Funding and Financing

AN ERM REPORT FOR THE ZERO CARBON OXFORD PARTNERSHIP FEBRUARY 2025





Introduction to this report, authors, and disclaimer

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About this document

This document reports the findings from WP5.2 of the ZCOP Local Industrial Decarbonisation Roadmap (LIDP) project, investigating barriers and enablers related to funding and financing decarbonisation of the Oxford Industrial Cluster.

Link to other work

The report builds upon the findings of the Oxford's Industrial Landscape & Baseline (WP1) report alongside the Scenario Modelling (WP4) report. The analysis was also informed through several stakeholder engagement activities (WP2).

The recommendations in this report inform the actions identified in Oxford's Industrial Decarbonisation Roadmap and Action Plan (WP6).

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Executive Summary



Oxford Industrial Decarbonisation Project - Funding and Financing

To achieve Oxford City Council's ambition of net zero by 2040 will require substantial investment into decarbonisation technologies

- Oxford's industrial sector is characterised by dispersed small and medium-sized enterprise (SMEs), numerous university spin-outs, few larger emitters, and clusters of energy users concentrated in business/science parks.
- **Financing is defined as the act of obtaining or furnishing money or capital for a business**. Financing comes from various sources, such as loans, lines of credit, and issuance of bonds and is generally utilised to supports the overall financial needs of a business.
- Funding is defined as money provided, especially by Government, related to specific projects or stages of growth. Funding is unlikely to be associated with interest repayments, instead it typically involves shared ownership or mechanisms to offer return to investors.
- Supporting the landscape of decarbonisation solutions required in Oxford necessitates a mix of funding and financing solutions and collaborative actions as **industrials, technology developers, and financiers face a broad range of challenges to investing in decarbonisation**.
- Industrial companies need to build a business case to convince internal decision makers to invest or seek
 investment. A decarbonisation technology deployment is generally a balance between upfront
 expenditure and long-term cost reductions such as reduced fuel cost, maintenance, carbon
 liability/taxation, or additional revenue generation.
- This report investigates the key funding and financing needs to decarbonise the Oxford Industrial Cluster, and the barriers present to achieving this. The report then summarises the key investment solutions available before investigating the broad enablers to help unlock these solutions. The final outcomes are specific and targeted actions for the Cluster to support funding and financing of industrial decarbonisation.





The Oxford Industrial Cluster faces a series of significant barriers preventing investment into decarbonisation projects and technology

SMEs small-scale decarbonisation projects are unable to benefit from economies of scale, compounded by fixed procurement/installation expenses. Oxford's dispersed industrial landscape also complicates coordination of larger infrastructure projects.

SMEs face significant challenges in securing upfront capital for decarbonisation projects. They often rely on external funding, which is targeted at limited technologies and competitive / timeconsuming to obtain, or private loans that create long-term financial burdens.

Low-carbon technologies often struggle to demonstrate a strong return on investment (ROI) due to market uncertainty, fuel price volatility, and low technical maturity. Without a convincing ROI, or fast payback period, investors are hesitant to support these projects or technologies.



financial risk due to limited creditworthiness, further deterring investment.

Conversely, short-term leases discourage tenant investment in long-term decarbonisation technologies.

human resource capacity to navigate investment for decarbonisation.



Innovative funding and financing solutions can enable SME industrials and landlords to overcome upfront capital constraints

- Traditional financing options such as debt and equity financing remain likely pathways for funding mature, low risk decarboni sation projects of widely available and proven technologies being used in familiar sectors. Businesses can also access green loans or bonds, paying back through profits or interest.
- National government grants provide valuable capital or operational support; however, these grants are often competitive, mand ate minimum project capacities and act over short timeframes making it difficult for smaller SMEs to plan for and secure funding. Local governments can also support decarbonisation by providing further financial incentives through **tax reliefs, rebates, and specific funding programs**.
- Blended finance offers a solution to some of these challenges by **combining public and private investment to lower the overall risk profile. Public-private partnerships can provide both financial backing and access to essential expertise**, making projects more feasible. This model has the added benefit of potentially offering long-term revenue streams for the Oxford Industrial Cluster which could be reinvested into future decarbonisation projects.
- For larger decarbonisation projects, third-party infrastructure investment is a key opportunity. External infrastructure providers fund and develop major decarbonisation infrastructure such as microgrids or heat networks, with businesses paying for services (power/heat) rather than managing the technology themselves. This reduces both upfront capital needs and operational risks for industrials or landlords, whilst aggregating demand to produce more investable projects.
- A novel approach for smaller businesses is **decarbonisation-as-a-service which removes the barrier of upfront capital entirely**, allowing third-party providers to install and maintain the technology, while industrials pay a premium over time. As-a-service solutions for technologies such as heat pumps or solar PV systems can be deployed without the need for large initial investments, making decarbonisation much more accessible to Oxford's abundance of dispersed SME in dustrials.





The Oxford Industrial Cluster should undertake several enabling activities to unlock the key investment solutions available

Capacity Building

Direct Support

Oxford's industrial landscape requires further **knowledge, skill, and capacity development** to maximise opportunities for investment in decarbonisation.

To support the city's ambitions the Oxford Industrial Cluster should develop a **programme of education, knowledge sharing, match-making, and bid support activities** to empower industrials and technology developers to identify and access optimal funding and financing solutions. The Oxford Industrial Cluster has the capabilities to directly support and unlock investment opportunities for industrial sites.

Firstly, **establishing partnerships with technology developers** to increase awareness and support for technology deployments.

Secondly, through **deploying local funding levers** to reduce the upfront capital investment for technologies or improve the longterm business case for decarbonisation.

More applicable to innovative technologies that require earlystage support to develop and demonstrate viability

Aggregation

To overcome challenges of scale and limited skills/capacity across Oxford's dispersed SME industrial landscape the Oxford Industrial Cluster should look to **aggregate demand for different technologies,** also in collaboration with other sectors.

This can help **enable bulk procurement and to demonstrate a scalable business case** for largescale infrastructure investment.

Aggregation can also help **reduce total cost by levering collective bargaining powers.**

Portfolio Development

By combining the prior enablers, the Oxford Cluster can develop investment portfolios offering diversity across sector, technology, and location to create a large-scale opportunity for investors to support.

This approach has the benefit of sharing risk between industrials and can enable multiple investor classes to participate.

Portfolios can also **balance profiles of more and less attractive projects** to enable planning and investment in all viable decarbonisation solutions.



More applicable to mature technologies that require support to accelerate roll out at scale

Recommendations for progressing towards the delivery of funding and financing to decarbonise Oxford's industry

- Oxford City Council's has set an ambitious net zero target by 2040; to meet this target, substantial investment will be required in emerging decarbonisation technologies.
- **Decarbonising Oxford's industrial sector will require addressing significant financial and structural barriers to providing investment**. There are distinct barriers to overcome that face industrial sites looking to deployment specific technologies, technology developers looking to expand their deployment portfolio, and investors hoping to support the decarbonisation technologies and projects required by the cluster.
 - Oxford's landscape of **industrial SMEs requires bespoke support to overcome investment barriers associated with their small scale**; namely an inability to provide upfront capital and a limited resource and skills pool.
 - The Oxford Industrial Cluster must also continuously engage the investor community to understand the key parameters required to attract investment through risk mitigation (technical, market, policy, regulatory), scalability, and return on investment.
- By leveraging innovative financing mechanisms, forming public-private partnerships, and prioritizing scalable, low-cost technologies, the Oxford Industrial Cluster can unlock the investment needed to achieve its 2040 net zero goal.
 - The cluster should **prioritise capacity building and simple partnership/funding mechanisms to enable industrials to identify and uptake decarbonisation investment** solutions, especially for innovative technology options that require more bespoke support for early demonstrations.
 - The next stage is to further support industrials, especially SMEs, by aggregating demand, potentially into complex portfolios, to generate scale, reduce investment risk, and enable investment this can drive scale up and rapid roll out for mature decarbonisation technologies across the cluster.
- Where possible **funding and financing should be targeted towards the prioritised technologies identified in the wider ZCOP ID report** and support the additional demands on the cluster such as improving decarbonisation literacy, closing the supply chain gap, and forming a vibrant and co hesive cluster network.
- The funding and financing levers should also be considered outside the scope of "industry" and seek synergies with other sectors of Oxford's economy such as transport, buildings, and waste management that may utilise similar technologies. The cluster must also create a supportive, holistic environment for investment through other actions targeting collaboration, policy, planning, skills, supply chain, and regulatory aspects.



Barriers to Investing in Decarbonisation



Oxford Industrial Decarbonisation Project - Funding and Financing

Decarbonising Oxford will require novel funding and financing pathways

- Oxford's industrial sector is characterised by **dispersed small and medium-sized enterprise** (SMEs), numerous university spin-outs, few larger emitters, and clusters of energy users concentrated in business/science parks.
- To achieve Oxford City Council's ambition of net zero by 2040 will require substantial investment into the prioritised decarbonisation technologies to reduce the emissions from the variety of sectors in the cluster; including the key sectors of high-tech engineering, life sciences, and automotives.
- **Financing is defined as the act of obtaining or furnishing money or capital for a business**. Financing come from various sources, such as loans, lines of credit, and issuance of bonds and is generally utilised to supports the overall financial needs of a business, including day-to-day operations, expansions, and investments. Financing typically requires repayment through interest repayments or provision of equity in the business.
 - For this report, financing is considered primarily to derive from the private sector.
- **Funding is defined as money provided, especially by an organization or Government, for a particular purpose**. Funding is often related to specific projects or stages of growth. Funding is unlikely to be associated with interest repayments, instead it typically involves shared ownership of projects or other mechanisms to offer potential return to investors/Government.
 - For this report, funding is considered primarily to derive from local or national Government support.
- Supporting the landscape of complementary, integrated, and innovative decarbonisation solutions will require a mix of funding and financing solutions as industrials, technology developers, and financiers face a broad range of challenges to investing in decarbonisation.
- This report first lays out those barriers and then investigates the enablers and actions available to the industrial cluster to support different funding and financing solutions to achieve the clusters ambitions.





Decarbonisation technologies can recoup upfront expenditure through a variety of long-term operational cost reductions

For an industrial **the deployment of a decarbonisation technology is conventionally a balance between upfront expenditure and long-term cost reductions**. CAPEX is generally recouped through a reduction in OPEX – this could be:

- reduced fuel cost,
- reduced maintenance costs,
- reduced energy demand,
- less carbon liability/taxation,
- additional revenue generation, e.g. a green premium on products,
- business growth driven by greater customer attraction/retention due to green credentials,
- ongoing financial support from government business model contracts or tax/levy exemptions to support new technologies.

Industrial companies need to build this business case to convince internal decision makers to invest or seek investment. This has been demonstrated in Oxford by progress from companies such as Seacourt and BMW Group Mini.

Nevertheless, the key barrier remains the upfront CAPEX that many small businesses are unable to generate internally. Therefore, industrials are often dependent on external financing. However, this comes at an overall cost penalty due to interest repayments and financiers requiring projects/technologies to meet a range of criteria to consider investing.



Expected costs trends for decarbonisation options compared to incumbent technologies

(prioritised technologies)

Technology	CAPEX	OPEX
Electric Heating	2	7
Heat Pumps	7	2
Heat Networks	\rightarrow	2
On-site renewables	1	\checkmark
External renewable supply	\rightarrow	\rightarrow
Carbon Capture	\uparrow	7
Hydrogen Fuel Switching	7	7
Biofuel Switching	\rightarrow	7



What are the key barriers to funding/financing in Oxford? An industrial perspective

Scale

- Oxford's industrial landscape is predominantly characterised by SME industrials, with only a few larger industrial or aggregated demands such as science parks.
- Higher Costs for Small-Scale Deployments: Due to fixed procurement and installation costs, small-scale decarbonization projects are more expensive per unit of output compared to larger industrial sites.
- **Difficulty Achieving Economies of Scale:** SMEs do not benefit from the reduced unit costs seen in larger deployments, increasing the overall investment hurdle.

Upfront Capital Constraints

- Upfront capital remains a fundamental barrier preventing SME industrial investing in decarbonisation technologies.
- Limited Access to Capital: SMEs face difficulty securing the upfront capital needed for decarbonization technology investments. They rely on external financing like loans and grants, which are time-consuming to secure.
- **High Cost of Financing:** Private loans often result in long-term cost burdens due to interest repayments, making decarbonisation less attractive for SMEs.
- Lack of Large Capital Reserves: Business park landlords typically lack substantial capital to invest in existing properties, compounding the challenge for tenants.

Landlord-tenant Relationship

- Stakeholder engagement indicated many of Oxford's industrials utilise rental properties. This presents several barriers to investing in decarbonisation technologies.
- Split Incentives: Landlords are less inclined to invest in energy efficiency or renewable energy projects since tenants, not landlords, benefit from the cost savings.
- Short-Term Leases: Rental agreements of around 10 years often do not align with the longer payback periods of decarbonization technologies, discouraging both parties from investing.

Human Resources & Skills Gap

- As SMEs, most of Oxford's industrials lack a detailed understanding of the funding and financing solutions available to help decarbonize their operations.
- Limited Expertise in Funding: Many SMEs lack the knowledge and resources to navigate funding options or create strong business cases for decarbonization.
- **Time-Intensive Applications:** Government and private financing often demand significant time and resources, which SMEs may struggle with.
- Fragmented Landscape: The dispersed nature of SMEs, especially in smaller clusters, makes coordinating larger infrastructure projects difficult due to technical and commercial uncertainty.



What are the key barriers to funding/financing in Oxford? An investor perspective

Return on Investment

- Investors key metric is delivering a return on investment (ROI), or similarly a fast pay-back period. Without a strong ROI within a reasonable timeframe projects are highly unlikely to receive financing.
- **Emerging technologies:** Low carbon technologies often struggle to show a convincing ROI due to technoeconomic uncertainties in novel applications and rapidly evolving market conditions.
- **Robust business model:** A proven business model is essential to mitigate market risks and attract investment.
- **Fuel price uncertainty:** The business model for industrial decarbonisation technologies is often dependent on future fuel cost and carbon pricing projections that remain highly uncertain.

Scale of Opportunity

The value proposition of a project increases with scale. A higher return percentage on a larger investment is more attractive because it can better absorb overhead costs.

- **Uncertain market size:** Emerging markets and low adoption rates for new technologies can limit the demonstrable market scale limiting the investment opportunity.
- **Growth potential:** Demonstrating the potential for scalability is crucial to secure investment in a technology. New technologies often struggle to demonstrate this or the potential to unlock potential additional revenue streams.

Risk Management

Clear risk mitigation is crucial to enabling investment. Investors will expect risks related to many of the other criteria to have been identified and managed.

- **Technical risks:** Decarbonisation technologies are susceptible to technical risk with potential performance issues that could lead to cost overruns and delays. Similar challenges are seen in the deployment, operation, and maintenance of new technologies.
- **Market risk:** such as changing fuel costs or customer preferences, is another key barrier that Oxford industrials must overcome to attract investment.
- **Policy risk:** The UK decarbonisation agenda continues to evolve rapidly which can result in policy and regulatory risk that could impact a technology's investability.
- **Financial risk:** SME industrials are also likely to have limited creditworthiness from an investor perspective due to limited experience and capital capacity.



What are the key barriers to funding/financing in Oxford? A technology developer perspective

Technoeconomic Maturity

- A clear, reliable and tested business model is required to ensure the upfront capital investment can be recuperated through stable revenue streams.
- **Business model maturity:** For emerging technologies this is often reliant on projected cost reductions in both capital and operational expenditure to make a strong business case.
- **Technical maturity:** Low TRL technologies need to prove a technological pathway to commercial scale as well as a pathway to scale production and installation capacity.
- **Timelines:** Expected timelines for technical and commercial maturity often offput investors looking for faster payback periods.
- **Demonstration Opportunities:** Industrial sites can be hesitant to act as pilot sites/testbeds for developers to prove their emerging technologies outside of a lab/research centre due to technical risks.

Regulatory and Policy Landscape

- A favourable policy and regulatory environment, including both national and local government support, is crucial for innovative technology developers to bring their product to commercial maturity and markets.
- National focus: UK Government industrial decarbonisation policy is focussed on decarbonising the major hubs through the cluster sequencing program. This leaves Oxford, and other dispersed industrial clusters, with limited support for financing or delivering infrastructure to enable decarbonisation.
- **Regulatory clarity:** The regulatory environment can often delay the emergence of novel low-carbon technologies which without resolution can significantly impact the total market potential.

Scalability and Competition

- The ability of a technology or project to deliver returns requires it to either scale or be highly repeatable across sectors and sites. The emergent and dispersed nature of the Oxford industrial cluster is necessarily accompanied by some uncertainty in the scale and nature of the city's industry; this can make accessing the necessary scale to attract investment difficult.
- **Competitive Advantage:** The solution should be able to demonstrate advantages over existing and potential competitors in the market, delivering a unique value proposition to encourage investment.
- **Opportunity recognition:** This poses a barrier for technology, and especially large-scale infrastructure, providers that are unable to fully quantify the potential customer base for the decarbonisation technology.
- Expansion Potential and Replicability: Limited awareness of industrial customer base in Oxford makes it harder to qualify the potential to scale the technology to different industrial sectors and capture replicability benefits.



Investment Solutions

FUNDING AND FINANCING PATHWAYS AVAILABLE TO SUPPORT DECARBONISATION OF THE OXFORD INDUSTRIAL CLUSTER





Traditional private financing can support strong decarbonisation opportunities; blended finance provides additional risk mitigation

Private Investment

There are several key categories of classical private investment that could be available to industrials and low -carbon technology/infrastructure providers in Oxford¹:

- <u>Debt Financing</u> involves borrowing money from external sources with a commitment to repay the principal amount along with interest over time. Common examples for decarbonisation technologies include green loans, green bonds, infrastructure investment funds, and revolving lo ans.
- Equity Financing involves raising capital by selling ownership stakes in the company to investors, the investor then has shares in the company/project's profits.
- Seed Funding/Venture Capital is typically provided for start-ups and small businesses with high growth potential to develop their initial offering/technology in exchange for equity.
- **Bootstrapping** is a form of self-financing, where the company funds its operations using savings from existing revenue. This form of funding is unlikely to be applicable to many of the SME industrials in Oxford.

Blended Finance

- Blended finance reduces the risk for private investors and encourages them to engage and invest in the Oxford region.²
- One potentially important financing pathway to consider is the use of **public-private joint-venture (JV) partnerships to provide blending finance.** The partnership also allows the project to benefit from the skills, capacity, and connections of both the private and public bodies, enabling Oxford City Council to support projects through stakeholder engagement, planning, and consenting processes. Blended finance also offers potential for **revenue sharing, potentially providing the Cluster with a long-term income stream**.
- Similar mechanisms could also be important in enabling shared investment and revenue sharing between from landlords and tenants across Oxford's industry.
- The Aberdeen Hydrogen Hub is a strong example of this pathway, where Aberdeen City Council and bp have collaborated, under the JV of *bp Aberdeen Hydrogen Energy Ltd*, to develop and secure national government funding for a proposed electrolyser in the city to help decarbonise council vehicle fleet and bus emissions.¹



Decarbonisation-as-a-service and 3rd party investment can be used to overcome the critical barrier of upfront capital investment

- As-a-service providers remove any upfront capital costs, instead installing and maintaining the technology for an ongoing cost.¹ This is often enabled by financing for a technology developer to deliver the upfront decarbonisation technology.
- This innovative, turnkey financing solution allows smaller industrials to access decarbonisation measures without the requirement for large upfront capital investment or borrowing.
- A slight premium allows the technology developer to recoup its investment over time; the cost to the industrial can often include a fixed fee as well as a cost per unit delivered, for example per MWh of heat delivered by a heat pump.
- Several technology developers are investigating in this innovative business model to enable smaller industrials to decarbonise for example Clade is offering an innovate heat pump as a service solution² and several developers (e.g. Low Carbon Hub) have begun offering rooftop solar PV for industrial sites without upfront fees.
- An established example is the use of **Energy Saving Performance Contracts (ESPC)** as a financing mechanism for energy efficiency projects with no upfront capital costs. In an ESPC, the energy service provider designs, installs, and guarantees the performance of the measures before the industrial repays the provider from the gradual energy savings generated.³
- Other contractual mechanisms can allow industrials to avoid upfront capital investment by procuring low carbon solutions from other larger projects, such as renewable electricity PPAs, renewable energy tariffs, or green gas contracts.
- Large industrials or business parks may want to install heat networks or microgrids on-site. Investors support is necessary in large-scale low carbon infrastructure projects to navigate the requirement for significant CAPEX investment.
- 3rd party infrastructure providers could develop and fund large on-site infrastructure, with the industrial/business park tenants then paying for the final service of power/heat without managing the technology themselves. This reduces the risk for industrial sites and limits the technical demands on the site as operation and maintenance services are provided by the 3rd party developer.
- Investment is most likely to be recovered through fees charged to users of the new infrastructure. However, this relies on a customer base that are committed to the service before any investment decision or funding is delivered.



National and local government funding pathways can support specific targets

National Funding

- National government runs a large variety of funding programs for different industrial decarbonisation technologies. This funding can be categorised into two broad strands: innovation or deployment support. Current funding opportunities are limited due to the cycle of government funding; it is likely that new funding competitions will be announced in mid-2025, supporting the new Government's agenda.
- Grant funding competitions can help in **enabling the business case** for novel technology deployments and supporting the **techno-commercial development of innovative technologies**. Funding has been targeted towards technologies that need greater support; however, this has left behind a **gap for SME investment in energy efficiency technologies**.
- Funding can be provided via **upfront capital grants or through operational expenditure support**, this allows industrials to target the support they require. Funding is often requisite on a certain scale of energy/emissions or a minimum grant award, this may limit access for many of the smaller industrials in Oxford.
- Support is often secured through a competitive allocation process to ensure Government value for money, however this can place a large burden on industrials to complete detailed application forms without guaranteed support.
- One of the key funding umbrellas is the Net Zero Innovation Portfolio projects¹ which includes funding for competitions such as the Industrial Energy Efficiency Accelerator², the Industrial Energy Transformation Fund³, the Industrial Fuel Switching Competition⁴, and the Long Duration Energy Storage Competition⁵.
- Government also has ongoing operational support for novel technologies through business models for CCUS and hydrogen, however this has not been extended to electrification beyond the Energy Intensive Industries Scheme which gives exemptions to electricity levies .^{6,7,8} Government funding through the Green Heat Network Fund has been crucial in de-risking investments in heat networks.⁹
- Government also provides subsidies for smaller scale decarbonisation technologies across other sectors of the economy, e.g. heat pump subsidy, which could be extended to industrial decarbonisation technologies.

Local Funding

- Local funding could also play a key role in enabling industrial decarbonisation in Oxford, especially for smaller industrials that may not be able to access national funding.
- Tax Incentives and Rebates: City councils can make exemptions around business rates to make investments more feasible. This would likely only be available for SME industrials to avoid too big a fall in revenue for the council. Business rates relief could also be used to encourage local supply chain development and skills training by providing reliefs to technology developers/ installers in the city.
- Insetting: Oxford's area based insetting program could be used to support dispersed sites implement energy efficiency and decarbonisation technologies.¹⁰



Oxford Industrial Decarbonisation Project - Funding and Financing

 Net Zero Innovation Portfolio. 2 - Industrial Energy Efficiency Accelerator (IEEA): successful projects. 3 - Industrial Energy Transformation Fund.
 Industrial Fuel Switching Competition Phase 2: demonstration projects. 5 - Longer Duration Energy Storage Demonstration Programme; successful projects. 6 - Carbon capture, usage and storage (CCUS): business models. 7 - Hydrogen production business model. 8 - Energy Intensive Industries. 9 - Green Heat Network Fund. 10 - Future Fit Area Based Insetting (FABI). - Low Carbon Hub

Investment Enablers

BROAD CATEGORIES OF ACTIVITIES FOR THE CLUSTER TO UNLOCK DECARBONISATION SOLUTIONS



Oxford Industrial Decarbonisation Project - Funding and Financing

Investment capacity building via knowledge sharing, bid support, and match-making can underpin broad benefits for low-carbon investments

- Oxford's industrial community will benefit greatly from the ongoing development of the industrial cluster however there is a need for ongoing engagement, knowledge sharing, and support to enable the long-term decarbonisation of the dispersed, SME industrials.
- Many of the **smaller industrials in Oxford will have limited skills, knowledge, and resources available to identify potential funding and financing solutions** for decarbonising their operations. Many would also benefit from forums to engage with technology providers and financiers and support in making strong applications for investment.
- There are several actions the cluster could take to support the development of financial literacy and connectivity with the city's industrial ecosystem:
 - Provision of knowledge sharing platforms and financing education provide valuable opportunities for dispersed sites to better understand and utilise the options available. Develop case studies of successful projects to show to investors and industrials the positive outcomes possible from decarbonisation
 - The industrial cluster could also encourage engagement between industrials, technology developers, and financiers through matchmaking platforms for different technology solutions, including specific innovation forums to support emerging technologies to collect investment and identify early deployment/demonstration opportunities.
 - A signposting platform for key financing opportunities from local organisations, private capital, and government schemes would enable industrials to better identify the most applicable options for their plans.
 - Another key opportunity is for the cluster to support industrial sites in their applications for private finance or government funding. This could be through individual guidance, technical support, tendering templates for key technologies, or the provision of standardised materials demonstrating the advantageous aspects the Oxford industrial cluster can bring for investment in different projects.

Barriers Addressed: Scale of Opportunity Limited Human Resource & Skills

Technologies Supported: Onsite & Procured Renewables Heat Pumps Heat Network Electrification Alternative Gas

Funding & Financing Solutions Supported: Private Investment Government Funding



Financing partnerships can enable rapid and widespread investment in decarbonisation technologies across the Oxford Cluster

- The cluster could **partner with several different types of entities to accelerate the provision of finance for decarbonisation technologies** to industrial sites in Oxford.
- Within these partnership the cluster would be able to provide access to the local industrial ecosystem, raise awareness of certain technologies, and utilise the council estate to act as demand anchors for some technologies.
- Partnerships will crucially **increase investor confidence in projects/technologies**, share greater understanding of the industrial customer base in Oxford for different technologies, and support projects overcome any regulatory/policy barriers with the council on-side.
- Actions ideas:
 - **OCC could co-invest in key pieces of decarbonisation infrastructure** such as low-carbon gas production or an industrial heat network to reduce risk and support these complex projects through the development process, especially where the council's network and skill could be most beneficial.
 - The cluster could **partner with local organisations** (LEON, OxLEP, LCH) to collaboratively increase funding, capacity, and outreach through these organisations.
 - The cluster could **partner with tech developers** / **as-a-service business model providers to provide confidence to investors and industrials**.
 - The cluster could also **endorse providers for specialist solutions**, such as Puro Earth for high-quality carbon removal credits, allowing streamlined procurement for industrials.

Barriers Addressed: Investment Risk Limited Human Resource & Skills Regulatory and Policy Landscape Scalability

Technologies Supported: Heat Pumps Heat Network Alternative Gas Offsets

Funding & Financing Solutions Supported: Decarbonisation-as-a-service 3rd Party Infrastructure Investment



Local funding levers can capitalise on local resources to improve the long-term business case for industrial decarbonisation

- An enabler available to the Oxford Cluster is the provision of local funding by the council or private enterprises. In many cases, investment in key decarbonisation infrastructure and technologies in Oxford could result in long-term gains for the Cluster so should be viewed as a strategic investment. For example, developing a heat network may enable expansion on site parks with renewable heat retaining, and attracting, innovative, industrial SMEs in the Oxford area.
- Both the city and county council could improve the **business case for different technologies/industrials to support decarbonisation by providing business rate/tax reductions** for green technology companies or decarbonised industrials.
- Another local funding mechanism is the **trialled insetting mechanism** that could be extended to include industrial energy efficiency and small decarbonisation technology deployment.¹
- Local funding solutions, such as the Low Carbon Hub (LCH)², can help support the development of distributed, small-scale solutions. The cluster should continue to engage and back LCH and similar organisations to provide support for dispersed industrial sites.
- Action ideas:
 - **Consider co-investing/subsidising major infrastructure developments** (e.g. co-invest in an alternative gas production facility or subsidise grid connection upgrades for industrial sites)
 - Work with the insetting team to better understand opportunities to fund industrial energy efficiency/ decarbonisation projects through the insetting framework
 - Investigate the potential for business rate/tax reductions for technology developers/installers that set up in Oxford or industrials that implement certain decarbonisation measures

Barriers Addressed: Upfront Capital Constraints Return on Investment

Technologies Supported: Electrification & Renewables Heat Pumps Heat Network Alternative Gas Offsets

Funding & Financing Solutions Supported: Blended Finance 3rd party infrastructure investment





Demand aggregation can build a scalable business case and reduce investment risk

- Industrials, investors, and technology developers all benefit from aggregation of demand to reduce risk, benefit from replicability, and to build a scalable business case.
- Demand aggregation is the concept of **bringing together multiple small opportunities to create a larger demand profile across the cluster**. The diversity of smaller demands reduces the overall risk profile of the investment by providing a mix of sectors, business models, and removing the reliance on an individual industrial to underpin the investment case.
- Aggregation can enable the provision of numerous individual technology deployments, such as heat pumps or rooftop solar PV arrays, but can equally underpin larger investments that require economies of scale to reduce costs, such as low carbon gas generation or heat networks.
- Demand aggregation could also be utilised to access the scale required for contractual acquisition of renewable electricity or gases where market participants, especially for PPAs, are generally very large generators and consumers.¹
- Another pathway for enabling demand aggregation is zoning, a concept most prevalent in heat network deployment, where buildings within a certain area become obliged to connect to a heat network once available. Zoning could also be used to create scalable demand or opportunity for other technologies, such as identifying land/roofs to support renewable roll-out.
- Aggregation will depend on the establishment of the industrial cluster and be underpinned by the publicity and engagement campaigns to identify industrials across city. From that point the cluster could develop:
 - **Aggregation platforms for the procurement of low carbon energy** (PPA, green gas), potentially acting as an intermediary between the energy generator and the various industrial demands.
 - **Bulk buying programs for specific technologies** (heat pumps, rooftop PV) through regular procurement cycles or simplified tendering with preferred providers.



Barriers Addressed: Scale of Opportunity Investment Risk Limited Human Resource & Skills

Technologies Supported: Onsite & Procured Renewables Heat Pumps Heat Network Electrification Alternative Gas

Funding & Financing Solutions Supported: **Private investment 3rd party infrastructure development Government funding**

Portfolio development can overcome key investment barriers to source aggregated finance to underpin the Cluster's plans

- Development of investable project portfolios is the composite of several of the previous enablers; by
 aggregating demand from several technologies to be provided by a consortium of technology delivery partners
 the cluster could seek financing to underpin the cluster decarbonisation plan.
- Portfolio development goes one step further than aggregation by combining numerous technologies, technology developers, and potentially several financiers to reduce collective risk profiles. Portfolios can also balance profiles of more and less attractive projects to enable planning and investment in all viable decarbonisation solutions.
- Portfolio development support projects by offering larger investment opportunities and more predictable, stable returns for investors.
- Through **bringing together technology vendors** to provide solutions for a range of the industrial sites the cluster can **overcome many of the key scale, risk, skills, technical, and regulatory barriers**.
- Portfolio development can also **enable investment-side aggregation by incorporating funding from various investor groups to mitigate risk**. Blended finance from development banks, government, and investors can also offer technical assistance to help the cluster develop innovative risk-mitigating strategies.
- Action ideas:
 - **Early and continued engagement with the investor community** to identify potentially interested parties who could support portfolio development and understand key criteria for different financiers.
 - Set up an **internal ZCOP sprint group to investigate the potential for portfolio development**, drawing together different technologies and use cases outside the industrial sector
 - **Engage with previous examples of successful portfolio development**, from industrial decarbonisation or parallel sectors, to understand further barriers and actions



Barriers Addressed: Scale of Opportunity Investment Risk Limited Human Resource & Skills Regulatory and Policy Landscape Return on Investment

Technologies Supported: All

Funding & Financing Solutions Supported: Private investment 3rd party infrastructure development

Recommendations to Support Investment



Oxford Industrial Decarbonisation Project - Funding and Financing

Oxford Industrial Cluster needs to focus on key priorities to enable decarbonisation investment

Recommendation	Enabler	Funding/Financing Option	Barriers Addressed	Relevant Players	Relevance to Oxford
Aggregation platforms for key technologies (PPA, green gas)	Aggregation	Private Financing As-a-service	Scale	OCC, SSEN, new ZCOP intermediary entity	High
Match-making platforms for investors, tech providers, and industrials for different technologies	Capacity Building	Private Financing	Resources & Skills Gap	OCC, OG	High
Innovation forums to connect tech providers with investors	Capacity Building	Private Financing	Technoeconomic Maturity	OCC, OG	High
Develop government funding signposting portal to help industrials easily identify relevant funding opportunities	Capacity Building	Government Funding	Resources & Skills Gap	OCC	High
Partnerships with as-a-service business model providers	Direct Support (Partnerships)	As-a-service	Upfront Capital Risk Management	OCC, Tech Developers	High
Partner with local organisations/projects to increase funding, deployment capacity, and targeted industrial outreach	Direct Support (Partnerships)	As-a-service Local Funding	Resources & Skills Gap	OCC, LAEP, LEON, OxLEP, LCH, OxonCC	High
Early engagement with the investor community to identify interested parties who could support portfolio development and understand key criteria	Portfolio Development	Private Financing 3 rd party investment Government Funding	Scale ROI Risk Management	OCC, Investors	High
Set up an internal ZCOP sprint group to investigate the potential for portfolio development - drawing together examples from different technologies, uses outside the industrial sector, and previous successful portfolios examples	Portfolio Development	Private Financing 3 rd party investment Government Funding	Scale Resources & Skills Gap	OCC, ZCOP Partners	High
Bulk buying programs for specific technologies (heat pumps, rooftop PV)	Aggregation	Private Financing Government Funding	Scale Resources & Skills Gap	OCC, new ZCOP intermediary entity	High



There are a range of further recommendations that can further support decarbonisation of the Oxford Industrial Cluster

Recommendation	Enabler	Funding/Financing Option	Barriers Addressed	Relevant Players	Relevance to Oxford
Work with the insetting team to better understand opportunities to fund industrial energy efficiency projects through the insetting framework	Direct Support (Local Funding)	Local Funding	Resources & Skills Gap Upfront Capital	OCC	Medium
Investigate the potential for landlord-tenant co-investing and revenue/benefit sharing to accelerate decarbonisation	Capacity Building	Blended Finance	ROI Risk Management	OCC, Business Parks	Medium
Zoning for technologies to enable scalable deployments (e.g. solar farms) and establish demand (e.g. shared heat pumps/batteries)	Aggregation	Private Financing 3 rd party investment	Scale Regulatory Barriers	OCC, LAEP	Medium
Develop a standardised template for industrial to register interest / technology procurement with partner tech providers	Capacity Building	Private Financing	Resources & Skills Gap	OCC	Medium
Develop case studies of successful projects to show to investors and industrials the positive outcomes possible from decarbonisation	Capacity Building	Private Financing 3 rd party investment Government Funding	Risk Management	ZCOP Partners	Medium
Look at the potential for business rate reduction for technology developers/installers in Oxford that provide training for skills/supply chain	Direct Support (Local Funding)	Local Funding	Resources & Skills Gap ROI	OCC	Medium
Look at the potential for business rate reduction for industrials that implement certain decarbonisation measures	Direct Support (Local Funding)	Local Funding	ROI	OCC	Medium
Partnerships with reputable suppliers of emerging technologies (credits, etc.)	Direct Support (Partnerships)	Private Financing	Resources & Skills Gap	OCC, Tech Developers	Low
Consider co-investing in an alternative gas production facility	Direct Support (Local Funding)	Blended Finance	ROI	OCC, Tech Developers	Low



Appendix – Case Studies



Oxford Industrial Decarbonisation Project - Funding and Financing

Bristol City Leap is a prime example of portfolio development to support widespread decarbonisation

The Bristol City Leap Energy Partnership is a Joint Venture (JV) which aims to deliver around £500m of low carbon energy infrastructure over a five-year plan to 2028.¹

The project is a collaboration between **Bristol City Council** bringing local experience, **Ameresco's** knowledge of implementing decarbonisation as a service models, and **Vattenfall Heat UK's** technical expertise underpinning the technology deployment in the project.

Bristol City Leap is supporting the development of an extended **heat network in the city, but the framework also supports deployment of alternative solutions such as heat pumps, on-site renewables, and battery storage.**

As well as enabling sites to choose the optimal decarbonisation technology for their industrial processes this also **reduces the collective technology risk**, **operational risk**, **and socio-political risks by diversify the range of solutions** being invested in.

The program is all cross-sectoral, delivering decarbonisation for **industrial, commercial, residential, and institutional players.**

The funding mechanism also included a £1.5 million Community Energy Fund designed to aid Bristol's community energy sector by providing development finance and a further £500,000 Innovation Fund for research and development activities in the city.

The project has **led government to support pilot programs in four locations across the county investigating the potential to create portfolios to leverage private sector finance**.²





Private finance is increasingly supporting renewable energy developments similar to those that will be necessary in Oxford

On-site solar

Solar panels typically reach **breakeven in 6-10 years in the UK**, and with a lifetime of over 20 years therefore represent a valuable investment for industrial sites.

The payback period for solar PV depends on the **location**, type of panel, coupling with storage, energy usage, and the cost of the alternative electricity source.

During the energy crisis as electricity prices rose, solar PV could return investment in just four years. With energy costs still high and uncertain, self-generation can increase the security of supply for a site.

An installation at Novatech in Portsmouth recorded a four-year payback period, achieving cost reductions of over £50,000 per year.¹

Regardless, current solar installation costs are up to £1500/kW so represent a large upfront investment which many industrials may not be able to fund.

Local funding solutions such as the Low Carbon Hub can help support the development of distributed, small-scale solutions. Low Carbon Hub have supported Acro, a manufacturer of aircraft seating, to install a 200 kWp rooftop array to meet a third of their annual electricity demand.²

Solar farms

Oxford's industrial sites / business parks are unlikely to be able to produce enough renewable energy to meet their demand. Local renewable development could therefore play a crucial role in decarbonising industrial electricity demand.

Solar farms are increasingly attracting private financing. This can be in the form of funding for a specific project or support for a solar PV project developers' full pipeline:



Last year **Santander invested £25 million into a 50MW solar park in Dorset.** 100% of the power generated by South Farm has been purchased by the City Corporation, which has a 15-year power purchase agreement which provides reliable income for the project to borrow against.³



- A senior debt facility from NatWest, Lloyds Bank and AIB has allowed Low Carbon to develop three solar farms with a collective capacity of over 75 MW.⁴
- In May, Recurrent Energy secured a **multi-currency revolving credit facility worth up to £1.1 billion from ten major banks** providing flexible support to fund their project pipeline.⁵



Solar Together demonstrates the potential for aggregation to drive decarbonisation and unlock cost savings



The business model employed by Solar Together revolves around group-buying for solar photovoltaic (PV) systems and battery storage.

This model **aggregates demand from numerous homeowners and businesses to create collective bargaining power**, allowing participants to secure more competitive prices from pre-vetted installers.

Bulk buying is facilitated through reverse auctions, where vetted installers bid for the work, and the lowest bidder wins, ensuring cost efficiency without compromising on quality. The initiative also provides peace of mind by ensuring the installations come with insurance-backed guarantees and post-installation monitoring.

Applying a similar model to industrial decarbonization could yield significant benefits. By uniting multiple sites under a group-buying scheme, **industries can collectively reduce the cost of adopting decarbonization technologies** such as renewable energy generation, heat pumps, or energy storage.

This model lowers the barrier to entry, especially for smaller businesses, by reducing the level of site-specific research necessary and limits the upfront capital expenditure, while still ensuring quality control and standardized installation.

The program is **delivered by iChoosr, an independent entity in group-buying** which has been organising schemes with councils and other community leaders in the UK since 2012. **iChoosr's primary role is to support local authorities deliver the Solar Together program** and maintain the online platform and call centre. For every successful installation, **iChoosr receives a fee that is often shared with the local authority** to ensure continued financial support to promote the solution.



<u>1 - Group-buying for solar | Solar Together</u>

Appendix - Methodology



Oxford Industrial Decarbonisation Project - Funding and Financing

Research Methodology

- This report was primarily developed through literature review and analysis of existing case studies regarding funding and financing of industrial decarbonisation and similar investment problems.
- Stakeholder engagement was the second key strand of development, used to gather both local stakeholder knowledge, from organisations such as Oxford City Council, project partners, and external experts such as Low Carbon Hub, but also from further afield and by utilising ERM's internal expertise.
- Stakeholder engagement was performed in 1-on-1 interviews, group workshops, and through review of preliminary output.







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