North Tyneside Council drives operational efficiencies with low carbon redevelopment of its Killingworth Depot

North Tyneside Council
Wednesday 24 April 2024

Summary

North Tyneside Council is committed to delivering net zero by 2030 yet like many councils has a large and complex estate that it will need to decarbonise. One of the council's most carbon intensive sites historically is its Killingworth operations depot, a Grade II listed site. In recent years, the site has been comprehensively redeveloped, delivering 61% carbon reductions, while it has also allowed the council to consolidate its operations depot provision ensuring that the sites legacy continues.

Councillor Sandra Graham, Cabinet Member for the Climate Emergency, says:

"North Tyneside Council has clear and ambitious targets for reducing our carbon emissions, including an aim to be Carbon Net Zero by 2030. As Cabinet Member for the Climate Emergency, I am proud of how innovation at the Killingworth Site is helping us to meet our targets.

I am very clear in acknowledging the impact global economic pressures are having, and I'm pleased with what we're achieving, despite competing financial priorities. In fact, projects such as our work on the Killingworth Site help to mitigate against the volatile price of energy through generating our own power by use of solar panels on our roofs and solar car ports, which also help to charge vehicles in a sustainable way.

The transformation of the Killingworth Site into our flagship exemplar is indeed a footprint for the future. We have showcased its development and operation to many local and regional organisations who have asked to learn from us. We expect that to continue as we strive forward in the site's development as the potential location for a mine water heat network energy centre.

The savings in carbon emissions are testament to the holistic approach we have adopted for our built assets, and we are excited for the benefits this new approach could bring to our wider estate as opportunities arise".

The problem

Creating a sustainable borough is a priority for North Tyneside Council and is a key policy commitment of its Elected Mayor and Cabinet.

Since declaring a climate emergency in 2019, the authority has made huge inroads in reducing its carbon footprint through a range of initiatives. The Authority's Net Zero Action Plan covers 10 workstreams with 150

actions being progressed.

The authority's Killingworth Site Operations Depot was originally a National Gas Council Engineering Research Station. The authority purchased the site in 1995. The depot was the highest heat and energy consuming site within the authority's asset portfolio. The authority uses consumption data from 277 sites in its carbon reporting. The Killingworth site has reduced its emissions by 1,072,000 tCO2 (61%) since the base year 2010/11. The site used to make up 13.82% of emissions in 2010/11 however as of 2022/23 only makes up 6.67%, compared to the council's 24 major operational buildings.

The site is around 7.5ha. in size and is a mix of Grade II* Listed buildings including office accommodation, training facilities alongside other operational space including fleet workshops, welfare facilities, external storage, fleet car parking and bike storage areas.

The listing status of the substantive building asset Block A, including its age and the construction fabric of the building did present some challenges to introducing some of the proposed measures. Making fabric improvements was difficult as it was not possible to change some elements such as the single glazed ribbon window which runs at first floor level around the substantive perimeter of the building.

The solution

The project aimed to enable the council to rationalise its operational depot provision, which was previously delivered from several locations, into one unique low carbon building.

The aim for the Depot Project was to deliver an exemplar retrofit project incorporating fabric first design, energy generation and low carbon technology integration. Using sustainable urban development funding the project aimed to deliver a low carbon, energy efficient and renewable future for the depot including upgrades to office accommodation, workshops, welfare and other facilities on the site. In doing this particular focus was placed on future-proofing its operation, energy efficiency and functionality using a range of energy efficiency products, alongside energy generation and energy storage solutions. Key interventions include:

- Optimising the building heat supply with heat pump technologies*.
- Utilising other efficient heating systems, such as electrified radiant heat in storage areas.
- Rooftop and carport photo-voltaic arrays (circa 2000 panels delivering 850KWp generation).
- Battery energy storage in conjunction with both rooftop and carport arrays.
- Electric vehicle (fleet & staff) charging points (as part of solar carports and wider infrastructure).
- Internal and external energy-efficient LED lighting.
- Below ground ductwork infrastructure to support an integrated energy network to allow optimum efficiency, generation, storage and distribution.
- Intelligent electrical circuit design including smart sub-metering and building management system which will holistically manage all of the energy systems to a single integrated hub.
- Upcycling and re-wiring some of the original light fittings to retain as much as possible of the building heritage.
- Installation of heat recovery system in large roof-based plant rooms.
- Upgrading the building fabric to ensure thermal and insulation benefits are fully realised as part of the refurbishment programme.
- Water saving technologies and systems will also be integrated into the project including waterless urinals.

*In terms of heat pump technologies, the site has been identified as the primary location to house an energy centre associated with the development of the Killingworth Heat Network scheme. This scheme is designed to provide heat to the council buildings on site as well as other public sector buildings, local social housing estates, and some local commercial and industrial sites. The heat source will be derived from existing mine water galleries directly below the site so ground source heat pumps will predominate and be supplemented by air-source heat pumps if needed. This scheme is currently at the Detailed Development Stage.

Timeline

The project was the culmination of a 2 year feasibility study into the rationalisation of the council's depot estate which then resulted in cabinet approval in January 2018 to both commence the project and bid for ERDF grant funding. There were several key project elements which were delivered over a five-year period from an initial £2M Block A asbestos remediation project completed in 2019 to the refurbishment of the Block F fleet workshops in 2023. With several key project milestones in between including the installation of Solar PV, Battery Storage and EV charging.

The project timelines had to be adapted and extended, as a result of global factors outside the council's control, which slowed down the construction sector and pushed build costs upwards.

Stakeholders

The key stakeholders in this project were the council's mayor and senior leadership team, in-house council services and external partners. Collaboration between all stakeholders was critical, and to support this an extensive internal governance framework with a depot board was established to oversee all aspects. This was chaired by the council's deputy mayor.

There were 16 main stakeholders involved throughout the project. The majority of these were internal services including the Environmental Services and Housing Repairs teams. External partners included Capita and Enerveo. One of the key challenges throughout the project was the fact the site was an operational depot, so all works had to be delivered whilst ensuring minimal impact on the day-to-day service activities.

Impact

Since completion, initial key performance data indicates:

- 1,878,172 kWh (56% against the counterfactual) decrease in annual primary energy consumption of public buildings
- 547 tonnes CO2e (51% against the counterfactual) estimated annual decrease of GHG.

Further reductions in consumption and emissions are anticipated as understanding of the overall energy use across the site increases.

The project supports the following key service delivery aspirations:

- Climate Emergency Action Plan and reducing climate change impacts
- Local supply chains
- Local economy
- Building local resilience to future energy price shocks

Some of the refurbished depot site has also been rented out to external partners, securing the efficient use of the Council estate, as well as an additional income stream.

Lessons Learned

Workshops were undertaken with all members of the project team to consider what could have been improved. This identified that for long projects which span several years consideration needs to be made for:

- Allowance for inflation in capital project budgets spanning over several financial years.
- Greater allowance for risk and contingencies when refurbishing existing complex assets.

Opportunities were also identified to improve internal processes between the various project teams to improve cross-working which it was identified would help to ensure:

- Project milestones and outputs were met.
- Performance against indicators outlined in the project initiation document.

- Ongoing learning was attained by the project team for use on both this and future projects.

Project Strengths

- The project team was made up of a broad range of officers with extensive experience and knowledge in delivering challenging capital projects, including those involving ERDF funding.
- The robust governance established throughout all levels of the project enabled swift and effective decision making.
- The relationships between the project team and the onsite services enabled the phasing and delivery of the works to be undertaken with minimal impact to critical council services.
- The appointment of consultants for critical design aspects including mechanical, and electrical systems was made at an early stage enabling them to be fully embodied in the project at an early stage.
- The procurement process led to the appointment of highly competent and knowledgeable contractors who assisted the project team in achieving the right outcomes for the project.
- The maintenance of key internal staff throughout the project ensured ownership and accountability for all project aspects.
- The in-house delivery model reduced project risk and costs throughout the project.

Project Weaknesses

- Inadequate financial allowances for contingency and risk.
- Inadequate time provision for project delays caused by the pandemic and supplier delays. Although it is accepted that the project has been delivered during an unprecedented period.
- Inflation impact was not factored into project budgets which span several financial years

Recommendations

The recommendations below have been developed following the experience gained on delivery of the project and have been shared across teams to enable learning for delivery of similar schemes in the future.

Recommendation 1: Wherever possible utilise the same project team to maximise the learning achieved for future projects.

Recommendation 2: Ensure the expertise of the appointed contractors is drawn upon in determining final solutions. For example on this project the Solar PV contractor proposed a design solution which delivered the same outputs and saved approximately £750,000 of infrastructure costs.

Recommendation 3: Ensure inflation is allowed for in projects spanning several financial years – this recommendation has been adopted by the council's Investment Programme Board.

Recommendation 4: Facilitate wider learning by sharing case studies and host events with neighbouring authorities and the private sector where appropriate.

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The project cost in the region £15M with a circa £3M European Regional Development Fund. The application and management of the ERDF funding was complex and resource demanding but did enable North Tyneside to deliver a project with such a broad scope incorporating energy efficiency, energy generation and storage.

The project was delivered over a period of significant uncertainty. Delays due to covid regulations slowed down progress, while subsequent build cost inflation resulted in some difficult board decisions having to be made around increased costs and programme timelines.

Next steps

The redevelopment of the Killingworth depot makes it a key strategic asset that will be a cornerstone in the local area's transition to a low-carbon future.

North Tyneside Council has recently been working with the North East LEP Energy Accelerator Programme, to support the development of a pipeline of localised heat decarbonisation projects. With the support of the LEP Accelerator Programme and grant funding from the Heat Network Delivery Unit (HNDU), the authority has re-visited a historical heat network feasibility study completed in 2016 for the Killingworth area. The revision of the feasibility work has significant merit especially given the refurbishment of the Depot site which could act as a heat anchor and was not included in the 2016 study due to the uncertainty of its future.

The authority has now progressed to a fully funded detailed project development stage which will assess the economic, technical and options for the authority to commercialise a heat network. This stage will further evaluate options for:

- public buildings
- schools
- local commercial and industrial clusters
- social and private households

The heat network studies will assess the utilisation of local mine water and the associated energy centre would be sited within the boundary of the depot footprint.

There is a long way to go on this particular piece of work, but it is one of many opportunities the authority is currently exploring as we progress to our 2030 targets. This scheme supports the ambition of decarbonising heat in the borough.

As a low carbon demonstrator project, North Tyneside Council is keen to showcase the redeveloped Killingworth site and will continue to share their learnings from this project to support the wider transition to net zero.

Links, contacts, and credits

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