OxFutures

Action on Energy

Final Public Report

November 2013 – November 2016

www.oxfutures.org

Solar roof at Osney Lock Hydro (credit: Low Carbon Hub)

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OXFORD CITY COUNCIL

low carbon hub

Co-funded by the Intelligent Energy Europe Programme of the European Union

OXFORDSHIRE COUNTY COUNCIL

OxFutures Programme final report: Action on Energy

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Executive Summary

Our Aim and foundation

The OxFutures programme, led by Oxford City Council, Oxfordshire County Council and key delivery partner, social enterprise, Low Carbon Hub, was funded by Intelligent Energy Europe to deliver around £18 million of investment into renewables and energy efficiency in Oxfordshire by 2017.

Driven by a recognition of the environmental, social and economic benefits of moving towards locally owned, clean energy generation, OxFutures has built on the pioneering work of Oxfordshire communities in trialling community benefit models for energy investment and explored new models for scaling up energy efficiency. The project has benefitted from Oxfordshire's strong foundations in supporting community groups and leadership in the low carbon agenda.

Our successes

Our energy efficiency trials have revealed good practice in community engagement and created a significant impact for the recipient households. However, community energy has emerged as the most resilient, compelling and sustainable model in our programme, and as such has dominated our pipeline.

At the time of writing £14 million of renewable and energy efficiency projects have been directly delivered through the Oxfutures programme. The projects save 3500 tonnes of CO2 per year and contribute nine megawatts of renewable generation to Oxfordshire. Another £12 million of projects are identified in our project pipeline. Many further renewable projects have been initiated by this programme and taken forward by private or public organisations themselves.

Partnership working by the project board has been a significant strength of this programme and has been resilient in the face of widespread policy change and significant financial uncertainty that continues to this day. We have successfully reviewed emerging risks and challenges and rescoped our programme to address these; ensuring the sustainability of our project pipeline.

Legacy

OxFutures has positioned Oxfordshire at the forefront of community energy in the UK. The programme and partners have received a number of prestigious awards recognising our success and the role of the EU in stimulating change.

In local government we have developed a better understanding of our ability to support and leverage this activity and the wider wealth generation potential this will offer for the County. We have a clearer idea of the emerging challenges that will benefit from continued partnership working; particularly around constraints to the local grid.

The OxFutures programme has been instrumental in supporting Low Carbon Hub to move confidently out of its start-up phase. The Hub has developed a sustainable income stream to support further renewable and energy efficiency development, and is well positioned to deliver projects in a post-subsidy environment.

Foreword by Jonathon Porritt

Serendipity: *an aptitude for making desirable discoveries by accident.*

Origin: *Serendip + ity (1754); Horace Walpole so named a faculty possessed by the heroes of a fairy tale called The Three Princes of Serendipity*

OxFutures has been a project that has had serendipity by the bucket-load! It's been hard graft, but the partnership between Oxford City Council and Oxfordshire County Council, working with the Low Carbon Hub, is a testament to what happens when people start collaborating seriously to make good things happen in the community.

It's been quite a journey. Back in 2011, when the Partners were negotiating with the European Commission, the world looked somewhat different. The low-carbon agenda was still supported by all political parties in the UK, and ambitions ran high for major new policy interventions on both energy retrofits and community renewables.

Five years on, domestic energy efficiency is now a mighty difficult nut to crack. There are now no programmes to help deliver loft and cavity insulation at scale in the UK; which means that powering down our energy usage remains a huge challenge.

We can, however, power up. Community-owned renewables have been an awe-inspiring success in Oxfordshire, and the community has gained some truly amazing assets – from micro-hydro on the River Thames, to any number of schools, businesses and rooftops now with their own PV arrays.

As I've been arguing for a long time, this kind of energy generation at the community scale shows that we're moving from a niche activity, run by hard-core pioneers, to a potentially disruptive force that can be tapped into by any community anywhere in the country.

The strength of a partnership like this (apart from facilitating all those serendipitous connections!) is that it can work across sectors in ways that make increasing sense to investors. The far-sighted decision by Oxford City Council (to make construction finance available as a loan to the Low Carbon Hub) provided the critical assurance that was needed, and the enthusiasm of Oxfordshire County Council in facilitating access to a range of schools across the county, to make PV a reality, was equally important.

I've watched this project unfold, leant my support at a number of events, and invested personally. I've been hugely impressed by what I've seen come alive in Oxfordshire, not least in terms of its impact on communities themselves, informed and empowered as they now are.

The real legacy will be for others to replicate this kind of work right across the UK – in a coming together of groups based in communities to own and provide for their own energy needs, and in so doing, to make a vital contribution to tackling climate change.

June 2016: Jonathon Porritt CBE, Environmentalist and Founder of Forum for the Future

Forward by OxFutures partners

Barbara Hammond: CEO Low Carbon Hub

"Our work over the last four years demonstrates that Oxfordshire's renewable energy resources can be developed democratically, by building new 'energy partnerships' between social developers, local councils, communities, schools and businesses. We are at a pivotal moment in the shift towards a new energy economy and our activity is helping to lead the way"

Councillor John Tanner: Oxford City Council Board Member for a Cleaner, Greener Oxford

"I'm really thrilled with the success of the project and what a boost this has given to community renewable energy in Oxfordshire. Thanks to EU funding and effective and innovative partnership working with the City Council, County Council and the Low Carbon Hub, we now have a wealth of community owned renewable energy projects in our local schools and businesses. This is great for the environment, for communities and for the local economy. There is no more important issue than climate change, and the OxFutures initiative has been a very positive step in addressing that issue".

Councillor David Nimmo- Smith: Oxfordshire County Council Cabinet Member for Environment

"I am delighted to see the scale of ambition and achievement in this programme, enabling Low Carbon Hub to demonstrate the contribution community energy can make to both energy security and the local economy. Low carbon goods and services already contribute £1.15 billion of sales per year to the Oxfordshire economy. With our mix of active communities, innovative businesses and committed local authorities, Oxfordshire is uniquely placed to lead as the global low carbon economy expands over coming decades."

1. Introduction: OxFutures – Action on Energy

The OxFutures programme was established under a grant from the Intelligent Energy Europe fund of the European Union. It is tasked to leverage around £18 million of investment into renewable energy and energy efficiency projects by 2017.

The programme is led by Oxford City Council and Oxfordshire County Council in conjunction with our principal delivery partner, social enterprise, Low Carbon Hub.

OxFutures builds on, and scales up, the pioneering work of Oxfordshire communities in developing new models for community energy generation and ownership: locally owned renewable installations that are funded and developed by and for the benefit of the community. It also tests new approaches to energy efficiency.

This report sets out our journey to a sustainable business model for community owned energy, not only across the four years of the OxFutures programme, but the foundations that underpin it, and the legacy it will create.

The report shares the evolution of our project, the elements that have been critical to our success and the wide range of learning we have gathered.

2. A Crossroads: The need for new direction on energy

In Oxfordshire, we are at a pivotal moment in the development of our energy system. The remaining major power station in the county, Didcot B will be shut by the end of decade. This will leave Oxfordshire a net importer, rather than exporter of energy; the source of our power increasingly out of sight, out of mind. Nationally the picture is the same; two thirds of our existing power stations will reach end of life by 2030[1].

Households, businesses and industry in Oxfordshire presently spend £1 billion on importing carbon-based energy every year[2] - money that is lost to the county to become someone else's profit. At the same time our businesses and communities are exposed to the changing politics and fortunes of distant commodity markets, and consequently significant risks around energy security and rising costs.

Fuel poverty remains a persistent and systemic challenge. Nationally 9,000 people died early in 2015 as a result of inadequately heated homes[3]. In Oxford rented households are at twice the national average. With high demand for rented accommodation, there is limited incentive for landlords to improve the energy efficiency of their properties. In rural areas 20,000 households rely on expensive polluting oil fuel for heating.

And Oxfordshire is growing. Oxfordshire needs around 5,000 additional homes a year to meet the need for affordable homes from now until 2031[4]. Without a change in approach we risk locking more households and businesses into the present inefficient energy system, in buildings that fail to optimise energy efficiency, connected to an inflexible grid that's currently ill-equipped to accept the output of the renewable technologies we will need.

Oxfordshire, along with many communities around the UK, is recognising the local effects of a changing climate; experiencing an increase in severe weather, notably increased flooding events. It reminds us that there is a both a global and local imperative, as well as an opportunity, to develop an economy free of carbon-heavy energy.

Didcot Powerstation, Vale of the White Horse

1 Smart Power, National Infrastructure Commission, May 2016
2 Oxfordshire Low Carbon Economy Report, Environmental Change Institute, University of Oxford, October 2014
3 Panorama "Too poor to stay warm" BBC 1. Broadcast 21 March 2016
4 Oxfordshire Strategic Housing Market Assessment: Key Findings on Housing Need; March 2014 GL Hearn Ltd

3. Vision: Partnering for a new energy system

In Oxfordshire we have a vision for a new energy future: a future where communities, businesses and the public sector 'power up' by developing renewable energy schemes and 'power down' by reducing energy use.

The rivers, woodlands and rooftops of Oxfordshire will become the power stations of the future. The revenue generated from this clean energy will be retained locally, funding work around energy efficiency and further investment in renewables, and exploring new sustainable energy models.

There are significant rewards to be had in embracing this vision: economic, social and environmental benefits for Oxfordshire and beyond.

Bure Park School at the launch of their PV array (credit: Low Carbon Hub)

4. The road to OxFutures: Low Carbon West Oxford

Three major flood events occurred in Oxford between 2001 and 2007 affecting a number of areas of the City and causing widespread disruption. West Oxford, especially the Victorian estate, Osney Island, located near Oxford station and surrounded on three sides by the Thames, was particularly badly hit.

West Oxford residents protesting during the 2011 floods (credit: Andrew Muddiman)

The 'double carbon cut' model

Seeing the effects of climate change on their locality added renewed impetus to the West Oxford community's efforts to tackle carbon emissions

In order to achieve a significant and sustained carbon reduction over the long term, they recognised that a predictable source of revenue would be fundamental; freeing them up from constant fundraising, and reducing their reliance on unreliable sources of grant income.

Developing renewable energy projects offered the potential to earn this revenue through the Feed in Tariff (Inset 1) and sale of electricity. It could also achieve a 'double carbon cut' - firstly from the generation of the renewable energy itself, and secondly from investing the profits into further low carbon living and behaviour change projects in the community.

Low Carbon West Oxford (LCWO), a registered charity, and its sister organisation, West Oxford Community Renewables (WOCoRe) were created in 2007 and 2009 respectively to deliver the model.

The organisations shared the same overall aim: to reduce West Oxford's carbon footprint by 80% by 2050. WOCoRe would develop and build renewable projects; raising finance through share offers and owning the installations (Inset 2). LCWO would receive the funds generated by WOCoRe for wider community benefit activity.

WOCoRe was breaking new ground and had gathered significant learning[5] on structuring the development of community energy and raising capital through community share offers. In 2011, a further grant[6], received by Oxford City Council allowed the creation of Oxford North Community Renewables mirroring the model in West Oxford, and the launch of Low Carbon Hub as an umbrella social enterprise with the mission to develop community energy across the whole of Oxfordshire.

[5] Low Carbon Living: How to make it possible: Low Carbon West Oxford 2010
[6] DECC Local Carbon Frameworks

Inset 1: What is the Feed in Tariff?

The Feed-in Tariff (FIT) is a UK Government incentive designed to encourage uptake of small-scale renewable electricity generation technologies, such as PV.

The FIT provides an incentive in 2 ways:

1. Generation Tariff: A payment for each kW of clean electricity an installation produces (even if it is all used on site).
2. Export Tariff: A payment for each kW of electricity exported to the grid.

The FIT has decreased over time, sometimes dramatically. Once an installation is accredited for the FIT, the rate is fixed at that amount for 20 years, increasing with RPI (retail price index).

Inset 2: The first West Oxford projects

In 2009 funded by grant[7] and prize money[8] as well as their first community share offer WOCoRe started work on five PV schemes; testing a range of settings to understand the process and business model for community PV.

The first 215kWp[9] of community solar PV in Oxfordshire

- 100kWp at Matthew Arnold School: At the time the largest PV array on a school in the country.
- 52kWp on the Aldi supermarket;
- 42kWp on The King's Centre, community building: The first rooftop PV project in the UK installed via third-party lease
- 10kWp on social housing owned by Oxford City Council;
- 10kWp on a local church.

The profits from the schemes were cycled back into LCWO Low Carbon Communities Scheme, engaging local residents on energy efficiency.

Solar PV array Matthew Arnold School (credit: Lois Muddiman)

[7] The Low Carbon Communities Challenge
[8] The Big Green Challenge by National Endowment for Science Technology and the Arts (NESTA)
[9] kWp defines the maximum possible output of a solar system under standard conditions

5. Oxfutures: Submitting the bid

Councillors and officers from Oxford City Council had tracked the progress and impact of this pioneering community work.

Seeing the potential to accelerate this model, a bid into the Intelligent Energy Europe, 'Mobilising Local Energy Investment' was developed with financial assistance from Oxfordshire County Council.

The overall vision of the OxFutures bid was to deliver a step change in renewable energy generation and energy efficiency across household, commercial and public sector estates in Oxfordshire.

We envisaged a number of pathways to deliver this; scaling up the community energy model, as well as exploring new models for domestic energy efficiency and large scale energy performance contracting on the public estate.

We would later adjust our focus away from energy performance contracting to place greater emphasis on the emerging success of community energy. A three year programme (extended to four years) was granted funding in 2012 (Inset 3).

Inset 3: Details of the Intelligent Energy Europe Funding for OxFutures

Funding	Fund 75% of a 1.5m Euro programme over three years November 2012 – 2015 (subsequently extended by a year to November 2016)
Partners	Oxford City Council, Oxfordshire County Council, key delivery partner; Low Carbon Hub
Objectives[10]	• To develop the OxFutures Fund, a fund for major energy development across the city of Oxford and county of Oxfordshire covering the following investment types: 1. Investment on the public estate. 2. Underwriting and start-up funding for community energy projects including installations on the public estate. 3. Community bonds to support domestic retrofitting for those in hard-to-treat homes or in fuel poverty. • To implement the business plan of the Low Carbon Hub, a social enterprise aggregating the market and organising investment into the market for domestic energy retrofitting and community-scale energy projects across the city of Oxford and the county of Oxfordshire • To enable investment in 4.5MW of renewable energy projects and 151 MWh of energy demand reduction on the public estate across the City and County by November 2015 (10m euro investment) • To enable investment in 8.2MW of community-owned energy projects by November 2015 (20m euro investment). • To pilot a programme enabling investment in whole house domestic retrofits by aligning Green Deal with Feed-in Tariff and Renewable Heat Incentive by Nov 2015

[10] The Objectives for our project have changed over time as set out throughout this report. This table shows the final set of objectives for the programme.

6. Low Carbon Hub Community Energy Financing Model

An early deliverable for the OxFutures programme was for Low Carbon Hub to set up the legal and financial structures necessary to scale up the model tested in West Oxford.

How does the Low Carbon Hub Community benefit model work?

Low Carbon Hub delivers community renewable projects in 2 ways;

1. Engaging directly with Landowners, businesses, schools and the wider public sector to manage projects to develop renewable energy on their land;
2. Supporting other community groups to develop similar projects directly; passing on knowledge around tendering; raising finance; leases and planning and supporting with development costs.

The Hub differs from a commercial developer in re-investing 100% of the surplus from their energy projects into community benefit activities.

The model works in a cycle creating a carbon cutting chain of benefits:

- The Hub develops, installs and manages renewable energy projects on businesses and the public estate.
- The Hub raises the finances through a community share offer so that local power is owned by local people
- Shareholders get long term ethical returns on their investment
- The "host" businesses and schools get discounted, green electricity and CO^2 savings
- The Hub gets a sustainable income from the feed-in tariff and electricity sales
- This income supports others in the community to deliver their own renewable energy projects or energy efficiency projects
- The community schemes generate further income to support local carbon reduction schemes

How is Low Carbon Hub structured?

The Hub is set up as two interacting organisations, both forms of cooperative (Inset 4).

Low Carbon Hub Industrial Provident Society (IPS)

Low Carbon Hub Industrial Provident Society is a not for profit social enterprise. Its main purpose is to provide core funding for Low Carbon Hub CIC by developing profit-making renewable installations.

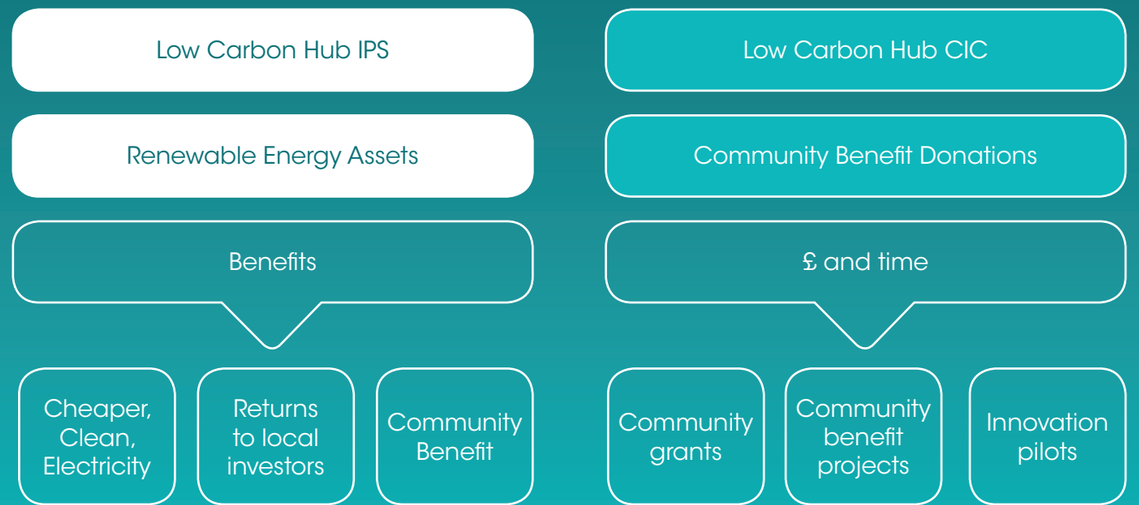
It raises the investment for, and is the owner of, the energy generation assets of the Hub. It has no staff or costs other than a maintenance contract for each installation. It passes its profits to the CIC.

Low Carbon Hub Community Interest Company (CIC)

The CIC employs a team of staff that manage the community benefit activity of the Low Carbon Hub. It also provides the manpower for the implementation and management of the IPS projects under a contract to the IPS.

The Low Carbon Hub CIC and IPS are both governed by a board of Directors. 25 community group partners have a shareholding in the CIC ensuring operations are transparent and fulfilling the community benefit objectives. One of these community members also sits on the board of directors as a revolving position.

Inset 4: The model of Low Carbon Hub



Financing and Loan facility

Pre-development finance

The OxFutures grant has acted as start-up funding for Low Carbon Hub; financing the pre-development stage of early projects (staff time, legal and professional costs).

As the model matures, this funding is replaced by the sustainable surplus created by income from the original installations.

Construction finance and the revolving loan facility

The projects in West and North Oxford had already demonstrated the potential to raise equity for long term finance through community share offers. However, raising money on a project by project basis would create delay and risk for the Hub. Businesses signing up to the scheme wanted to act immediately following signature on a lease, and there was a need to capitalise on the school holiday periods for builds on school sites.

To address this Oxford City approved a revolving £2.3m loan facility to Low Carbon Hub. The loan is used to finance the build. Once the schemes are built, they are then refinanced using the equity raised in a share offer. The capital is returned to the City Council along with interest of 5% across the loan period, a favourable return relative to other investments.

Case Study 1: Oxford Bus Company: Pioneering a community: private sector renewables partnership

Oxford Bus Company prides itself on delivering a low emission and low carbon service: 43% of the company's fleet is electric-hybrid, the highest percentage of electric in a bus fleet in the UK. They were interested in solar PV as part of their plan to reduce carbon emissions. However, with a payback period of 10 years, the business would have had to take a bus off the road to fund it.

Low Carbon Hub proposed a partnership. The Hub would develop, fund install PV on the roof space leased from Oxford Bus Company. The Bus Company would benefit from green electricity supplied to them at a discount and any surplus would be sold back to the grid.

In its first year, the project would generate £12,000 in funds for further community energy work through the Hubs community benefit model.

At 140kW, the solar PV installation on Oxford Bus Company's depot roof was, at the time of installation, the biggest solar PV scheme in Oxford. It was also the first partnership LCH entered into with a private business.

Oxford Bus Company has been a great advocate of their partnership with Low Carbon Hub. Through talks, site visits and the sharing of lessons learned, tools and templates, the bus company has gone on to proactively recruit more businesses for this ground breaking partnership model.

> *"It isn't just about our buses, it's about how we run our whole business. The Low Carbon Hub project was attractive to us because it had the right investment profile and a great payback to the community"*
>
> **Luke Marion, Oxford Bus Company Finance Director.**

Luke Marion, OBC, and Barbara Hammond, LCH, switch on the ground breaking array, Oxford Bus Company's green bus fleet (credit: Low Carbon Hub)

7. Community Renewable pipeline success

Of the types of projects we have piloted, community energy has proven to be the most resilient. In fact it has been such a strength that it has dominated our pipeline of projects and secured a level of investment in Oxfordshire's energy system that might not have been otherwise realisable.

Some of the highlights of the community energy programme are:

1. Thirty-three schools signed heads of terms in the first round of the Low Carbon Hub's solar schools offer – greater than many national programmes and significantly out performing other commercial offers.
2. Oxford Bus Company became the first commercial organisation to partner with Low Carbon Hub and a strong advocate of the Hub to other businesses.
3. In Autumn 2014 Low Carbon Hub raised £1.7m in its first share offer beating its target of £1.5m.
4. Over £4m / 3 MW of 'self-delivered' projects have taken place, triggered by Low Carbon Hub's work, but where the landlord eventually chose not to take a community benefit approach to financing.
5. The commissioning of Osney Lock Hydro in February 2015 (Case Study 2) was a major pathfinder project leading to significant learning and confidence in initiating further hydro schemes.
6. Projects led by the community directly have also seen significant success, not least gaining planning permission for Southill Solar farm (see page 20).

Case Study 2: Osney Lock Hydro, the first community-owned hydro on the Thames

Osney Island is a 200-household riverside community in west Oxford. Osney Lock Hydro was set up by a group of local residents to enable the first community-owned hydro scheme to be built on the Thames. The Hydro became fully operational in May 2015, generating clean electricity for the equivalent of 60 households, and an income stream for community projects for 40 years. This could be in excess of £2 million.

Low Carbon Hub supported OLH with legal and marketing costs, outreach and expertise to develop a community share offer in 2013 to raise the money to build the hydro. Over 200 people became shareholders in the scheme with 40% from within 1 mile of the project and 60% within the City.

The Archimedean screw turbine for the hydro allows sediment and fish to move downstream. A new fish pass, installed as part of the construction, allows fish to move freely up river for the first time in 200 years.

> *"Although the Osney Lock Hydro may itself only contribute a small fraction of clean energy to the national mix, it can have huge knock-on benefits in paving the way for community-led projects, raising awareness of the potential for renewables and capturing the abundance of currently untapped, clean, renewable energy available in the UK".*
>
> **Paul Spencer, Director, Osney Lock Hydro.**

Osney Lock Hydro (OLH), Credit: Oxford Mail

8. Map of our Projects

	Installation Name	Type	Size (KWP)	Lifetime Tonnes CO2 saved
1	Banbury Academy	Rooftop Solar	150	1125
2	Botley School	Rooftop Solar	43	360
3	Bure Park Primary School	Rooftop Solar	60	476
4	Charlbury Primary School	Rooftop Solar	24	182
5	Cheney School	Rooftop Solar	91	774
6	Chilton County Primary	Rooftop Solar	30	230
7	Edward Feild School	Rooftop Solar	16	126
8	Fir Tree Junior School	Rooftop Solar	35	246
9	Hook Norton Banbury Skip Hire	Rooftop Solar	50	400
10	Larkrise Primary School	Rooftop Solar	20	160
11	Middle Barton Primary School	Rooftop Solar	10	100
12	Nettlebed Community School	Rooftop Solar	30	226
13	Norbar Torque Tools Phase 1	Rooftop Solar	250	1840
14	Orchard Fields School	Rooftop Solar	100	758
15	Osney Lock Hydro	Hydro	50	3320
16	Owen Mumford	Rooftop Solar	141	1540
17	Oxford Bus Company	Rooftop Solar	140	1537
18	St. Barnabas School	Rooftop Solar	28	220
19	Stonesfield School	Rooftop Solar	34	298
20	The Cherwell School	Rooftop Solar	82	650
21	The Warriner School	Rooftop Solar	106	806
22	Thomas Reade School	Rooftop Solar	49	364
23	Warming Barton (16 houses)	Energy efficiency	-	643
24	Watchfield Sports Pavillion	Rooftop Solar	10	100
25	West Kidlington Primary School	Rooftop Solar	23	160
26	Wheatley Park school	Rooftop Solar	49	376
27	Windmill Primary school	Rooftop Solar	26	180
28	Oxford City council estate - energy efficiency	Energy Efficiency	-	3775
29	Barley Hill Primary	Energy Efficiency	-	552
30	Icknield Community College	Energy Efficiency	-	1596
31	Langtree School	Rooftop Solar	104	734
32	Sandford Hydro	Hydro	440	29000
33	Southill Solar	Solar Farm	4500	47440
34	Endeavour Academy	Rooftop Solar	30	229
35	King Alfred's Academy	Rooftop Solar	30	229
36	Long Furlong school	Rooftop Solar	30	232
37	Rose Hill School	Rooftop Solar	28	182
38	Sir William Ramsay Academy	Rooftop Solar	50	400
39	Wood Green School	Rooftop Solar	50	376
40	Prodrive	Rooftop Solar	636	5280
41	UTC Aerospace Systems CTG	Rooftop Solar	712	5940

9. Project Snapshots

Children at Botley School with their new PV array (Credit: Andrew Aitchison / ASHDEN)

Low Carbon Hub: Oxfordshire Solar Schools

The programme has had an impressive uptake. Schools have been motivated as much by the environmental and wider community benefits, as the cost savings and fully managed programme.

"The Hub cover the fundraising and installation costs, and all we do is get cheaper power and produce less carbon. We pay less and are able to learn more about being responsible citizens. It was an easy decision to make. With the children in the computer room we can look at how much electricity we're generating, so I can make talking about energy use real and base it on our own usage and production".

Ed Finch, Larkrise School, South Oxford

Developing plans for Southill Solar with a "brolly day" (Credit: Southill Solar)

Sustainable Charlbury: Southill Solar

Southill Solar is a 4.5MW solar farm that will create enough energy to power nearly all the homes in its 3 nearest parishes for 25 years.

Gaining planning permission for Southill Solar owes its success largely to the quality of community engagement led by Sustainable Charlbury with the Hub's support. Following an initial rejection at planning, 100 enthusiastic community members turned up on "Brolly Day" to mark out a new configuration of panels by holding colourful umbrellas. Photos taken at various angles demonstrated the significantly reduced visual impact of the new proposal. Evidence gathered on "Brolly Day" led to planning approval and receipt of the Landscape Institute's Landscape Planning award in 2015

"Our ambition has been to produce an exemplar community solar farm model, one that a community can call it's own. Southill Solar would have been impossible without the level of community involvement and support that we have achieved"

Tim Crisp, Sustainable Charlbury

Catherine Rohill, Barbara Hammond and Philip Brody on roof of Norbar Torque Tools (Credit:Low Carbon Hub)

Low Carbon Hub: Norbar Torque Tools Solar PV

The installation was Low Carbon Hub's largest business project at the time producing equivalent electricity to power 50 homes.

"One thing that struck me quite forcibly when standing on the roof of our factory looking at our scheme is just how much commercial roof space there is in Banbury (and no doubt every other town and city in the country) on which solar schemes could be placed. The added benefit of the Low Carbon Hub model is that approximately one third of the money generated from the installation funds further community projects in the local area…… It gives people a direct stake in moving to a low carbon economy." Catherine Rohll, Commercial Director, Norbar Torque Tools Ltd

10. Dealing with Difficulties: Energy efficiency

Early changes to our ambition on public estate investment

The UK's national austerity policy had a significant impact on our plans for the public sector energy efficiency pipeline. We had envisaged developing an investment vehicle based on a large pipeline of energy performance contracts on public estate buildings across the county.

Under austerity the nature of councils' investments in their estate changed. Many local authorities started planning for a smaller estate and, whilst they intended to continue to invest , they wished to retain flexibility in asset management. Private sector borrowing and long term contracts in the form of Energy Performance Contracts were less desirable. The City Council reduced its own office accommodation by 30% over this period.

Schools and academies, however, continued to be an area of the public estate with certainty over building life and were seen to have significant potential to engage with the community energy model, and energy efficiency pilots (Case Study 4).

Challenges leveraging Energy Company Obligation (ECO[11]) for domestic retrofit

Our domestic energy retrofit programme: Warming Barton, demonstrated the benefit of a strong community engagement approach when promoting household energy efficiency. The external wall insulation and other measures installed had a significant impact on resident's energy bills and comfort (Case Study 3).

Engaging with ECO to fund the scheme however proved extremely challenging to project delivery. The price for carbon (the mechanism for allocating funding within the scheme) was not stable, and the process for securing funding for the properties that most needed improvement required invasive assessments, driving up costs.

The funding available also fell well short of the levels required to bring about real change at the worst performing properties. Top-up funding was required from the Low Carbon Hub and Oxford City Council to enable completion. This made it impossible to roll out the pilot at scale.

Rescoping to our emerging strength

Whilst the challenges around energy efficiency were emerging, Low Carbon Hub was continuing to demonstrate the replicability of its community energy model with successful projects in North Oxford and with Oxford Bus Company.

Through dialogue and support from the EU, the OxFutures programme was therefore re-scoped to place greater emphasis on the growing community energy pipeline to deliver our targets.

[11]ECO is a scheme that requires the largest national energy suppliers to improve the energy efficiency of UK households, especially those with low incomes and/or hard-to-treat homes.

Case Study 3: Warming Barton

Barton, an area in Oxford ranked amongst the 10% most deprived neighbourhoods in England, was selected as our pilot location for domestic energy efficiency and helping address fuel poverty.

Originally owned by Oxford City Council, large parts of the estate consist of post-World War II steel frame pre-fabricated houses. Properties that have remained in council ownership have been improved. However, large numbers were purchased by individuals and families under the 'Right to Buy' scheme and remain unimproved. The very poor wall insulation leads to high fuel bills, poorly heated properties, and an adverse impact on residents' health and wellbeing.

Community engagement was a success: supported by ward councillors and key local figures the party started, literally, at the annual Barton Bash – a highlight in the local events calendar. Volunteers got chatting to local people about the potential to improve their homes and lower their energy bills. Follow-up included leafletting and a door-knocking campaign that targeted hard-to-treat properties. One hundred and nineteen households signed up and received a free energy efficiency assessment and advice on low/no-cost measures.

We took sixteen pilot homes forward as a 'package' to attract Energy Company Obligation funding for external wall insulation; calculated to save an average of £450 on each homes annual fuel bill. Barton resident, John Cavendish commented:

> *"The evening after the insulation had been put up the house was noticeably warmer… and we can sit in our lounge without a blanket over us!"*

While the improvements to the pilot homes were significant and the community engagement exercise was considered a huge success, there were real difficulties in securing sufficient funding. The issues working with the ECO funding were many and often compounding.

It was difficult to be an 'honest broker' – especially for properties that weren't a standard type – as we didn't know up front what we could offer residents.

On site surveys were needed for these properties in order to secure the maximum funding and even that needed a top up to avoid charging residents.

Unfortunately this meant we had to take the decision not to scale this part of the programme up as we wouldn't have been able to meet the investment targets set by the EU funding.

Case Study 4: Energy Efficiency in Schools

Schools and academies in Oxfordshire spend close to £7 million on energy each year. Over 20% of this cost is estimated to be from lighting[12].

Low Energy lighting is a maturing technology with a natural synergy with solar installations (being most in use at the times of day/year where the building is drawing the least energy from the solar). We worked with schools to explore the current drivers and barriers for uptake of low energy lighting, as well as piloting installations:

- The evidence of improved pupil concentration by moving away from fluorescent tubes should in itself create a strong driver for schools to upgrade lighting if economically feasible.
- Schools lack capacity both in time and expertise to fully assess the benefits of an LED scheme for their building. An independent, trusted third party is needed between the supplier and the school. This is a challenge in times of local government austerity and where more schools are becoming academies – independent from the Local Authority – and entirely responsible for their own buildings. Already half the annual schools energy spend in Oxfordshire is in academy schools.
- Salix (interest free funding for short-mid payback energy efficiency schemes) is a critical enabler for projects. The paybacks for the schemes we are developing range from 3 – 7.5 years.
- Lighting hours and fittings vary widely in a single school building and across the portfolio. It is difficult to extrapolate the potential for a large scale programme from individual sites or offer a single solution.

A number of schools installed lighting under this pilot. Rolling out a larger programme will be reliant on finding a sustainable model to fund independent third party advice. Under Salix funding management time can be added to the capital costs, however the degree to which full costs can be recovered whilst retaining a viable payback is a challenge.

[12]Carbon Trust "Schools Sector Overview CTV019"
https://www.carbontrust.com/resources/guides/sector-based-advice/schools/

Pupils at Middle Barton School with their Solar Panels (credit: Low Carbon Hub)

11. Factors for success

It has been possible to start this journey in Oxfordshire because we have a history of collaboration, as well as strong leadership on the low carbon agenda from both the community and local government.

Community Capacity

Oxfordshire benefits from significant community activity around carbon reduction. More than 36,000 volunteer hours were put into carbon reduction activity in 2015, reaching out to nearly 20% of the population[13].

Oxfordshire County Council has supported networking and capacity building amongst volunteer sustainability groups for over 15 years through the Community Action Group project (see Inset 5). The award winning network consists of 65 groups and is the largest of its kind in the UK.

Oxford is also uniquely home to a dense crop of experts in diverse fields from carbon reduction to financing. The involvement of these individuals in community environmental activity either directly, or through partnership activities, has made it possible to think and deliver "big" here; undertaking sophisticated and pioneering projects that can then be replicated by other groups.

There are also those in the community with funds to invest who have actively sought ethical investments and therefore have been in a position to support Low Carbon Hub's projects.

OxGrow CAG is a community growing project in the centre of Oxford (credit: Community Action Project).

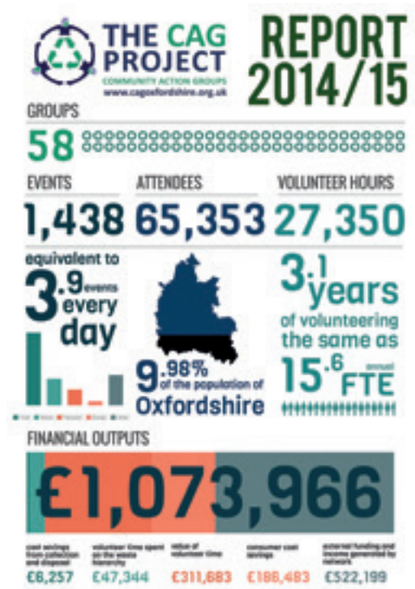
[13]Community Action Group 2015/16 Activity Report.

Inset 5: Community Action Group Project: Building capacity in Oxfordshire's grassroots sustainability groups

The Community Action Group (CAG) Project began in 2001, funded by Oxfordshire County Council, supporting volunteer environmental groups wanting to develop and drive forward waste reduction and recycling activity in the County. The project is delivered by Resource Futures (formerly The Recycling Consortium).

A handful of community groups made up the original network in 2001. This has grown to 65 in 2016 with groups undertaking a broad range of projects; ranging from local food, sustainable transport, through to energy efficiency and community renewables. The project employs three staff to grow, support and build capacity in the network.

The project has created a unique peer-reviewed modelling tool that measures the impact of community led environmental activity. Resource Futures recently received funding from Department for Environment Farming and Rural Affairs (DEFRA) to further develop the model for free use by other community projects and local authorities. The new tool, Resource Community Impact Tool, will be launched UK wide in November 2016.



Extract from the Resource Community Impact Tool

Leadership around the Low Carbon Agenda

The priority given to reducing carbon emissions by communities around Oxfordshire provides a strong mandate for the public, private and third sectors to show strong leadership too. Both the County and City councils have a strong track record on reducing carbon emissions from their own estates.

Oxford City Council has received awards for implementing its own carbon management plan. But it recognised early on that, as it only represented 1% of city emissions, working in partnerships would be essential for progress. Working with the Oxford Strategic Partnership, the City core-funds Low Carbon Oxford as a collaborative mechanism for organisations to share their knowledge, showcase their achievements, and work together to realise greater carbon emissions reductions.

Inset 6: Low carbon leadership through Low Carbon Oxford

Low Carbon Oxford comprises over 40 organisations based in and around Oxford from across the sectors. Its activities include: networking events themed around the latest developments and opportunities for sustainability; intelligence sharing through case studies and small group activities; commissioning and delivering research and analysis to help inform the transition to a low carbon economy; and, working on opportunities for members to collaborate on projects.

The ideas for the OxFutures programme stemmed from Low Carbon Oxford meetings and it was through Low Carbon Oxford that the funding stream was identified. Pathfinders Oxford Bus Company were the first business to host a community energy solar installation delivered by Low Carbon Hub and have been strong advocates of the Hub and the OxFutures programme locally.

As set out in a report commissioned by Low Carbon Oxford, Oxfordshire County Council and the Environmental Change Institute at the University of Oxford, low carbon economic activity accounts for 7% of Oxfordshire's economy: around 8,800 jobs and 570 businesses. Low Carbon Oxford aims to facilitate the growth of that sector and bring the benefits of low carbon innovation and operations to businesses, the public and third sector in Oxford and Oxfordshire.

Signatories from across the City with the Oxford Low Carbon Charter (credit: Oxford City Council)

Strong partnerships and the Board

The merits of partnership working, such as avoiding duplication or maximising efficiency and benefits, are often voiced but much harder to achieve in practice. It isn't always easy for partners to come together. This is especially true where they have different strategic drivers and pressures to respond to, for example the city and county councils, or where one partner operates on a different scale or pace; such as the councils as compared with the Low Carbon Hub.

Effective partners must challenge one another to live up to their goals and aspirations. This can mean having some hard conversations. They must understand and support one another. They must be self-reliant, but enthusiastic and committed to shared objectives.

Our project board was comprised of Oxford City Council, Oxfordshire County Council and the Low Carbon Hub. We are pleased to say that despite a rapidly changing policy context, we managed to find strength in working together. We believe the characteristics that enabled this were:

- the drive of the individuals involved from each organisation;
- a clear idea of what we were trying to achieve and belief in that vision;
- a willingness to challenge ourselves and operate outside of our comfort zones constantly; the partnership was relentless but flexible
- flexibility to support one another (which can be as simple as moving a meeting to a more convenient location);
- patience;
- regular, informal catch ups with the programme manager helped to maintain a shared understanding of progress and all partners' interests;
- not shying away from difficult issues from the start – in particular with this grant that meant acknowledging how we would deal with any claw back of the funding;
- strong senior management support to back up the day to day efforts of the team;
- councils willing to take on managed risks.

When the goal is to deliver a change we inevitably bump up against barriers that are there for a good reason. Dealing with those is part of the job and having good partners to help makes it a lot easier.

Archimedes Screw at Osney Lock Hydro (OLH)
(credit: Andrew Aitchison /ASHDEN)

12. Lessons learnt

The story of OxFutures across the last three years has been one of ongoing learning. We have experienced many external challenges including:

- Dismantling of much of the low carbon policy framework that had supported renewables and energy efficiency
- Emergence of constraints to the national grid in Oxfordshire limiting the size and timing of our renewable installations
- The impact of local government austerity causing us to reduce our emphasis on the public estate
- The falling cost of PV – which although advantageous in terms of payback period on one hand, has conversely meant that we have also had to deliver a greater number of projects to meet our targets[14].

Our premise that access to funding would be the major challenge in this programme has not proven to be the case. Low Carbon Hubs' work in getting "contract ready" and ensuring they had the correct legal and financial structures in place has paid off in this regard. A greater challenge has been supporting the decision making processes of the large number of stakeholders involved in leasing their roofs/ land or playing a supporting role in the development of schemes.

Our early ambition that domestic energy efficiency would account for a large part of our overall programme was ultimately impossible to deliver. Despite best efforts and some good practice and delivery in our pilot schemes, limitations of the present UK funding regime in this area make it impossible to deliver a powering down programme at any scale.

The partnership has responded admirably to the risks experienced during the programme, changing approaches and direction and actively seeking and prioritising those areas emerging as strengths. We have learnt lessons, both specifically about EU funding, and more widely about the unique considerations of pioneering energy programmes.

[14]Data based on the solar schools programme quantifies this. For the first tranche of schools an investment of £1.06m was been required to deliver each megawatt. This is nearly 54% of the anticipated cost per MW and so nearly twice as much capacity is needed to meet the expected investments from solar.

12.1 Our learning: Working within EU programmes

Use available lead in time

Our experience:
We started our project immediately after the grant was agreed meaning we spent much of the early part of the project undertaking set up activity, rather than delivering on targets.

Our advice:
If you can, delay your kick off by six months – bring on board key stakeholders, promote the objectives of your programme widely, and give yourself time to put the correct resourcing in place.

Be realistic about your third party costs

Our experience:
Our estimate of legal, financial and technical costs turned out to be insufficient.

Our advice:
Whilst previous experience of developing roof leases and other legal agreements can reduce costs to an extent, no two agreements are the same and therefore legal advice will remain a significant cost.

Understand how you will deal with abortive costs

Our experience:
A major challenge of this programme has been the engagement and decision making process with multiple stakeholders. If not managed carefully, this can lead to abortive costs that cannot be covered by the grant. An example of this is the work the Hub carried out with Church of England schools. Fourteen heads of terms were signed, but governance and legal issues could not ultimately be resolved leading to abortive costs. Additionally several large business installations initiated and developed by the Hub were later taken on as commercial ventures by the business itself, and therefore could not be formally allocated to our programme.

Our advice:
The EU may wish to consider its position on abortive costs for future rounds. Greater flexibility in framing and accounting for costs, i.e. treating funding like a start-up investment in business would be more appropriate for this kind of project.

Partnerships should consider how they will deal with abortive costs, and gateways should be put in place to ensure these are reduced.

Engage a dedicated programme manager from the outset

Our experience:
Continuity of a dedicated, skilled programme manager has been a critical part of our success.

Our advice:
Negotiating and running an EU programme is complex and will require dedicated resource. A programme manager will allow you to better deal with risk, have a better dialogue with Europe and give other project partners more space to deliver the operational elements of the project

Managing a budget in Euros

Our experience:
The exchange rate variation meant it was difficult to forecast both budget and spend as both varied on a month by month basis. Towards the end of the project, we experienced significant changes to the £/euro exchange rate substantially increasing the investment target we needed to meet.

Our advice:
Consider exchange rate implications for your monetary target and forecast a range of exchange rate scenarios to keep the Board appraised of exchange rate risks. If possible have your target agreed in the local currency, or as a MW target instead.

12.2 Our learning: Pioneering energy programmes

Actively consider your resilience to policy change

Our experience:
We experienced significant policy change around both energy efficiency (the end of Green Deal and changes to ECO) and renewables (the dramatic reduction in Feed in Tariff support for solar and end to pre-accreditation). We were able to deal with these changes because of our strong governance structure and the breadth of our project portfolio. We also benefitted significantly from Low Carbon Hub's ability to mobilise quickly allowing them to pre-accredit many schemes in the window before the policy took effect.

Our advice:
Creating a diverse portfolio of projects provided us with some resilience to policy change. It is worth acknowledging however that with a diverse portfolio comes an increase in abortive costs. Actively horizon scan for risks and create a long term vision that will move you beyond government incentives even if they are necessary now.

Understand risks around grid connection

Our experience:
Problems connecting local generation to the grid increased during the life of our programme. Prohibitive connection costs led to down-sizing and abandoning of projects and associated abortive costs.

Our advice:
Create a critical path that ensures grid constraints are considered early on. Work to raise awareness of the constraint highlighting it in local infrastructure plans and engaging the District Network Operator in considering solutions i.e. export limiters. It is also important to keep abreast of demands others are making on the grid; with hindsight we could have foreseen some pressure in capacity from our knowledge of several large schemes in development.

Solar roof at Norbar Torque Tools, Banbury (Credit: Low Carbon Hub)

13. Recognition, Communication and Sharing

Low Carbon Hub, alongside Oxford City and Oxfordshire County Council, have cemented a national reputation as partners at the forefront of community energy delivery (Inset 7).

Barbara Hammond (CEO of Low Carbon Hub) has influenced local government policy through the chairing of DECC's Hydro working group, and encouraging the production of a national Community Energy Strategy[15]– published in 2014. In 2015 Barbara received an MBE (Most Excellent Order of the British Empire) for her services to community energy in Oxfordshire.

The programme has gained the attention of a wide range of stakeholders; community groups, local and central government, think tanks, universities and more. We have responded directly to enquiries from peers across the UK and other EU countries, and shared our learning more widely through our 3 conference events (Inset 8).

Inset 7: Recognition for OxFutures and Partners

UK Ashden Award for Sustainable Communities 2016: Low Carbon Hub

Most Sustainable Public Sector Organisation in the Public Sector Sustainability Awards 2014: Oxford City Council

Local Authority Partner of the Year in the Community Energy Awards 2014: Oxford City Council

Best Community Project 2016: Oxfordshire Community Voluntary Action Award – Community Action Group project (funded by Oxfordshire County Council)

Barbara Hammond (CEO Low Carbon Hub) awarded MBE in 2015 New Year's Honours list

Shotlisted for Lifetime Achievement Award at Oxfordshire Community Voluntary Action Awards 2016: Community Action Group (funded by Oxfordshire County Council)

Short-listed for Best Renewable Energy and Energy Efficiency Project at the APSE Awards 2015: Oxford City Council

Shortlisted for the 2014 and 2015 Observer Ethical Awards for Community Energy Project: Low Carbon Hub

Shortlisted for Community Energy in the Ashden Awards 2015: Low Carbon Hub

Shortlisted for 2Degrees Social Value award 2014: Low Carbon Hub

[15]https://www.gov.uk/government/publications/community-energy-strategy

The conferences have played an important role in building the profile of our work and maintaining a dialogue with decision makers locally. PoweringUP was organised as a joint event between DECC and OxFutures, and created significant momentum around community energy nationally.

As part of our communications approach we have also developed "The People's Power Station" as a legacy tool to demonstrate the contribution 'positive energy' is making to Oxfordshire.

The online, live generation tool is populated with data from the Low Carbon Hub's portfolio as well as a number of additional community and council owned installations.

As the project develops Low Carbon Hub will plug in more renewable energy generation to show the growing impact of local energy to help meet our energy needs.

The ultimate aim is to work with everyone across Oxfordshire to plug in all renewable generation across the County.

Inset 8: The OxFutures conferences

The launch event for OxFutures in January 2014 was attended by around 200 local influencers from business, the public and third sectors. It explored the benefits of the low carbon economy to Oxfordshire and practical steps to scale up activity and investment. It created a real buzz around the programme and resulted in pledges from businesses and funders to collaborate with us.

ACTION ON ENERGY

This joint national conference between OxFutures and Department of Energy and Climate Change (DECC) followed the launch of the community energy strategy in January 2014; exploring challenges and developments in this sector. Secretary of State Ed Davey addressed the conference which was attended by 200 participants. Following on from the success of the event, a sister event PoweringUpNorth took place in Manchester following the same format.

POWERING UP!
Thursday 4 September 2014 - Oxford Town Hall

Attended by 150 participants Energising Oxfordshire, in July 2015, celebrated the range of projects now in operation and sought to engage new partners for the next phase of installations.

Energising Oxfordshire

14. The legacy of OxFutures

Through Low Carbon Hub, communities in Oxfordshire now have the tools, experience and support to develop and operate local renewable projects that will generate clean energy and income over the next 25 years.

Schools and businesses are able to partner with the community to choose cleaner, cheaper power without having to divert resource from their core business activities.

Low Carbon Hub has moved out of its start up phase with a pipeline of projects valued at £12 million. The sustainable income stream into the CIC has fulfilled the Hub's goal of creating a system for change that starts to move beyond dependence on motivated, volunteer individuals.

Recent changes to Feed-in Tariffs have led to discussions over the future financial viability of community energy. Low Carbon Hub remains confident in its ability to adapt to these changes. Optimal site selection, power purchase agreements, maximising on-site use of the electricity generated and falling technology prices will be important factors in continuing viability.

The Hub's 2016 Manifesto[16] sets a strong and optimistic vision for the next steps in the transition to a renewables based economy in Oxfordshire.

In local government we have developed a better understanding of our own ability to support and leverage this activity and the wider wealth generation potential this will offer for the County. Oxfordshire already has the foundations of a thriving low carbon economy. An ambitious low carbon investment programme over the next 15 years could add £1.35 billion annually to the Oxfordshire economy by 2030, and create over 11,000 new jobs[17].

The programme has raised awareness across our organisations of the collective challenges we continue to face on this journey; particularly, exposing capacity and constraints on the Oxfordshire grid, and the potential for further joint working on solutions such as smart grids and storage that will be necessary in coming years

Background shows Saïd Business School Fieldwork Facility, Oxford

[16]http://www.lowcarbonhub.org/manifesto
[17]Oxfordshire Low Carbon Economy Report: Produced by Oxford University and funded as part of Low Carbon Oxford by Oxfordshire County Council and Oxford University

Further Reports

This report: "OxFutures Final Public Report" forms part of a set of three public documents documenting our programme:

OxFutures Final Public Report
OxFutures: Report on Contracts
OxFutures: Report on Financing

Reports are available to download at www.oxfutures.org

We would like to acknowledge the following people for their support of our programme:

Project Board

Mairi Brookes: Sustainable City Team Manager, Oxford City Council

Jo Colwell: Environmental Sustainability Manager, Oxford City Council

Tim Sadler: Executive Director Community Services, Oxford City Council

Lyndsay Cane: Legal Services Manager, Oxford City Council

Nigel Kennedy: Head of Finance, Oxford City Council

Barbara Hammond: Chief Executive Officer, Low Carbon Hub

Robin Rogers: Strategic Infrastructure & Planning Resources Manager, Oxfordshire County Council

Sarah Gilbert: Energy Strategy Officer, Oxfordshire County Council

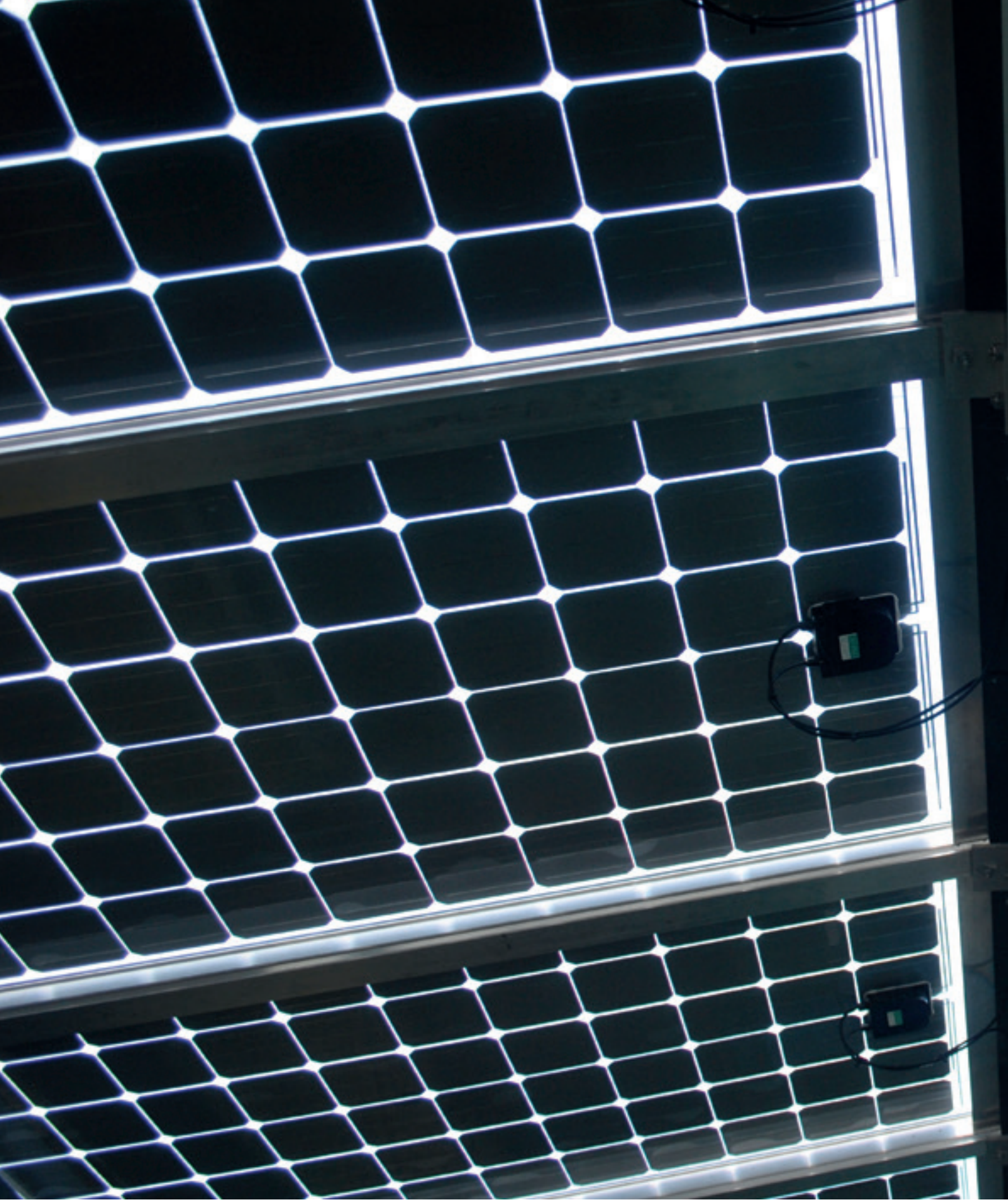
Bev Hindle: Deputy Director Strategy and Infrastructure Planning, Oxfordshire County Council

Former Project Board members

Nick King and Tom Flanagan (formerly Oxfordshire County Council)

And the many colleagues from across our partnership and the community who have worked on, driven and supported the projects and events that have been delivered for the OxFutures programme.

Particular thanks also goes to the Community Energy Team at the Department of Energy and Climate Change for their support towards the Powering UP! conference.



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OXFORD CITY COUNCIL

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Co-funded by the Intelligent Energy Europe Programme of the European Union

OXFORDSHIRE COUNTY COUNCIL