

Belfast City Council

# Net Zero Belfast Pathfinder project

Summary Report

25/07/2025

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# 1. Introduction

## 1.1 Project background

The Belfast Net Zero Pathfinder Project represents a landmark step in the city's journey towards a sustainable, inclusive, and low-carbon future. Initiated in June 2024 through a partnership between Belfast City Council (BCC) and Energy Systems Catapult (ESC) and supported by Innovate UK's Net Zero Living Pathfinders programme, the project is rooted in the city's Local Area Energy Plan (LAEP) and the Queen's Island Decarbonisation Plan (QIDP). These guiding frameworks prioritise scalable, cost-effective solutions that reduce emissions, foster innovation, and stimulate green economic growth across Belfast.

Belfast has set ambitious science-based targets aligned with the Net-Zero Carbon Roadmap: a 66% reduction in carbon emissions by 2025, 80% by 2030, and net zero by 2050 (all relative to 2000 levels). These targets are underpinned by a suite of progressive policies, including the Green Growth Strategy for Northern Ireland, the Circular Economy Strategy, and the Belfast City Council (BCC) Corporate Plan 2025–2028. The Pathfinder Project is also a cornerstone of the Belfast Agenda, the city's vision for a sustainable, inclusive, and prosperous Belfast by 2035.

This report summarises the outputs from the Belfast Net Zero Pathfinder Project which will inform the next phase of Belfast City Council's work to advance its energy transition. The project builds on the groundwork laid during Phase 1 which examined how Belfast's LAEP and the QIDP could support a whole systems approach to transition the city to net zero. These plans provided modelling and analysis of the city's energy system and identify priority decarbonisation projects and highlighted the practical challenges—beyond technology—that must be addressed to move from planning to delivery.

Phase 2 funding enables the Council to overcome a range of non-technical barriers that impede implementation of the LAEP and QIDP and help BCC to move viable interventions recommended by the energy masterplans (the LAEP and QIDP) into delivery projects: a city-centre heat network and a solar PV deployment. The objective is to accelerate and de-risk the delivery of two priority decarbonisation projects identified in the LAEP and QIDP.

The non-technical barriers include: limited maturity and readiness of market/supply chain for net zero investments, insufficient capacity of council and local stakeholders to progress decarbonisation projects, lack of business model clarity (e.g. off-taker arrangements) that can often deter investors, gaps in understanding of the optimum legal and commercial arrangements for public-private collaboration, and public concerns about local impacts of decarbonisation projects.

The project commenced on 1<sup>st</sup> June 2024 and ended on 31<sup>st</sup> July 2025. It was funded with an Innovate UK grant of £149,964 split between two project partners BCC (lead - £91,844) and the ESC (£58,120).

## 1.2 Work packages

To address these challenges, the project is organised into six work packages.

- **WP1: Project assessment** - clarifying objectives and delivery pathways for the heat network and solar PV projects and analysis of non-technical barriers.
- **WP2: Market readiness** - to provide an understanding of the readiness of market actors (potential off-takers, investors, supply chain stakeholders etc) to engage and deliver decarbonisation projects.

- **WP3: Capacity building of local stakeholders** - strengthening capacity to take forward LAEP / QIDP outputs embedding this expertise across local anchor institutions.
- **WP4: Commercial viability and routes to finance**
  - WP4a: Business model analysis - to identify potential business models that might support their deployment and assess the most appropriate role for BCC to catalyse and enable the projects.
  - WP4b: Optimum legal and commercial arrangements for BCC to catalyse investment - to identify suitable delivery models to enhance the capacity of Council to engage private sector partners.
- **WP5: opportunities for downstream investments to upskill /empower excluded groups** - Engaging local communities and identifying ways to support underrepresented groups
- **WP6: assessment of economic, environmental and social impacts of the interventions** - tracking environmental, economic, and social outcomes, with dedicated resources for reporting

By accelerating and de-risking the delivery of two priority decarbonisation projects identified in the LAEP and QIDP, the project has supported ongoing efforts by Belfast City Council (BCC) and its partners to reduce emissions from the city's built environment which is the largest source of emissions in the City.

Moreover, tackling these non-technical barriers enables Belfast to progress decarbonisation using a whole systems approach to decarbonise the local area while also delivering wider benefits to local communities. As many places are increasingly commissioning LAEPs, the outputs and learning from this project can be applied to other areas with insights being relevant for all UK local authorities.

### 1.3 Project delivery

The six work packages were delivered through a collaborative model that draws on the strengths of Belfast City Council, Energy Systems Catapult (ESC), and two specialist subcontractors (Bird and Bird and Atkins Realis). The Council led the overall governance and stakeholder engagement, ensuring that the work aligns with city priorities and existing plans and delivers against the objectives set out in the proposal. ESC has provided technical expertise on market readiness and business modelling using best practice and proven methodologies. Two sub-contractors have been brought in to support specific tasks:

1. Bird & Bird who advised BCC on the optimum legal and commercial arrangements; and
2. Atkins Realis who advised BCC on the community opportunities and impact assessment.

This approach combines local insight, energy systems thinking, and targeted technical input. The project was designed to accelerate delivery, maximise value, and build lasting capability within the Council and its partners.

### 1.4 Project roles

As noted above, the project is a collaboration between BCC, ESC and local sub-contractors. As lead, Belfast City Council has undertaken most project management activities, including programme, funding officer liaison, tracking KPIs, contract management etc. The project team is listed below:

## BCC team

- Project Lead and Quality Assurance - Debbie Caldwell (BCC)
- Project Manager – Odhrán Crolly / Lauren Flanagan
- Monitoring Officer - Claire Shortt

## ESC team

- Analyst (Barriers) - Peter Graham
- Business Model Identification & Evaluation, & Market Engagement - Tom Elliot & Reace Edwards
- Quality Assurance - Andrew Clark & Marcus Alexander

## Atkins Realis

- Community Development – Karen Rodgers (Atkins Realis)

## Bird & Bird

- Legal and commercial arrangement - Stuart Cairns, George Matthew and Michael Rudd

Roles assigned to each work packages are shown below.

Work Package	BCC (Lead)	Energy Systems Catapult	Specialist Subcontractors
<b>Work Package 1</b> Project Assessment	<ul style="list-style-type: none"><li>• Define objectives and delivery pathways for the heat network and solar PV projects</li><li>• Coordinate stakeholder engagement</li></ul>	<ul style="list-style-type: none"><li>• Lead project assessment</li><li>• Analysis of non-technical barriers</li><li>• Write up final report</li></ul>	
<b>Work Package 2</b> Market Readiness	<ul style="list-style-type: none"><li>• Local stakeholder engagement,</li><li>• Provide contextual insights,</li><li>• Review submission</li></ul>	<ul style="list-style-type: none"><li>• Lead market readiness assessment</li><li>• Write up final report</li></ul>	
<b>Work Package 3</b> Capacity Building	<ul style="list-style-type: none"><li>• Convene multiple stakeholder meeting and roundtables</li><li>• Ensure knowledge and understanding developed by ESC and Subcontractors is embedded across local stakeholders</li><li>• Track activities and compile report</li></ul>	<ul style="list-style-type: none"><li>• Undertake interviews with potential heat network off-takers</li><li>• Provide onsite engagement with local stakeholder groups to build capacity building</li></ul>	<ul style="list-style-type: none"><li>• Undertake interviews with specific BCC and stakeholders in relation to the heat network and solar PV projects</li></ul>
<b>Work Package 4a</b> Business Model analysis	<ul style="list-style-type: none"><li>• Local stakeholder engagement,</li><li>• Provide contextual insights,</li><li>• Review submission</li></ul>	<ul style="list-style-type: none"><li>• Lead market readiness assessment</li><li>• Develop business models</li><li>• Write up final report</li></ul>	

Work Package	BCC (Lead)	Energy Systems Catapult	Specialist Subcontractors
<b>Work Package 4b</b> Legal and Commercial arrangements	<ul style="list-style-type: none"> <li>Review sub-contractor's submission</li> <li>Align with council objectives and activities</li> </ul>		<ul style="list-style-type: none"> <li>Legal advisors draft and validate delivery models</li> <li>Provide strategic insights</li> <li>Prepare paper</li> </ul>
<b>Work Package 5</b> Community Opportunities Assessment	<ul style="list-style-type: none"> <li>Provide contextual insights and technical information related to overarching projects</li> </ul>		<ul style="list-style-type: none"> <li>Deliver community consultation,</li> <li>Identify opportunities and risks related to the two projects for delivery,</li> <li>Set out clear method for future stakeholder engagement</li> <li>Prepare final report</li> </ul>
<b>Work Package 6</b> Impact Assessment	<ul style="list-style-type: none"> <li>Provide contextual insights and technical information related to overarching projects</li> </ul>		<ul style="list-style-type: none"> <li>Identify and assess impacts</li> <li>Prepare final report</li> </ul>

## 2. Work Package 1 - Project assessment

This work package was intended to enable all partners and stakeholders on the project to operate from an agreed project definition baseline including the role of BCC and any other stakeholders. It includes a high-level review of the five non-technical barriers to allow subsequent work packages to build out solutions to the barriers identified. It also uses project storyboards to capture what, where, when, how many, how much, and who, aspects of each project.

It explains the rationale for prioritising a city-centre heat network and a solar car park with integrated EV charging which were identified through the Belfast LAEP and the QIDP as priority interventions capable of reducing carbon emissions, tackling fuel poverty, and supporting wider city objectives.

The report outlines the strategic case for each project, detailing their objectives, expected benefits, and the roles Belfast City Council and other stakeholders may play in delivery (with stakeholders categorised into supporter, enabler and investor). For the heat network, Belfast's building density, public sector anchor loads, and proximity to potential heat sources offer a strong foundation for development. The solar car park project responds to urgent grid constraints and the need for more EV infrastructure, while also demonstrating the city's potential for scaling up solar PV generation.

The report also explores the five key non-technical barriers that must be addressed to move these projects forward:

1. limited maturity and readiness of market/supply chain for net zero investments,
2. insufficient capacity of council and local stakeholders to progress decarbonisation projects,

3. lack of business model clarity (e.g. off-taker arrangements) that can often deter investors,
4. gaps in understanding of the optimum legal and commercial arrangements for public-private collaboration, and
5. public concerns about local impacts of decarbonisation projects.

The findings will inform future decision-making and help ensure that both projects are delivered in a way that is technically viable, commercially attractive, and socially inclusive.

**To note:** While the solar carport project was initially chosen, it was decided not to carry it forward after stage 1 – Project assessment due to future use and ownership complexities of the solar car port site. This followed conversations with two of the key stakeholders where it was envisaged solar car ports could be developed: the Odyssey and Catalyst.

Instead, the focus was shifted to rooftop solar PV installation across Belfast, and the development of a portfolio approach to sleeving solar power generated from multiple rooftops to a single off-taker (which could for example be an energy centre for a heat network)..

### 3. Work Package 2 - Market readiness to progress net zero innovation

This work package explored how ready Belfast's local energy market and supply chain are to support rooftop solar PV and heat network projects. The focus was on understanding what potential off-takers need, what's holding the market back, and whether there's a realistic path to scaling up local decarbonisation efforts.

#### Key Objectives

- Speak directly with stakeholders across the energy value chain to gauge interest and identify constraints
- Pinpoint the non-technical challenges slowing down deployment
- Understand what drives off-taker decisions—what they care about, what worries them, and what tips the balance
- Offer practical recommendations to improve market engagement and readiness

The team carried out structured interviews with a wide range of stakeholders: landlords, solar PV installers, electricity network operators, energy service companies (ESCOs), and organisations that might connect to future heat networks, etc. These conversations were extremely valuable to both elements of the work. They revealed concerns and opportunities related to PV and the heat network.

Landlords were generally positive about rooftop solar, some more focused on off-setting carbon while others focused on supplying energy to tenants. The Energy Efficiency Capital Grant (EECG), despite offering up to £150,000, was seen as being too complex and the process too slow and unpredictable for many.

Installers, including 35 MCS-certified firms active in Belfast, liked the idea of portfolio PPAs. They were particularly interested in models that allow flexible onboarding and shared agreements across multiple sites. However, they flagged the need for clearer guidance on future non-domestic solar grants and a faster approval process to keep momentum going.

Investors focused on self-consumption rates, ideally above 70%, as a key factor in making PPAs financially viable. Some were open to oversizing systems to make full use of rooftop space, but only if there were solid demand forecasts and reliable export options to manage risk.

NIE, the local electricity network operator, said Belfast's rooftop solar ambitions didn't pose immediate technical issues. Early assessments showed that city-centre installations were feasible, and network upgrades are already in motion to support more distributed generation. That said, they stressed the need for more detailed data at a building-level to guide future planning.

The ESCo partnership could offer greater contractual simplicity than the supplier facilitated model, as there would only be one PPA between Belfast City Council and the ESCo, rather than contracting directly with multiple generators.

PPA platform providers confirmed that portfolio PPAs are technically feasible and could help match solar generation with heating and cooling loads. Their platforms could streamline onboarding for smaller buildings and maximise rooftop use.

The report also looked at how ready the market is for heat networks. Most stakeholders saw them as a credible alternative to gas, especially for meeting Net Zero targets without major building changes however cost was a major concern. Organisations were generally open to paying a connection fee, provided it was reasonable and offered a clear return. Some potential off-takers expressed concern over being locked into 15 year heat supply agreements given they are currently able to hedge price fluctuations and switch to new deals every two years.

Carbon reduction was a strong motivator, with many already working toward decarbonisation goals. Some were willing to pay more for low-carbon heat, but only if it stayed competitive with gas. Affordability and price transparency were especially important for public sector bodies tied to fixed procurement rules or budget constraints.

Social benefits such as like job creation, and locally sourced energy generation (energy security) were recognised but not seen as priority considerations. Also, stakeholders wanted a business case that made financial sense, delivered carbon reductions, and didn't add complexity to their operating procedures.

There's clear interest in both rooftop solar and heat networks, but the market isn't quite ready. Fragmented efforts, uncertain funding, and a lack of coordinated strategy are holding things back. To drive this on, Belfast City Council would need to:

- Develop clear, tailored offers that fit with how stakeholders procure energy;
- Promote collaborative purchasing models to reduce risk and improve uptake;
- Position heat networks as part of a wider city decarbonisation strategy; and
- Prioritise early engagement and transparent communication to build trust.

## 4. Work Package 3 - capacity of key stakeholders to take forward the LAEP

Capacity building has been integrated into all of the work packages of the Project, designed to address internal technical constraints, foster collaborative delivery, and prepare

stakeholders for the implementation of solar PV and heat network interventions. The strategy recognises that delivering complex energy infrastructure in an urban context requires more than technical expertise, it also requires broad understanding of the different routes to market, strategic alignment, and the ability to collaborate across institutions, communities and the market. The capacity building strategy adopted was therefore rooted in principles of co-design, systems thinking, and collaborative learning.

The approach taken leant on long standing city-wide and internal relationships. Drawing on existing working groups which were co-designed for systems thinking and collaborative learning. These existing working groups were convened to bring together Council departments, City-wide and third-party stakeholders.

Technical knowledge exchange played a key role in building confidence and clarity. Expertise from a range of BCC internal and city-wide stakeholders was integrated into discussions covering social, legislative and technical considerations for both the heat network and solar PV. These exchanges also included updates on partners' estates, ongoing energy and sustainability projects, and shared reflections on successes and challenges. This helped clarify complex issues and enabled non-technical stakeholders to engage more confidently with the material.

Capacity building was also tailored to the needs of specific stakeholder groups. Council staff received support on governance, commercial structures, and technical delivery, while city-wide partners were engaged in strategic discussions about net zero integration and the potential for connecting their estates to future heat networks. Although not funded under this programme, the heat mapping and masterplanning study for the Belfast Heat Network was leveraged to support these efforts. Outputs such as heat mapping, energy centre site selection, network routing, anchor load identification, and techno-economic modelling were used to inform workshops and engagement sessions.

Additional capacity-building activities included participation in the heat network off-taker interviews, conducted by Energy Systems Catapult. A member of the Council's climate team joined these interviews to strengthen relationships and bring additional insight to the discussions. These interviews helped shape an understanding of what an attractive connection offer might look like and contributed to the development of delivery models. Similarly, the community opportunity assessment involved direct engagement with Council staff and community organisations in Donegall Pass, integrating local knowledge into the planning process.

Capacity building was embedded throughout the Pathfinder project via three key groups.

1. The **Council's Heat Network Internal Working Group**, which informs and leads on the development of the Council's approach to incentivising the development of a heat network in Belfast and enables cross-departmental collaboration. It includes cross-departmental membership from: the Climate Team, Procurement, Property and Projects, Legal Services, Planning, Finance, City Regeneration and Development.
2. The **Net Zero Delivery Group** (part of the City's Community Planning Partnership) established following completion of the LAEP to co-ordinate emerging net zero investments across the City. This group provides collective leadership to promote and support the development of a coordinated series of net zero investments across the city to achieve the emission reduction targets in a cost optimal way whilst creating wider benefits for local communities. Its membership comprises: BCC, SONI, Phoenix Energy, NIE Networks, Queens University Belfast, the NI Housing Executive, Action Renewables, National Energy Agency and the Royal Society of Ulster Architects. The group provides a platform for city-wide operational stakeholders to share insights and catalyse private sector interest and investment and political traction.

3. The **Our Planet Strategic Oversight Group**, which oversees delivery of the City's strategic plan (Belfast Agenda) across the Our Planet programme of work. Membership includes: BCC, Translink, Queens University, NI Housing Executive, Dept for Economy, Dept for Agriculture, Environment and Rural Affairs, Belfast Harbour, NIE Networks, SONI, and Climate NI.

These groups are an integral part of the City's partnership approach to tackling the climate crisis and meet regularly. These groups are instrumental in bridging the gap between technical feasibility and delivery readiness for complex decarbonisation projects in the City.

The outcomes of this work have been significant. Internally, Council departments have developed a stronger understanding of heat network delivery and built confidence in progressing complex infrastructure projects. Externally, strategic alignment has been strengthened across city-wide stakeholders, and there is growing interest in forming an additional dedicated knowledge-sharing group for potential heat network off-takers. Capacity-building efforts have also been closely integrated with the heat network feasibility study, through the off-taker interviews, aligning the pathfinders project.

Looking ahead, capacity building will remain a core element of the delivery strategy. The continued convening of city-wide groups will support planning, risk management, and stakeholder coordination. A new off-taker forum will be explored to support the heat network project, and lessons from the Pathfinders programme will be used to address risks. Belfast City Council will extend these approaches across other city-climate projects.

## 5. Work Package 4 – Commercial viability and routes to finance

### 5.1 WP4a - Business model analysis

This work package focused on identifying and evaluating viable business models to support the accelerated deployment of rooftop solar PV in Belfast, a key priority in the LAEP, which recommends scaling rooftop solar installations to 22MW per year between 2025 and 2030, and ultimately reaching 1.1GW of installed capacity by 2050. The analysis centred on the feasibility of developing a portfolio Power Purchase Agreement (PPA) as a mechanism to unlock investment, aggregate generation, and support wider decarbonisation goals.

#### Objectives

- Analyse rooftop solar PV generator archetypes and their commercial motivations
- Evaluate business model options for self-consumption, behind-the-meter PPAs, and portfolio PPAs
- Test the feasibility of portfolio PPAs through stakeholder engagement and market analysis
- Recommend an implementation plan

The report begins by categorising rooftop solar PV generators into two project types: large energy consumers and surplus providers. Large energy consumers typically have high demand behind-the-meter and seek to maximise self-consumption to reduce electricity bills. Surplus providers, on the other hand, have sufficient roof space to generate more than they consume and are interested in exporting surplus energy to the grid at a commercially viable rate. However, low export tariffs often limit willingness to oversize solar PV installations.

Three business model options were assessed for their suitability.

Business Model	Summary	Complexity
Self-consumption	Building owner installs and consumes solar PV directly.	Low
Behind-the-meter PPA	Third party installs PV and sells energy to building user.	Medium
Portfolio PPA	Appendix A- Aggregated energy from multiple rooftop assets sold to a central off-taker.	High

Case studies from Belfast, including Catalyst and the Odyssey Trust, illustrated how these models operate in practice. Catalyst's self-consumption model supplies communal services and recovers costs through tenancy agreements, while Odyssey's behind-the-meter PPA allows for sub-metered billing and cost recovery across tenants.

The portfolio PPA model was explored in depth as a strategic mechanism to aggregate rooftop solar generation across multiple sites and supply energy to a central off-taker, such as Belfast City Council or a heat network joint venture. Three implementation pathways were considered:

1. **Supplier-Facilitated:** Belfast City Council or a JV would contract directly with individual generators, while an energy supplier would aggregate and sleeve the energy. This approach offers control over generator selection and contract terms but involves high administrative burden and supplier fees.
2. **Aggregator-Facilitated:** An aggregator would manage contracts with generators and balance energy supply and demand. Belfast City Council would hold a single commercial agreement with the aggregator, reducing legal complexity but limiting influence over generator selection and pricing.
3. **ESCo Partnership:** An energy services company would fund rooftop PV installations and sell surplus energy to Belfast City Council via a portfolio PPA. This model simplifies contracting and thus may unlock private investment, but requires careful planning around asset ownership and long-term participation.

Stakeholder engagement helped inform the technical and commercial viability of portfolio PPAs, but also highlighted key considerations. Investors generally seek high self-consumption rates to ensure financial viability as off-setting the electricity bill offers a greater return than selling electricity. Therefore, they are traditionally cautious about oversizing systems without clear demand forecasts. Installers and ESCOs expressed interest in multi-party agreements, while PPA innovators emphasised the importance of digital platforms to streamline participation and maximise rooftop utilisation.

The strategic value of a portfolio PPA lies in its ability to support Belfast's rooftop solar targets, integrate with heat network development, and provide a scalable mechanism for local energy procurement. The portfolio PPA offers electricity generation diversification, it is cost competitive and has the potential to demonstrate increased carbon reductions incentivised over-design.

For the next steps, the report recommends piloting a portfolio PPA with a small group of generators to test contractual and operational frameworks. ESCo partnerships should be explored to unlock private investment and simplify delivery, and the design of the portfolio PPA should align with Council procurement processes and Net Zero targets. Ultimately, portfolio PPAs could serve as a cornerstone of Belfast's energy transition, enabling coordinated deployment of rooftop solar PV and supporting broader decarbonisation initiatives across the city by way of feeding into the heat network energy centre.

## 5.2 WP4b - optimum legal and commercial arrangements for BCC to catalyse investment - CONFIDENTIAL

This summary is based on legal and commercial advice provided by the specialist subcontractor; Bird & Bird and is strictly confidential. It is intended for use by Belfast City Council's Corporate Management Team and the Climate Team. It must not be shared, circulated, or referenced outside this project, including the appendices attached.

The work package outlines recommended delivery models for the Belfast Heat Network (BHN) developed through a series of workshops, executive-level meetings, and committee presentations. The purpose of this work package is to inform strategic decision-making by elected members on the next phase of market engagement.

Following a detailed assessment, two delivery models were proposed for further market engagement: a Joint Venture Energy Services Company (JV ESCo) and a Golden Share model. These options were selected from a broader longlist, based on BCC's strategic priorities, its preferred level of control, available funding, and the anticipated appetite of the market.

The assessment considered five core criteria: the degree of control BCC wishes to retain over project development; the level of desired involvement in the operation of the heat network, its capacity and willingness to invest capital; its need ownership; and the likelihood of attracting credible private sector partners. Several alternative models—including Local Authority Delivered, Private Sector Delivered, Infrastructure/Operation Split, and Concession—were excluded due to perceived appetite of the elected members.

The JV ESCo model involves the creation of a 'special purpose vehicle' jointly owned by BCC and a private partner, governed by a Shareholders' Agreement. This structure requires capital investment from BCC and offers the potential for financial return. It enables strong operational influence but demands significant internal resource and expertise. A Development Agreement may be used to govern the design phase prior to committing to full delivery, allowing BCC to shape the project before entering into the Shareholders' Agreement.

The Golden Share model is another similar approach, where the BCC would hold a non-economic share in a delivery vehicle. This model does not require capital investment and therefore does not generate return. Thus, the golden share provides limited operational influence and requires minimal internal resources. Strategic oversight is retained without financial exposure, and a Development Agreement may also be used to shape the project prior to delivery.

Both models have been informed by delivery structures emerging under England's Advanced Zoning Programme. While zoning policy does not apply in Northern Ireland, it is recommended that BCC continue to monitor developments in England to ensure alignment with evolving market expectations and best practice.

## 6. Work Package 5 – Community opportunities assessment

The objective of this work package is to assess how the decarbonisation projects can upskill and empower excluded groups and communities through consultation and engagement.

### **Decarbonisation opportunities and challenges**

- **City Centre Heat Network:** the development of a low-carbon heat network has high potential to provide reliable, efficient heating to a variety of building types, including heritage structures and mixed-use developments in the city centre. However, bespoke engineering solutions are required to integrate new systems with existing infrastructure while maintaining architectural integrity.
- **Solar PV on Public Buildings:** large-scale deployment of solar PV increases local renewable electricity generation, directly lowers operational costs for public institutions, and supports energy resilience. The public sector's leadership in solar adoption is expected to catalyse further investment and uptake across the private sector.
- **Donegall Pass and Focus Zones:** areas such as Donegall Pass, which face higher levels of fuel poverty, older housing stock, and limited retrofitting space, are identified as priorities for targeted investment and innovation. Tailored interventions, such as fabric upgrades and community energy schemes, address both social and technical barriers.

### **Policy Integration and Strategic Alignment**

- The Belfast Net Zero Pathfinder Project is closely aligned with wider regional and national strategies, including the Circular Economy and Green Growth Strategy, reinforcing the importance of resource efficiency, local energy generation, and innovation in clean technology. It operationalises the Belfast Agenda and Net-Zero Carbon Roadmap, translating high-level ambitions into actionable, localised plans that address the unique challenges of Belfast's urban landscape

### **Lessons from comparable projects**

- Bristol have been able to leverage £61.5m in social value package, delivered through the Leap City Partnership
- St Ives forward thinking smart energy programme was also able to deliver a low carbon business support programme, managing to support 35 local SMEs to take carbon emission reduction steps.
- In Aberdeenshire, a drastic reduction in fuel poverty was achieved through the smart solar and storage project, bringing solar PV and battery storage to 500 homes.

### **Barriers and recommendations**

- **Integration with Existing Infrastructure:** delivering large-scale interventions in inner-city locations requires overcoming challenges related to building age, density, and historical value. The report recommends ongoing stakeholder engagement and pilot projects to demonstrate feasibility.
- **Social Equity:** ensuring that the benefits of decarbonisation are distributed equitably demands focused investment in deprived neighbourhoods and the removal of barriers to participation in training and employment.
- **Innovation and Adaptability:** continued investment in emerging technologies is recommended to future-proof the energy transition.

### **Conclusions**

The Belfast Net Zero Pathfinder Project aims to drive an inclusive and sustainable energy transition through rooftop solar and a city centre heat network. Careful planning and collaboration can deliver benefits beyond carbon reduction, including community empowerment and job creation. Social value should be embedded in procurement,

governance, and supply chains to ensure equitable outcomes. Early, ongoing community engagement and alignment with local plans are vital for project success. These projects will provide a blueprint for inclusive climate action that benefits both the environment and local communities.

## 7. Work Package 6 – Impact assessment

This section provides an overview of the social, economic and environmental factors associated with two core decarbonisation interventions: the development of a city centre heat network and the deployment of solar photovoltaic (PV) systems. The objective of this work package is to evaluate the likely economic, environmental, and social impacts of these interventions, ensuring a just transition and maximising benefits across the city.

### **Socio-economic and community impact**

- The Belfast Net Zero Pathfinder Project places strong emphasis on inclusive growth. Extensive consultation and engagement is recommended to identify opportunities to upskill local residents—particularly those from excluded or underserved groups—for new jobs created in green construction, energy management, and maintenance of renewable infrastructure.
- Community ownership models and energy-as-a-service initiatives can provide opportunity to foster local empowerment while ensuring affordability and wider participation in the energy transition.
- Reduction in energy poverty and improved energy security are expected, particularly in areas previously more vulnerable to high energy costs and unreliable heating.

### **Economic and environmental impact**

- The report projects significant economic stimulus from green infrastructure investment, with the potential creation of skilled jobs, stimulation of local supply chains, and enhanced attractiveness for inward investment.
- Environmental modelling indicates that the combined interventions could deliver substantial carbon savings, contributing materially to Belfast's interim and long-term climate targets.
- The LAEP's phased implementation approach—focusing initially on “low-regrets” actions like fabric upgrades and public sector-led solar PV installations—enables flexibility and adaptation as technologies and market conditions evolve.

### **Project Specific Impact**

- Heat Network: Air quality improvements, as there would be less on-site fossil fuel combustion heating sources. Therefore, a reduction of NO<sub>2</sub> and PM<sub>2.5</sub> exposure in dense urban and lower-income areas can be expected.
- Both a heat network and increased solar PV deployment would provide the community more security of supply and insulate the users from geopolitical trends effecting fossil fuel prices or other price shocks.

## 8. Appendices

Appendix A      Work Package 1: Project Assessment

## Appendix B      Work Package 2 and Work Package 4a: market readiness and business model analysis

## Appendix C      Work Package 3: capacity building of local stakeholders

## Appendix D      Work Package 4b: optimum legal and commercial arrangements

## Appendix E      Work Package 5: opportunities for downstream investments to upskill /empower excluded groups

## Appendix F      Work Package 6: assessment of economic, environmental and social impacts of the interventions