested that meeting the Net Zero targets, including the delivery of 20 per cent of 2GW of low carbon hydrogen production by 2030, would require a significant expansion of the grid capacity in south Wales to allow for an additional 10GW.

In the responses there was a particular emphasis on renewable energy generation including solar farms, and wind farms. One response from an umbrella body noted that in order to reduce reliance on fossil fuels and reach Net Zero, Welsh industry will require 25 GW of energy generation from offshore wind to almost completely replace the need for fossil fuels. The response argues that this is ten times the total installed renewable generation capacity in Wales, and it would also need to meet at least five times the current electrical demand. Responses identified that funding for wind farms was anticipated. One business noted that the National Grid alone will be investing £16bn over five years in upgrading our networks and enabling the deployment of clean technologies like offshore wind. The same response noted that according to the Offshore Wind Industry Council, the offshore wind sector anticipates £155 billion of private investment between 2022 and 2030<sup>31</sup>.

### 7.1.2 Who is impacted

As noted previously, very few responses noted a specific impact on any groups as a result of the transition to Net Zero in the sector.

In terms of jobs and skills, responses stated that workers in current carbon intensive electricity and heat generation sectors are likely to be affected by the transition as these industries are phased out. One umbrella body noted that this could lead to job losses and economic disruption in these communities but that the transition also provides opportunities to create new green jobs in renewable energy and other low carbon industries.

However, several responses also noted that the transition to Net Zero would create jobs in sustainable energy. Several pointed to the UK Government's Ten Point Plan for a Green Industrial Revolution, which noted that the £1bn investment in the CCUS Infrastructure Fund could support up to 50,000 jobs in the UK by 2030<sup>32</sup>. In addition, one third sector organisation suggested that if Wales were to be run on 100 per cent renewable electricity by 2035, this would require the addition of 9,500 annual FTE jobs in Wales and could create £2.2bn of gross value added for Wales. Another response argued that the energy industry would need to recruit for 400,000 jobs by 2050, with 6.3 per cent of these in Wales. The response noted that 120,000 of these jobs will be needed between now and 2030, if the UK is to meet its Net Zero target<sup>33</sup>.

One third sector organisation noted that the International Labour Organisation (ILO) recognises a transition to Net Zero to be an opportunity to create decent jobs for women in energy, transport, agriculture and waste and water management. However, as a number of responses note, women face certain barriers and underrepresentation in science, technology, engineering, and maths (STEM) fields, which are vital for many green industries. Both responses note that investment and targeted programs

<sup>31</sup> Offshore Wind Industry Council, 2022, [Offshore Wind Skills Intelligence Report](#)

<sup>32</sup> UK Government, 2020, [The Ten Point Plan for a Green Industrial Revolution](#)

<sup>33</sup> National Grid Group, 2020, [Building the Net Zero Energy Workforce](#)

can be implemented to support women in STEM fields, promoting their participation in the energy sector. Gender mainstreaming and setting specific gender targets in skills development can also help create a more inclusive environment. The role of women in the workforce is discussed further in Chapter 8, Findings: Support .

Responses from businesses and the public sector also highlighted that the development of green energy technologies had onward benefits in terms of supporting the decarbonisation of other sectors, as well as supporting social causes in the process. A few responses also highlighted that increasing grid capacity would not only facilitate the transition to Net Zero in Wales but also benefit other sectors, namely heat, and transport. One business specifically argues that the decarbonisation of heat presents an opportunity to improve rural housing in Wales, thereby bringing significant social benefits.

Similarly, one energy organisation noted that their wind farm projects across Wales have contributed more than £15 million into neighbouring Welsh communities through community funds. The response goes on to say that over the rest of their lifetime these Welsh wind farm projects operated will make an additional total contribution to community funds of over £51 million. Similarly, another energy organisation referenced the development of a wind farm in mid Wales and noted the project had explored the option for up to 10 per cent local ownership, in addition to the community fund which is expected to contribute up to £425,000 to the local community every year of operation.

### 7.1.3 Timelines

The transition to Net Zero in the energy sector encompasses short, medium, and long term impacts. Although it was recognised in the responses that achieving Net Zero will be a long term process, there are opportunities for short term benefits as well. One energy business highlighted the potential for establishing demand-side response services, which enable consumers to use energy flexibly. This approach was considered to be more cost-effective than expanding grid infrastructure. Additionally, the response argued that supporting consumers in developing their own responsive home energy ecosystems through demand-side responsiveness and domestic flexibility capacity can alleviate the need for the expansion of grid infrastructure in the short term.

In the medium term, responses noted it is crucial for the Welsh Government to provide support and recognition of decarbonisation opportunities. One energy organisation noted this must include initiatives like the use of blue hydrogen and carbon capture in the power sector and industrial processes. These efforts play a significant role in the transition towards green hydrogen and broader decarbonisation of the energy sector. Specific examples, such as the support for Pembroke National Grid Substation efforts and the South Wales Industrial Cluster, were suggested to demonstrate how the Welsh Government can facilitate medium term decarbonisation in these sectors.

In the long term, one response from an umbrella body argued that a transition to Net Zero in the energy sector is an opportunity to achieve energy stability, security, and self-sufficiency. In addition, the adoption of renewable energy sources and implementation of energy storage technologies can ensure a reliable energy supply for Wales. However, another response from an energy umbrella body noted that realising this vision will require businesses to attract private investment in renewable energy. This, the response argued, requires clear signals from governments across the UK. Such signals would entail governments providing long term decarbonisation targets and providing funding support for household decarbonisation. These measures, backed by governments, will incentivize the adoption of sustainable solutions and expedite the transition to a low carbon economy.

#### 7.1.4 Evidence gaps identified by the responses

No evidence gaps were identified in the responses.

##### **Key points raised by the evidence submitted:**

- Responses that focused on Energy and Heat Generation had less of a focus on the Just aspect of the Net Zero Transition than others, tending more to highlight aspects central to decarbonisation per se. Much of this discussion overlapped with issues raised regarding Transport and Residential Buildings pathways.
- CCUS was considered essential to reach Net Zero as was increasing the capacity of offshore wind farms but there was less concrete evidence regarding the role of hydrogen.
- Responses highlighted concerns about grid capacity and its impact on the transition to Net Zero.
- There were some concerns about the potential for job losses in the oil and gas industry, but these were matched with optimism about job creation in clean energy.
- The opportunity for jobs for women in new energy technologies was highlighted whilst noting that support would be required as women are traditionally under-represented in STEM careers.
- The potential role of community benefits from wind farms was highlighted as an opportunity to support the Just Transition.
- Responses highlighted that the transition to Net Zero in the energy sector is an opportunity to achieve energy stability, security, and self-sufficiency, but this will only be achieved with sufficient government prioritisation, funding and investment from the private sector.

## 7.2 Transport

The Call for Evidence stated that the transportation sector (buses, trains and cars) was responsible for 15 per cent of Wales' carbon emissions in 2020. As such, decarbonising the transport sector through measures such as increasing take up of public transport, active travel and low emissions vehicles is essential to deliver carbon reduction targets, and doing this in a way that is fair to all is essential for a Just Transition<sup>34</sup>.

Net Zero Wales<sup>35</sup> set's out the three broad areas for action for meeting Carbon Budget two and entering upon a pathway to meet net zero by 2050 for passenger and freight transport: a) demand reduction and modal shift to reduce or change demand for travel, b) the options and uptake of transport with low or zero emissions, and c) improvements to fuel efficiency in conventional vehicles. This will require input from, and have an impact on, the Welsh public in terms of the conscious choices they make when they travel; the public sector in helping meet low-emission targets; and business and industry in terms of exploring alternative, low or zero-carbon transportation options. In the responses to the Call, each of the broad areas were identified and the impact on businesses and the public were noted.

### 7.2.1 Sector and spatial impacts and opportunities

Overall, 57 responses to the Call in noted the importance transport in the transition to Net Zero, with 31 of these focusing on decarbonising transport. 29 of these noted the use of electric vehicles (EV) to some extent, and 13 noting the role of fuel efficiency in terms of petrol cars., most of these responses came from respondents in the energy and transport sectors, including from umbrella bodies, businesses, charities, and government bodies.

As outlined in Section 3.6, the perspectives and evidence in this report represent a synthesis of submissions to the Call. It is not possible to ensure that the statistics and points raised within submissions adhere to the rigour of Welsh Government standards. As such, unless accompanied by a published source, figures and statistics should be viewed as illustrative. The majority of the evidence submitted was for transport was a mixture of evidence and views, consisting of 20 verifiable responses, 19 views, 13 justifiable responses and five lived experiences.

Across the responses, it was noted that the decarbonisation of the transport sector is an opportunity to bring about benefits to health. Walking and cycling are not just the transport modes with the lowest or no emissions, at the lowest cost, but also offer a large number of wider environmental, economic, social and health benefits, and the reduction in greenhouse gas emitting cars would improve air quality. However, it was noted in one response from an academic organisation that there is a need for baseline population data on health and inequalities across Wales, to enable the impact of Net Zero interventions on health and inequalities to be comprehensively evaluated and ensure a fair and Just Transition to Net Zero.

Many responses (29) noted the importance and opportunity of increased usage of electric vehicles (EVs), and the provision of charging infrastructure, in the transition to Net Zero. One response from a third sector organisation highlighted that, in the view of children and young people, moving to EVs for journeys was a key action individuals could take to reduce their carbon footprint. However, another response from an energy organisation noted that only two to three per cent of cars driven in the UK are

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<sup>34</sup> Climate Change Committee, 2020, [Sixth Carbon Budget](#)

<sup>35</sup> Welsh Government, 2021, [Net Zero Wales](#)

electric or hybrid, and that more action would need to be taken to encourage the move to electric vehicles, and ensure it is an affordable choice.

In addition, one response from an umbrella body noted the importance of building EV infrastructure. According to Department for Transport data from October 1, 2022, Wales had 39 public charge points per 100,000 people, which is lower than the UK average of 52 charge points per 100,000 people. The distribution of charge points is uneven, with limited availability in many parts of mid-Wales<sup>36</sup>. Even in places where public charge points exist, they are often designed with cars in mind, making it challenging for larger vans to access the public charging network. Moreover, the EV charging spaces are often small and narrow, lacking sufficient headroom to accommodate larger electric vans, and the charging leads are often too short. These limitations make it more difficult for transport businesses, including haulage, leading to some operators to continue using petrol and diesel vehicles for longer than they initially intended, even if they are eager to transition to electric vehicles.

It was noted that there could be cross-sectional impacts as the electrification of industries including transport will put huge demands on the energy sector. Power supply, and physical infrastructure, for EV charging could be a challenge, particularly as the demand for EVs increases over time. One response from an umbrella body presented findings from an online survey conducted with logistics workers, which found that the biggest challenge for fleet electrification, and thus for delivering a Just Transition, is the availability of an adequate power supply to charge EVs in terms of public charging networks, and at transport depots.

The fuel efficiency of existing technology was also raised by 13 responses, who noted the importance of fuel efficiency and reducing greenhouse gas emissions created by transport, particularly for petrol cars. Although only noted by one response, the transition to E10 petrol was identified as an opportunity to reduce 750,000 tonnes of CO<sub>2</sub> emissions per year in the transportation sector. Additionally, the response noted advancement in technology and the resulting use of new low carbon liquid fuels like HVO (Hydrotreated Vegetable Oil) could potentially achieve a significant 80-90 per cent decrease in carbon emissions compared to regular fossil fuels. This response noted that an added advantage of HVO is that it can be directly used as a 'drop-in' fuel without requiring any modifications to existing vehicles or refuelling infrastructure.

25 responses to the Call noted the importance of sustainable travel, with 20 discussing the impacts and opportunities for public transport, and 11 for active travel options. Most of these responses were in the transport and public sectors, including umbrella bodies, trade unions, public bodies, and charities.

Overall, it was noted that the transport sector's Net Zero transition should bring about increased opportunities for public transport and a modal shift in transportation. One response from a trade union noted that in Wales, to meet carbon reduction targets by 2030, the kilometres travelled by car will need to reduce by 20 per cent (compared to 2019 levels), and that CO<sub>2</sub> from road transport will need to reduce by 45 per cent overall. The response emphasised that to achieve this there will need to be an enormous increase in the use of public transport – a 133 per cent increase in rail passenger kilometres travelled per year compared to 2019 levels, and a 124 per cent increase in bus passenger kilometres travelled. This presents a significant challenge; the same response noted that to achieve the shifts necessary in Wales to meet carbon reduction targets, additional operating funding of £1.1 billion per year will be

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<sup>36</sup> Department for Transport, 2022, [Electric vehicle charging device statistics](#)

required (comprising £0.7 billion rail and £0.5 billion bus) and £1.3 billion additional capital funding (£1.2 billion rail and £0.1 billion bus) per year will be required between now and 2035<sup>37</sup>.

One response from a transport organisation noted that decarbonising the rail sector in Wales poses a significant challenge, especially for the Heart of Wales route, which currently has no plans for electrification by Network Rail. Additionally, Pembrokeshire faces issues with limited public transport options. These routes are crucial for decarbonising longer journeys (over 50km) in Wales and, this respondent emphasised that priority should be given to promoting a reliable and accessible train service to encourage a shift from road to rail in these rural regions. Given the longer trip distances, bus travel may not be the preferred option for commuters, making an efficient and accessible train service essential. A response from a trade union pointed to a fully costed report by the Campaign for Better Transport identifies a number of new lines in Wales and England which could be prioritised by a railway investment programme<sup>38</sup>.

For shorter journeys, the Call document noted that ‘walking and cycling should become the natural modes of choice. To achieve this, we need to create the conditions that make this safe and attractive. The extent to which these modes of transport are used varies.’ In principle, Call responses agreed that active transport will not just aid in the transition to Net Zero but will also bring along a number of other health, economic and social benefits, however there was limited evidence provided to support this. This is discussed further in **Section Error! Reference source not found.**

It was also noted that there are spatial limitations in both active travel and public transportation networks that need to be addressed to ensure that the transition to Net Zero is fair. Referring to the UK Government's Future of Transport: rural strategy report<sup>39</sup>, it was noted by a financial organisation, that people living in the most rural areas rely more on private cars, accounting for 76 per cent of all their trips. In comparison, residents of urban conurbations make 52 per cent of their trips by private car. Moreover, another response from a transport organisation highlighted that in areas like the valleys, active travel may not be accessible for everyone, particularly those with reduced mobility, due to topographical constraints. Consequently, delivering active travel options in these areas can be challenging, leading residents to choose the convenience of traveling by car. The responses note that to promote a shift towards more sustainable modes of transport, reliable, accessible, and sustainable public transportation services should be made available in rural areas. It is also important to ensure good connections and ease of transfer between different forms of transportation.

### 7.2.2 Who is impacted

Responses to the Call identified different impacts on groups of society across the three broad areas for action: a) fuel efficiency b) uptake of zero-emission vehicles and c) demand reduction and modal shift.

The transition will result in impacts on jobs and the workers in this sector, with one third sector response noted that workers at all levels will be affected, from those working in petrol stations to those on oil platforms. However, another response emphasised that this is a key opportunity for green job creation. A response from an umbrella body also noted that as vehicles transition to electric and other zero-emission technologies, a significant number of job opportunities could be created, particularly for vehicle technicians and engineers with the necessary skills to service, maintain, and repair electric vehicles and charging infrastructure. The response noted that currently, there is a shortage of technicians proficient in

<sup>37</sup> TUC, 2023, [Transport for Quality of Life report](#)

<sup>38</sup> Campaign for Better Transport, 2019, [The Future of Rail](#)

<sup>39</sup> Department for Transport, 2021, [Future of Transport: Rural Strategy Call for Evidence](#)

new vehicle technology skills. It is expected that the demand for experienced and qualified technicians will continue to grow as more fleets adopt electric and zero-emission technologies. This presents a promising trend for those seeking job opportunities in the field of electric vehicle maintenance and infrastructure management.

To address the skills shortage in Wales for EV technicians, another response from a trade union noted that it is important to increase the availability of EV technician courses while ensuring that these courses are well publicised and easily accessible to interested individuals. The challenge for the Welsh government is to ensure that these essential courses are offered in a greater number of colleges and in locations that are easily reachable for the local population. Additionally, raising awareness about the existence and benefits of these courses should be a priority to prevent the skills gap from worsening in the future. By taking these steps, Wales can equip more individuals with the necessary skills to meet the growing demand for EV technicians.

It was noted that low income and/or deprived groups were some of the most likely to be affected by the transition to Net Zero in the transport sector. One third sector organisation identified that in most parts of Wales, between 40 to 50 per cent of households are living in transport poverty<sup>40</sup>. In addition, the response noted that price rises in travel have continued to outstrip rising wages: fuel has risen by 39 per cent in the last ten years. With 84 per cent of people in Wales saying they are worried about the rising costs of living it is essential to mitigate the rising cost in transport and work to ensure it is truly affordable so that no one is left in transport poverty<sup>41</sup>.

In addition, an academic organisation presented research by the Understanding Risk Research Group at Cardiff University and the UK Energy Research Centre found that, whilst many liked the idea of EVs, they were considered to be too expensive in comparison to petrol and diesel cars. One response noted that the average price for a new electric vehicle in July 2022 was £48,650, which was £19,385 more than the average salary in Wales<sup>42</sup>. As a result, EVs may not be seen as a viable option for many households who cannot afford the initial cost required to purchase an electric vehicle.

As a result, individuals who cannot afford EVs will become more reliant on public transportation over time. Another third sector response noted that, bus and coach fares rose by 90 per cent over the past 10 years, and a survey undertaken by Transport Focus highlighted that 22 per cent of people in the UK feel that public transport in their area limits their ability to access employment; this number was 4 per cent higher for disabled people who answered the survey<sup>43</sup>. This response emphasises that it is crucial to invest in upgrading public transportation infrastructure to mitigate these challenges and ensure reliable and efficient travel for all individuals.

There were also significant risks raised for disabled people and older people. One response noted that blind and partially sighted people along with other disabled people and older people are more reliant on public transport than other adults. One trade union noted that people with a limiting long term illness or condition were less likely to walk every day (13 per cent) for more than 10 minutes than those without a limiting illness (20 per cent). Another response from a third sector organisation noted that in a survey with older people carried out by Age Cymru, focusing on older people's experiences, older people noted

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<sup>40</sup> Transport poverty is where more than 10 per cent of a household's income is spent on running a car (whether they have one or not).

<sup>41</sup> Sustrans, 2022, [Making the Connection](#)

<sup>42</sup> No published source provided

<sup>43</sup> Transport Focus, 2021, [Accessible transport: Unlocking a better normal](#)



a general lack of public transport<sup>44</sup>. They highlighted that public transport services were infrequent and had not returned to pre-pandemic levels. This was particularly problematic for those living in rural communities and those that don't drive.

The Equality and Human Rights Commission 2020 report into 'Accessible Public Transport for Older and Disabled People in Wales' found that equality considerations for older and disabled people had not been comprehensively integrated into strategies and policies, and in some cases put disabled people in danger. In one extreme example, another third sector organisation noted that EVs make no discernible sound meaning that they are incredibly difficult to detect if you cannot see them. Research commissioned by Guide Dogs in 2014 showed pedestrians are 40 per cent more likely to be hit by a hybrid or electric car than a car with a typical combustion engine<sup>45</sup>.

Similarly, responses noted that the infrastructure needed for EVs can be problematic for disabled people, for example, the same third sector response highlighted concerns relating to how 'more personal charging where cables are extended over pavements would be particularly problematic as blind and partially sighted people need pavements to be clear of clutter and trip hazards.' In order to achieve a Just Transition, it is crucial to consider the needs and concerns of all stakeholders, including disabled people. Making infrastructure modifications and improvements to accommodate disabled individuals is an important aspect of ensuring an inclusive transition.

There was some information provided on the impact of gender when it came to the transport sector, particularly around safety. One transport organisation pointed to a recent report by Transport Scotland into the experiences of women and girls on public transport found that there was a consensus that the presence of staff on public transport and staffed ticket offices made women and girls feel safer when travelling. Another transport organisation noted that the move to active travel needs to consider safety for women and other vulnerable groups during the evening and/or winter when it is dark.

Nonetheless, there is unmet demand for active travel from those who do not already walk and cycle. One response noted that despite low participation levels, 46 per cent of people from ethnic minority groups, 32 per cent of women and 30 per cent of disabled people who do not currently cycle would like to do so.

### 7.2.3 Timelines

Across the transportation sector, there are key timelines which will need to be adhered to and will have impacts on different groups/sectors at different points in time.

In the short to medium term (to 2035), new petrol and diesel cars and vans will no longer be sold on the UK market, with 2035 ending the sale of new hybrid cars and vans, as well as non-zero emission at the tailpipe trucks (26 tonnes and under). One trade union response echoed earlier comments about the upfront cost that the move to EV will require. It emphasised that the decision to eliminate the sale of petrol cars by 2030 has inherent consequences for both the public sector workforce, as low-paid workers who might be unable to afford new vehicles, and more generally for households who may not be able to afford the upfront cost of a new vehicle. Another response from a trade union noted the impact this will have on the taxi industry, where in the short term there is a push for drivers to purchase Euro 6 compliant hybrid vehicles, and in the long term they will be expected to upgrade to fully electric vehicles. Much like householders, this response noted that taxi drivers are unable to afford this change.

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<sup>44</sup> No published source provided

<sup>45</sup> Guide Dogs, [Safe and Sound campaign](#)

Another response from an umbrella body noted that the short medium term targets will also have an impact on the waste sector and the circular economy. This is because, if a large amount of cars start to become 'obsolete' around the same time, it could have implications for how we handle the materials they are made of. In a 'circular economy,' it will be important to consider opportunities for reusing and recycling car parts. This means thinking about ways to extend the lifespan of the cars or find new purposes for their components rather than simply discarding them. By implementing circular economy principles, we can minimize waste and make the most efficient use of resources.

In addition, if the Government is to meet the 2035 targets, another transport organisation noted that 23 recharging points need to be installed daily to expand EV infrastructure to meet these targets, and current demand; currently, just one per day being installed.

In the longer term, by 2040, the same rules will apply to all Heavy Goods Vehicles (HGV). This will have significant and specific impacts on the logistics and industrial transport sectors, where there will need to be significant overhaul in terms of commercial fleets, and also ensuring that there is enough staff able to service them, for which there is currently a shortage.

#### 7.2.4 Evidence gaps identified by the responses

The response also noted that Wales is fortunate to have access to a world leading infrastructure, the Secure Anonymised Information Linkage (SAIL) to support research and inform policy. Swansea University has recently been funded by the Administrative Data Research Wales (ADR-Wales) to use SAIL to harness the potential of routinely collected data to produce evidence that can inform climate change planning and policy in Wales.

Data on active travel was also noted by the responses to be limited. As one third sector organisation noted, this could be due to the withdrawal from Wales in the National Travel Survey in 2013<sup>46</sup> means very little data has been collected on active travel rates and that Wales also has poorer access to this type of data than Scotland and Ireland, through their greater participation in the Walking and Cycling Index<sup>47</sup>. More data needs to be collected on the rates of active travel in Wales across population types to better understand the baseline picture of active travel usage and understand the impact of the transition to Net Zero on this.

#### Key points raised by the evidence submitted:

- The main issues raised related to the transition to EVs, the fuel efficiency of diesel and petrol fuelled cars, and sustainable travel.
- Decarbonisation of transport via active travel was noted in terms of contribution to health benefits.
- Responses highlighted the lack of EV charging infrastructure and potential impacts that greater take up of EVs could have on the grid as key challenges with the transition away from petrol/diesel cars.
- Fuel efficiency was also highlighted as a key requirement for the transition including technological development into lower emission fuels.

<sup>46</sup> No published source provided

<sup>47</sup> No published source provided

- Challenges were highlighted regarding the decarbonisation of the public transport system via rail electrification. The importance of reliable, accessible, and sustainable public transport in rural areas was also noted.
- Concerns about job losses were countered by the potential for job creation via the green economy. However, there are skills shortages, for example in relation to EV technicians, that need to be addressed.
- Transport poverty is a key issue in Wales and it is important that the transition does not exacerbate this. Responses highlighted affordability challenges with EVs and public transport.
- Older people and disabled people tend to heavily rely on public transport and are less able to take up active travel opportunities; ensuring public transport is accessible, safe and affordable is of key importance. In addition, some challenges have been identified with EVs for disabled people related to their quiet operation and issues with charging infrastructure.
- Short term concerns were highlighted regarding the costs of replacing vehicles with EVs and also the potential waste from obsolete vehicles.

## 7.3 Residential buildings

The Call for Evidence document states that, in 2020, residential buildings sector emissions in Wales were primarily from direct fuel combustion in homes, such as heating and cooking. This accounted for 97 per cent of sector emissions and 11 per cent of total Welsh emissions. The Committee on Climate Change (CCC) balanced pathway recommends phasing out the installation of fossil fuel boilers by 2035, and sales of oil boilers by 2028 and gas boilers by 2033 in residential homes<sup>48</sup>.

Net Zero Wales sets out the three broad areas for action for meeting Carbon Budget two and entering upon a pathway to meet net zero by 2050. These are a) ensuring energy efficiency for homes by setting standards for new build and existing properties, with the social housing sector leading the way, b) a transition to low carbon heating and phasing out fossil fuel heat sources, and c) supporting a behavioural shift which could lead to reduced demand and greater take up of energy efficient appliances.

### 7.3.1 Sector and spatial impacts and opportunities

In total, 65 responses to the Call focused on the residential properties and home emissions sector. 30 of these noted that a Just Transition in the residential building sector presents both a significant opportunity and risk in terms of job creation and skills gaps. These responses were typically from umbrella bodies and charities in the industry and business, energy and third sectors.

As outlined in Section 3.6, the perspectives and evidence in this report represent a synthesis of submissions to the Call. It is not possible to ensure that the statistics and points raised within submissions adhere to the rigour of Welsh Government standards. As such, unless accompanied by a published source, figures and statistics should be viewed as illustrative. The majority of the submitted evidence related to this section was deemed to be verifiable, consisting of 30 verifiable responses, 16 justifiable responses, 14 presenting views and five presenting lived experience.

#### Job creation

One government body referred to the Future Generation Commissioner Office 'Homes fit for the Future: The Retrofit Challenge' which identified that investment in key infrastructure projects in green industries and nature restoration could create at least 45,000 direct jobs and over 60,000 indirect jobs in the next two years. This includes over 4000 jobs in housing retrofit, almost 6000 jobs in renewable energy, 5000 in reforestation and flood defence, and 3000 in research and development of green technologies. These types of roles combined will also work towards climate change mitigation and adaptation. Done well, the response argues, this can also help prevent future inequalities in access to fair work, access to nature, in having energy efficient, warm homes and much more<sup>49</sup>.

Furthermore, one umbrella body response argues that the localised nature of most energy efficiency work means that many of these jobs will be created locally within Wales, meaning Wales can retain the job and growth opportunities offered by the Net Zero transition. The employment opportunities created by the green transition in sectors, such as insulation, could help to offset the economic impact and job losses of the pandemic. Moreover, the same response notes the growth of the construction sector in the transition to Net Zero presents an opportunity to engage more women in a field where they are currently underrepresented, accounting for only 13 per cent of the workforce. However, the response emphasises that deliberate efforts must be made to ensure that women are actively involved in the transition and

<sup>48</sup> Climate Change Committee, 2020, [Sixth Carbon Budget](#)

<sup>49</sup> Future Generations Commissioner For Wales, 2021, [Homes fit for the Future: the Retrofit Challenge](#)

provided with the necessary skills. This inclusivity is crucial to guarantee that the transition in the construction sector is inclusive and equitable.

Similarly, the same response argued that many of the green jobs needed to drive the transition to Net Zero in Wales will be in the retrofit sector. The response refers to modelling carried out by the Construction Industry Training Board (CITB) which suggests that an additional 12,000 fulltime equivalent construction jobs will be required in Wales by 2028, and the majority will deliver improvements to reduce energy demand in existing buildings<sup>50</sup>.

However, responses also highlighted that the transition requires not only a large workforce, but also a workforce equipped with the green skills necessary to operate low carbon economy. One response from an academic organisation highlighted that, at present, there is a skills gap in the UK in relation to low carbon heating. The response points to a survey commissioned by Energy Efficiency at City Plumbing<sup>51</sup>, which revealed only 18 per cent of engineers are currently installing heat pumps and 44 per cent don't know where to go to learn the skills to do this. Similarly, another response from an umbrella body highlighted that, to meet heat pump installation targets, roughly eight to nine times the number of existing heat pump engineers will likely be required. However, less than three per cent of existing heating engineers have retrained to install heat pumps. Both responses stress that there is a challenge in overcoming the skills barrier.

### Energy efficiency and low carbon heating

Of the 65 responses which focused on residential properties, 30 responses focused on improved energy efficiency of homes, with 24 of these focussing on the retrofit of existing homes, and 12 noting the construction of new homes. These responses came from a range of organisation types, including from those in the energy sector, the housing and built environment sectors and research organisations.

Typically, responses noted that increasing the energy efficiency of new, and existing, homes will require a substantial amount of work, particularly in rural areas. One response suggested that if Wales to be run on 100 per cent renewable electricity by 2035, this would involve more than 870,000 homes receiving energy efficiency measures.

Another third sector organisation noted that a 2022 housing study by the Office for National Statistics found that 25 per cent of Welsh housing stock pre-dates 1900 – the largest proportion in the UK – and 63 per cent was graded Energy Performance Certificate (EPC) Band D or below<sup>52</sup>. And, as another response from an umbrella body outlined, in rural areas the homes are more likely to be older, solid wall properties with poor insulation, and are also more likely to use nonregulated fuels to heat their homes, as well as facing wider access challenges. This also means those living in these properties are likely to face higher energy and utility costs. Responses note that this is a significant challenge facing decarbonisation efforts in Wales, particularly in rural areas.

The responses also identified that energy efficiency and retrofit works for existing homes are high cost. One energy organisation referenced the figures presented in a recent parliamentary enquiry commissioned by the Environmental Audit Committee, which highlighted real life costs in Leeds ranging from £17,700 to £27,400 for energy efficiency improvements<sup>53</sup>. Furthermore, evidence from retrofit

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<sup>50</sup> CITB, 2021, [Building Skills for Net Zero in Wales](#)

<sup>51</sup> City Plumbing, 2023, [The UK's heat pump skills gap laid bare](#)

<sup>52</sup> Office for National Statistics, 2022, [Age of the property is the biggest single factor in energy efficiency of homes](#)

<sup>53</sup> No published source provided

programs in Ireland, where similar initiatives are taking place, indicates that deep retrofits can cost in excess of €60,000.

As highlighted in another response from an energy organisation, there are currently approximately 35,000 off grid homes in Wales who face additional challenges in terms of retrofitting and increasing the energy efficiency of their homes. The response argues that these homes face additional challenges to energy efficiency and retrofitting because they are currently behind in terms of adopting energy efficient measures and need more time to adequately prepare their homes for decarbonisation compared to homes connected to the gas grid. Another energy organisation response argues this will increase the costs for these types of home, highlighting that, in September 2020, the Secretary of State for Business Energy and Industrial Strategy estimated that the cost of improving the energy efficiency of an average home off the gas grid from band E to band C would be approximately £12,300. For homes in band F and G, the estimated cost would be around £18,300. Additionally, based on the information provided regarding oil heated homes and their respective EPC bands, it is estimated that the average installation cost for an oil heated home in the UK would be approximately £20,500<sup>54</sup>. This can present a challenge for homeowners, particularly those with limited financial resource or more vulnerable individuals and households.

Other responses promoted retrofitting as a solution to creating an energy efficient housing stock. One business considered that the Welsh Government should promote a fabric first approach to retrofit which needs to be rolled out widely. The response noted how energy efficiency helps to improve indoor air quality which also reduces the likelihood of damp and mould. The response notes that as hybrid working<sup>55</sup> has become routine for many office workers following the pandemic, it is more important than ever to ensure energy efficiency and improved levels of home insulation are standard. The response referenced how consumer demand is key to ensuring that businesses invest in a Net Zero future, citing a Santander report which found that there is a 10 per cent premium on homes that have been retrofitted<sup>55</sup>. Research conducted by one academic organisation looked at Active Homes and their approach to retrofitting. Their research suggested that installation of low carbon technologies should be a given, which would help avoid challenges for residents when properties needed to be retrofitted in the future.

25 responses focused on low carbon heating options, and the move away from fossil fuels. Unsurprisingly, the majority of these responses came from the energy sector, including from energy related businesses, third sector organisations and umbrella bodies.

These responses identified that there are concerns about the limited choice available for low carbon home heating, the choice of heat pumps, and/or the use of alternatives to oil and LPG boilers. One respondent flagged a survey conducted by an energy trade association, with 1,000 of their customers found that 79 per cent were concerned about the upfront cost; 75 per cent were concerned about the ongoing running cost; 59 per cent were concerned about the upheaval or disruption of the installation itself; 59 per cent were concerned about the availability of consistent and reliable heat; 41 per cent were concerned about the ease of use; and 33 per cent were concerned about the impact on the exterior of their home<sup>56</sup>. Similarly, one energy umbrella organisation noted that choice was essential to ensuring consumer support. They suggested that instead of promoting the use of heat pumps as the primary decarbonisation solution for homes and buildings, to instead adopt a technology neutral approach and

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<sup>54</sup> UK Parliament, 2020, [Question for Department for Business, Energy and Industrial Strategy](#)

<sup>55</sup> Santander, 2022, [Buying into the Green Homes Revolution Report](#)

<sup>56</sup> No published source provided

support all heating technologies which support all heating options which reduce greenhouse gas emissions.

In addition, the responses noted that there were different levels of readiness for low carbon heating, meaning some homes would need significant retrofit to prepare them for low carbon heating installation. As mentioned in one response from an energy organisation, well insulated homes can relatively easily transition to heat pumps with minimal additional costs beyond the installation itself. However, homes with poor insulation and ventilation will require significant retrofit work to achieve the same level of energy efficiency. In the context of a Just Transition, it is essential to recognise that not all homes are equally prepared for the adoption of low carbon heating technologies. Responses imply that addressing the energy efficiency gaps in homes with poor insulation and ventilation is crucial to ensure an equitable transition.

Responses also noted that low carbon heating options, specifically air source heat pumps, are also high cost. One response from an energy organisation noted that air source heat pumps cost around four times as much to install as an oil boiler. The same response suggests that the average cost of a heat pump installation reported to the Microgeneration Certification Scheme under the Renewable Heat Incentive scheme in 2019 is £10,918. Under the current Boiler Upgrade Scheme (BUS), this figure has risen to a median average cost of £13,000. This presents a significant challenge to achieving household decarbonisation targets in Wales.

The response also argues that heat pumps may not be a feasible solution for decarbonising a significant number of off grid homes. According to analysis presented in one response, the most cost-effective renewable heat option for these properties would be a bioLPG boiler<sup>57</sup>. However, it is worth noting that the upfront costs for implementing this technology are substantially higher compared to other options. For instance, in a specific property archetype, the installation and necessary retrofitting for an air source heat pump would cost £19,640, with annual running costs totalling £976. This response implies that alternative approaches need to be explored and considered for off grid homes to achieve comparable carbon savings. Taking into account the specific characteristics and requirements of these properties, it is important to evaluate and implement the most suitable and cost-effective solutions to ensure a successful and equitable transition towards decarbonisation.

One consultancy organisation highlighted the role of wood as a source of domestic energy. The response pointed to research which estimated that 0.5 million cubic metres of wood were used to generate 2,880 GWh of heat in 2012 making wood the single biggest renewable energy source in Wales. The response suggests that with the recent shift towards solid fuels during the energy price crisis, there is an immediate requirement for deeper consideration of what the Net Zero transition means for this particular sector. This could involve either replacing or enhancing stoves and ensuring improved access to sustainably sourced wood from publicly owned land. The response considered that this sector, responsible for heating approximately 14 per cent of Welsh households, is entirely neglected in terms of policy and interventions.

### Behaviour change

Four responses discussed the importance of behaviour change in a transition to Net Zero. This is because, as one third sector organisation suggested, if Wales to be run on 100 per cent renewable

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<sup>57</sup> Ecuity, 2021, [Welsh Archetype Analysis](#)

electricity by 2035, this would involve a 20 per cent energy demand reduction because of consumer behaviour change<sup>58</sup>.

All four responses note that interventions to change behaviour are vital to ensure that individuals have the knowledge, skills, and understanding to make informed choices and take actions that contribute to energy efficiency and decarbonisation goals. One response from a public body refers to research conducted by Jones and Davies (2021)<sup>59</sup>, which emphasises that ‘supporting individuals to understand and respond to the energy performance of their home is crucial’ meaning that utilising behaviour change methods as part of energy efficiency policy implementation is crucial.

Another example presented in one third sector response related to the Welsh Government’s commitment to end the sale of peat for retail purposes. Where, the response argues there is a critical opportunity for the horticultural industry to shift towards more sustainable operations and simply replacing peat with other unsustainably sourced raw materials would be a missed opportunity for more climate friendly operations. The response notes that horticultural trade is not a ‘green’ sector in practice; it has significant impacts in terms of single use plastics, waste, energy use, and chemical inputs. A shift in consumer attitude towards ‘greener’ gardening is essential to contribute to Net Zero. The response notes this could be done through the promotion of natural fertilisers and pest controls, home composting, planting of native species, support for pollinators and other wildlife, and the encouragement of perennial gardens rather than bought-in annual bedding plants.

Another response from an umbrella body suggested that more work is needed to empower consumers in establishing their own adaptive home energy systems. In these systems, self-generated renewable energy plays a key role in reducing the dependence on a national energy infrastructure by incorporating demand side responsiveness and domestic flexibility capacity.

Likewise, another third sector highlighted that support for behaviour change is currently a missing link in Net Zero policies and is discussed further in Chapter 7.3.4, Evidence gaps identified by the responses. The response, from a charity, says they have observed that where customers do not understand how their new heating system works, they will struggle to use it efficiently and may not benefit from potential cost or carbon savings.

### 7.3.2 Who is impacted

The Call document also noted that, in Wales, significant numbers of households, particularly those with lower incomes, are predicted to be in fuel poverty as a result of spending a higher proportion on energy bills than those with higher incomes. One umbrella body noted that according to the Welsh Government’s own estimates, in 2022, up to 45 per cent (614,000) of all households in Wales are in fuel poverty. The response argues that, considering that the Energy Price Guarantee is 27 per cent higher than the April 2022 price cap, current fuel poverty levels in Wales could be even higher than the data suggests. More than one response also highlighted home based working with regards to home workers having to cover daytime energy costs. One response noted that more vulnerable households (defined in this instance as those on lower incomes, those who are unemployed, long term sick or have young

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<sup>58</sup> Shea Buckland-Jones and Rhea Stevens, 2019, [A plan for Wales’ renewable energy future: Essential actions to reenergise Wales by 2035](#)

<sup>59</sup> Jones, A and Davies, L, 2021, [The importance of household energy efficiency for health and well-being: Discussion Paper](#). Public Health Wales NHS Trust.



families) are more likely to live in cold, draughty, or inefficient homes and spend a higher proportion of their income on energy<sup>60</sup>.

One response from an industry business articulated how increasing energy efficiency, including insulation, plays a significant role in decreasing emissions and addressing the energy crisis by permanently lowering a property's heating and energy requirements; this will then lead to reduced energy bills for consumers. In the medium and longer term, widespread adoption of domestic energy efficiency measures should significantly reduce demand on heating and therefore reduce risks of future spikes in energy costs. Reducing heating demand, the response argues, is a key means of mitigating fuel poverty and goes in hand with the Just Transition.

There is a significant opportunity to improve public health by enhancing the temperature and energy efficiency of homes, which aligns with a Just Transition. As mentioned in one energy organisation's response, cold, damp, and leaky homes pose a major health risk, costing the NHS in Wales over £95 million per year. Several responses noted that living in cold indoor temperatures increases the likelihood of respiratory illness, cardiovascular disease, and poor mental health. Cold and damp conditions also worsen existing health conditions. Additionally, cold homes are associated with various physical discomforts such as aches, pains, joint conditions, skin problems, and arthritic and rheumatic pain, which can increase the risk of falls and accidents. One response from a third sector organisation referred to findings from Public Health Wales in *Making a Difference Housing and Health: A Case for Investment*, which estimates that the full cost to mitigate poor housing is £584 million in repairs, improvements, reducing falls and cold hazards<sup>61</sup>. Improving the temperature and energy efficiency of homes has the potential to not only promote public health but also contribute to a Just Transition by creating healthier and more sustainable living environments for all individuals. Another response from a consultancy cited an example of long term occupants of the first Passivhaus Certified house in Wales (completed in 2010), where the household included family members with a history of Chronic Obstructive Pulmonary Disease (COPD). They reported significant benefits to their respiratory health after moving into the property<sup>62</sup>.

One umbrella body referred to a study published in the *Lancet Planetary Health* medical journal in January 2023<sup>63</sup>, highlighting the significant health benefits of insulation measures. According to the analysis, retrofitting all homes with insulation measures would result in at least 836,000 additional years lived across the population of England and Wales by 2050. Additionally, another third sector cited a study estimating that investing in retrofit measures to address health issues would provide a return on investment within seven years. These findings underscore the importance of delivering insulation improvements to properties, especially for vulnerable groups, in order to facilitate a Just Transition.

In terms of well-being, several responses highlighted the opportunity to positively impact mental health. The response notes that a lack of affordable warmth is associated with multiple mental health risks, particularly for young people<sup>64</sup>. Living in cold homes increases the likelihood of exposure to these risks, with individuals in such situations being seven times more likely to face mental health challenges. Additionally, responses highlights the link between fuel poverty and debt, which can contribute to mental health issues. One umbrella body noted that in October 2022, the British Psychological Society warned of a potential mental health crisis, with new figures showing that one in two people are experiencing

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<sup>60</sup> UK Government, 2014, [Understanding Behaviours: Household Fuel Poverty Review](#)

<sup>61</sup> BRE, 2019, [Public Health Wales in Making a Difference Housing and Health: A Case for Investment](#)

<sup>62</sup> Passivhaus Trust, 2021, [Passivhaus Benefits](#)

<sup>63</sup> Lancet, 2023, [Impact on mortality of pathways to net zero greenhouse gas emissions in England and Wales: a multisectoral modelling study](#)

<sup>64</sup> Institute of Health Equity, 2011, [The health impacts of cold homes and fuel poverty](#)

anxiety about being able to pay their bills as a result of the cost-of-living crisis<sup>65</sup>. Another response noted that people with problem debt are significantly more likely to experience mental health problems, with almost half of them experiencing mental health problems<sup>66</sup>. The consultancy also identified that the Mental Health Foundation had reported that financial strain and poverty are key contributors to mental health problems<sup>67</sup>. Therefore, providing a means to reduce energy demand is of key importance for the well-being of households. A Just Transition recognises the importance of addressing these interconnected issues. The responses imply that by ensuring access to affordable warmth and tackling fuel poverty, we can promote mental well-being and reduce disparities in mental health outcomes, in line with the Just Transition principles of fairness and equity.

Responses also noted that the transition to Net Zero may have specific impacts on older people, particularly in relation to residential housing. As one third sector organisation highlighted in its response, older people are more likely to experience fuel poverty, as they often have to allocate a larger proportion of their income towards fuel costs. This leaves them with limited resources for other essential needs. Furthermore, the response notes that older people tend to reside in older and less energy efficient properties, which can contribute to poor housing conditions and potential health issues. The housing stock in Wales, for example, is known to be some of the oldest and least thermally efficient in the UK and Europe, further exacerbating the challenges faced by older residents.

In addition to housing conditions, the digital divide is another issue highlighted in the responses. Research presented in one response from an academic organisation, found that citizens are concerned that older people may struggle to develop the digital and technological capabilities needed to adopt low carbon technologies and consumption practices<sup>68</sup>. The response argues this poses a potential barrier to their participation in the transition to Net Zero, as they may face difficulties accessing and using sustainable technologies. These responses imply that efforts are needed to address these challenges and ensure a Just Transition that considers the specific needs of older people in their own homes.

A specific concern raised in relation to housing quality and safety is the impact of COVID-19. One third sector response points out that reduced visits and social interactions during the pandemic may have prevented necessary repairs and maintenance, leading to the deterioration of homes. This can result in smaller issues escalating into larger structural concerns. The increased cost associated with retrofit interventions further adds to the challenges faced by older individuals, especially those who rely on low incomes or are on benefits.

It was noted in the Call, that energy poverty may have increased for disabled people. In their response an umbrella body noted that disabled people and those with health conditions are disproportionately affected by living in cold, damp homes. Another public body noted that disabled people are also more likely to live in rented accommodation<sup>69</sup>. As these responses imply, if the transition is not managed carefully, there could be social inequality caused as a result of a transition towards Net Zero. If these groups are not effectively engaged, or for example, changes to household heating and insulation are

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<sup>65</sup> BPS, Oct 2022, [One in two people experiencing more anxiety about being able to pay their bills than last year, warns BPS](#).

<sup>66</sup> Money and Mental Health Policy Institute, [The Facts: What you need to know](#)

<sup>67</sup> Mental Health Foundation, 2022, [Stress, anxiety and hopelessness over personal finances widespread across UK - new mental health survey](#)

<sup>68</sup> Thomas, Gareth, Christina Demski, and Nick Pidgeon, 2020, Energy justice discourses in citizen deliberations on systems flexibility in the United Kingdom: Vulnerability, compensation and empowerment, *Energy Research & Social Science* 66, 101494.

<sup>69</sup> MacBride-Stewart, S and Parken, A., 2021, [Inequality in a Future Wales: Areas for action in work, climate, and demographic change – Full report](#)

financially unviable, there is the risk that disabled people or those with long term illnesses will be left behind.

Conversely, one academic organisation's response highlights recent research indicating that residential decarbonisation efforts in Wales and the UK may have negative effects on well-being due to the high costs associated with low carbon heating and retrofitting. Similarly, the research found that there was uncertainty surrounding the realisation of anticipated cost reductions, and suggested this poses a significant barrier for low-income households to invest in retrofit measures. This uncertain environment, the response notes, can create anxiety among participants in the private rental sector who fear that potential rent increases may be used to fund residential decarbonisation initiatives. Moreover, participants expressed concerns that the pressure to decarbonise, coupled with insufficient information and grant support, could result in disruptive and unmanageable changes to their already vulnerable housing and financial situations.

Responses highlighted that all households, regardless of tenure, would need to be protected from energy price volatility to achieve a Just Transition. One third sector response highlighted that a key way to keep energy affordable was through improvements to building fabric that should reduce energy demand. The charity stated that there is a real challenge with incentivising non-bill paying private landlords to meet energy efficiency targets, as there is no requirement for them to do so and they are not personally affected by price rises. An energy sector consultancy also promoted the need for greater domestic energy efficiency to support the move to a Just Transition. The response cited Climate Change Committee research which detailed that demand from the National Grid is currently projected to be 'around 50 per cent higher than pre-Covid levels in 2035 and around 100 per cent higher by 2050, incorporating the electrification of surface transport, heating and industry'<sup>70</sup>. The research promotes the use of Passivhaus solutions which reduces energy demands by 90 per cent in a new build and 60 per cent in existing buildings but also highlights the challenges of embedding knowledge regarding the benefits of airtightness and mechanical ventilation, both in the reduction of energy use and the benefits to well-being.

Housing tenure also effects how individuals may be impacted by a transition to Net Zero in the residential homes sector. Responses argued that there are a range of benefits for homeowners, including landlords, who invest in insulation and other energy efficiency measures in their properties. One umbrella body noted that for private landlords, an energy efficient property with low energy bills is more appealing to tenants, and for homeowners, the property is more marketable and can increase in value. The response points to a recent pricing study commissioned by BEIS that demonstrated a five per cent increase in property value in homes with an EPC Band C rating, compared to those with an EPC Band D<sup>71</sup>. Thus, investing in energy efficiency measures such as insulation will also increase the value of a property for landlords, as well as owner occupiers.

However, there are also some drawbacks for landlords, noted by one umbrella body. As the Welsh Government is planning to raise the Minimum Energy Efficiency Standard (MEES) to EPC band C in 2028, significant sums of capital will have to be invested by landlords for their properties to remain compliant with legal requirements. One response pointed to the 2021 'Homes Fit for the Future' report<sup>72</sup>

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<sup>70</sup> Climate Change Committee, 2023, [Delivering a reliable decarbonised power system](#)

<sup>71</sup> Nationwide House Price Index, [Annual house price growth slows but remains in double digits](#)

<sup>72</sup> Future Generations Commissioner For Wales, 2021, [Homes fit for the Future: the Retrofit Challenge](#)

which estimated that a national home decarbonisation programme would require £5.52 billion of investment in the social housing sector in Wales by 2030.

Likewise, another business response noted the private rented sector is the least energy efficient area of the housing stock. The response also argues that in this sector most of the cost of energy efficiency upgrades will be provided by private landlords themselves, many of whom do not have the available capital. The same response pointed to the 'Homes Fit for the Future' report which estimated that £670 million would need to be invested in the private rented sector to help landlords bring their properties up to energy efficiency standards. This also creates concerns for residents in the private rented sector because they have limited control over improvements to the thermal efficiency of their homes or the types of heating technologies used within them<sup>73</sup>. If private landlords are not incentivised to make these changes, those living in private rented accommodation are likely to be left behind in the transition to Net Zero. Both responses imply that this area must be addressed if Wales is to reach Net Zero by 2050.

One response from an umbrella body notes that upgrading the energy efficiency of rented properties brings advantages for billpayers, and in most rental agreements, the tenant is responsible for paying the utility bills. As one response notes, this means that when insulation and other energy efficiency measures are installed, tenants will directly benefit from lower energy bills, which can help alleviate fuel poverty (as previously discussed). Additionally, proper insulation creates a warmer, healthier, and more comfortable living environment, which directly benefits the tenants' well-being and overall quality of life.

One response from a business made the argument that a 'Building Passport' approach could be useful. This would be a 'live' document, which measured the costs and savings and could therefore tailor energy decision-making per household. The response argues that tailored building improvements for energy efficiency are vital for those with protected characteristics and specific needs, such as accessibility and health related conditions.

### 7.3.3 Timelines

As with other sectors, across the residential building sector there are key timelines which will need to be adhered to and will create different impacts and opportunities at different points in time.

Responses noted that, in the short term, there is a skills gap across areas such as the installation of heat pumps and insulation which will support the deployment of energy efficient home upgrades. As previously noted, one response from an academic organisation noted that there is a heat pump skills gap - 18 per cent of engineers are currently installing heat pumps and 44 per cent don't know where to go to get trained<sup>74</sup>. Another response from an umbrella body highlighted that while this will be a challenge, there is an opportunity for large-scale training and upskilling of the existing workforce to take place.

There are also challenges related to cost and financing in the short term. One energy consultancy argues that social housing providers in Wales will face short term impacts. This is because they currently rely on funds from the Optimised Retrofit Programme. The response suggests that the lack of clarity on achievable standards and the complex funding mechanisms are hindering progress in achieving Net Zero standards for both new and existing homes. To achieve Net Zero efficiently and quickly, the response notes the need for an outcomes-based funding approach.

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<sup>73</sup> Shirani, F. et al., 2021, Who cares about Valley people? Lived experiences of energy vulnerability in the South Wales Valleys, Journal of Poverty and Social Justice 29, 103-120

<sup>74</sup> No published source provided

Similarly, in the short to medium term, landlords will have to invest significant sums of capital to remain compliant with minimum legal requirements to continue to rent out their properties.

One umbrella body highlighted the 2021 'Homes Fit for the Future'<sup>75</sup> report by the Future Generations Commissioner for Wales. It argues that a national home decarbonisation programme in the social housing sector would require an estimated £5.52 billion of investment in Wales by 2030. The response argued that this presents significant short term opportunities for the insulation industry in Wales.

However, it was also noted that there are significant short to medium term opportunities for helping to alleviate fuel poverty with energy efficiency installations. The Welsh Government has set a target in their 'Tackling Fuel Poverty: 2021-2035' plan that aims to have no more than five per cent of households living in fuel poverty by 2035<sup>76</sup>. One umbrella body argues that enhancing energy efficiency through insulation is crucial in addressing fuel poverty, and providing energy efficiency measures to fuel-poor households is a key to meeting its medium term targets. Another business argues that, insulating the housing stock in Wales will reduce customer's energy bills in the short term, and result in reduced demand for energy in the medium term. The response also states that implementing subsidised insulation measures for households in fuel poverty, the Net Zero transition can benefit the most economically disadvantaged and vulnerable members of Welsh society.

Two responses also noted the short and medium term opportunities for behaviour change. One energy organisation argued that enabling consumers to use energy flexibly is more cost-effective than building additional electricity grid infrastructure. To support this, the response argues, it is important to empower consumers to understand how to use energy differently, including by using self-generated renewable energy to reduce reliance on the national energy system.

Finally, in the long term, responses note that heating demand could be significantly reduced, which could reduce risks of future spikes in energy costs. This, one response argues, will help to reduce the number of households in fuel poverty in Wales.

#### 7.3.4 Evidence gaps identified by the responses

Few evidence gaps were identified in the responses, and only one response pointed to an area where more work could be done.

One umbrella body noted that, to ensure the skills pipeline was prepared for the demand of a Just Transition to Net Zero, more work needed to be done to identify green skills that will be required by the transition. The response argued that a roadmap was needed to create the green skilled workforce needed to roll out the necessary energy efficiency measures.

#### Key points raised by the evidence submitted:

- Responses pointed to evidence which suggested that investment in green industries could create over 100,000 jobs in the next two years, including jobs in industries like housing retrofit, renewable energy, and green technology research.

<sup>75</sup> Future Generations Commissioner For Wales, 2021, [Homes fit for the Future: the Retrofit Challenge](#)

<sup>76</sup> Welsh Government, 2021, [Tackling Fuel Poverty 2021 to 2035](#)

- It was noted that a large skilled workforce is required for the transition to Net Zero, with a specific need for skills in low carbon heating.
- It was argued that up to 870,000 homes in Wales could require energy efficiency improvements for the country to run on 100per cent renewable electricity by 2035.
- The transition to energy efficient homes will be costly, particularly for homes off the gas grid, which may need to spend over £20,000 to improve energy efficiency.
- The retrofitting of homes, particularly with insulation, could decrease emissions and energy demand, thereby reducing household energy bills and mitigating fuel poverty.
- A Just Transition will require significant investment and others measures to ensure vulnerable groups, including older people and disabled people, can afford the necessary upgrades to make their homes energy efficient.
- The digital divide and lack of technological skills among older people could pose a barrier to achieving the net zero target.
- Behavioural change is crucial for the transition to net zero, with education and awareness programmes needed to encourage energy efficient practices.

## 7.4 Industry and business

The Call for Evidence document states that the industry and business sector accounted for 41 per cent of Welsh emissions in 2020. Decarbonising these industries will require significant transformation that may impact jobs requiring the reskilling of the workforce. Moreover, the current industrial structure in Wales has a higher carbon footprint than the UK average, particularly in carbon-intensive industries like liquid natural gas terminals, oil refineries, and fossil fuel-powered vehicle and aeroplane manufacturing<sup>77</sup>.

The Welsh Government's ambition statement outlines four areas of action for achieving Net Zero targets: a) resource and energy efficiency, b) fuel switching to low carbon fuels like hydrogen, c) carbon capture storage and utilisation (including bio-energy with carbon capture and storage (BECCS) , and hydrogen plants), and d) increasing energy efficiency in commercial buildings.

### 7.4.1 Sector and spatial impacts and opportunities

Overall, 61 responses to the Call noted the impact of the Just Transition on industry and business. These tended to be from umbrella bodies, trade unions, charities and businesses working across the energy, agriculture, industry and business, and sustainability sectors. Many of the responses noted that the impact on industry and business overlapped with other emission sectors, in particular transport, energy heat generation, and agriculture. However, it was less common for responses to discuss the impact on a Just Transition.

As outlined in Section 3.6, the perspectives and evidence in this report represent a synthesis of submissions to the Call. It is not possible to ensure that the statistics and points raised within submissions adhere to the rigour of Welsh Government standards. As such, unless accompanied by a published source, figures and statistics should be viewed as illustrative. The majority of the submitted evidence related to this section was deemed to be verifiable with 27 verifiable responses, 16 presenting views, 15 justifiable responses, and three presenting lived experience.

24 responses noted the role of switching to low carbon fuels in the transition to Net Zero. As noted in one response from an umbrella organisation, Wales's industrial carbon footprint is primarily influenced by iron and steel production and petroleum refining, and that the 36 per cent reduction since 1990 can be attributed mainly to operational changes, fuel switching, and improvements in production efficiency. The same response estimated that 47 per cent of the South Wales Industrial Cluster's (SWIC) CO<sub>2</sub> emissions will be eliminated through fuel switching<sup>78</sup>. However, the same response argues that between 1999 and 2019 there has been a significant decline in the output of refined petroleum products, amounting to around 30 per cent and this reduction was mainly associated with the decrease in industrial output and subsequent offshoring of emissions.

Other responses noted the opportunity for alternative fuels, such as hydrogen, in the transition to Net Zero. One energy organisation noted the potential role of hydrogen in supporting the transition and achieving Net Zero saying that new low carbon liquid fuels, such as Hydrotreated Vegetable Oil (HVO), could lead to an 80-90 per cent reduction in carbon emissions compared to regular fossil fuels. In addition, HVO is also considered a 'drop in' fuel, with no adaptation needed of existing vehicle or refuelling infrastructure<sup>79</sup>.

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<sup>77</sup> Climate Change Committee, 2020, [Sixth Carbon Budget](#)

<sup>78</sup> No published source provided

<sup>79</sup> No published source provided

A few responses also noted that resource efficiency plays an important role in achieving a Just Transition to Net Zero. One third sector organisation highlighted that the local terrain in Wales presents opportunities for agroforestry, which can support sustainable industries by providing plant-based raw materials. The response specifically points to research conducted by Aberystwyth University and Bangor University that focuses on industrial hemp and flax strains suitable for West Wales which can have diverse applications such as paper, cloth, automotive parts, construction materials like hempcrete, and fuel briquettes.

Additionally, the same response emphasises that industrial hemp has a higher carbon sequestration capacity than trees, with a potential rate of 8-15 tonnes of carbon dioxide per hectare, surpassing the 2-6 tonnes per hectare rate of trees, depending on environmental conditions<sup>80</sup>. As a result, hemp-based bioplastics and other materials have the potential for a net negative carbon footprint, offering alternatives to materials like fiberglass composites and aluminium in various applications, including construction.

The role of CCUS and carbon sequestration was discussed in Chapter 7.1, Electricity and heat generation. No responses noted the role of decarbonising commercial buildings in relation to a transition to Net Zero.

#### 7.4.2 Who is impacted

As noted previously, very few responses noted a specific impact on any groups as a result of the transition to Net Zero in the industry and business sector, and none provided hard evidence.

One of the groups identified in a few responses was small to medium businesses. Although not providing any hard evidence, one third sector organisation specifically highlighted the importance of ensuring equity for organisations during a Just Transition to Net Zero, especially for small businesses with a limited market. The response argued that businesses may face difficulties in transitioning to a low carbon or carbon neutral future. While acknowledging the significant efforts already underway in the industry, it is crucial to provide further support to businesses, including SMEs, to invest in the development of Net Zero jobs. By prioritising the needs of small businesses and ensuring they have access to resources and support, the response argued that Wales can foster a more inclusive and sustainable economy as part of the Just Transition to Net Zero.

12 of the responses noted the impact of the transition to Net Zero on jobs and skills in industry and business. Although no responses provided exact estimates of the number of jobs which could be created by a transition to Net Zero, one umbrella body pointed to The Green Job Taskforce (2021) report<sup>81</sup>, which stated that Net Zero and energy efficient industries including EV production, charging infrastructure and carbon capturing were all estimated to create thousands of jobs, including the transition of 'brown' engineering into 'green' technologies. Similarly, another umbrella body pointed to analysis which revealed that there are huge opportunities for the growth of green industrial sectors and job creation, and argued this should form a key part of the UK's Green Industrial Revolution.

In particular, responses noted an increase in jobs and capacity will be required in the manufacturing sector. One umbrella body noted that manufacturing remains a proportionally larger part of the Welsh economy than in the rest of the UK, and as another umbrella body noted, manufacturing capacity for key products may increase tenfold to meet demands for Net Zero delivery. As such, both responses argued

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<sup>80</sup> Fairs M., 2021, [Hemp "more effective than trees" at sequestering carbon says Cambridge researcher](#)

<sup>81</sup> UK Government, 2021, [Green Jobs Taskforce](#)



that there is a huge potential for job creation and economic growth if investment in this sector is prioritised, particularly around low carbon technologies.

Responses also noted the impact of the transition to Net Zero on skills. One umbrella body argued that the skill-sets of many people in sectors such as oil and gas and heavy machinery, may be partly transferable. The response argues this would allow workers to reskill as electricians, plumbers, and Heating, Ventilation and Air-conditioning (HVAC) engineers. Another third sector organisation stated that investment will be needed to support those in carbon intensive industries to help people re-train, upskill or possibly start their own businesses to ensure that they are not left behind.

Importantly for a Just Transition, one third sector organisation noted that the growth of green skills will not only be required in sectors such as manufacturing and construction, but in a wide breadth of areas, including, for example, project management and administration. This is essential, the response argues, to ensure a move to Net Zero will be all encompassing and Just.

### 7.4.3 Timelines

In the short term, responses noted that the transition to Net Zero in Wales will require significant public sector investment in renewable energy, energy efficiency, and sustainable transport. One umbrella body noted that there is a particular impact on the public sector, because government funding may be necessary to incentivise business investment in strategies aligned with Net Zero, particularly in sectors such as food, manufacturing, and agriculture.

Another energy consultancy noted that, in the short term, there is a clear opportunity for the education sector to play a vital role in this process by developing courses that equip new entrants to the industry with the necessary skills. This includes addressing the skills gap among individuals not currently in employment, education, or training. The response argues that by funding education initiatives, particularly among young individuals, we can ensure that the workforce is prepared to meet the demands of a transitioning industry and business landscape in the short term. It is crucial to equip individuals with the necessary knowledge and abilities to contribute effectively to the Net Zero goals of Wales.

In the medium term, responses argue that the transition to Net Zero in Wales is likely to require a significant shift away from fossil fuels and towards renewable energy sources. The changes in the energy system may include the decommissioning of existing fossil fuel infrastructure and the development of new renewable energy infrastructure. One umbrella body argues that this shift can lead to job creation and economic opportunities, particularly in the renewable energy sector, contributing to a Just Transition by ensuring that local communities benefit from the transition. However, as previously noted, other responses present this as a significant risk for communities to be left behind in the transition.

Furthermore, the same response notes a particular opportunity to create and supporting Smart Local Energy Systems and Local Ownership schemes within suitable communities reinforces the principles of a Just Transition. The response argues these would ensure communities can have a say in the energy decisions that impact them, allowing for more inclusive and democratic approaches. This helps ensure that the benefits from renewable energy projects are distributed fairly and that communities have a stake in the transition process.

Another academic organisation's response argues that, in the medium to long term, there are opportunities that arise for large-scale thermochemical hydrogen production with carbon capture (referred to as 'blue hydrogen'), particularly in locations like Milford Haven and Port Talbot. This

approach, the response argues, would facilitate the decarbonisation of crucial industrial and power processes and 'green' hydrogen, although rapidly scaling up, may not be available at a sufficient scale to meet the demands of these larger-scale applications until the longer term. Therefore, incorporating a mix of blue and green hydrogen strategies could be a more practical approach for achieving industrial decarbonisation goals in the medium term.

#### 7.4.4 Evidence gaps identified by the responses

No evidence gaps were identified in the responses.

##### **Key points raised by the evidence submitted:**

- The responses noted that switching to low carbon fuels is crucial for reducing Wales' industrial carbon footprint, which is mainly influenced by iron and steel production, and petroleum refining.
- There exists potential for alternative fuels like hydrogen and renewable energy generation from solar and wind farms.
- Responses emphasised that resource efficiency was key, with potential benefits from agroforestry and crops like hemp offering versatile applications and significant carbon sequestration capacity.
- SMEs are likely to require additional support during the transition, to ensure they are not left behind and can engage in the green economy.
- The Net Zero transition could create job opportunities, particularly in manufacturing and the development of 'green' technologies.
- Skills transfer and reskilling will be critical, with possible opportunities for workers in carbon-intensive sectors to transition to roles in electrician, plumbing and HVAC engineering fields.
- Growth of green skills is not only required in sectors such as manufacturing and construction, but also in areas like project management and administration, making the transition more Just.
- There is potential for job creation and economic growth in the manufacturing sector if investment in this sector is prioritised, particularly around low carbon technologies.

## 7.5 Agriculture

The Call for Evidence states that the agriculture sector accounts for 15 per cent of all Welsh emissions in 2020, although, as one umbrella body noted in their response, agriculture emissions declined by 13 per cent in 2020 compared with the base year (1990)<sup>82</sup>. In addition, another umbrella body noted that 88 per cent of land in Wales is used in agriculture. As such, decarbonising the agriculture sector through measures such as changing farming practices and releasing land, is critical to reducing greenhouse gas emissions and meeting carbon reduction targets. It also means that there will be significant impacts on the agriculture sector, and these impacts will need to be managed to ensure a Just Transition to Net Zero<sup>83</sup>.

Net Zero Wales sets out two broad areas for meeting Carbon Budget two and entering onto a pathway for delivering net zero emissions across Wales by 2050 a) a move to low carbon farming practices, focusing on helping farms to reduce emissions from soils, livestock, and waste and manure management, and b) introducing measures to release land through changes in consumer and farmer behaviour, whilst maintaining a strong food production sector.

Responses to the Call acknowledged that agriculture and farming in Wales play a fundamental role in the international food industry and that transitioning to Net Zero practices in this sector will create opportunities for growth but can also have significant ripple effects. Although there are a number of statistics relating to emissions as a result of the food industry, one third sector organisation's response to the Call highlighted that GHG emissions attributed to the UK food system could account for 20 per cent of the UK's total emissions<sup>84</sup>. They go on to suggest that primary production (which includes farming and agriculture), could contribute up to 56 per cent of food supply chain emissions<sup>85</sup>. Additionally, the energy consumed during processing, manufacturing, transportation, retail, and food preparation could represent 37 per cent of emissions in the supply chain. More broadly, another third sector organisation notes animal farming itself constitutes 15 per cent of all carbon emissions globally<sup>86</sup>.

### 7.5.1 Sector and spatial impacts and opportunities

Overall, 46 responses to the Call noted the importance of decarbonising farming and agriculture. It was most common for these responses to come from organisations within the agriculture sector, including third sector organisations, trade unions, and umbrella bodies.

As outlined in Section 3.6, the perspectives and evidence in this report represent a synthesis of submissions to the Call. It is not possible to ensure that the statistics and points raised within submissions adhere to the rigour of Welsh Government standards. As such, unless accompanied by a published source, figures and statistics should be viewed as illustrative. The majority of the submitted evidence related to this section was deemed to be verifiable, consisting of 25 verifiable responses, 11 justifiable responses, seven presenting views and two presenting lived experience.

12 responses to the Call focused on agricultural jobs, and the impact of decarbonising agriculture on jobs. The Welsh Government estimated that agriculture accounts for slightly over three per cent of the Welsh workforce. Other figures were presented for the size of the agricultural sector in Wales, with one umbrella body noting that over 50,000 people are directly employed on farms in Wales. Other responses

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<sup>82</sup> Welsh Government, 2021, [Net Zero Wales](#)

<sup>83</sup> Climate Change Committee, 2020, [Sixth Carbon Budget](#)

<sup>84</sup> No published source provided

<sup>85</sup> No published source provided

<sup>86</sup> No published source provided

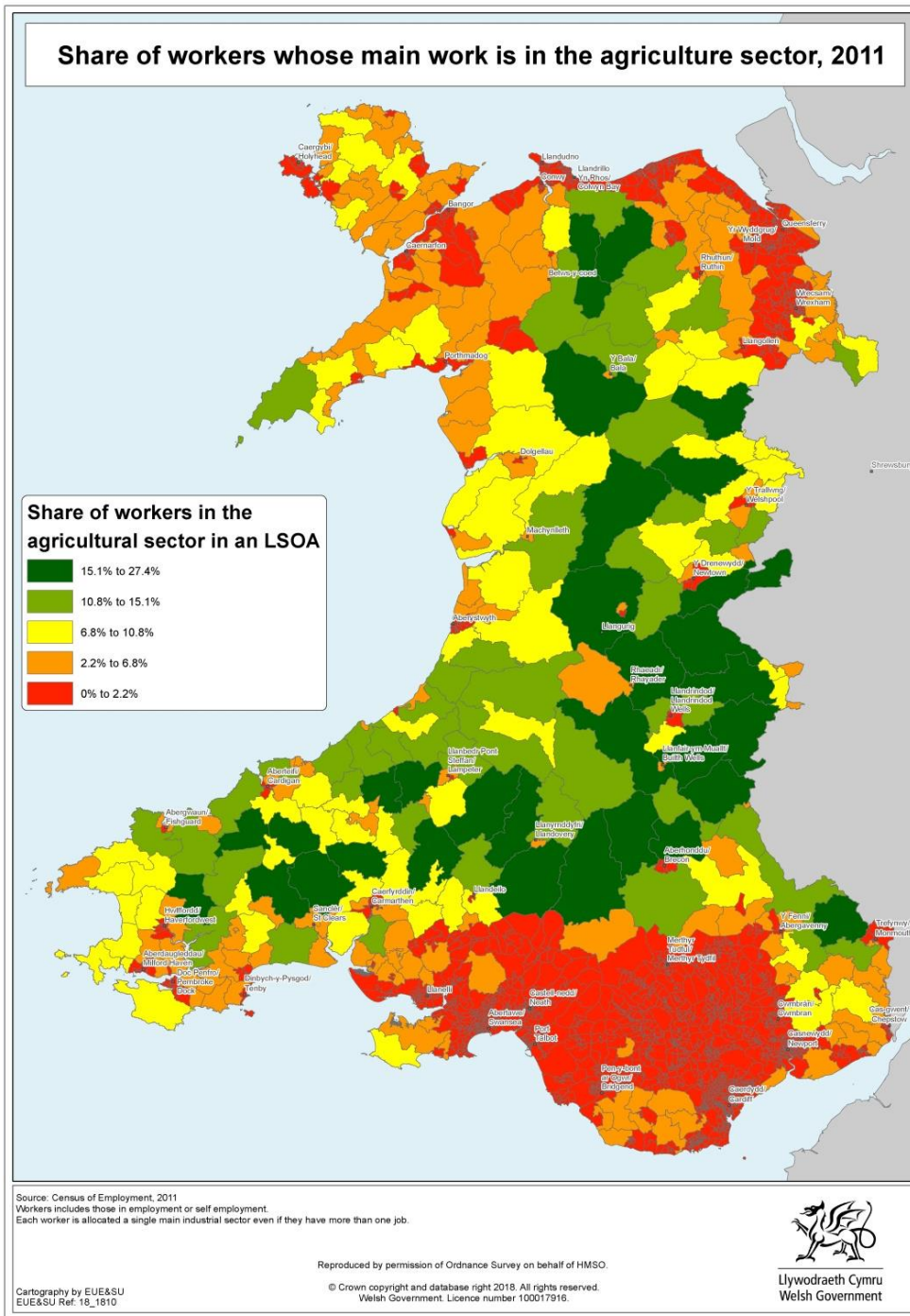
argued that as agriculture and farming underpin the food and drink industry, which in Wales is worth £8.5 billion and is the largest employer in Wales, this provides jobs for over 224,500 people. Therefore, the response argues, that any changes to the agriculture sector will impact more than three per cent of the Welsh workforce<sup>87</sup>.

Moreover, the same umbrella body noted that Welsh Government analysis reveals that in certain areas of Wales, the agricultural sector is responsible for up to 28 per cent of direct employment. The areas are mainly in central and east Wales plus pockets within west and north Wales. A full map is shown in Figure 7.1 below. The response notes that agricultural employment tends to be highest in remote areas where alternative employment opportunities may be more limited, meaning that when discussing climate policy and the transition to Net Zero, it is important to consider the spatial distribution of agricultural employment and alternative employment options for workers in these areas.

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<sup>87</sup> No published source provided

**Figure 7.1: The share of workers whose main work is in the agriculture sector, 2011<sup>88</sup>**



**Source: Welsh Government Census of Employment, 2011**

Responses to the Call also focused on the areas for action related to the transition, with 23 noting the impact on food production processes, 18 specifically referencing the need for changes to farming practices, and fewer (5) discussing land management practices.

Responses typically noted that the take up of low carbon farming practices provides an opportunity to create green jobs in the agriculture sector. For example, one third sector organisation suggested that 5,000 jobs in land, forestry and agriculture could be created through a package of £6 billion in public

<sup>88</sup> Welsh Government, 2011, [Census of Employment](#)

investment. Another third sector organisation, however, pointed to a research article which estimated that to ensure sustainable agriculture is effective in the UK it may need up to 20 per cent of the population to be involved in some capacity<sup>89</sup>.

Responses also noted that a move to more environmental farming practices and releasing land would require more specialised jobs, for example in agroforestry, arable farming, horticulture, and in plant-based food. Although limited evidence or statistics was provided on the specifics of these jobs, responses noted that there was a need for increased training and education for these practices, including through apprenticeships and retraining programmes. As one third sector organisation's response noted, at present, awareness and understanding of agri-environmental practices is low, with a survey suggesting that 71 per cent of rural Wales have never heard of agroecology, and 54 per cent have never heard of agroforestry<sup>90</sup>. This is a barrier to providing job opportunities in this area.

However, it was noted that a shift away from livestock and dairy would create a significant risk to agriculture sector. One umbrella body noted that according to the latest Welsh Government figures, the annual agriculture output from Livestock in Wales was £825 million and Milk and Milk products was £570 million. Welsh red meat exports in 2022 were valued at £250 million with Dairy and Egg exports in 2021 being over £100 million<sup>91</sup>. The response notes that there will be impacts to existing agricultural and food businesses in Wales if national and international consumer diet choices change substantially.

The Call document identifies that the move away from livestock farming would also help to release land. One response from a third sector organisation noted that arable land currently used for growing animal feed is estimated to be almost half of the total cropland in Wales. The response argues that the transition away from livestock farming would allow for increased and diversified fruit, vegetable, pulse and seed crop production for human consumption.

Conversely, other responses raised concern about releasing land to increase woodland cover. The UK CCC 'Path to Net Zero' report recommended increasing woodland cover in Wales from 15 per cent to 24 per cent, with a requirement for 180,000 hectares of new planting by 2050, and 43,000 hectares by 2030. One third sector organisation emphasised that, as at present nearly 90 per cent of Welsh land is allocated for agriculture, and just 0.08 per cent of this is allocated to horticulture achieving the CCC targets would put a significant number of farms at risk of being removed entirely. This is because, with an average farm size of 48 hectares, achieving these targets would require the complete afforestation of 3,750 farms<sup>92</sup>.

A small number of responses also noted that a risk arises with the plans for rural tree planting. One response from a trade union noted that policies aimed at promoting tree planting, especially when the funding provided exceeds the support available for agricultural land, may have unintended consequences for tenant farmers. There is a risk that landlords may terminate or not renew tenancies in order to implement tree planting schemes. This could potentially impact the livelihoods of tenant farmers.

A small number of responses noted that the transition is an opportunity to address lack of access to nutritious food and promote healthy eating. One third sector organisation pointed to research which suggested that a move away from farming sheep and cattle can reduce food insecurity and

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<sup>89</sup> Soil Association, 2007, [One Planet Agriculture](#)

<sup>90</sup> WWF, 2021, [Farming with Biodiversity](#)

<sup>91</sup> No published source provided

<sup>92</sup> Climate Change Committee, 2020, [Sixth Carbon Budget](#)

impoverishment, as well as empowering more people to choose healthy, sustainable diets which suit their preferences<sup>93</sup>. Another third sector organisation noted that, although the Eatwell Guide recommends a third of our daily food consumption should consist of fruit and vegetables, just 0.08 per cent of Welsh agricultural land is presently used for horticulture<sup>94</sup>.

Another third sector organisation calls for a more localised food economy, shortening the supply chains. Results from a study of adults facing food insecurity showed that Community Supported Agriculture can lead to substantial improvements in diet quality for vulnerable people<sup>95</sup> and localised economies can withstand the systematic disruptions that impact supermarket supply chains that leave certain groups exposed to food poverty<sup>96</sup>. Local food economies would help marginalised groups such as the Black, Asian and Minority Ethnic communities, who are more likely to experience food poverty and the more rural areas of Wales; 26 per cent of rural areas across England and Wales are food deserts (17 per cent for urban areas in England and Wales)<sup>97</sup>.

Other responses emphasised that the move away from livestock farming may help reduce agriculture's carbon footprint in relation to imports and exports. Another third sector organisation highlighted that the Welsh food industry products are predominantly consumed outside of Wales. In addition, dairy, beef, and lamb make up more than three quarters of Welsh domestic food production, yet only five per cent of lamb and beef produced in Wales is consumed in Wales, and 90 per cent of the milk processed in Wales is made into cheese. Just over half of these goods are exported to the wider UK, with the remainder being exported to the European Union<sup>98</sup>.

Another response from a third sector organisation notes that Britain currently imports almost half of its fruit and vegetables from abroad and is increasingly reliant on sourcing this produce from water scarce countries, further having an impact on natural resource pressures, overseas. Both responses noted that this is a significant contributor to agriculture's carbon footprint and, to ensure a transition to Net Zero is equitable and sustainable on a global scale, it must consider Wales' global responsibility.

Additionally, two responses (from an umbrella body and a third sector organisation) noted that Wales depends on animal feed imports for livestock production, particularly in the poultry and pig sectors, where the bulk of its imports of soy beans come from Argentina, Paraguay and Brazil – countries that are at high to very high risk of deforestation and/or social issues. The same responses noted that Wales imports an estimated 190,000 tonnes of soy a year and that soy imports increased from 2011 – 2018, peaking in 2015. The same responses also noted that greenhouse gas emissions from land use change, such as deforestation, for growing Welsh imports of soy total over 1.1 million tonnes of CO<sub>2</sub> each year, nearly all from land use change in Latin America<sup>99</sup>.

Finally research from one third sector organisation which suggests there is some appetite outside Wales for participating farmers to move away from livestock farming<sup>100</sup>.

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<sup>93</sup> The Vegan Society and The University of Sunderland, 2021, [Planting Value in Our Food System](#)

<sup>94</sup> NHS, 2022, [The Eatwell Guide](#)

<sup>95</sup> Bellin, R., et al., 2019, [Health Center-Based Community-Supported Agriculture: An RCT](#)

<sup>96</sup> Folk, E., 2020, [Local Food and Global Food Security](#)

<sup>97</sup> Corfe, S., 2018, [What Are the Barriers to Eating Healthily in the UK?](#)

<sup>98</sup> Meat Promotion Wales, 2021, [Industry Statistics](#)

<sup>99</sup> WWF Cymru, et al., 2021, [Wales and Global Responsibility](#)

<sup>100</sup> Stockfree Farming, 2022, [Thriving Beyond the Protein Transition Survey Report](#)

## 7.5.2 Who is impacted

One response from a third sector organisation pointed to statistics from Stats Wales which indicate that there has been a decline in small and medium sized farm numbers in Wales during the period, 2013-2017, whereas large and very large farms increased in number<sup>101</sup>. A small number of other responses also noted the disproportionate impact that the move to low carbon farming practices may have on smaller-sized or family farms, risking reducing this number further. The same response referenced the Welsh Parliament research briefing 'The Farming Sector in Wales'<sup>102</sup> which notes that small and medium sized farms make up the majority (over 50 per cent) of farms in Wales, yet they account for only seven per cent of the farmed area.

The same response argued that smaller farms in Wales will need support to implement nature friendly, agroecological practices, because smaller sized farms are likely to have less upfront resource. This could make it disproportionately difficult to transition their operations to Net Zero practices; converting from high input and intensive systems to more regenerative practices can impact farming businesses in the short term as it takes time for ecological processes to recover previously diminished functions. The response argued that small and medium sized farms should be considered as more vulnerable because they may not have the economic resources or time to implement change.

Similarly, another response from a trade union highlighted that around 27 per cent of the farmland in Wales is rented, often through short term agreements. This poses a challenge for implementing changes to farming practices on rented farms, as the upfront funding required for such changes may not be recouped if the tenancy agreement is not renewed. The prevalence of annual Farm Business Tenancies and the limited control tenants have over the land, along with restrictions and the need to seek the landlord's consent for agricultural work, present significant barriers for tenants. Additionally, the duration of tenancy agreements compared to the durations of agri-environmental scheme contracts further complicates the inclusion of tenants in sustainable practices. It is important to note that landlords' reluctance to provide consent for work, including investments, may be rational considering the potential long term adverse effects of such work or actions on the agricultural value of the land, as well as the affordability of compensating existing tenants for their work and structures.

Responses also noted specific impacts on Welsh speaking communities. One third sector organisation highlighted that Welsh is the everyday language of 43 per cent of those employed in the agriculture sector (this includes agriculture, forestry and fisheries) and emphasised that the language is central to the identity of farming communities. Another response from an umbrella body noted that this proportion of Welsh speakers is the highest among any sector in Wales and is significantly greater than the overall proportion of Welsh speakers, which stands at 17 per cent across all workers<sup>103</sup>.

The same response also noted that four of the top six counties in terms of the proportion of Welsh speakers, are also four of the top six counties in terms of the population employed in the agriculture sector. These are Gwynedd, Anglesey, Ceredigion and Carmarthenshire. This adds extra complexity to the transition to Net Zero and requires additional engagement with these communities. The responses emphasised that to ensure procedural justice in the transition Net Zero, there must be genuine engagement with Welsh speakers (who work in agriculture or otherwise) to ensure that any proposed changes to the agriculture sector are communicated and developed through a culturally sensitive and

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<sup>101</sup> Stats Wales, 2019, [Agricultural Survey](#).

<sup>102</sup> Welsh Government, 2022, [Farming Sector in Wales](#)

<sup>103</sup> Welsh Government, 2019, [Agriculture in Wales](#)



bilingual approach. One response noted that not engaging with these groups would put the Welsh language and identity at risk of being left behind.

A small number of responses also highlighted the specific impact on women, and the gender implications of a Just Transition in the agriculture sector. These responses emphasised that although women constitute a significant proportion of the agriculture workforce in Wales and globally, their positions tend to be more unstable. One response from a third sector organisation pointed to official statistics which indicated that women make up 30.8 per cent of the agricultural workforce in Wales<sup>104</sup>. Another response, also from a third sector organisation, noted that globally, the proportion of women in the sector increases to 48 per cent<sup>105</sup>. However, as of 2020, only 15 per cent of global full-time workers in fishing and agriculture were female, indicating the prevalence of unstable positions for women in this field.

Moreover, the response goes on to note that the contributions of women in agriculture often go unrecognised due to their lower representation as landowners and business owners in the agricultural industry in Wales. Unfortunately, there is a lack of gender-disaggregated information on women in agriculture in Wales, which further impacts the understanding of the specific challenges faced by women. This gap is discussed further in Section 0.

Responses noted that the shift to a low carbon economy may create new employment opportunities for women in sustainable agriculture and farming. One response from an umbrella body noted that, women may face barriers to accessing these jobs and noted that women are often underrepresented in science, technology, engineering, and maths (STEM) fields, which are critical to many green industries, including sustainable agriculture.

Conversely, a third sector organisation noted this may be changing, and that there are indications of growing interest in farming among women. This response highlighted that in 2021, Aberystwyth University revealed that, for the first time in its history, women constitute the majority of students studying agriculture at Aberystwyth University. During the 2019-20 academic year, women accounted for 63 per cent of students enrolled in degree programs related to agriculture and food studies. Additionally, the response noted, women make up 52 per cent of apprentices in the agriculture sector<sup>106</sup>. The response argued that a transition to Net Zero presents an opportunity to further engage women in the sector, however, to make sure the transition is just, women must be brought along on the transition, including consulting them at the early stages to ensure that procedural justice is followed.

One response from a trade union also noted the age of farmers and agricultural workers in Wales was much higher than the average age of workers in the country. The response notes that only three per cent of farm holders are under 35 years old. Although not explicit in the response, to bring young people along on the transition to Net Zero, and to make it just, young people in all sectors need to be engaged in the process.

One response from a third sector organisation did note a specific challenge for young people in relation to their mental health, highlighting that the Farm Safety Foundation launched the 'Mind Your Head' campaign after finding that around 80 per cent of younger farmers (under the age of 40) in the UK felt poor mental health was a very significant problem for them<sup>107</sup>. That research suggested that contributing

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<sup>104</sup> Welsh Government, 2021, [Labour market statistics \(Annual Population Survey\): July 2020 to June 2021](#)

<sup>105</sup> World Bank, 2022, [Green jobs for women can combat the climate crisis and boost equality](#)

<sup>106</sup> Aberystwyth University, 2021, [Most agriculture students are women at Aberystwyth University for first time](#)

<sup>107</sup> Mind Your Head: [Mental Health in Agriculture](#)

factors to poor mental health include a) many farmers feeling distressed knowing that they must harm the natural environment to generate profits and b) the process of sending the animals they have raised for meat to be killed also takes a toll on mental well-being. The workers in slaughterhouses also have well documented high levels of mental health problems. Transitioning towards plant based, ecologically sound land management techniques which support climate stability should also have positive impacts for mental health.

### 7.5.3 Timelines

The transition to Net Zero encompasses a range of policies and funding schemes that will be implemented over different timelines, relating to changing farming practices and land management changes. The policies and targets include the Welsh 2030 emissions targets, the Agriculture (Wales) Act and the Sustainable Farming Scheme. Overall, responses acknowledged that these policies will establish the primary legislation for future agricultural policy and support and will also be fundamental to delivering the aims of agricultural reform and tackling the climate and nature emergencies in the short, medium, and long term.

In the short to medium term, however, a few responses noted that funding could be a challenge. As one response from an umbrella body notes, although the Basic Payment Scheme is expected to continue until 2025, other Rural Development Programme funded projects aimed at supporting the transformation of the sector will end this year or have already ended. These schemes include, the Red Meat Development Programme, the Dairy Improvement Programme, the Sustainable Production Grant, Farm Business Grant and Farming Connect<sup>108</sup>. In addition, another response noted that the abolition of the Feed in Tariffs in 2019 has led to a significant slowdown in on-farm investment into renewable energy sources, consequently weakening the environmental benefits associated with private initiatives and diminishing the momentum of reaching Welsh Government's carbon reduction targets. Both responses argue that, because of this, significant government intervention will be needed between 2023 and 2025 to ensure that agriculture is supported throughout the transition period and is in the best position in 2025 to meet longer term targets.

Furthermore, one response from an umbrella body noted that Welsh farming is currently encountering significant economic challenges and inflationary pressures that are beyond their control and these are expected to continue for at least the medium term. The price index for agricultural inputs has experienced a substantial increase of 22.6 per cent in the 12 months leading up to November 2022<sup>109</sup>. These rising input costs are projected to remain high for the foreseeable future and are already impacting the wider supply chain in the agricultural sector. The response argued that global volatility in the market poses a threat to the stability of food production, food security, and energy security worldwide. The present difficulties not only affect the businesses directly impacted but also have repercussions for wider rural communities and access to affordable, high-quality food as production contracts in certain sectors. Welsh farmers are currently facing economic turmoil due to factors outside their control, resulting in unprecedented inflationary pressures. Rising input costs are anticipated to persist in the medium term, with implications for the agricultural supply chain, global food production and security, and the well-being of rural communities.

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<sup>108</sup> Meat Promotion Wales, Red Meat Development Programme (2018-2023); Welsh Government, Dairy Improvement Programme (2014-2020); Welsh Government, Sustainable Production Grant (2014-2020), Welsh Government, Farm Business Grant (2014-2020); Welsh Government, Farming Connect (2023)

<sup>109</sup> No published source provided

Additionally, the transition away from conventional farming and growing practices presents its own set of challenges. One response from a third sector organisation noted that moving towards more regenerative and sustainable farming methods requires adjustments in agricultural processes and infrastructure. This transition may involve incorporating organic farming techniques, reducing the use of synthetic inputs, and implementing practices that improve soil health and biodiversity. However, while these changes pose challenges, they also present opportunities. Support for local, regenerative farming systems can help create resilient food systems. Providing incentives for farmers to transition away from intensive, industrial practices can contribute to the long-term sustainability of the agricultural sector. This shift towards more sustainable practices can benefit both the environment and the overall health and well-being of individuals.

In the longer term, the same response noted that changing dietary patterns, specifically shifting from a high meat consumption diet to one that includes less and higher quality meat and dairy products, presents challenges in terms of behaviour change in the medium to long term. The process of encouraging individuals to adopt new dietary habits involves promoting awareness, education, and the development of sustainable behaviours. Changing long standing dietary preferences and habits requires time, as well as effective communication and targeted interventions to influence consumer choices.

#### 7.5.4 Evidence Gaps

As mentioned earlier, a response noted the impact of the transition to Net Zero on women in the agricultural sector. However, it pointed out that the farming data reported for Wales in 2021 lacks gender-disaggregated information. This lack of data makes it challenging to understand the current situation of women working in agriculture in Wales, including the conditions of women farmers. Consequently, assessing the specific impact of any changes resulting from the transition to Net Zero becomes difficult without this baseline information, and obtaining gender-disaggregated data within the farming sector in Wales is crucial to assess the impact of the transition to Net Zero on women and to Recognise their contributions.

To effectively understand the impact of changing practices, one response suggested that farms and other agricultural businesses require support in comprehending their own carbon footprint. It highlighted the use of a Low Carbon Farming Framework, specifically designed to address the barrier of data capture, enabling farmers to better understand their own environmental impact. Additionally, supporting farms and agricultural businesses in understanding their carbon footprint is essential for effectively evaluating the consequences of changing practices.

#### Key points raised by the evidence submitted:

- Responses indicate that a transition to low carbon farming practices could create green jobs in the agriculture sector as part of the transition towards Net Zero.
- Responses raise the potential that a shift from livestock farming to horticulture could lead to significant land-use changes and energy efficiency.
- The transition's impact extends beyond the agricultural workforce, potentially affecting rural communities, language, culture and ensuring an equitable transition requires careful management.
- Concerns were raised about the impact of such transformation on small and medium sized farms, which may not have the necessary resources for a smooth transition.

- The potential impacts of the transition on specific demographic groups such as Welsh speakers, women, and young people were highlighted.
- The shift away from livestock farming could present challenges for the existing food production and export economy, affecting agricultural businesses in Wales.
- The need for support in understanding carbon footprints for farming and agricultural businesses is crucial for successful transition.
- In addition, there is a lack of gender-disaggregated information for comprehensive understanding of the impacts of the transition.
- Changing long standing dietary preferences towards less meat consumption is identified as a challenge which requires effective communication and targeted interventions.
- Possible positive changes like job creation, improved farming techniques and potential for localised economies were recognised as part of the transition journey.

## 7.6 Forestry and land use

According to the Call for Evidence document, the Land Use, Land-Use Change and Forestry (LULUCF) sector in Wales, In 2020, at -0.6 MtCO<sub>2</sub>e, the LULUCF sector remained a net removal of emissions. This reduction was primarily driven by the removal of carbon dioxide by carbon sinks, with the largest sinks being existing forest land, harvested wood products, and the conversion of cropland to grassland. However, it is important to note that the LULUCF sector in Wales includes both carbon sinks and emission sources. The largest emission sources identified were the conversion of grassland to cropland, existing cropland, existing settlements, and the conversion of grassland to settlements<sup>110</sup>.

The two key areas of action are a) increasing tree cover by planting new woodland and improved woodland management and b) safeguarding and increasing other carbon stores in soils through the restoration of peatland and 'blue carbon' habitats.

### 7.6.1 Sector and spatial impacts and opportunities

Overall, 36 responses noted the role of forestry and land use to some extent, with 25 noting the role of increased tree coverage and the same proportion (25) noting the importance of carbon stores in soils. Typically, responses that noted the role of forestry and land use in a transition to Net Zero were third sector or charity organisation, trade unions and umbrella bodies in sectors such as agriculture, sustainability and industry and business. Limited reference was made to a Just Transition in relation to forestry and land use, with more responses noting the potential for emission reduction.

As outlined in Section 3.6, the perspectives and evidence in this report represent a synthesis of submissions to the Call. It is not possible to ensure that the statistics and points raised within submissions adhere to the rigour of Welsh Government standards. As such, unless accompanied by a published source, figures and statistics should be viewed as illustrative. The majority of the submitted evidence related to this section was deemed to be verifiable, consisting of 20 verifiable responses, eight justifiable responses, six presenting views and two presenting lived experience.

One response noted that currently, only about 14 per cent of Wales is covered by woodland, which is below the European average of approximately 37 per cent. One response from an umbrella body also noted that Wales also has approximately 106,000 km of hedgerows and has the highest proportion of ancient woodland in the UK, accounting for 4.6 per cent of the total land area. In addition, the area of land covered by trees and woodland in Wales has tripled since the 19<sup>th</sup> century, reaching 306,000 hectares, but a quarter of this tree cover is located on Welsh farms. More broadly, another response from a third sector organisation noted that the UK is also one of the least forested countries in the world, with only 13 per cent woodland cover compared with the global average of 31 per cent. The same response noted that the UK is the second largest net timber importer in the world, second to China; we import 80 per cent of the wood we consume, and we are yet to reach peak timber consumption.

Generally, responses noted that re-wooding parts of Wales as part of the Net Zero transition holds the potential to support carbon sequestration, pollution removal, flood protection, and habitat provision. One response from a public body highlighted research which found that in 2017, carbon sequestration by farmland and woodland in Wales was estimated to be 2.4 million tonnes of carbon dioxide equivalent. Woodland accounted for 75 per cent of the removal, while farmed grassland accounted for 24.8 per cent. The total value of this sequestration was calculated to be £152.3 million. The same research estimated that the total removal of air pollutants by farmland, woodland, and freshwater vegetation in Wales in

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<sup>110</sup> Climate Change Committee, 2020, [Sixth Carbon Budget](#)

2017 was estimated to be 81.4 thousand tonnes. Of this, 64.5 per cent was removed by farmland, and 33.2 per cent was removed by woodland. The total value of this pollutant removal was estimated to be £43.8 million<sup>111</sup>.

However, as one response from a third sector organisation notes, despite generating £4.1bn from actively managed woodlands, which make up 54 per cent of the country's woodlands, the UK Government is not investing in tree cover and woodlands. Despite the commitment to planting 11 million trees in the next 25 years, the UK Government is spending less than £1 per person per year to trees, in contrast to the over £50 per person per year paid out to farmers<sup>112</sup>. The response noted that this has resulted in neglected and poorly managed conservation and amenity woodlands leading to low productivity and below par forest products which, along with cropland, often lack biodiversity and suffer from land degradation after harvesting.

One response noted that by focusing on the distribution of 'Warm Moist' and 'Cool Wet' climate zones that intersect with current grazing land, it is possible to predict the spatial impact of re-wooding efforts. The response notes that regions such as Pembrokeshire, Carmarthenshire, and Ceredigion present significant opportunities for re-wooding, with the potential for sequestering up to 120 kt CO<sub>2</sub> per square kilometre in certain areas. In addition to carbon sequestration, re-wooding grazing land in these regions can lead to reduced nitrogen pollution, improved water filtration, flood buffering, enhanced soil health, and provide habitats for wild animals, and increase resilience to extreme weather. Re-wooding also aligns with Wales' commitments for tree regeneration and offers recreational opportunities.

With regard to carbon stores in soils, responses highlighted the importance of promoting and supporting the restoration and maintenance of permanent, semi-natural pastures in Wales as part of a Just Transition to Net Zero. One response noted that a third of the Earth's carbon is stored in grassland soils and that they store carbon as soil organic matter at about 3.5 times greater than plants. The same response also noted that a 1 per cent increase in soil organic matter can hold an additional 250 tonnes of water per hectare and sequester an additional nine tonnes of CO<sub>2</sub> per hectare<sup>113</sup>. Similarly, one response identified that currently, two-thirds of the land in Wales is covered by permanent grassland, but only nine per cent consists of semi-natural grassland. The response notes that semi-natural grasslands have higher carbon storage capacity due to their less intensive management practices, greater plant species richness, and undisturbed soils<sup>114</sup>.

One response from another third sector organisation noted that increased woodland could be an opportunity for economic growth. One response noted that one of the proposed National Forest sites in the North East of Wales is an opportunity for nature to play a more central role in the region, and also provides an opportunity for economic growth and employment. For example, the rivers and canals in the area provide an opportunity for fishing and tourism given the current pollution of the waters in the area. Similarly, another response from a third sector organisation presents a case study for Hazel Hill Wood, a 70-acre ancient woodland site, where a programme of school visits, retreats, tours, and workshops attracts just under 1,000 visitors a year<sup>115</sup>. Both responses argue that an increase in woodland will both help the transition to Net Zero and support economic activity.

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<sup>111</sup> Woods, M; Heley, J; Goodwin-Hawkins, B and Howells, H., 2021, [A Rural Vision for Wales: The Evidence Report](#).

<sup>112</sup> No published source provided

<sup>113</sup> Bot, A. and Benites, J., 2005, [The importance of soil organic matter](#)

<sup>114</sup> Emmett, B.A. et. al., 2010, [Soils Report from 2007](#)

<sup>115</sup> No published source provided

Similarly, responses also noted that a transition to Net Zero will require additional jobs and skills in industries such as forestry and horticulture, which one charity argues could help mitigate against job losses in other sectors such as heavy industry. One response from a third sector organisation also noted that this was an opportunity for those in rural areas to become employed in areas such as land management with responsibilities including restoring bogs or creating woodland. Similarly, one response noted that as carbon capture technology will play an essential role in protecting woodlands, it has the capacity to create an entire economy around climate change protection, which can be used as the basis for job creation and education.

However, some responses expressed scepticism about the introduction of new green jobs due to concerns about potential trade-offs with less environmentally friendly sectors. One third sector organisation mentioned that green jobs in forestry and construction can only be truly sustainable if they do not cause harm to local ecosystems while attempting to mitigate climate change. It is important to strike a balance and ensure that the positive environmental impact of green jobs is not offset by negative consequences to biodiversity.

### 7.6.2 Who is impacted

Responses noted that farmers and the agricultural sector would be most impacted by the transition to Net Zero in relation to forestry and land use. This is because, as one response from an umbrella body notes, farmers in Wales collectively manage about 81 per cent of the total land area of Wales, over 1.84m hectares, which is crucial for achieving the government's Net Zero objectives<sup>116</sup>. In addition, Welsh farming also delivers a significant proportion of Wales's access provision including 16,000 miles of footpaths; 3,000 miles bridleways; 1,200 miles of cycle network; and 460,000 ha of open access land.

Another response from a charity noted that because land use change is needed for a transition to Net Zero, land workers will be impacted by this change. This will require the upskilling of land management workers to enable more sustainable horticultural production and regenerative farming practices. In addition, the response argues that providing nature-based jobs is integral for a Just Transition and for workers to access the full benefits from sustainable farming.

However, as one trade union notes, for the average farm of 48 hectares, currently only 6.5 per cent of the land is used for woodland cover, not including hedgerows and boundary/individual trees. To achieve the 43,000 hectares of new woodland, another response from an umbrella body argues that the complete afforestation of 3,750 farms will be required<sup>117</sup>. Both responses argue that this presents a significant risk to Welsh farming, and that the agricultural sector will need to be effectively engaged in decision making processes, to ensure they are not left behind in the transition and to ensure the transition is Just.

One umbrella body also noted that small farms, which make up a significant portion of Welsh farm holdings, also face barriers to benefiting from increasing woodland cover. Small farms, defined as those under 20 ha, make up 55 per cent of all Welsh farm holdings. The response argues that current funding and carbon market schemes often cater to larger projects, making it difficult for small farmers to participate due to the costs involved in registering, verification, and measuring. A Just Transition to Net Zero must ensure that small family farms and those with limited upfront capital are not left behind.

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<sup>116</sup> No published source provided

<sup>117</sup> Climate Change Committee, 2020, [Sixth Carbon Budget](#)

There are also impacts of increasing woodland cover on rural areas and communities. One trade union also noted that, policies aimed at increasing tree cover may attract external investors to buy farms for complete afforestation, which can have negative consequences for farming and rural communities. The changes in land ownership can redirect financial benefits away from local communities and limit opportunities for future generations to engage in farming, potentially harming rural economies.

However, one response noted that there is an opportunity to positively impact public health and well-being through the transition to Net Zero through increasing access to woodland spaces. One response pointed to research which mapped the most deprived and greyest areas of Great Britain, revealing 295 deprived neighbourhoods of 440,000 people that are grey deserts meaning areas with no trees or accessible green space<sup>118</sup>. Another trade association noted that by increasing the quantity and quality of green spaces, health impacts will be maximised along with environmental impacts. Both responses note that a Just Transition should address disparities in access and promote better connectivity between urban and rural areas, with the aim of revitalising the value of local communities and fostering a stronger connection between individuals and the environment.

Conversely, another response from a public body noted that the well-being and mental health of rural communities may be disproportionately impacted by the transition to Net Zero. This is due to the strain on communities' well-being stemming from the uncertainty around land use, practices and jobs driven by the sustainable transition, and adding to the existing implications and stress from Brexit. The response argues this has significant implications for the mental health and well-being of rural communities<sup>119</sup>.

### 7.6.3 Timelines

In the short term, responses highlighted the economic factors that could affect the feasibility of the proposed 10 per cent tree planting target for some farms. It was noted in one response from an umbrella body that agricultural land tends to have higher value and provides immediate income, whereas forestry requires long term investment. The response argues that this presents challenges for farmers who rely on consistent and immediate cash flows from woodland forestry. In the short term, the response argued, these economic factors may have an impact on the ability of farmers to meet the tree planting targets because the immediate need for income from agricultural land could deter farmers from investing in long term forestry projects. This could affect the overall progress towards the desired level of tree planting in the short term.

Similarly, one third sector organisation believed that greater consideration for multi-year funding would alleviate existing barriers related to acquiring funding for delivering projects across different locations, thus enabling greater focus on landscape scale delivery. Similarly, one response noted the importance of redirecting agricultural subsidies towards rewarding farmers for their sustainable practices and outcomes. The responses argue that this would provide incentives for farmers to adopt environmentally friendly practices, further driving the transition to Net Zero. By gaining a better understanding of the potential for carbon reduction and implementing fair distribution practices, it becomes possible to facilitate an equitable transition to a Net Zero future.

No long term impacts were noted in the responses.

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<sup>118</sup> No published source provided

<sup>119</sup> Homolova et al., 2020, [Building resilience in the fishing sector in Wales, Public health Wales and the Mental Health Foundation](#)



#### 7.6.4 Evidence gaps identified by the responses

One response highlighted the presence of an evidence gap regarding the economic viability of small-scale woodland management. This issue is particularly important as more landowners are expected to engage in planting, managing, and deriving income from growing trees, particularly with a diversified composition that includes various types of broadleaves. To effectively support and facilitate the transition to increased woodland management, it is crucial to address these evidence gaps through research and data collection. Specifically, there is a need for evidence that informs and guides the management of broadleaf woodlands, as outlined in the 'State of Natural Resources Report' (SoNaRR)<sup>120</sup>. By conducting research and gathering evidence in these areas, policymakers, landowners, and stakeholders can make more informed decisions and design effective strategies to promote the economic viability of small-scale woodland management. This may involve exploring different models, identifying best practices, assessing economic incentives, and developing support mechanisms that ensure the long term sustainability and profitability of such endeavours.

#### Key points raised by the evidence submitted:

- The responses argue that the transition to Net Zero in forestry and land use presents opportunities for carbon sequestration, pollution removal, flood protection, and habitat provision
- Agricultural land in Wales, managed primarily by farmers, plays a crucial role in achieving Net Zero objectives.
- Responses argued that increasing woodland cover might pose significant risks to Welsh farming, especially for small farms and those with limited upfront capital.
- Increased woodland cover could also pose potential socio-economic challenges to rural communities due to changes in land ownership and economic benefits.
- Responses noted that the shift to a low carbon economy may create new job opportunities and the need for upskilling in forestry and land management.
- Transitioning to Net Zero may impact the mental health and well-being of rural communities due to uncertainties around land use and practices.
- Short term economic factors may challenge the feasibility of achieving tree planting targets on farms due to higher value and immediate income from agricultural land.
- Existing funding arrangements may pose barriers to landscape scale delivery of projects; a consideration for multi-year funding could help ease these barriers.
- There is an evidence gap regarding the economic viability of small-scale woodland management, which is crucial to support increased woodland cover.

<sup>120</sup> Natural Resources Wales, 2020, [State of Natural Resources Report \(SoNaRR\) for Wales 2020](#)

## 7.7 Waste and circular economy

In 2021, the Welsh Government published 'Beyond Recycling'<sup>121</sup>, Wales's first Circular Economy strategy which set out the key actions towards a circular economy. To tackle both the climate emergency and the global biodiversity crisis the strategy outlines how Wales will move beyond recycling to a circular economy with zero waste by 2050, where materials are kept in use for as long as possible and all waste is avoided. The Call for Evidence states that in 2020, waste accounted for three per cent of Welsh emissions, totalling 1.0 MtCO<sub>2</sub>e. The primary sources of emissions were landfill and wastewater treatment. However, there are opportunities to improve resource efficiency and circularity across all sectors and therefore potential beyond the waste emissions sector.

Net Zero Wales provides three broad areas of mitigation to meet Carbon Budget two and enter upon a pathway to Net Zero. These focus on landfill, recycling, and behaviour change. It seeks to reduce greenhouse gas emissions from landfill by minimising waste sent to landfills and increasing the capture and utilisation of methane. Behaviour change campaigns, like the 'Be Mighty' initiative, aim to encourage recycling habits and waste reduction. By implementing these actions, Wales aims to become a zero-waste nation with almost 100 per cent reuse and recycling of materials, ultimately minimizing waste in landfills and reducing emissions<sup>122</sup>.

The Call emphasises the importance of a circular economy, which focuses on maximising resource efficiency and reducing waste in order to decrease emissions in other sectors. This approach involves promoting activities such as resource reuse, repair, and re-manufacturing to retain and create jobs, as well as substituting high-carbon materials with sustainable alternatives. The growth of the circular economy could potentially generate between 54,000 to 102,000 net jobs across all regions in the UK by 2030<sup>123</sup>. Shifting towards a circular economy can also decrease the demand for imported goods and increase local job opportunities, particularly in repair and manufacturing sectors.

### 7.7.1 Sector and spatial impacts and opportunities

Overall, 38 responses to the Call in some way mentioned waste, however these tended not to be directly related to the waste industry itself but rather overlapped with other emissions sectors. In addition, where waste was mentioned there was limited hard data or evidence provided specific to Wales. Much of the evidence provided is UK-wide and, as noted in the methodology, caution should be exercised when applying UK evidence to Wales, as the evidence does not necessarily transfer.

As outlined in Section 3.6, the perspectives and evidence in this report represent a synthesis of submissions to the Call. It is not possible to ensure that the statistics and points raised within submissions adhere to the rigour of Welsh Government standards. As such, unless accompanied by a published source, figures and statistics should be viewed as illustrative. The majority of the submitted evidence related to this section was deemed to be verifiable or justifiable, consisting of 16 verifiable, 15 justifiable, five presenting views and two presenting lived experience.

In total, only 38 responses discussed the waste industry in depth. 21 responses discussed recycling, 13 responses discussed the circular economy and principles of reuse, six noted any type of behaviour change related to waste, and only four discussed landfill waste. These responses tended to be from

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<sup>121</sup> Welsh Government, 2021, [Beyond recycling](#)

<sup>122</sup> Wales Recycles, [Turn food waste into Welsh power](#)

<sup>123</sup> UK Government, 2021, [Green Jobs Taskforce Report](#)

umbrella bodies, industry and business as well as academia, plus some responses from those in agriculture and farming and research.

Overall, responses agreed that as the transition to a low carbon economy takes place across all sectors in Wales, the application of circular economy principles and the use of recycled materials will become important. As one umbrella body highlights, this can create opportunities in the recycling sector, leading to increased demand for recycled materials and the development of new recycling technologies through research and innovation.

However, the same response noted that there may be risks associated with this transition. Increased demand for recycled materials can potentially strain the supply chain, as builders shift to using recycled steel to reduce embodied carbon. Additionally, the shift to new materials carries the risk of potential failures or unsuitability in specific industrial environments, even as there is an incentive to utilise alternative materials. It is important to carefully manage these risks while promoting the use of recycled materials and advancing sustainability goals.

Responses also identified that food waste has significant implications for emissions. One response noted that according to the WWF 'Hidden Waste' report, approximately 3.3 million tonnes of food are lost and wasted annually in the UK at the farm level. This amount of food could provide 6.9 billion meals. The waste generated from this alone contributes to six million tonnes of CO<sub>2</sub>eq (MtCO<sub>2</sub>e), which is around 10 per cent of the UK's agricultural emissions<sup>124</sup>. The report suggests that supply chain models play a role in driving this type of food waste. If the underlying issues such as food waste and supply chains promoting economies of scale are not addressed, farmers will continue to waste substantial amounts of edible food, perpetuating the practice of industrialised farming.

Another third sector organisation highlighted a UK-wide survey by Feedback, which showed that the farmers that participated in the survey waste between 10 per cent to 16 per cent of their produce annually, which translates to approximately 22,000 to 37,000 tonnes of food. This waste could have provided five portions of fruit and vegetables per day for a year to 150,000 to 250,000 people<sup>125</sup>. Food waste not only represents a loss of nutrients, but it also contributes to missed opportunities for people to consume these calories. These findings underscore the importance of addressing food waste and implementing measures to reduce it at all levels of the food supply chain. By tackling issues such as supply chain inefficiencies and promoting sustainable practices, the report states that we can significantly reduce emissions associated with food waste and ensure that valuable resources are not needlessly discarded.

The same response from the third sector organisation argued that building a closer relationship between farmers and consumers in local food systems can have positive impacts on food waste and encourage consumers to think about their behaviours in relation to the environment. Customers of vegetable box schemes and Community Supported Agriculture (CSA) often report wasting less produce. For example, Growing Communities, an organic fruit and veg supply scheme in Hackney, found that 13 per cent of their box scheme customers said that the scheme had influenced their decision to use more reusable

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<sup>124</sup> WWF, 2022 [Hidden Waste Report](#)

<sup>125</sup> Feedback, 2018, [Farmers talk food waste: supermarkets' role in crop waste on UK farms](#)

packaging<sup>126</sup>. This indicates that a closer connection between farmers and consumers can lead to reduced food waste and more sustainable packaging practices.

When it comes to behaviour change, and a Just Transition more broadly, one academic and research organisation presented findings from a study conducted by Cardiff University and Cynnal Cymru which highlighted the importance of citizen values and their role in driving behaviour change. The research suggests that the British public, including those in Wales, hold values such as the conservation of finite resources, avoidance of waste, justice and fairness for vulnerable groups, protection of the environment, energy affordability, and long-term planning for the energy transition<sup>127 128</sup>. These values align with the provisions of the Well-being of Future Generations (Wales) Act 2015, and the response argues that by aligning with citizen values, behaviour change efforts can be more effective in creating a sustainable energy future in Wales.

One umbrella body noted a specific opportunity to use food waste in reducing combustion emissions from the construction sector and argued that waste biomass should be used in the most efficient and environmentally friendly way. The response highlighted a recent report commissioned by the Mineral Products Association which found that using food waste in cement manufacturing is more beneficial for the climate compared to other methods like energy from waste or anaerobic digestion. By using one tonne of food waste in cement manufacturing, nearly half a tonne of CO<sub>2</sub> emissions can be avoided, which is more than using the same waste for biomethane or electricity production. This is because the waste biomass replaces fossil fuels like coal, which have higher emissions.<sup>129</sup>

Similarly, it was mentioned in one response from an umbrella body that there is an opportunity to enhance resource efficiency and circularity. The potential use of waste materials, such as tyres, sewage sludge, and other carbon-rich materials to replace coal, has not been fully explored. To realise this potential, it is important to attract secondary industrial operators to Wales who can improve the recycling or upcycling of these materials. This would contribute to a more sustainable and circular economy by maximising the value extracted from waste resources.

### 7.7.2 Who is impacted

Several responses highlighted the potential of a circular economy and changes to waste and resource practices to support job creation. One umbrella body specifically mentioned a 72 per cent increase in the number of 'green jobs' in the past five years, signalling increased opportunities for employment. Research by Wales TUC suggests that over a two-year period, the green recovery, including waste and recycling sectors, could create more than 60,000 indirect jobs and 45,500 direct jobs<sup>130</sup>. While no specific estimates were submitted in the Call, the types of jobs that could be created were outlined, such as refuse and salvage occupations, recycling workers, and managers. These indications demonstrate the potential for job growth associated with transitioning to a circular economy and implementing sustainable waste and resource practices.

Furthermore, it was highlighted in two responses that a transition to Net Zero in the waste sector would have differing impacts based on gender. One response noted that in the water supply sector (which

<sup>126</sup> Jaccarini, C., Lupton-Paez, M. and Phagoora, J. (2020). The good things that could come with your food: An evaluation of the social, environmental and economic contributions of Growing Communities. New Economics Foundation and Soil Association. Not yet published.

<sup>127</sup> Pidgeon, N.F., et al., 2014, Creating a national citizen engagement process for energy policy

<sup>128</sup> Cynnal Cymru, 2020, [The Wales We Want National Conversation](#)

<sup>129</sup> No published source provided

<sup>130</sup> Wales TUC, 2020, [Job Creation in Wales from Infrastructure Investment](#)

includes sewerage, waste management and remediation activities), 69 per cent of the workers are male, and 31 per cent are female<sup>131</sup>. If there was to be significant changes to the waste industry this could therefore have a disproportionate impact on men in the industry, as they make up more of the workforce in this area.

Another third sector organisation noted that skill development and investment would create additional jobs in a number of sectors, but particularly in waste, water management and agriculture. The response argues that investment and targeted programmes to support women into STEM, gender mainstreaming and gender targets in skills development and a gender-transformative approach in curricula to empower women and girls and foster their preparedness to participate in climate discussions.

### 7.7.3 Timelines

There was limited evidence supplied on the impact of a transition to Net Zero on waste and resource management over specific timelines. Where evidence was provided it related to targets set on the reduction of greenhouse gas emissions. One charity organisation argued that in the Net Zero Wales Carbon Budget two, there needed to be an emphasis on reducing nitrogen waste by 2030, and reducing methane emissions by 30 per cent by 2030, compared with 2020 levels, to ensure that overall emissions are reduced quickly and efficiently.

### 7.7.4 Evidence gaps identified by the responses

No gaps in evidence were identified by the responses to the Call.

#### Key points raised by the evidence submitted:

- The responses argued that the just transition to Net Zero in waste and resource sector involves implementing circular economy principles and increasing demand for recycled materials.
- Some responses noted that managing food waste effectively across the supply chain is crucial to significantly cutting emissions and supports a just transition.
- Building stronger relationships between consumers and farmers within local food systems can lead to both reduced waste and the adoption of more sustainable practices.
- Public engagement aligned with citizen values can foster effective behaviour change towards a sustainable future.
- Responses noted that innovative uses of waste biomass, such as in cement manufacturing, can help in reducing emissions and that environmentally friendly use of waste contributes to a just transition.
- The transition could create job opportunities in the waste and resource sectors, aiding economic growth.
- The impact of the transition could be felt across genders, with responses noted men might face more changes due to their majority presence in the existing workforce, but that targeted skill development and investment are needed, particularly for women.

<sup>131</sup> Welsh Government, 2021, [Labour market statistics \(Annual Population Survey\): July 2020 to June 2021](#)

## 7.8 Public sector

The Call for Evidence document asserts that the public sector in Wales will have a crucial role in the transition to Net Zero and the sector have set an ambition of collectively achieving net zero by 2030. While acknowledging that the greenhouse gas (GHG) inventory of the public sector in Wales is relatively small, the role of the public sector extends beyond immediate emissions. Evidence from annual reporting of operational emissions by public sector organisations suggests that the emissions of the public sector are typically generated by procurement and supply chain (60 per cent), buildings (20 per cent), and mobility and transport (20 per cent)<sup>132</sup>. Along with action around land use, these align with public sector's areas for action set out in Net Zero Wales and are defined in the Public Sector Route Map for decarbonisation<sup>133</sup>.

To achieve these goals, collaborative efforts among public sector organisations at various levels are deemed necessary. Furthermore, the engagement of the approximately 311,000 public sector employees and the communities they serve is emphasised. Their active participation is crucial in achieving the objectives outlined in the emission pathway.

### 7.8.1 Sector and spatial impacts and opportunities

While 38 responses discussed the role of the public sector in some way, few explicitly discussed the role of the public sector in the transition to Net Zero. Interestingly, it was most common for third sector organisations, umbrella bodies and trade unions to discuss the role of the public sector in a Just Transition to Net Zero. Very few figures or statistics were provided relating to the public sector in Wales.

As outlined in Section 3.6, the perspectives and evidence in this report represent a synthesis of submissions to the Call. It is not possible to ensure that the statistics and points raised within submissions adhere to the rigour of Welsh Government standards. As such, unless accompanied by a published source, figures and statistics should be viewed as illustrative. The majority of the submitted evidence related to this section was deemed to be verifiable, consisting of 18 verifiable responses, 11 justifiable responses, six presenting views and three presenting lived experiences.

Of the 38 responses which discussed the public sector, 23 responses received in the Call highlighted the significant role of public procurement in the transition to Net Zero and its potential to ensure a Just Transition. While not providing hard evidence, responses to this question emphasised that changes to public procurement processes will provide incentives for businesses to make environmentally friendly changes and provide the framework to ensure Net Zero targets can be met in the timeframes outlined.

Of the 23 responses which noted the role and impact of public procurement processes, seven noted the role of the Social Partnership and Public Procurement Act (2022)<sup>134</sup>. In the responses, the Act is considered an important piece of legislation that aims to formalise the concept of social partnership and outline specific responsibilities for employers. Specifically related to procurement, one response from an umbrella body argued that the Act seeks to align local public and procurement policy with the global consensus on Net Zero. This alignment is expected to simplify the consensus, reduce confusion, and prevent greenwashing. Furthermore, another trade union noted that the Act acknowledges the significance of social dialogue and promoting a fair working environment, encouraging public participation in establishing well-being goals. Significantly, the Act is seen in one response to align with

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<sup>132</sup> Climate Change Committee, 2020, [Sixth Carbon Budget](#)

<sup>133</sup> Welsh Government, 2021, [Net zero carbon status by 2030: public sector route map](#)

<sup>134</sup> Welsh Government, 2022, [Social Partnership and Public Procurement \(Wales\) Act](#)

the principles of value-based decision making that is essential for achieving a fair transition to Net Zero. The central aspects of the Social Partnership and Public Procurement Act position it as a key facilitator towards a Just Transition in Wales.

Several responses to the Call specifically noted that lessons around procurement can be learned from the actions of international governments. One third sector organisation noted that, in Denmark, a commitment to procuring organic food has resulted in the public sector in Copenhagen procuring 90 per cent organic food, highlighting the positive impact that targeted procurement strategies can have on sustainability goals. Similarly, another third sector organisation noted the French Government has produced a Zero Deforestation Public Procurement Guide<sup>135</sup> and the State of California passed deforestation free public procurement legislation<sup>136</sup>. These examples could be used to inform statutory guidance in Wales and present an opportunity for Wales to be part of a cohort of countries, nations and states adopting progressive environmental policies.

In terms of improving the efficiency of public sector buildings, only nine responses referred to publicly owned buildings. None of these responses provided hard data related to the impact of retrofitting or improving the energy efficiency of the buildings, despite many noting that this would reduce carbon emissions.

However, a small number of responses noted the social benefit of improving publicly owned buildings. One response from an umbrella body used the Swansea Community Energy and Enterprise Scheme as an example of how low carbon heating can generate benefit for the community and the public sector<sup>137</sup>. In this example, solar panels were installed in local authority buildings and the local authority bought the energy generated from the community, which provided cheaper electricity for the buildings as well as generating over £500,000 of community benefit fund for the local community. The response argued that this is a great example of a local authority supporting community energy to create long term benefit for a community.

Similarly, another response from an umbrella body argued that the transition to Net Zero provides an opportunity to decarbonise social buildings such as community and faith centres, which can raise awareness and provide learning, as well as alleviating fuel poverty and supporting the green recovery by reinvesting the economic returns of community owned generation into the local area.

Finally, another response from an umbrella body explicitly discussed the role that public sector bodies, particularly local authorities, have in terms of reducing their own emissions and their wider leadership role. The response argues that local authorities must be key actors not only in terms of the steps they must take to reduce their own in-house emissions but also in terms of their wider leadership role. Local authorities' transport and planning roles mean they have a major influence on behaviour and patterns of activity in their areas. They are also responsible for household collections of waste and recyclable materials, and consequently play a significant role in promoting sustainable practices and reducing carbon emissions in their areas. Further to this, with their local education authority role, there is a need to lead by example. For instance, they can showcase their commitment to sustainability by establishing Net Zero schools and encouraging measures like 'walking buses' to minimise car based journeys to schools. Overall, this response highlights the multi-faceted role that local authorities have in championing sustainability. By implementing environmentally friendly practices within their own operations and taking

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<sup>135</sup> French Government, [National strategy to combat imported deforestation](#)

<sup>136</sup> California Legislature, [AB-416 California Deforestation-Free Procurement Act 2021: Public works projects: wood and wood products](#)

<sup>137</sup> Swansea Community Energy and Enterprise Scheme, [Swansea Community Energy](#)

on a leadership role in their communities, local authorities can contribute effectively to the broader goal of achieving Net Zero targets and have a role to play in ensuring the transition is just.

### 7.8.2 Who is impacted

Responses noted that a change to public procurement could have a particular impact on SMEs. One umbrella body highlighted the potential benefits of adopting a 'Think Small First' approach to public procurement contracts in Wales as part of the transition to Net Zero. By breaking up these contracts into smaller sizes, it creates a favourable environment for SMEs in the country. This approach presents a significant opportunity for local businesses in Wales to enter a new market and actively contribute to the journey towards achieving Net Zero emissions. This aligns with the principles of a Just Transition, ensuring that small businesses are not left behind and can play a meaningful role in the Net Zero transition. By providing a pathway for small businesses to participate and contribute to the Net Zero goals, it supports local economic development and fosters a more inclusive and equitable transition process.

One consultancy organisation also discussed the varied impact of building retrofit and energy efficiency improvements for individuals based on their housing tenure. The response noted that there would be less of an impact on social housing tenants, when compared with those in the private rented sector and homeowners. The response noted that energy performance improvements have been targeted in social housing, based on a 'worst-first' basis, by grant finance available to local authorities. The private rental sector, the response noted, has historically been harder to engage in retrofitting efforts at scale and incentivising landlords (who often do not pay the bills) is likely to remain a challenge. Therefore, this means that social housing tenants would be at an advantage when compared with those with other home tenure arrangements.

### 7.8.3 Timelines

Across the public sector, responses noted that the targets were typically in the short to medium term. One public body argued that this will adversely impact the public sector in comparison to other businesses. This is because of the challenging 2030 carbon reduction targets outlined by the Welsh Government, which will require significant and rapid decarbonisation, across all areas of operation, within a seven year timeframe. Another umbrella body noted that meeting these targets will require significant public sector investment in renewable energy, energy efficiency, and sustainable transport, as well as more government funding to incentivise business investment in New Zero aligned business strategies.

The response from one public body argued that the onus is on public sector organisations to decarbonise their activities at speed and this will require extensive investment in technologies, such as renewable energy, which are currently expensive and hold a long carbon payback period. The public body noted that they are currently scoping out options for carbon reduction and conducting feasibility studies. However, they also noted that these options are not currently financially viable, and they would be left with a considerable amount of shortfall, without reaching Net Zero.

### 7.8.4 Evidence gaps identified by the responses

There were no evidence gaps identified in the responses.



### **Key points raised by the evidence submitted:**

- Responses to the Call for Evidence indicated that public procurement plays a significant role in the transition to Net Zero and can facilitate a just transition by incentivising businesses to adopt environmentally friendly approaches that can help meet Net Zero targets.
- Changes to public procurement could benefit small and medium-sized enterprises (SMEs) by creating opportunities for them to contribute to the Net Zero mission.
- The Social Partnership and Public Procurement Act is viewed as instrumental in ensuring a just transition and aligning local public and procurement policy with global Net Zero consensus.
- Local authorities play a multi-faceted role in championing sustainability, both in reducing their own emissions and leading in their communities.
- Retrofitting programs and energy-efficient improvements vary in impact depending on housing tenure, with less of an impact on social housing tenants compared to those in private rented sectors and homeowners.
- Several responses highlighted the significant carbon sequestration potential of increasing woodland in Wales, with economic, environmental and employment benefits.
- Lessons can be learned from international governments regarding effective procurement strategies that contribute to sustainability goals.

## 8 Findings: Support

**The questions in the Call for Evidence which referenced the supporting resources needed for a transition to Net Zero were:**

**Q12.** What evidence do you have that demonstrates the role of finance and/or social infrastructure in facilitating or delivering a Just Transition?

**Q13.** What evidence and information is there across Wales to identify and develop required Net Zero skills?

**Q14.** What evidence is there to demonstrate the additional support and information needed to identify and develop required Net Zero skills?

**Q15.** Are there any particular gaps in supporting a Just Transition?

**Q16.** What evidence do you have to show effective involvement of people, communities, and organisations to enable their participation in developing and implementing a Just Transition? Including, enabling participation that fully represents the perspectives of diverse communities in Wales and specifically those with protected characteristics?

As outlined in Section 3.6, the perspectives and evidence in this report represent a synthesis of submissions to the Call. It is not possible to ensure that the statistics and points raised within submissions adhere to the rigour of Welsh Government standards. As such, unless accompanied by a published source, figures and statistics should be viewed as illustrative. Most of the submitted evidence related to this section was deemed to be verifiable, with a large proportion also submitting views. This consisted of 37 verifiable responses, 33 presenting views, 28 justifiable responses, and ten presenting lived experience.

### **Q12. Evidence that demonstrates the role of finance and/or social infrastructure in facilitating or delivering a Just Transition**

In the responses, this question was interpreted in different ways and many respondents provided suggestions, rather than evidence. The different ways the responses were interpreted included: a) the role of finance in facilitating a Just Transition, b) examples of previous funding initiatives, or where additional funding is required, to aid a Just Transition, and c) discussion of the role of social infrastructure in achieving a Just Transition.

There were also a number of responses which referred to physical infrastructure which we have summarised below. The emission sector impact and opportunities chapters cover these in more detail.

#### **Role of finance**

Responses largely highlighted areas where finance is needed to facilitate a Just Transition. This often related to the transformation required to decarbonise energy, transport, industry, and homes, along with enabling people on low incomes to benefit from the transition, rather than being disadvantaged by the transition itself.

At this question responses asserted that the combination of high capital and operational charges associated with a move to Net Zero might result in a significant portion of the Welsh population and workforce being unable to participate in the Transition, making it unjust. One energy organisation noted

that it is essential that initiatives aimed at promoting Net Zero, such as scrappage schemes, are designed to be accessible to workers who depend on their vehicles for livelihoods, including those with lower incomes. It is implied that the availability and allocation of funding to support the adoption of sustainable technologies will be crucial to ensuring the transition to Net Zero occurs across all social groups and types of workers, not just those that can afford it, ultimately ensuring it is Just.

As well as a need for additional finance, one national charity identified the need for more long term or multi-year funding to support a Just Transition. They argue this would enable delivery partners to deliver projects at scale and pace and enable pan-Wales projects to be funded. It was suggested that this would help remove the barriers of 12-month funding cycles and repetitive application processes. The response argued that the benefit of this would be an increased focus on large scale (e.g., landscape) delivery and ensuring there is adequate time for planning, design, development, and engagement for projects. The response implied that additional planning time would enable projects to consider the impact more carefully on individuals, ensuring the transition is Just.

Some responses noted that to ensure a Just Transition, it is crucial to offer a range of funding options to promote competition, innovation, and lower prices. This approach provides consumer choice and supports the goal of a sustainable and affordable transition. For instance, an energy umbrella organisation highlighted that relying solely on heat pumps as the primary solution for decarbonising homes may raise concerns for homeowners regarding cost and additional work required before installation.

Responses identified that the allocation of project funding and the choice of financing methods have significant implications for achieving a Just Transition. The decisions made in this regard can greatly impact the success and fairness of the transition process. An umbrella organisation used the example of The Optimised Retrofit Programme, which offers assistance mainly to social housing organisations and focuses on initiatives aimed at enhancing energy efficiency and promoting local carbon generation<sup>138</sup>. The response notes that directing funding in this way can influence which groups reap the benefits. This approach can help establish a more level playing field, particularly when compared to private sector households that may be able to afford to pay for such initiatives themselves.

Another umbrella organisation highlighted the need for finance or support for small businesses to ensure a level playing field and ensure certain businesses do not get left behind in the transition. The response outlines that 22 per cent of small businesses in Wales noted a lack of sufficient capital to invest in assets as one of the key barriers in the transition towards Net Zero. 54 per cent also noted that in addition to grants or low-interest loans, a discount on business rates would encourage more businesses to invest. The response argued that a 'Help to Green' voucher scheme and continued funding from the Development Bank of Wales Green Business Loan clearly has a role in supporting small businesses through the transition. 28 per cent of small businesses have also noted that a discount in businesses rates would encourage them to improve energy efficiency<sup>139</sup>. The response goes on to argue that taxing businesses for environmental improvements like installing solar panels on their buildings through increased business rates is contradictory. Instead, financing and the tax system should be used to enable businesses to invest in the environmental and economic improvements that align best with their operations<sup>140</sup>.

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<sup>138</sup> Welsh Government, 2023, [Optimised Retrofit Programme](#)

<sup>139</sup> No published source provided

<sup>140</sup> Welsh Government and Development Bank of Wales, 2023, [Green Business Loan Scheme](#)

Responses also argued that funding solutions could play a dual role in supporting both the transition to Net Zero and addressing social causes and help to build a fairer society. An example provided by one umbrella body is the concept of Warm Hubs, which demonstrates how financial support can contribute to social infrastructure. This funding aimed to help individuals during periods of increased energy costs by providing a centralised, warm space for a group of individuals, ideally within an accessible, energy efficient structure powered by locally generated renewable energy. Such a facility can be more energy efficient than multiple households individually heating their homes or potentially facing health issues due to reluctance to use heating as a cost-saving measure. By investing in projects that have positive social impacts alongside environmental benefits, funding can contribute to a Just Transition that considers both the ecological and social aspects of our society.

Another response from a charity organisation highlighted that a transition to Net Zero provides an opportunity to effectively finance social initiatives which could help to create a more equitable society. The response stated that this could be achieved in various ways including by improving access to finance for women's enterprises that contribute to the low carbon economy, investing in social protection floors and care-related social infrastructures, implementing care leave policies and services, ensuring that green finance support initiatives do not exacerbate gender inequalities, and utilising financial mechanisms like the Green Climate Fund to develop projects and initiatives that create green jobs in the low carbon economy.

#### Examples of previous funding initiatives and/or where additional funding is needed

Responses pointed to examples of previous funding, or identified a need for funding, across the transport, energy, and agriculture, which have been summarised here. More information on each of the pathways can be found in the relevant impact sections.

Responses argued that funding was required in the transport sector because the transport system and current funding is failing to meet the need for individuals and workers to transition to Net Zero. In particular, responses pointed to the funding for the take up of, and infrastructure to support, electric vehicles. One energy organisation highlighted that the UK Government's Project Rapid Fund demonstrated how finance can support a Just Transition by focusing on future needs and developing infrastructure in a phased manner. The fund, along with an allocated budget of £950m, aims to ensure that the necessary charging capacity for electric vehicle rollout is available on the strategic road network in England<sup>141</sup>. The response argued that a similar initiative will be required in Wales to ensure that adequate charging infrastructure is in place along the Welsh strategic road network as more consumers transition to electric vehicles and engage with the transition to Net Zero.

Similarly, it was noted by an umbrella body that affordable and sustainable forms of transport were necessary to support the facilitation of a Just Transition, but that this would require significant investment. Current Welsh Government proposals suggest the introduction of franchising to bus services, as an opportunity to create networks which respond to socio-economic need. However, it was noted that funding issues were consistently seen as one of the most significant challenges facing councils. Responses noted that securing loans and attracting private funds would be required, because dependence on grants from the Welsh and UK Government would be inadequate to support a transition to Net Zero.

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<sup>141</sup> UK Government, [Rapid charging fund](#)

Additionally, examples were provided from energy organisations and trade associations about additional funding which would be required in the energy sector. Another energy organisation argued that the extension of the gas network into off gas communities has been a significant effort over the past 17 years, with a cost sharing process developed according to the Gas Charging Regulations 2002. However, the response highlighted that projects with customer contributions exceeding £3,000 were rare, considering the additional costs for new boilers, pipework, and appliances<sup>142</sup>. Nonetheless, the response highlighted that funding from schemes such as the Gas Networks Fuel Poor Network Extension Scheme<sup>143</sup>, combined with ECO<sup>144</sup> and ARBED<sup>145</sup>, have gone some way to help progress projects by providing financial support to those with the lowest incomes, while contributions from those able to pay and support from local authorities have also played a key role.

In terms of agriculture and diet change, one third sector organisation highlighted the 'Grow Green Report', which emphasises the importance of providing financial support to land managers for transitioning to sustainable plant-based methods<sup>146</sup>. The response argued that, in Wales, subsidies should be redirected towards sustainable agroforestry, arable and horticulture techniques, while also supporting the local community social infrastructure. The response also suggests that innovation funding in the food and drink sector should be reallocated to plant-based businesses, and subsidies at the point of purchase and consumption should be provided to make nutritious and sustainable foods affordable for everyone.

Overall, responses emphasised the need for financial support, clear targets, and accessible support services to ensure that the most vulnerable households can benefit from energy efficiency initiatives. By fully funding measures, establishing interim fuel poverty targets, and providing independent advice and support services, responses stressed the importance of both financial resources and social infrastructure to achieve a fair and equitable transition toward a more sustainable and energy efficient future.

Responses highlighted the need for financial support to assist energy intensive industries with transitional support for research, innovation, and deployment of low carbon technologies. There was also strong support for regulators being well funded to ensure adequate resource, training and prioritisation of large scale decarbonisation projects to enable early delivery of Net Zero projects.

### Social infrastructure

Responses to the Call noted that discussions about Net Zero and a Just Transition tended to focus on the role of decarbonisation, however, as one third sector organisation noted, to realise Net Zero and build greener economies, the broader economic context must also be considered. The response argued that to effectively realise Net Zero and build greener economies, it is crucial to consider how investment in sustainable sectors can support climate action and create a more equitable society. One third sector organisation pointed out that transitioning to Net Zero could offer new job opportunities for women. The response emphasised that the increased role of women in emerging green industries, including the care economy, can contribute to the creation of decent work opportunities for women. For example, the response argued that the transition presents an opportunity to reshape the care sector into a social

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<sup>142</sup> No published source provided

<sup>143</sup> Ofgem, Fuel Poor Network Extension Scheme (2016)

<sup>144</sup> Ofgem, Energy Company Obligation (ECO) scheme (2022)

<sup>145</sup> Welsh Government, [ARBED](#)

<sup>146</sup> The Vegan Society, 2017, [Grow Green Report: Solutions for the farm of the future](#)

infrastructure where care responsibilities are shared, promoting fair distribution within society, and enabling efficient use of time, and resources, and minimising waste<sup>147</sup>.

One third sector organisation identified that existing Welsh Government commitments provide the framework and structure for funding to be able to facilitate a Just Transition. In particular the ‘worst first’ approach, which by prioritising low-income households with the greatest need and targeting the least energy efficient homes, funding can help alleviate the disproportionate burden faced by these vulnerable groups.

Responses from trade unions all pointed to the importance of strong public services in the roadmap to Net Zero and the facilitation of a Just Transition. One such response indicated that these include ensuring that there are the systems in place to properly support people and communities in the transition through income protection and retirement benefits, protection of pensions, skills, and retraining. Another response illustrated how establishing a well-developed skills base can provide small businesses with the workforce they require to participate in a Just Transition. The response asserted that social infrastructure plays a pivotal role in fostering innovation, ensuring that there is a local, skilled workforce capable of generating new technologies, businesses, and operational approaches within a Net Zero framework. trade unions suggested that supporting social infrastructure and innovation will also facilitate knowledge exchange among small businesses, enabling them to network and share and adapt green technologies effectively.

### Q13. Evidence to identify and develop required Net Zero skills

### Q14. Evidence to demonstrate the additional support and information needed to identify and develop required Net Zero skills

Nearly all the responses received during the Call emphasised the crucial role of skills in achieving a Just Transition to Net Zero. Out of the 117 responses, 113 responses acknowledged the importance of skills to some extent. These responses typically addressed questions 13 and 14 together, and their content was categorized into two main themes: (a) evidence of a skills gap in the context of a transition to Net Zero, and (b) strategies for closing the skills gap.

It is worth noting that a comprehensive discussion on the specific skills required for each emission sector in Chapter 7, **Error! Reference source not found.**, thus those details have not been repeated here.

#### Evidence of Net Zero skills gap

A significant number of responses noted the importance of skills to aiding the transition to Net Zero, and ensuring it is just. One government body highlighted that Wales has a chronic problem with skills attainment. One response noted that in 2015 the Council for Economic Renewal<sup>148</sup> projected that more than half of the Welsh workforce would require skills at level four or above by 2022. However, the Annual Population Survey estimates for 2021 indicate that only 38.6 per cent of the population in Wales possesses skills at that level, compared to the UK average of 43.5 per cent<sup>149</sup>.

Some responses provided evidence of where work had been done to identify skills gaps. Where relevant, these have also been outlined in in Chapter 7, under each emission sector. These include, for

<sup>147</sup> Women’s Budget Group, 2020, [A care-led recovery from Coronavirus](#)

<sup>148</sup> Council for Economic Renewal, 2015, [Skills, the recovery & growth](#)

<sup>149</sup> Nomis, 2021, [Labour Market Profile - Wales](#)

example, one umbrella body which cited the ‘Help to Green’ scheme which involved business consultations to identify green energy and skills needs. Similarly, another respondent noted that a Net Zero Skills framework is currently being developed, with the scope of understanding the skill gap that will likely emerge across sectors. This framework will also help identify opportunities for reskilling and upskilling the workforce. Another umbrella body identified immediate skill gaps in specific areas related to construction of residential homes and commercial buildings, including Low Carbon Construction and Retrofit Construction, where roles such as Retrofit Coordinators, Retrofit Assessors, Surveying, Design, and Energy Evaluation are in high demand as well as in Horticulture and Forestry.

Importantly, one third sector organisation noted that the growth of green skills will not only be required in sectors such as manufacturing and construction, but in a wider breadth of areas, for example, project management and administration. The response argues that to ensure the move to Net Zero is all encompassing and considers the needs of all workers, it’s important to assess the impact on all workers and roles.

Similarly, some responses also identified that non-carbon intensive industries will play a role in creating new jobs and skills in the green economy, and to ensure a Just Transition, these workers will also need to be considered. For example, one financial organisation projected that the Welsh financial services sector would lead the way in Wales’s Just Transition to Net Zero, as traditional carbon intensive industries decline. In 2022, their research highlighted the Welsh Financial Services sector’s 46 per cent output growth over a decade, employing 55,000 people and contributing £4.7 billion to the economy, equal to seven per cent of total Welsh output.

Interestingly responses also identified that a change in job role and the necessity for new skills had been anticipated by a significant number of workers already. One umbrella body referenced a regional Employer Skills Survey conducted in May 2022 which found that 43 per cent of respondents were anticipating some new job roles and/or skills within their organisation over the next three years to be considered as ‘green jobs’ or are aligned to the Net Zero agenda<sup>150</sup>. According to another response from a trade union, only five per cent of their members believe they will have to change job roles though most reported they would consider switching to a ‘greener’ role. The most popular green jobs highlighted in the research were ‘Environment Conservation Professional’, ‘Forestry Worker,’ ‘Environmental Assessment Auditor’ and ‘Further Education Professional’ and ‘Care Worker’. In all the aforementioned roles, members identified that they would need to learn new skills to make the switch; 28.8 per cent of members think that their skills would be useful in the green economy and only 10.6 per cent feel that they would find it easy to retrain skills needed<sup>151</sup>.

### Closing the Net Zero skills gap

To address the skills deficit, 10 responses noted that many workers have transferable skills or existing experience which can be utilised to support a transition to Net Zero. For example, the one response from an academic organisation noted that approximately 90 per cent of employees in the UK oil and gas sector possess transferable skills that can be applied in other industries<sup>152</sup>. Workers such as pipe fitters and designers, leak test technicians, and offshore barge operators, for example, already possess skills that can be utilised in emerging sectors such as hydrogen and carbon capture, utilization, and storage (CCUS). Similarly, another response points to the example of Cottam Power Station in Nottinghamshire

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<sup>150</sup> No published source provided

<sup>151</sup> UNISON, University of Leeds, 2022, [UNISON members, climate change, the green economy and just transition](#)

<sup>152</sup> No published source provided

where, before its closure workers were able to move across to similar roles in nuclear and renewables<sup>153</sup>. By carefully planning and providing ample reskilling opportunities, responses argue that job displacement can be minimized, and a Just Transition can be achieved. This means that individuals currently employed in high-carbon sectors can secure long term employment in new low carbon technologies.

Similarly, responses identified that non-technical workers can also leverage their skills to support a green transition, ensuring these workers are not left behind. One response from an umbrella body argued that this could involve leveraging HR professionals, upskilling accountants, or enhancing green energy support. The response noted that it's crucial to utilise existing programs to pinpoint these gaps and proactively address them to strengthen future capacity. The response also argued that achieving this type of flexible, cross-sector workforce requires cooperation from public and private stakeholders across eco sectors, further emphasising the need to follow procedural justice in a transition to Net Zero.

A response from a public body highlight that qualifications currently available do not adequately cover the use of new technologies and stressed the importance of education and training to ensure that no aspect of the workforce is left behind in the transition to Net Zero. Furthermore, the call to integrate social justice into the technological transition, requiring both technological and social innovation, further emphasises the need for a broader range of skills.

One example provided by a vocational learning charity is the TimberTED initiative, which offers flexible online training modules to help address a lack of accreditation in the offsite timber industry<sup>154</sup>. Similar tools can be applied to post-16 qualifications and in-house training, enhancing continuous professional development and formal qualifications, showcasing how technology can address industry-specific challenges and deliver effective skill development and assessment methods.

Similarly, another response argued that there is a significant opportunity in relation to low carbon heating (covered in more detail in Chapter 7.3, Residential buildings), and referred to research conducted by Nesta, which identified a lack of information regarding available training opportunities and funding options in this field<sup>155</sup>. They argue that to build a highly skilled installer workforce in the context of heat pumps, it is essential to offer training courses, support schemes, and launch information campaigns. Therefore, it is recommended to promote heat pump training programs and funding schemes through targeted information campaigns aimed at experienced heating engineers.

Other responses highlighted the potential of job creation and skill development in supporting a Just Transition beyond the immediate workforce. They emphasised that such initiatives could extend into the community, fostering social improvements in addition to addressing economic and environmental challenges. For instance, one response from a public body highlighted the selection of the Celtic Freeport bid as an example. This bid aims to create two upgraded energy ports at Milford Haven and Port Talbot, with the goal of maximizing socio-economic benefits. The proposal includes the establishment of two green energy ports and a portfolio of major development projects across three proposed freeport tax sites. Additionally, a local legacy fund of £0.5 billion will be set up, sustained over 25 years through the growth of businesses related to the freeport. This fund primarily focuses on

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<sup>153</sup> Union Learn, 2020, [Prospect helps energy workers transfer skills](#)

<sup>154</sup> UFI VocTech Trust, [TimberTED](#)

<sup>155</sup> UK Government, 2023, [Heating and Cooling Installer Study \(HaCIS\): Main Report](#)



enhancing local skills and fostering innovation initiatives, contributing to the development of a vibrant green energy ecosystem, and supporting a Just Transition<sup>156</sup>.

12 responses also noted it was of particular importance of closing the skills gap in relation to gender, with most noting that women were at risk of being left behind as a result of the transition to Net Zero in terms of jobs and skills. Responses argued it is crucial to recognise and address the existing gender disparities. Responses highlighted that at present, women make up a very small proportion of the workforce which will be directly impacted by a transition to Net Zero. One umbrella body suggested that, at present, less than two per cent of the plumbing and heating workforce are women. In addition, another third sector organisation pointed to research which found that only 1.6 per cent of construction and 3.1 per cent of engineering apprentices are women<sup>157</sup>. Furthermore, one academic organisation pointed to evidence which suggests the energy industry in Wales exhibits an 'energy diversity gap', where the majority of existing jobs and new jobs in renewables are held by 'white, able-bodied men'<sup>158</sup>. This can perpetuate the narrow and exclusive cultures prevalent in the energy sector and, evidence suggests that this can hinder progress towards a more inclusive transition<sup>159</sup>.

Responses typically noted that to address this, it was essential to ensure that women were provided with the skills and training to engage in the new green economy. Although as one umbrella body noted, women may face barriers to accessing these jobs, as they are often underrepresented in STEM fields, which are critical to many green industries. Additionally, women may be more likely to work in industries that are vulnerable to disruption or decline as a result of the transition to a low carbon economy, such as the oil and gas sector.

Responses also noted that women make up the majority of the workforce in the care and childcare sectors. One third sector organisation noted that women make up a significant majority (96 per cent) of childcare apprentices and another third sector organisation noted that women make up 80 per cent of the workers in the care sector<sup>160</sup>. These responses argue that to achieve a Just Transition to Net Zero, it is essential to acknowledge and emphasise the significant role that women play in the wider workforce. By prioritizing sectors like childcare and social care, in addition to the more conventional green sectors, Wales can effectively address the potential skill shortages in other priority sectors and simultaneously tackle inequality. This approach ensures that women are actively involved in shaping and driving the transition to a sustainable and equitable future.

However, one academic organisation argued that, from a perspective of restorative justice, simply providing women or marginalised groups with access to training or reskilling opportunities in the pursuit of Net Zero jobs may not suffice. They provided evidence which suggested that if workplace cultures and structures remain centred around male perspectives (androcentric), the implementation of green projects may inadvertently reinforce inequality<sup>161</sup>. The response argues that more needs to be done to address workplace cultures and norms, as well as addressing the disproportionate representation of Black, Asian and Minority Ethnic women in low-paying and insecure roles within these sectors.

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<sup>156</sup> No published source provided

<sup>157</sup> Welsh Government, 2023, [Apprenticeship learning programmes started: interactive dashboard](#)

<sup>158</sup> Pearl-Martinez, R. and Stephens, J.C., 2016., Toward a gender diverse workforce in the renewable energy transition. Sustainability: Science, Practice and Policy, 12(1).

<sup>159</sup> Emmons Allison, J., et al., 2019, Closing the renewable energy gender gap in the United States and Canada: The role of women's professional networking. Energy Research & Social Science, 55.

<sup>160</sup> No published source provided

<sup>161</sup> Lunde Rasmussen, C. et al., 2021, [Social Equity in the Decarbonisation of the European Built Environment: report for the Laudes Foundation](#)

### **Q15. Any particular gaps in supporting a Just Transition?**

No responses highlighted any evidence gaps in relation to the support required for a Just Transition.

### **Q16. Evidence to show effective involvement of people, communities, and organisations to enable their participation in developing and implementing a Just Transition. Including, enabling participation that fully represents the perspectives of diverse communities in Wales and specifically those with protected characteristics.**

Citizen participation, and procedural justice more broadly, was seen in the responses as the key way that Wales can facilitate a transition to Net Zero which represents the diverse perspectives of wider society. Of the 116 responses who responded to the Call, 75 of these in some way referenced procedural justice. These responses were from umbrella bodies, third sector/charity organisations, businesses, and to a lesser extent academia and trade unions. These organisations were also typically from the energy sector, and to a slightly lesser extent industry and business, agriculture and farming, manufacturing, and building and research. Typically, these responses emphasised the importance of citizen and business consultations, so that further evidence can be gathered on the impact of these groups, but also to engage them in the Just Transition process and ensure that there are benefits for specific groups.

Responses strongly emphasised that procedural justice and community engagement play important roles in achieving a Just Transition to Net Zero. In particular, grassroots engagement, capacity-building, and commitment in resource cultivation have been highlighted in the responses as crucial components of achieving a Just Transition to Net Zero. One response from a trade union emphasised the importance of top-down policy direction to support and establish frameworks for taking action and driving change. This approach involves delineating specific responsibilities and channelling funding towards areas that align with established priorities, aiming to build investor confidence.

Furthermore, the responses argued that juries and assemblies can contribute to decision-making that is informed by citizens, leading to more reflective and sustainable solutions. One umbrella body identifies that this, in turn, enhances the legitimacy of policymakers. The response also noted that citizen engagement becomes particularly important in developing guiding principles. While some basic principles, such as early and meaningful engagement and embedding questions of procedural justice, are already highlighted, citizens' juries and assemblies can help shape broader principles for a just transition. The response also provided some good practice examples, including the Scottish Government Local and Community Energy policy initiatives<sup>162</sup>.

For example, the same response argued that juries and assemblies offer distinct advantages in facilitating more equitable processes and outcomes. The response noted that by involving diverse stakeholders, these engagement methods help overcome barriers in expertise and information which often limit the participation of marginalised groups in energy decision-making processes. This helps ensure that lower-income individuals, ethnic minorities, and other marginalised communities have a more direct say in energy decisions, reducing the disparities often seen between more engaged and affluent middle-class communities.

Another response proposed that sectoral collective bargaining could strengthen the Well-being of Future Generations Act and contribute to the social infrastructure necessary for a fair transition. By engaging in collective bargaining, the response argued that various sectors can collaborate to ensure that the

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<sup>162</sup> Scottish Government, [Renewable and low carbon energy](#)

transition to Net Zero is just and considers the well-being of future generations. This approach fosters a more equitable distribution of resources and benefits, promoting a fair and sustainable transition for all.

Other responses, including one umbrella body, stressed the importance of investing in social discourse and providing substantial funding for training and upskilling as these play a vital role in nurturing a robust social consensus and fortifying community resilience. For example, another response from a public sector organisation presented the 'Communities and Climate Change in a Future Wales' report which argued that investment in social infrastructure is particularly needed in areas where community assets have been closed. It also addressed the issue of limited awareness regarding financial support among communities engaged in collective social action, particularly in marginalised groups across Wales. The 2019 report underscores the significance of community resilience as a protective factor for both individual and community well-being, emphasising the importance of networks and organisations that can mobilise people through supportive relationships and opportunities for participation. The response states that the report's findings align with international policies, such as the United Nations' Sustainable Development Goals and the World Health Organisation's Health 2020 framework, which emphasise the measurement and enhancement of community resilience and supportive environments for the betterment of health and well-being, and therefore support in the advancement of a Just Transition.

In summary, grassroots engagement, policy direction, funding allocation, and collective bargaining are all important elements in advancing a just transition to net zero. By incorporating these strategies, we can work towards a fair and sustainable transition that prioritizes the well-being of current and future generations.

#### **Key points raised by the evidence submitted:**

- Responses noted that the transition to Net Zero requires significant changes in public procurement processes, with a need for targeted, long-term funding and finance to ensure a just transition across various sectors including small businesses.
- The emphasis was on the need for financial support, infrastructural changes, social infrastructure, and support services to ensure a fair transition to Net Zero for all groups. It is important to enable people with low incomes to benefit from the transition. Robust social infrastructure, including strong public services and well-established skills bases, is crucial for a just transition to Net Zero in the long run.
- Responses noted that the transition to Net Zero necessitates significant emphasis on skill development and that current skills attainment in Wales does not meet the projected requirements for transitioning to Net Zero.
- Addressing the skills gap involves leveraging transferable skills, optimizing educational resources, and introducing new roles in the green economy. This also requires a thorough consideration of gender disparities, ensuring women are included and supported in the transition.
- Citizen participation and procedural justice in the transition to Net Zero is seen as a crucial element in making the transition just and fair. Grassroots engagement is identified as an important part of procedural justice. Well-planned citizen engagement can contribute to more reflective and sustainable solutions, including the use of citizen juries and assemblies.

## 9 Conclusions and recommendations

This report has provided a synthesis of the responses submitted to the Welsh Government following its Call for Evidence regarding the Just Transition to Net Zero. This chapter sets out the overall conclusions and recommendations to support the Welsh Government in developing its Net Zero decarbonisation pathway to 2050 as well as the Just Transition Framework.

### 9.1 Conclusions

The Call resulted in 117 submissions from 108 organisations providing a range of verifiable evidence, views and lived experiences regarding a Just Transition to Net Zero within Wales. The respondent organisations were dominated by umbrella organisations, third sector organisations and businesses with a noted low response rate from local authorities, NHS and social care, transport, and community organisations, specifically those focusing on Black, Asian and Minority Ethnic, and transient communities. All of the Call questions received responses from between a third and half of all respondents, with a focus on questions addressing the impacts and opportunities of the transition and governance questions linked to the Well-being of Future Generations Act.

An internal review regarding the type, quality and content of the responses revealed that just under half the responses had a strong focus on the Just element of the transition, and nearly a quarter (27 responses) had a weak focus making little or no reference to the Just element. This may be attributed to the fact that, after a strong introduction, the Call used the phrase Just Transition without further emphasising the importance of the focus on fairness. In addition, many of the questions could be answered without evidence to a Just Transition and there appeared to be a desire from respondents to detail the activities that they were conducting in relation to the transition to Net Zero without considering the Just aspect. With regard to the quality of the evidence provided, around a third provided verifiable evidence, under a third provided views regarding evidence, and one in ten provided details of lived experience. The verifiable evidence was largely provided by academic and umbrella organisations which is to be expected. In addition, as both Net Zero and Just Transition are relatively new concepts, there is unlikely to be a wealth of relevant peer reviewed evidence in this arena.

In addition to the gaps that the evidence identified, the internal review highlighted particularly the lack of reference to waste and the circular economy and also the key role of LAs with regards to support and governance for the Just Transition.

Each section sets out a summary of key findings which are not replicated here, but key themes were identified across the impact and opportunity syntheses for each of the emission pathways that were backed up by messages from the governance and support responses.

- The responses identify a clear set of opportunities and threats for each area, particularly across the agendas of job creation/loss and economic development, health and vulnerability. The transition's impact extends beyond jobs and economic development having a wider impact on communities, language, and culture.
- Decarbonising transport, industry, energy and heat generation, and agriculture across Wales will lead to job losses and job creation, could have positive or negative impacts of health and are likely to result in detrimental effects for vulnerable communities (those on low incomes, in specific geographic areas, with protected characteristics and transient groups) without public sector intervention and support.

- Related to the above, it is essential that those currently in fuel, transport, food and digital poverty are not disadvantaged by the transition, and that support is put in place to enable them to benefit from its opportunities.
- Procedural justice is a key theme throughout all of the responses and the need for collaboration across public, private and third sectors, and with communities, is of paramount importance. Collaboration, equality and local influence are key principles for enabling a Just Transition.
- There was a call for a rights based approach to the Transition with advocacy for transparent, agile, and inclusive governance.
- The policy context, specifically the Well-being of Future Generations Act and PSED are supportive and embedded in policy development, however, further action is needed to fully embed these in delivery.
- Focused financial support and the development of social infrastructure as well as capacity development and skills were identified as key enablers for a Just Transition.

Key evidence gaps identified by the responses cover the drivers and inhibitors for a Just Transition, the lack of business awareness of the steps needed to reach Net Zero and the current emissions impact of their operations, impacts for health and well-being, and impacts on young people.

## 9.2 Recommendations

Based on the above findings from the synthesis, the following recommendations have been identified to support the Welsh Government in developing its Net Zero decarbonisation pathway to 2050. These include recommendations relating to engagement due to strong advocacy around ensuring effective procedural and participative justice to support the Just Transition.

### Engagement

1. Welsh Government should focus on communication on the Just Transition to ensure that policy and decision makers, businesses, communities, workers and individuals have a good understanding of what this involves, how it may affect them and how they can influence positive outcomes and capitalise upon opportunities. The project team suggests that the use of the word fairness can be more effective than Just in some instances.
2. More outreach and engagement is needed to connect with and engage LAs due to the lack of visibility in this Call. There are likely to be many examples of good practice being implemented by LAs that need better showcasing to raise awareness of their contributions to the Just Transition.
3. The Call received an excellent response rate from industry and businesses. Welsh Government should build on this engagement to ensure that momentum to maximise potential opportunities to collaborate and foster further ownership of the Just Transition by the private sector. More effort is needed to engage the transport and waste/circular economy stakeholders as their absence in terms of both respondents and evidence was notable.
4. Additional thought should be given to how best to engage with community groups, including Black Asian and Ethnic Minority, young people and transient communities, and the general public. Different approaches are likely to be required such as using social media to raise awareness via case studies and lived experience stories.

5. The positive responses regarding job creation provide a genuine opportunity to provide positive communications on the Just Transition engaging wider sectors of society and the economy and encouraging greater commitment to the transition to Net Zero.

#### Further research

6. Welsh Government should identify opportunities to develop focused research projects with academic institutions who have done a lot of foundational work on what a Just Transition looks like to help inform the Just Transition Framework.
7. The specific areas of concern highlighted by the findings including impacts for specific groups, for industry, for SMEs and for agriculture should be investigated in more detail through focused discussion and exploration with relevant stakeholders.
8. Further investigations should be conducted in relation to the identified gaps in evidence (such as health and well-being, young people, transport, circular economy, role of LAs) including engagement with relevant bodies to identify if there is a genuine lack of evidence in these areas requiring additional research or if there is evidence available that was not provided as part of the Call.

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# Our standards and accreditations

Ipsos' standards and accreditations provide our clients with the peace of mind that they can always depend on us to deliver reliable, sustainable findings. Our focus on quality and continuous improvement means we have embedded a "right first time" approach throughout our organisation.



## ISO 20252

This is the international specific standard for market, opinion and social research, including insights and data analytics. Ipsos in the UK was the first company in the world to gain this accreditation.



## Market Research Society (MRS) Company Partnership

By being an MRS Company Partner, Ipsos UK endorse and support the core MRS brand values of professionalism, research excellence and business effectiveness, and commit to comply with the MRS Code of Conduct throughout the organisation & we were the first company to sign our organisation up to the requirements & self-regulation of the MRS Code; more than 350 companies have followed our lead.



## ISO 9001

International general company standard with a focus on continual improvement through quality management systems. In 1994 we became one of the early adopters of the ISO 9001 business standard.



## ISO 27001

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## The UK General Data Protection Regulation (UK GDPR) and the UK Data Protection Act 2018 (DPA)

Ipsos UK is required to comply with the UK General Data Protection Regulation and the UK Data Protection Act; it covers the processing of personal data and the protection of privacy.



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## Fair Data

Ipsos UK is signed up as a 'Fair Data' Company by agreeing to adhere to twelve core principles. The principles support and complement other standards such as ISOs, and the requirements of Data Protection legislation.

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