

Job creation in Wales from a Covid recovery infrastructure stimulus

Welsh infrastructure investment options to build back better

Research questions

1. What infrastructure projects and on what scale can form part of an urgent COVID19 economic recovery package in Wales?
2. What employment can be created by these projects in Wales within the coming two years?

Summary

This analysis, commissioned by Wales TUC, recommends **16 infrastructure projects** totalling **£6 billion in public investment** that can create over **59 thousand jobs** in Wales for the next two years. These projects meet a set of World Bank-derived criteria including long-term job creation, resilience and sustainability. They create jobs in some of the sectors hardest hit by the COVID-19 economic crisis, including construction and manufacturing and will indirectly support other worst hit sectors including hospitality and retail.

Broken down by sector, projected job creation (direct and supply chain) is as follows:

- 27 thousand jobs in housing construction and energy efficiency retrofits
- 18 thousand jobs in transport upgrades
- 9 thousand jobs in energy, manufacturing, and broadband infrastructure upgrades
- 5 thousand jobs in land, forestry, and agriculture improvements

These jobs benefit some of the sectors and demographics hit hardest by the COVID19 emergency. Over 75% of the jobs would be created in sectors that traditionally employ non-graduate workers.

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Public benefits from an infrastructure recovery programme for Wales

The projects proposed would deliver:

- Enough new social homes to clear backlog of unmet housing need, in line with Welsh Government assessment
- All social homes in Wales retrofitted to at least EPC level C.
- A transformational R&D fund for the Welsh steel industry, enabling demonstration projects such as upgrading the Orb steelworks to expand the use of domestic scrap steel, a Hlsarna furnace, or hydrogen and direct reduction furnaces connected to floating offshore wind.
- Two railways prepared for re-opening, Great Western Main Line (Swansea-Cardiff) and North Wales Main Line (Holyhead-Crewe) electrification and upgrades, and connectivity upgrades to Cardiff station and other train stations across Wales.
- Electric vehicle charging points brought to over 55,000 rural workplaces, representing 53% of rural businesses, as well as 80,000 rural homes.
- Best-practice cycle lanes and pedestrianisation for 50% of urban areas, vastly improving air quality
- Port upgrades and manufacturing investment needed for a thriving floating offshore wind supply chain in Wales, such as potential upgrades and expansions at Pembroke Dock, Mostyn and Holyhead.
- 13% increase in forest cover through reforestation

This analysis focuses on physical infrastructure upgrades that can be delivered through capital spending, that can take place primarily within the next two years, and are additional to existing government spending plans.

The proposals do not aim to describe a comprehensive recovery package, which should also include funding for care work, the NHS, and further education and skills programmes.

The full scale of the economic damage caused by the COVID-19 crisis is not yet known. Project selection should be cross-checked against up to date data on unemployment by sector and region. It is possible that our infrastructure proposals are too small to mitigate the economic damage caused by the Covid crisis.

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Research questions

- 1. What infrastructure projects and on what scale can form part of an urgent COVID19 economic recovery package in Wales?**
- 2. What employment can be created by these projects in Wales within the coming two years?**

Introduction

Given spiralling unemployment, large-scale government action is necessary to balance out the expected loss of jobs from dampened production and demand and disrupted supply chains. The OBR estimated a 35% fall in UK GDP in the second quarter of 2020 in its Coronavirus Reference Scenario, with unemployment rising by more than 2 million to reach 3.4 million. OBR projected an unemployment rate of 10% in the UK by June 2020, falling to 5.5% only in Oct-Dec 2021 - still almost 50% higher than before the crisis.¹ The OBR forecast was widely seen as optimistic.²

¹ <https://obr.uk/download/coronavirus-reference-scenario-charts-tables/>

² <https://www.ft.com/content/73a35c9e-7f41-11ea-82f6-150830b3b99a>;
<https://www.telegraph.co.uk/business/2020/04/14/obrs-dire-projections-still-optimistic-virus-will-hurt-economy/>

According to analysis by the Learning and Work Institute, Wales was second only to London among UK regions with the highest proportion of workforce in most at-risk industries.³ According to NatWest Wales, Welsh manufacturing and service businesses have been shedding employees quicker than UK average.⁴ 46% of Wales's businesses have less than six months' reserves - a higher proportion than in England or Scotland.⁵

Young people and people with low or no qualifications are among the groups particularly at economic risk,⁶ as are people from BAME backgrounds and women.⁷ The COVID-19 crisis exacerbates pre-existing economic inequalities, hitting areas with weaker economies hardest.

Infrastructure spending can deliver rapid job creation, including in hardest hit areas and for people with fewer qualifications, addressing some though not all of the economic inequalities exacerbated by the crisis.

A number of countries successfully used infrastructure spending to aid economic recovery after the 2008 recession. A key lesson from these programmes is the need to prioritise shovel-readiness.⁸ This analysis therefore focuses on infrastructure projects that can be implemented rapidly, putting people to work in the short term.

The job creation potential of each project is estimated by investment size (in £ million) and multiplier (jobs created per £ million invested). Projects are then assessed against ten criteria on economic and social benefit (based on World Bank guidance for policy-makers on COVID-19 recovery measures):⁹

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<http://www.learningandwork.wales/resource/understanding-the-potential-impact-of-coronavirus-in-wales/>

4

<https://businessnewswales.com/business-activity-continues-to-fall-in-wales-amid-weak-demand-conditions/>

5

<https://www.ons.gov.uk/businessindustryandtrade/business/businessservices/bulletins/coronavirusandtheeconomicimpactsontheuk/18june2020>

6

<https://learningandwork.org.uk/wp-content/uploads/2020/04/Coronavirus-and-the-Labour-Market-Impacts-and-Challenges.pdf>

<https://autonomy.work/portfolio/covidunemployment-age-regions/#1589964170972-1392a861-0070>

7

<https://www.cardiff.ac.uk/news/view/2410317-economic-impact-of-covid-19-compounding-existing-inequalities-in-wales-report-finds>

⁸ <https://www.thenation.com/article/economy/shovel-green-new-deal/>

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<http://pubdocs.worldbank.org/en/223671586803837686/Sustainability-Checklist-for-Assessing-Economic-Recovery-Investments-April-2020.pdf>

- Longterm direct job creation/protection
- Targets/includes held-back regions
- Builds domestic low-carbon technology & manufacturing
- Supports transition in hard-to-decarbonise sectors
- Improves productivity
- Develops UK skills base
- Resilient to reinstated lock-in
- Supports health, public services and social fabric
- Improves resilience, land or sea

The next section presents the findings.

Findings

Stimulus outline

Our analysis for Wales recommends 16 infrastructure projects to upgrade transport, digital, manufacturing, housing, energy, and land infrastructure as part of a recovery package. These projects can create 59 thousand jobs, including 45.5 thousand direct jobs and 13.5 thousand jobs in supply chains. Most of this work should take place in the immediate two years.

- **Total jobs created: 59 thousand. Total investment: £6.02 billion.**
- **More than 75% of the jobs created will be in sectors that tend to employ non-graduate workers.**
- **Projects that score best both on social and economic benefit criteria and purely on job creation also help cut greenhouse gas emissions.**

Direct and supply chain job creation through infrastructure investment will predominantly take place in the Construction and Manufacturing sectors, sectors with high percentages of workforce furloughed in the UK at 40.5% and 28.8%.¹⁰

Employment figures modelled here are only direct and indirect (supply chain), and do not include induced employment. As induced employment derives from spending of salaries by workers, this would also support revival in the hospitality, entertainment and retail sectors.

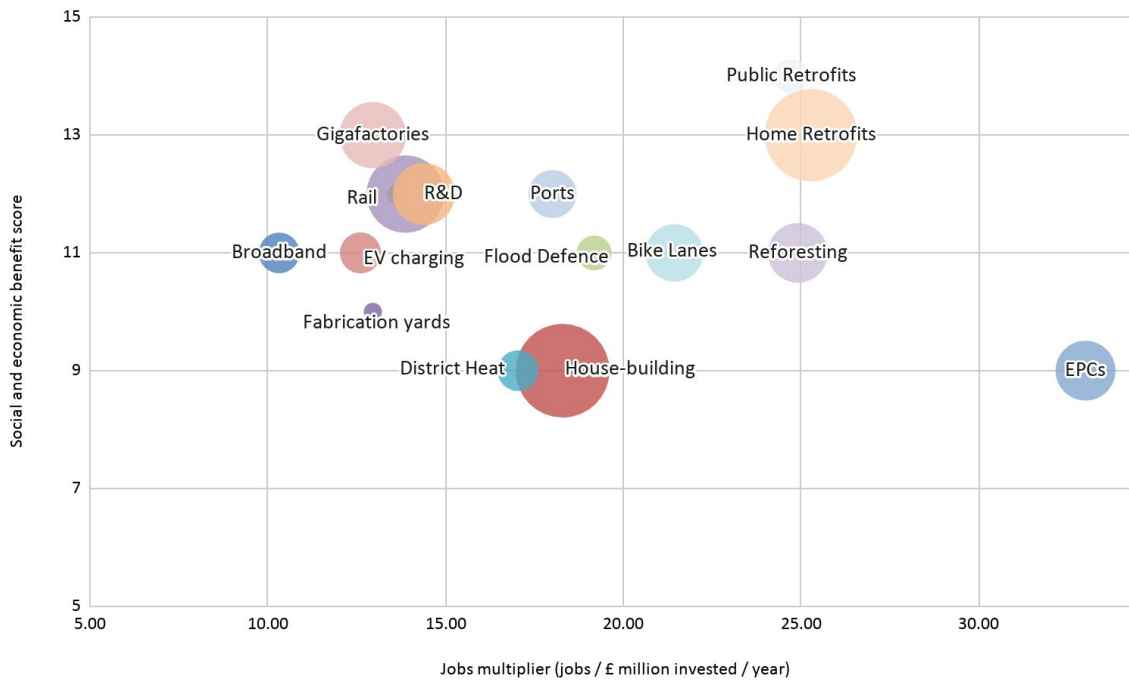
The best scoring projects, including purely by job creation effect and disregarding other benefits, contribute to the climate transition. But not every “green” project scores well. The two projects scoring lowest were road building and solar panel installations; these were therefore not included in our recommendations.

The list of recommended projects is not intended to be an exhaustive list of what meets emergency stimulus criteria, but a range of possibilities.

This analysis suggests possible investments: they should be evaluated alongside the latest data on expected job losses and the potential labour force. The full scale of the economic damage caused by the COVID-19 crisis is not yet known - it is possible that a larger economic stimulus is required than we are proposing.

¹⁰ Proportion Furloughed (5) - BICS Wave 5: 4 May to 17 May 2020
<https://www.ons.gov.uk/economy/economicoutputandproductivity/output/datasets/businessimpactofcovid19surveybicsresults>

Figure 1 summarises the assessment (bubble size represents the comparative scale of job creation).



Public benefits from an infrastructure recovery programme for Wales

The infrastructure projects proposed would deliver:

- Enough new social homes to clear backlog of unmet housing need, exceeding Welsh Government assessment.
- All social homes in Wales retrofitted to at least EPC level C.
- A transformational R&D fund for the Welsh steel industry, enabling demonstration projects such as upgrading the Orb steelworks to expand the use of domestic scrap steel, a Hlsarna furnace, or hydrogen and direct reduction furnaces connected to floating offshore wind.
- Two railways prepared for re-opening, Great Western Main Line (Swansea-Cardiff) and North Wales Main Line (Holyhead-Crewe) electrification and upgrades, and connectivity upgrades to Cardiff station and other train stations across Wales.
- Electric vehicle charging points brought to over 50,000 rural workplaces, representing 53% of rural businesses, as well as 80,000 rural homes.

- Best-practice cycle lanes and pedestrianisation for 50% of urban areas, vastly improving air quality.
- Port upgrades and manufacturing investment needed for a thriving floating offshore wind supply chain in Wales, such as potential upgrades and expansions at Pembroke Dock, Mostyn and Holyhead.
- 13% increase in forest cover through reforestation.

Best infrastructure projects for immediate job creation

The largest absolute numbers of direct and supply chain jobs can be created in construction projects (rail upgrades, social housing building and retrofits), and industrial projects including a battery factory for Electric Vehicles and steel industry decarbonisation development (Table 1).

<i>Project</i>	<i>Average jobs created over 2-year stimulus</i>
Build social housing (using domestic offsite manufacture)	12,138
Retrofit social housing	10,210
Expand and upgrade rail network	7,604
Build battery factories for EVs	5,130
Steel industry R&D for decarbonisation	4,317

Source: Transition Economics analysis

Ranked by their Welsh employment multiplier - i.e. the number of direct and supply chain jobs created per £1 million investment - the best projects are energy efficiency upgrades, pedestrianisation and cycle lane schemes, and reforestation (Table 2).

<i>Project</i>	<i>Jobs created / £1 million invested / year</i>
EPCs and Building Renovation Passport for all homes	33.00
Reforestation schemes	23.16
Retrofit social housing	22.00
Retrofit public buildings	21.44
Build cycle lanes & pedestrianisation	21.44

Source: Transition Economics analysis

Best projects for economic and social benefit

Projects that scored best on economic and social benefit criteria were: energy efficiency retrofit projects, steel industry decarbonisation, and building a battery factory for Electric Vehicles.

Table 3. Top 7 projects by economic and social benefit score	
<i>Project</i>	<i>Score (out of 20)</i>
Retrofit public buildings	14
Build battery factories for EVs	13
Retrofit social housing	13
Steel industry R&D for decarbonisation	12
Expand and upgrade rail network	12
Upgrade ports and shipyards for offshore wind supply chain	12
Support farmers to switch to Organic Agriculture	12

Source: Transition Economics analysis. Note that 'Combined scores' referenced in Table 4 take account of the jobs multiplier, as well as the social and economic benefits score together. However, scores (out of 20) in Figure 1 and Table 3 *do not* incorporate the jobs multiplier into the score, and hence are lower.

Full project list: scoring, investment, employment

The table below provides the full list of projects, their scores and job creation potential.

Table 4. Full project list¹¹

Project	Score	Wales jobs multiplier (jobs created / £1m invested / year)	Public Investment (£ billion)	Direct short-term job creation in Wales	Direct & indirect short-term job creation in Wales
Digital					
Broadband upgrade	13	9.95	0.17	1,014	1,313
Manufacturing					
R&D for decarbonising heavy industry - experimental technology (e.g. cement, petrochemicals, CCS demonstration, hydrogen)	15	14.39	0.50	3,426	4,317
Transport					
Expand and upgrade rail network	15	13.87	1.37	5,870	7,604
Build battery factories for EVs	16	12.95	0.33	3,960	5,130
Electric car charging points (rural)	14	12.60	0.18	1,077	1,396
Build cycle lanes & pedestrianisation	15	21.44	0.41	2,725	3,530
Road building	X	X	X		
Buildings					
Build social housing (using domestic offsite manufacture)	13	18.29	0.66	9,370	12,138
Retrofit social housing	17	22.00	1.16	7,882	10,210

¹¹ X = project excluded because of low score (roads and solar), lack of shovel-readiness (water infrastructure), or because a very similar project scores higher and can be delivered faster (private rental retrofits).

Retrofit private rental homes	X	X	X		
Energy efficiency assessments	16	33.00	0.30	2,731	3,960
Retrofit public buildings	18	21.44	0.09	572	741
Energy					
Upgrade ports and shipyards for offshore wind supply chain	16	18.01	0.15	1,668	2,161
Build manufacturing facilities for offshore (including floating) wind turbines	13	12.95	0.03	240	311
Solar generation (on schools, commercial roofs, private roofs)	X	X	X		
District Heating	12	17.02	0.10	1,051	1,361
Land					
Reforestation schemes	16	23.16	0.39	2,895	3,613
Environmental restoration (incl flood defences)	15	19.13	0.12	709	918
National water transfer network	X	X	X		
Support farmers to switch to Organic Agriculture	15	14.96	0.06	327	359
Total			6.02	45,518.56	59,062.57



Conclusion

This analysis recommends sixteen projects worth £6 billion that can create almost 60 thousand jobs in Wales. Broken down by sector, projected job creation (direct and supply chain) is as follows:

- 27 thousand jobs in housing construction and energy efficiency retrofits
- 18 thousand jobs in transport upgrades
- 9 thousand jobs in energy, manufacturing, and broadband infrastructure upgrades
- 5 thousand jobs in land, forestry, and agriculture improvements

The direct and supply chain job creation modelled here would also support economic recovery in other sectors, including leisure, retail and hospitality, through induced spending. Selection of projects should be cross-checked against up-to-date data on available workforce in the relevant sectors.

Appendix: Methodology and Data

This analysis follows the approach used in the infrastructural stimulus report prepared by Transition Economics for the TUC in June 2020.¹²

The selection of projects is based on a review of existing proposals, including proposals from interviews with trade unions, the UK National Infrastructure Commission's most recent *National Infrastructure Assessment (2018)*,¹³ policies suggested in LSE's Grantham Research Institute and Oxford University' Smith School recovery package analyses in 2008 and 2020,¹⁴ and proposals voiced by the Committee on Climate Change, Metro Mayors and MPs.

Any UK-wide proposals were assessed for their Wales component based on ONS and other government data sources.

The list of projects considered in this research is not exhaustive. It is also limited to infrastructure upgrades that can be initiated and delivered to a substantial extent at short (under two years') notice. A number of proposed projects were discarded due to expected lengthy timelines or insufficient published data, which also likely indicates these projects would not be able to start work quickly.

In some cases, projects that are usually slow to deliver - for instance, cycle lanes and pedestrianisation - can be accelerated, as local authorities and cities have begun demonstrating.¹⁵

Having identified which infrastructure projects can be initiated and deliver immediate-term employment, our research then examined whether these projects also provide economic and social benefit, against ten criteria.

The criteria were selected on the basis of World Bank guidance for policy-makers on COVID-19 recovery measures.¹⁶

¹² <http://transitioneconomics.net/uk-covid-recovery-infrastructure-jobs-tuc>

¹³ <https://www.nic.org.uk/publications/national-infrastructure-assessment-2018/>

¹⁴ <https://www.smithschool.ox.ac.uk/publications/wpapers/workingpaper20-02.pdf>

¹⁵

<https://www.london.gov.uk/press-releases/mayoral/mayors-bold-plan-will-overhaul-capitals-streets>

<https://www.sustrans.org.uk/our-blog/opinion/2020/may/greater-manchester-puts-walking-and-cycling-at-the-heart-of-its-recovery-plan/>

<https://www.sustrans.org.uk/space-to-move/>


¹⁶

<http://pubdocs.worldbank.org/en/223671586803837686/Sustainability-Checklist-for-Assessing-Economic-Recovery-Investments-April-2020.pdf>

Criteria	Scoring
Job Creation Multiplier (jobs per £million invested)	Points = Multiplier divided by 5
Shovel Readiness	Maximum points score = 2
Long-term direct Job Creation/Protection	
Builds domestic low-carbon technology & manufacturing	
Supports transition in hard-to-decarbonise sectors	
Improves land/sea and wider resilience	
Improves economic productivity	
Develops domestic skills base	
Resilient to re-instated lockdown	
Supports health, public services and social fabric	

How were employment multipliers and specific criteria assessed?

- **Employment multipliers for direct and indirect (supply chain) jobs** are calculated using ONS, Homes and Communities Agency and other government sources and research by the Welsh Economy Research Unit at Cardiff University, and supplemented with data from published third-party economic modelling. For each project, we use a weighted average of a variety of estimated multipliers, prioritising government sources, recent estimates, and a close match to the project.
- Note that nearly every multiplier in the assessment relies on input-output modelling (top-down) methodology, which tends to slightly overstate job creation compared to empirical (bottom-up) methods. Due to the lack of exact precedent for many of the projects and due to the need to account for supply chain jobs, we consider input-output based multipliers the most appropriate methodology.
- **IMPORTANT NOTE:** The employment multipliers presented here describe the jobs created in the immediate term as part of a recovery - which often do not correspond to ongoing long-term employment. For example, a government decision to support construction of a gigafactory will lead to short-term construction jobs in building the gigafactory and associated supply chain jobs e.g. providing construction materials and machinery. This is the employment represented in Table 5 above - not the ongoing future jobs in manufacturing EV batteries in the gigafactory. Similarly, this



analysis considers the jobs in building and upgrading rail lines and planting forests - not in operating rail lines or managing forests. Longer-term job creation estimates are available from Transition Economics, but not included in this report.

- **Other criteria and the government investment size** were assessed based on existing published proposals for these or similar projects: e.g. the social housing programme uses Shelter's assessment of the need for social housing investment and Welsh Government statements on unmet housing need.
- **Government investment leverage** (i.e. how much investment from other actors would be leveraged by a central government investment) was based on existing examples of public investment programmes in the respective sectors.

Final projects list: Based on the projects' scores against criteria, four projects were discarded from the list:

- Water transfer infrastructure (as the only project that could not start work within two years)
- Road building and solar panel installations (as scoring by far the lowest)
- Private rented housing energy efficiency retrofits (as scoring lower and starting slower than public housing retrofits).

Selection of projects should be cross-checked against up-to-date data on job losses in the relevant sectors.



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