Michelle Morris,
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Cyngor Bwrdeistref Sirol
Blaenau Gwent
County Borough Council

THIS IS A MEETING WHICH THE PUBLIC ARE ENTITLED TO ATTEND

23rd April 2021

Dear Sir/Madam

REGENERATION SCRUTINY COMMITTEE

A meeting of the Regeneration Scrutiny Committee will be held in Virtually via Microsoft Teams - if you would like to attend this meeting live via Microsoft Teams please contact committee.services@blaenau-gwent.gov.uk on Wednesday, 28th April, 2021 at 10.00 am.

Please note that a pre and post meeting will be held 30 minutes prior to the start and following the conclusion of the meeting for members of the committee.

Yours faithfully

Michelle Morris
Managing Director

AGENDA **Pages**

1. SIMULTANEOUS TRANSLATION

You are welcome to use Welsh at the meeting, a minimum notice period of 3 working days is required

should you wish to do so. A simultaneous translation will be provided if requested.

2. APOLOGIES

To receive.

3. DECLARATIONS OF INTEREST AND DISPENSATIONS

To receive.

4. REGENERATION SCRUTINY COMMITTEE 5 - 16

To receive the minutes of the Regeneration Scrutiny Committee held on 24th March, 2021.

(Please note the minutes are submitted for points of accuracy only).

5. ACTION SHEET - 24TH MARCH, 2021

There were no actions arising from the meeting of the Regeneration Scrutiny Committee held on 24th March, 2021.

6. CARDIFF CAPITAL REGION CITY DEAL PERFORMANCE REVIEW 2020/21 Q4 17 - 182

To consider the report of the Managing Director.

7. GOVTECH CATALYST CHALLENGE 183 - 188

To consider the report of the Team Manager Regeneration Opportunities.

8. LIME AVENUE BUSINESS PARK AND BOXWORKS PROGRESS UPDATE 189 - 198

To consider the report of the Principal Project Officer.

To: Councillor J. Hill (Chair)
Councillor G. A. Davies (Vice-Chair)
Councillor M. Cross
Councillor M. Cook
Councillor G. L. Davies
Councillor P. Edwards
Councillor H. McCarthy

Councillor K. Hayden
Councillor S. Healy
Councillor W. Hodgins
Councillor J. C. Morgan
Councillor J. P. Morgan
Councillor L. Parsons
Councillor K. Rowson
Councillor B. Willis

All other Members (for information)
Manager Director
Chief Officers

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COUNTY BOROUGH OF BLAENAU GWENT

REPORT TO: **THE CHAIR AND MEMBERS OF THE REGENERATION SCRUTINY COMMITTEE**

SUBJECT: **REGENERATION SCRUTINY COMMITTEE – 24TH MARCH, 2021**

REPORT OF: **DEMOCRATIC & COMMITTEE SUPPORT OFFICER**

PRESENT: COUNCILLOR J. HILL (CHAIR)

Councillors G.A. Davies
G.L. Davies
M. Cook
K. Hayden
S. Healy
W. Hodgins
H. McCarthy
J.C. Morgan
J.P. Morgan
L Parsons
K. Rowson
B. Willis

AND: Corporate Director Regeneration & Community Services
Head of Regeneration & Development
Service Manager Business & Regeneration
Team Manager Regeneration Opportunities
Team Manager Connected Communities
Skills Development Manager - Aspire Blaenau Gwent
Marketing Projects Officer
Scrutiny & Democratic Officer/Advisor

ITEM	SUBJECT	ACTION
No. 1	**SIMULTANEOUS TRANSLATION** It was noted that no requests had been received for the simultaneous translation service.	

No. 2	**APOLOGIES** Apologies for absence were reported for Councillors M. Cross and P. Edwards.	
No. 3	**DECLARATIONS OF INTEREST AND DISPENSATIONS** The following declarations of interest were reported: Councillor J.C. Morgan – Item No. 9 Tredegar Townscape Heritage Initiative Progress Report Councillor W. Hodgins – Item No 10. Advanced Engineering Centre & MTC Report	
No. 4	**REGENERATION SCRUTINY COMMITTEE** The minutes of the Regeneration Scrutiny Committee held on 10th February, 2021 were submitted. The Committee AGREED that the minutes be accepted as a true record of proceedings.	
No. 5	**ACTION SHEET – 10TH FEBRUARY, 2021** The Action Sheet arising from the meeting of the Regeneration Scrutiny Committee held on 10th February, 2021 was submitted. The Committee AGREED that the Action Sheet be noted.	
No. 6	**DESTINATION MANAGEMENT PLAN UPDATE** Consideration was given to report of the Service Manager Business & Regeneration. The Service Manager Business & Regeneration presented the report which sought endorsement of the draft Blaenau Gwent Destination Management Plan (Plan) for 2020-25. He said when the report was previously reported to Scrutiny decision was taken to defer the report, and following Members feedback the Plan was reviewed.	

	He said the report provided a summary of the Plan contents and the themes around which it was based. The report also summarised the context of the Plan, and the role of the Destination Management Partnership and other stakeholders in its production. The Officer pointed out the Plan was a strategic document and had been co-produced by a number of stakeholders and overseen by the Design Management Partnership. The document itself differed from some of the Council's other documents and strategies in that it sat both within the Council and Design Management Partnership, and also stakeholders across the tourism sector, so this was not solely a Blaenau Gwent document. The document was an important piece of work and was recognised by Visit Wales as a strategic approach to developing tourism within the geographical area and would also be used to help with funding applications. The key aim of the Plan was to ensure that people, businesses and organisations work together to deliver agreed targets. A Member referred to discussions when the Plan was reported previously to the Committee, and said he felt that the report now provided clarity that the Plan was not just about Blaenau Gwent. Another Member agreed, and said the Plan was more condensed and would be more fluid moving forward. However, he also pointed out that developing tourism was an extensive piece of work and questioned the limited resources within the Council. In terms of the document, he still felt that the Plan did not sufficiently recognise some partners, and also lacked reference to community tourism in terms of some of projects and investment that had been made, e.g. the THI Project, 10 The Circle, Tredegar. He said this project had received investment of £400k by Coalfields Regeneration Trust, and said projects of this scale of investment should be mentioned within the Plan. He referred to the action plan on page 23 of the Plan, Home of the NHS, and said Coalfields Regeneration Trust should be identified as a stakeholder. In response the Officer agreed that greater clarity should have been provided previously in terms of the scale of the	

	involvement of partners and the range of stakeholders. He said community tourism was a fundamental aspect of the Plan and was a key strand through, not only the Plan, but type of work being done in the area. He also agreed with the Member's comments regarding Coalfields Regeneration Trust and said they had been fundamental to the project. They had been omitted in error but the Officer confirmed that they would be included in the final Plan. Another Member said when the report was submitted previously in December 2020, he had referred to the Audit of Commemoration report dated 26th November, 2020 led by the First Minister. The Corporate Director had reported that a piece of work was being undertaken on the appropriateness of street names, and the Member asked when a report on this could be expected. The Corporate Director Regeneration & Community Services said this was an important piece of work, however, he was unsure when the report would be submitted but undertook to liaise with Officers regarding this. A Member referred to his previous comments regarding the limited resources within the Council in terms of developing tourism in the area, and commended the work of the Destination Management Officer. He suggested that perhaps funding could be explored through Cardiff Capital Region City Deal for additional resources to drive the Plan forward. The Committee AGREED to recommend that the report be accepted and the BGDMP 2020-25 be endorsed with amendments requested, i.e. inclusion of Coalfields Community Regeneration as a key partner; and also reference to community tourism.	
No. 7	**<u>PROGRESS UPDATE – RE:FIT PROJECT</u>** Consideration was given to report of the Team Manager Regeneration Opportunities. The Team Manager Regeneration Opportunities presented the report which provided update on progress of the RE:FIT project to deliver more efficiently managed energy within	

	Council properties and reduce energy costs to the Council, Leisure Trust and Schools in forthcoming years. Around 35 buildings were originally considered to form part of the Blaenau Gwent RE:FIT project and an initial phase was developed. This phase was further split into smaller stages to enable works to be undertaken as proposals were developed and agreed, and these were highlighted in sections 2.5 – 2.17 of the report. The Officer explained that whilst there would be annual energy savings, those identified in section 5.8 of the report are gross energy savings. The savings would be used to make the bi-annual repayments of the loan to Salix. In order to realise in-year savings, the loan repayments would be extended from 8 years to 10 years and this would allow buildings to benefit from some of the savings generated from participating in the project. Once repayment is complete all buildings would benefit from all the savings. A Member referred to section 2.15 of the report and asked whether this was the figure of the total number of streetlights within the residential areas of Blaenau Gwent. The Officer undertook to check whether this was the figure was just residential or included other areas. However, she reported that if there were any lights left, a possible future phase could be considered and Salix had indicated that they would welcome other projects. In response to a further question raised by a Member, the Officer confirmed that the streetlights would be operated by one management system moving forward as detailed in section 2.13 of the report. In terms of future projects, a Member asked whether road traffic management signs could be considered, and the Officer undertook to liaise with the Community Services Team. Another Member said he was aware that a number of schools were concerned about entering the project and whether the potential savings generated would be sufficient	

	to cover the loan repayments, and asked for information on the figures. The Officer said there were no figures available at the moment due to the Covid pandemic. She explained that the savings were calculated on a certain profile, and estimates based on buildings being operational. However, due to Covid the schools had been closed so this would impact on savings. The Officer confirmed that the next report to Committee it was intended to include case studies of buildings in terms of what was installed and the costs, and savings etc. The Committee AGREED to recommend that the report be accepted and note the progress of the project, and a further report on performance will be provided in the future.	
No. 8	**<u>CIVIC CROWDFUNDING</u>** Consideration was given to report of the Team Manager Connected Communities. The Team Manager Connected Communities presented the report which sought endorsement to submit a CCRCD Challenge Fund application for a regional civic crowdfunding programme to support solutions to local identified projects and challenges. A regional approach across the CCRCD was proposed, and the CCRCD team has encouraged a submission from BGCBC as the proposed lead authority by the 12th March, 2021, which had been done, with a subsequent decision anticipated after board determination on the 20th April, 2021. As lead Authority, the Council would manage the relationship and enter into contract with an appropriate provider to deliver the crowd funding platform for an initial period 2021/22 through to 2023/24. The Officer then spoke to the report and highlighted points contained therein. The Officer reported that there were some slight changes from the report and what went into the application as result of conversations that took place. She confirmed that the	

	total amount being sought for the project was £1.3m in value, and up to £1.1m was being sought from City Deal, however, this may fluctuate depending on the level of investment from other LA's. The Officer said whilst LA investment was not a requirement, it would be seen as favourable, and she confirmed that Blaenau Gwent had identified £50k over 3 years within Regeneration related resources. In response to a question raised by a Member regarding engagement, the Officer explained that the Lead Officer would have responsibility for a clear engagement strategy with local community groups the third sector would be critical in terms of the organisations that they were already supporting. The provider of the platform would also support that engagement, and there would also be a public launch and workshop events, along with a dedicated website to promote and signpost people to those projects seeking crowdfunding. Members would also play a big part in that engagement. Another Member referred to the same initiative undertaken in Swansea and asked whether there were any case studies available to give some idea of what was achievable, and also whether any indication had been received regarding the level of investment from other LA's. The Officer confirmed that Appendix 1 to the report provided a link to the website for Swansea crowdfunding which included the types of projects that have been funded. In terms of the level of investment from other LA's, the Officer confirmed that discussions had taken place with the Regional Director and there was firm support for the proposals, however, the financial contributions element was currently being worked through. The Officer confirmed that the application had been submitted identifying that that element was still to be concluded. A Member asked whether applications for projects would be submitted to us as Lead Authority for consideration, or CCRCD.	

	In response the Officer explained that if successful, and CCRCD had agreed investment, then governance arrangements would be put in place, and a proposed Steering Group would be established with representation from LA's, CCRCD, Welsh Government and key partners, who would be responsible for determining which projects would be supported. However, if the Council was putting in additional investment, there would be opportunity to influence that investment through the same platform but with separate criteria and in terms of the project being funded. A Member asked what level of support would be provided to community groups making applications for funding. The Officer said the Lead Officer would offer some resources, but there would be different levels of community development support available, and the third sector would be critical in this regard. She said the platform was more efficient because the data only needed to be input once and was then exposed to a number of funders. However, she acknowledged that a digital platform would provide challenges for some community groups, but support would be available, and the platform has also encouraged new people to come forward with new initiatives. In response to a further question the Officer said Members could support a community group in making an application, but the detail would need to be considered. The Committee AGREED to recommend that the report be accepted and: i. Endorsed the submission of a CCRCD Challenge Fund application for a civic crowdfunding platform, acting as the lead Authority, and ii. Endorsed the implementation of a regional crowdfunding platform, inclusive of Blaenau Gwent, to support solutions to locally identified projects and challenges; subject to funding award (Option 2).	
No. 9	**<u>TREDEGAR TOWNSCAPE HERITAGE INITIATIVE PROGRESS REPORT</u>**	

Councillor J.C. Morgan declared an interest in this item.

Consideration was given to report of the Corporate Director Regeneration & Community Services.

The Team Leader Regeneration Opportunities presented the report which provided an update on the current position regarding the Tredegar Townscape Heritage Initiative, and also provided a snapshot of projects completed to date.

The Officer went through the report and highlighted points contained therein.

In response to a question raised by a Member regarding the NCB project, the Officer confirmed that following discussions the applicant and contractor were still committed to the project. However, in the event that the applicant decided to not progress then the Council would consider its position in terms of the funding provided to date.

A Member reported that an update on the NCB project had been provided at the meeting of the Advisory Board meeting last week and the owner was very much still on board and had every intention of completing the work. The Member also commended Nick Landers and Amanda Phillips for their work and contribution to the THI which had been excellent.

He mentioned 10 The Circle and said this was a very important project, and said the Advisory Board was extremely proud of the work that had been done and the contribution made by Coalfields Regeneration Trust, Cymru Creation, and the community. He reported that Tredegar Comprehensive School had also been involved in developing the building for the National Curriculum, and this would attract schools from all over South Wales. He said the creation of the NHS gave Tredegar a national perspective which would not have happened without the THI Project.

The Member suggested that as part of the ongoing work with Coalfields Regeneration Trust they be invited to give a presentation to a future meeting.

Another Member said this was a very worthwhile project and was also a catalyst for the rest of Blaenau Gwent particularly in developing tourism in the area.

The Committee AGREED to recommend that the report be accepted and:

i. Noted the extension to the THI Programme originally planned for closure in July 2020 and the revised completion date of December 2021.

ii. Acknowledged progress made to date with the refurbishment of properties outlined in 2.4; and also highlighted within Appendix 1 of the report.

iii. Noted the involvement of the THI Advisory Board who are responsible for the continued management of the Tredegar THI Programme and ensure the following key principles are applied to the methodology of the programmes delivery:

- To hold the vision for the Historical Core
- To assist in designing, programming and delivering events.
- To assist the selection process.
- To ensure the emergent interpretive and access proposals in accord with the underlying vision for the project.
- To develop further the interpretive ideas and links with relevant audiences.
- To develop further detailed briefs on:
- Educational delivery
- Community involvement

No. 10 **<u>ADVANCED ENGINEERING CENTRE & MTC REPORT</u>**

Councillor W. Hodgins declared an interest in this item.

Consideration was given to report of the Skills Development Manager.

The Skills Development Manager presented the report which sought endorsement of the Blaenau Gwent Future

	Skills report and the subsequent funding proposal submitted to Tech Valleys for the refurbishment of the Monwell Building into an Advanced Engineering Centre. In 2018 the Council acquired the former Monwell Factory and set about developing the site to realise an ambition to create a venue which would support the future skills needs of the manufacturing industry across Blaenau Gwent and the Heads of the Valley. December 2020, MTC Training Services published their findings based on research across Blaenau Gwent industry for Future Skills Recommendations and delivery within the proposed training centre, and this was attached at Appendix 1 to the report. The Officer went through the report and highlighted points contained therein. In response to a question raised the Officer confirmed that this was a refurbishment project, using the existing structure and building on top. The footprint of the building would remain the same, and the plans included a mezzanine floor to increase floor space for classrooms. Parking would be provided within the grounds. Members said this was an exciting project, bringing regeneration, education and training all under one roof, and not only investing in a redundant building but in our future generations. The Officer said the timescale was tight as the College had aspirations to get on site next September, and Officers were working closely with Welsh Government in terms of funding. She said this was an exciting opportunity, and this type of facility was very much wanted by manufactures in the area. The Committee AGREED to recommend that the report be accepted and: i. Endorsed the MTC report and associated recommendations; and ii. Noted and endorsed the TV submission for the refurbishment of Monwel into the AEC (Option 2).	

No. 11	**<u>FORWARD WORK PROGRAMME: 28TH APRIL, 2021</u>** The Forward Work Programme for the meeting scheduled to be held on the 24th March, 2021 was submitted. The Chair reported that the following reports had been withdrawn: Aneurin Bevan Report Tech Valleys Progress It was also reported that an information item would be submitted on the Turkish Glass Factory. A Member took the opportunity to commend the reports presented and the Officers responses, and said he hoped that the FWP continued the format of this meeting. The Committee AGREED, subject to the foregoing, that the report be accepted.	

Executive Committee and Council only

Date signed off by the Monitoring Officer: N/A

Date signed off by the Section 151 Officer: N/A

Committee:	**Regeneration Scrutiny Committee**
Date of meeting:	**28th April 2021**
Report Subject:	**Cardiff Capital Region City Deal Performance Review 2020/21 Q4**
Portfolio Holder:	**Cllr N. Daniels, Leader / Executive Member Corporate Services**
Report Submitted by:	**Michelle Morris, Managing Director**
Report Written by:	**Ellie Fry, Head of Regeneration & Development**

Reporting Pathway								
Directorate Management Team	**Corporate Leadership Team**	**Portfolio Holder / Chair**	**Audit Committee**	**Democratic Services Committee**	**Scrutiny Committee**	**Executive Committee**	**Council**	**Other (please state)**
30.03.21	08.04.21	13.04.21			28.04.21			

1. **Purpose of the Report**

1.1 To inform Scrutiny Committee on the performance of the Cardiff Capital Region City Deal (CCRCD) against projects relating to investment in Blaenau Gwent during the last few months. during 2020/21.

1.2 This report summarises and highlights key programmes of work Blaenau Gwent (BG) are engaged in and are of interest to BG.

2. **Background and Context**

2.1 The report includes progress of the programme against key targets identified within the CCR Business Plan for 2020/2.

2.2 Highlights for BG include:

- Metro Plus Programme - Transport for Wales (TfW) progress
- CCR Levelling Up Prospectus
- Ultra Low Emission Transformation Fund
- Housing Catalyst Fund
- Challenge Fund Application
- CCR Energy Strategy
- Aspire Roll Out

2.3 There are a number of projects that are now being progressed with CCR funding in Blaenau Gwent and these are outlined below with an update on the current position.

Metro Plus Programme - Transport for Wales (TfW) progress

2.4 Progress is continuing on the rail investment alongside Transport for Wales (TfW) on the project components put forward as part of the Metro Plus scheme in BG including both the Ebbw Valley line and the Abertillery spur.

2.5 The local authority Metro Plus schemes are progressing as part of the wider programme of regional enabling infrastructure, to stimulate economic growth and regeneration across Cardiff City Region, supporting the sustainable mobility of people, and improving the way people make their economic contribution.

2.6 Work is continuing on the improvements to the Ebbw Valley line to increase frequency of services and will be continuing over the next few years to enable the line to take more train capacity. The design work on the Abertillery line from the CCR funding is also progressing with the development work continuing for 20/21 and 21/22. The links and services to both Cardiff and Newport are being tested in detail as part of the infrastructure and scheduling work. TfW have published the Passenger Rail Vision document that outlines the overall program aspiration and is attached at Appendix 1.

Prosperity for our Place (CCR Levelling Up Prospectus)

2.7 UK Government have invited areas in the UK to put forward strategic plans for investment as part of their Levelling Up agenda and have asked City Regions to come forward with proposals.

2.8 The CCR Investment Prospectus outlines the requirements for levelling-up the Cardiff Capital Region - with a particular focus on R&D, infrastructure investment, fiscal incentives and potential physical support in the form of re-locating government activities - and the results that are expected from those interventions - both for the region and for the UK. This is an ambitious document that identifies parallel work to do to level-up within the Cardiff Capital Region itself, given the widening inequality gap exacerbated by the pandemic.

2.9 The document sets out a number of key areas that represent the core proposals and the key enabling areas for exploration and intervention. This is complemented by a series of longer term proposals which could be within reach following to the deployment of the core and enabling initiatives. All these propositions and proposed interventions are complementary and linked together. The core propositions are transformational programmes. They are based around the areas sectoral strengths and build on the catalysts needed for impact, added value and multiplier effects for the region. The prospectus is attached at Appendix 2 for information.

Ultra Low Emission Vehicle Transformation Fund

2.10 CCR has been awarded £1.3million from the Welsh Government Ultra Low Emission Vehicle (ULEV) Transformation Fund to assist with the transition to Low Emission across the region.

2.11 One of the projects within this is the Taxi ULEV project and CCR has awarded the Taxi ULEV infrastructure tender to TH White for

implementation. This will place charging infrastructure on taxi ranks for the sole purpose of charging taxis.

2.12 Officers have agreed sites with the contractor for the location for the charging infrastructure within each Taxi rank in Abertillery, Brynmawr, Ebbw Vale and Tredegar. Due to the size of the taxi rank at Abertillery it has been determined to use an alternative site nearby which is Carmel Street car park which the Taxi Association in Abertillery previously wanted to occupy.

2.13 The contractor will be starting work on site in April and will issue an installation programme shortly. CCR have utilised the procurement approach from the Gwent Electric Vehicle project and will be entering into a Concession Agreement for the operation and maintenance of the charge points.

2.14 The second part of the project is to provide a few EV Taxis for each local authority to encourage take up of electric taxis. As the vehicles are expensive to purchase the 'try before you buy' option that this enables will see a better take up from taxi drivers and has been successful in other areas of the UK.

2.15 BG has been assigned 2 electric taxis from the 50 purchased by CCR to enable 30-day free trials for taxi drivers. These have been delivered and work with the licencing team is taking lace to contact taxi drivers to offer them the opportunity.

2.16 Lastly, CCR are due to go out to tender shortly for a contractor to install 22kW charge points on-street and in car park locations. BG have put forward 10 sites on Council owned land/car parks across the borough which are due to be included within the tender. The Market Square car park in Brynmawr has been included even though only part of the site is Council owned. Based on this we have recommended the site is included within the tender and the contractor looks to install the charging infrastructure within the part of the car park within Council ownership.

Housing Catalyst Fund

2.17 CCRCD developed a £35million Viability Gap Fund, a targeted funding programme to bring forward new homes on key strategic housing sites across South East Wales.

2.18 Each Authority was encouraged to submit applications for a maximum of 2 sites based on their ability to meet the set criteria, particularly in terms of a known viability gap and readiness to deliver. A number of sites within Blaenau Gwent were assessed in line with these criteria and the site in Ashvale, Tredegar identified as the preferred site to take forward, reflective of:

- Development size – 70 units (inc. 10% affordable)
- Developer identified with a sale agreed (subject to contract)
- Site Investigations undertaken

- Known and evidenced viability gap identified to bring forward development
- Ability to progress the development within the timelines set out by CCR

2.19 The proposed development site is made up of 2 parcels of land (private and LA owned). In 2018/19 the opportunity to package both parcels of land was presented (creating a larger development area with improved access) and progressed through an informal tender opportunity (inclusive of a light touch development pack) and a preferred developer identified.

2.20 The application was developed following the launch in September '20 and submitted January '21 to CCR, following a series of project development meetings, seeking investment of up to £1.175m to cover eligible expenditure (confirmation of state aid compliance in place) and address the viability gap (grouting, infrastructure and SABS).

2.21 Following a period of due diligence and assessment by independent consultants appointed by the CCRCD team, an indicative project shortlist was presented to the CCR cabinet on the 15.03.21 and was subsequently approved, which included the Ashvale Site. Final sign off is expected by the cabinet in June and details of next steps are currently awaited from the CCR team.

2.22 Subject to final approval/sign off the current indicative timeline is:

Action	**Year**
Secure Planning Permission	2021/22
Commence Infrastructure Work	2022/23
House construction	2023-25

Cardiff City Region Challenge Fund Application

2.23 The date for the Challenge Fund submissions is now over and BG is acting as lead on a submission to the fund for a CCR wide civic crowdfunding project. In March 2021 we brought a report to Scrutiny explaining the aims of the Civic Crowdfunding project in some detail. As a reminder this fund was asking us to explore creative and innovative solutions to local economic challenges; developing ideas/products that could be scaled up locally or nationally and build local wealth.

2.24 The closing date was 12th March and the outcome of funding is still awaited. The project will need some further development across the region if the Challenge Fund monies are awarded.

Cardiff Capital Region Energy Strategy

2.25 The strategy was commissioned by the Welsh Government and supported by the Welsh Government Energy Service (WG ES). It has been developed by Cardiff Capital Region City Deal with additional support from regional stakeholders, including Local Authority Officers. The energy strategy was

approved at CCR Cabinet on 7th December 2020, please see attached report and energy strategy.

2.26 Following endorsement of the strategy next steps have been identified for the region including:

- co-ordinate and align the regional approach so that a co-ordinated implementation plan can be developed;
- commence development of the implementation plan, in partnership with stakeholders and the WG ES;
- as part of the implementation plan, to scope the first 'Energy Mission' or challenge for the region;
- embed a core set of energy 'asks and offers' within the investment prospectus for levelling-up, that showcase the potential for transformative programmes of activity; and,
- agree the strategy and implementation plan as part of 'Build Back Better'.
- In order to prepare the Implementation Plan CCR are setting up a CCR Energy Strategy Steering Group to work with CCR and WG ES to help guide key activities over the next few months

The Energy Strategy is attached at Appendix 3 for information.

Aspire Roll-Out across the City Region

2.27 CCR Investment panel received a proposal from Aspire BG to roll out the offer across the Region to provide support for Industries of the Future in 2020. The Investment panel have requested a review to be undertaken of the existing apprenticeship landscape across SE Wales, specifically focussing on Shared Apprenticeship Programme aspect and Industries of the Future. The review work will identify gaps in service delivery and business needs. We are still awaiting the outcomes of the review to understand whether the Aspire proposal will be funded. This has been delayed, but we are expecting it by the summer.

3. Recommendations for Consideration

3.1 That the content of the CCRCD report is noted.

4. Evidence of how this topic supports the achievement of the Corporate Plan / Statutory Responsibilities / Blaenau Gwent Well-being Plan

4.1 The CCRCD is a key strategic initiative for the Council, which will assist in delivering the Corporate Plan in terms of job creation, housing and improved transport connections in addition, alongside nine other Local Authorities we are working to deliver a range of programmes to improve the connectivity, infrastructure and business governance of the region.

4.2 These projects support the amendments made to the Outcome Statements within the Corporate Plan in its review in October 2019.
Corporate Plan 2020/22 Outcome Statements:

- Protect and enhance our environment and infrastructure to benefit our communities

- Support a fairer sustainable economy and community
- To enable people to maximise their independence, develop solutions and take an active role in their communities
- An ambitious and innovative council delivering the quality services we know matter to our communities

5. **Implications**

5.1 There are no direct implications as part of this report as it is monitoring other projects that will or have been reported and have separately listed implications.

6. **Monitoring Arrangements**

6.1 Monitoring and reports will be reshaped for the next Council cycle.

Background Documents /Electronic Links

- Transport for Wales - Passenger Rail Vision document
- CCR Levelling Up Prospectus
- Energy Strategy and Action Plan

Cardiff Capital Region

Passenger Rail Vision

Contents

Foreword 4

Introduction 6

Executive Summary 8

Policy Context 19

Economic Context 25

Transport Context 32

Transport Planning and Choices 38

Priority Rail Enhancements for CCR 47

Overall Benefits 57

Next Steps 61

Endnotes 62

Contact Us 64

Foreword

Investing in transport infrastructure is key to 'levelling-up' up productivity and ensuring that funding to connect and regenerate our places, is capable of working for all parts of the UK. A functioning multi-modal transport system is critical to objectives to 'build back better' and improve our economic, health and societal outcomes. It will also be a key tool in our armoury in the race to net zero as we can expect to see a heightened focus in collective efforts to combat rapid climate change.

Accordingly, it is vital that we continue to see a shift in spending to the nations and to the regions of the UK and in particular to the Cardiff Capital Region. In preparing our Strategic Rail Priorities framework for the Cardiff Capital Region, I welcome commitments made for a new National Infrastructure Strategy, the establishment of a new National Infrastructure Bank and the £4BN 'levelling-up' Fund announced in the 2020 Comprehensive Spending Review. Combined with measures to review the 'Benefits Cost Ratio' of the so-called 'green book' approach, this is an opportune moment in time to highlight the significant potential we have in the CCR to contribute towards objectives for both connecting the union and for achieving prosperity for all.

Our Strategic Rail Priorities have been shaped and informed by robust evidence and data with experts, such as Professor Mark Barry, working with our Regional Transport Authority.

I believe we have articulated a compelling set of requirements and potential results. We understand that investment in trains is not a panacea and indeed, have meaningful proposals for bus and active travel development – but we do understand that achieving our fair share of investment for rail, will be an important anchor for our wider connectivity ambitions. Upgrading and enhancing rail in the CCR represents a key opportunity to close the economic divide – to fast-track delivery of major strategic projects and significantly reduce carbon emissions.

The South Wales Metro is an important starting point – but we need to do more and we need to start now.

Our requirement of UK government is not solely one of funding. Investing in building increased resilience will also require fiscal incentives and the kind of backing seen in the North of England where the new National Infrastructure Bank is set to be based. In return for that commitment we will create the conditions for the region to be more economically competitive and productive and, in so doing, make a contribution to the wider success of the UK economy.

Whilst these initial priorities are just to get us started , we are confident that we have the makings of a distinctive and stratified plan that works across a combination of our priority R&D sectors, energy and net zero ambitions and proposals for a skilled workforce. Set in the context of our wider investment ambitions for levelling-up the CCR – we believe we are taking the initiative and setting out the policy tools and investment levers that will help government in its quest to re-balance spending across the UK and unleash the significant potential of the Cardiff Capital Region.

Cllr. Huw David
Chair of the Cardiff Capital Region
Transport Authority

Introduction

I have been involved in the “Metro” project in the Cardiff Capital Region since its modern inception through my report, “A Metro for Wales Capital City Region – Connecting, Cardiff, Newport and the Valleys”[i] which was published with the Cardiff Business Partnership and the Institute of Welsh Affairs in 2011. Aside from making the case for better regional connectivity the report also highlighted the importance of links between South Wales, Swansea Bay, Bristol and London.

At the time of the 2011 report, there was no executive capacity or capability in either local authorities or Welsh Government (WG) to take on such a large rail project. When one considers that rail powers and funding were, as they are today, not devolved (a status that is still a major constraint on progress), then any significant interventions seemed unlikely given only limited interest at best from Westminster.

Yes, there were, and have been, many good smaller local schemes that did not run up against the major institutional and funding barriers; so new stations, and the Vale of Glamorgan and Ebbw Valley Lines reopening pursued by the South East Wales Transport Alliance (SEWTA) for example. However, it was clear to me then, that, despite the constraints of rail devolution arrangements, it was Welsh Government (WG) which would need to develop both the intent and capability to make the Metro a reality.

Following my Metro Impact Study in 2013[ii], which was commissioned by the then Minister for Economy, Science and Transport, Edwina Hart, and the earlier Integrated Transport Task Force report, and despite the challenges and perhaps to be expected resistance from some, to its credit WG have made remarkable progress. I joined the First Minister, Carwyn Jones, on Nov 30th 2015[iii] at Pontypridd station, when the Metro was formally announced. This complemented the establishment of Transport for Wales (TfW) that, in the five years since, has undertaken perhaps the most complex rail franchise procurement in the UK since privatisation, the biggest in WG history and are now dealing with the enormity of Covid. Despite that, the next phase of Metro, the transformation of the Core Valley Lines (CVL) through faster and more frequent electrified services, is still planned to be delivered by 2023/4; the new depot being built at Taffs Well is an early sign of progress.

This is a remarkable achievement, and yes whilst I expect some further bumps on the road, we should acknowledge just how quickly this project is moving forward when compared to many other similar endeavours. Just ask the residents of places like Leeds and Bristol who have been debating enhanced public transport infrastructure for decades. For me it is very clear, despite the challenges,

there would be no Metro without WG and by implication without devolution. It is frustrating because I know that with fully devolved rail powers, we could do even more.

The challenge now, is for the region to show equal ambition and intent to develop plans for the Metro for the period beyond 2024 out into the 2030s. Building on earlier work, this paper sets out that vision in respect of passenger rail services. This vision is also consistent with the findings of the South East Wales Transport Commission (SEWTC).

I have also tried to present some of the wider considerations and the choices that will inevitably be required. The existential threat presented by the climate emergency is perhaps the most significant. We can’t proclaim a climate emergency but act as if there isn’t one. We really have some big questions to answer:

How do we reduce car dependency? How do we build places designed around public transport and active travel? How do we develop a more sustainable and equitable economy, and how can we afford it? The legacy of Covid also presents opportunities for changing how, when and where we work, but as I set out, no matter what our post Covid world looks like, we will still need more public transport.

I have been involved in all stages of the Metro, from its modern inception in 2011, within and outside WG and TfW, and have confidence we can answer these questions. As I have also said previously – we do not really have a choice.

Mark Barry
Professor of Practice in Connectivity, School of Geography and Planning at Cardiff University

Executive Summary

The Cardiff Capital Region (CCR) is home to 1.5M people, covering a diverse and unique geography from coast to valley to mountain; a history that encompasses the crucible of the industrial revolution, an industry that fuelled the world in the 19th and early 20th Centuries and the foundation of the NHS. It now supports a modern diverse multicultural society drawn from all parts of the world as well as its own unique language and history.

In partnership with Welsh Government (WG) and Transport for Wales (TfW), the region is working to bring forward ambitious plans for the development and expansion of its public transport network at the heart of a sustainable and more equitable economy. This paper is focussed on strategic passenger rail priorities and sets out the primary schemes to be developed over the next 10-15 years. This will augment the £740M upgrade of the core valley lines[iv] through faster, more frequent and electrified services *Figure 23* being delivered to 2023/4 by TfW.

Whilst clearly integrated bus services, fares policy and active travel are essential components of the overall Metro programme they are not considered in detail in this paper. Similarly, the anticipated Strategic Development Plan will provide the statutory basis for future land use policy and development that is integrated with the Metro.

The primary consideration in developing plans, is that pre-Covid, cars trips made up 80% of commuting mode share *Figure 1*, indicating that there is a large untapped market for public transport (PT). The region clearly needs a better public transport product able to attract the 80% still using their cars onto public transport.

Drawing from earlier work and analysis[v], it has been calculated that benefits of over £4Bn could be secured for the region over 30 years by combining traditional transport user benefits and the potential wider economic benefits enabled by the Metro.

The Climate Emergency and a need to reduce our car dependency

In developing a coherent vision for rail and integrated public transport across the Cardiff Capital Region, the existential threat of the climate emergency demands that our priority is to bring forward proposals that radically change our mobility ecosystem. This is in line with our broader environmental and well-being obligations and goes beyond purely transport interventions.

Changes in Commuting Mode in Wales, 2003 - 2017

Mode	2017 Mode share	2003 - 2017 % change in use of each mode and change in ave. journey time
Car	81%	+9%, +4 mins
Walk	8%	-18%, +5 mins
Bus	4%	-7%, +7 mins
Train	4%	+212%, +7 mins
Cycle	2%	+46%, +4 mins
Car Share (% change in numbers of car drivers and car passengers 2003 - 2017)		+24% Driver; -51% Passenger; -21% Sometimes driver, sometimes passenger

Figure 1 Senedd Research, Commuting mode share in Wales 2017

The implicit need to decarbonise infers a need to significantly reduce our car dependency. This is important, as car use is responsible for over 60% of transport CO_2 emission; even a completely electrified car eco system with power generated entirely through renewables (which is not realistic in the short term), would only reduce the total car emissions by perhaps ~50%. Whilst this would be welcome, the wider societal costs of car use require us to go further.

Transport CO_2 Emissions in the EU

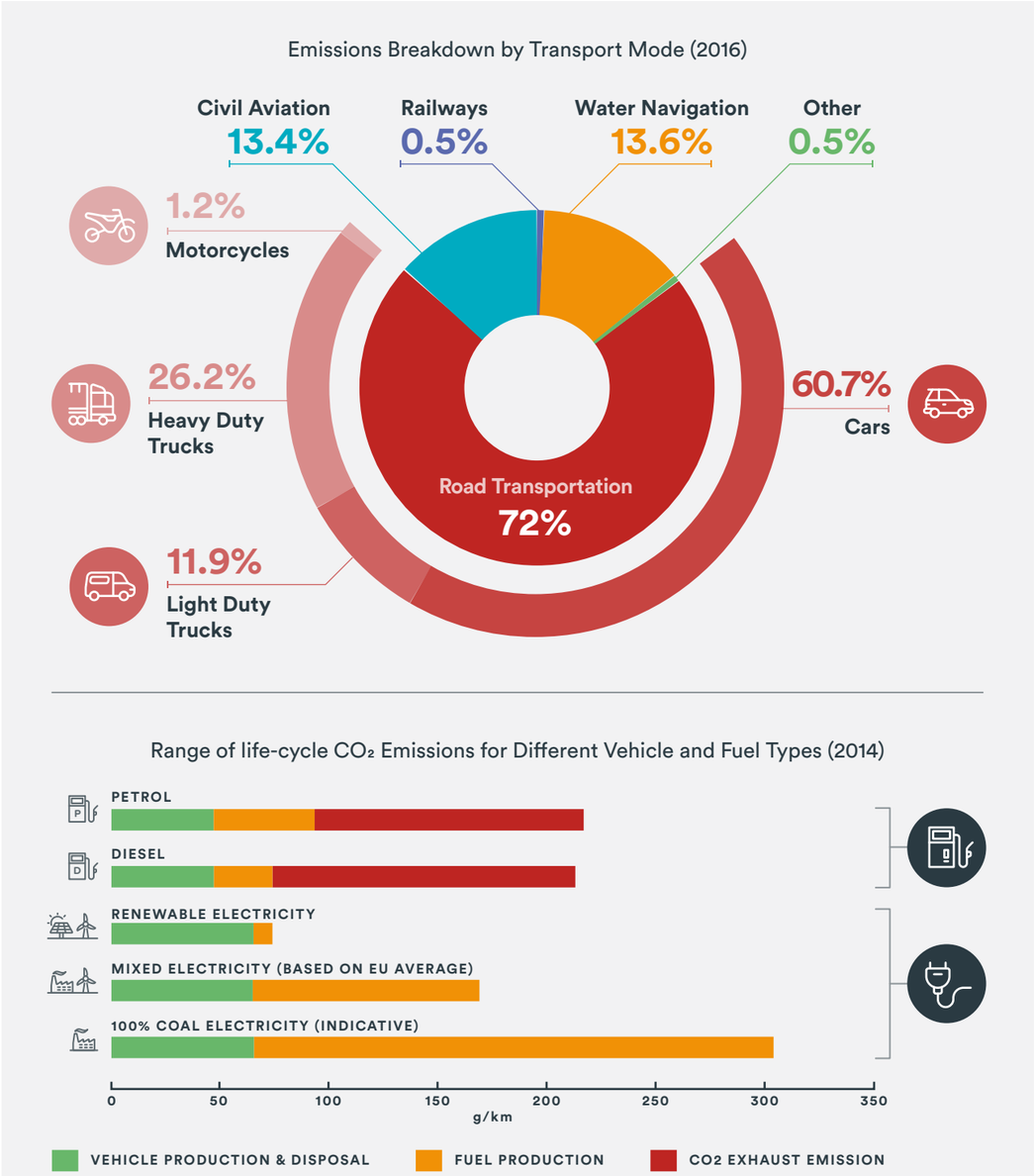


Figure 2 CO_2 emission by mode, EU Environment Agency 2016[vi]

Much of the growth in car use from the relatively low levels in the 1950s, has been enabled by the phenomenon of induced demand resulting from road building, enabling new car-based developments, that have generated a need for more car trips, requiring more road space to accommodate them. An unvirtuous cycle. It is also a stark reality, that the vast majority of the world's cars spend perhaps 95% of their time doing nothing[vii]. Aside from being a grossly inefficient use of scarce natural resources, having to design our cities around cars when they are not moving, is as bad as having to do so when they are.

As was the case across the UK during the 1950s-1970s, a lot of our rail infrastructure was pulled up and built over given the huge growth in car ownership and usage[viii] *Figure 3*. The folly of those interventions is only now being recognised given the growth in rail usage over the last twenty years and now the urgent need to address the climate emergency. The work of experts like Martin Mogridge[ix] led the way in recognising the failure of large-scale road building.

UK Transport Modal Share (1952-2015)

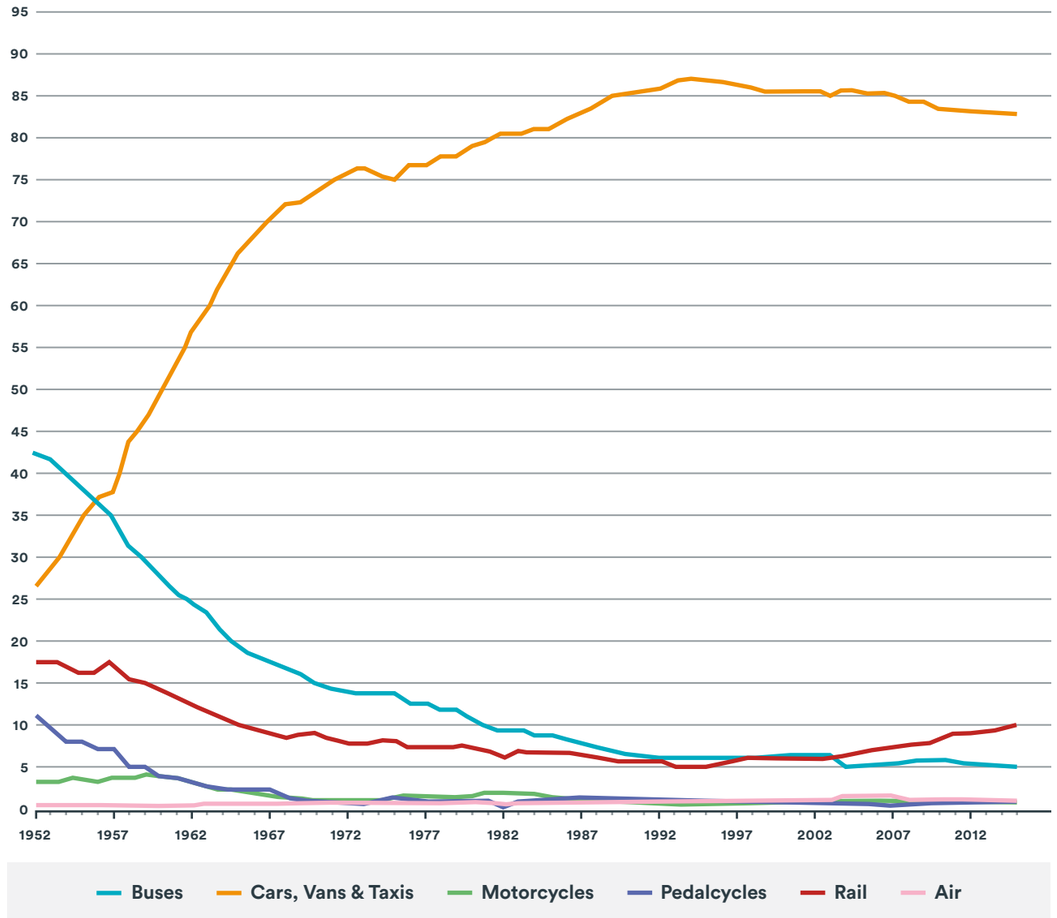


Figure 3 Passenger Transport % in UK 1952 – 2015

We have also become de-sensitised to the enormous societal costs borne by all of us resulting from car use; 150,000 road traffic casualties in the UK per year[x], 28,000 serious injuries and 1,700 deaths as well as 20,000 to 30,000 premature deaths resulting from poor air quality[xi].

We need to seriously consider what sort of future we want *Figure 4*. If we can secure a significant shift to public transport and active travel, we will find that we have more than enough road space for those that still need or choose to use cars for particular journeys. After all, it is only 20~30% of traffic that causes 100% of congestion as was found by the South East Wales Transport Commission[xii].

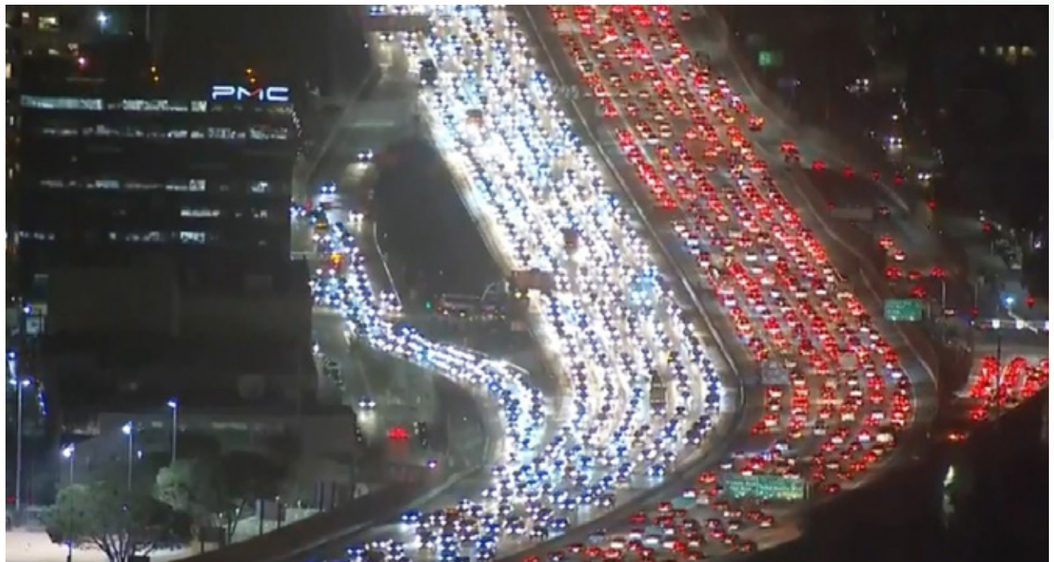
In this context, interventions, including fiscal, to discourage car use, need to be considered: to change behaviours; raise capital; and to fairly apportion more of the external societal costs of car use to car users. WGs recent Independent Review of Road User Charging[xiii] in Wales, found:

... there is a pressing need for a "National Policy Framework for Road User Charging in Wales" to be developed and introduced as soon as possible."

Levelling Up and Sustainable Economic Development

As important, there is also a complementary need to develop a sustainable and more equitable economy and, as the UK Government has stated[xiv], to, "level up". These are broad words which need real thought in scheme development and implementation and goes beyond transport. We can't continue to feed an economy that does not account properly for the irresponsible depletion of natural resources, our environment and the excessive production of CO_2. Similarly, the challenges of post-industrial decline impacting many other parts of the UK, as well as the CCR, requires more than rhetoric. Levelling up requires, as WG have stated, "positive discrimination in how funding and investment decisions are made". This is even more important given the scale and economic impact of rail schemes being developed elsewhere in the UK (especially HS2) which has the potential to negatively impact the Welsh economy without further transport interventions. WG and UK Government can and must work together with the CCR to address this challenge.

Figure 4 What sort of future do we want? (Los Angeles Traffic on I 405)



Vision

A strategic public transport network for the Cardiff Capital Region providing a high-quality, reliable, efficient and affordable transport services to support sustainable economic development and social regeneration.

The key feature of the CCR vision is a high quality, integrated grid of public transport services (rail and bus) that presents a single joined up network to the passenger. The ultimate aim is to reduce car mode share to perhaps 40% or less (which was common until the 1950s) from 80% today; this implies a significant increase in public transport and active travel – from a total mode share of 20% today, to closer to 60%. In parallel, the vision anticipates a range of transport related economic development and regeneration interventions right across the region.

In the short term, this will include: re-designed bus networks integrated with new metro rail services planned as part of the next phase of Metro by 2023/4; delivering integrated fares and ticketing; station and interchange enhancements; and the redevelopment of Cardiff Central. However, the vision goes beyond that and sets out an ambition for an expanded rail network as the backbone of an integrated public transport network, to be developed and delivered over the next 10-15 years.

Rail Network and Services

The delivery of the CCR Rail vision *Figure 5* will include:

- **A major upgrade of the South Wales Main Line (SWML) is an early priority, to form the backbone of the region's public transport network through new stations and a mix of intercity express and local commuter services; specifically, there is a need for more services from Bristol Temple Meads through Newport and Cardiff to Swansea and West Wales. This is consistent with the measures set out by the South East Wales Transport Commission**
- **Measures to address bottlenecks on the rail network to allow more services on the Ebbw Valley, Marches Line, Maesteg Branch, The Vale of Glamorgan (VoG) and City and Coryton Lines in Cardiff**
- **Re-use of freight lines where demand justifies (e.g. Aberdare - Hirwaun)**
- **Introduction of further new stations, in addition to those included in the core CVL transformation, to connect more people and places to the Metro network**

- **Re-use and connection of underutilised lines to create the Cardiff Crossrail & Circle, to deliver high quality & frequent public transport (PT) services across much of urban Cardiff, the Bay and extended through the NW Corridor into RCT to Talbot Green and Pontyclun**
- **Enhanced cross valley links, using both bus and tram-train, integrated through high quality interchanges with new north-south CVL rail service; this will deliver a grid that makes more journeys between the valleys viable and affordable using public transport**
- **Reconnection of Caerphilly with Newport using the Machen freight line and tram train services, the on-street tramway capability of which can be applied in Newport to avoid conflicts with the congested SWML and support regeneration in Newport.**

There are also schemes across Wales and the UK that could help the CCR economy *Figure 6* for example: Western Rail Access to /Heathrow; enhancement to HS2 Phase 2 and rail lines south west from Birmingham to allow more services between Cardiff (via HS2) and places like Manchester, Leeds, Sheffield, Newcastle and onto Edinburgh and Glasgow; integrated Metro development in Swansea Bay and Bristol; and improved N-S services in Wales.

Bus Services and Integration

Whilst not addressed here in detail, aligned to this rail programme is a need to redesign bus networks (including more rail/bus interchanges) and integrate fares and ticketing to provide the joined-up single network passengers expect. This is essential to attract some of the 80% of people who currently (pre-Covid) use cars for most of their journeys.

Wider Benefits, Regeneration, Flexible Working and Transit Oriented Development

Enhanced inter and intra-regional connectivity will enable more efficient labour markets and help develop the regional economy. For example, WG identified formal transport user benefits of up to £1Bn that could be realised through enhancement to the SWML in its 2018, "Case for Investment"[xv]; and the high-level analysis as part of the 2013 Metro Impact Study[xvi], set out the potential to enhance the regional economy by £4Bn over 30 years from the full range of schemes set out at the time.

There are also wider environmental and wellbeing benefits that can be realised; reduced carbon emissions, improved air quality and reduced road traffic accidents are perhaps the most significant.

Some schemes, such as the Cardiff Crossrail/NW Corridor, can support more sustainable, connected and densified housing development along an entire corridor, so called Transit Oriented Development (TOD), as well as enabling development in Cardiff City Centre, Cardiff Bay and Talbot Green. Similarly, the cross mid valley proposals can help re-orient the region's economic geography from being more than just trips to/from Cardiff and so support development in places like Pontypridd.

This programme also presents an opportunity to augment those benefits through a range of station focused development and regeneration interventions to maximise the benefits of the investment in our public transport network. These include:

- **Cardiff City Centre and Bay**
- **Newport City Centre**
- **Nantgarw/Trefforest**
- **Pontypridd Town Centre**
- **Bridgend Town Centre and Ford Site**
- **Ebbw Vale Enterprise Zone**
- **Cardiff Airport and St Athan**
- **Merthyr Town Centre and the emerging plans for Cyfarthfa Castle**
- **Key Hubs such as Barry Town, Caerphilly, Pontypool, Aberdare, etc**

If we can embed TOD into our planning and development ecosystem, we can begin to encourage the relocation of more of our shops, offices, schools, hospitals, etc away from car based "out of town" locations, back to our town and city centres where good public transport is easier and less costly to deliver. There are also a range of more community focussed interventions that can be progressed at places like Porth, Maesteg and Butetown.

The impact of Covid and the phenomenon of more flexible working (through some home and local workplaces) will alter demand patterns. However, the real opportunity is to reduce the peakiness of movement so that less of us are having to travel at peak times in one direction twice a day. In that context, given the very high pre-Covid levels of car use, and the need for more TOD, we still need much more PT capacity.

The full range of schemes presented here, can significantly boost those benefits and when added to the transport user benefits calculated by WG in 2018, justify a major capital programme over the next 10~15 years of perhaps £2~3Bn.

Next Steps

The primary steps necessary to progress this vision are that the CCR work collaboratively with key partners (including local authorities, WG, TfW, DfT, UK Gov, NR) to:

- **Secure support from across the region**
- **Further develop and refine these schemes through TfW's Metro Scheme and Business Case Development programmes; this work will confirm scope, phasing, benefits and costs of these emerging proposals**
- **Secure commensurate long-term funding (capital and revenue); including consideration of demand management measures (e.g., workplace parking levy, road user charging)[xvii], Community Infrastructure Levy, Tax increment financing, etc**
- **Bring forward public transport focussed economic development, TOD and regeneration interventions across the whole region aligned to Metro stations and public transport corridors.**

Professor Marquand from the School of Industrial Relations at Cardiff University, who first set out the metro concept in his book "South Wales Needs a Plan", published in 1936, would, I suspect, welcome these proposals.

Key Interventions Summary

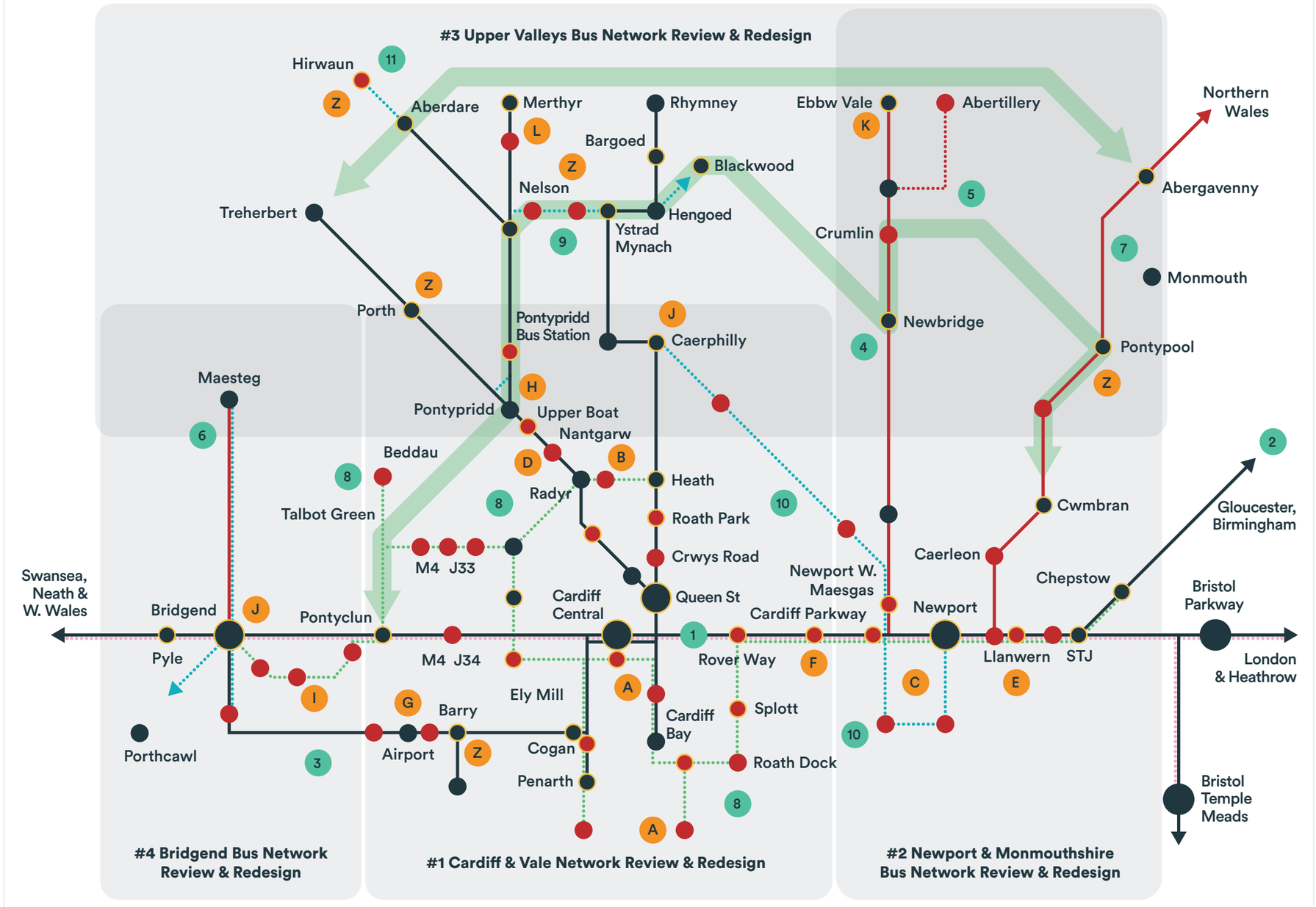


Figure 5 CCR Strategic Rail Priorities

Illustration only, not all stations, routes or services shown

Table 1: Priority Rail Schemes

1. **South Wales Main Line (SWML) Upgrade**
   - Mix of intercity express & local commuter services & new stations
   - Enhanced line speed and capacity
2. **Route and service upgrade to Birmingham**
3. **VoG service enhancements**
4. **Ebbw Valley service enhancements**
5. **Abertillery spur**
6. **Maesteg line service enhancements & potential tram train operation and local extendibility**
7. **Marches line service enhancements**
8. **Cardiff Crossrail & NW Corridor tram-train**
   - City and Coryton link and service upgrade
   - Bay line extension to Rover Way
   - Tram train on SWML to Newport/STJ
   - NW Corridor to Pontyclun
   - Extend tram train west from Pontyclun
   - Extend tram train to Penarth and lower Penarth
9. **Mid-valley tram train connection**
   - Tram train from Rhondda to Ystrad Mynach via Pontypridd, Abercynon and Nelson
   - New Stations at: Pontypridd bus station, Nelson, Tredomen Business Park
10. **Caerphilly-Newport tram train**
    - Re use and extend Machen freight branch to Caerphilly
    - On street "tramway section" over SWML and via Royal Gwent
11. **Aberdare-Hirwaun**

Table 2: Economic Development Sites & Regeneration Opportunities

- **A** Cardiff Central, Central Quay, Butetown Cardiff Bay
- **B** GE Life Science Innovation Park
- **C** Newport Knowledge Quarter
- **D** Nantgarw/Treforest Industrial Estate
- **E** Llanwern/Glan Llyn
- **F** Hendre Lakes/Cardiff Parkway
- **G** Cardiff Airport/St Athan Business Park
- **H** Development and regeneration in Pontypridd
- **I** Llanilid
- **J** Bridgend City Centre and Ford Site
- **K** Ebbw Vale Enterprise Zone
- **L** Merthyr Town Centre and Cyfarthfa Castle
- **Z** Multiple Local Regeneration Opportunities

Bus Network Redesign	Suggested Key Bus Hubs/Interchanges
#1 Cardiff & the Vale of Glamorgan	Cardiff Central, Waungron Rd, Heath Hospital, Heath Halts, Bay/Arena, Queen St, Rover Way/Newport Rd Barry Town, Pontyclun, Barry Docks, Cogan, Cowbridge
#2 Newport, Monmouthshire & Ebbw Valley	Newport, Cwmbran, Pontypool, Abergavenny, Monmouth, Newbridge, Ebbw Vale, Chepstow, Llanwern, Severn Tunnel Junction
#3 Mid & Upper Valleys	Merthyr, Aberdare, Pontypridd, Bargoed, Newbridge, Blackwood, Porth, Ystrad Mynach, Ebbw Vale, Abercynon, Llanbradach
#4 Bridgend	Bridgend, Porthcawl, Pyle, Maesteg

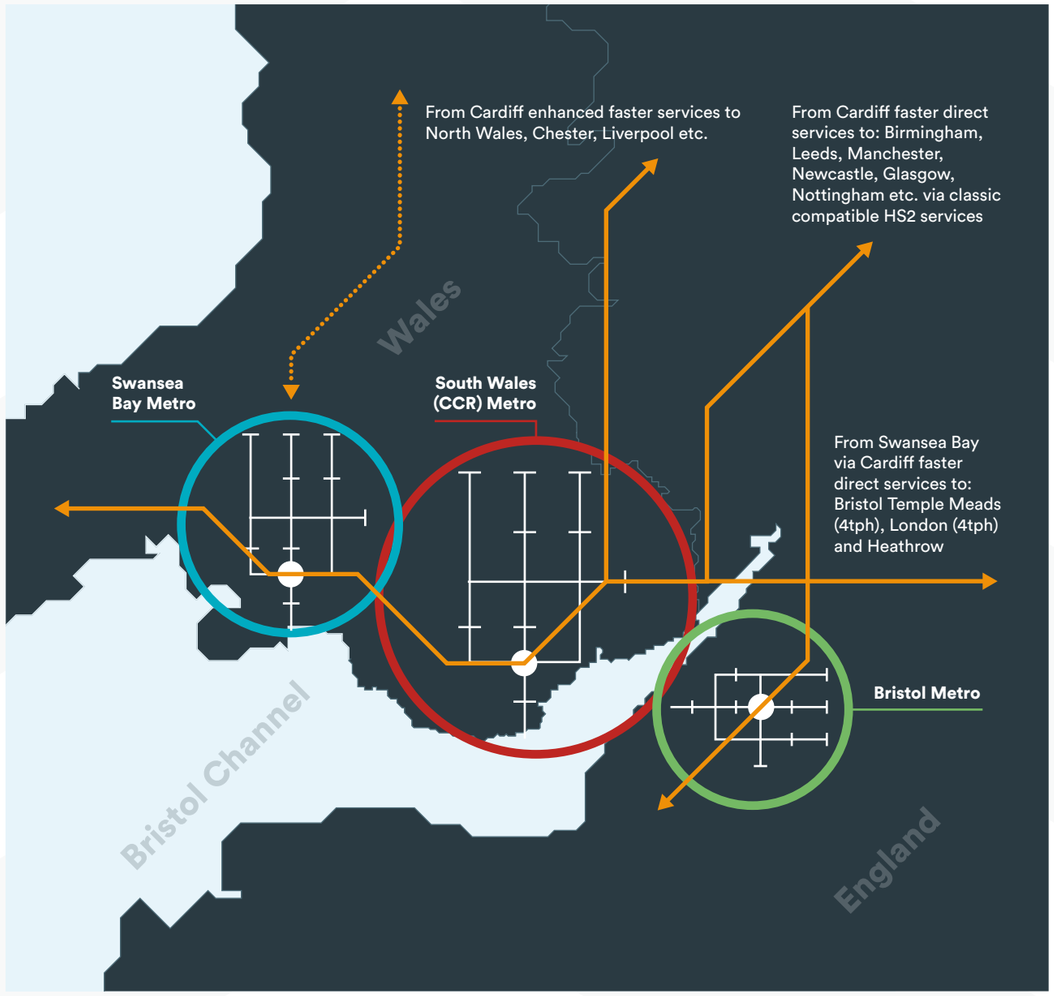
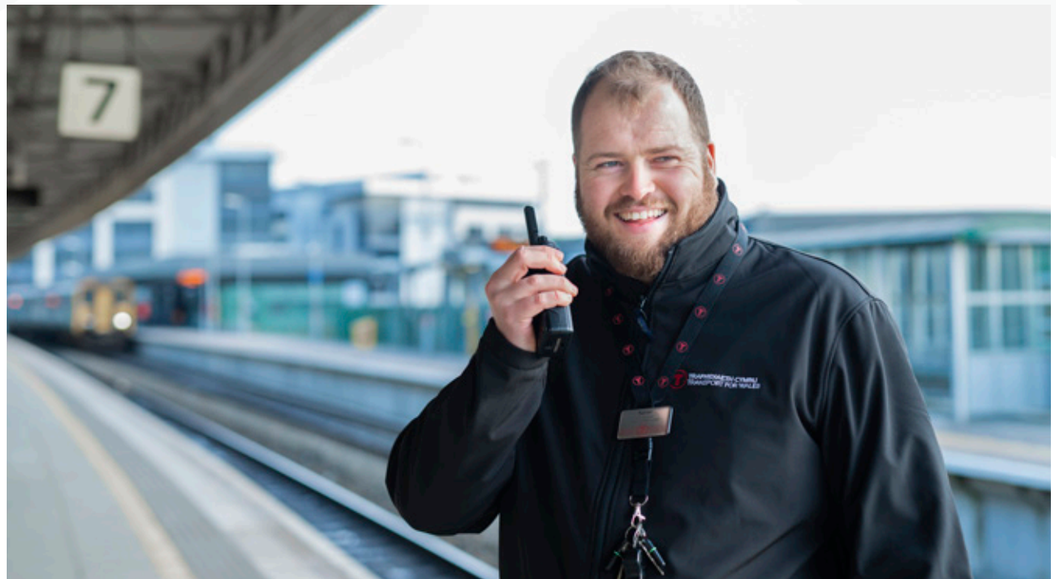


Figure 6 Integrated Metros in Bristol, Swansea Bay & CCR (South Wales Metro)



Policy Context

The ten local authorities in South East Wales have come to together to form the Cardiff Capital Region[xviii] with an intent to support sustainable economic development across the whole region. In doing so the need to develop skills, support innovation and implement improved physical and digital infrastructure is of paramount importance. In the face of a global pandemic and the climate emergency, now is the time to be clear on priorities across the region.

This paper sets out the priorities for investment in strategic passenger rail services and infrastructure over the next 10-15 years. This is important as rail services will provide the backbone of an integrated public transport network across the region and enable complementary measures in respect of integrated bus services, active travel and transit-oriented development (TOD).

These proposals augment those already in development via CCR, Welsh Government (WG) and Transport for Wales (TfW). These include the current WG work being delivered by TfW to implement the £740M transformation of the core valley lines with more and faster electrified services, which is due to be completed by 2023/4; as well as the CCRs Metro Plus Programme[xix], Metro Central and the Metro Enhancement Framework, which is bringing forward a range of tactical measures across the region to improve accessibility of public transport.

Welsh Government Policy

In developing its position on strategic rail priorities, the CCR is also reflecting both broader WG policy and specific transport proposals as set out in WG policy documents and supporting statements. These include:

- **Prosperity for All: The National Strategy**[xx]
- **Well-being of Future Generations (Wales) Act 2015**[xxi]
- **National Development Framework**[xxii]
- **Welsh Government Low Carbon Plan**[xxiii] **& Air Quality Plan**[xxiv]
- **Environment (Wales) Act 2016**[xxv]
- **Policy Statement: Accessible and Inclusive Public Transport Objectives 2017**
- **Wales Transport Strategy**[xxvi] **(for consultation – see below)**
- **Welsh Government, Independent Review of Road User Charging**[xxvii]

More specifically, Welsh Government has also been developing its vision and priorities for rail through a number of documents and statements; these complement similar statements from the South East Wales Transport Commission, the regions local authorities and the Cardiff Capital Region. Collectively, these include:

- **2018, The Case for Investment and supporting Programme Strategic Outline Cases (PSOCs)**[xxviii]

  This identified over **£2Bn transport user benefits** that could be realised across Wales with a commensurate capital investment programme; this figure would be higher if the full range of schemes Welsh Government has in development, and Wider Economic Benefits, are considered.

- **2019, A Railway for Wales**[xxix] [xxx]

  This sets out the case for devolution of rail powers, current plans, wider well-being considerations and ambitions for future rail development & innovation across Wales. This was supported by a statement setting out the Welsh Government's key service and journey time aspirations which included extensions of the south Wales Metro and the need to deliver at least 4tph for urban Metro services

- **The findings of the South East Wales Transport Commission (SEWTC)**[xxxi]

  This works sets out the importance of significant further investment along the South Wales Main Line (SWML) corridor (via more capacity additional services and stations) to provide the backbone of an integrated public transport network across the whole of South Wales

- **Further formal scheme and busines case development work undertaken by TfW, WG, and/or local authorities related to projects like Ebbw Vale frequency enhancement, Maesteg frequency and Cardiff NW Corridor/Cardiff Crossrail**[xxxii]

- **Network Rail has also been developing Strategic Outline Cases (SOCs) under guidance from the Department for Transport (DfT) for schemes including: Relief Line Upgrade and Swansea Cardiff journey times. Whilst welcome, these fall some way short of the Welsh Government's strategic ambition for the rail network in Wales.**

- **October 2020 Rail Enhancement Priorities**[xxxiii]

  To succinctly bring together all the emerging strategic priorities for rail enhancements across Wales, WG produced its Rail Enhancement Priorities. In the CCR this re-stated the need for a major upgrade to the SWML, measures on the Ebbw Valley, Marches and Maesteg Lines and schemes like NW Corridor/ Cardiff Crossrail

Despite the limitations of the devolution settlement in respect of rail powers and funding, WG has nonetheless, via TfW, progressed the next substantive phase of the South Wales Metro. This will deliver significant benefits as a result of the current contracted £740M Core Valley Line (CVL) transformation[xxxiv] and provides the foundation for the proposals set out here.

Wales Transport Strategy

The Wales Transport Strategy[xxxv], whilst still in development, sets out a vision for transport which will be reflected in proposals for the CCR.

An effective, affordable and accessible transport system that is good for the economy, good for individuals and communities, good for the environment and good for Wales.

The Wales Transport Strategy also sets out a "transport planning hierarchy" which gives priority to meeting the demand for travel by walking, cycling and public transport ahead of private motor vehicles.

The WTS sets out the focus of the transport investment hierarchy *Figure 7* will be to:

- **Reduce the need to travel unsustainably (or at all), by adopting measures and policies that bring services closer to people**
- **Widen and promote more sustainable travel choices**
- **Make better use of the existing transport network, ensuring new transport infrastructure is planned alongside other infrastructure so that people and their communities are properly connected.**

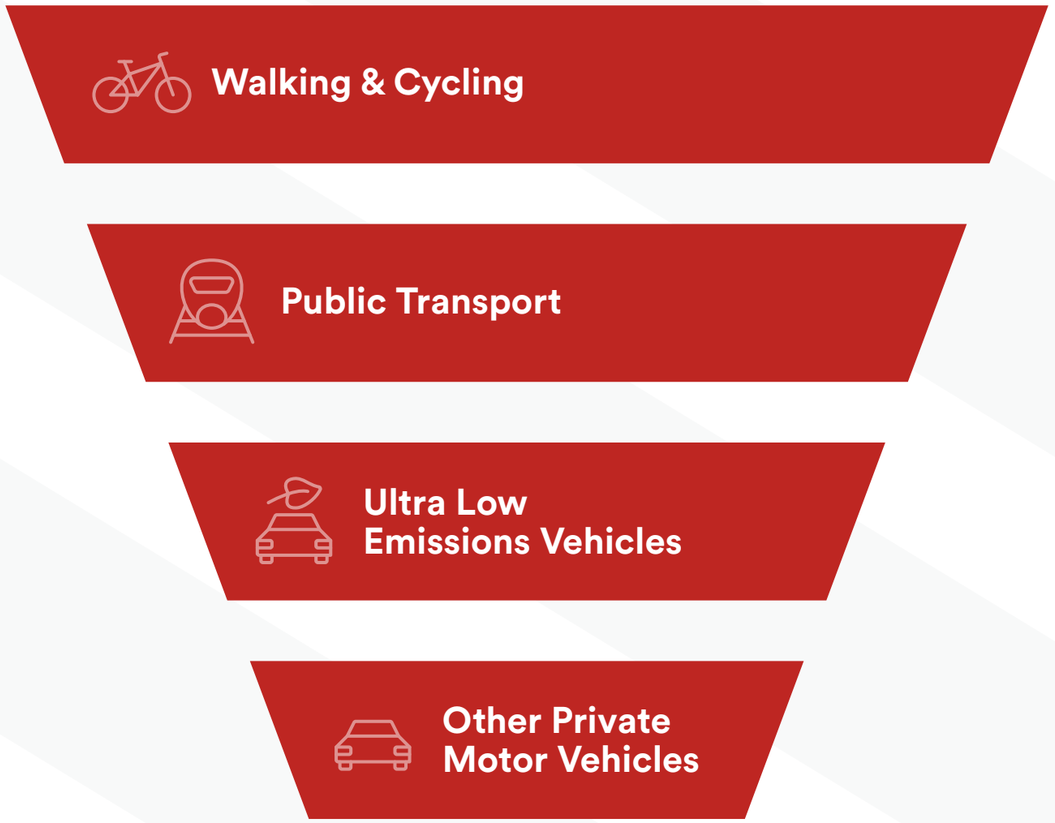


Figure 7 Wales Transport Strategy - Transport Hierarchy

Cardiff Capital Region

The importance of enhanced transport connectivity has been highlighted by the Cardiff Capital Region's Economic Growth Partnership in its "Industrial and Economic Growth Plan"[xxxvi] which emphasised that connectivity is critical – both digital and physical:

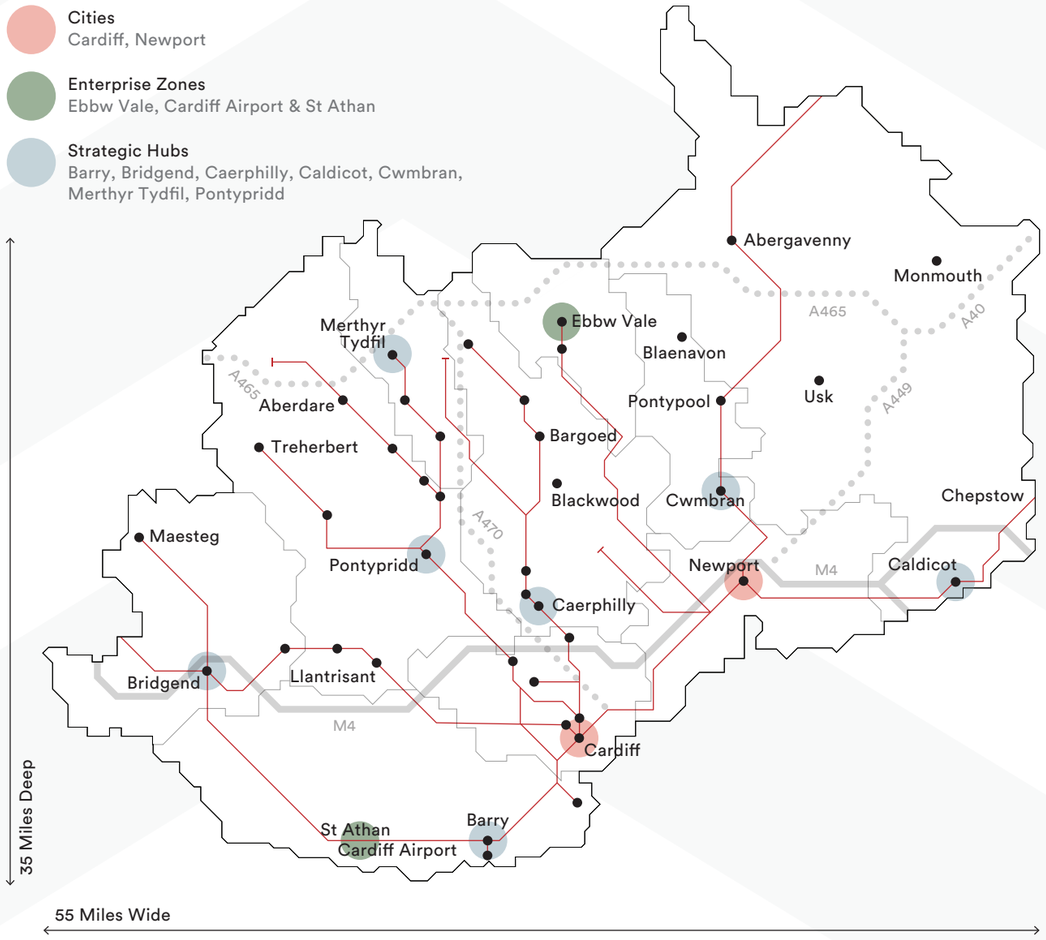


Figure 8 CCR Strategic Hubs & Opportunity Areas (CCR Industrial & Economic Growth Plan)

"The region needs a reliable infrastructure that connects the region, both within and wider afield, to boost productivity and prosperity. The current Metro plans are a significant step in this direction, and we will bring forward further proposals to maximise and unlock future potential offered by its development. We will ensure that we have a road, rail, air and digital infrastructure (fixed and mobile) to connect us to the world. Working with our partners we will (in respect of transport):

- ***Continue to work closely with the UK and Welsh Governments to further develop, enhance and implement the transport network to improve links within the region, reduce congestion and connect people***
- ***Embrace the Metro as a backbone to connecting CCR and shaping places on its networks***
- ***Develop a series of strategic employment spaces across the region to meet the needs of businesses***
- ***Develop proposals for energy efficient and accessible housing***
- ***Utilities networks – ensure, for example, we are ready for the future of electric and/or hydrogen vehicles.***

A region wide strategic focus Figure 8 will enable key towns across the region to be connected ensuring that the growth of the economy is balanced and inclusive."

UK Government "Levelling Up"

It is welcome that the UK Government is now exploring the opportunity to "level up" rail investment across the UK; it should also be recognised that the ultimate success of the Cardiff Capital Region City Deal and the key role of Metro within it, acknowledges the relationship between economic development and transport connectivity.

The recently announced UK Government, Union Connectivity Review[xxxvii] also presents an opportunity to address some of the issues that still constrain rail services in the Cardiff Capital Region. The CCR would welcome an opportunity to contribute to the work of Sir Peter Hendy who is leading the review for the UK Government.

The CCR also supports Welsh Government's view that genuine 'Levelling up' cannot simply mean a sprinkling of new, ad hoc rail projects decided in Whitehall, it has to be part of a strategic approach to promoting growth in all parts of the UK. Neither can it just be about equality of access – merely the ability to 'bid in' to new funding sources - it must be about outcomes and a genuine attempt to narrow the real-world gap in terms of rail infrastructure investment between Wales and the rest of the UK. This requires a degree of positive discrimination to counter the inbuilt advantages of areas like the Southeast of England. 'Levelling up' has to be something which meaningfully involves devolved governments in the design and governance of its approach.

This is even more important given the scale and potential economic impact of rail schemes being developed elsewhere in the UK (especially HS2) which has the potential to negatively impact the Welsh economy without further transport interventions.

High Speed 2 and UK Government Rail Investment in Wales

A number of Welsh Government reports, papers and statements[xxxviii] have found that there are issues related to the devolution settlement as it impacts rail infrastructure investment in Wales. The data is clear, Wales' rail network has been significantly and systematically, underfunded in terms of enhancement vs the network elsewhere in the UK for decades. WG have estimated an underspend for the period 2001-2029 of the order of £3Bn.

This is important, as enhancements improve the capability, capacity, reliability of the rail network. So, the limited share of such investment in Wales, over a prolonged period, has led to relatively less attractive services, attracting fewer passengers leading to lower modal share and higher subsidies

vs the rest of the UK. *This is different from the Operations, Maintenance and Renewal Spend (OMR) which is about maintaining the network's current capability and reliability.*

One of the implications of the lopsided devolution settlement is that HS2 (which does deliver much needed rail capacity for England) is a project that in effect is partly "funded by Welsh taxpayers" but as set out in the DfT's own analysis has significant disbenefits[xxxix] for South Wales. Whilst the UK economy is predicted to receive a £15Bn[xl] benefit, South Wales' GDP will lose an estimated £200M a year; there are similar negative impacts for SW England with Bristol losing £100M pa, and Gloucester, Bath and NE Somerset another £100M.

The CCR will work constructively with UK Government, but is fully supportive of WG efforts to achieve a fully and fairly devolved settlement for the funding and discharge of powers over rail infrastructure and enhancements.

Economic Context

It is essential that the Region's connectivity is enhanced, both internally and externally to key UK and international centres. This will improve access to employment for all of the communities within south-east Wales, whilst allowing the seamless and efficient flow of people and goods.

These aspirations are reflected in the Cardiff Capital Region City Deal's objectives which are to create a local economy that is Connected, Competitive and Resilient. It published three reports setting out further details of these themes and which provide context for the emerging rail priorities:

- **State of the Region Part 1: Connected**[xli]
- **State of the Region Part 2: Competitive**[xlii]
- **State of the Region Part 3: Resilient**[xliii]

Some of the key economic and demographic data for the region have been published in complementary papers; a brief summary is set out below. It should be noted, that aside from presenting metrics at local authority level, it can also be helpful to use datasets based at a regional level, or at a more granular level using Lower or Middle, Super Output Area (LSOA, MSOA). The reality is that there are a range of different issues, challenges and opportunities across the Cardiff Capital Region as well as differences in some measures even within individual local authorities.

Population

In respect of population[xliv] the combined 2019 mid-year estimate for SE Wales was 1.54M, with Cardiff by far the largest at 364,000; RCT is the next largest on 241,000; Blaenau Gwent is the smallest at 70,000. The ONS also identified (based on 2011 census data) the population of the Cardiff Built Up Area (BUA includes parts of VoG, Caerphilly and RCT) at 447,000 with a density of 43 people per hectare[xlv] making it one of the most densely populated BUAs in the UK. The same is also true of large parts of urban south East Wales as shown in *Table 3*. Understanding the demographics and especially density and extent of built-up areas, is important as they can indicate which modes and services maybe most appropriate.

Table 3: **Selected ONS BUA population (2011 Census)**

Built Up Area (ONS 2011)	BUA Population *in thousands*	BUA Density *persons per hectare – pph*
Cardiff (inc urban Pontypridd, Caerphilly & Penarth)	447	44
Newport (inc urban Cwmbran & Pontypool)	306	36
Tonypandy	62	49
Bridgend	58	30
Barry	54	38
Merthyr	44	38
Aberdare	31	39
Swansea (inc Neath)	300	34
Greater Manchester	2,500	41
Liverpool	864	43
Tyneside	774	43
Nottingham	729	42
Bristol	617	43

2014 based unitary authority population projections (2019, 2029, 2039)

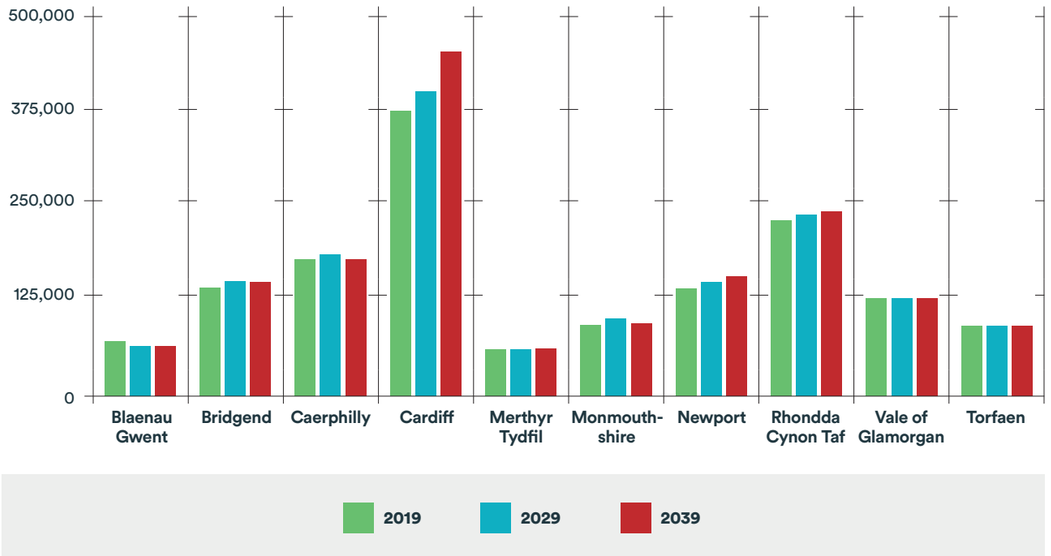
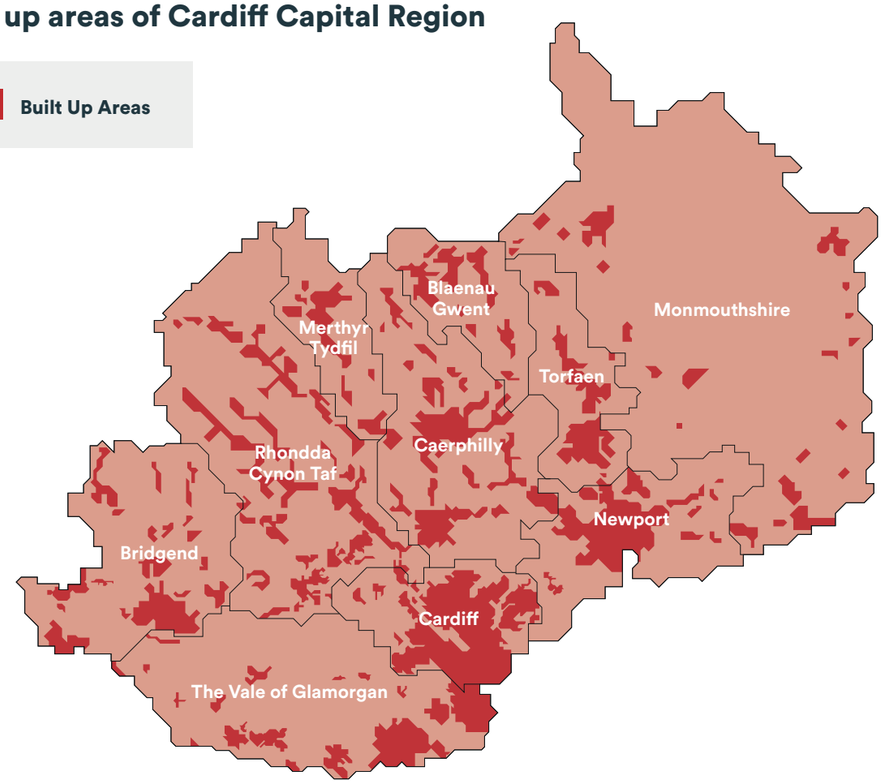


Figure 9 Estimated and projected populations for Local Authorities in CCR (2014 based)

Built up areas of Cardiff Capital Region



Population density (persons per square kilometre) (mid 2017)

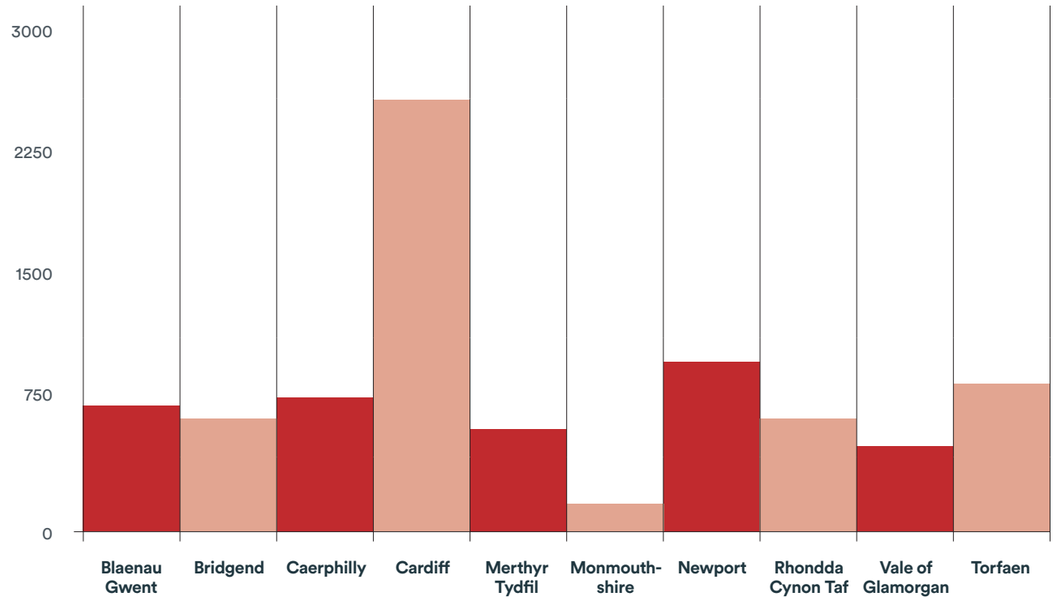


Figure 10 Urban areas and local authority population density (different from BUA to the left)

Economic

The regional GVA[xlvi] in 2018 of SE Wales was 77% of the UK average. Whilst commuting figures distort local authority GVA numbers, Cardiff was highest on 113% with Blaenau Gwent the lowest on 46%. It should be noted that, GVA & GDP tend to become less useful at scales smaller than functional economic areas.

Perhaps more useful, the figures for Gross Disposable Household income[xlvii] shows that the wider region is 80% of the UK average; Monmouthshire being the highest at 102%, followed by the Vale of Glamorgan at 92%; Cardiff was about the same as Newport on 81% with Blaenau Gwent the lowest on 67%. Weekly wages are highest in the region[xlviii] in VoG, Monmouthshire and Torfaen.

Cardiff, with 39, has more Lower Super Output Areas (LSOA)[xlix] in the top 10% of the Welsh Index of Multiple Deprivation (WIMD) than any other local authority in Wales[l], the next nearest is RCT on 27, then Newport with 23; with Blaenau Gwent and Bridgend on 6.

Commuting & Mode Share

The scale of movement within the region is also complex, with by the far the most movements to/ from and within, Cardiff.

Table 4: **Stats Wales Local Authority Commuting Data 2018**

	Total number of working residents in the area	Total number of people working in the area	Number of people living and working within the same area	Number of people commuting out of the area	Number of people commuting into the area
Bridgend	**66,200**	**59,300**	**43,500**	**22,700**	**15,700**
Vale of Glamorgan	**61,600**	**40,700**	**30,000**	**31,600**	**10,700**
Cardiff	**193,400**	**260,200**	**161,700**	**31,700**	**98,600**
Rhondda Cynon Taf	**103,200**	**71,800**	**53,200**	**49,900**	**18,600**
Caerphilly	**80,700**	**58,400**	**40,200**	**40,600**	**18,200**
Blaenau Gwent	**30,000**	**18,200**	**13,300**	**16,700**	**4,900**
Torfaen	**40,800**	**35,400**	**21,300**	**19,500**	**14,100**
Monmouthshire	**44,300**	**45,600**	**26,700**	**17,700**	**18,900**
Newport	**70,700**	**78,100**	**42,800**	**27,900**	**35,300**
Merthyr Tydfil	**26,400**	**25,200**	**14,600**	**11,800**	**10,600**
Total	**717,300**	**693,100**	**660,300**	**57,000**	**32,700**

However, there is much cross-region movement. For example, as per Stats Wales data[li]: overall there are a total of 717,000 working residents in the CCR of which 660,000 live and work within the region with 57,000 commuting out (includes approximately 25,000 to Bristol and SW England and 12,000 to Swansea and West Wales) and 33,000 commuting in. This is a net out-commute of 24,000 leaving an overall working population in the region is 693,000; with 260,000 in Cardiff and 433,000 elsewhere in region.

The visualisation of ONS 2011 data *Figure 11* also illustrates the patterns which demonstrate the very different mobility challenges across the region.

In terms of mode share, the region is still over reliant on car use, which for commuting makes up over 80% of journeys.

Commuting flows (net origin-destination) (2011)

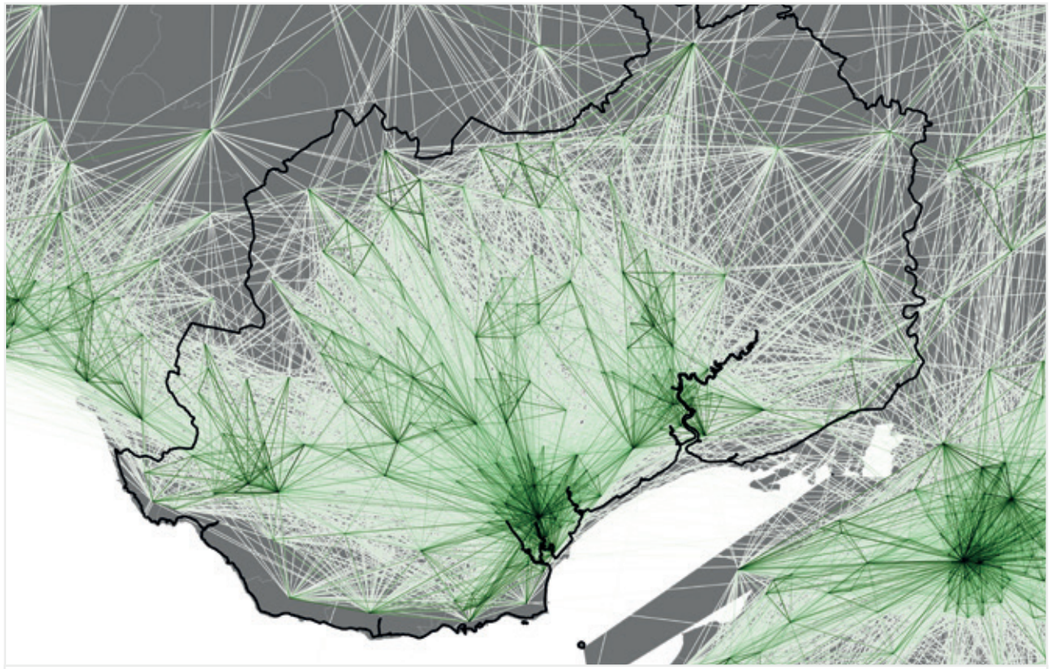


Figure 11 Commuting Patterns (Source: ONS: Census of population, 2011)

Method of travel to work, all usual residents aged 16 to 74 (2011)

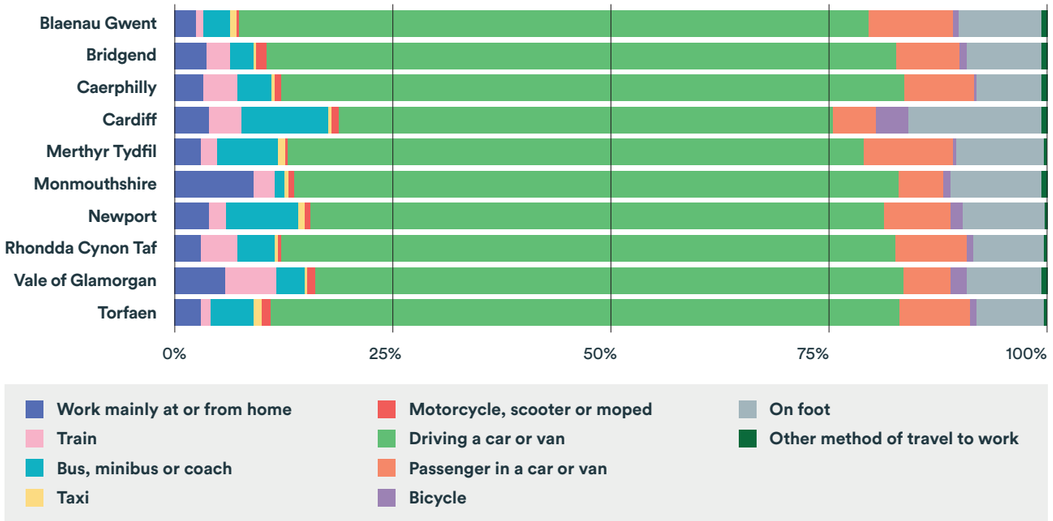
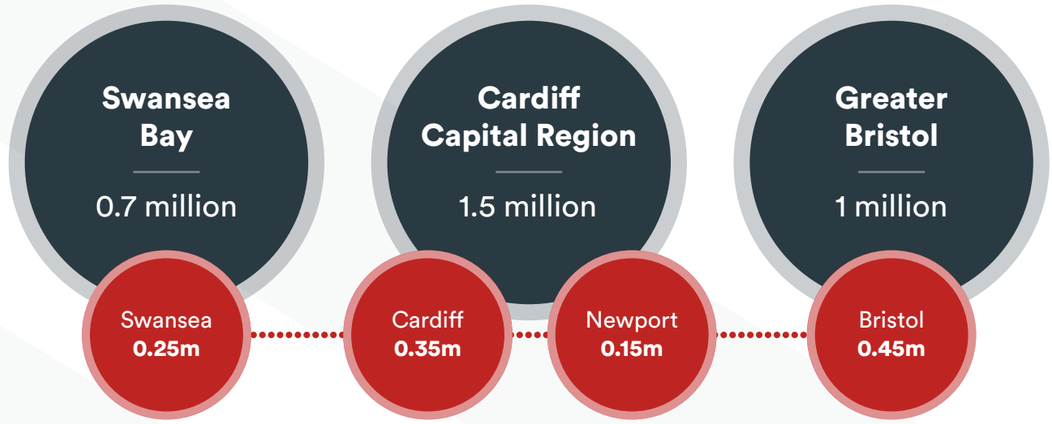


Figure 12 from CCR Report – Mode Share (2011)

Relationship with South West England and Swansea Bay

Over 3M people live between Swindon and Swansea *Figure 13* including the cities and city regions of Bristol, Cardiff and Newport; a combined urban area that has major agglomeration potential across multiple industries including financial & professional services, semiconductors, biotechnology, and TV/Film production.

Figure 13 GWML/SWML serves over 3M from Bristol to Swansea



This potential was set out in 2018 by the Office of the Secretary of State for Wales[liii]. This ambition though is dependent on enhancing rail capacity and reducing journey times between the Swansea Bay City Region, the Cardiff Capital City Region, Bristol, London and Heathrow.

The South Wales and SW England regions have more than 10 universities, and a £107 billion economy consisting of 156,000 businesses, including growing financial and professional services, advanced engineering, creative and digital media sectors. The area also benefits from a unique and varied natural environment.

The role of Wales' leading higher education institutions and their impact on the national economy should also be noted; Cardiff University for example is one of the UK's leading research universities being ranked in the top five in the last formal research excellence assessment in 2014[liii]. Its role was crucial in the recent Cardiff Capital Region[liv] City Deal agreement to develop a compound semiconductor cluster[lv] in the region.

A report, by Metro Dynamics[lvi], set out a strong evidence base for a cross-border partnership, presenting recommendations that would drive improved infrastructure, investment, internationalisation and inclusive growth across the South West England and South Wales.

One of the priorities of that report was, integrating road and rail improvements to enhance connectivity. This priority has been refined into a set of connectivity objectives in the Spring 2020 Western Gateway Prospectus[lvii]. In summer 2020 the Western Gateway Sub National Transport body published its draft strategic transport plan for SW England[lviii].

Transport Context

In developing a policy foundation for further rail scheme development there are a number of strategic issues that need to be considered, and which have been previously set out and/or documented in earlier studies and reports.

These include, but are not limited to:

- **Road congestion, especially on the A470, M4 and both urban Newport and Cardiff**
- **Poor east-west public transport connectivity, especially cross valley**
- **Many current journeys across the region are poorly served by public transport**
- **Limited bus/rail integration**
- **Population growth in Cardiff and Newport**
- **Car-based development across the region resulting from poor transport/ land use choices**
- **Air quality and health issues resulting from car/vehicle pollution and road traffic accidents**
- **Limited Active Travel infrastructure.**

Now, the "Climate Emergency" and the cancellation of the M4 Relief Road, infers a need to develop more public transport capacity in South East Wales. With Covid and a potential change to working patterns, a more holistic review of travel demand will also be required to inform this programme. TfW's Transport Modelling capability, the emerging Wales Transport Strategy and Welsh Government Transport Appraisal Guidelines (WelTAG) will provide the framework for all scheme and business case development. In doing so, we also have to develop the means to better identify and quantify the Wider Economic Benefits as part of the Strategic Case.

Key Rail Issues

As context for the choices, the following represents a summary of the key rail issues that have been identified through the body of work undertaken in South Wales in the last few years:

- **Rail journey times to/from Swansea/ west Wales to Cardiff and Bristol/ London are poor.**

  Much of the South Wales main line (SWML) is a 90-mph railway or less vs 125 mph east of Bristol Parkway *Figure 14*; this constrains demand & encourages more car usage on already congested roads, with consequential air quality impacts.

- **Low service frequency and overcrowding from Cardiff to Bristol Temple Meads – 2tph. This is major constraint on rail use and in stark contrast to the provision of 6tph between Leeds and Manchester, the demand for which NR estimated in their 2043 route studies is only marginally higher than the demand between Cardiff and Bristol**

- **Capacity constraints on the Ebbw Vale and Marches lines limits the operation of more local services in/around Newport; other key rail bottlenecks include Ebbw Junction, Cardiff West junction, the two-track main line between Cardiff and Bridgend and the Maesteg branch**

- **Much of east Cardiff and Newport, the areas around Blackwood/Pontllanfraith, west Cwmbran and Church Village are poorly served by rail and integrated regional public transport, contributing to more car use, congestion, and air quality issues.**

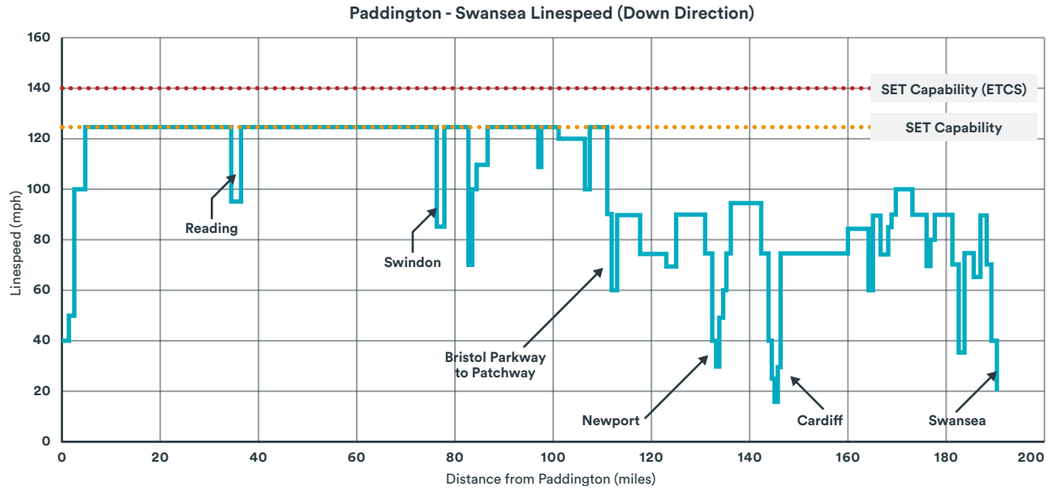


Figure 14 Line speeds on GWML between Paddington and Swansea (source ARUP)

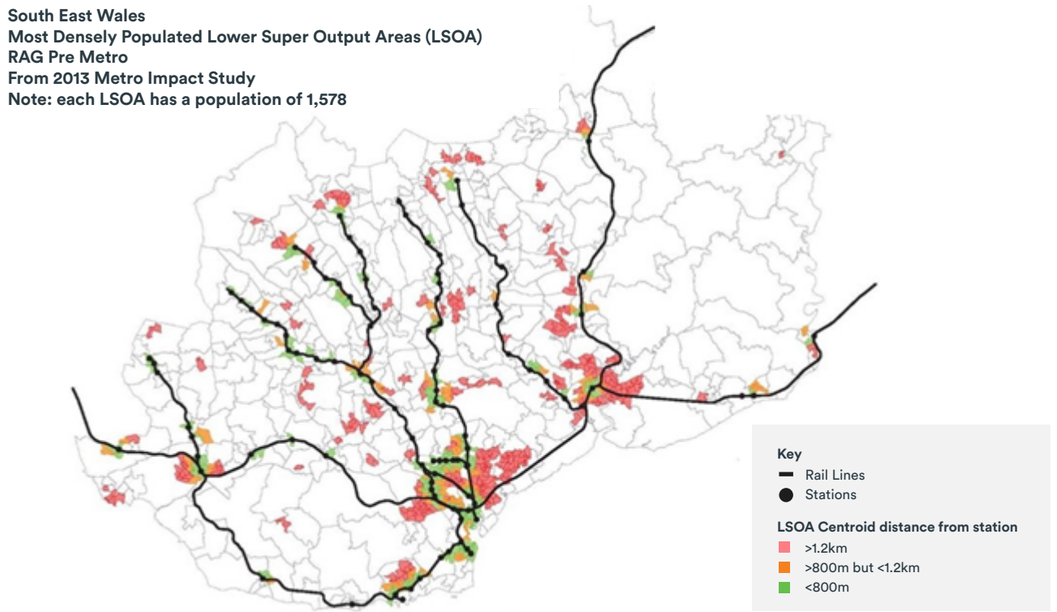


Figure 15 Population Density Vs Access to Rail Service from Metro Impact Study 2013[lix]

Broader Inter Regional Requirements

Like Northern Powerhouse Rail, there is a need to deliver strategic enhancements to the rail network and services between the key centres of Swindon, Bath, Bristol, Gloucester, Cardiff, Newport and Swansea Bay as well as wider connectivity to/from South Wales, North Wales, South West England and the English Midlands.

However, current rail infrastructure and services are not commensurate with the emerging ambition for the region and are limited in respect of both capacity and speed.

For example, the 84-mile rail journey from Swansea to Bristol Temple Meads takes over two hours and requires interchange at Cardiff. In comparison the Northern Powerhouse is already delivering (via NR) the £3 billion Trans Pennine upgrade[lx] between Leeds and Manchester with potentially the multi-billion Northern Powerhouse Rail[lxi] [lxii] to follow, as well as benefiting from improved connectivity as a result of HS2. Cardiff is also the worst rail connected major city *Figure 16* in the UK[lxiii] in respect of direct services to other major UK cities.

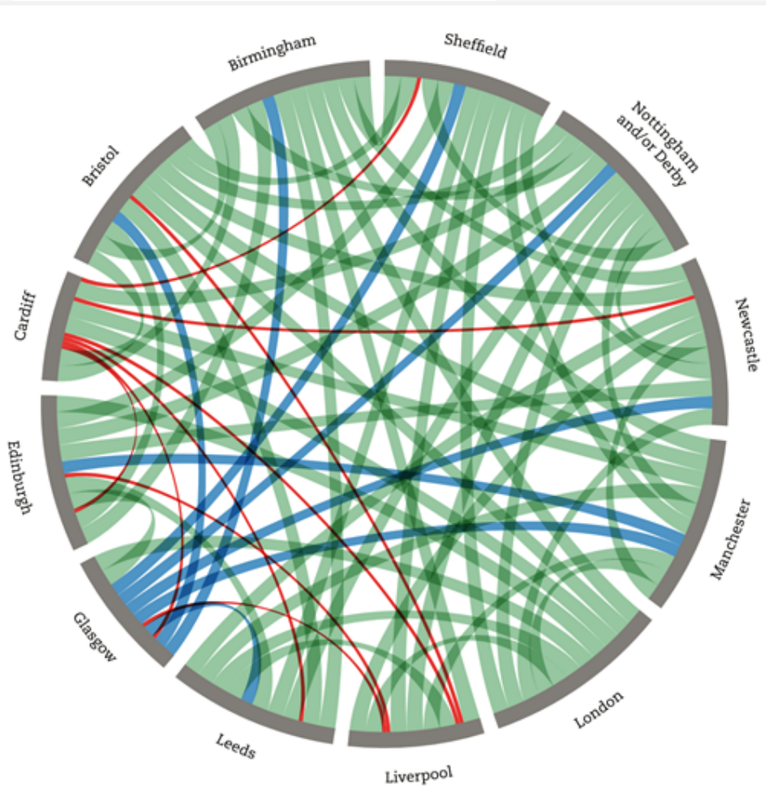


Figure 16 Cardiff rail connectivity vs major UK cities (Greengauge 21, Beyond HS2, May 2018)

South East Wales Transport Commission

Earlier in 2020 Lord Burns (who Chaired the South East Wales Transport Commission) published his emerging conclusions[lxiv] and in November 2020 he published his final report[lxv].

There is significant overlap between his findings and the proposals which both the Welsh Government and the Cardiff Capital Region wishes to pursue. It is worth restating some of the key finding from Lord Burns' work:

Congestion on the M4 is largely a peak-hours problem, predominantly associated with commuting.

The M4 is largely used for regional, medium-distance travel, with many trips starting or ending in the cities of Cardiff, Newport and Bristol.

Many people do not have good transport alternatives to the motorway.

All of the rail, bus and active travel networks offer insufficient services and are poorly integrated.

Technology is unlikely to ameliorate the congestion problem.

Land use decisions with respect to homes, offices and retail parks have contributed to congestion and, on the current trajectory, this looks set to continue.

If we are to alleviate congestion, we need to create attractive and viable alternatives for people. Until these exist, it is very difficult to solve the problem sustainably.

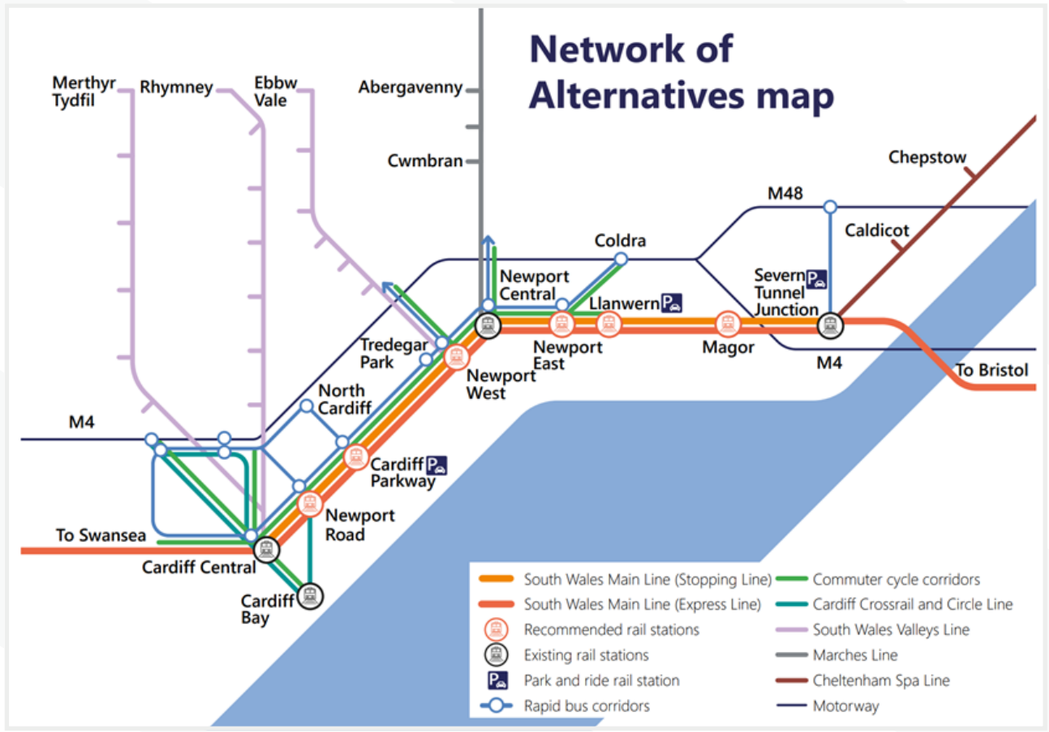


Figure 17 Network of Alternatives from SEWTC Final Report, November 2020

The COVID-19 epidemic has radically changed the situation – the question is for how long.

In the long term, a substantive and sustained increase in remote working could have a meaningful impact on reducing traffic. However, our view remains that in order to function efficiently, the region requires additional, non-car transport options

Key facets of a response set out by the commission that complement CCR's emerging proposals, include:

- **The development of a public transport grid across South East Wales with a mix of integrated express rail and frequent local rail and bus services, which is consistent with the commission's "network of alternatives"** *Figure 17* **The primary component is a major upgrade of the SWML to support a mix of intercity express and local commuter trains serving new stations between Cardiff and Severn Tunnel.**
  This is very welcome and re-states ambitions previously presented in part through SEWTA[lxvi], as comprehensively set out in the Metro Impact Study in 2013 and restated by WG in the "The Case for Investment" in 2018. Then as now, the primary challenge will be funding and delivery, especially given non-devolved status of the rail network in Wales (aside from the CVL)
- **Measures to fully integrate active travel, rail and bus services (including new WG legislation), fares, ticketing and customer information, so that the passenger sees a single network**
- **Demand management measures, including consideration of road and workplace parking charging (to more fairly apportion the significant external costs of car use: carbon emissions, road accidents, air quality and urban sprawl based induced demand)**
- **Planning policy and especially land use decisions to encourage and incentivise more transit-oriented development and to encourage more mixed-use development in our town and city centres and around our public transport network.**

Regional Transport Authority (RTA) and Metro Enhancement Framework

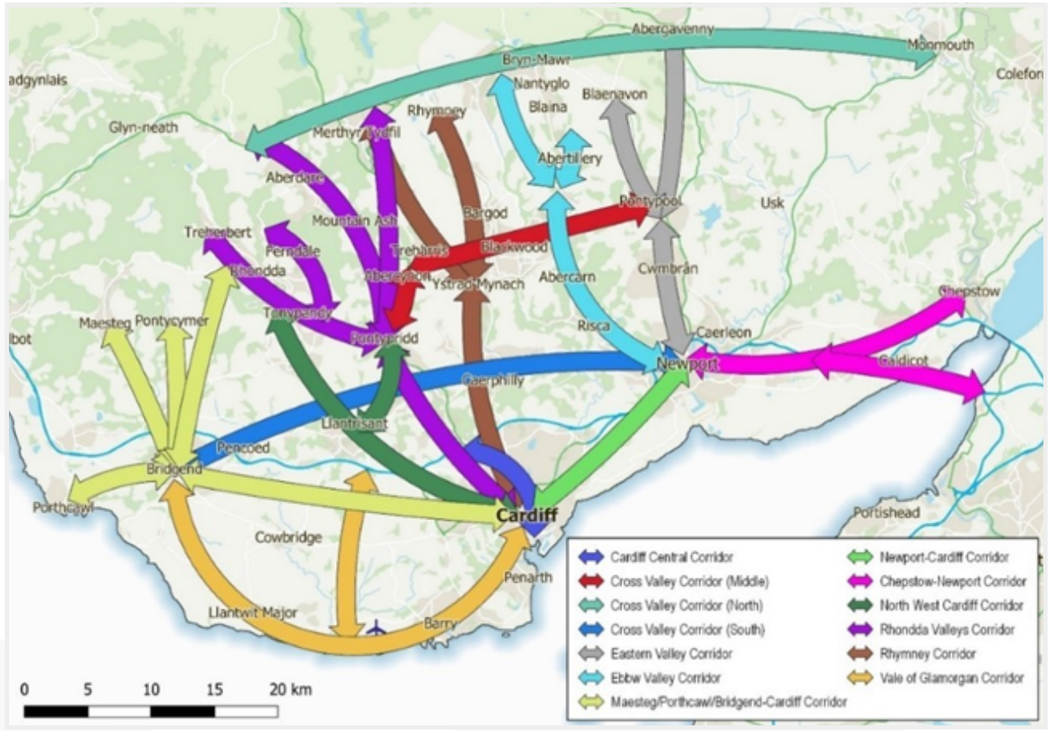
As part of the City Deal arrangements the region established a nascent Regional Transport Authority (RTA) which has overseen the development of the Metro Plus package of measures and schemes such as Metro Central[lxvii].

In 2019, WG and the region via its nascent RTA, agreed a methodology, The Metro Enhancement Framework, to appraise potential locally focussed interventions from across the region. This is based on 13 transport corridors *Figure 18* across the region.

Whilst this work provides a comprehensive foundation for future local scheme development for much of the region, there are key areas that require additional analysis. These are:

- **Urban movement within Cardiff, noting that the requirements related to Cardiff have been captured and presented by the local authority in its Transport White Paper[lxviii]**
- **Urban Movement within Newport**
- **Cross valley movement**

Figure 18 MEF Corridors



- **The impact of the proposals set out by the SEWTC**
- **A high-level strategic assessment of the key issues and opportunities when looked at a regional level;** ***this paper provides that framework in respect of rail priorities***
- **An assessment of Wider Economic Benefits (WEB) and regeneration that could be enabled – with a focus on major developments and stations;** ***this requires further discussion with regional partners and Welsh Government.***

All of the aspirations set out in this paper and schemes developed through the MEF process, will be further developed via TfW's emerging Metro scheme and business case development programmes using WelTAG and informed by the South East Wales Transport Model (SEWTM). Overall Strategic Programme Case are being developed by TfW for both the CCR and the Cardiff Core Metro, to help position and prioritise all the emerging transport proposals (rail, bus and active travel). The RTA and key local authorities are fully engaged in their development.

Transport Planning and Choices

When developing schemes and busines cases, transport planners have to weigh up and assess a wide range of costs and benefits and reflect the needs of current and potential passengers, as well as the needs of operators and governments. Contributory factors include congestion, demand, capacity, Persons of Reduce Mobility (PRM) compliance, station design, integration, service frequency and costs – both capital and revenue.

There are few “right answers”, only choices with implications, based upon priorities.

For example:

- **Services that aim to maximise coverage, especially where demand is low, can add to opex per passenger**
- **Services that maximise ridership & demand typically result in lower cost per passenger & more efficient operations, but may not serve everyone at all times**
- **Service with “turn up and go” frequency, especially where local catchment is high can increase demand and reduce opex per passenger; however, in areas of lower total catchment or off peak, can add to opex and increase costs per passenger**
- **Services with low and subsided fares can attract more demand but make incremental service expansion (that may be needed to satisfy the increased demand) more costly**
- **Segregated operations (via rail, bus lanes etc) which may have high capex, enable faster more reliable and attractive services (so higher demand and fares) with lower opex.**

Choices always have to be made and transport planners do their best to develop schemes and business cases that deliver the most value to most people; they also have to assess a range of alternative measures to deliver the same outputs. This is what WelTAG tries to achieve.

Perhaps the primary consideration to acknowledge is that the region needs to develop a transport network and services that can attract some of the approximately 80% of people who chose to use their cars. There is clearly a large untapped market for public transport, so the region needs a better product designed more around what the 80% want and perhaps less so the 15% already using public transport.

Demographics and Impact on Transit Choices

It is generally acknowledged that any transit system works most efficiently and can offer more attractive services, when it is segregated from other modes, especially cars and to a lesser extent, pedestrians and cyclists. So dedicated rail, heavy rail (HR) or light rail (LR), and/or Bus Rapid Transit (BRT) on segregated alignments is most optimal. Operating in “mixed traffic” (esp. cars) impacts journey times and reliability. This adds costs through having to operate more vehicles (so more staff and opex) to maintain frequency of services, which are also less reliable and slower supressing demand and fare revenues. In short, the ability to operate faster on segregated alignments reduces opex and increases demand.

Academic data (examples[lxix lxx lxxi]) also indicates that fixed segregated public transit, typically needs a minimum population of 200,000, a density 22 people per hectare (pph), and a planning system that encourages employment as well as residential development along transit corridors; especially within 800m of transit stops.

The combined Cardiff, Newport, Pontypridd, Merthyr, Urban area (using ONS BUA definitions) population is nearly 900,000; a total population comparable with Tyneside, Liverpool and with (certainly as regards Cardiff) a pph higher than many other places in the UK. This suggests that along any defined transit corridor, the built-up areas of Newport and Cardiff and the core valleys, can support fixed segregated systems. In fact, the physical geography of the South Wales valleys north of Cardiff and Newport and their dense population makes them perhaps one of the most suitable parts of the UK for fixed segregated public transport. In many cases the limiting factor is not the potential demand, but the capital costs required to deliver a “new system” or “segregation”. That is why relatively small investments that enable greater utilisation of existing infrastructure (see below) is so effective; this includes new links, new stations and measures to address bottlenecks.

In areas with sufficient density the choice of Bus, Bus Rapid Transit (BRT), Light Rail (LR), Heavy Rail (HR) is then in general terms,

determined by the local demand and long-term revenue and operating profile of the system, as well as the initial capital costs (which are often a barrier for fixed segregated systems – especially rail). The biggest component of operational costs relates to numbers of vehicles and staff required to move a fixed number of people. As an example, it is operationally more efficient to move 1000 people an hour between two points in 2 or 3 trains (of 300/400 people) or 4 Light Rail Vehicles (of 200~250 people) instead of 12 or 13 buses (of 70~80 people). At 100~200 an hour then perhaps 3 or 4 buses works better than one train, remembering that a frequency of 4 services an hour is generally regarded as the minimum required to deliver a "turn up and go" services able to attract most passengers.

So, broadly, the bigger the demand then fixed segregated rail (HR and LR) solutions are most efficient *Figure 19*, for lower demand then local bus services can be most efficient; segregated BRT sits in the middle. For much shorter journeys of up to 5km then Active Travel is best.

For example, the demographics and potential demand around the City and Coryton lines in Cardiff indicate that these could support rail services of at least 4tph (vs the 2tph now). There is also a role for segregated bus services and some comprehensive Bus Rapid Transit (BRT) across parts of urban Newport and Cardiff where rail capital costs for new build maybe prohibitive. Similarly, segregated bus can play a role across the urban valleys where redesigned bus networks can be developed to integrate with rail services. Outside the core urban areas, the opportunity is via development of and integration with local bus services. For areas of low density and more variable demand then Demand Responsive Transit (like Fflecsi[lxxii]) may be most suitable.

In all cases quantitative demand analysis through WelTAG will be required to inform decisions.

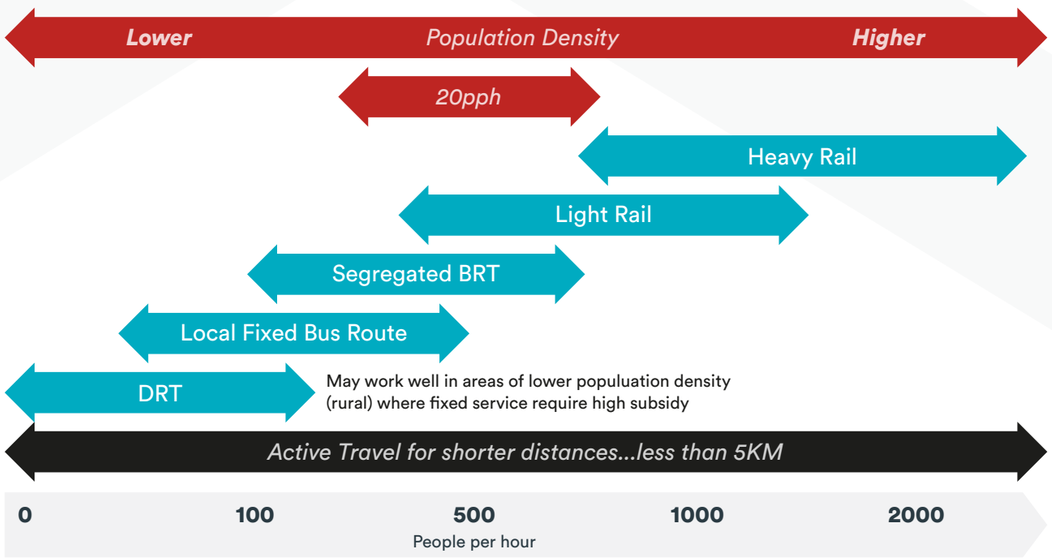
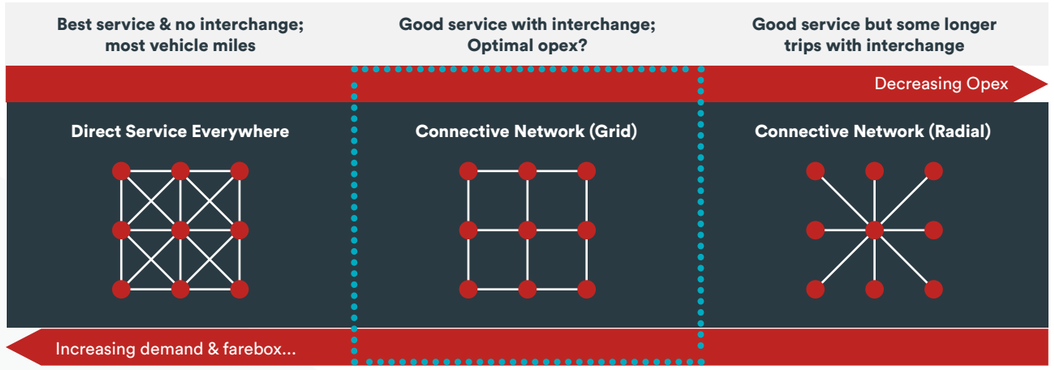


Figure 19 Illustration of most suitable of modes Vs demand and density

Figure 20 From Human Transit by Jarrett Walker, Grids vs Direct Services



Networks and Interchange

One of the legacies of the deregulation of the bus industry in the 1980s, is the fragmentation of public transport networks and operations. Outside London there is no sense of a single public transport system anywhere in the UK. This has implications, especially on operating costs, because each network operator is only concerned about the design, operation and costs of one network. There is often little or no regard for all the other operators – even when they share the same geography. This overall adds to opex whilst at the same time delivering a suboptimal service - esp. to the 80% who typically don't use public transport.

Evidence from other Regions show that there is an opportunity to develop a 'single integrated network'. This has implications for network design. Rather than each network trying to operate direct services to/from a single hub, we instead design an integrated "grid" of services. With higher quality interchanges and importantly faster services of sufficient frequency, it is possible to deliver more coverage and enhanced services levels at lower cost (from reduced vehicle miles) than a series of more fragmented, unconnected networks based around single hubs. This choice is constrained by needing to deliver the "best services" with the least opex. In the example in *Figure 20* it is the middle "network" grid (vs the direct services everywhere or the radial network) that is perhaps the optimal configuration. The EU "HiTrans" series of best practice guidelines, one of which focussed on networks[lxxiii], is a good source of insight as well as practitioners like Jarrett Walker[lxxiv].

In this context, the role of several proposed stations in the CCR is not to just provide local Origin/Destination demand, but also to provide an interchange between different rail and bus services to help deliver a much more efficient and attractive "grid" of services. The recent report from the South East Wales Transport Commission also emphasised the importance of integrated networks. The strategic function of the cross-valley link proposed should be viewed in this context and not just for supporting local trips. The challenges of designing and implementing integrated multi-modal networks is not to be underestimated. Careful consideration needs to be given to local conditions, market and passenger needs and done in a way that properly engages with passengers and transport operators. These are the kind of stark choices we are faced with if the objective to encourage 80% of current car users onto PT is to be achieved.

Making Better Use of Existing Rail Assets

There is a unique opportunity to make much better use of existing and underutilised rail infrastructure across the region. Even after the current contracted phase of Metro is delivered only 2tph are proposed for the Ebbw Valley line, City Line and Coryton Lines, 1tph for the Maesteg Lines and there are some freight only lines with no passenger services – most notably beyond Ystrad Mynach to Nelson/Treharris, the Machen freight line, the Ford site access and across Cardiff docks. There are also some key rail bottlenecks which impact the desire for more services – most notable are the Ebbw Valley junction with the SWML, Cardiff West (which is a constraint on more service to the VoG from east of Cardiff) and the two-track section of the SWML between Cardiff and Bridgend.

By enhancing and better utilising the various under-used rail lines and addressing the known bottlenecks there is an opportunity to deliver a high quality, high-capacity urban transit network across much of the region – some of these using the tram-train capability being developed for the Taff Vale Lines.

The introduction of tram-train LRVs *Figure 21* and their ability to operate on tighter radii, steeper elevations and to tramway standards, presents a range of new and/or reopening schemes that just would not be possible using traditional Heavy Rail (HR). The capital costs of such are also likely to be significantly lower than an equivalent "new build".

This is the kind of approach adopted in developing most of the UK's modern Light Rail (LR) systems – they were all predominantly based on the use of existing and underutilised rail infrastructure.

Transit Oriented Development

One of the major contributory factors to more car use and the induced demand for more road space, has been the development of homes, offices, shops, hospitals, etc in locations across the region which can only be accessed by car. Newport has been particularly badly affected as have many local town and high streets across the wider CCR.

Metro presents an opportunity to encourage and enable more jobs, leisure, educational and public services to be re-located away from car based (and often out of town) locations, to places with good public transport accessibility; especially our town and city centres - so called "Transit-Oriented Development" (TOD). These are key considerations in the new Wales Transport Strategy, which is in development, and the National Development Framework.

Whilst there is no single agreed definition of "TOD", some key features include:

- **Mixed use and higher density development around transport corridors and stations**
- **Aligning new housing, public services and employment sites with public transport**
- **Improving safety and quality of urban realm, especially streets**
- **Integration with active travel**
- **Integration with open/green spaces**
- **Community engagement and involvement**

Figure 21 City Link Light Rail Tram-train "Metro Vehicles"

This delivers real benefits:

- **With higher density it becomes easier and less costly to provide public services**
- **Local shops and retail have a higher local demand that can be accessed via active travel**
- **In many cases schemes for new housing can be linked to local and town centre regeneration projects and greening urban realm improvements**
- **TOD also means public transport investment becomes easier to justify because higher numbers of people can more easily access transit services (helping build the fare box and reduce the operational subsidies of new transit – bus or rail).**

Collectively, and more importantly TOD reduces our need to use and own cars – given the present danger of climate change this perhaps is the primary reason for us in Wales to embrace TOD. This intent has also been set out in the National Development Framework and will flow through into the regional Strategic Development Plans anticipated across Wales.

There are plenty of good international examples where holistic planning of transport and land use have been combined to reduce car dependency. Freiburg is one such European example[lxxv]; in the US Denver *Figure 22* is also looking to exploit development opportunities around its growing Metro network[lxxvi]. In the UK, The Urban Transport Group has also published advice and guidelines related to TOD[lxxvii]. This concept has also been explored through recent local events and publications; for example, "Metro and Me"[lxxviii] in 2018, and a TOD charrette organised by bodies including CCR, Design Commission for Wales (DCfW) and Cardiff University in 2019[lxxix].

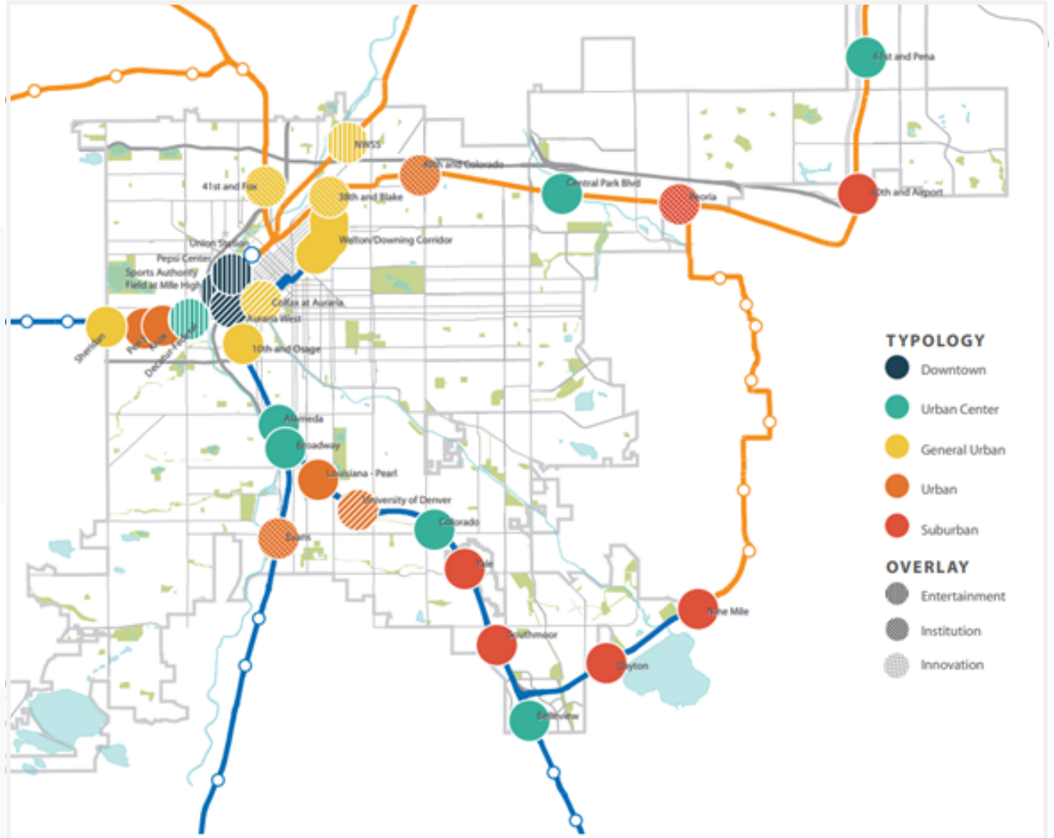
There are real opportunities in the region to apply TOD, for example, in Newport the UK Gov could work with WG to relocate the ONS and Patent Office to Newport City Centre (cf HMRC Hub and BBC in Cardiff). These facilities, even with a smaller footprint through more flexible working, would then be much easier to access using public transport from across the region, whilst at the same time helping to regenerate Newport City Centre.

There is also a need for a more coherent and strategic effort to develop and implement a wider range of station focussed economic development and regeneration initiatives right across the Cardiff Capital Region. These will complement the delivery and operation of the Metro by TfW and range from major property led schemes like Metro Central, Central Quay, Cardiff Parkway; city/town centre regeneration in Newport, Pontypridd, Bridgend and Merthyr to more locally focused and community-based interventions in places like Porth, Butetown and Maesteg. Post Covid there is also an opportunity to explore the development of more town/ community focussed shared workspaces right across the region – in a model originally championed by Indycube. The application of DCfW Placemaking principles[lxxx] would be appropriate for such schemes.

Post Covid & Flexible Working

Covid will clearly impact future transport planning. However, even with more local and home working, it is expected that post Covid there will still be a need for more public transport given the very high levels of pre-Covid car use (~80% commuting mode share).

The adoption of more flexible working presents an opportunity to reduce the "peakiness" of public transport demand.



STATION TYPOLOGY

- **Downtown** – Mixed use, highest density, tallest buildings, high pedestrian activity, transit hub, and historic areas
- **Urban Center** – Mixed use, high density, grid and alley block pattern, high pedestrian activity, and multi-modal
- **General Urban** – Multi-family residential, grid and alley block pattern, main streets , corner stores, and multi-modal
- **Urban** – Grid and alley block pattern, predominantly single family residential, main streets, corner stores, and multi-modal
- **Suburban** – Town centers, community open spaces and residential neighborhoods

Functional Overlays:

- **Innovation** – Allowing a wide range and diversity of TOD land uses, activities and building forms to accommodate new types of development such as advanced manufacturing, research and development, creative design studios, and more.
- **Institutional** – Academic campuses, medical and government centers with a significant amount of jobs
- **Entertainment** – Major destinations – typically evenings and weekends

Figure 22 From Denver's TOD Plan 2014

Converting the better allocation of work across most employees into a more even demand profile on transport systems, can help address one of the biggest issues facing transport operators and governments in supporting and subsidising public transport. That is the stark reality that transport services and infrastructure are typically designed to support demand that is generally in one direction for 2-3 hours, twice a day; often much of the rest of the time trains and buses are moving around with low loadings. The same applies to the road network with most congestion occurring in the morning and evening peaks.

Induced Demand and External Costs of Car Use

There is clearly more discussion to be undertaken before any form of equitable road user charging and/or other demand management measures, can be implemented across the region. However, these discussions are necessary if we are going to develop and deliver the transport infrastructure required to support the mode shift required and to help deliver our collective climate emergency obligations. This needs to be an informed debate and one which acknowledges the real issues and data to help make informed choices.

For example, academic evidence indicates that building more road space typically generates more traffic and that many of the costs of car use are external and not adequately appraised. The work of people like Todd Litman[lxxxi] and Jarrett Walker[lxxxii] and even the DfT's own analysis of induced demand[lxxxiii] demonstrate this phenomenon.

So, car users, have effectively been given a discount to drive as there are real external costs that have not been properly apportioned – maybe as much as 30%. This has resulted in sprawl with car-based housing and employment sites that generate an even greater demand for road space, damaging our urban realm and impacting air quality. The executive summary of Transport Costs and Benefits by the Victoria Transport Policy Institute is a good guide[lxxxiv].

Another external cost, and something society has become desensitised to, is that in the UK, there are about 5 deaths on average each day (1700 per year) on the UK's roads[lxxxv]; this is in addition to 24,000 serious injuries and 160,000 road traffic incidents. There are also significant air quality and health impacts that are only now being fully appreciated[lxxxvi] which leads to even more deaths – perhaps as many as 20,000 premature deaths each year. The phenomenon of volume car-based retail has also had a damaging impact of many town and community high streets across the region. This is on top of the carbon emissions resulting from car use[lxxxvii].

A "charge" provides a means to more fairly apportion the long-term external costs of car use to the user instead of the taxpayer. Any revenues secured can also be used to contribute to a major capital programme such as proposed here.

Priority Rail Enhancements for CCR

The schemes set out focus on the need to deliver more rail capacity, shorter journeys, more services, more stations and integration with bus and active travel. The primary drivers are to enable more efficient labour markets, support sustainable economic development and our collective need to address the climate emergency through reduced car use. Post Covid the opportunity to support the economy through infrastructure development is also a key consideration.

Emerging Vision and Objectives for Rail Services in CCR

A strategic public transport network for the Cardiff Capital Region providing a high-quality, reliable, efficient and affordable transport services to support sustainable economic development and social regeneration.

Supporting this vision, a number of objectives have been drafted that will be refined through more formal Strategic Programme and Outline Business Case Development using WelTAG.

Economic & Transport

- **Improve connectivity by linking communities with all major commercial, social, health and leisure attractors across the region**
- **Act as a catalyst for sustainable economic growth and development by ensuring all major development sites are linked by metro services at the outset**
- **Provide comparable journey times across public and private transport modes, with at least 4 services per hour on all routes to offer a realistic travel choice**
- **Integrate with the national rail, local bus and active travel networks at key nodes.**

Social

- **Improve accessibility to public transport**
- **Encourage active travel and social inclusion initiatives.**
- **Ensure metro services are accessible by all**
- **Increase range of journeys that can be made by public transport**
- **Provide mobility options that improve people's health.**

Environment & Culture

- **Provide reliable public transport services, resilient to climate change**
- **Reduce the impact of transport on the environment by making better use of existing transport infrastructure**
- **Support Welsh language and culture**
- **Enhance the built environment through high quality placemaking and TOD**
- **Develop plans that support biodiversity and enablement of green infrastructure.**

Financial (Affordability) & Management (Delivery)

- **A financially sustainable metro system**
- **Flexibility to adapt, grow and deliver new services as capacity become available**
- **Maximise utilisation of existing infrastructure.**

Priority Schemes for CCR

TfW is working on the £740M upgrade of the Core Valley Lines to deliver faster, more frequent (4tph to/from Rhymney, Merthyr, Treherbert and Aberdare) and electrified services by December 2023 *Figure 23*. The CCR is setting out its vision for how this core network is further enhanced and expanded into the later 2020s and 2030s.

The emerging rail proposal *Figure 5* are in the main, focussed on enhancing and/or better utilising existing rail infrastructure. There is only one substantive new alignment, the NW corridor; most benefits can be achieved from incremental measures that deliver minor extensions, short new connections and by addressing network bottlenecks.

Given the work to date and the emerging vision and objectives, the primary proposals (some of which have been subject to initial development) that merit further scheme and option development through Programme Strategic and Outline Business Cases (PSOC & OBC), include:

Enhance South Wales Mainline and route to Birmingham

To bring the **South Wales Main Line (SWML) (#1)** up to the same standard as the other "main lines" across the UK, requires a major upgrade in terms of line speed, capacity, and electrification and importantly to allow a mix of express and local commuter services as recommended by the SEWTC and the 2013 Metro Impact Study. This is essential to enable delivery of the Welsh Government's journey time and economic ambitions and to integrate with the work of the sub-national transport body in south west England, and the wider work of the Western Gateway partnership.[lxxxviii]. It will also help maximise the benefits of the investment in the Core Valley Lines which is now the responsibly of the Welsh Government.

Key requirements include:

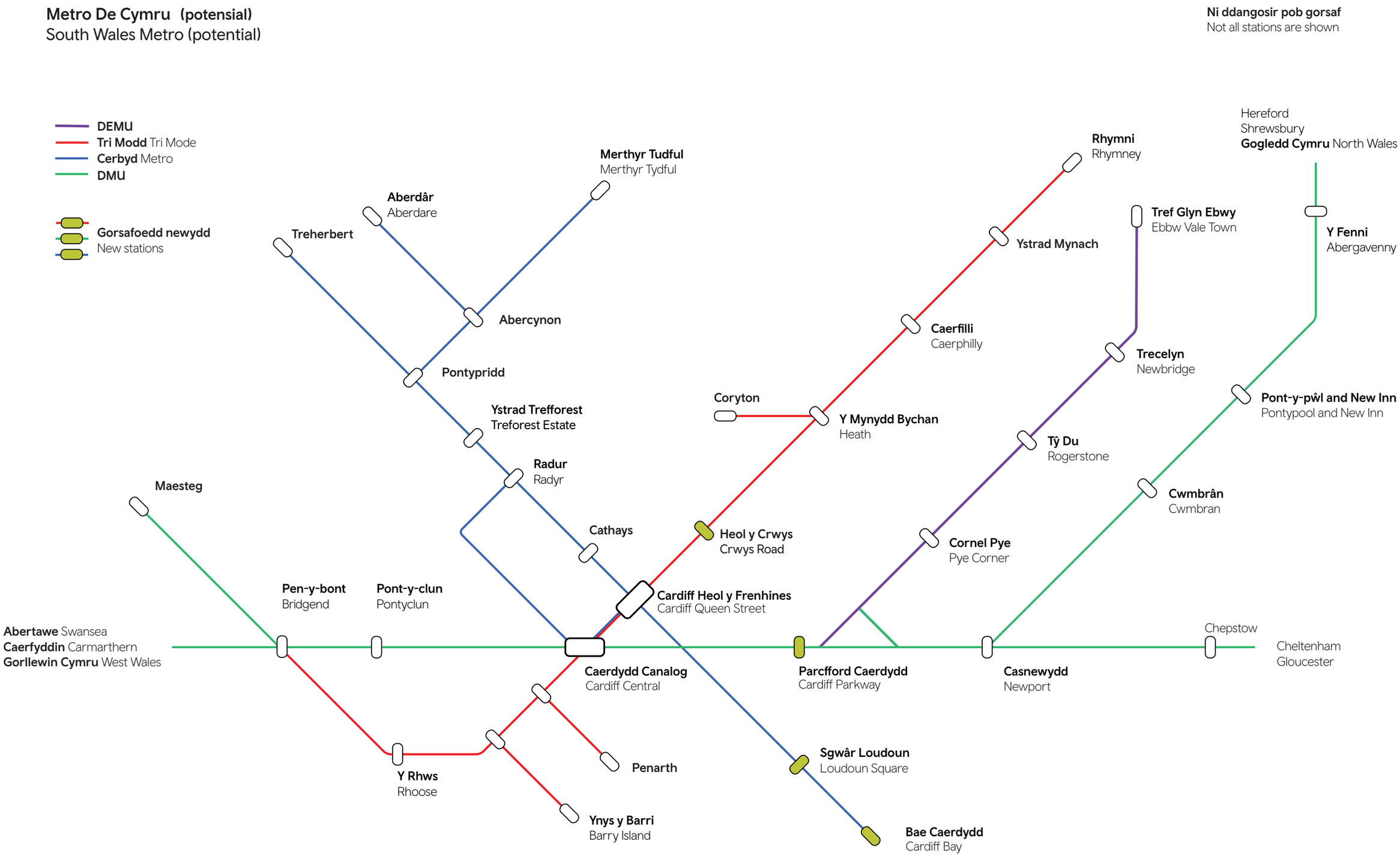
- **Additional London and Bristol Temple Meads services to Cardiff, Swansea & West Wales**
- **New SWML/Relief Line local services and stations/interchanges including: Magor, Llanwern, Cardiff Parkway, Rover Way/Newport Rd, M4 Junction 34**
- **CCR also endorse Welsh Government journey time ambitions:**
  - London-Cardiff 85 minutes
  - Cardiff - Swansea 30 minutes,
  - Cardiff - Bristol Temple Meads 30 minutes
  - Carmarthen-Cardiff 75 minutes
- **The region also wishes to emphasise the importance of connectivity to Birmingham (#2) via Gloucester and the north of Wales and England via Abergavenny. Both these lines require line speed and capacity upgrade and full electrification as acknowledged in NRs recent decarbonisation strategy[lxxxix].**

Address frequency constraints and bottlenecks on existing network

Contributing to the limitations of services on the existing network are a number of "network bottlenecks" that need addressing:

- **Measures to address constraints at Cardiff West will, aside from being essential to the Cardiff Crossrail & NW Corridor proposals, also enable more services (inc. from east of Cardiff) to operate onto the Vale of Glamorgan (VoG) Line to Barry and the Airport (#3) and avoid the constraints of the 2 track SWML between Cardiff and Bridgend. This may bolster the case for further stations to better serve Cardiff airport and St Athan and to introduce direct services to the airport from places like Bristol Temple Meads and Gloucester/ Cheltenham or even Birmingham**
- **Informed by the development work undertaken, significant investment is required to deliver 4tph Metro frequencies on the Ebbw Valley (#4) corridor (as is the case with the CVL) with additional stations (e.g., Crumlin and Maesglas/Newport West) and services to both Newport and Cardiff, and a spur to Abertillery (#5). In doing so we also need to assess the potential application of tram-train on this line**
- **Network constraints impact the ability to increase services on the Maesteg branch (#6) to more than 1tph; addressing these and the application of tram-train could enable local network extensions, for example operating Maesteg tram-trains south onto the VoG Line enabling one or two more stations in Bridgend and perhaps a connection to the Ford site**
- **The City and Coryton Lines in Cardiff are currently constrained to 2tph, securing 4tph on these lines is likely to have the best affordability profile of all the schemes given the local catchment population Vs the limited number of additional vehicle miles required**
- **The region also needs the introduction of metro frequency services on the Marches line (#7) as far as Abergavenny, with further new stations at places like Caerleon where demand justifies.**

Figure 23 Illustration of potential next phase of the South Wales Metro (TfW to 2023/4)



Further CVL stations

Whilst the CVL transformation will deliver radically improved services to the Taff Vale and Rhymney Valley Lines, and additional stations (such as Crwys Rd and the new Bay Line stations) there are still opportunities for further enhancement via new/relocated stations and Park and Ride (P&R) sites.

At this stage these include:

- **Confirmation that stations that were to be funded out of revenue on the CVL will progress (Nantgarw/Trefforest Ind Estate, Gabalfa)**
- **Llanbradach P&R**
- **Upper Boat P&R**
- **Pentrebach P&R and/or a new station at Abercanaid**
- **Pontypridd Bus Station**
- ***Cardiff CVL stations are included under #8 Crossrail (Roath Park, Ely Mill, Gabalfa, etc) and SWML stations under #1***

Strategic Schemes

Most of the proposals set out are focussed on making better use of, and enhancing, existing rail services. There are though, some significant proposal that both make better use of underutilised rail assets as well as requiring new infrastructure. These could form the substance of 10-15 year expansion plan for Metro tram-train services.

- **Cardiff Crossrail and NW Corridor (#8)**

  The **Cardiff Crossrail** programme will upgrade and connect existing underutilised rail assets to enable 4tph on all the rail lines in Cardiff and connect the largest and most densely populated parts of the region at a much lower cost than a new build system.

  This will include the **Coryton and City Lines** and a link between the Bay line and Tidal Sidings to Rover Way/Newport Rd. The full extent of Crossrail (likely to be phased) extends west via the **NW Corridor to Rhondda Cynon Taf** (RCT) and a potential interchange with the SWML at Pontyclun with stations serving new housing at Plas Dwr, a P&R at M4 J33, Creigiau and Talbot Green. It will also **connect the City Line to Radyr** to enable "circle" connectivity; with tram-trains likely operating west from Heath Halt Lower.

  The introduction of new stations at places like Rover Way/Newport Rd, Ely Mill, Roath Park, Gabalfa and Crwys Rd, Butetown and across the bay, will provide much of the city access to high quality and frequent public transport services that integrate with SWML.

  Subject to further analysis, Crossrail could also be extended east from Rover Way/ Newport Rd with **tram-trains operating on the relief lines to Cardiff Parkway, Newport or even Severn Tunnel Junction or Chepstow**. This presents an opportunity to deliver more rail capacity on the SWML Corridor by avoiding the network constraints through Cardiff Central and to the west.

  There is also a longer-term opportunity, linked to land use changes and which should be assessed via the regional SDP, to **extend NW Corridor tram-train operations from Pontyclun, west toward Bridgend** and potentially integrated with the Maesteg line. Some of this route could run adjacent to the current SWML and then divert via the potential major housing and mixed-use development at Llanilid. This may also allow some local stations to be relocated to the new "route" to free up capacity on the SWML.

  There is also potential to operate **tram-trains to Penarth** and **extend the network to Lower Penarth** and consider a station at Cogan on the Penarth branch, once the issues at Cardiff West are addressed.

- **Cross Mid Valley Connection (#9)**

  There is a long-standing need to better connect E-W across the valleys. The primary corridor extends from Cwmbran/ Pontypool to Newbridge, Blackwood and Ystrad Mynach on to Nelson, Pontypridd and via Church Village to Talbot Green/ Pontyclun. This route could connect over 200,000 people.

  At key points this cross-valley services will interchange with north-south metro rail services to deliver a grid of public transport services that makes many more journeys between the valleys viable and more efficient to deliver using public transport. For example: Caerphilly to/from Merthyr, Blackwood or Bargoed to/from Pontypridd.

  On that basis and enabled by the tram-train technology being developed on the CVL, is the opportunity to explore **a direct tram-train connection between The Rhondda and Ystrad Mynach or Hengoed via Pontypridd**. This may only require a short 2km section between the TVL near Quakers Yard to the Cwmbargoed freight line near Trelewis. This can include measures to re-open the Pontypridd north curve and introduce a metro rail station at Pontypridd bus station.

  Whilst there are more ambitious longer-term options to extend tram-train further east (to Blackwood for example), this key core component when combined with integrated bus measures to Blackwood, Newbridge and Pontypool/Cwmbran in the east, and via Church Village to Pontyclun and Talbot Green in the west can deliver an attractive and reliable cross valley public transport service.

- **Caerphilly to Newport (#10)**

  Proposals to **re-use and extend the Machen freight line** have been proposed in the past (inc. by SEWTA). But issues and constraints associated with Heavy Rail (HR), especially the route into Caerphilly and main line constraints on the SWML into Newport, make a traditional HR approach more difficult to deliver.

  Whilst likely a long-term project, the potential to use tram train to connect Caerphilly to Newport can be revisited; this time with a **short "on-street" tram-train section in Newport** via a flyover of the SWML near Cardiff road and a route via the Royal Gwent Hospital and the city centre to avoid compromising limited capacity on the SWML.

- **Aberdare – Hirwaun (#11)**

  This scheme is already in development. Aside from extending Metro tram-train services to Hirwaun it provides a P&R and Bus interchange on the A465 Heads of the Valleys Road. There is an opportunity in the longer term to consider similar expansion in Merthyr.

Key Schemes Outside the CCR

Whilst not the responsibility of the region, there are some emerging proposals across the UK that the region supports, for example:

- **Enhance HS2 connections in Birmingham to allow classic compatible services to operate form the northern branches of HS2 south west from Birmingham to Cardiff and Bristol as proposed by Greengauge 21**[xc]
- **The Western Rail Access to Heathrow**[xci] **has already been highlighted by the region as a means to improve sustainable surface access to Heathrow airport and is already in development via Network Rail.**
- **Complementary Metro development in Bristol and Swansea Bay.**

To reduce overall need for car use within the CCR will also require as many origin and destination points in the adjacent regions of Bristol and Swansea to be accessible via attractive public transport services for trips to/from the CCR. CCR therefore supports the development of complementary Metros in Bristol and Swansea Bay *Figure 24*. This connected metro concept was presented by the Cardiff Business Partnership in its evidence to Westminster's Transport Committee review of HSR in 2011[xcii].

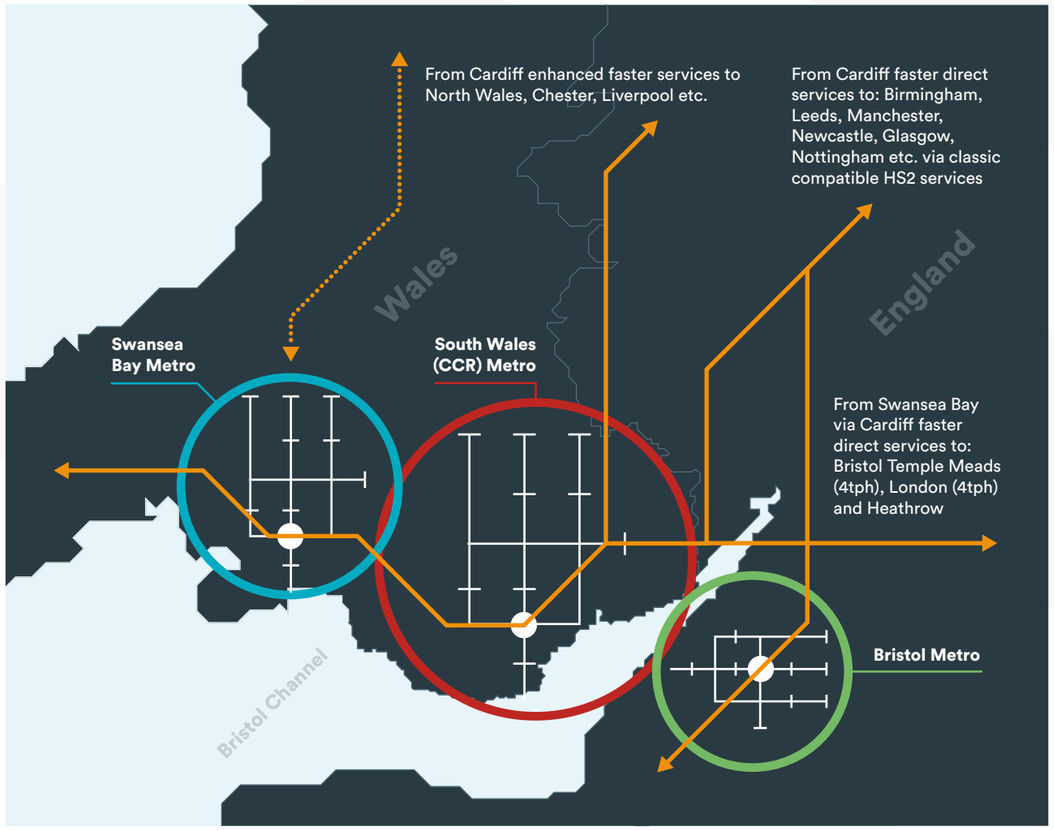


Figure 24 Integrated Metros in Bristol, Swansea Bay & CCR (South Wales Metro)

The Supporting Role of Integrated Bus Services

The ultimate ambition is to present the passenger one, joined up, multi-modal public transport network. So, whilst this paper is focusing on the priority strategic rail schemes, there is an equally important and parallel effort required to develop vastly improved and integrated bus services.

The focus will be local bus services and areas where strategic connections cannot be affordably delivered via rail. This will most likely include BRT in Cardiff and Newport, and some of the cross-valley connections required across the mid and upper valleys.

Working with TfW and WG, the CCR will:

- **Redesign bus networks (where appropriate) to fully integrate with rail services across the whole region, including development of segregated BRT routes.**
- **Deliver integrated fares, ticketing and information systems and common user platforms in terms of app and web systems**
- **Further test and apply innovative solution like Demand Responsive Transit (e.g., Fflecsi) as part of the overall public transport offer**
- **Accelerate the introduction of zero emission and accessible bus fleets**
- **Develop and implement common standards for local bus stops across the region**
- **Support TfW's Metro brand development work and its application across all modes of transport in the CCR.**

Whilst further analysis is required, there would appear to be four natural sub regional areas *Figure 5* (that do overlap in part), that could be the focus of bus network & service interventions. These are, with potential bus hubs and/or bus/rail interchanges identified:

- **Cardiff and the Vale of Glamorgan**

  Hubs: Cardiff Central, Waungron Rd, Heath Hospital, Bay/Arena, Queen St, Heath Halts, Rover Way/Newport Rd, Barry Town, Barry Docks, Cogan, Penarth, Pontyclun, Cardiff Airport, Cowbridge

- **Newport, Torfaen, Blaenau Gwent and Monmouthshire**

  Hubs: Newport, Cwmbran, Pontypool, Abergavenny, Monmouth, Newbridge, Ebbw Vale, Llanfrechfa Grange Hospital, ICC, Chepstow, Severn Tunnel Junction, Newport West/Maesglas, Llanwern

- **Bridgend**

  Hubs: Bridgend, Porthcawl, Pyle, Maesteg

- **Mid and Upper Valleys (parts of RCT, Merthyr, Caerphilly, Blaenau Gwent and Torfaen)**

  Hubs: Merthyr, Aberdare, Pontypridd, Bargoed, Blackwood, Newbridge, Porth, Ebbw Vale, Ystrad Mynach, Abercynon, Llanbradach

The delivery of integrated bus services is perhaps a more challenging problem than new rail services and infrastructure given the complexity of the bus industry and its legislative framework. However, this is where the most benefits can be delivered in the next 5 years.

Active Travel

The role and importance of Active Travel cannot be understated. In many of our urban areas across the region there is a major opportunity to deliver infrastructure that will encourage more and safer walking and cycling instead of car trips. For longer journeys, which many of us have to make, the contribution of Active travel for the first and last miles of journey has to be encouraged. To do so, we need to develop and introduce measures that make all our stations accessible from their local communities using Active Travel. This will include safer walkways, cycle routes, safe accessible stations and secure cycle storage at stations. In many cases and outside the station boundary, this work will fall to the CCR and the regions local authorities and not TfW to deliver – as is the case with the developing cycle network in Cardiff.

Overall Benefits

Strategic Benefits

Transport cannot exist in isolation of the wider economy, so the Welsh Government and TfW have identified a range of high-level benefits for the various Strategic Cases in development as they apply in the CCR they include:

Economic Benefits

- **Enhanced connectivity between key economic centres on the SWML like Swansea, Cardiff and Bristol will help create more efficient labour markets; similar benefits can accrue to places like Pontypridd, Merthyr and Caerphilly through enhanced Metro connectivity. This is very much in keeping with the Welsh Government's desire to encourage regeneration and transport-oriented development and especially mixed use and housing development at/near stations across the network**
- **The Welsh Government have previously estimated Transport User Benefits of £1Bn are likely from enhancements to the SWML; a figure that is likely to be higher when the full range of schemes set out, and agglomeration, network and Wider Economic Benefits are included**
- **A high-level strategic analysis as part of the 2013 Metro Impact Study set out the potential to enhance the regional economy by £4Bn over 30 years from the full range of scheme set out at the time. The current CVL phase of Metro is only one part of a larger long term programme.**

Environmental and Wellbeing Benefits

- **Given the urgency required to address the climate emergency, these measures provide the radical increase in public transport capacity required to reduce currently very high levels of car use. Across Europe cars are the biggest contributor (even if all electric) to transport carbon emissions (~60%), which is the only sector that has increased its carbon footprint since 1990**[xciii]
- **Reduced car use can also improve health outcomes from fewer road accidents (150,000 each year in the UK, 28,000 serious injuries and 1,700 fatalities**[xciv]**) and improved air quality to reduce the current estimated 30,000 premature deaths per year**[xcv] **caused by air pollution.**

Transport System Benefits

The proposals set out will deliver a more flexible and efficient railway, able to operate a mix of express and integrated local commuter services on the SWML integrated with local metro services from and across the valleys

Offering more attractive rail services to more people will significantly improve efficiency of rail operations and reduce subsidy per passenger.

Examples of Specific Scheme Related Benefits

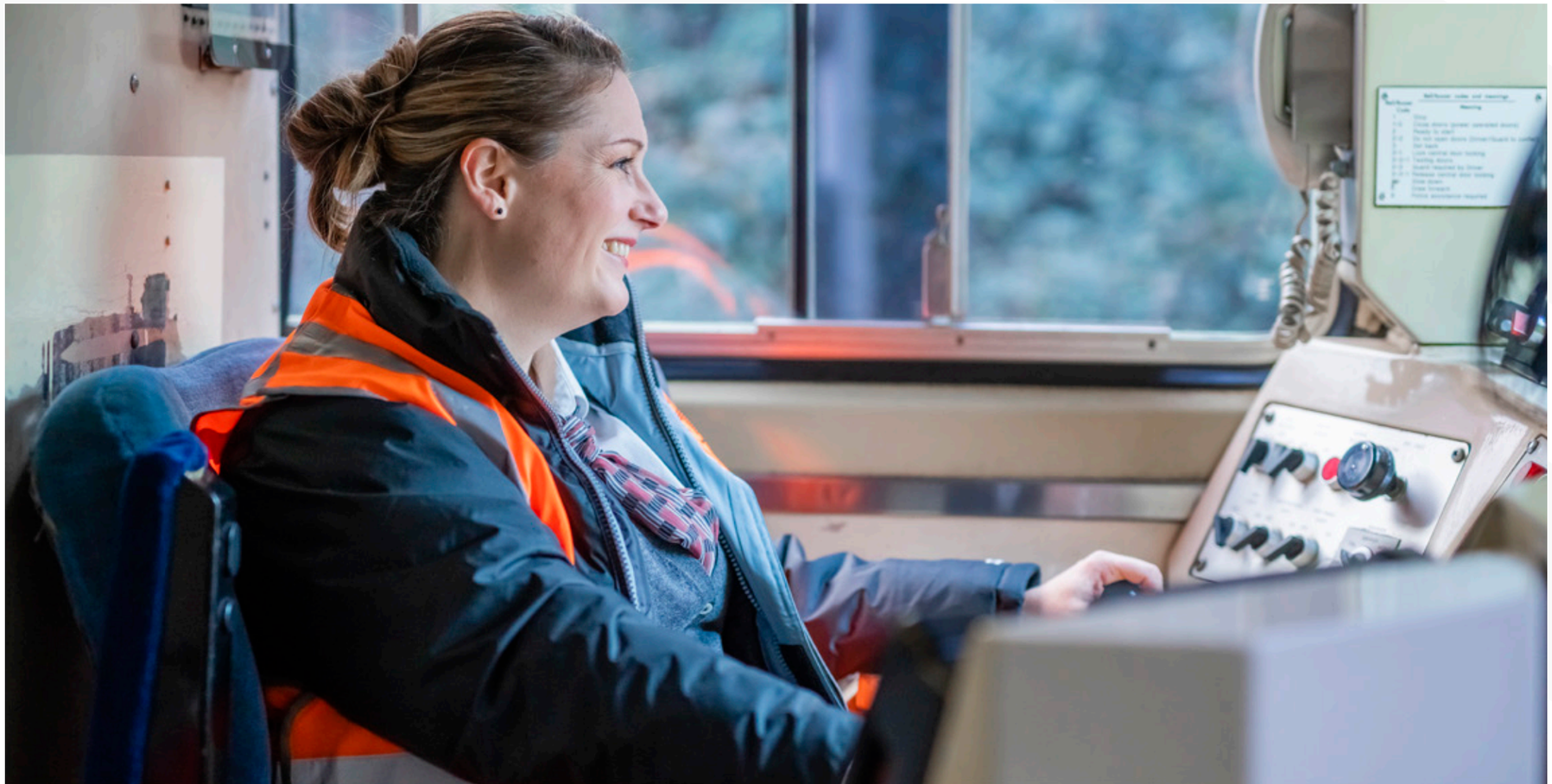
There are also a range of benefits that derive from the specific schemes set out, including:

- **Along the SWML corridor (#1) there are significant development opportunities that will be influenced by these proposals; for example: Cardiff Parkway, and Bridgend, Newport and Cardiff City Centres**
- **Delivering enhanced connectivity to/from the Ebbw Valley (#4 #5), which is facing significant economic challenges, to both Cardiff and especially Newport will help support further development and regeneration in and around Ebbw Vale itself and further support its Enterprise Zone**
- **More commuter services on the Marches Line (#7) to Pontypool and Abergavenny and new stations, will help provide sustainable travel options to new developments like Mamhilad urban village and Sebastopol as well as help Pontypool deal with some serious economic challenges**
- **The Crossrail proposals (#8) will connect a number of major mixed used and/or brown field developments (e.g., Cardiff Bay & Docks, Arena, Parkway, Plas Dwr, GE Life Science Hub) as well as connecting Splott and Tremorfa to the Metro, both areas within the top 10% of Welsh Index of Multiple Deprivations (WIMD)[xcvi]**
- **Metro and specifically the mid cross-valley measures (#9) set out, presents a strategic opportunity for the region to begin to radically transform its economic geography. This means developing a transport network not overly focussed on journeys to/from Cardiff. Whilst that will always be important, there is an opportunity to better connect all parts of the region and especially key centres like Pontypridd, Newport and Merthyr**
- **The longer-term Caerphilly-Newport scheme (#10), as with Llanilid, will likely need to be developed alongside a review of land use and the potential for future housing along the corridor between Bassaleg and Caerphilly. This is something that should be explored in the upcoming Strategic Development Plan for the region**
- **The Aberdare-Hirwaun extension (#11) will enhance the impact of the proposed developments, new housing and the energy park in the area.**

Transport Led Economic Development & Regeneration Opportunities

Beyond these specific scheme-related and strategic benefits, there are a number of significant development opportunities and economic activities that are dependent on, or whose impact can be enhanced through improved rail services and connectivity. Some of these are part of the Cardiff Capital Region City Deal, they include:

- **As part of the Cardiff Crossrail there are several major contingent developments. For example, at Cardiff Central/Central Quay(A) and Cardiff Bay(A) including more residential, hotel, commercial and a potential Higher Education Institute. There is also an opportunity to enabled mixed use development on what is currently brown field land across Cardiff Docks. A community focussed regeneration programme aligned to the bay line and a new Butetown station. There is also the prospect at GE/Forest Farm for a Life Sciences Innovation Park(B) anchored by GE and the Wales Genomics Centre**
- **Delivering more commuter services into Newport City Centre from across the region will help support the development of the Newport Knowledge Quarter(C) with partners including Alacrity, Alacrity Cyber, USW Cyber school and Airbus. There is also an opportunity to consider the re-location of the UK Government's facilities (such as the Patent Office and ONS) to a location in Newport city centre**



- The schemes set out will enhance the accessibility of the Nantgarw/Treforest Industrial Estate(D) and help bring forward a major mixed use regeneration project including more residential; this augments the relocation of the Department of Work and Pensions (DWP) adjacent to the new Metro stations planned at Nantgarw
- New SWML commuter services and a new station at Llanwern will connect Llanwern/Glan Llyn(E) residential development to the rest of the region and help bring forward further development sites near the station
- The new station in development at Cardiff Parkway provides the opportunity for more "mixed use" development at Hendre Lakes(F)[xcvii]; this site is at the heart of the corridor between Newport and Cardiff which is already a regional centre for Compound Semiconductors (CS)[xcviii] (inc. SPTS, Newport Wafer fab, IQE, Cardiff University)
- Enhanced connectivity to Cardiff Airport/St Athan(G) will help support the development of the business parks in this location – the potential to operate direct rail services from places like Bristol Temple Meads and Gloucester can be explored in this context
- The Metro is already enabling development in Pontypridd (H) and it is expected further development and regeneration opportunities will come forward in and around the town centre and potentially linked to further Metro measures (like cross valley and a new station at the bus station) into the late 2020s
- (I) Llanilid. As part of the emerging SDP there is the potential to explore a more substantive TOD base development between Pontyclun and Pencoed at Llanilid that could be delivered into the 2030s if linked to further expansion of the Metro through the area
- There are significant town centre regeneration opportunities in Bridgend (J) as well the Ford site which could potentially be served by tram-train services if introduced on the Maesteg Line
- The local economic potential of an enterprise Zone at Ebbw Vale (K) will be enhanced by both access to Newport and Cardiff and the cross valley (rail and bus) schemes proposed
- There is a masterplan in development for Merthyr town centre (L) which will be augmented by plans for a major visitor attraction and community facility at Cyfarthfa Castle[xcix]
- (Z) Aside from these more substantive and developed proposals, the Metro also presents opportunities for further "transport hub" focussed development and regeneration measures in places like Barry Town, Pontypool, Caerphilly, Maesteg and Hirwaun. In many cases this builds on work already in progress, such as in Caerphilly
- As has already been noted, many of the wider benefits that can be realised requires a more coherent and nuanced approach for smaller scale interventions and those which support local foundational economies; especially to enable more community focussed regeneration measures at many of the smaller stations across the region. CCR will work in partnership with WG, the region's local authorities and TfW to develop a portfolio of such interventions and in doing so align with WGs "Transforming Towns"[c] initiative.

Next Steps

This paper provides the policy foundation to underpin further scheme and business case development of rail projects by WG, TfW, NR and the Region. Further progress requires a holistic approach across multiple organisations who will need to work together to:

- Integrate these policy-based proposals through TfW's formal Strategic Metro Development Programmes to create a 10-15 year implementation programme (the details, scope and phasing of which will be refined through the development of Programme Cases by TfW and in consultation with the CCR)
- Develop methods for securing long term funding (capital and revenue)); this to include consideration of demand management measure (such as workplace parking levy and road user charge), Community Infrastructure Levy, Tax increment Financing, etc
- Establish a more coordinated regional capability to develop and take forward complementary economic development & regeneration initiatives right across the Metro network.

  This will include substantive property development as well as more locally focussed community-based interventions
- Develop a comprehensive Metro focussed Transit Oriented Development Plan that covers major development led interventions through to small scale local placemaking measures. Working with key partners like Registered Social Landlords (RSLs), house builders, developers, regeneration practitioners and community groups, will be essential as will the support of bodies like Design Commission for Wales (DCFW)[ci] and Community Housing Cymru (CHC)[cii]
- Ensure that the regional Strategic Development Plan (SDP) proactively develops opportunities for more transit-oriented development. In the first instance the gradual relocation of public services and offices back to city and town centre locations right across the region. The role of placemaking[ciii] to be embedded in this approach
- Complement the work of regional bodies in Swansea/West Wales and South West England to ensure these proposals complement those being developed in adjacent regions
- Support WG in making the case for devolution of rail with funding for enhancement. It is likely that without substantive changes, most of the proposal set out will not proceed
- Support further academic research to underpin these proposals – especially the wider benefits that may be realised.

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Cardiff Capital Region

MARCH 2021

Investment Prospectus

Prosperity for our Place

Across Levelling-up and the Framework for Regional Investment in Wales we have an opportunity to renew the focus on things that bind our communities together. It's this kind of step change to balancing growth ambitions with improving the wellbeing of our least competitive places that will truly lead to narrowing the productivity gap between the regions and nations of the UK.

Kellie Beirne
Director, Cardiff Capital Region City Deal

Contents

Forewords 4

Executive Summary 6

Cardiff Capital Region 14

Strategic Ambition 20

Proposition Detail 26

Core Propositions 28

Enabling Propositions 40

Wider Proposals 50

Contact Us 54

Forewords

‘Levelling-up’ is a welcome symbol of intent to tackle the geographic inequalities that exist in our country.

However, in the post-Covid world, it has to mean more than simply supporting growth in places that are ‘lagging behind’. This is an opportunity for exploring how we exploit the natural assets and resources of our places, how we unlock responses to societal challenges such as climate change, mental health, ageing and mobility and also how we ‘manage’ the resulting increase in growth and productivity. Achieving this will make demands on all of us but it is essential in order to both revive our sense of civic pride – and to imbue both confidence and resilience in the businesses and institutions that will play a vital role in helping reshape and reinvigorate our communities and sense of place.

This Investment Prospectus outlines our requirements for levelling-up the Cardiff Capital Region - with a particular focus on R&D, infrastructure investment, fiscal incentives and potential physical support in the form of re-locating government activities - and the results that we expect from those interventions - both for the region and for UK plc. But our ambitions do not end here. There is parallel work to do to level-up within the Cardiff Capital Region itself, given the widening inequality gap exacerbated by the pandemic.

We believe our experience in delivering new forms of regional public investment is starting to make a real impact and give us firm foundations to build upon. The Regional Investment in Wales framework allows us to build upon this, and postion place at the very heart of future decision making. We have governance structures that are endorsed by three layers of government and we have proved we can work effectively through our achievements to date delivering evergreen funds, challenge-led approaches and complex large-scale programmes through our City Deal.

As we mature and evolve into a fully-fledged model of regional economic governance, our agenda will by necessity become more demanding and ambitious. Accordingly, it is essential we focus our current efforts on; directing our areas of research excellence and sectoral strengths into industrial scale clusters in order to create economic strength of place; delivering our compelling plan for infrastructure investment to improve regional and national connectivity and mobility; and pioneering mission-driven innovation to build creative capacity and capability in our public services.

UK Government support in the form of the requirements outlined in this document would enable us to augment our existing programme of interventions, significantly level-up the region and support our ambition to become truly Connected, Competitive and Resilient.

Anthony Hunt
Chair, Cardiff Capital Region Cabinet

Making public investment work better for all parts of the UK, although timely and significant, is a huge task - and in the Cardiff Capital Region we want to help make it easier by setting out what it means to us.

The clamour for promised ‘extra investment’ is understandable amidst the continuing devastation of the Covid pandemic, but our approach has to be more nuanced and long-term than just seeking more investment today. Thinking hard about the tools, levers, freedoms and support is something the Regional Economic Growth Partnership has really challenged itself to do. Our clear view is that whilst the government must set the policy direction, the private sector also has a large part to play in levelling-up, not least as we will be a powerful voice in encouraging businesses and investors to locate to the region.

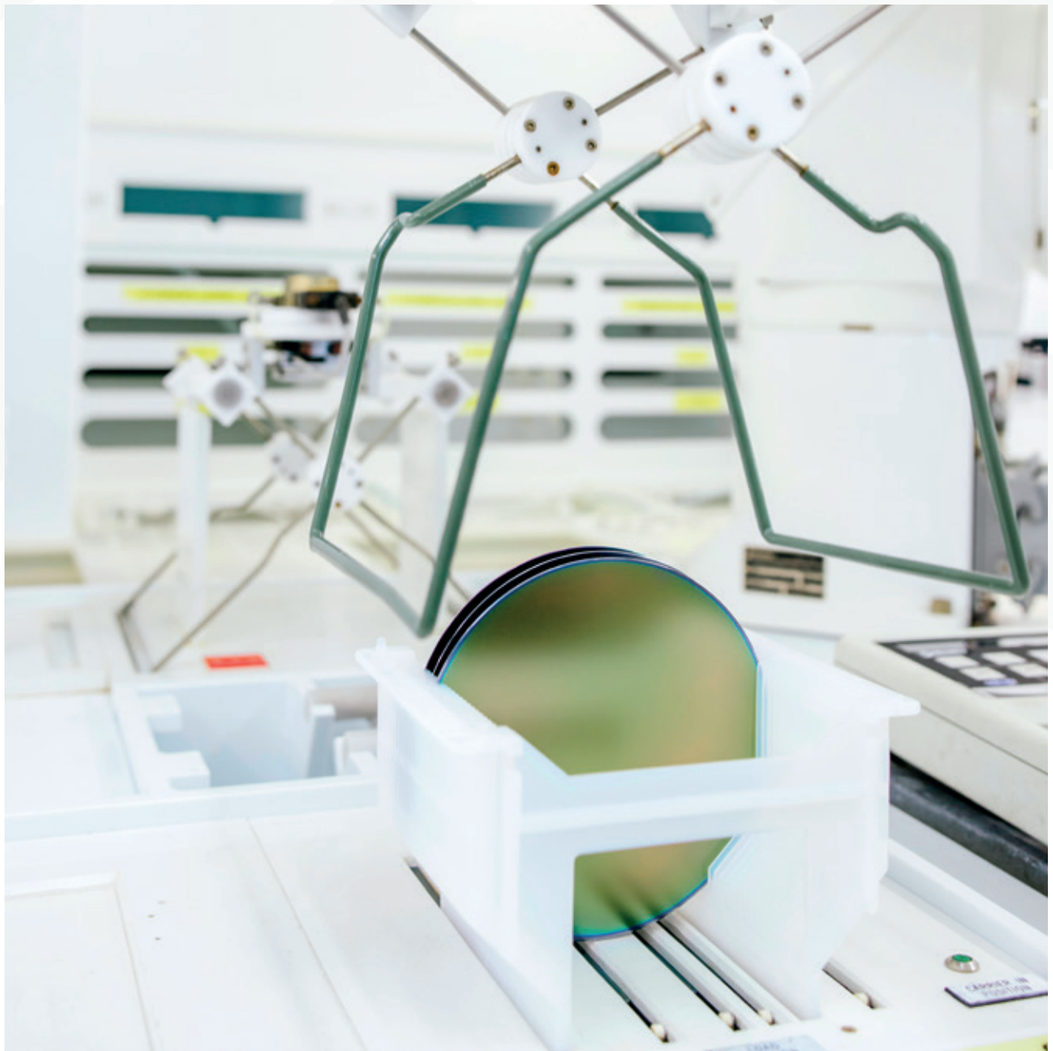
The issue of timing is also an important one, for in the same way our City Deal is a 20-year endeavour, levelling-up will not yield short-term economic impact. As our experience tells us, sustained productivity turnarounds do not happen overnight. Helping our businesses to perform better, addressing low-growth productivity issues across both the ‘foundational’ and tradeable economies - and closing the individual attainment gap - must be enduring priorities. There is no one fund or solution that can help achieve this; and whilst this Prospectus draws on the structural issues that need addressing (such as R&D investment, infrastructure spending and development of the nascent economies of the future), it sits alongside the systems-wide work already in train. These existing interventions focus on improving the quality of work through our focus on innovation clusters as anchors for growth, initiating challenge-led funding, improved digital capability and building a ready workforce for the future.

We believe that well-directed policy measures, reducing silos and barriers to investment, taking strong industrial leadership - and harnessing the potential inherent within the transformational programmes outlined in this prospectus - presents an opportunity to introduce greater continuity and ambition into the heart of our region’s future. It is time to think with vision and act with ambition.

Frank Holmes
Chair, Cardiff Capital Region Economic Growth Partnership

Executive Summary

This document presents investment proposals to UK Government from the Cardiff Capital Region designed to augment our regional programme and build upon the catalytic deployment of the £1.3bn City Deal fund agreed in 2017. Economic recovery from the Covid-19 pandemic offers an opportunity to tackle industrial, social and environmental problems more comprehensively, firing up imaginations and encouraging communities, businesses and learning institutions to build back better.



We Have Set a Precedent

The original City Deal funding, comprising contributions from UK Government, Welsh Government and the 10 local authorities that make up the Cardiff Capital Region, was agreed prior to the establishment of an agreed set of specific investment projects, in order to provide a fund that could be judiciously deployed to implement targeted infrastructure and innovation intervention in the areas that best served our ambition - which can be summarised as the creation of a Connected, Competitive, Resilient region.

Similarly, we now ask the UK Government, as part of its levelling-up commitment to making strategic investment work for all parts of the UK, to contribute towards the next phase of interventions. This requires resources, fiscal incentives, support from UK Government agencies based in the region, and a focus on wider, transformational proposals. We believe this is essential to enable us to deliver the sector-specific and enabling capability work necessary to address the social and economic challenges faced by the region. In so doing we will make a significant and sustained contribution to the UK economy and simultaneously create an inclusive economy in which prosperity is shared and wealth and wellbeing are compatible goals.

Connected.

Competitive.

Resilient.

We Have a Robust Framework for Growth

The document sets out 6 key areas that represent our core proposals and 5 key enabling areas for exploration and intervention. This is supplemented by a series of wider proposals which we feel could be within reach subsequent to the deployment of the core and enabling initiatives. All these propositions and proposed interventions are complementary and intrinsically linked and show the level of economic policy coherence which now characterises the CCR. The core propositions are transformational programmes. They are based around our sectoral strengths and build the eco-systemic and catalytic effects needed for impact, added value and multiplier effects. The enabling programmes by contrast are foundational investments which will serve the whole of the region and in so doing provide the baseline from which key sectoral propositions can grow. This builds up to a series of wider proposals which we believe could be deployed at transformational scale subsequent to implementing the core and enabling proposals.

We've set out our investment requirements and estimated results across these programmes. It is anticipated these funds would be deployed over a 5-year period:

IMMEDIATE REQUIREMENT

£1.05bn

£630m via a R&D Funding Settlement for the Region

Consistent with the R&D Roadmap and emergent R&D Place Strategy for developing our industries of the future into clusters that can compete on a world stage.

£100m via the National Skills Fund

For a capital investment to fund the provision of strategic assets, facilities and expertise for investment into future skills academies with an initial focus on capability to educate, equip and train 10,000 data scientist and cyber specialists over the next 5 years.

£320m of Levelling-up Fund Investment

For propositions in Digital and Strategic sites and premises to provide the foundational capability to enable businesses and communities to prosper and grow.

A suite of fiscal incentives

To be agreed with Treasury and relevant government departments to support our ambitions and help drive up competitiveness and productivity and increase R&D spend in the region. It is proposed that the CCR works closely with UK Government to model the impact of measures such as the application of Tax Increment Finance to support large infrastructure projects, pooling of National Non-Domestic Rates to allow strategic and targeted reinvestment, and the introduction of Innovation Tax Credits and Professional Development Tax Credits for SMEs to encourage productivity and R&D gains. This will enable the region to become more self-reliant and motivated to build wealth that can be re-invested in creating future resilience.

Support is required on a range of infrastructure and energy programmes to enable us to take significant steps forward toward the net zero agenda. We also have an urgent need to address historic under-funding on regional rail transport to better connect our region and make borders more permeable.

These by their nature are more substantive investments but consideration is requested.

LONGER TERM REQUIREMENTS

£3.2bn

£2bn contribution from Department for Transport

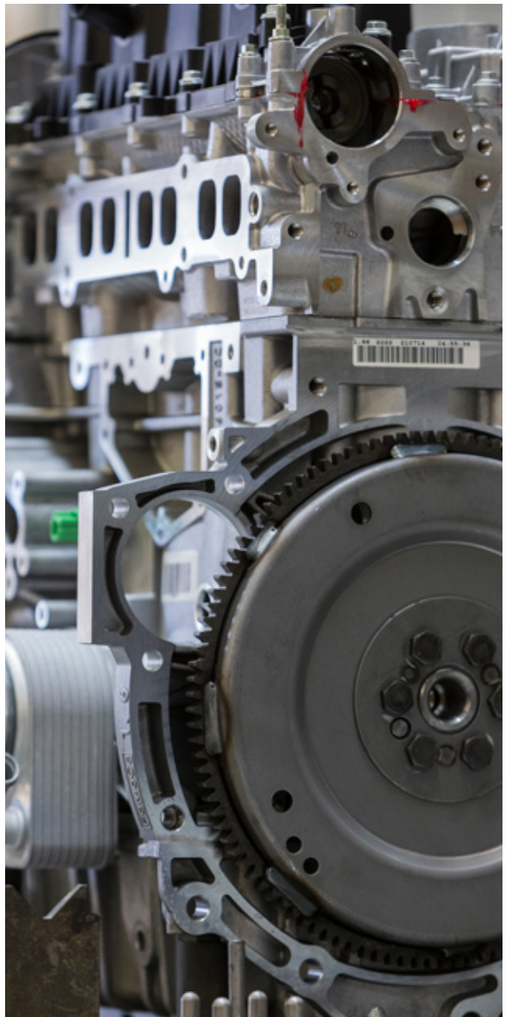
Toward the cost of progressing the strategic regional rail priorities, an enabling set of propositions that build upon the early stages of the South Wales Metro. The vision is to develop a multi-modal strategic public transport network for the Cardiff Capital Region capable of providing a high-quality, reliable, efficient and affordable transport services to support sustainable economic development and social regeneration. The initial priorities are set out within our Strategic Rail Priorities document and are outlined later within this prospectus.

£1.2bn contribution from the revised Industrial Strategy and ISCF

Toward a £8bn CCR energy delivery programme in the form of largely repayable stimulus funds to incentivise: clean energy domestic and industrial retrofits, hydrogen solution trials, the roll out of a fit for purpose charging infrastructure for ULEV vehicles, shifting energy consumption to renewable sources. Our immediate priorities within this programme are the commercial/industrial retrofits and the hydrogen trials for which a £30m kick-start fund is required. A further stimulus fund of up to £500m would be used to help scale and commercialise outcomes.

A commitment to joint working and discussions

On our wider proposals across both UK Government departments and also with non-departmental bodies based in the region, such as the Office for National Statistics, Intellectual Property Office and Companies House. These proposals would include a data campus, a digital accelerator, opportunities for harnessing the power of the Severn tidal range, designating of innovation districts and the creation of a hydrogen hub.



Estimated Results

For the immediate commitment sought of £1.05bn we estimate that this will facilitate:

33,500
Jobs

£3.75bn
Private Leverage

£2.5bn
GVA

These are estimates and will be subject to refinement as the individual projects are further defined.

For the longer term programmes on Energy, which is seeking a contribution of £1.2bn in the form of stimulus funds to incentivise transitional initiatives, and Strategic Rail Priorities which is seeking a £2bn contribution toward infrastructure development, further work is required to translate the initiatives into individual investment cases that will enable us to quantify the impact on jobs, leverage and GVA. Accordingly, at this stage of the process we are simply asking for a future commitment to allow time to work up the detail of the individual programmes of work.

YOU CAN TRUST US TO

Deliver

We have already created the conditions necessary for success. We have effective partnerships with shared political and business leadership in place and a delivery infrastructure with robust investment frameworks and solid governance and assurance processes. We have ambition, we have a robust strategy to capitalise upon our regions distinctive strengths and we have evidence of successful delivery through the work undertaken to date by the City Deal Regional teams. And despite the challenges Covid-19 has presented, we have momentum. It is critical we now harness the potential and move forward with pace. For that we need your support to ensure we continue to deliver for the people, the communities and the businesses that make up the Cardiff Capital Region.

YOU CAN TRUST US TO

Innovate

Our City Deal Wider Investment Fund works on an ‘evergreen' basis and we take every opportunity to seek optimum ROI, co-investment and private leverage. We also have the resolve and intent to creatively establish the means to fund our programmes as opposed to just relying on traditional sources of funding support.

We have employed challenge and mission driven approaches to experimenting with new ideas, ensuring we solve intractable problems through new thinking and ingenuity at both economic and societal levels.

YOU CAN TRUST US TO

Build Back Better

Our approach is about being clear about how we will do business – but not in a business as usual way. For economic recovery from Covid-19 to be durable and resilient, a return to ‘same old’ and environmentally destructive investment patterns must be avoided. We can be trusted to ensure recovery work triggers the investment and behavioural changes that will reduce the likelihood of future shocks, increasing our resilience to them when and if they do occur. We have the opportunity to optimise investment in R&D intensity and infrastructure development, all alongside factoring in resilience to climate change, future mobility systems and security in UK-based supply chains.

Cardiff Capital Region

Contributes
50%
of the Welsh economy

CDF — Closest Capital **to London** — LDN

Population:
1.5million
That's 50% of Wales!

3
Major Ports

4
International Airports
(in proximity)

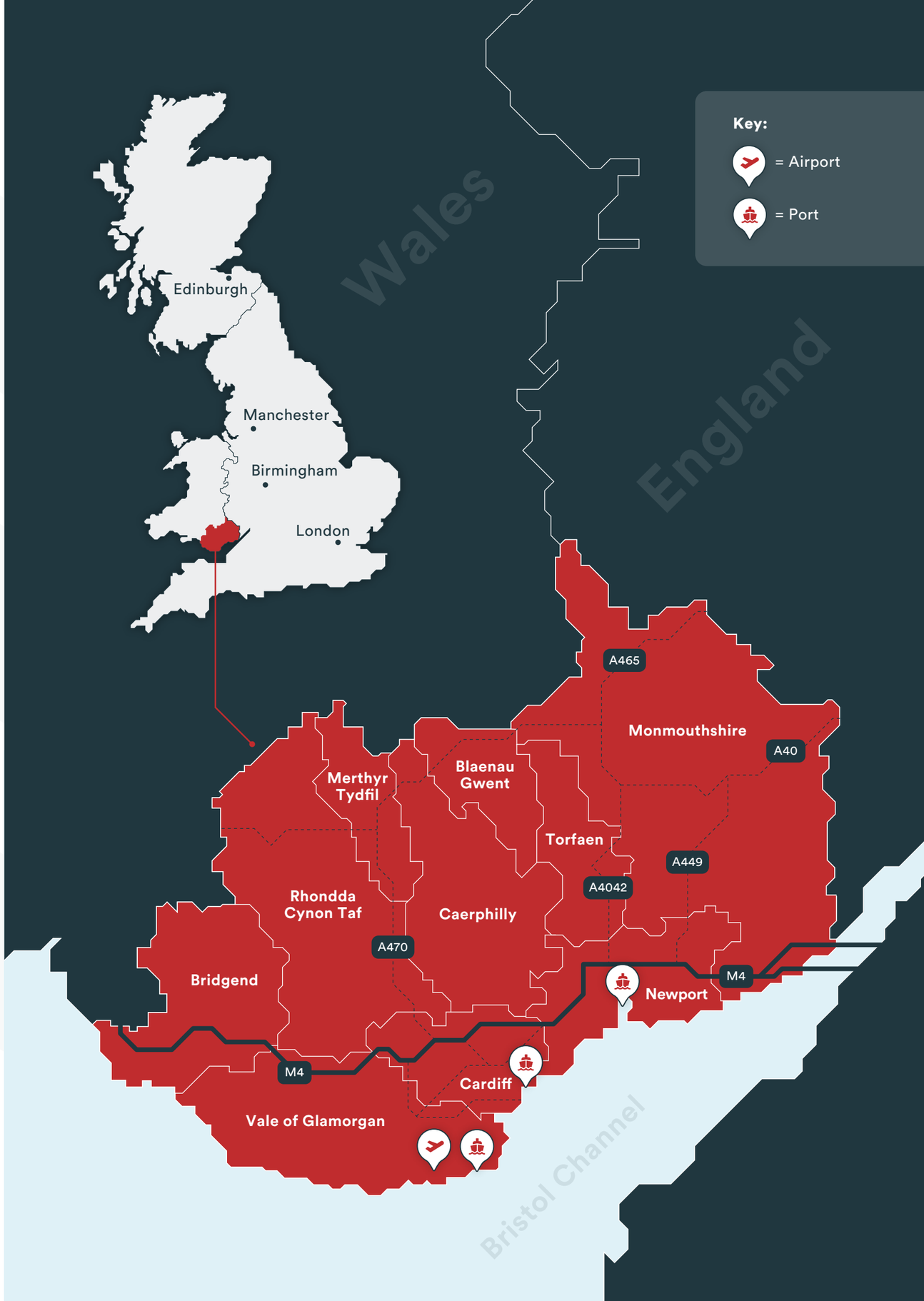
Home to the world's
2nd highest
tidal range

50,000
Enterprises

4 Universities
5 FE Colleges

BUT

24% below the living wage
2 of the 10 LAs at the bottom of the Competitiveness Index
Below average investment in R&D - only **1%** of Welsh GVA
Generates 80% of the UK average GVA per capita



An Economic Overview of the Cardiff Capital Region

The Cardiff Capital Region (CCR) embraces a uniquely diverse population, economy and geography. Home to 10 local authorities and 1.5 million people across South East Wales - with environments that vary from the cities of Cardiff and Newport, historic market towns and rural communities, to the post-industrial Valleys heartland and a 30-mile coastal belt - the region has enjoyed significant regeneration and investment over recent decades, creating new business parks, quality housing developments and imaginative recreational initiatives; with landmark projects including the Cardiff Bay regeneration, major road infrastructure works and the successful reintroduction of passenger rail services to Ebbw Vale.

The effects of this investment are clearly visible in an economy that **accounts for approximately 50% of the Welsh economy**. Drawing on a proud industrial heritage, the area has a number of anchor manufacturing businesses in Aerospace, Automotive and Defence, as well as an expanding diversification of the business base exemplified by the emerging world-class clusters in sunrise industries such as Compound Semiconductors, Creative Industries, Cyber and Life Sciences. With three universities, a well-skilled population including a regional average of 40% plus of the population possessing NVQ4 or above level qualifications, a vibrant capital city renowned for excellent cultural and sporting facilities - and an enviable combination of coastline, forests and parks - the region regularly reports high levels of wellbeing and quality of life.

However, despite these strengths and the undoubted success of investments made over the last 25 years, significant parts of the region continue to be defined as some of the most economically deprived areas in Europe - remaining eligible for the maximum level of financial support from European Funds. This leaves much of the region particularly vulnerable

to the loss of EU funds which, coupled with Covid-19 has heightened awareness of the region's vulnerabilities in terms of over-dependence upon particular economic activities and markets. On a per capita basis, the region lags behind the UK average, **generating only 80% of the UK average GVA per head**. This broad picture also masks considerable geographical variation across the region. There are significant and long-established economic and social disparities between the prosperous coastal zone around Cardiff and the Vale of Glamorgan, and the more disadvantaged areas of the South Wales Valleys. This juxtaposition of need and opportunity is a particular feature of the Cardiff Capital Region; together with the mutual interdependence between the capital city and its wider regional hinterland. Whilst Cardiff built its wealth on exporting from the coalfields of the South Wales Valleys, the fortunes of the Valleys communities are now critically linked to the jobs, skills and housing markets of Cardiff and Newport.

Key Challenges and Opportunities

Given this context, the region's key challenges and opportunities can be broadly grouped under three headings:

- **Connectivity**
- **Competitiveness**
- **Resilience**

Connectivity

There is a need to improve Physical and Digital connectivity both within and beyond the region for both people and businesses.

INCREASED COMMUTING

Levels of commuting to work continue to increase across the region. Indeed, unlike most other city regions in the UK, the CCR has a significant mix of urban and rural communities with over 75% of the population residing outside of Cardiff. There is heavy dependence on the car, with public transport connections lacking appropriate capacity and efficiency in key place. Current modal share is 80:10:10 car, active travel, public transport. This may be unsustainable and suggests the need for a more stratified approach.

DISTRIBUTION OF JOB CREATION

Employment growth is heavily concentrated in Cardiff. Whilst this is strong evidence of accumulation, to complement this, there needs to be a focus on good jobs closer to 'home'. There is a need therefore to develop high-value supply chains and ensure better quality jobs to drive productivity and the sense of belonging people attach to their place.

THE VALLEYS & RURAL DISCONNECT

The Valleys and some parts of rural CCR are less accessible than the major cities and coastal belt. Communities originally attracted to work in the now largely closed iron ore and coal industries are now comparatively isolated and difficult to sustain. In rural areas this is exacerbated by poor infrastructure and access to services placing a premium on the need for better transport links which will open up economic opportunity.

QUALITY, VARIETY AND AFFORDABILITY OF HOUSING

As a consequence, the projected rate of house prices, development opportunities and household growth are highly variable across the region.

Over the next 20 years the number of households in the Cardiff Capital Region is projected to increase by around 13%. By far the greatest increase is projected for the cities of Cardiff (31%) and Newport (16%). The opportunity to invest in affordable and innovative 'smart homes'; in flexible tenure homes and 'lifetime' mobility for both societal and economic benefit, is clear.

VARIABLE DIGITAL CONNECTIVITY

Digital connectivity is also variable across the region. The average UK broadband speed has nearly doubled in the past two years from 28.9 Mbit/s to 46.2 Mbit/s. Most authorities in the Cardiff Capital Region only reach just over half that average speed with some rural and valleys areas reporting feeling 'left behind' as a result.

Competitiveness

LACK OF CRITICAL MASS

The CCR has a relatively small economy and with a population of around 1.5 million, lacks the critical mass, evident in many of the UK's more prosperous city-regions and conurbations. We need to maximise the opportunities we have to gain further scale working closely with Welsh Government and playing a full part in initiatives such as the Western Gateway.

BELOW-AVERAGE GVA

Whilst GVA has grown and unemployment fallen in recent years, labour productivity in the region (measured by GVA per job filled or hour worked) stands at 85% of the UK average and lags behind the majority of city-regions across the UK. The issue is that productivity growth in last five years is mainly employment-led. Work on Clusters and innovation-led growth will be key to changing this.

VARIANCE IN EMPLOYMENT & PAY

Unemployment rates and wage levels vary considerably across the region. Unemployment is typically lowest in rural Monmouthshire and

highest in Blaenau Gwent and Merthyr. Average gross wages in the region are lower than the UK average, with 24% of employees in the region being paid below the living wage. 2 of the 10 local authority areas score particularly lowly on the UK Competitiveness Index.

SKILL LEVELS

Varying skills levels are the main determinant of productivity differentials, with a fundamental need to address these deficiencies across the skills spectrum, particularly for those people with the lowest levels of skill. The percentage of population with qualifications at Level 4 varies considerably in the Cardiff Capital Region - with highs of over 46% in Cardiff, the Vale of Glamorgan and Monmouthshire; and lows of less than 33% in Caerphilly, Merthyr Tydfil, and Blaenau Gwent. Parts of the region still have relatively high levels of people without any qualifications.

INVESTMENT IN R&D

Innovation is a further key determinant of productivity. The CCR contains a highly regarded science base through its Universities, collaboratively providing a strong foundation for developing new technologies and applications. Despite this, investment in R&D has remained comparatively low in the region, with Innovate UK expenditure in Wales measured at less than a third of the average UK per head figure - and government expenditure on R&D in Wales standing at just 1% of Welsh GVA. In the CCR, average investment is well below 1% with only Cardiff showing a figure of 1.1% placing real weight on the importance of CCR efforts to mobilise public investment in R&D.

SECTOR & CLUSTER STRENGTH

A number of strong and emergent clusters offer opportunities to develop value-chain growth. CCR has global credentials in manufacturing advanced compound semiconductors – a key component for the international smartphone, med-tech, automotive and 5G industries. In addition, it has comparative advantage in the growing field of Insuretech, as recognised through the Welsh Regional Entrepreneurship Accelerator Programme work in conjunction with MIT. In life sciences, the region has clear strengths in medical diagnostics and devices - whilst in the creative industries there is a proven strength in stage and screen. Our cyber capability is a further asset, closely tied in with inter-regional work across the Western Gateway geography.

Resilience

ECONOMIC MIX & DIVERSITY

The increasing turbulence in the wider economic world has brought a sharp focus on CCR's resilience - with the 2008 economic crisis, secession from the European Union, climate change and the Covid-19 pandemic all highlighting the importance of understanding the CCR's capacities to adapt to longer-term processes of transformation and change. The CCR is characteristically less complex and economically diverse than many city regions, given its heavy dependence on particular sectors (see above) and a relatively high ratio of rural areas. The relatively high dependence on public service is a key opportunity in this.

THE LESSONS FROM PAST SHOCKS

The suppression of the Covid-19 virus has had a significant impact on the local economy given the dependency on external investment, tourism, hospitality, retailing and significant numbers of micro-businesses - coupled with lower overall levels of prosperity and household income. The lessons from previous crises indicate economic resilience demands agility, innovation and long-termism in policy responses.

THE FOUNDATIONAL ECONOMY

There is a strong dependence on employment in the foundational economy across the city-region as a whole with some 35% of jobs in the region in education, healthcare and hospitality and retail. These sectors of the non-tradeable economy act as critical pillars for job creation and

stability, and for the employment of non-migrating graduates. As such, it provides considerable resilience to the regional economy because its activities are distributed according to population and demand. It is also heavily community and place-based and provides a powerful enabler of collective consumption, and local wealth creation. Judicious support for key local 'anchors' can help keep money circulating locally and create better employment conditions, so helping spread local prosperity and drive productivity. Covid-19 has amply demonstrated the significant capacity the public sector has to support the resilience of local communities when shocks hit - and there is significant potential to harness this in support of the longer-term process of rebuilding and renewal.

SECTOR-SPECIFIC DEPENDENCE

The CCR's heavy dependence on certain sectors creates a number of vulnerabilities. The projected job losses as a result of the Ford Bridgend closure and the recent announcements on the cessation of steel-making at the Orb works in Newport have highlighted the fragility of the region's traditional dependence on manufacturing.

DEMOGRAPHIC CHANGE

Like the rest of the UK, the region has an ageing population, with 20% of the population aged 65 years or older. This is projected to increase to 25% by 2036 but will vary considerably across different communities - creating increased demand for care provision and related services, with potential impact on the workforce available to other sectors. The region is also characterised by a emigration of those aged between 22 and 45, making efforts at retaining the large numbers of graduates through the region's three universities a key imperative.

CLIMATE CHANGE

Progressive carbon-reduction targets provide new opportunities for innovation and economic activity, but will also challenge many firms. The region's high quality natural environment provides a wealth of resources and opportunities for tourism, health and recreation, as does the region's breadth of cultural and historical heritage. Storm Dennis has very recently highlighted the vulnerabilities of many of the CCR's towns and businesses to flooding, and has reaffirmed the growing importance of appropriate and effective warnings in advance of unprecedented weather events.

COMMUNITY

The region has considerable strength in its social fabric and community spirit. This provides scope to be optimistic regarding the region's capacity to forge a strong and distinctive identity, and to cope with the various challenges that lie ahead.

Strategic Ambition

Diagram 1 below depicts the CCR ambition and the associated strategies, delivery mechanisms and interrelated investment propositions required to address the challenges outlined in the economic overview. It is these propositions that will enable the CCR to deliver on its ambitions to be Connected, Competitive and Resilient and become a place that is truly economically self-reliant offering equality of opportunity to all.

Diagram 1

PLACE:	Cardiff Capital Region		
GOALS:	Connected	Competitive	Resilient
STRATEGIES:	Connecting People and Places Through Improved Infrastructure	Leveraging Sectoral Strengths	Accelerating Transition to a Green Economy Future Skills Readiness
DELIVERY MECHANISMS:	Governance	Funding Mechanisms	Capability and Capacity
CORE PROPOSITIONS:	1 2 3 4 5 6		
ENABLING PROPOSITIONS:	1 2 3 4 5		
WIDER PROPOSALS:	1 2 3 4 5		

Our Goal

A **competitive, connected and resilient region** where prosperity is shared and wealth and wellbeing are compatible goals.

Creating and nurturing an inclusive economy where everyone can play a part is at the heart of the value-set underpinning our strategy and approach. Our aim is to make a real and enduring difference to all communities by;

- **Creating general prosperity – where no place gets left behind**
- **Fostering innovation in business, public services and local and foundational economies**
- **Ensuring that economic ambition is matched with progressive social policies.**

“The ambition is to bring the sort of continuity investment that will bring key industry clusters to life, ensure companies can fulfil their potential for innovation, and produce economically significant hubs with multiplier effects into local and regional supply chains.

Our Strategy

Our Strategy for realising our ambition revolves around leveraging regional strengths in priority industry sectors to create clusters where the CCR can compete effectively on a national and international scale.

Diagram 2

Support emerging clusters through identification and creation of strategic roadmaps and bids for external funding opportunities e.g. UKRI Strength in Places bids.

Support cutting edge developments in aeronautical, automotive, power and electric engine development that grow R&D and manufacturing in the region.

Move to more mission-driven and challenge-led deployment to procure innovation through innovative procurement, via focus on building innovation skills and productivity in public services.

Use our existing City Deal mechanisms, funds and deployment tools to invest quickly in targeted sectors.

Ensure strong links between our industrial strategy, skills strategy and investments.

Provide scale funding for sector cluster development.

Provide innovation funding interventions for anchor companies within cluster ecosystems.

Deliver impact at scale

Align skills provision to the industry sectors of the future.

Accelerate enabling infrastructure to connect people and place and see transport in particular, as means of not just moving people around but bringing people together

Provide infrastructure investment to encourage inward investment and company relocation to strategic locations/ hubs.

Build R&D focussed solutions to regional challenges working in collaboration with our Universities and their partners.

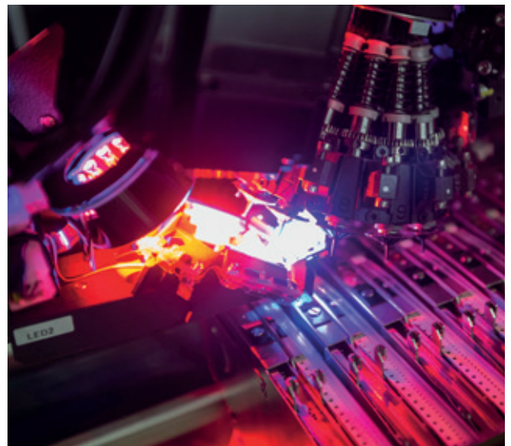
Focus on a green post-Covid recovery to ensure the region builds back better and transitions to a carbon neutral economy.

Identify and advocate use of local supply chains to facilitate greater economic self-reliance and foster circular regional economies.

Our Delivery Mechanisms

We have the right credentials. Our City Deal set up and experience provides us with the know-how and capability to execute at pace.

Diagram 3



In addition we have:

- Data, evidence and insight capacity on our markets, priority sectors and industrial sectors.
- A unique capability built with partners, economists and data scientists.
- A Regional Economic Growth Plan – adapted for Covid-19 that focuses on recovery, re-building and re-emergence and a framework for resilient growth.
- A Regional Investment and Intervention Framework – robust and legally reviewed process for assessing investment propositions attached to an expert public-private Investment Panel which advises Regional Cabinet. This supports innovation, infrastructure and challenge investment and operates on a ROI basis, ensuring a focus on hand-ups, not hand-outs.
- A rich and coherent partnership infrastructure, which in addition to investment and economic policy panels, comprises a Regional Economic Growth Partnership, a Business Council and a Regional Transport Authority.
- A Cardiff Capital Region Skills Board that has representatives from Industry, HE, FE, Work Based Learning, Trade Unions and Local Government.
- A growing culture of HE/ FE / Industry collaboration that builds for the region and sector as a whole and not for a particular institution or company unless regional benefit can be demonstrated.
- An emerging strategy and plan for embracing the opportunities afforded by the advent of Corporate Joint Committees.

We have 4 years' experience of effective regional public investment and economic governance - as evidenced by the recent evaluation report by SQW. We have a robust functional model capable of scale-up for delivering locally and regionally, local democratic legitimacy, and we have an emergent strategy for the evolution and delivery of capability and capacity to evolve from a City Deal into a full city region. We are confident in our ability to deliver.

Proposition Detail

Our Propositions

Diagram 4 lists our two categories of Proposition - Core and Enabling - each reliant on the other for ensuring optimal impact. The Core propositions are transformational proposals, built around priority sectors and are more targeted and focused. The Enabling propositions are foundational investments which serve the whole region. Together, these propositions will ensure no place gets left behind and that through supply chains, infrastructure links, human connections and innovation no place misses out.

Diagram 4

Core Propositions
1. Powering a World First Compound Semiconductor Centre of Excellence
2. Building a world leading med-tech cluster fully integrated with NHS Wales
3. Creating a Digital National Accelerator
4. Developing a Cyber Innovation Hub
5. Consolidating & Expanding a Creative Capital Region
6. Accelerating Transition to Hydrogen and a Commercial Property Energy Refit Programme

Enabling Propositions
1. Harnessing the Power of Digital - Fibre to the Premise and 5G Enablement
2. Provision of Accessible, Affordable Sites and Premises
3. Aligning Skills Provision with Future Industry Sector Needs
4. Future Proofing Our Rail Infrastructure
5. Green Energy: ULEV/Refits/Renewables

CORE 1

Powering a World First Compound Semiconductors Centre of Excellence

CCR is home to CSconnected – the world's first Compound Semiconductor cluster. Over the last 5 years successive investments through research councils, UKG, Innovate UK, WG and HEIs and businesses have all helped invest c£750M in growing the sector.

In 2017, CCR invested £38M with IQE co-investing £375M in the Newport CS-mega Foundry at Imperial Park which is home to IQE Plc – an AIM listed manufacturer of next generation compound semiconductors. The Foundry, also home to the £50M CSA Catapult, produces wafer chips that are exported the world over and are embedded in all major developing technologies from smart-phones to wearable technology and from advanced energy systems to next generative automotive.

With a £44M additional investment, £25M of which was awarded by the UKG UKRI Strength in Places Fund, CSconnected will build upon foundational investments by:

- **Developing the front door for inward investment and FDI.**
- **Reinforcing the trade body status of CSconnected.**
- **Creating the skills and talent supply and continued localisation of supply chains.**
- **Delivery of an open innovation 'Collaborative Research and Development Programme'.**

Proposition

Our power electronics proposition seeks to build upon this foundational capability by creating:

- **A skills academy for the UK sector through the continued development of the physical cluster at Imperial Park Newport.**
- **A full skills and talent development programme ranging from entry-level apprenticeships through to postdoctural development.**
- **A comprehensive learning, development and training programme for companies within the supply chain with the goal of achieving a 80% usage rate of regional networks.**
- **An international Research and Development partnership with South East Asian and North American Universities and Industrial partners.**
- **An open access lab facility that will enable co-innovation and development and commercialisation of programmes and products developed through the CRD programme.**

Requirements

£100m

To advance the creation of a skills academy, talent development programmes, global R&D partnerships and open access lab facilities.

CCR Fiscal Incentives

Via R&D tax credits.

Access to BEIS Analysts & Policy Support Functions

For insight and global market intelligence.

Support from DIT

For a targeted programme of international inward investment.

IQE

SPTS

CATAPULT
Compound Semiconductor Applications

CS connected

Microsemi

CORE 2

Building a World Leading Med-Tech Cluster Fully Integrated with NHS Wales

The Cardiff Capital Region is home to mature medical devices and diagnostic companies, cutting-edge genomic research at Cardiff University and a vibrant cohort of young Med-tech companies.

The region is also already home to the other ingredients required to transform CCR into the home of next generation diagnostics including:

- **The Life Sciences Hub – funded by Welsh Government to break down the barriers to innovation in the NHS**
- **A devolved NHS – flexible enough to adopt innovation to transform the health and wellbeing of the region**
- **The Compound Semiconductor Cluster – the future of electronics; faster, lighter, cheaper, with additional functionality**

Our aim is to bring these strands together into a thriving, R&D-led Med-tech cluster, creating an ecosystem where businesses can work in tandem with cutting-edge research, draw on the potential that compound semiconductors present, and deliver innovation directly into the NHS, benefitting the health and wellbeing of the region whilst also driving economic growth. At the centre of the vision is a Med-tech ecosystem, built on the Cardiff Edge site at Junction 32 of the M4. The aim is to create a connected, competitive and resilient site which goes far beyond a typical science park. In doing so, we will create a magnet for inward investment, and a skills pool to compete with Oxford, Cambridge and the North West.

The site itself is ideally located, with excellent rail infrastructure thanks to the Metro project, and its location on the M4 provides an easy commute from any part of the Capital Region. The CCR City Deal is proposing to invest in this site as a Joint Venture.

Proposition

Creation of:

- **Cutting-edge facilities (including cleanrooms and laboratories) with flexibility to cater for Medical Devices and Diagnostics companies, of all sizes and maturities**
- **A RTO specialising in product design, prototyping of medical devices and implants**
- **An open access facility for clinical development and training, providing facilities and expertise to test novel devices for regulatory approval, provide expert advice on regulatory pathways and to train surgeons in their use. Such a facility will be unique in the UK**
- **A University Health Data Academy, training the next generation of data scientists on live business data challenges and using public health data-sets**

These facilities and centres will be tailored to addressing challenges for scaling businesses in the sector. In so doing we aim to create a strong draw for inward investment and relocation of talent.

Requirements

£200m

To create the conditions necessary for the CCR to become the devices and diagnostics capital of the UK.

Activation of a med-tech mission

For a challenge fund linked to upcoming ISCF calls

Unlocking of IPO patents

For advance and repurpose orphan IP

Support from DTI

For targeted inward investment and mobilisation of med-tech partnerships formed via the Global Welsh Diaspora

Placement of a Med-tech discovery programme

Via ARPA-satellite presence

CREO MEDICAL

bbond DIGITAL HEALTH SOLUTIONS

Ortho Clinical Diagnostics

RENISHAW apply innovation™

CORE 3

Creating a Digital National Accelerator

Wales has the fastest growing digital economy outside of London, and the growth of the financial and professional sector in Wales has led to a thriving Fintech industry.

In the CCR, financial services companies such as FTSE 100 Company Admiral is among the region's largest employers. In addition, the CCR is a data rich region which has significant data resources. We have a world class Data Centre in the region and over 70% of UKG data is held in entities such as IPO, ONS, and Companies' House, all of which are domiciled in the CCR. With key developments such as the National Software Academy, Wales Centre for Digital Public Services and INFUSE – there is now real potential for us to harness the power of our data assets and become a stand out location for data-rich services that support both the public sector and thriving sectors like Fintech and Insuretech.

The Welsh fintech scene is now one of the most active in the UK thanks to its innovative talent pool and growing investment opportunities. Wales' thriving tech ecosystem with its growing supply chain combined with entrepreneurial universities provides a firm foundation for fintech to thrive. There is a vibrant community in Wales' technology scene, which allows start-ups, investors and larger companies to meet and share ideas through accelerators and incubators as well as networking events and flexible workspaces.

Furthermore, Wales is home to the first financial technology undergraduate degree. With the changing economic and technological climate in Wales, financial services and the technologies that run them will continue evolving to meet newer and faster-changing demands. The agility required in the financial markets of the future will require new innovations in technology and systems

Finally, the "Kalifa Review of UK Fintech", published on February 26 2021, now provides a clear strategy and delivery plan to ensure the UK can capitalise upon the opportunities fintech presents. Within this report, Wales - and in particular Cardiff and SE wales- is noted as one of the top 10 clusters in the UK with potential for significant growth, and developing real areas of excellence.

Proposition

- **Creation of digital accelerator capability to exploit data at scale for the development of insight, foresight and intelligent techniques.**
- **Development of skills programmes, providing "skills ladders" for data science, software engineering and AI, from secondary school interventions through to FE, HE and apprenticeships, enabling flexible upskilling, reskilling, entrepreneurial skills and CPD in Academies aligned to business.**
- **Knowledge exchange and greater capacity building for co-creating data/AI solutions - business acceleration activity, from start-ups to large companies, through agile projects with industry having access to rapid data analysis, modelling and AI expertise**
- **Application of a Venture to Scale up fund - an equity based fund to support new start- ups/ entrepreneurs in the phase from launching the initial venture, through to the point where it is substantive enough to become eligible for scale-up funding.**
- **Creation of a centralised Fintech hub -To offer shared support services, skilling and flexible working environments to de-risk new companies and entrepreneurs, as well as providing a "soft landing" space for on-boarding new companies.**

Requirements

£100m

To be injected into the development of DNA

Fiscal levers

Development of fiscal levers linked to data development and region's data credentials targeted at start-ups.

Confused.com

FinTechWales

infuse
GWASANAETHAU ARLOESOL Y DYFODOL
INNOVATIVE FUTURE SERVICES

CORE 4

Developing a Cyber Innovation Hub

Wales has a thriving cybersecurity sector which is growing an international reputation based on externally validated evidence – an internationally recognised mix of cybersecurity-focussed big business, a critical mass of small enterprise and GCHQ-recognised academic excellence – promoted by Welsh Government strategy.

Thales and Airbus have laid significant roots in cybersecurity innovation and are heavily engaged with public sector activities. Thales' National Digital Exploitation Centre in Ebbw Vale and Airbus' CyberLab in Newport represent £28m of investment in cybersecurity innovation in partnership with Welsh Government, Cardiff University and University of South Wales.

We have two Universities - Cardiff and USW that are recognised by the National Cyber Security Centre (part of GCHQ) as Academic Centres of Excellence in either research or teaching. Their work underpins ground-breaking research that has seeded spinouts and SME's and been translated into larger businesses. This creates a strong, sustainable supply chain in Wales, recognised and valued by its businesses. Having these ingredients makes us a nationally excellent cybersecurity ecosystem.

The Cyber Innovation Hub will provide the catalyst to significantly increase the number of cyber security businesses in the region and in so doing, attract further private investment and enhance our cybersecurity skills and talent pool.

The Hub will bring together market-driven cybersecurity challenges (via partners including Airbus, Thales, BT), the GCHQ-recognised research and skills excellence at Cardiff University and USW, and the Alacrity Foundation's experience of cultivating successful start-ups.

With innovations being tested against real, controlled cybersecurity attacks on a world-class "digital twin" infrastructure; and a unique set of cybersecurity reskilling courses - the CCR cybersecurity cluster will become a focal point for Cybersecurity businesses and investment both locally and internationally.

Proposition

The Hub will seek to:

- **Develop an MSc qualification in Cyber/ Ethical Hacking in partnership with Cardiff University, USW and backed by PWC.**
- **Create a physical space for FDI, demonstration and open innovation through the Cyber Demonstrator**
- **Establish and deliver a Cyber Challenge Fund with business, industrial, government and academic partners**
- **Reinforce partnerships across Cyber South Wales and the West, most centrally with Western Gateway partners and collaborators**

Requirements

£50m

To develop an open innovation space for R&D and a problem-solving 'living lab' capability

£25m

For a cyber specific challenge fund

Relocation

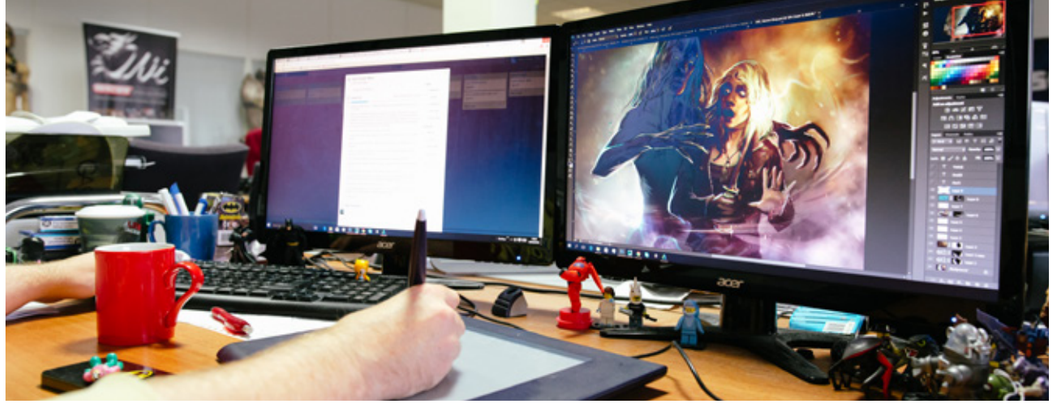
Consider relocating MoD policy development staff to the region to support a challenge based test bed approach to cyber problem solving that will have global application and relevance.

Cardiff University
Prifysgol Caerdydd

AIRBUS

THALES

University of South Wales
Prifysgol De Cymru



CORE 5

Consolidating & Expanding a Creative Capital Region

Our creative and media industries are thriving and have become one of the fastest growing sectors within the CCR.

With more than 1300 media firms, 600 of which are in Film and TV, contributing approx. £360 million GVA – the sector has become a growth engine for the CCR economy. Characterised by a high proportion of sole traders and freelancers, those working in media comprise 7% (and rising) of the region's workforce and represents one of highest sectoral employment concentrations in the UK. Since 2016, 34% of all new jobs in the UK's media sector have been located in the CCR.

South East Wales has become the place where creative companies and talent flourish – a recognised centre for TV and film production, home to BAFTA, Emmy and RTS award-winning businesses that are pushing the creative envelope domestically and globally, with fast developing international trade links and pioneering workforce training initiatives.

The CCR creative ecosystem is now in place to grow this success even further, with industry-leading names such Bad Wolf, Bang Productions, Dragon Studios, Screen Alliance Wales, Gorilla Post-Production and Mad Dog Casting very much part of the fabric of our creativescape and are all fully supported by our universities. It's no coincidence that major studios and big hitters in the creative industry are choosing Wales over other worldwide locations. Not only is our Region is blessed with incredible natural assets, the lure is in fact economic and largely due to a long-term strategy by the Welsh Government, led by its Creative Industries Sector Panel.

Since its inception in 2010 the Creative Industries Sector Panel has played a pivotal role in attracting over £100m of investment into Wales. The panel's support helped bring Pinewood Studio Wales and Wolf Studios Wales to Cardiff – and Bay Studios to Swansea – facilities which between them have already hosted Amazon Prime's Paris-set drama series The Collection, Da Vinci's Demons and the Netflix feature film, Apostle. The world's film-makers are flocking here to exploit the stunning locations, state-of-the-art facilities and rich seam of local expertise. At the same time, Welsh talent is creating its own home-grown drama, and exporting it to the world.

Cardiff Central Square houses the BBC's new broadcast headquarters – the first major broadcasting site in Europe to use IP broadcast technology at scale. The building is designed to be a hub for the industry, including a range of partners from the independent television and digital sectors.

Proposition

- **Enhance R&D capability through living lab style development and a range of systematic programmes that will work at creating, retaining and broadening forms of IP exploration and ownership.**
- **Explore new international markets**
- **Create a skills and development strategy that fosters innovation and creates supply networks that integrate the freelancer community.**

Requirements

£25m

To develop an innovation and R&D facility

£100m

For production facilities working in partnership with Dragon Studios, BadWolf and Great Point Media

5G Creative

Consideration of a specific programme aimed at providing enhanced 5G connectivity to optimise capabilities of the growing stage and screen sector.

GORILLA

BADWOLF

SCREEN ALLIANCE WALES

GREAT POINT

BBC cymru wales

CORE 6

Accelerating Transition to Hydrogen and a Commercial Property Energy Refit Programme

Creating the conditions for a transition to a carbon neutral economy in the CCR, using low carbon energy are considered a key enabler of economic regeneration and fundamental to improving the health and wellbeing of our communities.

In the same way that the region has areas of commercial and industrial strength that are capable of competing at a UK and international level we also have all the ingredients to develop similar growth and opportunity in the energy and environment sector.

The region has a large number of significant manufacturers who use high volumes of process gas, including Celsa, Rockwool, Dow Corning, Tarmac and Tata in Newport. It is also home to a thriving commercial and finance sector with large units of office accommodation rife for retrofit.

Capability within the region can harness industrial fuel switching as a catalyst to deploy and distribute hydrogen into wider energy demand sectors – delivering accelerated, optimised and lowest cost decarbonisation alongside renewable electricity and economic energy efficiency. Wales & West Utilities are committed to transitioning large parts of their network to hydrogen, with recent regulatory price control determinations meaning they can start laying the first hydrogen pipes within the next 5 years.

The South Wales Industrial Cluster through its Deployment and Cluster Plan Projects led by Costain and CR Plus respectively are developing proposals to produce Blue and Green Hydrogen at scale in various location across South Wales. This work will inform and help deliver the hydrogen transition across the CCR.

Proposition

— **Introduction of a "Green Deal" energy efficiency retrofit programme integrating renewable energy sources into commercial properties using the business rates mechanisms for recovery of the transition funding.**

— **Derivation of a series of trial solutions for transitioning to alternative fuel sources, including heating buildings with hydrogen heat pumps and hybrid technologies.**

— **Growing demand for hydrogen will support further expansion of the customer base and supply chain into target areas such as domestic heating, transport fuels and flexible power generation.**

Requirements

£30m

For kick start funding in order to be investment ready, with engineering and business requirements on an anchor site. This would enable the optimum industrial combinations and stakeholder buy in.

£500m

For a capital pot (£375k of which repayable over 15 years) to incentivise business customer take up.

Derogations

On arrangements for charging and collecting Business Rates to finance a revolving fund for retrofit.

passivSYSTEMS

SWIC South Wales Industrial Cluster

COSTAIN

WALES&WEST UTILITIES

IFT Freedom Project

ENABLING 1

Harnessing the Power of Digital Technology - Fibre to the Premise and 5G Enablement

The provision of high class digital services is a stimulant for innovation and the creation of new business streams, leading in turn to economic growth, social inclusion and cohesion. Accordingly it is a critical enabler for the achievement of the CCR strategic ambition and growth plans.

To date the region has suffered from a lack of commercial investment in digital infrastructure that consequently has resulted in an underlying gap in delivery capability compared with other regions of the UK. This has been brought into sharp focus throughout the Covid-19 pandemic.

It is now imperative we address the gap and future-proof fixed fibre and mobile networks in order to provide a transformative foundation for both businesses and citizens across the region. Failure to do so will result in:

- **A loss in local productivity, employment and reduction in GVA**
- **An inability to attract inward investment by highly skilled digital intensive industries**
- **An adverse impact on the delivery of local services, notably education, health and transport**
- **Environmental challenges**
- **A widening gap in access to digital services across the region leading to further isolated communities**
- **A loss of competitive advantage for the cities and development zones of the region.**

Proposition

With initiatives such as Superfast Cymru, Local Full Fibre Network, Rural Gigabit Programme and the South Wales Trunk Road Fibre Concession, together with agreed investment from the CCR Investment Framework into Full Fibre and 5G coverage, our ambition is to;

- **Deliver a world class, high-quality, full fibre and wireless digital services across the region.**
- **Provide a connectivity platform for our communities and key business sectors that enables them to compete on the global stage.**

This will facilitate:

- **Existing businesses being able to exploit Digital Infrastructure, including the use of 5G technology in machine learning and AI & VR applications, to innovate new business models, generate productivity and create new markets.**
- **New business start-ups being able to capitalise on Digital Infrastructure to operate new digitally dependent business models at lower cost and more flexibly than established businesses**
- **Communities being more self -sustaining through remote access to better digital services and by allowing rural SMEs to work and conduct business through digital platforms**
- **Advancements in smart cities/homes infrastructure offering reductions in energy use, congestion and fuel costs stemming from smart management, smart energy and smart travel systems.**

Requirements

£120m

To facilitate the roll-out of FTTP across our key industrial sites and towns across the region

£50m

To maximise the impact of 5G applications in our key clusters and support the roll out of 5G capability

ENABLING 2

Provision of Accessible, Affordable Domestic Housing Sites and Employment Premises

The region requires significant core investment into strategic sites and premises that can support foundational growth, local supply chains and sector-specific developments. In addition, support is needed for unlocking unviable sites for domestic housing development and for diversifying the quality, variety, and sustainability of local housing.

Across the UK, development funding availability remains highly limited for both debt and equity, in some sub-markets it is virtually non-existent. Traditional lenders have constrained risk appetites, offering lower leverage and often only being willing to lend when a scheme is fully pre-let. This is exacerbated by the current Covid-19 pandemic. Without developing speculative schemes, such as those that might support clusters, and creating good quality employment space for inward occupation of enterprises, the region will be at a disadvantage to other competing regions that are able to provide this occupational pipeline.

This is equally relevant for prime city-centre office space (which historically has been pre-let prior to development; this is seen less frequently in the current day) as it is for small SME industrial and manufacturing type space, where the occupiers seldom are able to plan ahead in time to commit to pre-let space. The accelerating trend in remote working, catalysed by the Covid-19 pandemic, is expected to make pre-letting even less common for at least the short-term but with likely consequences in the medium term.

Proposition

Provision of additional early stage development finance through enhancing the CCR Sites and Premises funds.Despite the lack of development debt available, there is still strong appetite from funders for completed development schemes with evidence of letting potential.

The proposed Fund provides the ability for innovative, flexible and structured finance solutions at various access points in the capital stack whilst bringing together the public and private sector to create the right environment to accelerate the delivery of projects. This will ensure that the Cardiff Capital Region is well positioned to maximise opportunities that arise in the economic recovery.

The Fund is designed to align with CCR objectives only funding projects where the strategic criteria are met. The Fund will target sectors where investment is needed and alignment to the strategic goals for CCR allowing for:

- **Regeneration & Infrastructure: Creating grade A or equivalent space, reusing Brownfield land, regeneration, and recycling capital**
- **Innovation: The Fund will target projects used to in support of innovation as well as business growth and regeneration.**
- **Skills and Employment: To promote and measure jobs creation from funding**
- **Connecting the Region: The Fund will be purposed to serve the CCR strategic approach and Funding connections within the region should also be considered**
- **Covid-19: Providing funding to kick start developments, which will attract inward investment which may have slowed due the pandemic as well as well as accelerating post covid-19 economic recovery.**

Requirements

£100m

To scale up the CCR Premises Fund to facilitate investment in cluster initiatives such as the creation of a Fintech hub.

£50m

To scale up the Housing Viability Fund over the next 5 years.

ENABLING 3

Aligning Skills Provision with Future Industry Sector Needs

To compete effectively in today's global economy confidence in a highly skilled, adaptable and dependable workforce is essential. Supply of local skills is one of the key considerations for any business deciding where to locate its operations and is of huge importance to how our region performs.

The CCR has a strong ecosystem of skills, knowledge, and research and industry collaboration. Home to Cardiff University, University of South Wales, Cardiff Metropolitan University and The Open University in Wales, together they account for around 75,000 students. This is alongside five Further Education Colleges - : Cardiff and Vale College, Coleg Gwent, Bridgend College, Coleg Y Cymoedd and the College Merthyr Tydfil supporting the learning and upskilling of an additional 60,000 learners.

There is a strong culture of collaboration between HE, FE and Industry in the region. The Universities and their industrial partners make a strong contribution to the economic and social resilience of the region and are key to future growth strategies. With a strong track record of developing collaborative solutions, including the notable recent success with the Strength in Places award to the CSconnected, we are keen to explore all opportunities for similar initiatives and to encourage further strategic collaboration and HE/FE connections with industry for activity that is aligned with the regions current and future sector needs. In so doing we will create lasting clusters and networks within the region.

Enabling 3

Proposition

- Development of "skills academies" to support our priority sectors and ensure we have both the quantum and quality of skills required to enable the achievement of the respective sector's growth objectives.
- Initial funding focus to be on the development of capability to enable the provision of 10,000 data scientists and cyber specialists over the next 5 years. This will complement our regional data assets by cementing our position as a centre of excellence for data science and cyber skills talent development.
- Consider proposals for setting up a National Software Institute.
- The intention is to promote progression into new areas of learning in new and emerging technologies and access to specialist kit/ resources and expertise on a regional basis. This will ensure that learners in all settings can engage with the reality of what jobs in the new and emerging sectors look like at all levels.

Requirements

£100m

For the establishment of skills academies for our priority sectors.

Initial funding focus to be on the development of capability to enable the provision of 10,000 data scientists and cyber specialists over the next 5 years. This will cement our position as a UK centre of excellence for data science and cybersecurity skills and talent development.

Cardiff Metropolitan University

Bridgend College Coleg Penybont

Coleg Gwent

University of South Wales Prifysgol De Cymru

ENABLING 4

Future-proofing Our Rail Infrastructure

Our vision is to develop a strategic public transport network for the Cardiff Capital Region capable of providing a high-quality, reliable, efficient and affordable transport services to support sustainable economic development and social regeneration.

This will include a high quality, integrated grid of public transport services (bus and rail) that presents a single joined up network to the passenger. Wales has the benefit of being small and compact and with its strategic location and desirable natural environment could be one of the most highly connected and accessible economies in the world.

However, over a prolonged period of time Wales has suffered from chronic underinvestment in its rail infrastructure.

The situation, which has resulted in a usage rate of 10% compared to private vehicles at 80% , now demands a forward thinking rail and integrated transport vision that incorporates proposals that radically change our mobility ecosystem. The opportunities for so doing are immense and will as a minimum:

- **Enable the region to function as a single coherent economic entity by linking communities with all major commercial, social and, health and leisure attractions.**
- **Facilitate sustainable economic growth by ensuring all major new development sites across the region are linked by metro services at the outset to embed sustainable travel choices.**
- **Facilitate more efficient labour markets.**
- **Offer significant environmental and wellbeing benefits e.g. reductions in carbon emissions, traffic congestion, RTA's.**

Accordingly, we are now working to bring forward ambitious plans for the development and expansion of our public transport. The proposition outlined is focussed on our strategic rail priorities.

Proposition

The key rail components of the vision include:

- **A major upgrade of the South Wales Main Line to form the backbone of the region's public transport network through new stations and a mix of intercity express and local commuter services. Specifically there is a need for more services from Bristol Temple Meads though Newport and Cardiff to Swansea and West Wales.**
- **Measures to address bottlenecks on the rail network to allow more services to Ebbw Valley, Marches Line, Maesteg Branch, The Vale of Glamorgan (VoG) line and the City and Coryton lines in Cardiff.**
- **Enhancements to the core valley lines through re-use of freight and the introduction of further new stations.**
- **Development of the Cardiff Crossrail, Circle and NW Corridor to deliver high quality and frequent public transport (PT) services across much of urban Cardiff, Cardiff Bay and extended into RCT to Talbot Green and Pontyclun.**
- **Radically enhanced core valley links. By integrating through high quality interchanges N+S rail services and E+W links we can make more journeys between the valleys viable and affordable.**
- **Longer term there is the potential to re-connect Caerphilly and Newport with rail services using tram-train, the on-street tramway capability of which can be applied in Newport to help avoid conflicts with the congested SWML and support regeneration in Newport**
- **Schemes across Wales and the UK that could help the CCR economy include:**
  - Western Rail Access to Heathrow,
  - Enhancement to HS2 Phase 2 and the rail lines south west from Birmingham to allow more services to/from Cardiff to use HS2 to serve places like Manchester, Leeds, Sheffield, Newcastle and onto Edinburgh and Glasgow;
  - Integrated Metro development in Swansea Bay and Bristol
  - Improved N-S services in Wales.

This programme also presents the opportunity to augment these benefits through a range of station focused development and regeneration interventions to maximise the benefits of the investment in our public transport network.

Requirements

£2bn

Capital investment contribution to progress the schemes outlined in the Passenger Rail Vision document (included with this document).

Fiscal Levers

Introduction of fiscal levers and incentives such as tax increment financing.

ENABLING 5

Green Energy

5a: **Accelerating a shift to ULEV Vehicles**

We have a significant opportunity to leverage the work being undertaken within the region in both power electronics and vehicle manufacture to lead the way in the adoption and take up of ULEVS and take a significant step forward toward our mutual zero carbon agenda, if we can expedite the roll out of a suitable EV charging infrastructure as well as refuelling stations for green gas like biomethane and hydrogen. Despite the prevalence of and preference for private vehicles, CCR has seen a slow uptake to date of electric vehicles. A similar picture exists for charger installations. CCR currently hosts 173 public charging devices, including 31 rapid public chargers.

Poor access to charge points is believed to be a significant part of the slow transition to EV along with concerns over range and restricted choice.

Work is already underway at the CCR CSA Catapult, which has created a state-of-the-art innovation centre within the compound semiconductor campus at Imperial Park, in South Wales which is accelerating the UK towards its Net Zero goal. Working with over 60 partners on projects worth in excess of £70m, this work will directly impact our ability to use more renewable energy and further electrify vehicles.

5b: **Domestic Energy Retrofit**

The region has a high level of fuel poverty and below average levels of energy performance in its EPC bandings. To put that in context:

- **154,000 homes need to be improved from EPC band G, F and moved to E to D, C and B;**
- **112,000 homes currently heated by fossil fuels to move to low carbon heating;**

Lack of incentives, funding, knowledge, and availability of skilled contractors are barriers to investment. However, the economics of retrofit needs to be considered in the context of the whole energy system, to avoid over-retrofitting buildings at a higher annual cost than consuming more low carbon energy. This is where optimisation of retrofit can be undertaken with decarbonisation of both grids and installation of intelligent and flexible heating, such as hybrid heating systems demonstrated through the pioneering Freedom Project undertaken by the local electricity and gas networks in Bridgend.

5c: **Renewable Electricity Generation**

The ambition is that the region will generate the equivalent of ~50% of its total energy consumption in 2035 from regional renewable sources. Analysis indicates that it is possible to install 1.6GW of renewable electricity in the CCR region (which includes 532MW of wind and 820MW of solar.

Additional opportunities also exist with approximately 70MW of wind projects identified on the public sector estate, with favourable grid and planning prospects.

Enabling 5

Proposition 5a:

- **Expedite the roll out of EV charging stations across the region so that we have the necessary infrastructure to capitalise upon the work being undertaken in both power electronics and vehicle manufacture.**
- **Engagement with bus and freight operators will be key to encouraging ULEV uptake. Our aim will be to increase operators' knowledge and awareness of different technologies and support them with access to funding. However, take up is likely to remain low until the necessary charging and refueling infrastructure is in place.**

Proposition 5b:

In order to increase take up of measures we propose the following:

- **Undertaking a full review of potential funding mechanisms. Consideration of grant funding where no suitable payback measures are viable.**
- **Commissioning a wraparound survey and specification offer to enable properties to be rapidly assessed and projects developed at scale and pace.**
- **Implementation of a trusted contractor scheme to deliver the works.**

Proposition 5c:

- **Galvanise the construction of renewable proposals and de-risk the local ownership requirement through injecting a public sector stake into the mix. A stimulus injection of funds equivalent to a 20% equity stake into the 1.6gw pipeline would heighten investor confidence and expedite activity.**

Requirements

£700m

In the form of repayable stimulus funds to incentive transitions – split £400M, £200M, £100M - domestic refits / renewables and ULEV.

Derogations

A derogation or ability to flex the Council Tax system in order to establish repayment mechanisms.

Wider Proposals

The primary purpose of this document is to set out a compelling vision for a series of core and enabling propositions that will enable us to further develop our sectors and harness the full economic potential of the region.

However, there is an even bigger opportunity to be at the forefront of new economic frontiers and to pioneer some of the higher-risk and higher-reward opportunities that we believe are of transformation-scale and could drive further world-class benefits for Wales and UK. Whilst these are currently not as well developed as the enabling and core propositions, they are emergent ideas we believe could have real currency but would require a joined-up approach across all levels of government to deliver.

1 Newport Data City

A large amount of UK Government data is held in the CCR through Government bodies such as ONS, IPO and Companies House. These non-departmental government bodies are located on the outskirts of cities. Working in collaboration and in tandem with core propositions such as the Digital National Accelerator, there is an opportunity to re-locate such entities into Newport City Centre, alongside USW and the Alacrity Foundation HQ. The focus on data accumulation, data analysis, data science and knowledge transfer would be a powerful combination especially when combined with a strong research base, emphasis on challenge and mission driven thinking, the commercialisation expertise of Alacrity and proposals for the National Software Institute.

2 Strategic Development of Severnside

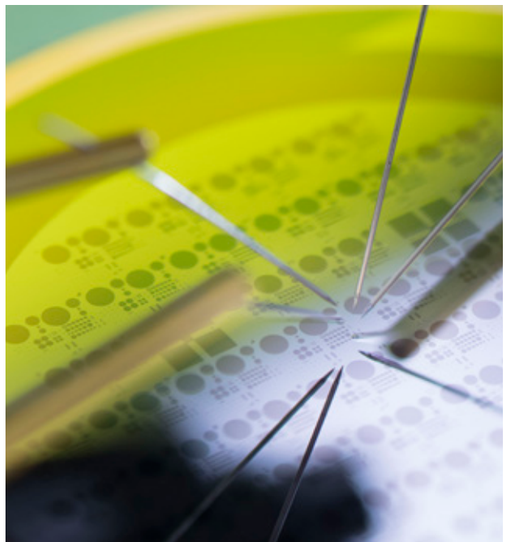
Severnside is integral to the Western Gateway economic geography and home to the second highest tidal range in the world. There is a significant opportunity to develop this in line with the Green Industrial Revolution 10 Point Plan. The concept of a Severn Barrage, comprising offshore wind and tidal power generation has immense potential to develop significant economic impact across the Western Gateway Partnership. There is the potential for all of this to be reinforced through the designation of Newport as a Free Port in partnership with Associated British Ports.

3 Hydrogen Hubs

Locations like Bridgend and parts of the Valleys with strong industrial legacy and renewable energy credentials have the opportunity to spear-head development of hydrogen hubs to deliver affordable net-zero transport for the city region. The use of hydrogen as a clean fuel for transport is attracting serious attention in the region with companies like Riversimple actively testing capacity in locations such as Monmouthshire and the South Wales Industrial Cluster exploring the ways in which hydrogen can be produced and distributed beyond industrial facilities to power fleets, heat homes and generate electricity.

Gigaplant for LEV Innovation

St Athan in the Vale of Glamorgan is a former MOD-owned strategic site which analysis shows is one of only a handful of sites capable of housing one of the Gigaplants needed in the UK to secure lithium-ion battery production and storage for the electric vehicle industry. Building upon work done to date with the Farady Institute and market intelligence on the future automotive market in the UK – St Athan offers a significant and "shovel ready" facility for a suitable industrial partner. The region is already home to Oxis, Yuasa batteries, CAPSE and others looking to locate here and leverage on the growing ecosystem of skills, research and industry footprint. Major partnerships working within the region include TATA, SERC, CAPSE and Ricardo and Flexis, a collaborative £24m research programme between Cardiff University, Swansea University, University of South Wales and large number of industrial partners.



Business and Innovation Districts

The 2014 Enterprise Research Centre analysis of the innovation geography of the UK demonstrated a strong "Arc of Innovation" along the M4 corridor, taking in Gloucester and Oxfordshire, but that it stopped east of the Severn Bridge. Given the work now underway on key sectors, recognition of the linkages between strong research and economic strength of place and the benefits of a clusters framework, there is a real opportunity to create levers and incentives for a SW-based M4 Innovation Corridor. This could provide connectivity into the Western Gateway around areas of shared economic strength and the basis for more formal collaboration across research entities and industrial groupings.

Contact Us

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Cabinet Prifddinas Ranbarth Caerdydd | Cardiff Capital Region Cabinet

7 DECEMBER 2020

TOWARDS AN ENERGY STRATEGY & IMPLEMENTATION PLAN FOR THE CARDIFF CAPITAL REGION

REPORT OF CARDIFF CAPITAL REGION DIRECTOR

AGENDA ITEM 8

Reason for this Report

1. To provide Regional Cabinet with details of the proposed CCR Energy Strategy for consideration and approval, along with details of the proposed next steps and associated timescales.

Background

2. There is consensus across the Cardiff Capital Region (CCR) that a huge transformation is needed in the way in which energy is generated, transported and utilised. This shift is needed in order to meet UK net zero carbon targets by 2050, enhance health and wellbeing of our citizens; support a just transition to a clean growth economy and protect the environment for future generations.

3. The Welsh Government Energy Service (WGES) is working with each region across Wales, with a support package up until March 2022. This partnership has created a CCR Energy Vision and Strategy with the assistance of over 100 key stakeholders across the region. The strategy has considered the 'business as usual' decarbonisation pathway alongside a detailed future scenario to put the region on a pathway to achieve net zero by 2050. The options and choices are stark and there are no neutral decisions.

Issues

<u>Energy Challenges and Opportunities in CCR</u>

4. The purpose of this report is to present the emergent Energy Strategy for the region. Whilst the urgency around the agenda is recognised, by March 2021, there is some important work to do to:

   - co-ordinate and align the regional approach to local strategies of the ten Councils and scope of individual climate crisis pledges so that a co-ordinated implementation plan can be developed;

- commence development of said implementation plan, in partnership with stakeholders and the WGES as a means of informing both City Deal and City Region opportunities. The latter will be particularly relevant given the evolution to a Corporate Joint Committee model and the wider funding streams and investment opportunities that can be secured through an expanded remit and focus;
- as part of the implementation plan, to scope the first 'Energy Mission' or challenge for the region – recognising the interlinked characteristics of climate crisis, historic low growth/ productivity in the region and the post COVID-19 recovery;
- embed a core set of energy 'asks and offers' within the investment prospectus for levelling-up, that showcase the potential for transformative programmes of activity; and,
- agree the strategy and implementation plan in readiness for the new financial year and the commencement of the new JWA Strategic Business Plan which will commence in 2021 and highlights the need for an amplified emphasis on decarbonisation as part of 'Build Back Better'.

5. Many scientists and commentators believe that the next 15 years will be the most consequential period in the history of humanity, demanding from us our best endeavours in dealing with a global pandemic and a climate and extinction emergency. As a result of COVID-19 and the huge scarring effects on global and local economies alike, all of this will play out against the backdrop of what certain experts are calling 'a systemic economic crisis'.

6. The interlinked challenges of climate, historic UK low growth-productivity and the post-COVID economic recovery, make for a real opportunity for CCR to play a distinctive role in the radical shifts and transformations required. This must build upon the region's unique natural energy generating assets and using the strength of our existing manufacturing base as a springboard for a transition to a hydrogen economy, with the creation of multiple Clean Growth hubs.

7. The recent '10 Point Plan for a Green Industrial Revolution' by UK Government provides important context. Coupled with continued commitments to increased R&D and infrastructure spending, there is an opportunity to align CCR's work to this and ensure the flow of public investment to catalyse such developments and 'level-up' the UK economy.

8. Our vision for Cardiff Capital Region was approved by Regional Cabinet 19/12/19 is:

   To create the conditions for a transition to a carbon neutral economy and society in the CCR, using low carbon energy as an enabler of economic regeneration, growing our regional income whilst maintaining guardianship of our environment through a laser-focus on clean growth

9. The strategy and forthcoming implementation plan must build upon this quickly and together with key developments such as the Levelling-up Prospectus, present a place-based proposal for a clean growth economy.

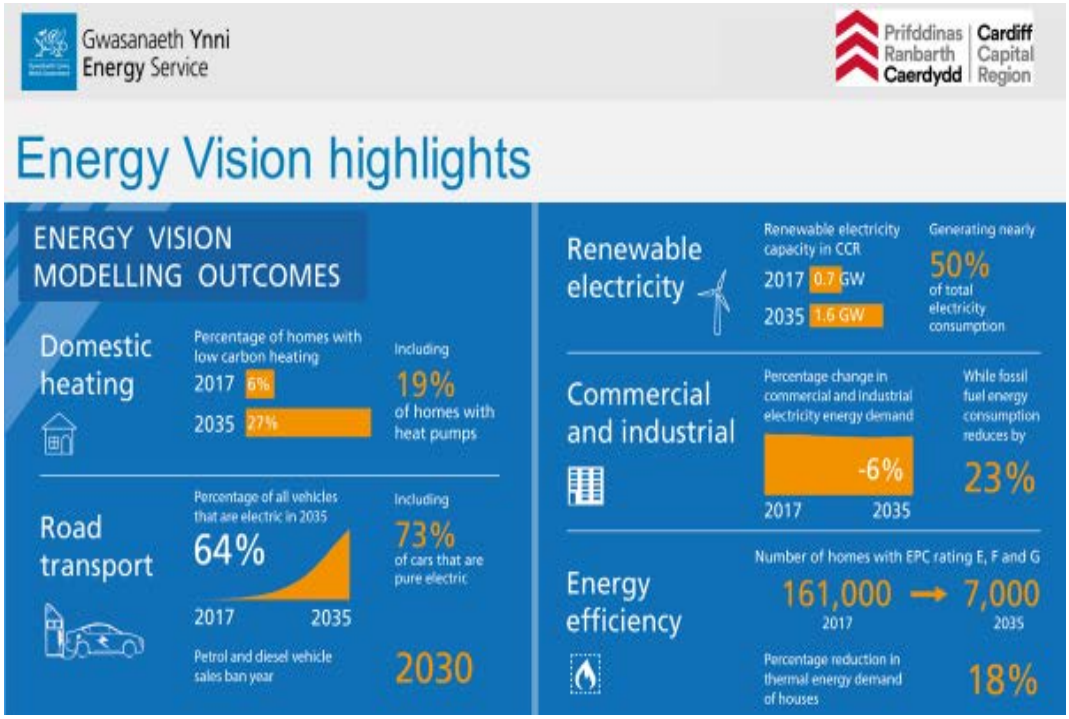
Data and Insights

10. Analysis shows that within all sectors in the region, energy use is 33 terawatt hours each year across heat, electricity, transport and fuel. This is significant and compared to Mid Wales which uses 5 terawatt hours – demonstrates the hive of industrial and consumer activity in CCR. Currently only about one sixth of this comes from renewable sources, predominantly electricity. The challenge of decarbonising the remaining five sixths is significant. The analysis pertaining to this is captured in the draft CCR Energy Strategy (Appendix 1).

11. To meet the targets Cardiff Capital Region needs to reduce emissions from its energy system by 55% by 2035, split by sector as follows:

- 51% reduction in domestic heat and power emissions;
- 54% reduction in commercial and industrial emissions;
- 60% reduction in road transport emissions.

12. The indicative requirements of the transformation, modelled to achieve the future vision are shown below:



Making it real – Implementation

13. The draft Strategy, whilst containing key data, evidence and early thinking and concepts, must now quickly translate to an implementation plan. This will comprise an actionable plan in its own right, key pillars of which are likely to mirror the following:

Levelling-up

14. Off the back of work undertaken to prepare the draft strategy, there are a set of draft proposals currently being developed to inform the Levelling-up Prospectus. Levelling-up is a significant area of policy focus at this time, key to making UK Government investment work for the whole of the UK and ensuring the benefits of both infrastructure and R&D investment extend beyond the 'golden triangle'. These emergent proposals are set out for information only at Appendix 3, with the proviso that they the full Levelling-up Prospectus containing a whole set of asks and offers, will be brought to Regional Cabinet for consideration early in the New Year. At this stage, it provides insight into objectives around domestic and commercial retrofit, hydrogen demonstration and harnessing tidal power. The Levelling-up Prospectus proposal is predicted to give a GVA of £1.2bn and 12,414 jobs, reflecting the specific job qualities of energy efficiency and renewable technologies.

Energy Mission

15. The characteristics and challenges of climate crisis, low growth-productivity and the COVID-19 economic recovery are interlinked. The scale of the problems and their sheer complexity means they cannot be solved through 'same old' approaches. There is a growing body of work in the UK principally driven by the UCL Institute of Innovation and Public Purpose, which demonstrates how challenge or mission-driven thinking can offer a more effective way of solving problems since it is data, R&D and knowledge -intensive. It also provides a focus on societal factors such as behavioural-change and gives a structure to public investments that respond to the problem posed, rather than the unsatisfactory answers that already exist. This means a stronger influence on the rate and direction of innovation.

16. Such an approach has already been applied to UN SDG goals and in CCR, the Local Wealth Building Challenge Fund is a strong example of such a challenge-driven approach. Given the commitment to replicate challenge funds in CCR, development of an Energy Mission spawning a myriad of energy challenges and demonstrators, will form a key pillar of the implementation process.

Next 5 Years and Beyond for CCR

17. The new JWA Strategic Business Plan is a transition document that seeks to transition the CCR City Deal into the CCR – offering opportunities for regional public investment at scale and outside of the parameters of one funding programme. One of the key areas of this plan 'Five for Five' is Build Back Better which places an emphasis on embedding energy objectives into economic objectives – in order that the societal and economic impacts are maximised. Not only will this help development of specific programmes and projects, it will assist

the mind-set change needed in showing wealth and wellbeing objectives, as closely aligned.

18. In addition, the JWA 5-year Business Plan is about moving into an environment broader and more diverse than City Deal and pioneering regional economic governance through the CCR Cabinet as the Corporate Joint Committee. This will open up opportunities for regional public investment on a wider scale. With the prospect of more place based funding for R&D, infrastructure, the new Shared Prosperity Fund, Green Industrial Revolution Fund (£12BN) and a revised Industrial Strategy, this will position CCR to bring together all of the public funding investment opportunities that can be used to lever in additional private money and partnerships to deliver on ambitions.

Transport work

19. Metro Plus and other local transport worked commissioned under the Local Transport Fund, all contain an element of carbon reduction. The LEV Taxi Strategy and plans to acquire a fleet of EVs in the region, as well as the £1.3M ULEV procurement, are all now underway. In addition the regional electric bus feasibility study is underway alongside feasibility for the introduction of 140 7kw for car-parking facilities across the region. Whilst all this is being reported into the Regional Transport Authority, it will be important to see this aligned and combined into core energy development work ongoing.

Engagement

20. The implementation process will also be informed and shaped by further engagement. Extensive engagement has already taken place via the regional energy officers group, via all Council Economic Development Leads, open-workshop events run by CCR and WGES and the Regional Business Council and the Regional Economic Growth Partnership. Wales and West Utilities has bene close to this work and this must be built upon to align with stated ambitions to decarbonise the gas grid in South Wales. All this continued work will be critical in ensuring ownership, buy-in and complementary connections across LA strategies and climate crisis pledges.

21. Engagement will be continue to driven by a continued focus on developing the evidence base and data – not just in relation to the scale of the challenge – but the scale of opportunity. High-level investments and the resulting GVA outputs and net job figures are shown below, which were produced as part of the Regional Energy Planning work by Welsh Government Energy Service specialist advisors. Investing to achieve the Vision produces more GVA and net jobs than a Business as Usual scenario.

22. The techno-economic analysis from the REP work shows that the investment needed between now and 2035, in order to meet the energy system transformation, totals £8.6bn, with investments required from a range of stakeholders. This investment would result in 47,330 (mostly net) jobs and a £7.2bn uplift in GVA.

Key issues

23. The WGES package of support will continue until March 2022, however, this is on the understanding that CCR defines responsibilities to continue what has been started. Prioritisation of this support can be discussed and prioritised but the proposed areas are to:

- maintain the current momentum;
- develop the implementation process as described (para 12-21 above);
- embed wherever possible into CCR City Deal activity;
- continued engagement to synch with work begun by Councils in the region (bus charging infrastructure, e-bikes, public charging points, feasibility studies, hydrogen storage, smart-grids, community heat networks and fleet review);
- undertake detailed analysis of grid constraints and opportunities working with Western Power;
- align the project proposals to work streams on energy efficiency, renewable electricity, fleet decarbonisation and hydrogen (working with Wales and West Utilities).

24. In addition CCR have implemented the Cardiff Capital Region Ultra Low Emission Vehicle Strategy and One Planet Framework and are currently procuring services for taxi charging infrastructure and concession contract. This will have a region-wide impact and therefore the opportunities for alignment and development complementary interventions are strong.

25. All of the above projects represent a step in the right direction, however a significant increase in scale and volume of interventions and investment is required to deliver these aspirations.

Resources

26. Scaling up of the current progress will require a commitment to shared purpose, cross-sector engagement and a focus on outcomes detailed in the CCR Regional Strategy. Currently, there is no dedicated resource within CCR for Energy work. It is therefore suggested that to match the investment being made by WGES, a sum of £50,000 from the top-sliced WIF Project Development Fund is made available to develop this work.

27. In addition, resource requirements to be set out in the Joint Committee Revenue budget in February 2021, will make the case for a further 3 permanent roles to the CCR establishment with the remainder of the team continuing to comprise secondments and fixed term posts. One of these posts is the proposed Transport and Energy Co-ordinator.

Governance

28. The proposed Transport and Energy Co-ordinator working to the Infrastructure head will be responsible for holding this programme together and convening the regional groups and stakeholders. All decisions and approvals required in line with the implementation process above will be brought before Regional Cabinet for consideration and approval. The Regional Transport Authority, Regional

Economic Growth Partnership and Business Council will remain as major stakeholder groups to this work, bringing together the necessary public, private, HEI and community sector expertise required.

Reasons for Recommendations

29. To seek Regional Cabinet approval of the draft strategy with the detailed work on implementation as set out in this to follow in March 2021.

Financial Implications

30. The report requests £50,000 is allocated from the Wider Investment Fund of CCR in order to match fund work with the WGES in order to develop a detailed implementation plan. Staff resources required to support this work will be managed from existing CCR budgets in order to inform a further report to Regional Cabinet. This report will aim to highlight a programme and ask for future investment and interventions in regional decarbonisation programmes.

31. Appendix 3 sets out indications of the costs and scale of potential revenue and capital investment which would need to come from Public, Private and Domestic sectors. These potential financial implications will need to be detailed further as part of any implementation plan and funding strategy, highlighting specifically any commitments being made using CCR Wider Investment Funding. Any future report will need to also consider the costs of establishing and operating any regional agency mechanism or relevant structures to support the delivery of any approved implementation plan.

Legal Implications

32. CCR will note that they are being asked to approve a draft energy strategy. All decisions and approvals required in line with the implementation of that strategy will be brought before Regional Cabinet for relevant consideration and approvals in due course. Therefore, there are no specific legal implications at this stage.

33. However, in considering its endorsement of this report the Regional Cabinet must have regard to, amongst other matters:

    (a) the obligations set out in the Welsh Language (Wales) Measure 2011 and the Welsh Language Standards;

    (b) the public sector duties under the Equality Act 2010 (including specific Welsh public sector duties). Pursuant to these legal duties, when making decisions, public bodies must have due regard to the need to (1) eliminate unlawful discrimination, (2) advance equality of opportunity and (3) foster good relations on the basis of protected characteristics, which are set out in section 4 of the Equality Act 2010;

Well-Being of Future Generations (Wales) Act 2015

34. In developing the Plan and in considering its endorsement regard should be had, amongst other matters, to:

a) the Welsh Language (Wales) Measure 2011 and the Welsh Language Standards;

b) public sector duties under the Equalities Act 2010 (including specific Welsh public sector duties). Pursuant to these legal duties Councils must in making decisions have due regard to the need to (1) eliminate unlawful discrimination, (2) advance equality of opportunity and (3) foster good relations on the basis of protected characteristics. Protected characteristics are: a. age; b. gender reassignment; c. sex; d. race – including ethnic or national origin, colour or nationality; e. disability; f. pregnancy and maternity; g. marriage and civil partnership; h. sexual orientation; I. religion or belief – including lack of belief, and;

c) the Well-being of Future Generations (Wales) Act 2015. The Well-being of Future Generations (Wales) Act 2015 ('the Act') is about improving the social, economic, environmental and cultural well-being of Wales. The Act places a 'well-being duty' on public bodies aimed at achieving 7 national well-being goals for Wales - a Wales that is prosperous, resilient, healthier, more equal, has cohesive communities, a vibrant culture and thriving Welsh language and is globally responsible. In discharging their respective duties under the Act, each public body listed in the Act (which includes the Councils comprising the CCRCD) must set and published wellbeing objectives. These objectives will show how each public body will work to achieve the vision for Wales set out in the national wellbeing goals. When exercising its functions, the Regional Cabinet should consider how the proposed decision will contribute towards meeting the wellbeing objectives set by each Council and in so doing achieve the national wellbeing goals. The wellbeing duty also requires the Councils to act in accordance with a 'sustainable development principle'. This principle requires the Councils to act in a way which seeks to ensure that the needs of the present are met without compromising the ability of future generations to meet their own needs.

   Put simply, this means that Regional Cabinet must take account of the impact of their decisions on people living their lives in Wales in the future. In doing so, Regional Cabinet must:

   - look to the long term;
   - focus on prevention by understanding the root causes of problems;
   - deliver an integrated approach to achieving the 7 national well-being goals;
   - work in collaboration with others to find shared sustainable solutions;
   - involve people from all sections of the community in the decisions which affect them.

35. Regional Cabinet must be satisfied that the proposed decision accords with the principles above. To assist Regional Cabinet to consider the duties under the Act in respect of the decision sought, an assessment has been undertaken, which is attached at Appendix 2.

Equality Act 2010

36. In considering this matter, regard should be had, amongst other matters, to the Councils' duties under the Equality Act 2010. Pursuant to these legal duties the Regional Cabinet must in making decisions have due regard to the need to (1) eliminate unlawful discrimination (2) advance equality of opportunity and (3) foster good relations on the basis of protected characteristics. Protected characteristics are:

- age;
- gender reassignment;
- sex;
- race – including ethnic or national origin, colour or nationality;
- disability;
- pregnancy and maternity;
- marriage and civil partnership;
- sexual orientation;
- religion or belief – including lack of belief.

RECOMMENDATIONS

37. It is recommended that the Cardiff Capital Region Regional Cabinet:

a) approves the draft CCR Energy Strategy as set out in in Appendix 1;

b) notes the next steps around the Implementation Process as set out in the report above and will receive the full Implementation Plan in March 2021;

c) approves a £50,000 match revenue budget for the development of the Implementation Plan process.

Kellie Beirne
Director, Cardiff Capital Region City Deal
7 December 2020

Appendices
Appendix 1 Draft Regional Energy Strategy
Appendix 2 Regional Energy Plan Summary (one page slide)
Appendix 3 Levelling Up for Energy – Emergent Ideas
Appendix 4 Well–being of Future Generations Assessment

Prifddinas Ranbarth Caerdydd | Cardiff Capital Region

Cardiff Capital Region Energy Strategy

Funded & supported by:

Llywodraeth Cymru Welsh Government

Gwasanaeth Ynni Energy Service

Contents

Executive summary 4
Acronyms and abbreviations 10
Introduction and Background 12
Regional energy strategy overview 12
Impact of the COVID-19 pandemic 13
Our Energy Vision 17
The principles behind the vision 17
Our priorities 18
Our energy system, energy use and emissions 23
Modelling an Energy Vision scenario 23
Baseline and modelling results: by sector 26
Our Energy consumption 26
Our domestic energy consumption 29
Our commercial and industrial energy consumption 38
Our energy demand from transport 41
Baseline and modelling results: Electricity 44
Our annual electricity demand 44
Our electricity generation 46
Summary 54
Economic Assessment 58
Next Steps 69

Executive Summary

Executive summary

This regional energy strategy for the Cardiff Capital Region was commissioned by the Welsh Government and supported by the Welsh Government Energy Service. It has been developed by Cardiff Capital Region City Deal with additional support from regional stakeholders. In this report the use of "We" refers to this collective group of stakeholders.

The overall objective of the strategy is to develop a strategic pathway identifying key interventions to deliver on the region's ambitions for decarbonising its energy system. An Energy Vision scenario has been modelled to set out a potential decarbonisation route that will put the region on track to achieve a net zero energy system by 2050.

Our vision for Cardiff Capital Region (CCR) is:

To create the conditions for a transition to a carbon neutral economy and society in the CCR, using low carbon energy as an enabler of economic regeneration, growing our regional income whilst maintaining guardianship of our environment through a laser-focus on clean growth.

Our priorities for achieving this vision are:

1. Energy efficiency and heat
2. Electricity and flexibility
3. Decarbonise transport
4. Grow business and jobs
5. Coordination, planning, regional support and ownership of the plan

The baseline energy assessment sets out the current energy use and generation in the region:

- Cardiff Capital Region currently consumes around 36% of all energy consumed in Wales, less than its 49% share of the population;
- Between 2005 and 2013, total energy consumption fell by 22% and since 2013, energy consumption in the region has remained relatively stable. The associated greenhouse gas emissions have fallen by 35% from 2005 to 2017;
- The region's total energy demand is split roughly into thirds across transport, domestic heat and power, and commercial/industrial heat, power and processes.
- Commercial and industrial electricity consumption constitutes 55% of all electricity consumption in the region, approximately 10% less than the Great Britain average;

- Renewable assets located in the Cardiff Capital Region currently generate the equivalent of 25% of the region's electricity consumption;
- Cardiff Capital Region currently hosts 22% of Wales' renewable energy capacity, with 311MW of solar PV and 299MW of onshore wind;
- Of the 709MW of renewable energy installed capacity in the region, 221MW (31%) is locally owned;
- 50% of renewable generation in CCR is from onshore wind projects and 18% is from solar PV;
- CCR has the lowest number of renewable heat installations with just 0.2% of homes having a heat pump or biomass boiler;
- 90% of homes are connected to the gas network, the highest of any Welsh region and above the GB average.
- Approximately 27,000 homes (~4%) are currently fuelled by oil, LPG, coal or other solid fuels;
- The average EPC rating is D and the region has the highest average energy efficiency ratings in Wales, with 75% of homes rated as EPC band D or above.
- Transport in the region is dominated by private car use with ~0.3% of cars pure electric, compared with an average of 0.6% of vehicles across Great Britain.
- CCR currently hosts 173 public charging devices, including 31 rapid public chargers.

Note on scope: the baseline assessment and strategy is focussed on the energy system only, covering power, heat and transport. Very large industry is excluded due to a lack of data availability, and it does not include greenhouse gas emissions or sequestration from non-energy related activity such as land use. The large industrial users should be included in the Zero2050: South Wales project led by National Grid.

Achieving our energy vision for Cardiff Capital Region: to meet Welsh Government targets, and to be on track for net zero by 2050, Cardiff Capital Region needs to reduce emissions from its energy system by 55% by 2035, split by sector as follows:

- 51% reduction in domestic heat and power emissions;
- 54% reduction in commercial and industrial emissions;
- 60% reduction in road transport emissions.

Figure 1: Summary of the Energy Vision's emission reductions by sector. Source: WGES analysis

The energy vision scenario modelling assumes a significant shift away from business as usual across these three sectors by 2035. The assumptions of the modelled future vision include:

Domestic:

- 154,000 homes improved from EPC band G, F and E to D, C and B;
- Over 140,000 heat pumps installed;
- 42,000 suitable houses accurately fitted with internal or external wall insulation;
- Over 185,000 other insulation measures in homes;
- 112,000 homes currently heated by fossil fuels to move to low carbon heating;
- Replacing heating systems in oil, LPG and solid fuel heated homes prioritised;
- No new gas connections for homes from 2025.

Commercial and industrial:

- A significant energy efficiency programme to reduce energy demand by 13%;
- A switch to alternative fuels, including hydrogen and electrification of heating;
- Decarbonising the electricity network through renewables and behind the meter renewable generation.

Road transport:

- 64% of vehicles driven in Cardiff Capital Region in 2035 are electric, equivalent to 15,000 more electric vehicles per year by the mid-2020s, peaking at 70,000 per year in the 2030s. This is to be facilitated by the deployment of 10,000 public and on-street EV chargers;
- 3,300 gas and hydrogen HGVs and 1,000 hydrogen vehicles;
- A 20% reduction in private vehicle mileage by 2035;
- A slowing of the growth in total number of vehicles on the road, facilitated by increased use of public transport and active travel.

Renewable electricity generation:

- 532MW of onshore wind installed (233MW of new capacity);

- 830 MW of solar PV installed (520 MW of new capacity of which 190 MW is roof-mounted and 325 MW from solar farms.);
- Sufficient flexibility, including storage, and network infrastructure upgrades to enable low carbon generation and demand technologies to connect;
- The region to generate the equivalent of ~50% of its total energy consumption in 2035 from regional renewable sources.

These assumptions summarise the level of action required between 2020 and 2035 to be on track to achieve net zero by 2050. The energy modelling focuses on known decarbonisation technologies and actions that could be implemented by 2035 in order to demonstrate a potential decarbonisation route.

The scenario is not intended to be prescriptive. There are a number of potential pathways to achieve energy system transformation, including new opportunities from technology innovation that will certainly emerge as the transformation takes place. The rapid evolution of technologies and pathways means that there are some major uncertainties and varying opinions about the precise route forward. One such alternative which has been developed is the Energy Network Association's "Pathways to Net Zero". The Pathways to Net Zero report focuses on a hybrid heat pump first approach. Wales and West Utilities has completed extensive research into its 2021-26 business plan which builds on this approach, the details of which are described in later chapters. What is clear is that different pathways all must achieve significant decarbonisation; should less action be achieved in any of the areas summarised above, other sectors will need to compensate with higher action to achieve the same results. The level of transformation described by the energy modelling actions is significant. More importantly, the modelling demonstrates the potential to be on a net zero pathway by using known and proven technologies and underscores the critical role of short- and medium-term action. Innovation will be essential to compliment this action and to develop technologies, skills, and practices that continue to achieve decarbonisation beyond 2035

The economic impacts of achieving the energy system vision have been assessed in terms of job creation, gross value added (GVA) and the investment (or spending) required for the energy transition, in comparison to business as usual. The economic analysis demonstrates that almost £3.4 billion of additional investment/spending is needed to achieve the energy efficiency, electricity generation, and heat aspirations described in the energy vision between now and 2035. This represents approximately £227 million per year and will need to be financed from a range of sources including the private sector, households, and national and local government. This investment is 65% more than is expected to be spent in the corresponding sectors under a business as usual scenario.

The energy system vision (ESV) scenario is estimated to result in an additional 16,700 net jobs, with an associated increase in GVA of nearly £1.7 billion, associated with the delivery of accelerated deployment of renewable electricity generation technologies and enhanced levels of energy efficiency. In addition, it is estimated that there will be over 3,000 more gross jobs associated with the provision of low-carbon heating

technologies in the ESV scenario than the BAU scenario, associated with £361 million of GVA.

When considering the job figures presented its important to reflect on where these jobs will be located. The methodology focuses on direct jobs, a greater proportion of which are considered likely to be located in the region than indirect or induced jobs[1]. However, we are unable to comment on the specific location of the jobs estimated; a portion of the jobs are likely to be located in the Cardiff Capital Region and a portion may be held by persons residing outside of the region. The experience of Wales to date has been that many electricity generation jobs are held by those living outside of the region. This contrasts with energy efficiency jobs which are often held by local residents who provide services to the surrounding area. In order to help Cardiff Capital Region benefit from jobs associated with future local electricity generation it will be important to first understand the reasons for any lack in local jobs and then to develop a policy response.

Note: please refer to the economic modelling chapter and technical annex for details on data sources, limitations and methodology.

Table 1. Estimated difference in jobs, GVA and investment between the energy vision scenario and business as usual, from 2020 to 2035

Energy vision scenario for:	Jobs**	**GVA**	**Investment required**
Electricity generation*	7,400(net) **(+23%)**	£853m **(+21%)**	£748m **(+204%)**
Domestic heat	3,000 (gross) **(+311%)**	£361m **(+320%)**	£701m **(+277%)**
Domestic energy efficiency***	9,300 (net) (**+43%**)	£555m (**+43%**)	£1.9b **(+43%)**
Total additional investment required to achieve the energy vision scenario			**£3,405,554,659**

** Electricity generation jobs figures were calculated using direct job intensity indicators. Direct jobs are typically more likely to be held by residents local to an energy site. However, jobs related to manufacturing may be located outside of the region. Likewise, some jobs may be held by persons residing outside of the region who travel into the region to undertake these jobs. As such, it is not possible to comment on the geographic location of these jobs. The perceived experience of Wales to date is that many of the long term operational and maintenance jobs associated with these technologies are held by persons outside of the region who travel into Wales to perform their duties. In order to help the region benefit from jobs associated with future local electricity generation it will be important to first understand the reasons for any lack in local jobs and then to develop a policy response.*
***Impact on jobs is presented as either net or gross jobs depending on the available data.*
****Data on the percentage change in jobs and GVA for domestic energy efficiency is unavailable.*
****Data on the percentage change across all indicators for commercial and industrial energy efficiency is unavailable.*

[1] Direct jobs are typically associated with the manufacture, construction, and installation of equipment. Indirect jobs arise in the supply chain of the energy technology. Induced jobs related to jobs generated as a result of spending incomes earned from direct employment.

Green recovery from the Covid-19 pandemic: this strategy has been finalised in the midst of the COVID-19 pandemic. At the time of writing, the true economic and societal costs of the pandemic for Cardiff Capital Region are not fully clear.

As we move from the immediate emergency response to considering our options for economic recovery, this energy strategy has the potential to play a significant role in helping Cardiff Capital Region to recover and rebuild sustainably. It sets out a pathway for accelerating the shift to a decarbonised energy system in the region and demonstrates the potential for achieving far greater local economic benefits than could be achieved by returning to business as usual.

Next steps: Achieving a net zero energy system in Cardiff Capital Region presents many challenges including, but not limited to, tackling deep retrofit in a large number of homes, reducing private car miles and enabling the low carbon vehicle roll-out including electric and hydrogen vehicles. There is an urgent need for action, using the growth deal and more broadly engaging stakeholders from across the region to deliver transformational projects. However, decarbonisation also faces many potential benefits for the region, from enacting significant energy efficiency programmes to creating investment opportunities for local people and organisations. The transition to a decarbonised economy will also provide exciting opportunities in engineering, the digital and retrofit markets as well as local skills and employment.

There are three key next steps to help this strategy come to life and to create action: developing the governance structure, socialising the strategy throughout the region and developing an action plan.

Acknowledgements: We would like to thank all of the stakeholders who made valuable contributions to this work through their participation in workshops, completing surveys, providing data, and additional communication on the phone and by e-mail.

Acronyms and abbreviations

ASHP	Air Source Heat Pump
BEIS	The Department for Business, Energy, and Industrial Strategy
CCC	Committee on Climate Change
CHP	Combined Heat and Power
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
CITB	Construction Industry Training Board
DNO	District Network Operator
DEFRA	Department for Environment, Food & Rural Affairs
DNS	Development of National Significance
ECO3	The Energy Company Obligation phase 3
EPC	Energy Performance Certificate
EV	Electric Vehicle
GSHP	Ground Source Heat Pump
GW	Gigawatt
GWh	Gigawatt hour
HGV	Heavy Goods Vehicle
HHP	Hybrid Heat Pump
kt	kiloton
kWh	Kilowatt hour
LPG	Liquid petroleum gas
MCS	Micro-generation Certification Scheme
MW	Megawatt
NAEI	National Atmospheric Emissions Inventory
NRW	Natural Resource Wales
PV	Photovoltaic
RHI	Renewable Heat Incentive
SME	Small and medium-sized enterprises
TWh	Terawatt hour
ULEV	Ultra Low Emissions Vehicle
WGES	Welsh Government Energy Service
WHQS	Welsh Housing Quality Standard
WPD	Western Power Distribution
ZILF	Zero Interest Loan Finance

Introduction

Introduction and Background

Regional energy strategy overview

In 2018, the Welsh Government commissioned the Welsh Government Energy Service to provide support to the Cardiff Capital Region City Deal and a number of regional partners and stakeholders such as the Economic Growth Partnership, the Business Council, Skills Partnership and Transport Authority to develop an energy strategy for the Cardiff Capital Region.[2] Similar regional energy strategies have also been developed with the remaining three economic regions of Wales.

The Welsh Government Energy Service (WGES) supports the public sector and communities to generate benefit for Wales from the transition to a low carbon economy. Support is provided to develop and implement large scale energy efficiency and renewable energy projects as well as wider advice to achieve targets for decarbonisation.

The Welsh Government declared a climate emergency in 2019 and accepted the recommendation from the Committee on Climate Change (CCC) to target a 95% reduction in greenhouse gas emissions by 2050 relative to 1990. After the Welsh Government accepted the CCC's recommended target, it presented in parallel an ambitious plan to go further and reach "net zero" by 2050. Wales had already announced in 2017 their ambitions for the Welsh public sector to be carbon neutral by 2030. The desire of the Welsh Government to aim for a more ambitious pathway than the one advised by the CCC is partly due to the unique legislative framework for climate policy that applies to Wales. The Well-being of Futures Generations (Wales) Act 2015 provides a ground-breaking legal framework for improving the social, economic, environmental and cultural well-being of Wales embracing the idea of a prosperous nation rather than an economic rich one. It mandates that all policy must contribute to sustainability and not undermine long-term goals.

Achieving this climate change target will require substantial transformation of our energy system and will result in radical changes in the technologies we use to heat our homes, to travel and to generate electricity. Transitioning to a modern, decarbonised energy system fit for the twenty-first century poses plenty of challenges, but it also has the potential to bring great benefit, both for the environment and for the economic and social wellbeing of our communities.

This work seeks to provide a strategic direction for the future of a decarbonised energy system including heat, power and transport within Cardiff Capital Region. It will define steps to begin to overcome the challenges we face. Furthermore, while the energy transition has the potential to bring benefits to our communities, maximising this benefit requires reflection on past experiences and would also benefit from an increased strategic focus.

The work has coincided with tremendous efforts that are underway to develop a City Deal for the region. Desired outcomes for the work include the identification of strategic projects that can be considered by the City Deal. More broadly, the plan provides a

[2] Full list will be in the Appendix.

considered approach and an evidence base for the region to move forward collaboratively towards a future decarbonised energy system through more tailored, detailed Local Area Energy Planning. This strategy is presented in five chapters.

Chapter 1: Vision - The energy system vision that is presented in this strategy was developed with stakeholder contributions through the project's first workshop, survey feedback, and targeted stakeholder conversations. The vision describes the region's aspiration for what a future energy system will achieve and how it will function. Five core values have been defined that should be at the heart of future energy projects and decisions.

Chapter 2: Priorities - A literature review was undertaken combining key policy and evidence documents with expert interviews and workshop consultation to build a more comprehensive picture of the challenges and opportunities in the Cardiff Capital Region. This includes available levers, barriers to development and key technologies. This research, and in particular the thoughts and ideas shared by stakeholders, informed the development of strategic priority areas. These priorities are central to achieving the region's decarbonisation goals and are important to its stakeholders.

Chapter 3: Energy system, energy use & emissions - A baseline study provides a portrait of the Cardiff Capital Region energy economy and landscape today. This chapter also summarises energy modelling that evaluates potential options for a pathway to a net zero energy system in the region.

Chapter 4: The future of energy and the economy - The fourth chapter considers the energy system pathways modelled and the economic impact of those pathways in terms of jobs, gross valued added (GVA), and the investment required to make those pathways a reality.

Chapter 5: Next Steps – Outlining the three key next steps that we will take to translate the Cardiff Capital Region energy system vision into reality.

Impact of the COVID-19 pandemic

This strategy has been finalised in the midst of the COVID-19 pandemic, which is having a profound effect on the lives of millions of people around the world, bringing unprecedented challenges for our economy, our society and our communities. At the time of writing, the true economic and societal costs of the pandemic for Wales and the Cardiff Capital Region are not fully clear, but the severity of the impacts on the global economy are forecast by many commentators to exceed that of the 2008 financial crisis.

The pandemic is also taking place against the backdrop of the ongoing climate emergency. And whilst the economic damage caused will undoubtedly result in a short-term reduction in greenhouse gas emissions, it is possible that emissions could rebound if climate positive solutions are not included as central elements in our economic stimulus packages.

As we move from the immediate emergency response to save lives, support the health sector, retain jobs and support our society and economy, we must recognise that our approach to the economic recovery that will follow provides us with a unique

opportunity to sustainably rebuild our economy and make greener investments and climate positive decisions that set us on a pathway that aligns with the Welsh, UK and international climate targets.

CCR have recently reconsidered and endorsed revised programme priorities in terms of reaction to COVID-19 and future economic adaptation. In this context, it is hoped that with the commitment to decarbonisation that CCR is making, that there will be acknowledgement that our economic recovery and growth plans need to be developed as part of driving down greenhouse gas emissions. We need to recognise the significant economic potential that a green recovery can contribute to rebuilding a sustainable economy in CCR.

The Committee for Climate Change (CCC)[3] has identified 6 key principles for a resilient recovery from the pandemic, and we must ensure that our strategy is underpinned by these cross-cutting principles to help put CCR in a position to capitalise on opportunities that may arise from the recovery:

1. Use climate investments to support economic recovery and jobs
2. Lead a shift towards positive, long-term behaviors
3. Tackle the wider 'resilience deficit' on climate change
4. Embed fairness as a core principle
5. Ensure the recovery does not lock-in greenhouse gas emissions or increased risk
6. Strengthen incentives to reduce emissions when considering tax changes.

We must also learn from the pandemic, taking the lessons from our response and apply them to the climate emergency. This may include for example:

- the need for openness and transparency;
- the importance of good data;
- the speed with which people can change behaviours and industry re-purpose;
- the need to support individuals and businesses through economic transition; and
- the importance of global collaboration.

Other lessons will undoubtedly emerge. But perhaps the biggest lesson from the COVID-19 pandemic is about the need for anticipation and preparedness in dealing with major societal issues, and the population's capacity and willingness to accept significant lifestyle changes if it is deemed necessary for the good of society. If it teaches us anything it is that we cannot afford to ignore science or expert judgement about the risks faced by our societies, or wait for problems to arrive before taking action. Learning lessons from the response to a global health emergency, and applying this to that of the global climate emergency could pave the way for the accelerated and sustained change that is so critical in solving the problem of climate change.

[3] https://www.theccc.org.uk/2020/05/06/take-urgent-action-on-six-key-principles-for-a-resilient-recovery/

As the COVID-19 crisis is still ongoing at the time of writing, it is still somewhat unclear when and how Wales will emerge fully from the current restrictions, and the process and timeframe through which the social distancing will be eased; or, indeed, whether we will encounter a subsequent lockdown in the future, whether at national or local levels. We must therefore acknowledge the significant uncertainties that exist around how the CCR economy will emerge from the crisis as well as the uncertainties associated with the shape of the future economic growth and decarbonisation trajectories modelled in this strategy. As such, the economic and climate modelling that underpins this strategy will need to be kept under review and updated when, and how, our emergence from the COVID-19 crisis becomes clearer. Certain elements of the strategy, such as our understanding of what it means to make 'futureproof decisions', may also need to be revisited.

In addition, CCR may be able to capitalise on the opportunity to sustain behaviours observed throughout the pandemic that have had a positive effect on reducing emissions, such as the increase in active travel, reduction in travel by private car, increased working from home practices and willingness to invest in domestic property improvements. Directing resources towards infrastructure that will support the embedding of such behaviours into business as usual for communities and businesses has the potential to drive lasting emissions reduction as we recover from the COVID-19 crisis.

However, the fundamental principles of this strategy remain firmly relevant. With its focus on cleaner, fairer economic growth, this energy strategy has the potential to play a significant role in helping CCR to recover and rebuild sustainably. It sets out a pathway for accelerating the shift to a decarbonised energy system in the region and demonstrates the potential for achieving far greater local economic benefits than could be achieved by returning to business as usual.

Our Energy Vision

Our Energy Vision

Our 2035 Energy Vision statement

To create the conditions for a transition to a carbon neutral economy and society in the CCR, using low carbon energy as an enabler of economic regeneration, growing our regional income whilst maintaining guardianship of our environment through a laser-focus on clean growth.

The principles behind the vision

Our vision is guided by three core principles:

Core Principles

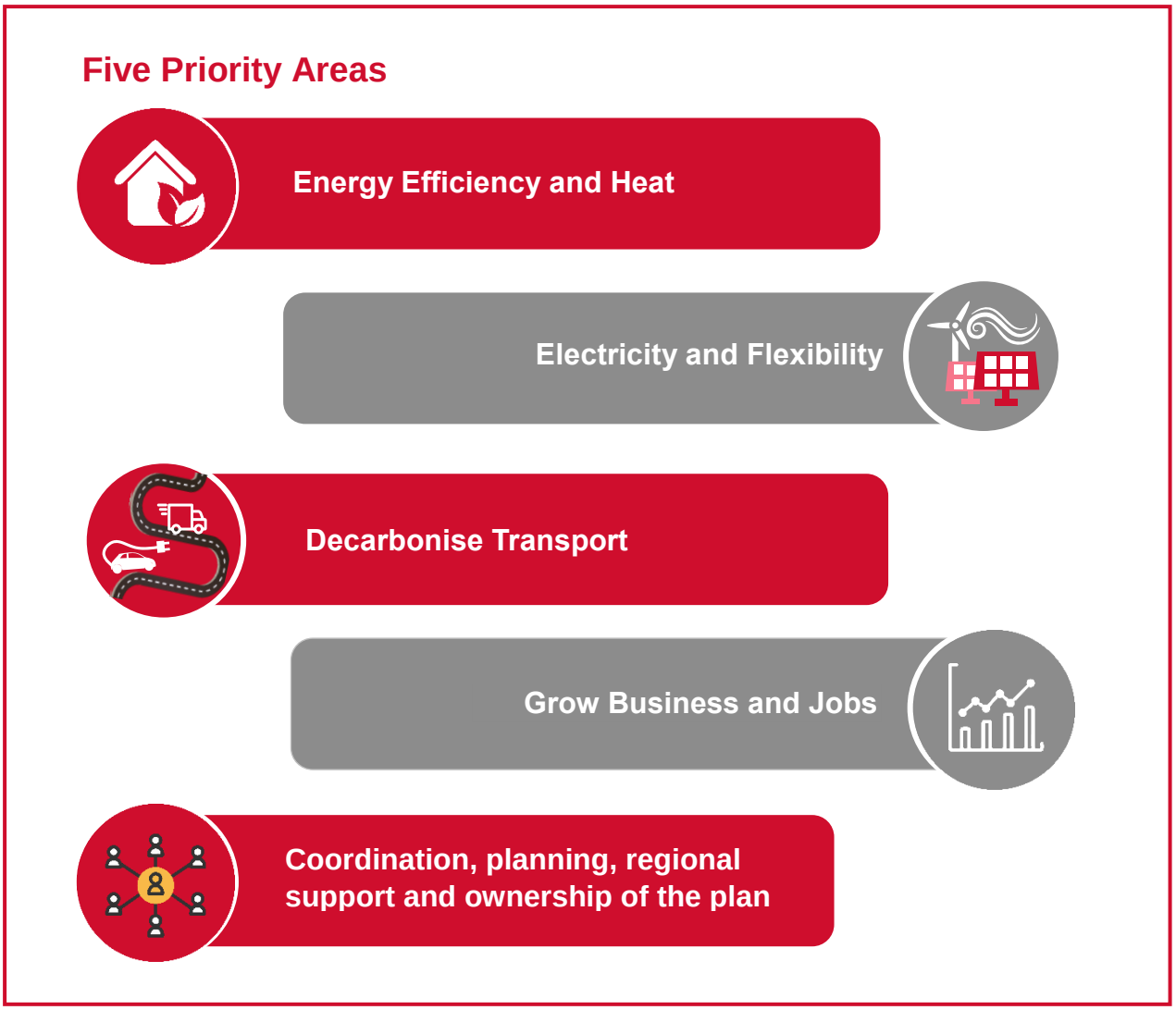
- **Act as an enabler to a sustainable regional economy:** deliver inclusive employment, profits and skills, lower costs and open up markets, and stimulate public and private investment in capital projects that deliver low carbon improvements across the region.

- **Contribute wider benefits to the region:** including alleviating fuel poverty, sparking innovation and developing local training and skills for people and businesses.

- **Decarbonise the energy system to meet national targets as a minimum**: make significant carbon reductions across all sectors, to have energy efficiency as a core focus, and to have a multi-vector system, that includes a range of low carbon technologies, that meets needs affordably and balances the best use of existing assets and resources.

Our priorities

To achieve our vision, we have defined the following five priority areas.



Energy Efficiency and Heat

- Deliver fabric improvements (e.g. window glazing, internal wall and roof insulation) to the region's existing and new builds including delivering a whole house retrofit approach to the existing housing stock, to improve energy efficiency and deliver cost savings.
- Build new homes to align with evolving 'Part L building regulations' including developments currently with planning permission.
- Help homeowners understand the benefits of energy efficient housing including cost savings, improved comfort and health.
- Utilise alternative fuels for heat including hydrogen, bio-methane and solar thermal.
- Develop flexible and hybrid heating solutions e.g. hybrid heat pumps, building on the learnings from the Freedom project based in Bridgend.

Electricity and Flexibility

- Ensure there is a mix of generating technologies across the region to provide resilience and flexibility.
- Encourage local development of renewable energy projects by public bodies on publicly owned land to increase revenue generating potential for public bodies and to increase public ownership.
- Map renewable energy potential against upcoming developments, particularly developments of regional level scale.
- Pilot energy/battery storage projects to maximise renewable energy potential and build on previous trials in Cardiff and Bridgend.
- Encourage uptake of smart meters, ensuring the public sector has smart meters installed across its estate, to open up the potential of load shifting and access to balancing/flexibility markets.
- Adopt generation technologies, demand patterns and battery storage technologies which reduce loads on the distribution network and work with the DNO to maximise the capacity of the existing network.
- Encourage low carbon technologies e.g. LED lighting, and invest in behaviour change programmes to reduce consumption
- Encourage smart digital integration and support wider local innovative grid flexibility pilots for roll out across the region.

Decarbonise Transport

- Prioritise investment in public transportation.
- Make public transport services more affordable and convenient to encourage a modal shift from private transport.
- Enable changes in people's travel methods capitalising on changing behavioural patterns as a result of the Covid-19 crisis.
- Promote electrification of public transport and build on trials including electric buses in Caerphilly and Cardiff, and the decarbonisation of the South Wales Metro.
- Encourage use of active travel modes e.g. walking and cycling.
- Develop an electric vehicle charging infrastructure, in collaboration with Transport for Wales and OLEV, taking a coordinated approach across the region e.g. the Gwent study, and encourage public sector fleet transitions to EVs.
- Lobby for additional Metro nodes to increase rural accessibility and connectivity.
- Ensure metro stations are integrated with other economic priorities and housing.
- Work with Welsh Government to identify a solution to the Newport/Cardiff trunk road bottleneck and consider addition of a dedicated bus lane.
- Consider hydrogen as an alternative fuel source where electrification is less suitable e.g. HGVs.
- Encourage the shift towards home-working created by Covid-19 especially in rural areas.

Grow Business and Jobs

- Create a commercial property strategy which incorporates access to renewable energy sources and access to public transport links
- Promote continued research into battery and hydrogen technologies, and continue to develop academic excellence in this field
- Develop supply chain opportunities for energy efficiency retrofit and renewable energy manufacturing
- Evaluate the region's capacity and capabilities in retrofit and renewable energy deployment and develop training opportunities/incentives as necessary.

- Build on the region's strong reputation for research and innovation through engagement with Higher Education Institutes, including developing digital and "smart" solutions to energy transitions, as well as future proofing ongoing developments.
- Upskill and retrain the workforce to ensure the industrial sector needs are balances with local needs, and that it delivers support to those people and places that are most likely to lose out from economic and technical change.

Coordination, planning, regional support and ownership of the plan

- Deliver against a shared vision and approach.
- Demonstrate aligned ambition and leadership across the region with plans agreed and championed by Chief Executives and leaders.
- Maximise economies of scale potential through the facilitating role of the region and through collaboration with other regions.
- Governance to use the framework for the City Deal Investment operations and will consult with the Regional Economic Partnership, Regional Business Council and Regional Skills Partnership. This will provide an enduring organizational structure which will secure the long-term delivery objectives of the plan.

Our energy system, energy use & emissions

Our energy system, energy use and emissions

Modelling an Energy Vision scenario

Aims of undertaking scenario modelling

Scenario modelling has been undertaken to create a 2035 Cardiff Capital Region Energy Vision scenario that could deliver against the level of ambition set out in the Energy Vision statement. The modelling outcomes are unique to the region, taking advantage of local resources and opportunities, and input from local stakeholders.

The overall aim of the scenario is to describe a potential decarbonisation pathway that will put the region on track to achieve a net zero energy system by 2050. The scenario is not intended to be prescriptive; there are a number of potential pathways to achieve energy system transformation, including new opportunities from technological innovation and changes to energy demand that will certainly emerge as the transformation takes place. The rapid evolution of technologies and pathways means there are uncertainties and varying opinions about the precise route forward. One such alternative is the Energy Network Association's "Pathways to Net Zero" which proposes pathways for decarbonising heat. Wales and West Utilities has completed extensive research into its 2021-26 business plan which builds on this alternative, the details of which are described in more detail in the chapter below. What is clear from research is that different pathways all must achieve significant decarbonisation.

The energy system vision pathway modelled demonstrates the potential to be on a net zero pathway by using known and proven technologies and underscores the critical role of short- and medium-term action. Innovation will be essential to compliment this action and to develop technologies, skills, and practices that continue to achieve decarbonisation beyond 2035.

The modelling presents a potential development scenario that is intended to:

- Highlight the scale of the challenge
- Identify existing opportunities and barriers
- Point to new opportunities and key decisions
- Provoke discussion and inspire action planning

The scenario focuses on known decarbonisation solutions that could be implemented by 2035, which would put CCR on a pathway consistent with achieving net zero emissions by 2050. However, this does not mean that activity around innovative new technologies should not also be pursued. The modelling takes a whole system approach to energy, considering the interactions between heat, transport and electricity demand. For example, the impact of decarbonising heat through electrification is reflected through an increase in electricity demand.

Why does the scenario look to achieve zero emissions from energy in 2050 and not 95% decarbonisation?

The Committee on Climate Change recommended in its 2019 report, 'Net Zero: The UK's contribution to stopping global warming', that Wales adopt an overall

decarbonisation target reduction of 95%, against a 1990 baseline, by 2050[4]. This target, which is lower than the equivalent UK 2050 net zero decarbonisation target, recognises that Wales faces several additional challenges including higher greenhouse gas emissions from its agriculture and parts of its heavy industry. However, Welsh Government has expressed an ambition to exceed this target and aim for 100% decarbonisation. Non-energy agriculture emissions are out of scope of this energy system study. Both a Welsh 95% and a 100% emissions reduction target require the energy system to maximise its decarbonisation, reserving any residual emissions for more difficult to decarbonise sectors such as agriculture and heavy industry. It is worth noting that during the course of our engagement, stakeholders in the region and across Wales have expressed very strong support for ambitious energy system decarbonisation.

Methodology in brief

The modelling sets an indicative decarbonisation trajectory to 2035. It has been created using a methodology that reflects the high-level methodology used by the Committee on Climate Change in its 2019 Progress Report to Parliament[5]. This absolute contraction method assumes a constant rate of decarbonisation is achieved between now and achieving net zero by 2050. This is used as a preliminary benchmark, pending 2020's more detailed assessment by the Committee on Climate Change, which will set out more detailed carbon budgets consistent with the new net zero target.

The CCR energy baseline has been established by gathering and analysing national and local datasets of energy consumption, energy efficiency and generation. The Energy Vision scenario has been created through a bottom-up analysis of the level of uptake of measures and technologies that is possible by 2035. Assumptions have been drawn from a range of sources, including:

- Committee on Climate Change reports[6,7]
- National Grid's Future Energy Scenarios[8]
- The project team's past work on future energy scenarios for Wales & West Utilities and for Western Power Distribution[9]
- Engagement and workshops with local, regional and national stakeholders.

[4] Committee on Climate Change (2019) Net Zero, The UK's contribution to stopping global warming. May 2019 https://www.theccc.org.uk/wp-content/uploads/2019/05/Net-Zero-The-UKs-contribution-to-stopping-global-warming.pdf
[5] Committee on Climate Change (2019) 2019 Progress Report to Parliament https://www.theccc.org.uk/publication/reducing-uk-emissions-2019-progress-report-to-parliament/
[6] Ibid
[7] Committee on Climate Change (2018) Hydrogen in a low-carbon economy https://www.theccc.org.uk/publication/hydrogen-in-a-low-carbon-economy/
[8] National Grid (2019) *Future Energy Scenarios*, http://fes.nationalgrid.com/media/1409/fes-2019.pdf
[9] Regen (2019) Wales and West Utilities – Regional Growth Scenarios for Gas https://www.regen.co.uk/project/wales-and-west-utilities-regional-growth-scenarios-for-gas/
Regen (2019) Future Energy Scenarios. https://www.regen.co.uk/area/local-future-energy-scenarios/

The methodology results in a bottom-up, stakeholder-informed Energy Vision for CCR

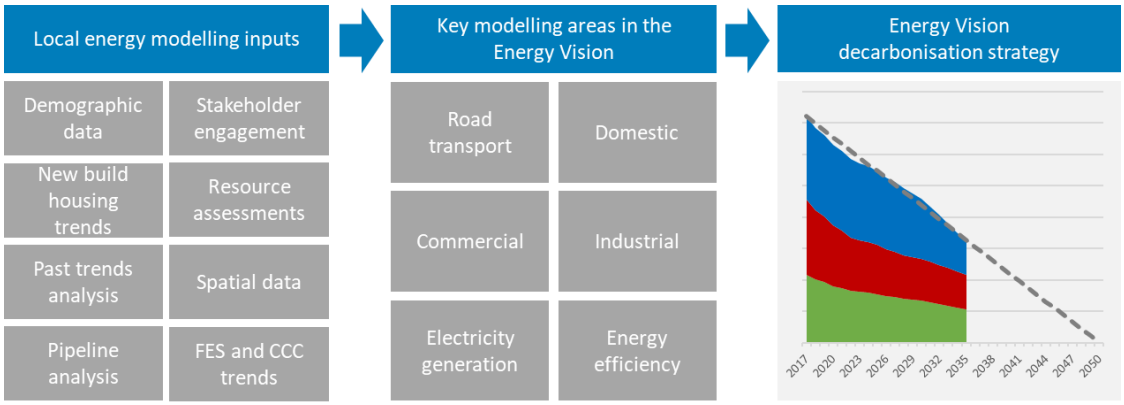


Figure 2: Outline modelling methodology

Worked example: The modelling approach for domestic heat

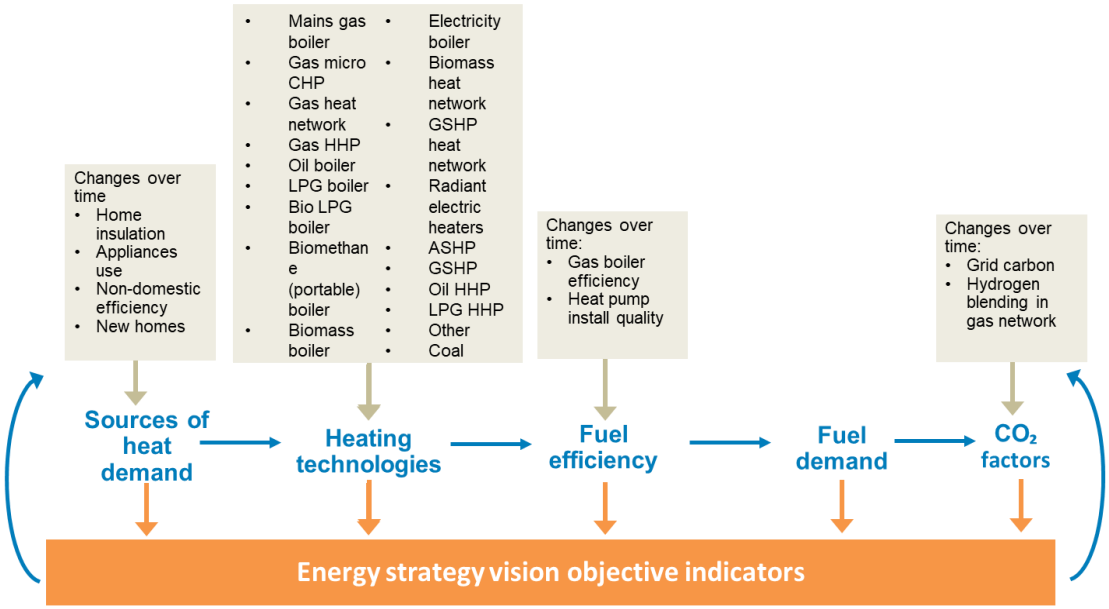


Figure 3: Diagram of the modelling approach for domestic heat

A note on scope

The strategy is focused on emissions associated with the energy system in CCR. As a result, the scope of the modelling is limited to the energy system, which includes transport, power and heat use. Emissions or sequestration from non-energy activity such as agriculture and land use are not considered in the model. Data limitations and issues around whether emissions are considered locally or nationally mean that some other emissions that are within the energy system are also not considered by the model. These include aviation, shipping and some very large industrial energy users such as the SWIC, as expanded on in the introduction.

Baseline and modelling results: by sector

Our Energy consumption

Baseline: energy consumption by sector

CCR currently uses around 32 TWh of energy[10]. The region accounts for around 36% of all energy consumed in Wales[10], which is less, on a pro-rata basis, than its 49% share of the Welsh population[11]. Fuels used to generate electricity are not included in this analysis, which is focussed on final consumption.

The region's total energy demand is split roughly into thirds across transportation, domestic heat and power, and commercial/industrial heat, power and processes[7].

CCR is the most urban region of Wales with the highest proportion of buildings connected to the gas network and so is the Welsh region with the highest consumption of gas, but also the lowest emissions per household due to the low number of homes heated by other, high carbon fossil fuels.

Energy consumption in CCR by sector and fuel

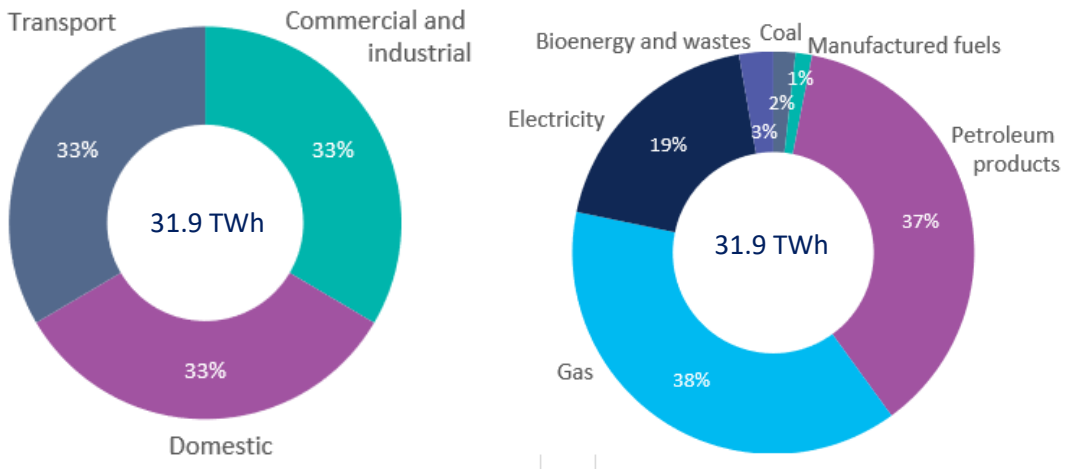


Figure 4: Breakdown of energy consumption in Cardiff Capital Region. Source: BEIS sub-national total final energy consumption, 2019.

[10] BEIS (2019) Regional and local authority electricity consumption statistics 2005 to 2018, https://www.gov.uk/government/statistical-data-sets/regional-and-local-authority-electricity-consumption-statistics

[11] StatsWales (2019) Population estimates by local authority and year https://statswales.gov.wales/Catalogue/Population-and-Migration/Population/Estimates/Local-Authority/populationestimates-by-localauthority-year

CCR's trend for decreasing energy consumption has plateaued in recent years

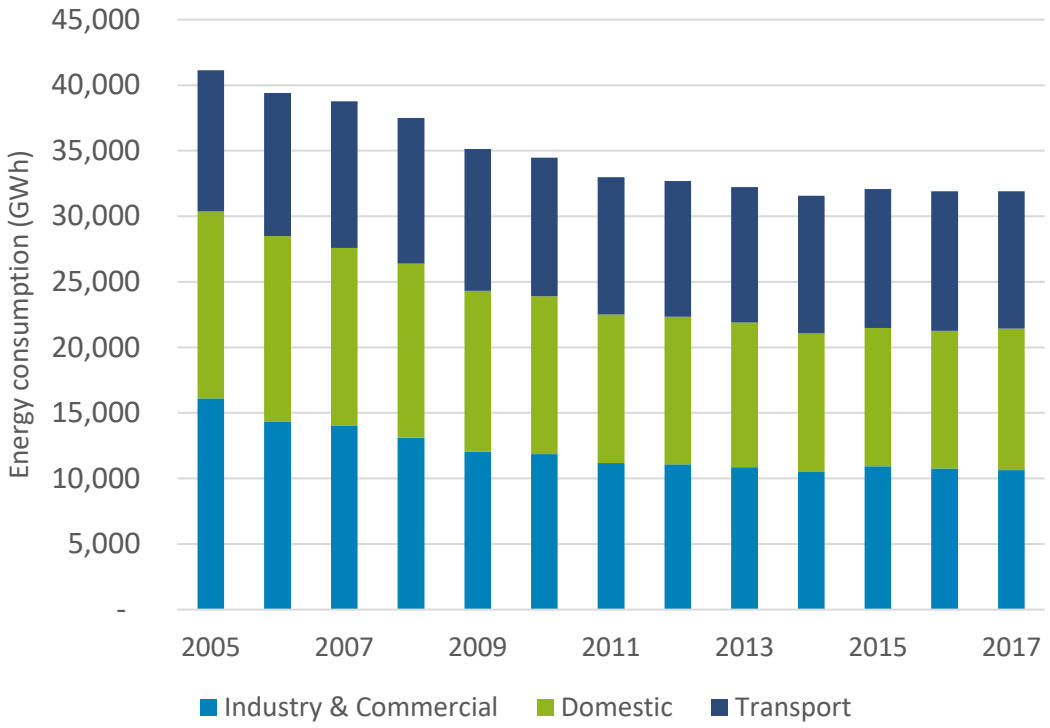


Figure 5: Trend of energy consumption in the Cardiff Capital Region, by sector. Source: BEIS sub-national total final energy consumption, 2019. (Excludes bioenergy and wastes)

Analysis of BEIS sub-regional data[12] shows that total energy consumption fell by 22% between 2005 and 2013, an average rate of about 2.4% per year. This is slightly greater than the 18% reduction in energy demand experienced across Great Britain over the same period. This is predominantly due to a significantly greater reduction in commercial and industrial energy consumption in CCR compared to Great Britain.

The 22% reduction in CCR's energy demand is predominantly due to the commercial and industrial sector's energy consumption reducing by 34%, while the domestic sector's energy consumption reduced by 24%. This is likely to be the result of deindustrialisation and behavioural change/energy efficiency measures in each sector respectively. Since 2013, energy consumption in the region has been relatively stable.

[12] BEIS (2019) Regional and local authority electricity consumption statistics 2005 to 2018, https://www.gov.uk/government/statistical-data-sets/regional-and-local-authority-electricity-consumption-statistics

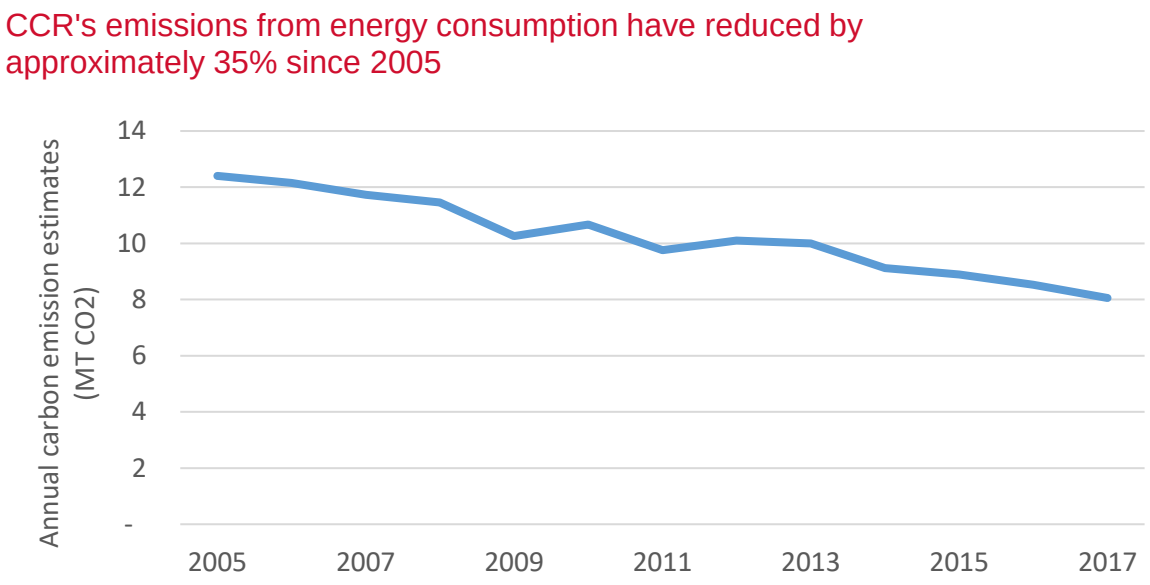


Figure 6: Estimated historic emissions in CCR. Source: BEIS sub-national emissions

Emissions from energy consumption reduced by around 35% from 2005 to 2017[13] as a result of falling demand and decarbonisation of the national electricity grid.

Energy system vision: energy consumption by sector

To be on track for net zero by 2050, CCR needs to achieve 55% decarbonisation of its energy system by 2035.

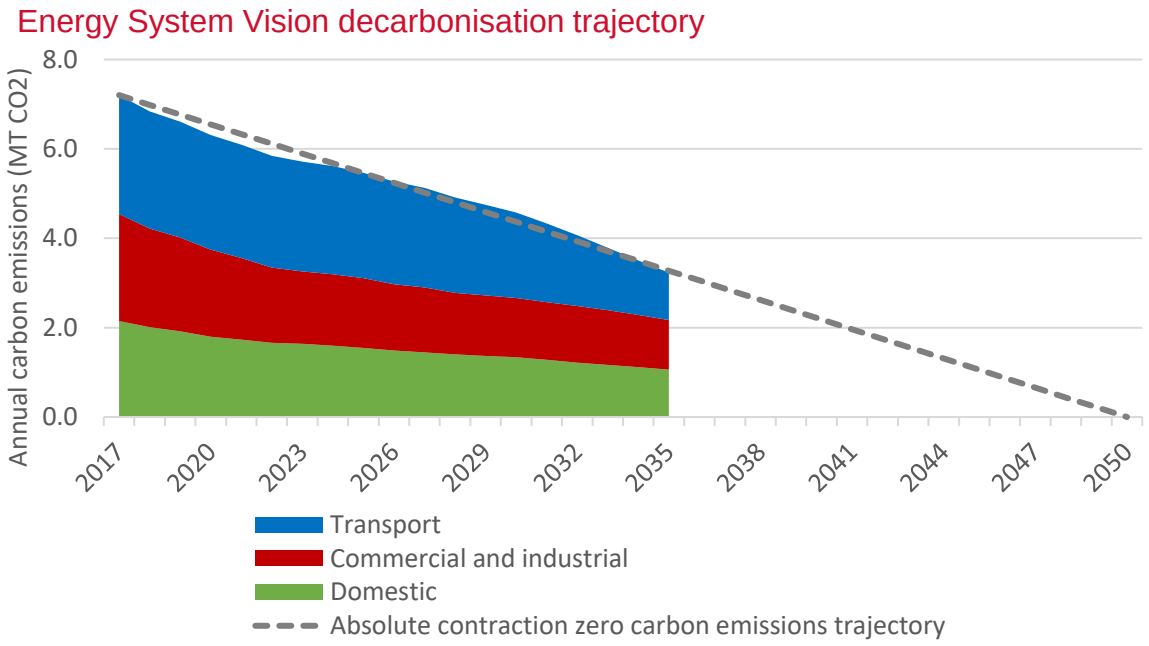


Figure 7: CCR's Energy Vision decarbonisation trajectory by sector to meet net zero 2050 under an absolute contraction methodology. Source: WGES analysis

[13] BEIS (2019) UK local authority and regional carbon dioxide emissions national statistics: 2005 to 2017 https://www.gov.uk/government/collections/uk-local-authority-and-regional-carbon-dioxide-emissions-national-statistics

- By reviewing the measures that could be implemented in CCR between the baseline year (2017) and 2035, this 55% decarbonisation target can be split by sector into:
    - 51% reduction in domestic heat and power emissions
    - 54% reduction in commercial and industrial emissions
    - 60% reduction in transport emissions.

The industrial decarbonisation will be addressed from decarbonising electricity, transferring heating from fossil fuel to electricity and rely on a small uptake of hydrogen.

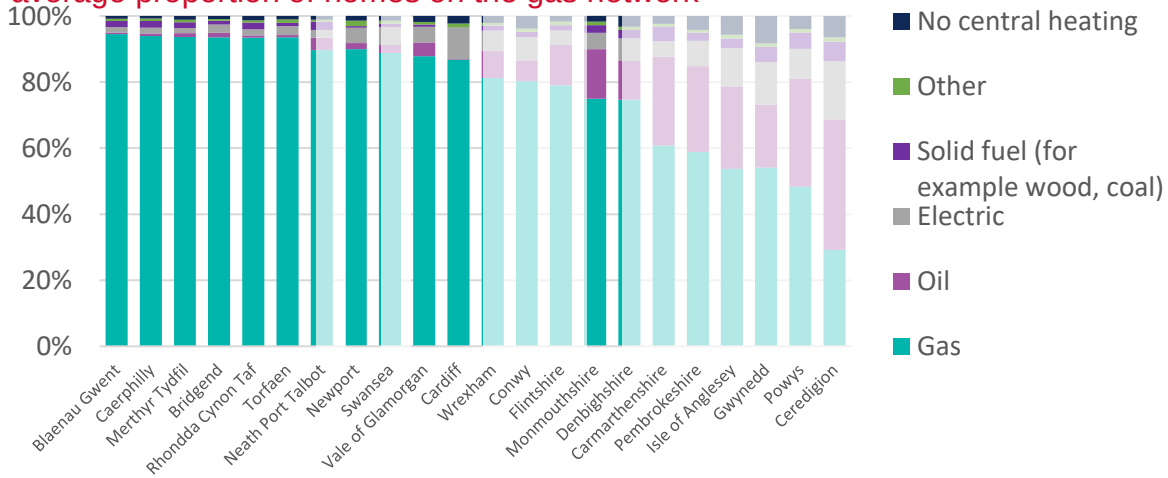
Figure 8: Summary of the Energy Vision's emission reductions by sector. Source: WGES analysis

Our domestic energy consumption

Baseline: domestic heating

Around 50,000 new homes have been built in the region[14] since 2005, but despite this, domestic heating demand has fallen by 31% since then, reflecting the national trend resulting from more efficient homes, appliances and lighting, and behavioural change.

Cardiff Capital Region's local authority areas have an above average proportion of homes on the gas network



[14] Welsh government, Household estimates for Wales - households by type by local authority, 1991 to 2017

Figure 9: Proportion of homes heated by each heating fuel type, by local authority. Source: Census, 2011. MHCLG, Energy Performance Certificates.[15]

Cardiff Capital Region is the Welsh region with the lowest number of renewable heat installations

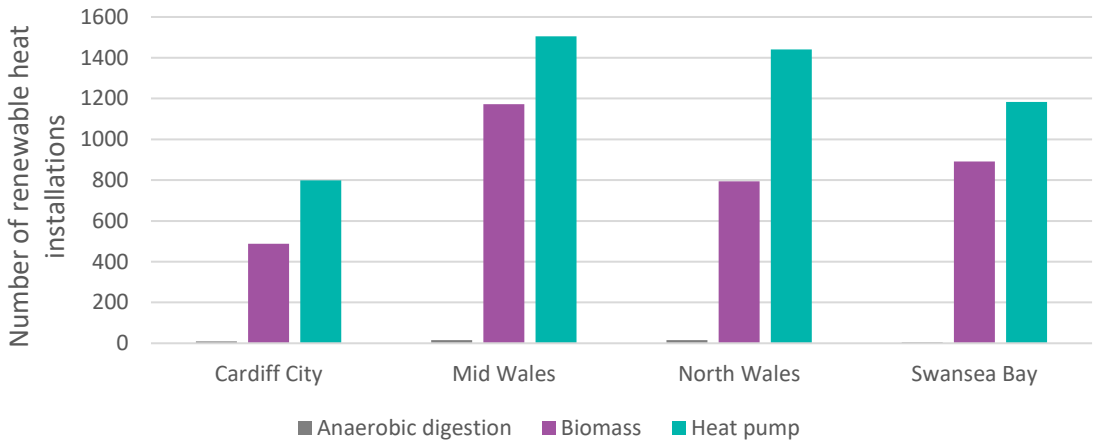


Figure 10: Renewable heat installations in Wales. Source: Energy Generation in Wales 2018

Despite hosting nearly half of all homes in Wales, CCR has the lowest number of renewable heat installations; it can be assumed this is due to the high proportion of on gas properties, meaning it is difficult for renewable heat technologies to compete against the low cost of natural gas. Just 0.2% of homes have a heat pump or biomass boiler.

Cardiff Capital Region's domestic properties have an average EPC rating of D

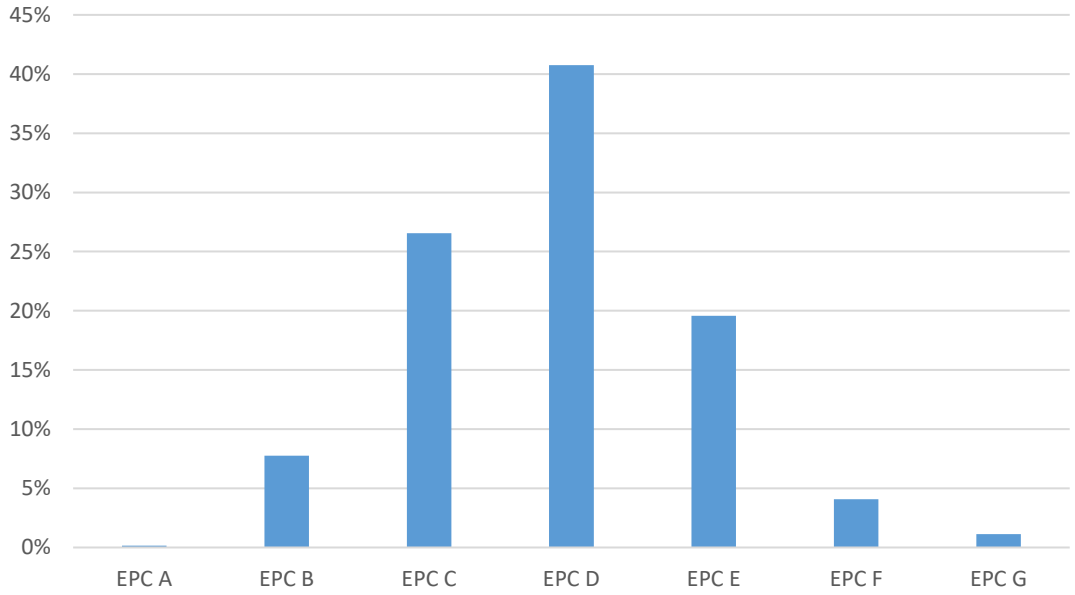


Figure 11: Proportion of homes in CCR in each EPC band. Source: MHCLG, Energy Performance Certificates

[15] To note, the Census data is now nearly 10 years old but EPC data and data on renewable heat shows little shift in heating types over that time.

CCR has the highest average energy efficiency ratings in Wales, with 75% of homes rated as EPC band D or above. This is, however, still below the Great Britain figure of 77% band D and above. The average rating (mean, median and mode) is a D, and there are virtually no A-rated properties; there is a significant need to improve energy efficiency to decarbonise the energy system.

Energy Vision scenario: domestic heating

Box 1: Assumptions regarding the decarbonisation of domestic heating in CCR[16]

The Cardiff Capital Region energy strategy modelling assumptions for domestic heating are based on input from regional stakeholders and the 2019 Wales & West Utilities Distribution Future Energy Scenario (DFES) project which explored potential future scenarios for the gas network in Cardiff Capital Region in 2035. Some of the key scenario highlights from the 2019 DFES included:

- Around 20% of homes could be heated by a heat pump by 2035, predominantly air source or ground source heat pumps replacing more expensive oil, LPG or solid fuel heating.
- Hydrogen offers a number of significant opportunities for Wales, particularly through the development of industrial clusters in North Wales and extending into the Wirral, and in South Wales in Pembrokeshire, Port Talbot and industrial zones around Cardiff and Newport. A number of hydrogen projects are planned and there is a high likelihood that hydrogen for industrial and transport applications will be become an important fuel over the next decade. There is the potential that some hydrogen from these trial projects could be used to supply heat to adjacent homes and commercial buildings, however hydrogen is not expected to become economically viable or widely available for network distribution as a heating fuel before 2035.
- Biomethane from food waste and sewage in populous areas, alongside farm waste in more rural areas, could provide up to 4% of energy supplied by the gas distribution network in Cardiff Capital Region by 2035. The proportion of biomethane that is injected into the mains gas network will depend on the availability of feedstocks and level of demand from other biomethane uses such as power generation.
- Consumption of natural gas energy in Wales could fall by over 20% between now and 2035.
- Projections on the uptake of heat pumps, including the proportion of hybrid heat pumps, were based on FES 2019 scenarios. Since then, the FES 2020 study has been published and includes a higher proportion of hybrid gas heat pumps, particularly under the Leading the Way scenario.

These findings have been built on in developing the Cardiff Capital Region Energy Vision scenario.

Wales and West Utilities' outlook regarding the potential for biomethane and hydrogen has evolved since the modelling was undertaken following the UK government evolution to a net zero target last year. Net zero scenario shows higher potential for biomethane and hydrogen. For example biomethane levels can exceed in some parts of the WWU network will reach over 20% by 2021. This would facilitate the decarbonisation of homes using smart hybrid heating systems.

[16] Regen (2019) Regional Growth Scenarios for Gas and Heat for Wales & West Utilities https://www.regen.co.uk/regional-future-energy-scenarios-for-heat-and-gas/

Table 2. Regional Growth Scenarios for Gas and Heat compared with energy modelling

Key assumptions for domestic heating fuels		2019 WWU DFES Study			WGES Energy Strategy Study
		Two Degrees Scenario	Community Renewables Scenario	Hybrid Accelerator scenario	
Heat pump deployment (% of houses with a HP by 2035)		12%	19%	17% (including significantly higher proportion of hybrid heat pumps)	19%
Biomethane and bioSNG energy	**Biomethane and bioSNG heat energy for domestic and C&I heating in 2035**	324 GWh	436 GWh	380 GWh	362 GWh (note the scope excludes some large industrial sites)
	Biomethane and bioSNG percentage of heat delivered by the gas network	3% of gas network energy	4% of gas network energy	3% of gas network energy	4% of gas network energy
Hydrogen use for domestic and commercial heating **(Hydrogen for industrial processes and transport is modelled separately)**		1% of gas network energy	None modelled before 2035	2% of gas network energy	None modelled before 2035 although there is potential for some domestic heating associated with industrial clusters

Existing homes

Achieving a 51% reduction in domestic carbon emissions by 2035 requires a significant shift in the way homes are heated and their level of energy efficiency. This is recognised in Prosperity for All: a low carbon Wales, Proposal 10, which looks at the challenges and opportunities around low carbon heat, and Proposal 11, which considers increasing the use of waste heat and low carbon heat.

One pathway to achieve this would be to focus on improving the worst performing homes, eliminating all E, F and G ratings through improvements, as well as some improvements to homes with higher ratings. For example, a 51% reduction could be achieved if 154,000 homes were improved from G, F and E to D, C and B, leaving just 1% of properties with an EPC rated E or worse. This should take account of the balance between the cost of building fabric improvements against the cost of gas and electricity grid decarbonisation

Upgrades to nearly all homes rated E, F and G required to deliver Cardiff Capital Region's Energy Vision

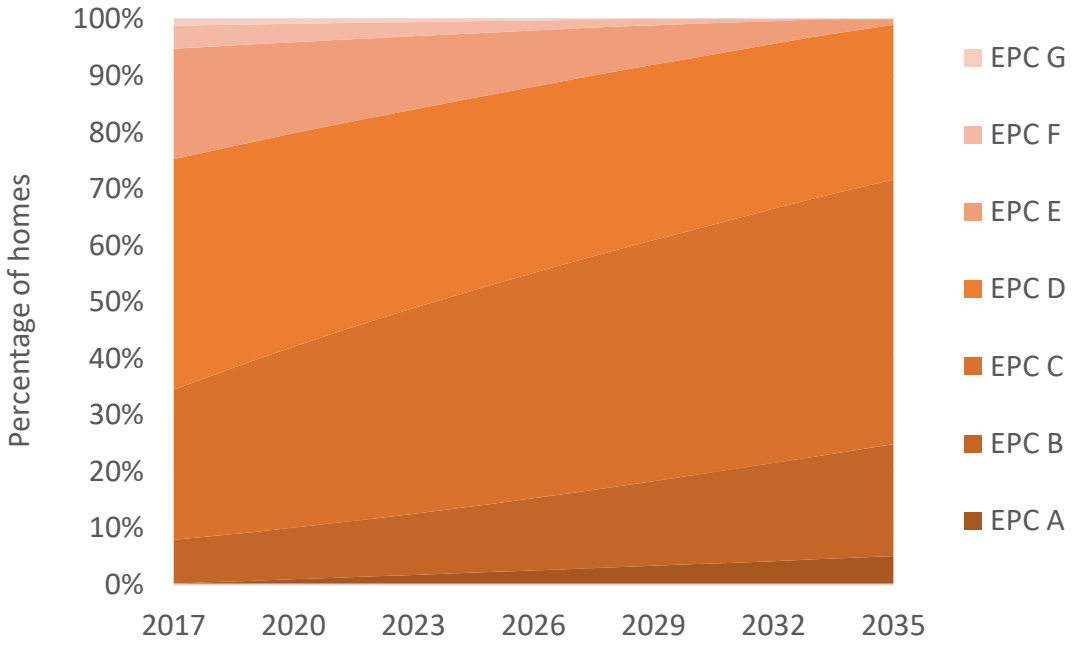


Figure 12: Estimated domestic EPC band changes to deliver the Energy Vision scenario. Source: WGES analysis

Around 112,000 homes, 17% of existing homes, need to move from using fossil fuel heating to low carbon heating by 2035, looking at cost effective solutions which consider fuel poverty, as heat pumps may not be affordable for all. Of these, approximately 27,000 (~4%) are currently fuelled by oil, LPG, coal or other solid fuels, with the remainder currently on mains gas.

The Energy Vision scenario assumes that the transition to low carbon heating will be dominated by a shift to air source heat pumps, with a supporting role for individual ground source heat pumps and shared ground loops. By 2035, over 140,000 heat pumps are assumed to have been installed in CCR, including over 28,000 heat pumps

in new homes and around 8,000 homes connected to heat pump-fuelled heat networks. The Vision includes a smaller role for biomass and bio-LPG heating options.

Air source heat pumps are the dominant new low carbon heating source introduced by 2035 under the Cardiff Capital Region's Energy Vision scenario

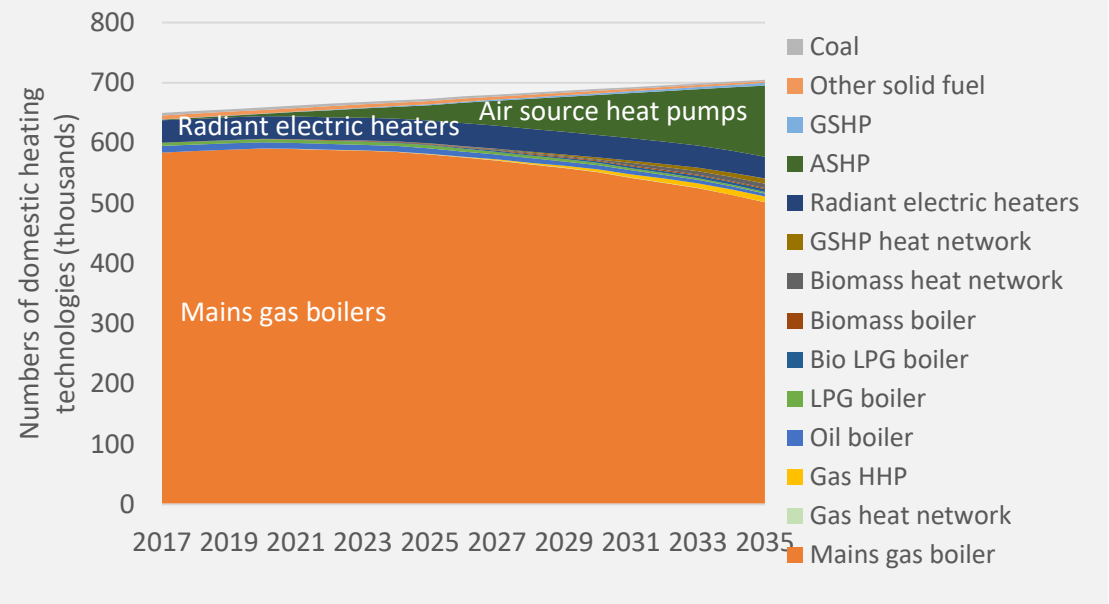


Figure 13: Breakdown of domestic heating technologies in the CCR Energy Vision scenario, including existing and new build houses. Source: WGES analysis

Despite these significant shifts to low carbon heat sources, gas boilers remain the dominant technology in existing homes in 2035; post 2035, there will need to be a focus on fully decarbonising these remaining on-gas homes.

Box 2. Alternative Domestic energy and heat Pathway – 'balanced' scenario

The Energy Networks Association's 'Pathways to Net Zero' report explores the role of gas networks in a future Net Zero energy system, producing cost-optimised scenarios out to 2050. The Pathways to Net Zero report presents an alternative pathway called the 'balanced scenario' for a decarbonized heating system that can also be applied to the Cardiff Capital Region.

The "balanced scenario" describes a future where low carbon and renewable gases are used in a *balanced* combination with low carbon electricity, where electrification plays a less dominant role and renewable gas grid conversion is prioritized. It highlights the significant role of renewable gas in meeting net zero by 2050, especially in cases where existing homes can't be renovated or all-electric heat pumps are not an appropriate solution. However, it also identifies current barriers to achievement, for example, a significant reliance on timely Carbon Capture Use and Storage implementation and accompanying policies to support this.

WWU have considered these principles into its 2021-26 business plan, consulting over 20,000 stakeholders and consumers in the process.

<u>'Balanced scenario' overview for domestic energy and heat:</u>

- Deployment of hybrid heat systems becomes main heat source in buildings not suitable for all-electric heat pumps and where connecting to a district heating network is not an option
- Heat supply is mostly hydrogen and biomethane
- Moderate renovation in existing buildings

The key difference between the balanced scenario and the energy system vision scenario modelled for this report concerns the level and timing of the installation of heat pumps versus hybrid heat pumps. The balanced scenario, when applied to the Cardiff Capital Region would focus on hybrid heat pump installation first. Another key difference between the balanced scenario and the energy system vision scenario are timelines. The balanced scenario models out to 2050, whereas the energy system vision modelling has modelled out to 2035.

Detailed energy planning is required to provide certainty on the pathway and short term actions required in CCR to decarbonise not just heating, but the wider energy system. The gas and electricity DNOs, and the local authorities in the region, are vital to this process. Electrification is currently one of the few proven scalable options for decarbonising heat, with heat pumps playing a substantial role in any Net Zero scenario. Local area energy planning will identify the preferred combination of technological and system changes needed to the local energy system, to decarbonise heat, and local transport, and realise opportunities for local renewable energy production.

Box 3: The Freedom Project

The Freedom Project, a joint innovation project between Western Power Distribution and Wales & West Utilities, installed and ran 75 gas hybrid heat pumps in Bridgend between 2016 and 2019. The project investigated the carbon and cost impacts of using an air source heat pump for the majority of heat demand, with a gas boiler providing heat during the coldest months of the year.

Hybrid heat pumps could provide significant reductions in emissions from domestic heating in the near-term and the project found the potential for lower system costs from a hybrid approach rather than through electrification alone.

In a net zero scenario, homes heated by a hybrid heat pump with a fossil gas backup would either have to transition to a fully electrified heat pump or be supplied by a low carbon gas such as hydrogen or biomethane.

New homes

The recent consultation from Welsh Government on Building Regulations Part L (responses from which are currently being reviewing) is looking to establish the standards for housing construction for 2020 to 2025 and give industry notice by exploring the expected standards that will be in place from 2025. The current proposals for 2020 are to improve the target emission rate for new build homes by raising the fabric standards, and introducing renewable energy technology into the notional building that sets the target emission rate. To meet the new target, developers may, for example, choose to install low carbon heating but if not, will be required to future proof so that low carbon heating can be easily retrofitted in the future. The target outcome is that homes built in 2025 will emit 75% to 80% less carbon than those built to the 2014 Part L requirements[17]. The challenge will be to close the remaining gap to true zero carbon development.

The Energy Vision scenario relies on new homes being built with low carbon heating and high standards of energy efficiency from 2025, rather than building properties that will need retrofitting at a later date. If Welsh Government or the local authorities in CCR choose to bring this date forward, there will be a direct benefit in that the number of homes needing to be retrofitted by 2050 would be reduced.

Table 3: Scenario summary: domestic

Sector	Example outcomes Energy Vision scenario	Energy prize	Carbon saving potential
Domestic heat and energy efficiency	42,000 suitable houses accurately fitted with internal or	18% reduction in gross thermal energy demand	666 kt CO_2 (51% reduction)

[17] Welsh Government (2019) Welsh Government Consultation Document: Building Regulations Part L and F Review https://gov.wales/sites/default/files/consultations/2019-12/consultation-document-building-regulations-part-l-review.pdf

	external wall insulation. Over 185,000 other insulation measures in homes Over 140,000 heat pumps installed. Replacing heating systems in oil, LPG and solid fuel heated homes prioritised No gas in new homes from 2025, to avoid retrofitting at a later date	30% net decrease in domestic heating energy consumption, taking into account demand reduction and improved heat technology efficiencies, including the impact of heat pump performance.	

Our commercial and industrial energy consumption

Baseline: commercial and industrial

Industrial energy demand has decreased by 34% since 2005 and emissions have decreased by 49%. The greater reduction in emissions, compared to the reduction in energy demand, is largely due to the decarbonisation of the UK's electricity grid. This has been achieved through the increase of low carbon and renewable electricity generation, such as wind and solar PV, and the decrease of traditional fossil fuel plants, such as coal and gas. As noted above, due to data limitations some very large industrial energy users are not included in this analysis.

Cardiff Capital Region's commercial and industrial energy demand declined rapidly between 2005 and 2011, before levelling out

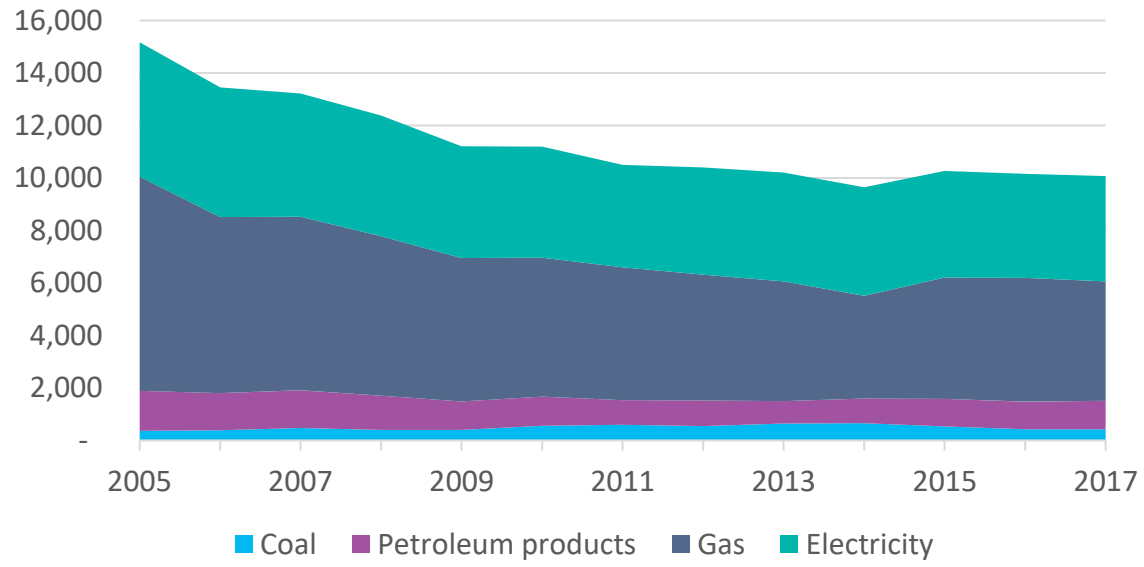


Figure 14: Cardiff Capital Region's historic commercial and industrial energy consumption, by fuel. Source: BEIS total final energy consumption (2019)

Energy Vision scenario: commercial and industrial

The Energy Vision scenario sets out a pathway to achieve a further 54% reduction in commercial and industrial emissions by 2035 through:

- A 13% decrease in energy demand through energy efficiency measures and electrification of heat and process demand
- Switching to low carbon fuels and heating, including electrification and some use of low carbon hydrogen in industrial processes
- Significant further decarbonisation of the electricity grid through renewable generation.

CCR's Energy Vision scenario includes a 13% decrease in commercial and industrial energy consumption by 2035

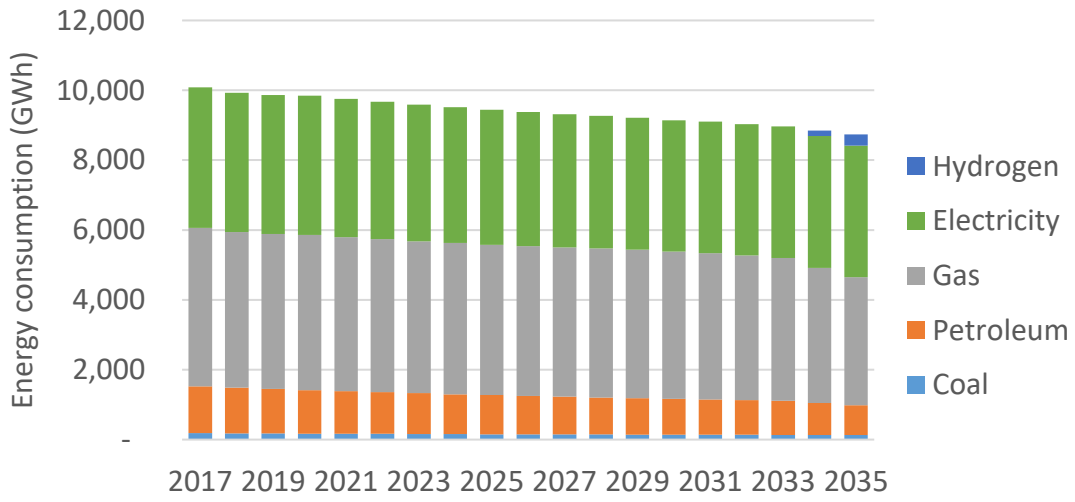


Figure 15: Energy Vision scenario commercial and industrial energy consumption, by fuel. Source: WGES analysis

Existing effort in this area can be built on, through the work of the South Wales Industrial Cluster (SWIC), which brings together a group of major industrial companies in CCR and other parts of South Wales to share knowledge, co-ordinate funding and collaborate on decarbonisation projects. It's focus areas include energy efficiency, carbon dioxide avoidance, the hydrogen economy, carbon capture, utilisation and storage (CCUS) and low carbon power generation.

Reaching a grid electricity average carbon intensity of 30gCO_2 per kWh[18] would in itself (with no additional demand reductions) achieve a 40% reduction in all commercial and industrial emissions in CCR, as shown in Figure 15. This very low electricity carbon factor would depend on significant installation of new low carbon generation capacity both in CCR and across the UK.

[18] Assumption based on Community Renewables and Two Degrees scenarios in National Grid (2019) *Future Energy Scenarios*, http://fes.nationalgrid.com/media/1409/fes-2019.pdf

Cardiff Capital Region's Energy Vision scenario results in a 51% decrease in commercial and industrial energy emissions by 2035, dependent in large part on decarbonisation of the electricity network.

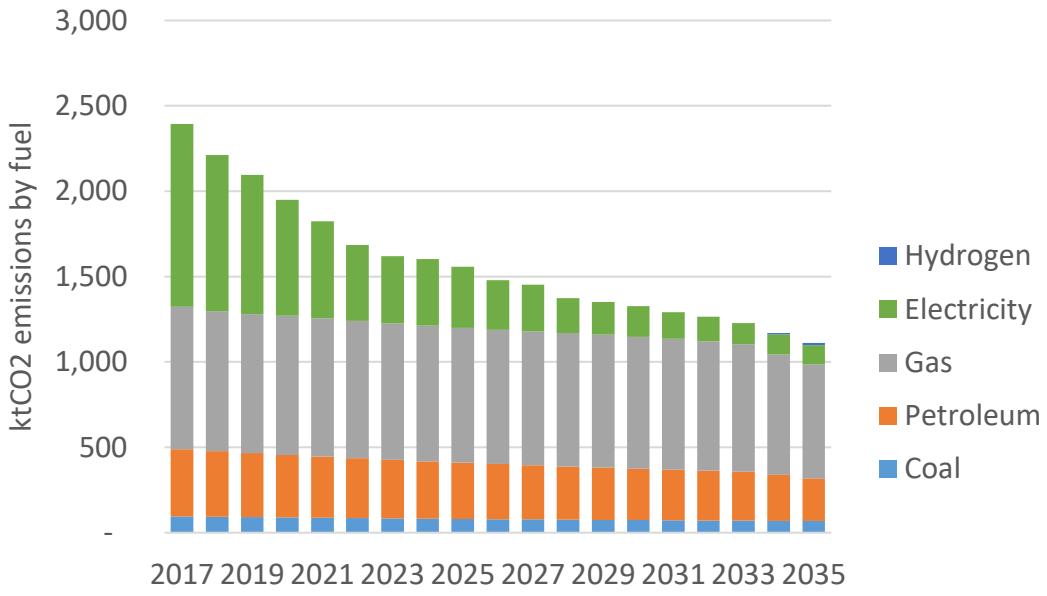


Figure 16: Energy Vision scenario commercial and industrial emissions estimates, by fuel. Source: WGES analysis

The future impact on energy utilities' networks and whole system decarbonisation in the CCR and beyond are beginning to be addressed through the Zero2050: South Wales initiative led by National Grid.

Use and production of hydrogen

Feedback from CCR stakeholders was that there is strong support for the region to lead the way on the development of hydrogen production, storage and use technologies. It is key to prioritise the use of hydrogen based on regional cost-effectiveness in the industrial sector before transport and then heating. Regen's (see **Box 1**) found that before 2035, under some scenarios, there could be some use of hydrogen in the region in industrial clusters. Based on stakeholder interest and detailed scenario analysis, the Energy Vision scenario assumes early hydrogen adoption, beginning with its use in industrial processes in a CCR cluster around 2033.

To achieve the region's net zero carbon ambitions, hydrogen should be produced either using excess renewable energy to power electrolysis or through other methods such as steam methane reformation with effective carbon capture and storage. To be viable for widespread hydrogen use, further pilots will be required to help with realising cost reduction and further technology development.

Research has already begun in this area in the region with the collaboration between the University of South Wales, Cardiff University and Swansea University for the FLEXIS project. The FLEXIS project, which has a demonstration area in Neath Port Talbot, includes work packages on hydrogen, syngas, BIOH2 and BIOH4, on subjects such as storage, sustainable production, efficient use and purification.

Table 4: Scenario summary: commercial and industrial

Sector	Example outcomes Energy Vision scenario	Energy prize	Carbon saving potential
Commercial and industrial energy demand	Significant energy efficiency programme A switch to alternative fuels, including hydrogen and electrification of heating Decarbonisation of electricity network through renewables and behind-the-meter low carbon generation	35% reduction in coal and petroleum energy consumption 19% reduction in gas consumption 4% of demand supplied by hydrogen through industrial clusters 6% reduction in electricity demand	1,284 kt CO_2 (51% reduction)

Our energy demand from transport

Baseline: transport

CCR has a high dependence on private cars for transport. Average annual vehicle miles in CCR are similar to those in other Welsh regions at 9,330 miles per car, 17% higher than the UK average[19]. Less than 1% of road miles are driven by buses and coaches in CCR[19].

The £738 million Metro project – the cornerstone of the £1.2billion City Deal - will create a credible mass transport infrastructure that is likely to drive a modal shift from private vehicle use to public transport.

To date, CCR has seen a slow uptake of electric vehicles. Approximately 0.3% of cars registered in the region are pure electric, compared with an average of 0.6% of vehicles across Great Britain. Similarly, despite a surge in charger installations in 2019, CCR currently hosts 173 public charging devices, including 31 rapid public chargers[20]. This is relatively low, as is the case across Wales, where there are half the number of public EV chargers per capita compared to Scotland.

Wales has significantly lower bus utilisation rates than England or Scotland

[19] DFT (2019) Road traffic statistics (TRA) https://www.gov.uk/government/collections/road-traffic-statistics and Regen transport model

[20] DFT (2019) Electric Vehicle Charging Device Statistics https://www.gov.uk/government/statistics/electric-vehicle-charging-device-statistics-october-2019

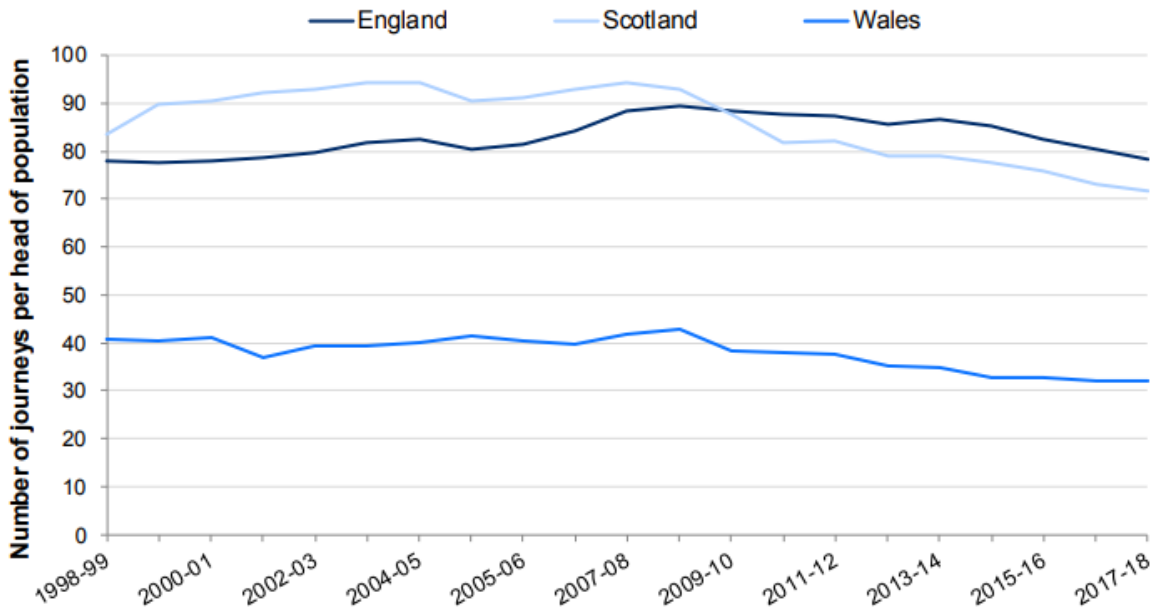


Figure 17: Passenger journeys per head on local bus services by country, 1998-2018. Source: Public service vehicles statistical bulletin, 2019

Energy Vision scenario: transport

Achieving a 60% reduction in transport emissions by 2035 is a significant challenge for Cardiff Capital Region with its high dependence on private vehicles. The Energy Vision scenario assumes:

- 64% of vehicles driven in Cardiff Capital Region in 2035 are electric, with the ban on fossil fuel vehicle sales brought forward to 2030.
- A 20% reduction in private vehicle mileage in 2035 facilitated by significantly increased use of public transport and active travel.
- A slowing of the growth in total number of vehicles on the road, facilitated by increased use of public transport and active travel.

The reduction in private vehicle mileage was originally set at 15%. However, feedback from stakeholders in the region was that the urban environment and projects such as the current Metro and Metro Plus projects should inspire the region to aim for a greater percentage reduction. The reduction in transport-related emissions due to the changing way businesses have operated during the lockdown caused by COVID-19 provides a tremendous opportunity to permanently reduce travel emissions if these new working practices are sustained post COVID-19. It should also be noted however that forecasts undertaken over the last couple of years (pre-COVID-19) by Transport for Wales (TfW) using their SE Wales Transport Model indicates that even sizeable percentage uplifts in public transport usage results in only minor percentage reductions in private car mileage due to the sheer number of car journeys that already take place. The effects of making all public transport in SE Wales free to use were modelled and it was found that by 2026 this would more than double bus use, triple rail use, but have only a 6% reduction in private car use. Thus, a reduction in private car mileage is not only dependent on increases in public transport facilities and usage, but will also requires significant behavioural change.

Cardiff Capital Region's Energy Vision scenario requires a significant decrease in the number of petrol and diesel vehicles

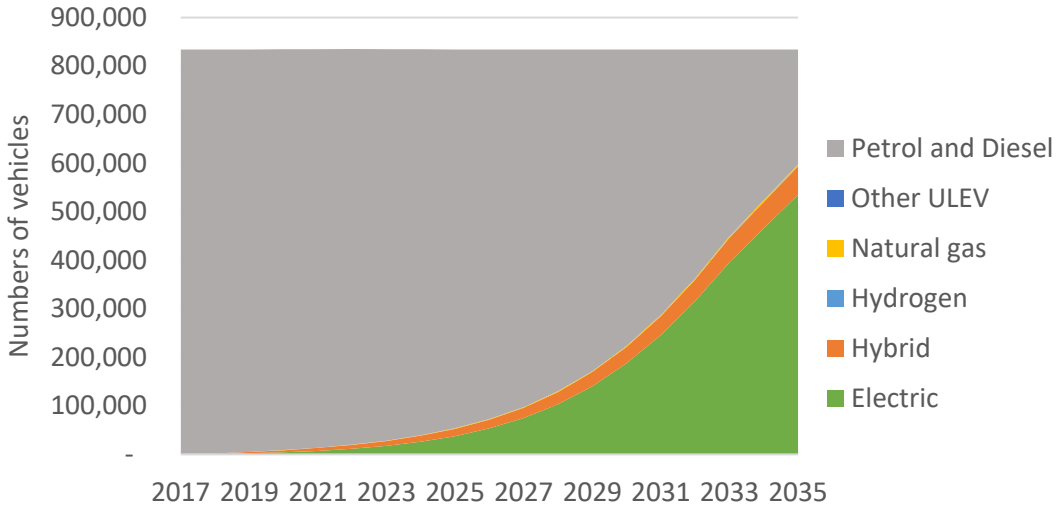


Figure 18: Cardiff Capital Region's Energy System Vision road vehicle numbers, by vehicle fuel. Source: WGES analysis

Cardiff Capital Region's Energy Vision scenario results in road transport emissions reducing by around 60%

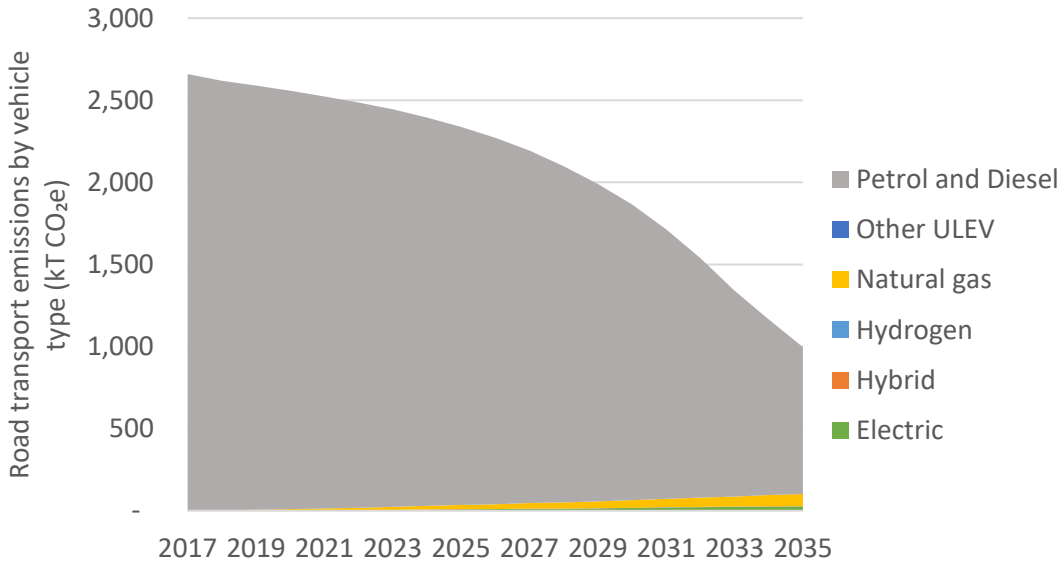


Figure 19: Energy System Vision road vehicle emissions, by vehicle fuel. Source: WGES analysis

Table 5: Summary: Transport

Sector	Example outcomes Energy Vision scenario	Energy prize	Carbon saving potential
Road transport	516,000 electric cars 3,300 gas and hydrogen HGVs 1,000 hydrogen vehicles 10,000 public and on-street EV chargers 20% reduction in private vehicle mileage	6.7 TWh reduction in petrol and diesel energy consumption 1.4 TWh increase in electricity consumption	1,606 kt CO_2 (60% reduction)

Achieving these outcomes requires 15,000 EV sales per year by the mid-2020s, peaking at 70,000 per year in the 2030s before reducing to 60,000 per year. Peak sales of fossil-fuelled cars in Cardiff Capital Region have historically reached 70,000 per annum[21]. Additional support, such as a scrappage scheme alongside a 2030 ban on new fossil-fuelled car sales[22], would be needed to retire some fossil-fuelled vehicles earlier than their average lifespan, in order to achieve a peak of 70,000 EV sales per year in the 2030s.

This level of EV sales will also require a supportive, area-wide EV charging network. Similarly, the switch to gas and hydrogen heavy goods vehicles and buses is reliant on the fuelling infrastructure being in place.

Baseline and modelling results: Electricity

Our annual electricity demand

Baseline: annual electricity demand

Annual electricity demand in CCR is currently approximately 6.2 TWh[23]. It has fallen steadily since at least 2005, when electricity demand was nearly 7.6 TWh[23], as a result of efficiency improvements and deindustrialisation.

Commercial and industrial electricity consumption constitutes 55% of all electricity consumption, approximately 10 percentage points less than the Welsh and GB average. Almost all of the remaining electricity demand is used in domestic buildings

[21] DFT (2019) Road traffic statistics (TRA) https://www.gov.uk/government/collections/road-traffic-statistics and Regen analysis

[22] The UK Government is due to consult on bringing forward the fossil-fueled vehicles ban to 2035 or earlier. The analysis assumes this is brought forward to around 2030.

[23] BEIS (2019) Regional and local authority electricity consumption statistics 2005 to 2018, https://www.gov.uk/government/statistical-data-sets/regional-and-local-authority-electricity-consumption-statistics

and appliances. The Energy Vision includes ambitious uptake of renewable energy, including on-site generation, in order to contribute to the UK's decarbonised electricity supply.

Energy Vision scenario: annual electricity demand

The scenario projection shows an overall net increase in annual electricity demand in CCR of 10% by 2035, compared to 2017. Increased energy efficiency measures and appliance efficiency lead to a continued decrease in the base electricity demand; however, by 2025 this is overtaken by the increased demand resulting from the electrification of heating and transport. Peak demand increases may be higher depending on whether time of use tariffs and other smart methods are successful in shifting demand across each 24-hour period.

In the Cardiff Capital Region Energy Vision scenario, decreasing base annual electricity demand is outweighed by increasing demand from electrified heat and transport

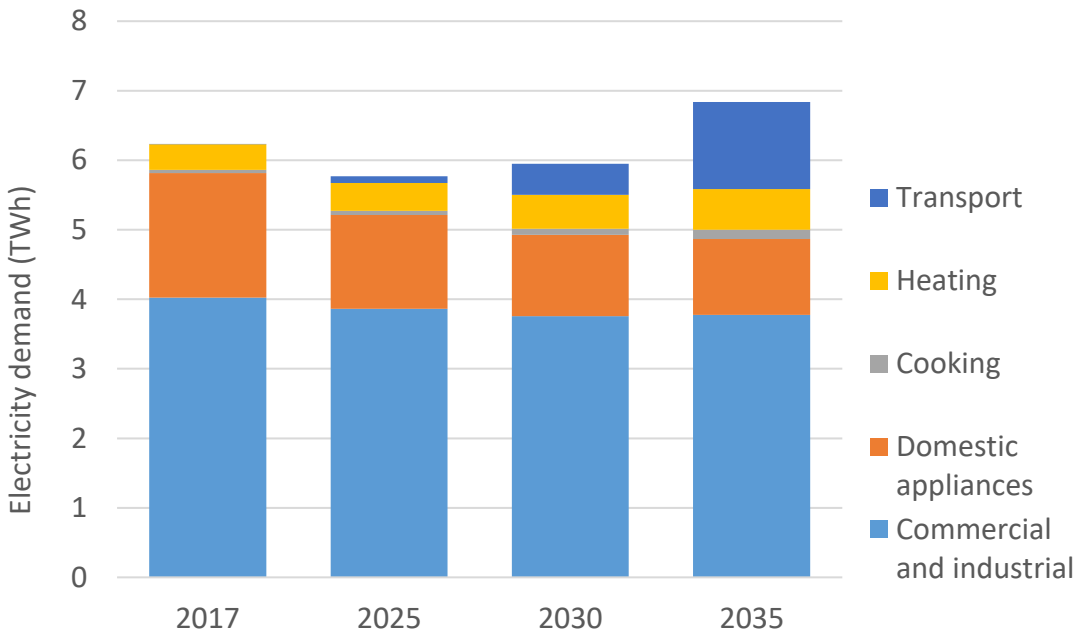


Figure 20: Cardiff Capital Region's Energy Vision scenario demand by sector. Source: WGES analysis

Our electricity generation

Baseline: electricity generation

Cardiff Capital Region hosts 311 MW of solar PV and 299 MW of onshore wind

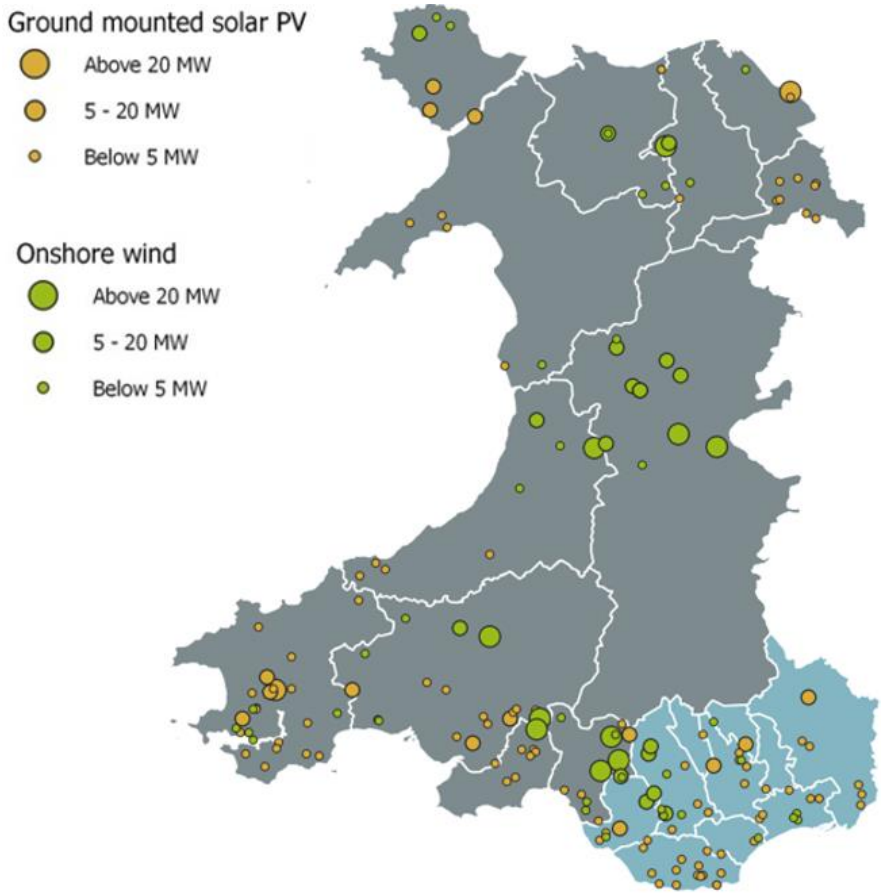


Figure 21: Solar PV and onshore wind projects (>1MW) currently generating in Wales. Source: BEIS Renewable Energy Planning Database, 2019

In 2019 there was a total of 709 MW of installed renewable electricity capacity in the region, with 221 MW of this locally owned[24].

Renewable electricity generation in CCR is mainly from onshore wind and solar PV. Solar PV has a relatively high installed capacity with 311 MW, but, due to a lower capacity factor, provides around 18% of renewable electricity generation in the region.

Cardiff Capital Region hosts approximately 40% of the Pen y Cymoedd wind farm, the largest wind farm in England and Wales. This project and nearly 90 others contribute to onshore wind currently generating 50% of the Cardiff Capital Region's renewable electricity generation.

[24] See Welsh Government (2019) Energy Generation in Wales, 2018 https://gov.wales/sites/default/files/publications/2019-10/energy-generation-in-wales-2018.pdf for definition of locally ownership.

The majority of the remaining renewable electricity generation in the region is made up of energy from waste, anaerobic digestion and biomass electricity/CHP projects.

Table 6: Current renewable energy generation in the region

Technology type	2018 Number of projects	2018 installed capacity (MW)	2018 Estimated annual generation (GWh)
Anaerobic digestion	10	9	48
Biomass electricity and CHP	13	42	245
Energy from Waste	1	30	125
Hydropower	25	1	2
Landfill gas	9	13	47
Onshore wind	91	299	770
Sewage gas	2	4	16
Solar PV	22,063	311	294
Total	22,214	709	1,549

50% of renewable generation in CCR is from onshore wind projects

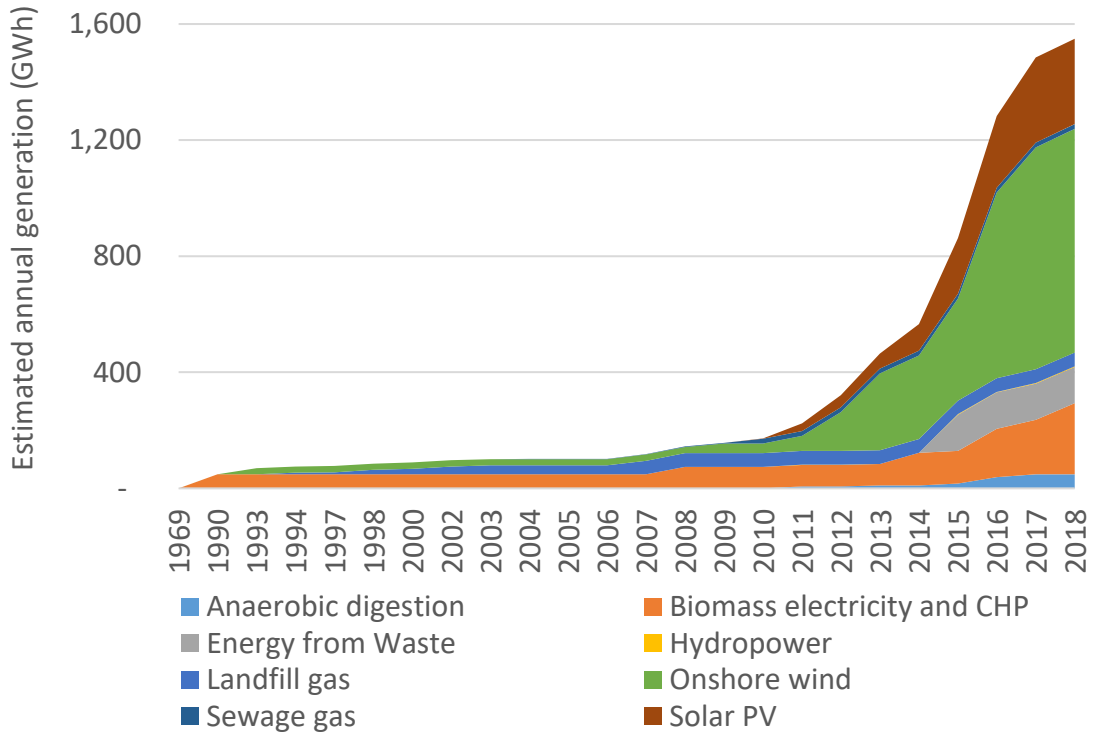


Figure 22: Cardiff Capital Region's renewable electricity generation trends 2008-2018. Source: WGES analysis, Energy Generation in Wales 2018

CCR hosts around a quarter of Wales' onshore wind capacity and a third of solar PV capacity.

Cardiff Capital Region hosts 22% of current Welsh renewable electricity capacity

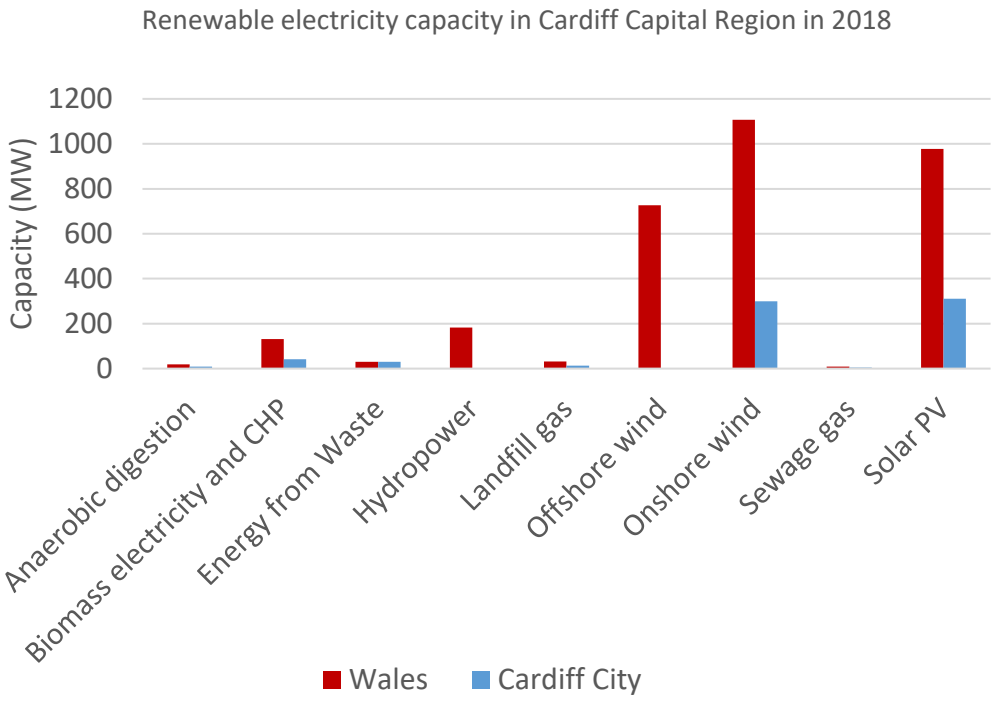


Figure 23: Renewable electricity capacity in Cardiff Capital Region, 2018. Source: WGES analysis, Energy Generation in Wales 2018

Cardiff Capital Region currently generates the equivalent of 25% of its electricity consumption from local renewable sources

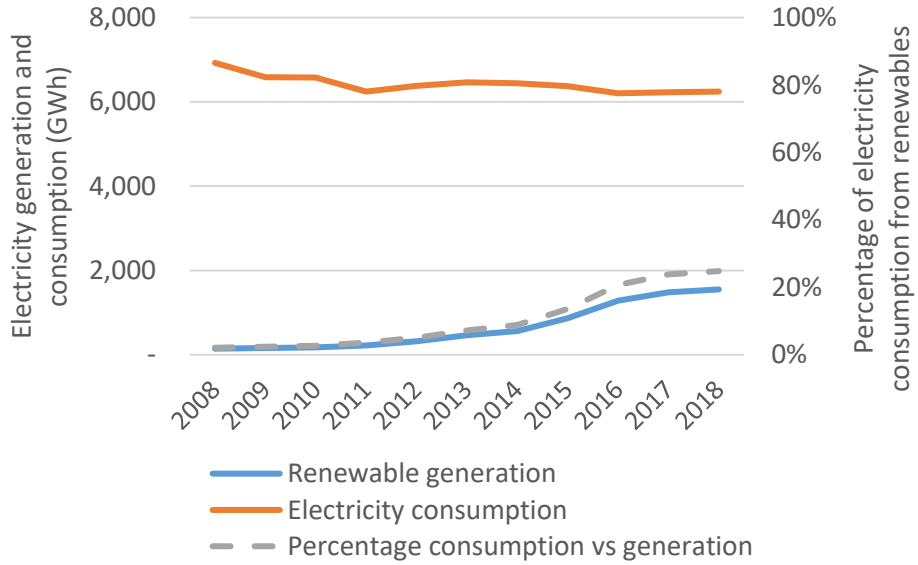


Figure 24: Percentage of electricity consumption from renewables in Cardiff Capital Region. Source: WGES analysis, Energy Generation in Wales 2018

Energy Vision scenario: electricity generation

Stakeholders engaged through the workshops for CCR were keen for the region to increase the amount of renewable electricity that is generated in the region. Compared to the other regions of Wales, it will be more challenging to exceed the equivalent regional annual consumption, with renewable electricity generation, due to the higher population base and lower availability of renewable resources.

As a result, the Energy Vision scenario includes the ambition that the region generates the equivalent of approximately 50% of its total energy consumption in 2035 from regional renewable sources. This figure is less ambitious than other parts of Wales but has been arrived at by balancing the region's ambition against the available resources, investment requirement and potential grid capacity[25]. Potential benefits to the region in addition to supporting decarbonisation would include investment opportunities, job creation, supply chain stimulation and community benefit funds. If projects are developed by or invested in by the public and community sector there are additional potential economic and social benefits that could result, enabling the region to retain a higher proportion of the value created. This would also support Welsh Government's target to have 1GW of renewable electricity and heat capacity in Wales to be locally owned by 2030, and for all new energy projects to have at least an element of local ownership from 2020[26]

Box 4: A note on grid carbon factors

Achieving net zero carbon emissions across the UK requires the decarbonisation of the electricity grid. In line with industry best practice, the modelling for the Energy Vision scenario applies the UK grid carbon factor to electricity consumed in the region, rather than creating a regional factor based on electricity generated locally.

To be on track for net zero, the Energy Vision scenario assumes that an average UK grid carbon factor of 30 gCO_2/kWh has been achieved by 2035, in line with the assumptions used by National Grid's 2019 Future Energy Scenarios[1]. In order to achieve this level of grid decarbonisation, National Grid's Community Renewables and Two Degrees scenarios require a net increase of 68 and 74 GW of low carbon electricity capacity respectively, across the UK by 2035. Cardiff Capital Region has the natural resources and the ambition to play an increased role in delivering renewable energy deployment.

[25] This Energy Vision projection does not include a Cardiff or Newport Tidal Lagoon project.

[26] https://gov.wales/sites/default/files/publications/2020-02/policy-statement-local-ownership-of-energy-generation-in-wales.pdf

To enable Cardiff Capital Region to meet the equivalent of 50% of its 2035 electricity consumption from local renewables requires a significant increase in generation and efficiency savings to offset new sources of electricity demand

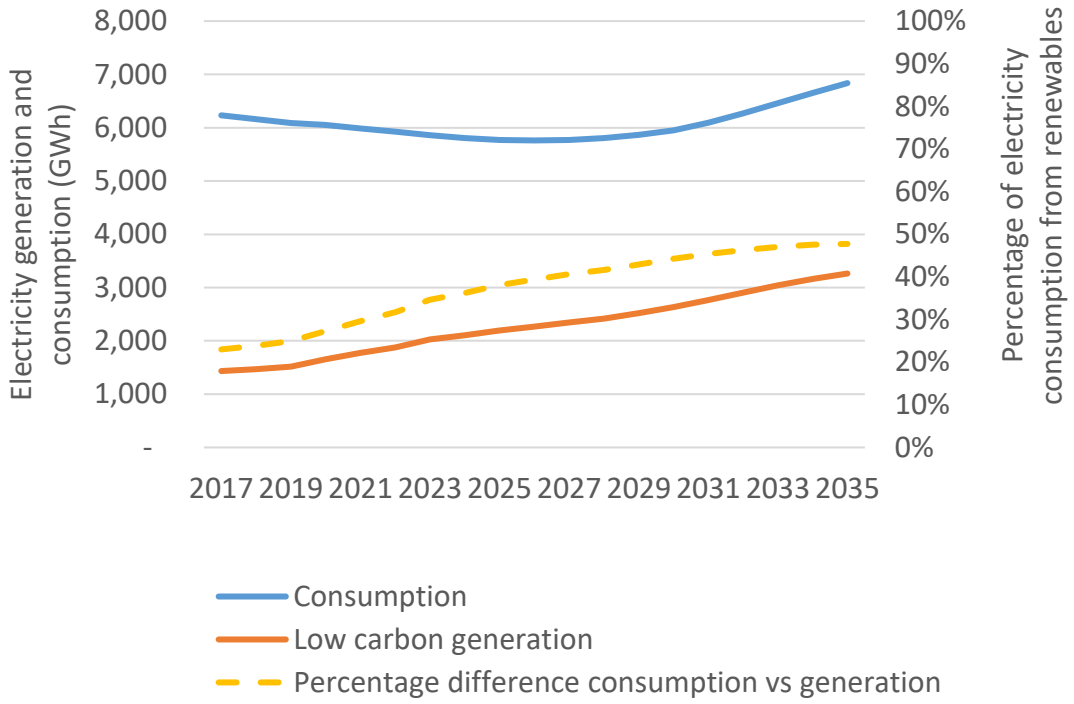


Figure 25: CCR's Energy Vision scenario electricity consumption vs low carbon generation. Source: WGES analysis

Figure 25 shows one pathway to achieving this level of electricity generation in the region.

Onshore wind and solar PV are the main electricity generating technologies focussed on in Cardiff Capital Region's Energy Vision scenario

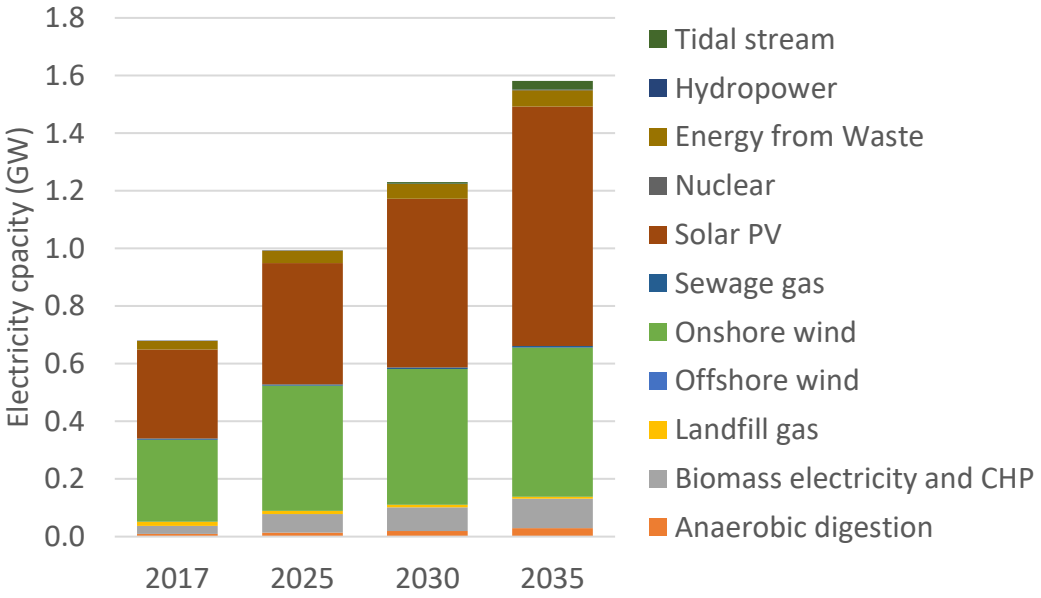


Figure 26: Renewable energy capacity increases under Cardiff Capital Region's Energy Vision scenario. Source: WGES analysis

Onshore wind

The Energy Vision scenario includes an increase in onshore wind capacity of 233 MW. This is a relatively small proportional increase, due to a lack of available sites, primarily due to the urban nature of the region. The capacity increase is made up of:

- a small number of projects currently in development
- new projects in the existing Strategic Search Area F (SSA)
- new projects in Priority Areas as designated in the National Development Framework (NDF) consultation
- new projects (made up of small numbers of large turbines) outside of areas designated by the NDF and SSAs
- and a number of small to medium-scale farm or community projects.

CCR's Energy Vision includes an increase in onshore wind capacity of over 70%

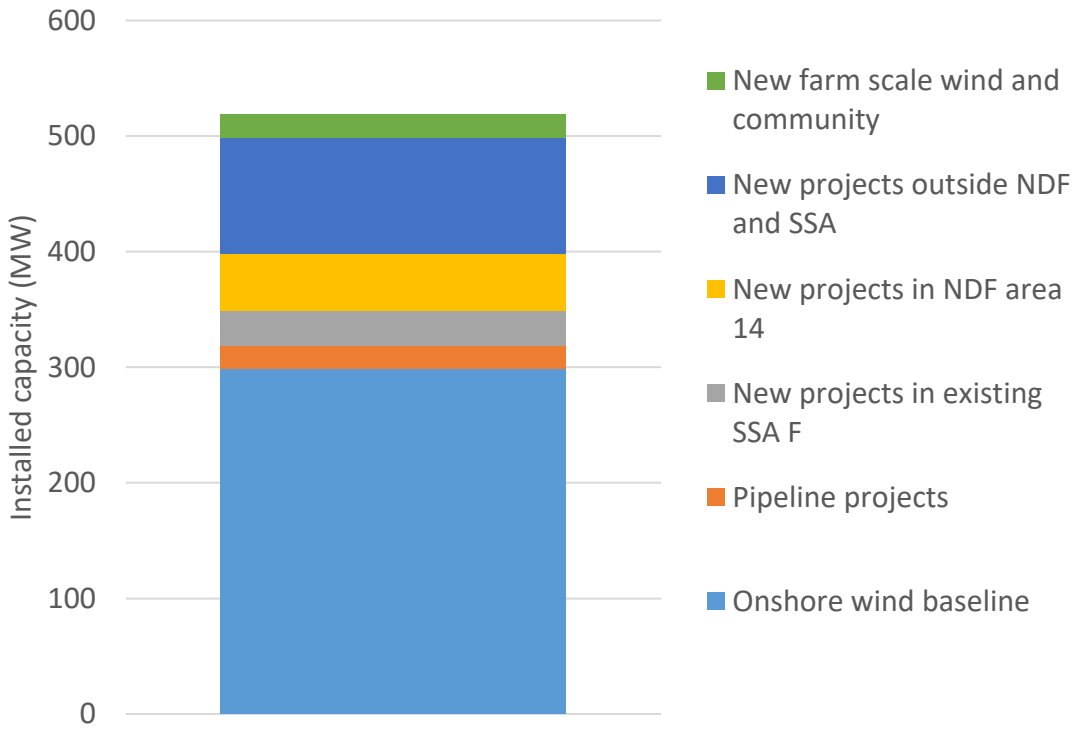


Figure 27: CCR's Energy Vision scenario for onshore wind. Source: WGES analysis

Solar PV

The Energy Vision scenario includes 0.5 GW of new solar PV, with 190 MW on rooftops and 325 MW from solar farms. Roof-mounted solar PV has an important role to play in the urban environment, particularly in engaging households and businesses in understanding the energy they consume as well as what they can generate.

Other renewables

The Energy Vision scenario also includes small increases in the deployment of anaerobic digestion (including biomethane-producing sites), and biomass electricity/CHP. Each of these technologies could have a small but significant impact on local renewable energy generation with associated economic benefits.

Marine

Stakeholder input and additional expert research suggested that, despite support and interest, a tidal lagoon project would be unlikely to be developed in the region by 2035 and its inclusion in the Energy Vision could mask the need to focus on other technologies.

Tidal power in the form of a barrage, lagoons or tidal stream continues to receive support in South Wales, with the potential Swansea Bay project (in the neighbouring region) and similar related projects investigated off Newport and Cardiff. Support for a tidal lagoon project is also highlighted within the CCR strategic business plan.

The Swansea tidal lagoon received significant commercial and public interest and was granted a development consent order in 2015[27]. But despite the interest in the area, to date there has been limited progress.

The Newport and Cardiff tidal lagoons are both potential projects in the pre-application stage of the National Infrastructure Planning register; however, no progress has been recorded on the register for either site since 2017[28]. Innovation is still required in this sector to reach a level of economic viability seen by other renewable energy technologies.

For tidal stream, the resource in the CCR area is limited and there are no projects in development in the public domain. Better tidal stream resource has been identified in Pembrokeshire and around Anglesey. The highest velocity tidal stream resource in the CCR region is near to Aberthaw in the Vale of Glamorgan. However, there are issues with the velocity at these sites being both marginal and/or unidirectional, meaning there is a better flood or ebb flows but not both. In addition, the best resource is in the main shipping lane, with limited options to divert shipping due to shallow waters either side[29].

Network infrastructure

At present there are significant network constraints on the transmission network in the licence area that supplies CCR. As a result, there is an embargo on controllable generators that run at peak times connecting to the Western Power Distribution (WPD)

[27] Planning Inspectorate (2020) National Infrastructure Planning https://infrastructure.planninginspectorate.gov.uk/projects/wales/

[28] National Infrastructure Planning register https://infrastructure.planninginspectorate.gov.uk/

[29] Welsh Assembly Government (2011) Marine renewable Energy Strategic Framework https://gov.wales/sites/default/files/publications/2019-09/marine-renewable-energy-strategic-framework-technical-addendum.pdf

network in the South Wales licence area. This doesn't affect onshore wind, solar or generators under 1 MW, but does affect the deployment of battery storage, gas generation, energy from waste and bio-energy that generates electricity.

It is possible that a system of Active Network Management on the distribution system could manage the constraint with a non-investment solution or equally the constraint may worsen and the embargo would continue. WPD are exploring whether exemptions to this embargo can be made for storage projects.

WPD's network capacity map shows significant further constraints for generation and demand customers across the region[30]. One method of working around network constraints would be through local flexibility and alternative connection agreements. The current embargo on connecting battery storage over 1 MW presents a barrier to some aspects of flexibility.

Storage and flexibility

Cardiff Capital Region hosts one of Wales' first large scale batteries, The Parc Stormy 4 MW/4.8 MWh storage project that came online in February 2018 and provides Firm Frequency Response (FFR) to the National Grid. Smaller-scale commercial behind the meter projects are known to be hosted in the region, in addition to tens of domestic battery projects[31].

Further deployment of electricity storage, alongside flexibility such as demand side response provision or the creation of local energy markets, could support the decarbonisation of energy generation in Cardiff Capital Region by enabling more renewables to connect to the network in constrained areas and supporting the business case for investing in renewables. These will be explored further through the delivery plan.

Table 7: Summary: electricity generation

Sector	Example outcomes Energy Vision scenario	Energy prize	Carbon saving potential
Renewable generation	Sufficient flexibility, including storage, and network infrastructure upgrades to enable low carbon generation and demand technologies to connect 532 MW of onshore wind (233 MW of new capacity)	Generating the equivalent of over 50% of electricity consumption in 2035	Contribution towards reduction in UK grid carbon factor

[3030] WPD (2020) *Network capacity map* https://www.westernpower.co.uk/our-network/network-capacity-map/

[31] Welsh Government (2019) *Energy Generation in Wales*

	830 MW solar PV (520 MW of new capacity)		

Summary

Under a Business as Usual scenario, CCR is expected to achieve only 26% decarbonisation by 2035, approximately half of the 55% needed to be on track for net zero. Delivering the Energy System Vision scenario represents a very significant step up from a Business as Usual scenario and will only happen with significant local, regional and national commitment.

Potential Business as Usual and Energy Vision decarbonisation trajectories in CCR

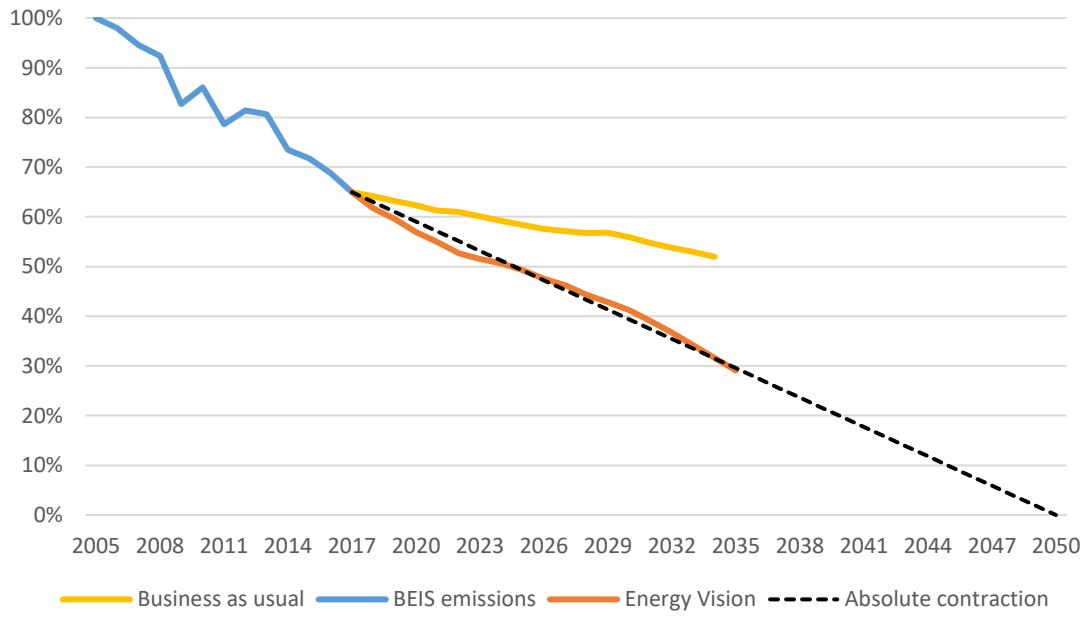


Figure 28: Decarbonisation trajectories in Cardiff Capital Region. Source: WGES analysis

The Energy Vision scenario focuses on known, deployable technology and behavioural change to 2035. Based on National Grid's 2019 Future Energy Scenarios[32] and the Committee on Climate Change[33], the scenario prioritises "clear, urgent, no regrets" actions. Table 1 summarises the results of the modelling, setting out key example outcomes to be achieved by 2035. Potential initial actions to set the region on course to achieve these outcomes are explored in the CCR delivery plan.

Beyond 2035, and to achieve net zero, further decarbonisation of all aspects of the energy system will be required. In some cases, this further decarbonisation is dependent on innovation, national policy and/or overcoming significant challenges. The delivery plan includes consideration for some of the longer-term issues raised,

[32] National Grid (2019) *Future Energy Scenarios*, http://fes.nationalgrid.com/media/1409/fes-2019.pdf
[33] Committee on Climate Change (2019) 2019 Progress Report to Parliament https://www.theccc.org.uk/publication/reducing-uk-emissions-2019-progress-report-to-parliament/

such as supporting research and development on hydrogen generation and use through the region's universities and heavy industries.

Table 8: Summary of Energy Vision scenario modelling results

Sector	Example outcomes Energy Vision scenario	Energy prize	Carbon saving potential
Domestic heat and energy efficiency	• 42,000 houses fitted with internal or external wall insulation • Over 185,000 other insulation measures in homes • Over 140,000 heat pumps • Replacing heating systems in oil, LPG and solid fuel heated homes prioritised • No gas in new homes from 2025, to avoid retrofitting at a later date	• 18% reduction in gross thermal energy demand • 30% net decrease in domestic heating energy consumption, taking into account demand reduction and improved heat technology efficiencies, including the impact of heat pump performance.	666 kt CO_2 (51% reduction)
Commercial and industrial energy demand	• Significant energy efficiency programme • A switch to alternative fuels, including hydrogen and electrification of heating • Decarbonisation of electricity network through renewables and behind-the-meter low carbon generation	• 35% reduction in coal and petroleum energy consumption • 19% reduction in gas consumption • 4% of demand supplied by hydrogen through industrial clusters • 6% reduction in electricity demand	1,284 kt CO_2 (51% reduction)
Road transport	• 260,000 electric cars • 2,600 gas HGVs • 1,000 hydrogen vehicles • 2,000 public EV chargers • 20% reduction in private vehicle mileage	• 3.2 TWh reduction in petrol and diesel energy consumption • 0.6 TWh increase in electricity consumption	660 kt CO_2 (55% reduction)
Flexibility and renewable generation	• Sufficient flexibility, including storage, and network infrastructure upgrades to enable low carbon generation and	• Generating the equivalent of over 50% of electricity consumption in 2035	Contribution towards reduction in UK grid carbon factor

	demand technologies to connect • 532 MW of onshore wind (233 MW of new capacity) • 830 MW solar PV (520 MW of new capacity)		

The future of energy and our economy

Economic Assessment

Introduction

The changes required to develop a decarbonised future energy system have impacts that reach beyond reducing carbon emissions. Changing the technologies that we use to heat our homes, generate our electricity, and produce our energy will also affect the economic landscape. Examples of these effects include:

- changes in the geographic distribution of jobs as energy becomes less centralised,
- in the job intensity required to produce electricity because this is unique to each generation technology,
- in how expensive new technologies are to install, construct, and operate, and
- how cash circulates around local economies as a result of these changes.

We have built on the scenario modelling described in the previous chapter to try to better understand the impact on net job creation and gross value added. Additionally, we have estimated the level of investment required to achieve the scenarios. The impacts that we consider; job creation, gross value added, and investment required, are just some of the economic impacts related to the energy transition. Other impacts, such as the impact on the cost of energy prices are not included in analysis. Where possible, we have sought to estimate the specific changes to the Cardiff Capital Region economy.

Approach

We have used an indicator-based approach to estimate job creation, gross value added, and investment. This involves using literature reviews to identify the most appropriate estimates such as jobs/MW, or GVA/employee. Subsequently, these indicators are applied to the results of the energy modelling and allow us to estimate the economic impact of changes in electricity generation, energy efficiency, and domestic heating. A technical annex that accompanies this report provides additional detail on the calculations and sources used in our analysis.

In practice, this approach has an important limitation in relation to low carbon heating. There is significantly less data available to assess the number of jobs associated with the transition to low carbon heating than electricity generation or energy efficiency. This means that the low carbon heating jobs are not comparable with the electricity generation or energy efficiency jobs. We discuss this in more detail in the low carbon heating section below.

In terms of scope, the economic impact in terms of jobs, GVA and investment has not been calculated in relation to two sectors in the energy modelling: 1) transport and 2) commercial and industrial energy efficiency. The transport sector was excluded because the production and employment benefits associated with EV manufacture will not be strongly influenced by the speed of customer switching to EVs in the same region. It is also frequently assumed that there will be no net change in jobs from the transition to EV manufacturing and assembly. Commercial and industrial energy

efficiency has not been assessed because the energy modelling inputs do not allow us to identify energy efficiency impacts from other factors influencing energy demand change, such as the macroeconomic assumptions underpinning the future energy scenarios.

Finally, it is important to provide clarity on the definition of the term “jobs” within the context of this analysis and how this applies to each technology area. Political and media commentary on “jobs” often refers to gross jobs, which are the direct jobs related to a specific project or intervention. In examining the economic impact of the energy transition the accepted standard is to calculate net jobs – this considers the net impact of the job gains alongside the job losses associated with transitioning from one technology to another. Where data sources have made this possible, we have sought to present jobs estimates in net terms, in line with this best practice. We also define jobs in terms of Full Time Equivalents (FTE) wherever data allows.

Additionally, there is a difference between direct, indirect and induced jobs. In an energy context, direct jobs are typically associated with the manufacture, construction and installation of equipment. Indirect jobs arise in the supply chain of the energy technology. Induced jobs related to jobs generated as a result of spending incomes earned from direct employment. Figure 29 below visualises these concepts.

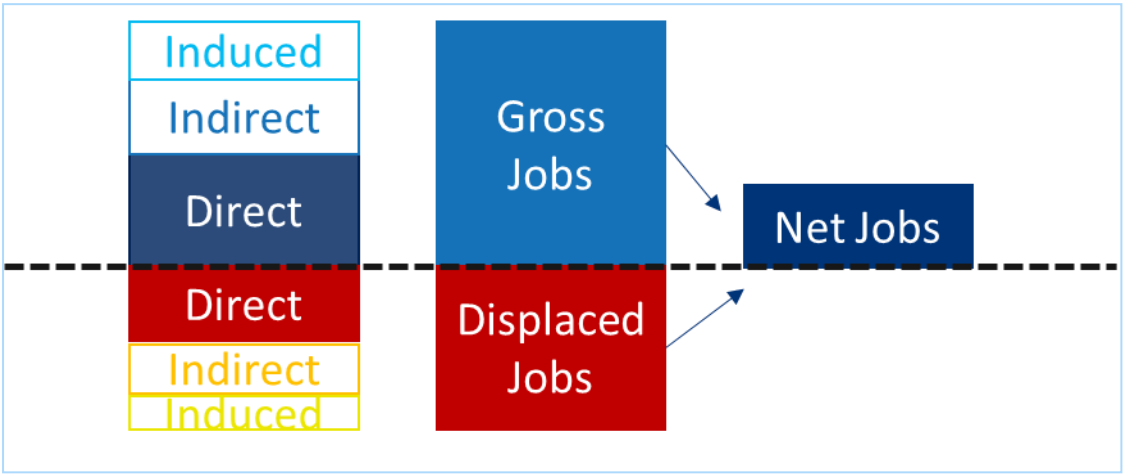


Figure 29. Shows the relationship between gross, displaced, and net jobs. Indirect direct and induced jobs are also shown. Indirect and induced jobs have not been filled with colour because these jobs are not taken into account in this analysis. [34]

Throughout this analysis we only calculate direct jobs, as depending on the area of decarbonisation, these are more likely to be local jobs than indirect or induced jobs. However, the analysis does not allow us to comment on the exact location of the job estimates. Some jobs are likely to be held by residents of the Cardiff Capital Region; other jobs may be held by those who travel into the region to perform their roles.

[34] Adapted from UKERC. 2014. Low carbon jobs: The evidence from net job creation from policy support for energy efficiency and renewable energy.

Electricity generation

The results from assessing the economic impact related to the change in energy generation technologies estimate that achieving the energy system vision scenario will require nearly £750 million of additional investment, equivalent to approximately £50 million per year, compared against the business as usual scenario. This spending will be made by a wide range of parties included businesses (and their investors), households as well as local and national government. The energy system vision scenario will also create an estimated 7,400 additional annual jobs and contribute nearly £850 million more in GVA than the business as usual scenario between 2020 and 2035. The location of these additional jobs is an important question and a difficult one to answer with a precise number. Construction, operation and maintenance jobs will occur locally – however manufacturing jobs may occur inside of outside of the region. Likewise, persons could travel into the region to provide operational support while being based elsewhere. Ultimately, a portion of the jobs figures presented are likely to be located within the Cardiff Capital Region however other jobs will be held by persons resident outside of the region. In order help the region benefit from jobs associated with future local electricity generation it will be important to fist understand the reason why operation and maintenance jobs may be located outside of the region in order to develop a policy response.

Table 9 summarises the estimated economic impact of the business as usual and the energy system vision scenarios. The figures shown in the table represent the total value from all years from 2020 through to 2035. Similarly,Table 10 summarises the additional investment, jobs, and GVA associated with the Energy System Vision (ESV) scenario.

Table 9 BAU and ESV economic impact2020- 2035[35]

Scenario	Gross Jobs including losses*	Average annual jobs including losses*	Discounted GVA	Discounted Investment
Business as usual (BAU)	32,737	2,182	4,110,777,412	£366,128,354
Energy system vision (ESV)	40,166	2,678	4,964,582,623	£1,114,348,193
**Gross and annual job figures have been calculated based on UK or international direct job intensity indicators per technology. These full time equivalent indicators include both short term (construction) and long term (operations and maintenance) jobs. However, short term jobs are weighted against the lifetime of the plant. Non-manufacturing direct electricity generation jobs are typically more likely to be held by residents local to an energy site. The experience of Wales to date is that many of the long term operational and maintenance jobs associated with these technologies are held my persons outside of the region who travel into Wales to perform their duties.*				

[35] A discount rate of 3.5% is applied to calculate investment and GVA over the 2020 – 2035 time period.

Table 10. Difference between the ESV and BAU scenarios 2020-2035[36]

Scenario	Net Jobs	Discounted GVA	Discounted Investment
Difference between ESV and BAU	7,429	853,805,211	£748,219,839
Difference between ESV and BAU (percentage)	23%	21%	204%

Investment

In terms of investment, the energy system vision scenario requires additional investment associated with the amount of new electricity generation included in the scenario, as well as the specific technologies involved. Onshore wind, solar PV, energy from waste, and biomass electricity and CHP each are related with approcimately 1/5th of the additional investment required to achieve the energy system vision. Figure 30 shows the breakdown of the additional estimated investment required by technology area to achieve the energy system vision scenario compared with the business as ususal scenario.

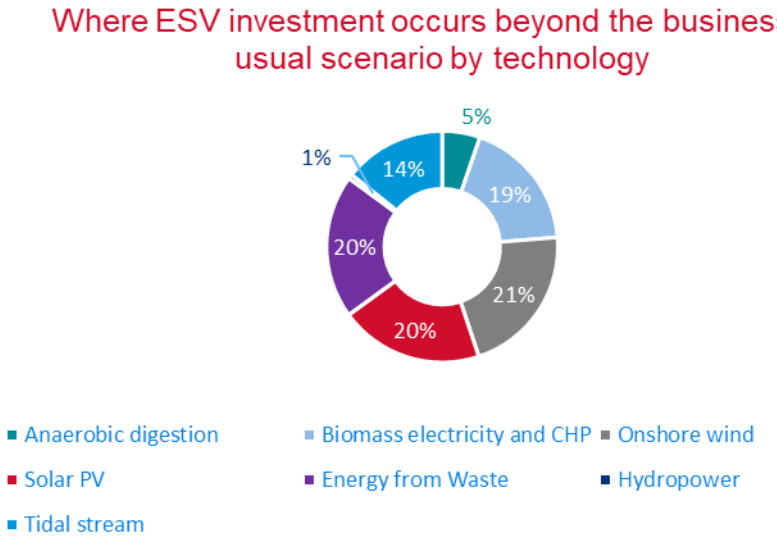


Figure 30 Where ESV Investment occurs beyond the BAU scenario by technology

Jobs

The jobs figures presented in table 6 include both the jobs associated with increases in capacity and output from some generation technologies (for example solar PV) as well as the fact that some jobs will be lost as the capacity and output from fossil-fuel

[36] A discount rate of 3.5% is applied to calculate investment and GVA over the 2020 – 2035 time period.

based generation technologies falls. The breakdown of jobs required in the energy system vision scenario is visualised on an annual basis in Figure 31 below.

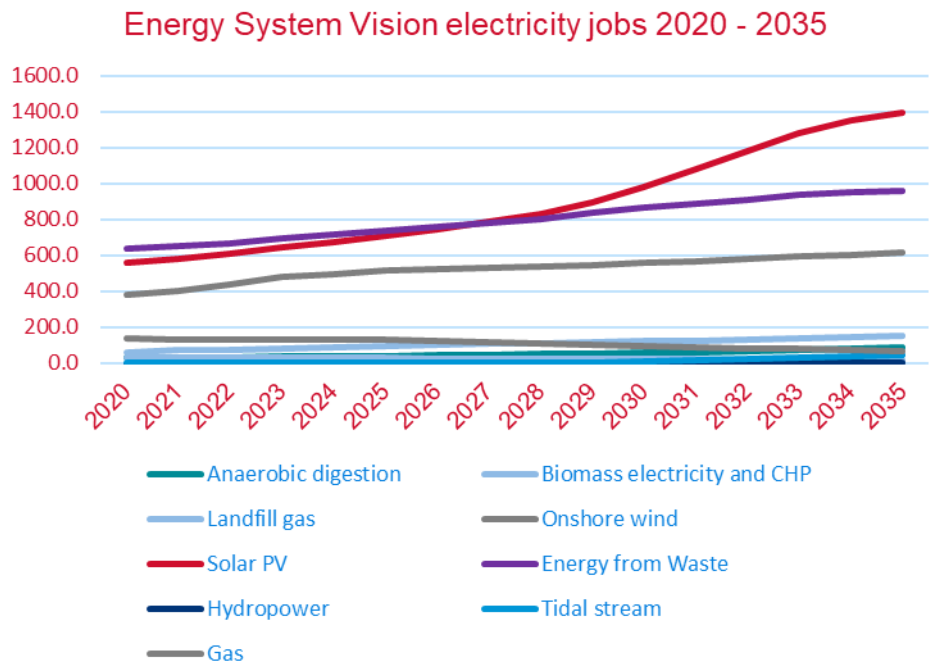


Figure 31. ESV Gross Jobs including job losses

It is estimated that in the energy system vision scenario electricity generation is responsible for 40,166 direct gross jobs from 2020 to 2035. This represents an average of 2,678 jobs per year. The number of annual jobs related to this scenario changes over the 2020 - 2035 as the deployment of technologies change. For example, in 2020 the energy system is estimated to support 1,821 jobs of which 133 are related to gas powered generation. Of renewable jobs in 2020, energy from waste is related to the largest number of jobs at approximately 634. By 2035, we estimate that the energy system vision scenario will support 3,323 jobs of which only 66 relate to gas generation. By 2035, solar PV requires the largest number of renewable jobs with 1,393 jobs or ~42% of the total jobs in that year.

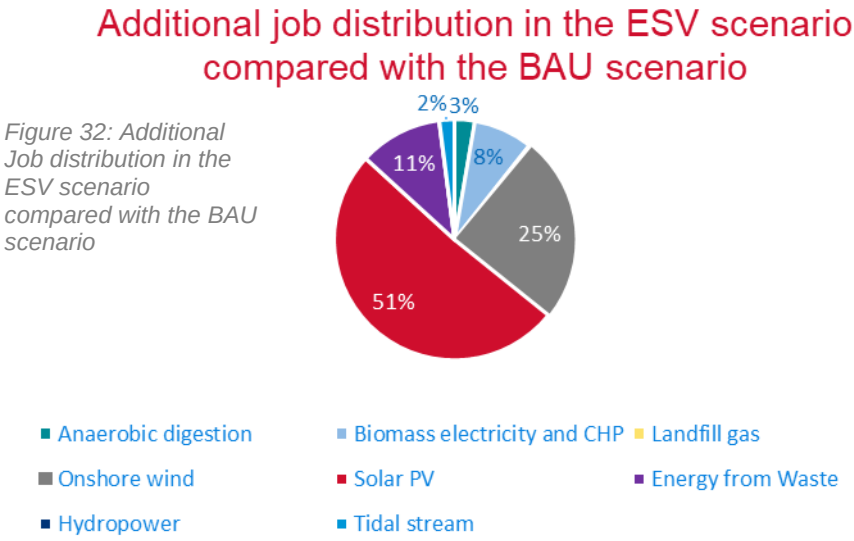


Figure 32: Additional Job distribution in the ESV scenario compared with the BAU scenario

Figure 32 looks at which technologies in the energy vision scenario supports additional jobs in comparison with the business as usual scenario. The difference between the two scenarios (known as net jobs) represents the net additional jobs supported by the energy system vision in comparison with the business as usual. Solar PV represents that largest difference in jobs between the two scenarios, followed by onshore wind and energy from waste.

Domestic energy efficiency

As with electricity generation, the increases in domestic energy efficiency associated with the Energy System Vision scenario relative to the BAU scenario require more investment, support more jobs, and lead to an enhanced contribution to GVA. This reflects that the energy system vision sees a more dramatic shift in the number of homes achieving higher EPC ratings and the larger number of energy efficiency improvements needed to achieve this outcome. These figures are presented in Table 11.

Table 12 shows that the energy system vision requires approximately 1.6 times the investment and jobs compared with the business as usual scenario. Additionally, it supports approximately 1.6 times the GVA associated with the business as usual scenario.

Table 11. Domestic Energy Efficiency additional economic impact of the ESV scenario compared with the BAU scenario from 2020 -2035[37]

Scenario	Net jobs	Discounted GVA	Discounted Investment
Business as usual (BAU)	21,900	£1.3b	£4.6b
Energy system vision (ESV)	31,300	£1.9b	£6.5b
Difference between ESV and BAU	9,300	£600m	£2b
Difference between ESV and BAU (percentage)	43%	43%	43%

[37] A 3.5% discount rate was applied to calculate the GVA and Investment over the 2020 – 2035 time period.

* Figures are rounded.
** Net jobs figures do not include estimations of operation and maintenance jobs associated with the energy efficiency improvements.

Investment

The majority of investment required to install the energy efficiency measures described by the BAU and ESV scenarios is related to insulation measures. The investment requirements can be seen in Figure 33.

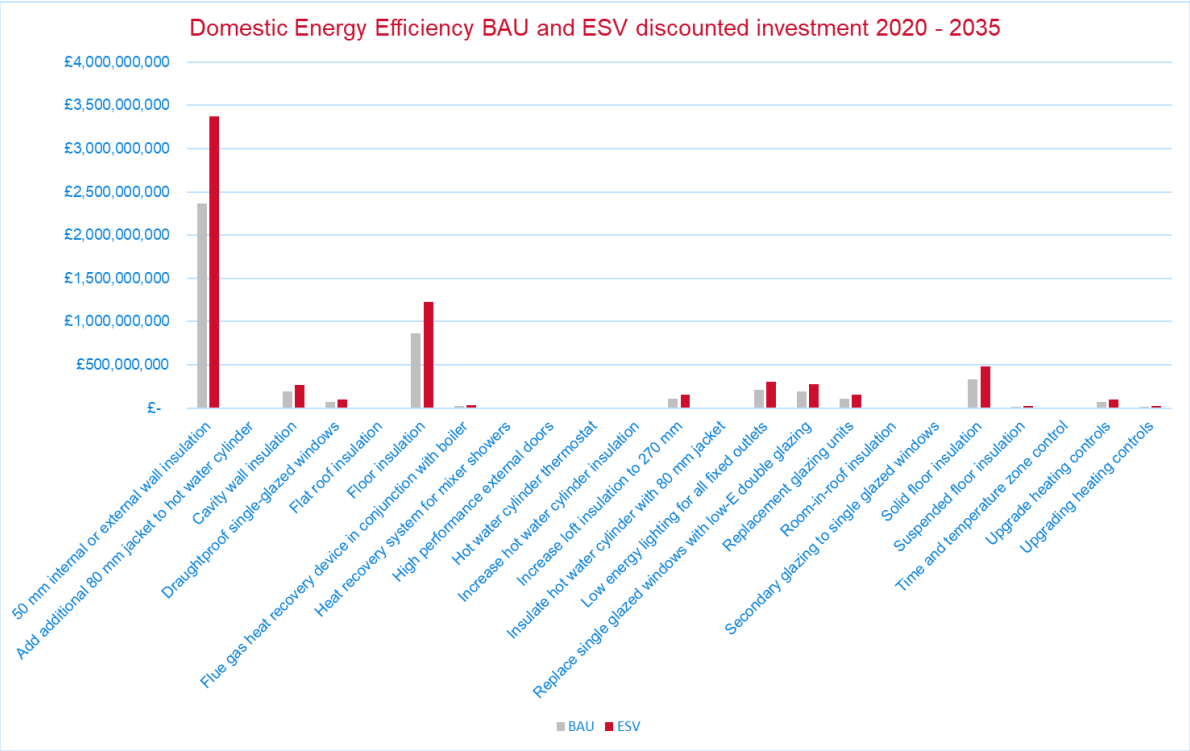


Figure 33. BAU and energy efficiency Investment requirements 2020- 2035

Jobs

9,300 additional net jobs are related to the energy system vision scenario in comparison with the business as usual scenario between 2020 and 2035. These are net direct jobs and take account of the fact that energy efficiency requires additional jobs to deliver and install the relevant technologies, but could also reduce jobs associated with the reduced need for energy production and supply. Like electricity generation, some energy efficiency jobs may be held by those residing in the region and other jobs may be held by people who travel into the region to perform these jobs.

The majority (52%) of the additional jobs in the ESV scenario relate to installation of 50 mm internal or external wall insulation and 20% of jobs relating to floor insulation. Figure 34 below show the estimated jobs required to implement the energy efficiency measures that relate to the EPC shift in the BAU and ESV scenarios.

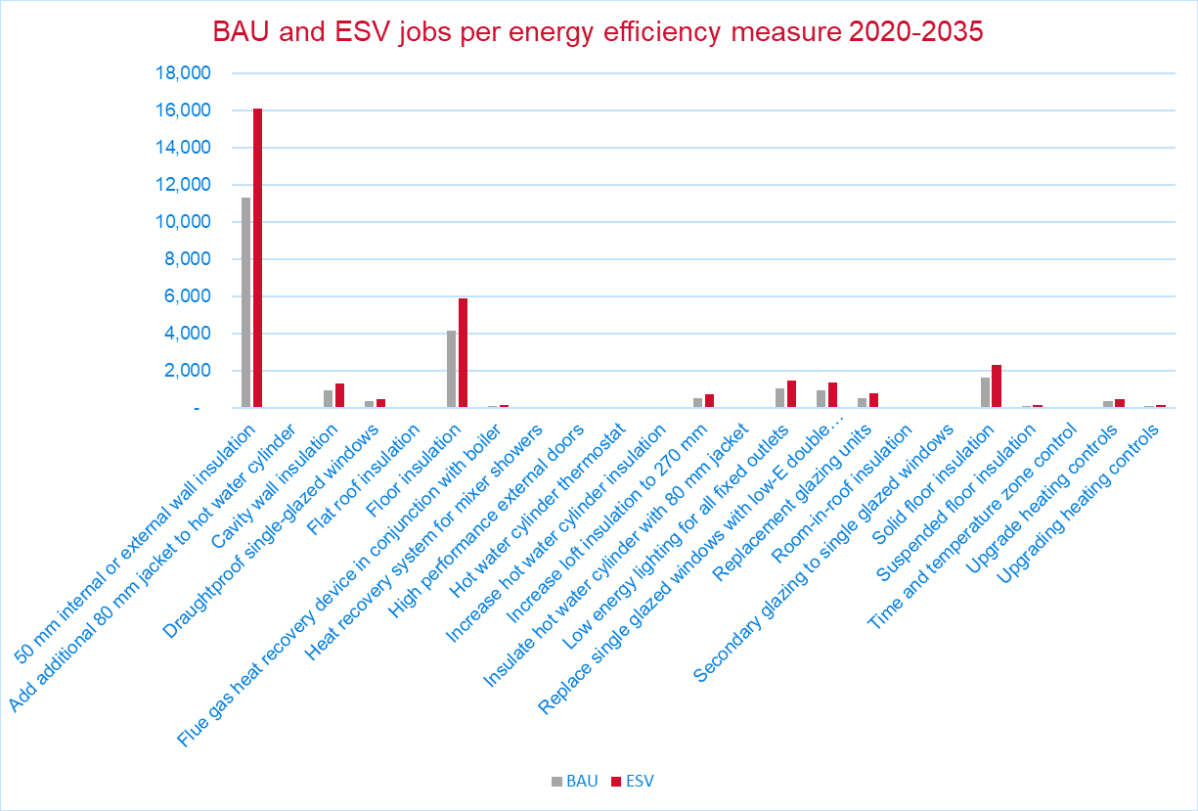


Figure 34. Net BAU and ESV jobs per energy efficiency measure 2020 – 2035.

Domestic heat

For domestic heat, we estimate that the energy system vision scenario has a larger economic impact than the business as usual scenario when it comes to investment and GVA. For example, the GVA related to the energy system vision scenario is 320 percent greater than the BAU. Similarly, the energy system vision scenario requires nearly triple the level of investment compared with the business as usual scenario. The ESV scenario also requires more jobs related to low carbon heating. However, a lack of data on jobs associated with traditional heating technologies means a comprehensive comparison in the jobs impacts from the switch to low-carbon heating technologies is not possible. Table 12 below summarises the economic impact of both scenarios and also shows the difference between the scenarios. A comparison of the investment required in the BAU scenario and the ESV scenario is presented in Figure 35.

Table 12. BAU and ESV economic impact as well the difference between ESV and BAU economic impact 2020-2035[38]

Scenario	Gross jobs associated with low carbon heating*	Discounted GVA associated with all heating technologies	Discounted Investment associated with all heating technologies

[38] A 3.5% rate is applied to GVA and investment to calculate these figures over the 2020-2035 time period.

Business as usual (BAU)	966	112,904,278	£253,448,346
Energy system vision (ESV)	3,971	474,208,575	£954,916,917
Difference between ESV and BAU	3,005	361,304,297	£701,468,570
Difference between ESV and BAU (percentage)	311%	320%	277%
*For domestic heat it is more difficult to link jobs to the local economy. This is because energy efficiency jobs are related to the manufacturing of energy efficiency technologies and products as well as their installation. A portion of these jobs is likely to be located within the Cardiff Capital Region however other jobs will be held by persons resident outside of the region.			

Investment

Figure 35 reflects that the shift to low carbon heating in the ESV scenario happens faster and at largest scale than the BAU scenario. For example, between 2020 and 2025, the ESV see less investment in gas boilers reflecting a faster shift away from this technology. The most predominant trend is across all year is that a substantial amount of additional investment is required in air source heat pumps. Investment particularly increases from 2025 in relation to air source heat pumps.

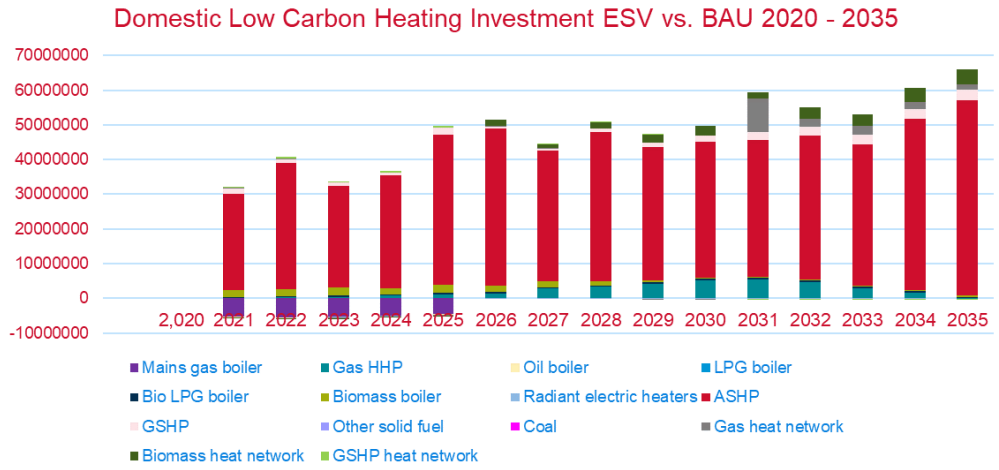


Figure 35. ESV vs. BAU discounted heat investment 2020 – 2035. Discounted at a rate of 3.5%.

Jobs

The job figures estimated for domestic heat differ from those calculated for electricity generation. Fewer studies have been undertaken to quantify the jobs related to the installation of heating technologies than electricity generation technologies. Specifically, indicators of FTEs/ £m turnover in non-heat network low carbon heating technologies were available. For heat networks the indicators used were permanent jobs per annual GWh heat generated.

However, our estimate of jobs related to heating technologies only relates to low carbon heating and does not include jobs related to the installation of more traditional heating technologies such as gas boilers, due to a lack of available high-quality data.

Figure 36 below shows the difference in low carbon heating jobs between the ESV scenario and the BAU scenario. Like investment, the majority of jobs related to air source heat pumps. It's worth emphasizing that these figures relate to low carbon heating only and don't include jobs related to traditional heating technologies such as gas or oil boilers (either within the BAU or ESV scenarios). Additionally, as stated at the beginning of this section on domestic heating, it is difficult to comment on the location of these jobs; some jobs will be held by Cardiff Capital Region residents while others will be held by those outside of the region.

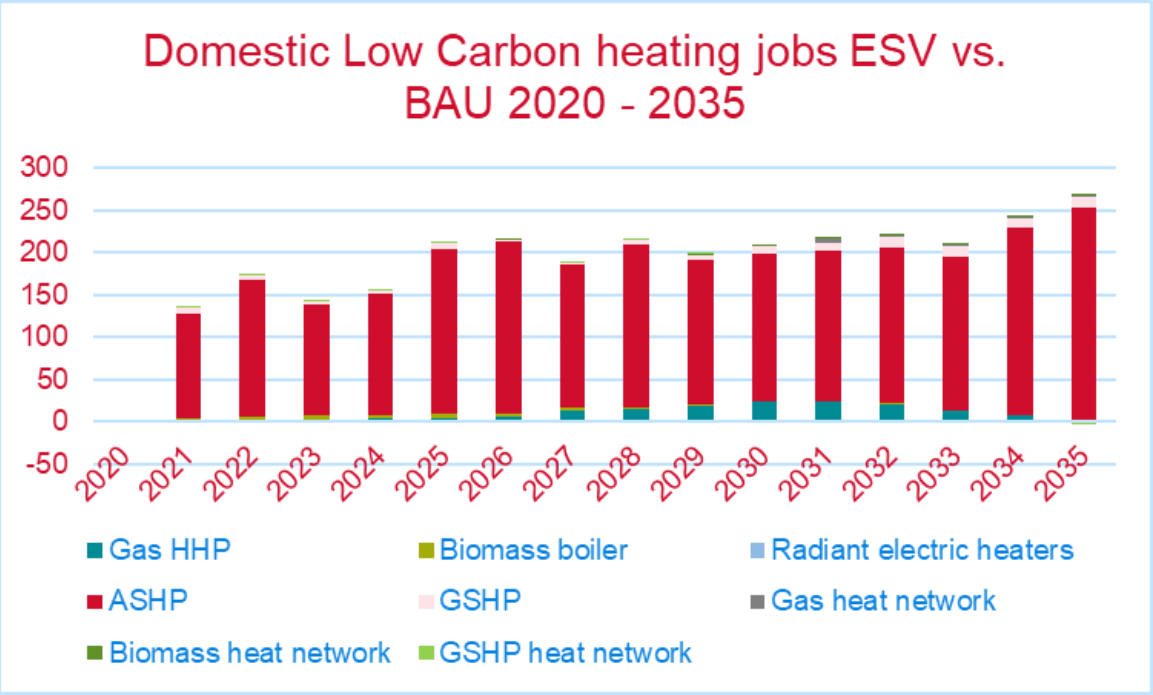


Figure 36. Domestic Low Carbon heating jobs ESV vs. BAU 2020-2035

Summary

Across all technologies, the substantially higher level of effort related to decarbonisation and the energy transition in the energy system vision scenario requires more investment when compared against the business as usual scenario. Likewise, achieving the ESV scenario delivers more jobs and additional GVA. In total the ESV scenario requires £3.4 billion of additional investment which is a 65% increase against business as usual. In terms of jobs, the ESV scenario is estimated to require an additional 16,700 net jobs to deliver the accelerated deployment of renewable electricity generation technologies and the enhanced levels of energy efficiency. These additional jobs are associated with nearly £1.7 billion more GVA (discounted at 3.5% over the period 2020-2035). In addition, it is estimated that there will be over 3,000 more gross jobs associated with the provision of low-carbon heating technologies in the ESV scenario than the BAU scenario, associated with £361 million of GVA.

Next Steps

Next Steps

The Cardiff Capital Region Energy Strategy has undertaken several important first steps towards addressing the climate emergency in CCR. We have developed a collaborative vision for the future energy system in CCR and defined key priority areas that are essential to achieving that vision. The assessment of current energy sector emissions has enabled a deeper understanding of the progress that has been made in decarbonisation to date as well as the gap between our current activities and a net zero energy system.

Building on this, the energy modelling demonstrates a potential pathway to 2035 that is consistent with the long term aim of achieving net zero by 2050. This is coupled with an assessment of the economic benefits associated with transforming our energy system in alignment with this trajectory. This will be critical in communicating the benefits of action and demonstrating the potential for far greater local economic benefits than could be achieved by return to business as usual, particularly in the context of a green, economic recovery from the COVID-19 pandemic.

There are three crucial next steps that we will now take to transition from a strategy to real world action in the delivery of our CCR energy system vision:

1) **Defining the strategy governance.** We will establish a robust and formal governance structure for the CCR Strategy. This will include defining a structure of cross-sectoral governance, powers, roles and responsibilities for overseeing the implementation of the strategy, and the monitoring and evaluation of its progress. This is essential to coordinate and unlock action, and to ensure momentum going forwards.

2) **Communicating and socialising the strategy.** We will undertake a series of engagement activities to communicate, socialise and build support for the final strategy amongst key political, corporate and community stakeholders throughout the region. This activity will help to align a diverse stakeholder group to the CCR energy vision and raise awareness of insights arising from the analysis and engagement undertaken as part of the strategy development.

3) **Establishing a delivery plan.** We will create a delivery plan for addressing the challenges identified in the energy modelling work, and for defining the processes and actions that could be taken forward to realise the energy system vision. We anticipate that the delivery plan will be a living document that is regularly reviewed and updated, and may be influenced by future local area energy planning or other relevant developments and research.

The energy modelling presented has shown that significant action is required for the Cardiff Capital Region to be on track for a net zero future and that we have the tools and technologies to make progress now. The economic assessment confirms that the challenge is large and will require investment from households, businesses, investors, and the public sector. This challenge is matched with a vision that reflects the values demonstrated by stakeholders throughout the development of this strategy.

The economic assessment also illustrates that the energy system transition may bring benefits to the Cardiff Capital Region in the form of jobs, however additional investigation is required to maximise these benefits. Likewise, the energy vision clearly sets out the intention that the future energy system should support the wellbeing of communities wherever possible. These next steps will help to scale up the existing decarbonisation and energy transition efforts in the region and turn the vision into action.

Cardiff Capital Region Energy Strategy

DRAFT v.1

Our vision for 2035

"To create the conditions for a transition to a carbon neutral economy and society in the CCR, using low carbon energy as an enabler of economic regeneration, growing our regional income whilst maintaining guardianship of our environment through a laser-focus on clean growth"

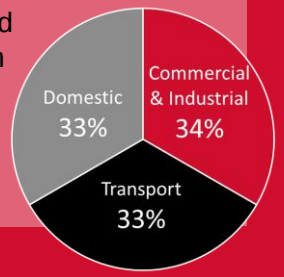
Prifddinas Ranbarth Caerdydd | Cardiff Capital Region

Our priorities

- Energy efficiency and heat
- Electricity and flexibility
- Decarbonise transport
- Grow business and jobs
- Coordination, planning, regional support and ownership of the plan

Our baseline energy assessment

- We consume **36%** of total energy consumed in Wales
- We host **22%** of Wales' renewable energy capacity
- **90%** of homes are connected to the gas network and **0.2%** use a biomass boiler or heat pump
- We have **709 MW** of renewable energy installed in the region, of which **31%** is locally owned
- Our total energy consumption fell by **22%** between 2005 and 2013 and greenhouse gas emissions from our energy system fell by **35%** between 2005 and 2017
- Commercial and industrial electricity consumption constitutes **55%** of all electricity consumption
- Transport is dominated by private car use with **0.3%** of cars pure electric
- Our sectoral energy demand split:



Energy vision modelling assumptions

Domestic
- 42,000 homes insulated
- 140,000 heat pumps installed
- 154,000 homes improved to EPC band D, C and B
- 112,000 homes moved from fossil fuelled to low carbon heating
- No new gas connections from 2025

Commercial & industrial
- Decarbonisation of the electricity network through renewables and behind the meter generation
- Switch to alternative fuels and electrification of heating
- 13% energy demand reduction

Renewable electricity
- Sufficient flexibility, storage and network infrastructure upgrades
- Equivalent of 50% of total energy consumption generated from regional renewables
- 532MW onshore wind
- 830MW solar PV

Road transport
- 64% of vehicles electric by 2035
- 20% reduction in private vehicle mileage

3,300 gas and hydrogen HGVs and 1,000 hydrogen vehicles

- Increased public transport and active travel

Achieving our energy vision

To meet Welsh Government targets, and to be on track for net zero by 2050, we need to reduce emissions from our energy system by **55% by 2035** split by sector as follows:

- **- 60%** Transport
- **- 51%** Domestic heat & power
- **- 54%** Commercial & industrial

Estimated additional economic impacts of achieving our energy vision compared to business as usual:

	Net Jobs / Gross Jobs	GVA
Electricity generation	Net Jobs +7,429	GVA +£853m
Domestic heat	Gross Jobs +3,005	GVA +£361m
Domestic energy efficiency	Net Jobs +413	GVA +£19m
Commercial energy efficiency	Net Jobs +269	GVA +£12m

£3.5 billion additional investment required to achieve our energy vision

* all figures shown are approximate values

Levelling Up Prospectus

Decarbonisation Work Programme

Cardiff Capital Region, with support from Welsh Government, has an Energy Vision which has been modelled to set out a potential decarbonisation route that will put the region on track to achieve a net zero energy system by 2050, in line with UK Government objectives. Investment in the modelled outputs will produce a greater GVA and increase in jobs than business as usual.

The energy vision scenario modelling assumes a significant shift above and beyond business as usual across these three sectors by 2035, in order to be on track by 2050, in other words relying on business as usual means that we will fail our 2050 targets.

We are determined to play our part in delivering this radical transformation. We see the next 15 years as the most consequential period in the history of humanity, demanding from us our best endeavours in dealing with a global pandemic and a climate and extinction emergency. Succeeding with this Levelling Up request will allow us to fully participate in responding to these unprecedented and unparalleled challenges.

We have the necessary ambition and a stubborn, gritty optimism. We see huge potential for positive change, for instance utilising the region's natural energy generating assets, and using the strength of our existing manufacturing base as a springboard for a transition to a hydrogen economy with the creation of multiple Clean Growth hubs.

In order to deliver this transformation described here, we propose establishing the Cardiff City Region Energy Agency. The aim of the agency would be to link the decarbonisation agenda to economic growth through delivery of programmes and innovation initiatives. The Agency would be a lead, working with the 10 CCR Local Authorities, in the acceleration of emissions reduction, increased implementation of technological innovations and in setting an enhanced forward thinking policy agenda.

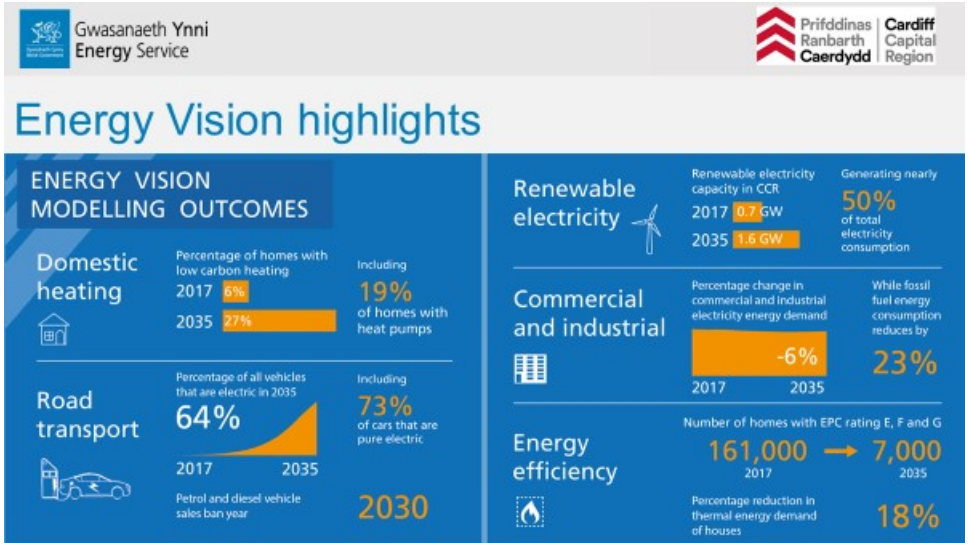
Our vision for Cardiff Capital Region is:

To create the conditions for a transition to a carbon neutral economy and society in the CCR, using low carbon energy as an enabler of economic regeneration, growing our regional income whilst maintaining guardianship of our environment through a laser-focus on clean growth.

To meet the targets Cardiff Capital Region needs to reduce emissions from its energy system by 55% by 2035, split by sector as follows, with visualisation below:

- 51% reduction in domestic heat and power emissions;
- 54% reduction in commercial and industrial emissions;
- 60% reduction in road transport emissions.

The indicative requirements of the transformation, modelled to achieve the future vision are shown diagrammatically below:



To turn to each of these areas in more detail :-

Domestic:

In terms of context the region has a high level of fuel poverty at 12% and below average levels of energy performance in its EPC bandings.

To be on track to achieve the 2050 targets, we need by 2035 to have achieved the following :-

- 154,000 homes need to be improved from EPC band G, F and moved to E to D, C and B;

- Working with Wales and West Utilities we want to build on Project Flexis to deliver hybrid heating systems and achieve over 140,000 installations of heat pumps;
- 42,000 suitable houses accurately fitted with internal or external wall insulation;
- Over 185,000 other insulation measures in homes;
- 112,000 homes currently heated by fossil fuels to move to low carbon heating;
- Replacing heating systems in oil, LPG and solid fuel heated homes prioritised;
- No new gas connections for homes from 2025.

Our proposition

There are currently insufficient mechanisms to incentivise householders to tackle the harder to deliver domestic retrofits. The region also has above average fuel poverty at 12%.

Recent Local Partnerships research suggests that there are four main barriers to private sector investment in domestic and commercial building retrofit:

- Availability of funds and suitable payback periods
- The knowledge of what to do
- Trusted contractors to undertake the work
- The level of disruption whilst the work is undertaken

In order to increase take up of measures we propose the following:

a) A review of potential funding mechanisms. Some of the measures have payback suitable for a ‘revolving door’ type loan arrangement. This could be secured on the property (as opposed to the individual) with regular payments being made alongside Council Tax or Business Rates. The savings would need to offset the loan payments for this to be attractive. Attaching the loan to the property as opposed to the individual simplifies the lending arrangements, especially as this investment mechanism does not touch the mortgage.

b) For measures required which do not offer a suitable payback consideration needs to be given to an element of grant funding to make this more attractive.

c) A wrap around survey and specification offer to enable properties to be rapidly assessed and projects developed at scale and pace. Ideally this would work on a neighbourhood scale to bring economies of scale.

d) A trusted contractor scheme to deliver the works. This should also include providing additional training for local companies and individuals.

Our Ask

1) A derogation or ability to flex the system of Council Tax (perhaps through the addition of a sundry debt) to establish a repayment mechanism.

2) Revenue of £4m to set up, manage and promote the scheme to homeowners and landlords and establish a retrofit framework of local contractors

3) Capital Pot of £400m (part repayable in over 20 years and part grant) to incentivise customer take up and offer grant to the fuel poor and grant towards measures without an economic payback.

Our Outcomes

Gwasanaeth Ynni Energy Service

CCR energy efficiency jobs and investment

	BAU	ESV	ESV vs. BAU
Jobs	21,970	31,318	9,348
Investment	£4.6b	£6.6b	£2b
Number of measures	3.7m	5.3m	1.6m
GVA	£1.3b	£1.9b	£555m

Gwasanaeth Ynni Energy Service

CCR low carbon heating

	BAU	ESV
Jobs	966	3,971
Investment	£254m	£955M
GVA	£361m	£474m

Commercial and industrial:

The CCR region has areas of commercial and industrial strength that are capable of competing at a UK and international level. Building on our competitive advantage and opportunity within the economy we are strategically targeting sectors for support, enabling them to grow and flourish. The region is also well skilled with a high proportion of the population with qualifications of degree level or equivalent. This makes CCR one of the most investable regions in the UK and an ideal environment for innovation led growth.

One such sector to benefit from CCR investment is the Compound Semi-Conductor Sector. In 2017 Cardiff Capital Region City Deal committed to a £38.5M project in acquiring and equipping the Compound Semiconductor Foundry in Newport, which is leased to IQE. This will help leverage up to £400m of private investment over the life of the project, to drive forward expansion and anchor the sector in the region.

The investment in the Foundry sits alongside £270m of strategically significant CS investments and assets already made in the region, which include:

- the Institute of Compound Semiconductors – which focuses on early stage R&D and is a partnership between IQE, Welsh Government and Cardiff University;
- the CSC Centre for Excellence – focusing on prototyping and a partnership with IQE and Cardiff University;
- applications-based Catapult Centre – led by Innovate UK and located at IQE's mega foundry in Newport;
- Centre for Integrative Semiconductor Materials – a materials foundry at Swansea University.

Investment in this sector will shortly be increase with UKRI funded CSConnected project. The project is based around integrating research excellence from the region's universities with the region's unique supply chains in advanced semiconductor manufacturing.

It is believed that the region has all the ingredients to develop similar growth and opportunity in the energy and environment sector. In line with UK ambition on hydrogen, the Welsh Government has commissioned a pathway strategy document for hydrogen in Wales, and this together with a baseline hydrogen activity assessment will be completed this year and will inform the low carbon transition plan moving forward, and also align activity to support the creation of a hydrogen market in Wales.

The region has a large number of significant manufacturers who use large volumes of process gas, including Celsa, Rockwool, Dow Corning, Tarmac and Tata in Newport.

In the first instance, working with the South Wales Industrial Cluster and IUK, CCR is expecting a bid into its newly created Local Welfare and Challenge Fund, which will resource a 6 month period of optioneering on up to 8 Clean Growth Hubs in South East Wales.

Our Proposition

We wish to see a pioneering transition to hydrogen as an industrial fuel source.

Within the Commercial and Industrial sector we also wish to deliver a significant energy efficiency programme, with building integrated renewables to reduce energy demand by 13% and secure electrification of heating.

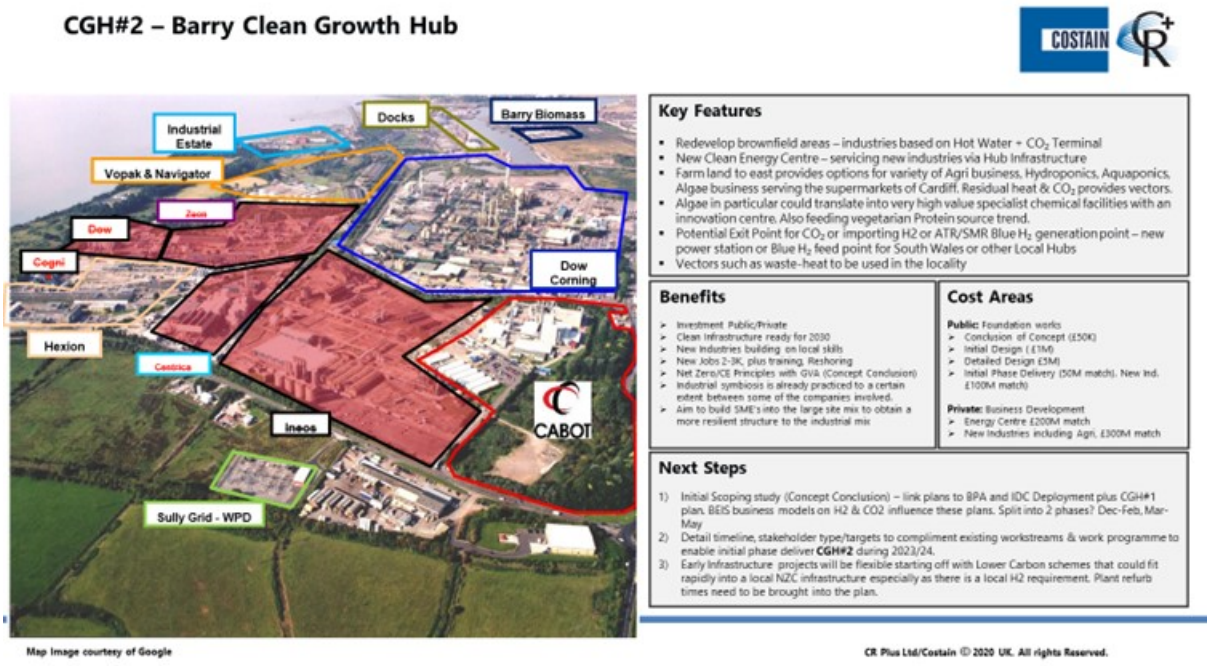
Our Ask

4) In order to be investment ready, with engineering and business requirements on an anchor site we require kick-start funding of £3m. This would enable the optimum industrial combinations and stakeholder buy in. The expected match from the first industrial adopters would be in the region of £50m.

This funding would achieve the following:-

- 15 potential sites for Clean growth hubs have been identified – an example of the clean growth hub at Barry Docks is shown below. Scoping of all 8 is required, with risk and opportunity profiling, to select 2 initial preferred locations.
- Undertake two feasibility studies on preferred locations to map process flows to select optimum industry combination and gain stakeholder buying
- Deliver Front End engineering reports for the two sites to establish the inward and outward connections and process flows, and determine an entity which is viable with financial constraints.

Initial work undertaken by the South Wales Industrial Cluster shows that there is potential opportunity in Wales for 25 clean growth hubs which they estimate as requiring £12.5 billion investment up to 2040, but with the creation of 62,000 jobs, plus the retention of existing manufacturing.



We would work with Wales and West Utilities and Welsh Water as both organisations have an appetite, appropriate infrastructure and access to funding for this transition.

We anticipate that if we can grow the demand for hydrogen then we would support further expansion customer base and supply chain into target areas such as domestic heating and transport fuels.

5) The Cardiff economy is also strong in the commercial and finance sector. Whilst asset rationalisation will be ongoing as part of the response to the pandemic we would like to offer Green Deal type energy efficiency retrofit proposal to the Commercial market uses the mechanism of Business rates to recover the investment. We seek a derogation on arrangements for charging and collecting Business Rates to finance what would be in large part a revolving fund for retrofit.

6) Revenue of £2m to set up and manage a scheme for a retrofit framework of local contractors for commercial premises

7) Capital Pot of £500m (repayable in large part over 20 years) to incentivise business customer take up.

Road transport:

CCR has a high dependence on private cars for transport. Average annual vehicle miles in CCR are 17% higher than the UK average.[1] Less than 1% of road miles are driven by buses and coaches in CCR.[1]

The £738 million Metro project – the cornerstone of our original £1.2billion City Deal - will create a credible mass transport infrastructure that is likely to drive a modal shift from private vehicle use to public transport. This modal shift alone will not be enough to decarbonise transport in the region; a shift to electric and hydrogen vehicles will also be needed.

To date, CCR has seen a slow uptake of electric vehicles. Approximately 0.3% of cars registered in the region are pure electric, compared with an average of 0.6% of vehicles across Great Britain. Similarly, despite a surge in charger installations in 2019, CCR currently hosts 173 public charging devices, including 31 rapid public chargers[2]. This is relatively low, as is the case across Wales, where there are half the number of public EV chargers per capita compared to Scotland.

Proposition

To achieve our targets we need 516,000 EV cars (equivalent to 64%) and small vans to be in use by 2035 which will require an estimated network of 10,000 charge points. High-level estimates suggest that this EV charging infrastructure will cost between £33m and £108m excluding grid connection costs. We believe that poor access to

[1] DFT (2019) Road traffic statistics (TRA) https://www.gov.uk/government/collections/road-traffic-statistics and Regen transport model

[2] DFT (2019) Electric Vehicle Charging Device Statistics https://www.gov.uk/government/statistics/electric-vehicle-charging-device-statistics-october-2019

charge points is a significant part of the slow transition to EV. Accelerating the deployment of EV charge points will provide the infrastructure needed to support the EV transition. Likewise, EV charging infrastructure may also support local EV business by providing the right eco-system. For example, the Cardiff Capital Region also aims to host the UK's first Giga Factory, producing EV batteries. If we can accelerate the transition to EV then we can help underpin the business start-up with BristishVolt.

Power electronics are at the heart of vehicle electrification, managing and optimising the power transfer between the battery (or fuel cell) and the electric motor. Incorporating compound semiconductors into power electronics can deliver significant performance and cost advantages – delivering vehicles that are lighter, more powerful and have greater range.

CSA Catapult, has created a state-of-the-art innovation centre within the compound semiconductor campus at Imperial Park, in South Wales and is already accelerating the UK towards its Net Zero goal. It is working with over 60 partners on projects worth in excess of £70m which will directly impact our ability to use more renewable energy and further electrify vehicles.

Our Ask

8) To overcome the criticism of range anxiety and improve confidence we would like to launch a £75m competitive fund (similar in principle to the OLEV EV charging fund) to incentivise and underwrite the installation of EV charge points. This would improve investor confidence given the long payback periods for this infrastructure.

Renewable electricity generation:

The Energy Vision modelling has assessed the land within the CCR region in terms of areas zoned for renewables from planning policy Strategic Search Areas and the Welsh Government's National Development Framework (due to be launched Feb 21). This analysis showed that it is possible to install 1.6GW of renewable electricity in the CCR region (which includes 532MW of wind and 820MW of solar).

The region will also work with the local DNO Western Power to jointly ensure sufficient flexibility, including storage, and network infrastructure upgrades to enable low carbon generation and demand technologies to connect.

The ambition is that the region will generate the equivalent of ~50% of its total energy consumption in 2035 from regional renewable sources.

Our Proposition

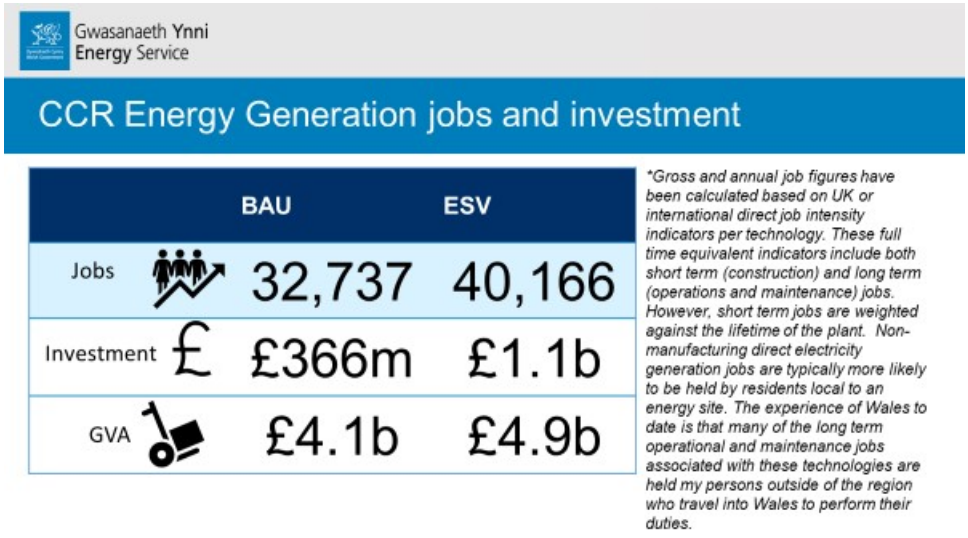
New Welsh Government policy requires local ownership of new energy assets. We have evidence that whilst this requirement is popular with private sector developers and local stakeholders there is a concern that developments are slowing and stalling as the practical arrangements to make this happen are not yet fully understood.

Additional opportunities exist directly on the public sector estate with approximately 95MW of wind projects identified on the public sector estate, with favourable grid and planning prospects. Progress is however slow, as each of the 4 public bodies involved do not have the necessary expertise or capacity to progress these projects at pace and scale.

Our Ask

9) Creation of a repayable stimulus pot of £200m, which is the equivalent of delivering a 20% public sector ownership in the 1.6GW pipeline. This will galvanise the construction of renewable projects by derisking the local ownership requirement and bringing investor confidence. We would anticipate around that the investment programme would perform at around 10% IRR for the public sector.

10) In respect of the public sector 90MW wind programme fund a Programme Manager and £1m development fees to coordinate the projects and steer the projects into and through planning, procure developers and oversee the construction contracts form the clients' perspective.



Summary of Asks

Initiative and ask	Levelling Up Ask	Repayable	Private sector match	Public sector match
Domestic retrofit				

1)derogation	Flexibility	n/a	n/a	n/a
2)retrofit arrangements	£4m revenue	no	no	no
3) capital pot	£400m capital	75% yes within 15 years	no	£10m
Commercial & Industrial				
4) Hydrogen feasibility and kick start	£3m revenue	no	£50m in 10 years	no
5) derogation	Flexibility	n/a	n/a	n/a
6) retrofit arrangements	£2m revenue	no	no	no
7) capital pot	£500m capital	75% yes within 15 years	£7.5m	no
Transport				
8) EV charging	£ 110m capital	50% yes within 15 years	55m over 15 years	no
Renewable energy				
9) Programme team	£1m revenue	no	no	In kind
10) Local ownership pot	£200m capital	100% within 15 years	no	no
TOTALS	Revenue £10m Capital £1.2bn		£112m	

The economic impacts of achieving the **totality** of the energy vision have been assessed in terms of job creation, gross value added (GVA) and the investment required for the energy transition, in comparison to business as usual. Investing to achieve the Vision produces more GVA and net jobs than allowing BAU. A detailed annex of the full techno-economic analysis is available.

This techno-economic analysis from the REP work shows that the investment needed between now and 2035, in order to meet the energy system transformation for 2050, totals £8.6bn, with investments required from a range of stakeholders. This investment would result in 75,500 (mostly net) jobs and a £7.2bn uplift in GVA.

Evidently, with our Levelling up Prospectus we anticipate contributing significantly, to kick starting and delivering these economic outputs.

The Prospectus, in respect of decarbonisation is asking for £1.2bn capital as a chunk of this investment, to deliver outputs as a stimulus boost to this transition and to establish delivery mechanisms and programmes of work. This approach is predicted to give us a GVA of £1.2bn and 12,414 jobs, reflecting the specific job qualities of energy efficiency and renewable technologies, which we are proposing for the Prospectus. The prospectus also promotes a boost for hydrogen, in line with the recent UK Green Industrial Revolution announcements. There is currently some uncertainty on the hydrogen economic impact.

Future Generations Assessment Evaluation
(includes Equalities and Sustainability Impact Assessments)

Name of the Officer completing the evaluation: Kellie Beirne **Phone no:** 07826 919286 **E-mail:** kellie.beirne@cardiff.gov.uk	**Please give a brief description of the aims of the proposal** Cardiff Capital Region Energy Strategy
Proposal: Cardiff Capital Region Energy Strategy	**Date Future Generations Evaluation form completed:** 7 December 2020

1. **Does your proposal deliver any of the well-being goals below?** Please explain the impact (positive and negative) you expect, together with suggestions of how to mitigate negative impacts or better contribute to the goal.

Well Being Goal	**Does the proposal contribute to this goal? Describe the positive and negative impacts.**	**What actions have been/will be taken to mitigate any negative impacts or better contribute to positive impacts?**
A prosperous Wales Efficient use of resources, skilled, educated people, generates wealth, provides jobs	The energy vision work sets out a clean growth agenda – the potential to safeguard planetary life support systems whilst growing regional income.	The vision has bene stakeholder informed and analysis of issues independently informed by data, evidence and insights. To optimize potential for impact this will be incorporated into a full action plan with a resultant 'energy mission'.
A resilient Wales Maintain and enhance biodiversity and ecosystems that support resilience and can adapt to change (e.g. climate change)	The report goes to the heart of the sustainability and resilience mandate.	More work needs to be done to show sustainability and economic growth are not mutually exclusive and CCR has the opportunity to demonstrate this.

Well Being Goal	Does the proposal contribute to this goal? Describe the positive and negative impacts.	What actions have been/will be taken to mitigate any negative impacts or better contribute to positive impacts?
A healthier Wales People's physical and mental wellbeing is maximized and health impacts are understood	Direct impact in terms of health, wellbeing and environmental benefits.	Climate crisis is causing worry and concern. More work will be needed in future to understand the link between anxiety and mental health and the state of the environment.
A Wales of cohesive communities Communities are attractive, viable, safe and well connected	Safeguarding environment and world key to ensuring communities can thrive	ROI assessments need social and environmental dimension and 'clean growth' aims to be more clearly understood. Work ongoing with Prof Max Munday to draw this out as part of wider approach to alternative economic intelligence.
A globally responsible Wales Taking account of impact on global well-being when considering local social, economic and environmental wellbeing	The report is a demonstration of CCR-wide responsibility to the planet	
A Wales of vibrant culture and thriving Welsh language Culture, heritage and Welsh language are promoted and protected. People are encouraged to do sport, art and recreation	Our City Deal is uniquely Welsh – but pitches towards being world leading in areas of competitive strength. This enables a strong reflection on our rich culture and heritage which is drawn from our natural environment and resources.	
A more equal Wales People can fulfil their potential no matter what their background or circumstances	The environment and climate crisis is a leveler – we are all responsible – we can all make a difference.	

2. How has your proposal embedded and prioritized the sustainable governance principles in its development?

Sustainable Development Principle	Does your proposal demonstrate you have met this principle? If yes, describe how. If not explain why.	Are there any additional actions to be taken to mitigate any negative impacts or better contribute to positive impacts?
Balancing short term need with long term and planning for the future	This is both a short, medium and long term goal and a golden thread running through all projects and programmes.	Continued work on data/ evidence and generating in equal measure, insight and foresight.
Working together with other partners to deliver objectives	The report sets out the different partners and sectors engaged in this work and the challenge process is about collective endeavor- civil society, business, HE, public services and community sectors.	More work to develop, align and promote shared purpose on this agenda.
Involving those with an interest and seeking their views	The report sets out the different partners and sectors engaged in this work	
Putting resources into preventing problems occurring or getting worse	Report and resultant action plan should create conditions for this to happen – at scale.	
Considering impact on all wellbeing goals together and on other bodies	This will be undertaken on a case by case basis through the new assessment process.	

3. Are your proposals going to affect any people or groups of people with protected characteristics? Please explain the impact, the evidence you have used and any action you are taking below.

Protected Characteristics	Describe any positive impacts your proposal has on the protected characteristic	Describe any negative impacts your proposal has on the protected characteristic	What has been/will be done to mitigate any negative impacts or better contribute to positive impacts?
Age	As with all those categories below – the impacts will relate to specific delivery that underpins the execution and operation of this Plan	None arising at this time.	
Disability	As above	As above	
Gender reassignment	As above	As above	
Marriage or civil partnership	As above	As above	
Pregnancy or maternity	As above		
Race	As above		
Religion or Belief	As above		
Sex	As above		.
Sexual Orientation	As above		
Welsh Language	As above		

4. Safeguarding & Corporate Parenting. Are your proposals going to affect either of these responsibilities?

	Describe any positive impacts your proposal has on safeguarding and corporate parenting	**Describe any negative impacts your proposal has on safeguarding and corporate parenting**	**What will you do/ have you done to mitigate any negative impacts or better contribute to positive impacts?**
Safeguarding	Not directly relevant –however, building the future economy in a sustainable way should have a profoundly positive impact on ability to safeguard the future of our residents		
Corporate Parenting	Not directly relevant – however building strength in the economy should create opportunities for all of the young people entrusted in our care – in particular in safeguarding the environment for their futures.		

5. What evidence and data has informed the development of your proposal?

- Analysis of energy consumption
- Mazzucato work on energy mission for GMA and UN
- Collaboration with Energy Services catapult
- Collaboration with GMA CA

6. SUMMARY: As a result of completing this form, what are the main positive and negative impacts of your proposal, how have they informed/changed the development of the proposal so far and what will you be doing in future?

As above, the main implications will be in the delivery of this work.

7. MONITORING: The impacts of this proposal will need to be monitored and reviewed. Please specify the date at which you will evaluate the impact, and where you will report the results of the review.

The impacts of this proposal will be evaluated on:	Quarterly 2020/21 and beyond

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Executive Committee and Council only
Date signed off by the Monitoring Officer:
Date signed off by the Section 151 Officer:

Committee:	**Regeneration Scrutiny Committee**
Date of meeting:	**28th April 2021**
Report Subject:	**GovTech Catalyst Challenge**
Portfolio Holder:	**Cllr D. Davies, Deputy Leader & Executive Member for Regeneration and Economic Development**
Report Submitted by:	**Amy Taylor, Team Manager Regeneration Opportunities**

Reporting Pathway								
Directorate Management Team	**Corporate Leadership Team**	**Portfolio Holder / Chair**	**Audit Committee**	**Democratic Services Committee**	**Scrutiny Committee**	**Executive Committee**	**Council**	**Other (please state)**
x	x	13.04.21			28.04.21	x		

1. Purpose of the Report

1.1. To provide Regeneration Scrutiny Committee with an update on progress of the GovTech Catalyst project.

2. Scope and Background

2.1. GovTech Catalyst is a £20 million fund from Government Digital Service, UK Government to work with suppliers to solve public sector problems using innovative digital technology.

2.2. The way in which GovTech Catalyst works is that the public sector proposes complex problems (or "challenges") and in the first phase they provided with funding to work with up to five suppliers for three months. If results are promising, up to two of those suppliers will be selected to proceed through to a second phase and continue to work on its development and testing for a year. This is all done with the aim of developing a solution that can be widely deployed to support challenges that are common throughout the public sector.

2.3. The Council's Regeneration department put forward a number of project ideas to GovTech Catalyst team and in 2018, Blaenau Gwent County Borough Council (BGCBC) was invited to form a collaboration to work on this with Durham County Council (DCC).

2.4. The project entitled "Intelligent data to transform local council service delivery" in which both councils would work together to develop the challenge.

2.5. In simple terms we wanted to see how existing assets such as Council vehicles could be utilised to support and improve how we deliver our services. BGCBC and DCC wanted to gather and analyse data from new sources such as information collected by residents or data captured using council vehicles. This data would then be used to improve delivery across the council services.

2.6. The competition looked at two specific data gathering techniques in the local council service; “Boots on the ground” and “Eyes on the street”.

2.7. The project is being delivered in two phases, Phase One: Feasibility study and Phase Two: Research and Development contracts.

2.8. Phase One: Feasibility study was awarded to demonstrate technical feasibility of the proposed solution. Five suppliers were chosen with a funding of £50,000 each to develop this phase over three months.

2.9. During Phase One the suppliers identified the potential innovative technologies such as machine learning that could be used to deliver the objectives of the “eyes on the street” element of the Project. It also confirmed the types of data that could successfully be collected and how it could be used to form predictive models.

2.10. The results of the “boots on the ground” data gathering were not as favourable and so it was decided that this would not be taken further into a second phase.

2.11. Phase One did however confirm that detection of pot holes, road markings and road defects was possible. It also suggested that further development and training of the machine learning models would enable size and depth of defects to be established and mapped across the Borough.

2.12. The results of Phase One showed that there are potential solutions to the original challenge and as a result of a gateway review with Government Digital Service, the project was given approval to move into Phase Two.

2.13. Phase Two immediately followed this approval and the stage looked to award Research and Developments contracts to two suppliers from successful phase one applicants. This set up the next stage of the project for up to twelve months with £500,000 funding for each supplier. It was hoped that end results would be a prototype installation for wide scale deployment that can test functionality and reliability.

2.14. Phase Two of the challenge commenced April 2020, however due to COVID-19 it was agreed at the beginning of the phase with the two suppliers that we would extend the twelve month deadline to fifteen months to ensure they were able to complete all work efficiently.

2.15. Phase Two has focused upon deployment of the technology across the two areas of Blaenau Gwent and Durham. Technology has been installed on two vehicles used by frontline services including highways and refuse. This equipment will test whether data can be collected and whether it is of the required quality to enable the data to be used to inform service delivery.

2.16. If successful in detecting defects and potholes, it is hoped that with machine learning it will be possible to develop predictive models to consider degradation of road condition and predict when intervention may be required. This will

support the service area to consider the business case of short term patching versus long term investment in repairing road surfaces.

2.17. Phase two will continue until the summer of 2021, and once this is complete we will be able to assess whether the technology is suitable for wider scale deployment across a greater number of vehicles and coverage across the borough.

3. Options for Recommendation

3.1. There are no options to be considered as part of this report. Regeneration Scrutiny Committee are asked to note the progress of the project and further report on outcome of the project will be provided.

4. Evidence of how does this topic supports the achievement of the Corporate Plan / Statutory Responsibilities / Blaenau Gwent Well-being Plan

Blaenau Gwent County Borough Council Corporate Plan Refresh 2020-2022

4.1. The project supports a number of the Corporate Plan Outcome Statements:

- Protect and enhance our environment and infrastructure to benefit our communities – by re-investing in highways maintenance including improvements to our residential roads, streets and pavements

- An ambitious and innovative council delivering the quality services we know matter to our communities – by developing a more commercial organisation to generate income and deliver cost reductions to make local services sustainable and raise money to re-invest in our priorities, a COVID 19 safe working environment for our staff and service users and seeking continuous improvement.

5. Implications Against Each Option

Impact on Budget

5.1. Through GovTech Catalyst £250,000 was allocated for Phase 1 and up to £1 million was allocated for Phase 2. In Phase One five suppliers were each awarded £50,000 each to undertake their initial feasibility studies. In Phase Two, two suppliers have been selected to move forward into live deployment and testing and they will each receive up to £500,000.

5.2. There are no direct financial implications for the Council or our Partner Durham County Council (DCC). At the end of the project if there are any underspends these would need to be returned to UK Government.

Risk including Mitigating Actions

5.3. There is a risk that the solutions developed by the suppliers are not suitable for wide scale deployment. In this case there are no financial or resourcing implications. The Council could return to current methods of service delivery.

Legal

5.4. The project has been procured as a pre-commercial procurement and the contract is based upon the Small Business Research Initiative. Blaenau Gwent has entered into this contract with the two suppliers and a Memorandum of Understanding (MoU) has been put in place between Blaenau Gwent County Borough Council and Durham County Council.

5.5. In order to ensure that the data collected through the project is managed correctly a Data Protection Impact Assessment has been prepared.

Human Resources

5.6. Existing resources from within Regeneration are being utilised to manage the project and frontline staff including highways are supporting the project.

6. Supporting Evidence

Performance Information and Data

6.1. Collecting additional data around the current condition of our roads and potential defects will help the Council to better understand the key areas where there are issues and assist in future planning for investment. The data can be used to prioritise areas requiring intervention.

Expected outcome for the public

6.2. Improving the way we deliver services to our residents will help improve the overall environment of Blaenau Gwent.

Involvement (consultation, engagement, participation)

6.3. Community Services have been consulted and participated throughout the project in its development. Staff in the service area have been working alongside the suppliers and have been testing the equipment that has been developed.

Thinking for the Long term (forward planning)

6.4. Collecting data and having a greater understanding of the way our roads change over time in terms of condition and defects will allow improved forward planning to take place.

Collaboration / partnership working

6.5. The Council is a joint challenge owner with Durham County Council so a collaborative / partnership approach has been taken throughout the Project. This has meant that both areas have opportunity to test and deploy the equipment and data collected by the suppliers.

Integration(across service areas)

6.6. Work for the GovTech project covers a number of service areas and they have been involved throughout the Project. Considerable engagement has been taking place with the Community Services department.

7. Monitoring Arrangements

7.1. As part of the Project a number of gateway reviews have been undertaken with Government Digital Service. This has enabled the project to move through Phase 1 and into Phase 2.

Background Documents /Electronic Links

N/A

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Executive Committee and Council only

Date signed off by the Monitoring Officer: N/A

Date signed off by the Section 151 Officer: N/A

Committee: **Regeneration Scrutiny Committee**

Date of meeting: **28th April 2021**

Report Subject: **Lime Avenue Business Park and Boxworks Progress Update**

Portfolio Holder: **Cllr D Davies, Executive Member Regeneration and Economic Development**

Report Submitted by: **Nick Landers, Principal Project Officer – Regeneration Opportunities**

Reporting Pathway								
Directorate Management Team	**Corporate Leadership Team**	**Portfolio Holder / Chair**	**Audit Committee**	**Democratic Services Committee**	**Scrutiny Committee**	**Executive Committee**	**Council**	**Other (please state)**
14.4.2021	15/4/2021	13.04.21			28.4.2021			

1. Purpose of the Report

1.1 The purpose of this report is to provide Members with a progress update on both the Lime Avenue Business Unit and Boxworks schemes on the former Works site in Ebbw Vale

2. Scope and Background

Background

2.1 Business Units (Hybrids)

The proposed operation will deliver a range of new build business units to accommodate small and medium sized enterprises. The scheme will also involve the development of the surrounding environment in making it an attractive self-contained estate. (please refer to attached photographs – Appendix 1).

The development comprises of the following -

- Bringing into use a total developable land area of 0.7 Ha / 1.7 Acres for the 8 business property scheme. B1 planning use classification.
- The construction of 8 modern and high quality hybrid style business units provides a total floor space of circa 22,000 sq/ft (GIA) with open workspace arrangement on the ground floor with a mezzanine floor providing associated office provision.

2.2 The proposed operation will encourage the creation and growth of knowledge-based businesses to facilitate a mixed and sustainable economy. The provision of the hybrid style units will attract entrepreneurs seeking to take forward high value businesses in sectors such as research and development, higher tech engineering, pharmaceuticals, digital technology, and creative industries.

2.3 Funding was provided by securing £2.58M from WEFO, £3,150,000 from WG Tech Valleys and £850k BGCBC's own Capital funds with the project delivered via a Joint Venture agreement with the Welsh Government.

2.4 The Council owned development site was previously subject to a repayable derelict land grant where a title on the restriction exists in favour of WG. The market value of the land is £75,000 per acre which equates to a repayable grant of £132,000 which has been factored into the Joint Venture arrangement.

The key component costs for the schemes delivery are bullet pointed below:

- WEFO - £2.58 Million
- Welsh Government - £3,150,000
- BGCBC - £850,000

3.0 Boxworks

3.1 The scheme comprises of 23 industrial shipping containers which have been configured to become self-contained business incubation units. (please refer to attached photographs – Appendix 2).

3.2 The custom-designed containers have been built to a high specification and include sustainable wood panelling and a special insulation layer to ensure they are warm in the winter and naturally cool in the summer. A super-fast high capacity internet connection comes as standard in all units. Tenants will also be able to enjoy the business lounge, café and chance to work with academics from the adjacent Ebbw Vale Learning Zone, in addition to occupying office/meeting provision at the General Offices.

3.3 The units are intended to be utilised for 15 years with the Council's Enterprise Facilitator assisting tenants to expand business opportunities to larger scale business accommodation. Whether you need space to meet for a day, week or month, high-profile seminars, board meetings, training sessions, networking events the proposed units will accommodate all needs.

3.4 The units were jointly funded by BGCBC - £1 Million and the WG - £490,000 under their Transforming Towns Initiative.

4.0 Current Position

4.1 Both the Business Unit and Boxworks schemes were tendered together, with contractors Kier now nearing completion, with only the final snagging stages outstanding.

4.2 Thales has expressed interest in taking occupation of two buildings on the development site to form part of a Thales 'campus'. There is also active interest in the Box units, eight companies showing interest to date and the Council will shortly arrange an open day to show perspective tenants around the facility.

4.3 Consultants Wavehill have been commissioned to undertake the monitoring and evaluation exercise of the Business Unit scheme in order to ascertain how the funding intervention has impacted on the wider community. The reports are presented in a baseline evaluation, mid-term review and final conclusion report.

4.4 We are working with an overspend that will be taken forward to the final account. Covid has impacted on the scheme in numerous ways including claims by the contractor as a consequence of having to introduce social distancing measures which has ultimately prolonged delivery.
Officers from BGCBC continue to work in conjunction with colleagues at WG to find a solution to mutually agree a final figure with the appointed contractor.

5.0 Options for Recommendation

5.1 To note progress made to date with both the Lime Avenue Business Unit and Boxworks schemes, with final completion anticipated to be in June 2021.

5.2 To note that a detailed closure report will be presented to Scrutiny later this year also incorporating findings from the Wavehill consultancy report, which is a condition of the WEFO funding.

4. Evidence of how this topic supports the achievement of the Corporate Plan / Statutory Responsibilities / Blaenau Gwent Well-being Plan

4.1 The project supports the Corporate Plan Outcome to support a fairer sustainable economy and community. Through these projects will work with partners to develop a new vision for our town centres ensuring their long term future.

4.2 The Council's Well-being Plan for 2018-23 includes 5 Objectives. This project directly supports the objectives of creating 'safe and friendly communities' and 'forge new pathways to prosperity'.

5. Implications Against Each Option

5.1 ***Impact on Budget***
The financial outcome of both projects is currently undetermined. The Council are awaiting further invoices from the contractor and also considering implications of how Covid-19 has impacted on delivery.

5.3 *Risk*
Officers will continue to engage with the contractor to finalise and agree the final figure. There are various aspects to both schemes to consider which may impact on the financial implications for delivery. The WG are party to these financial discussions as part of the Joint Venture arrangement and will look to conclude a resolution at the earliest opportunity.

5.4 *Legal*

The legal team has been party to the details of Joint Venture agreement and discussions with WG over the derelict land repayment.

5.5 *Human Resources*

Staff within the Regeneration, Technical Services, Planning and Estates has worked collaboratively throughout both scheme to bring the scheme

6. **Supporting Evidence**

6.1 **Performance Information and Data**

Please refer to attached progress photo – Appendix 1-2.

6.2 **Expected outcome for the public**
The project provides an excellent opportunity for existing and new businesses within Blaenau Gwent to establish and flourish with modern state of the art facilities.

6.3 **Involvement (consultation, engagement, participation)**
Both projects have the potential to deliver a key site forming part of the Works Masterplan, working with a Third Sector partner to provide premises for local businesses.

6.4 **Thinking for the Long term (forward planning)**
Both schemes have the ability to increase the range of premises available to local businesses and a pathway for growth in the area.

6.5 **Preventative focus**
The Council continue to advertise both schemes in order secure maximum revenue at the earliest opportunity.

6.6 **Collaboration / partnership working**
The project can be seen as an excellent example of collaborative and partnership working between BGCBC, WEFO, Welsh Government and the Coalfields Regeneration Trust in delivering high quality premises that supports the regeneration of the county borough.

6.7 **Integration (across service areas)**
Consultation has been undertaken across Planning and Regeneration and the initial designs and development work has been completed by Tech Services.

6.8 **EqIA (screening and identifying if full impact assessment is needed)**

An Equalities Impact Assessment screening is currently being undertaken as part of the monitoring and evaluation process.

7. **Monitoring Arrangements**

7.1 A number of monitoring arrangements are in place to monitor performance of the project, these include:

- Member briefing sessions (Executive Member, Ward Member);
- Quarterly performance reporting (Blaenau Gwent Business Plan internal reporting); and
- Six monthly monitoring reports to Welsh Government.

Background Documents / Electronic Links

Appendix 1 – Lime Avenue Business Park
Appendix 2 – Box Works

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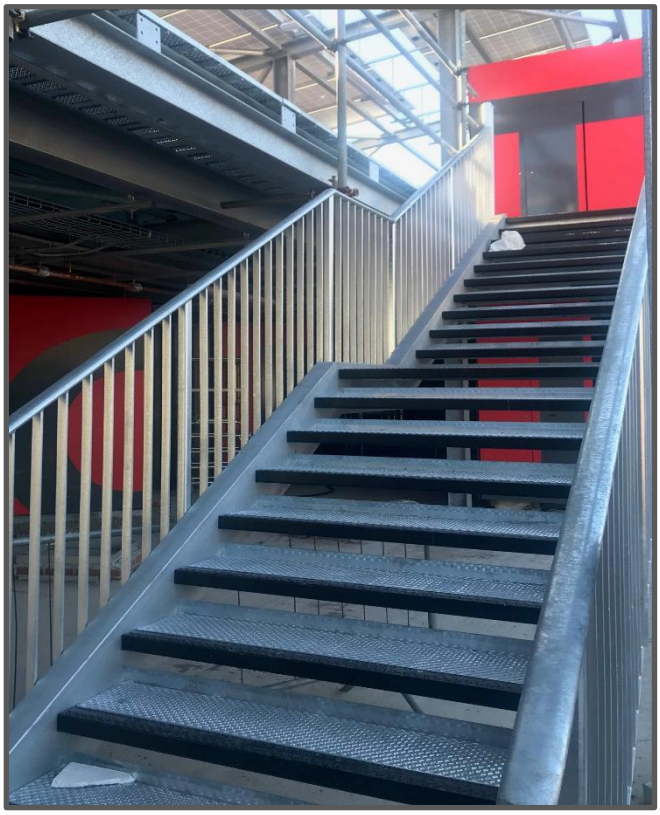
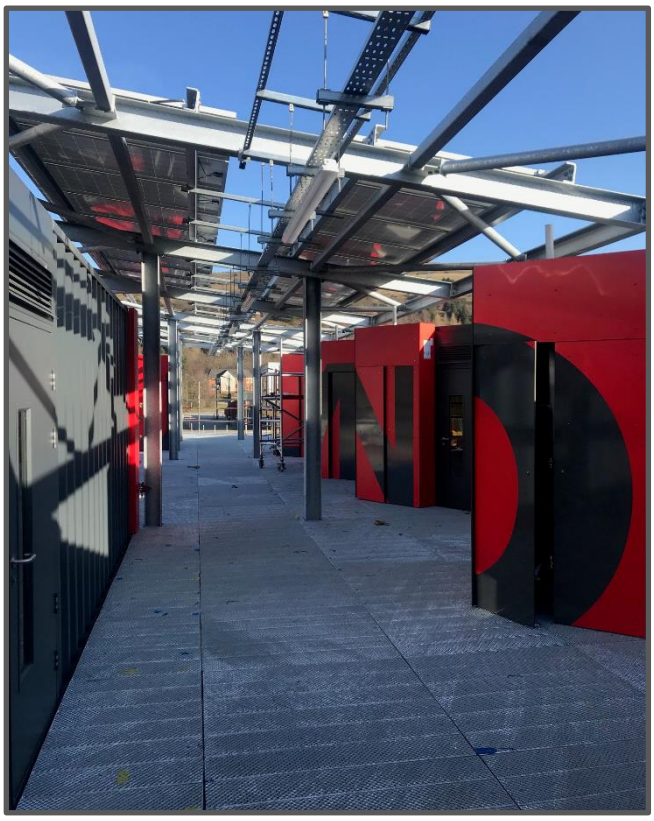
Appendix 1 – Lime Avenue Business Park

Appendix 2 – Box Works