Leisure centre solar carport drives progress towards Net Zero in North Norfolk

North Norfolk District Council
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Summary

The installation of a solar carport at North Norfolk District Council Leisure Centre is helping the council's mission to achieve Net Zero while also protecting the facility from future energy price volatility. This project aims to generate enough electricity to meet 34% of the leisure centre's annual demand, with an annual saving of 30-40 tCO2e. With investment the council hopes for the project to be paid back within just 6 years. While lessons are still being learned, the highly public scheme aims to showcase that climate action is possible.

"*This Solar Carport project is fundamental in ensuring that our Leisure centre is powered by a green, renewable source and demonstrates the case that we must be ambitious and innovative to tackle Climate Change and meet our crucial Net Zero targets,"* Cllr Adam Varley, Cabinet Member for Climate Change and Net Zero.

The problem

Leisure centres are often the biggest contributors to the carbon footprints of local authorities' estates, hoovering up huge quantities of hot water and energy for pools, showers and heating. For example, in 2022-23, North Norfolk's three leisure centres contributed a combined 877 tCO2e - 25% of the Council's overall carbon footprint. As critical community infrastructure, decarbonising these leisure centres is vital to delivering North Norfolk's 2030 Net Zero targets, across all council operations, but also for inspiring local residents and highlighting the benefits of climate action.

The Reef Leisure Centre, which opened in November 2021 is the largest of the three centres. It was designed to energy efficiency standards exceeding regulations, with the use of solar thermal water heating, high levels of insulation and low flow water fittings. These help to offset the high hot water heating requirements. The coastal conditions, including high wind speeds and salt erosion, also had to be factored in. The centre emitted 418 tCO2e in its first fully operational year, with 155 tCO2e of emissions due to electricity usage. This is a substantial carbon reduction compared to its predecessor, but it was still felt more could be done.

Like leisure centres nationwide, the Reef is also highly vulnerable to energy price fluctuations, due to its high energy use. Recent research by UK Active highlighted that the rising cost of energy has contributed to increased operational costs of more than 200% for leisure centres. Despite some government support, the same research shows that nearly 40% of leisure centres may need to reduce services or close sites, due to ongoing high prices.

The solution

Due to the Reef’s efficient use of energy, the leisure centre is better prepared than many to cope with fluctuating energy prices and optimise its carbon emissions, all while continuing to deliver a vital community asset. However, North Norfolk District Council felt that more could be done to support its overall optimisation objectives, while also protecting the facility from future energy price volatility.

In March 2023 the Council’s Cabinet approved plans for a solar carport covering two-thirds of the car park. The idea, which was originally outlined in the Council's Corporate Plan and Net Zero Action Plan, presented an innovative way to optimise the use of council land. It would both mitigate climate change by decarbonising the Reef further, but also help efforts to adapt to a changing climate by shading cars during the summer heat. As the roof of the Reef development had already been used for Solar Thermal, the large south-facing car park was the next best site.

The carport consists of 600 PV solar panels, with the electricity generated used by the electrical equipment at the leisure centre. The carport is a 265kW array with an estimated annual output of 276kWh. Modelling suggested that it should contribute approximately 34% of the annual electricity requirement of the Reef – providing an annual saving of 30 - 40 tCO2e. An added benefit is that any excess generated at times of low demand can be sold back to the grid via a feed-in tariff, helping to deliver a return on investment. It is anticipated that the investment in the carport will pay back in six years from energy savings.

The approved business case gave an alternative three-array design, but a two-array design was built for the following reasons:

- smaller capital outlay (although a similar pay-back period is predicted)
- less reliance on income from selling to the grid
- shorter construction time
- leaves part of the car park accessible to camper vans and larger vehicles
- further away from the adjoining skatepark

Timeline

Project conception:

The concept of a carport was first discussed during the construction of the Reef. A feasibility study was created, and supported by the Officers and Members subject to the production of a suitable business case, but due to covid issues, it was decided not to delay or complicate the Reef construction further by adding in this additional scope. However, the ducting for underground cabling was installed when the car park was laid so the car park surface would not need to be dug up should the project go ahead at a later point.

Pre-construction phase:

Planning permission, based on the feasibility study, was granted in January 2023, followed swiftly by procurement between January - February 2023. The design and construction company, RenEnergy, was procured via the Crown Commercial Service HELGA DPS. RenEnergy are a Norwich-based firm, their sustainability credentials such as the local manufacture of the steel and the subcontracting of the civil works to a local firm meant that they won the contract based on sustainability criteria as well as cost and quality.

Full Council decision for the project to go ahead was secured in March 2023, which allowed the final design and construction contract to be awarded.

Construction phase:

After a kick-off meeting in March 2023, phase one began in May of the same year.

Over 5 days anchor bolts were sunk into the car parks and the infrastructure for electrical cabinets was installed.

Phase 2 took place across 5 weeks between mid-June – mid-July 2023. This involved the installation of the main structure, which was finished before the summer holidays - as a condition of the construction tender.

Phase 3 consisted of electric hook-up, certification and switch-on in July 2023. The portfolio member for climate change and members of the youth council switched on the solar carport, and electricity began to be generated

and used by the Reef immediately.

Stakeholders

The carport was subject to the usual planning process where there were a number of compulsory consultees and the chance for the public to comment.

This project was undertaken by RenEnergy, a local company with experience in installing solar arrays in many commercial sites in the region and around the country.

The internal project team consisted of officers from the Climate, Estates, Property Services, Leisure, and Communications teams. It was important to involve teams from across the Council from the outset. As previously stated this was not just a construction project but a demonstration of climate action and an investment to reduce the cost of the leisure management contract. As the project continues beyond switch on it was important that those involved in its ongoing operation were involved from the outset.

The leaseholders of the building were very supportive of the project from the outset and as a company have their own carbon reduction targets which this project helps to meet.

Impact

Having only been installed in July 2023, it is too early to say if the panels will produce the electricity and carbon savings modelled.

Whilst it may be too early to tell on the data, it is clear that residents support the carport, regularly engaging with the available information on the scheme. In addition, the council has benefitted by learning lessons about the design and scale of the project.

The project will be further analysed when there is a full year of data, with lessons transferred to other Council-owned sites which may be appropriate for such technology.

Lessons Learned

There were a number of things that worked well for the project, ranging from strategic futureproofing of the car park infrastructure, stakeholder engagement, and the choice of location which helped ensure the project was a beacon for climate action in the region.

However, if the project were to be repeated the Council would change a number of things.

Firstly, height restriction signage would have been supplemented by height restriction barriers to avoid any structural damage.

Secondly, more modelling would have been undertaken on future energy prices to make the business case tighter.

Thirdly, the carport structure to support the panels significantly increased (almost doubled) the cost of the project compared to putting solar panels on an existing roof or alternative structure. Therefore opportunities to utilise existing suitable roof space should be prioritised where possible.

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The Council used its reserves of £0.5M capital investment for this project and received no external funding. It was forecast that the investment in the carport will pay-back in six years in electricity savings. It is hoped that income from the electricity will result in a decrease in the cost of leisure provision in the district.

Next steps

With the panels now in place, North Norfolk's next steps are to ensure their future, understand the impact, and disseminate learning. This will be done by continuing to monitor the performance of the panels:

- To ensure that maintenance and cleaning is carried out at the required frequency
- To ensure that the parts, many of which have a 25 year guarantee, continue to produce the maximum amount of energy possible
- To compare performance after a year against the business case to see if carbon and monetary savings have been achieved
- To see if the energy production and consumption warrants investment in a third array and/or battery storage
- To share their learning with other public sector organisations, having already met with two other Norfolk councils to share their experiences

Links, contacts, and credits

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