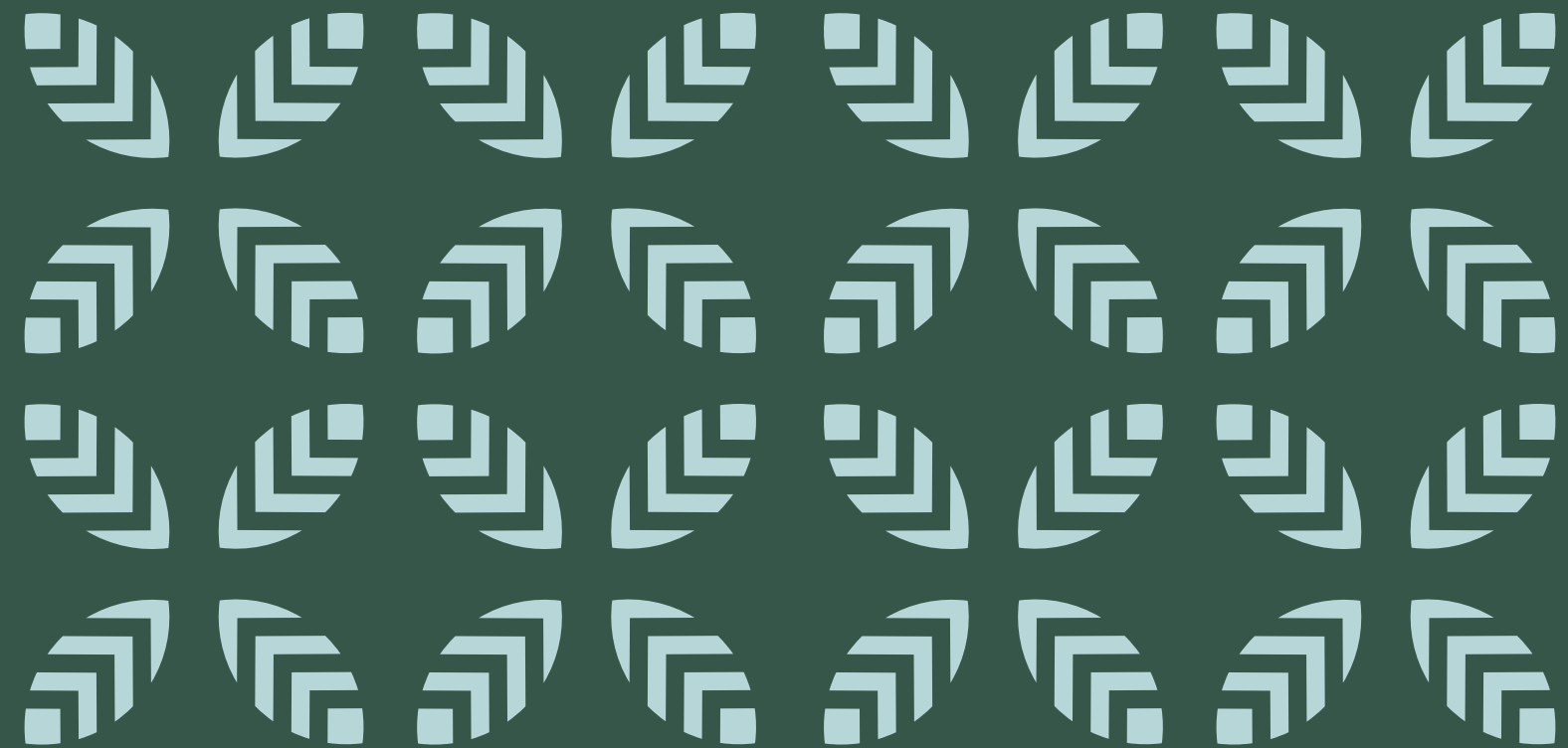


The Norwich Solar System

Executive Summary



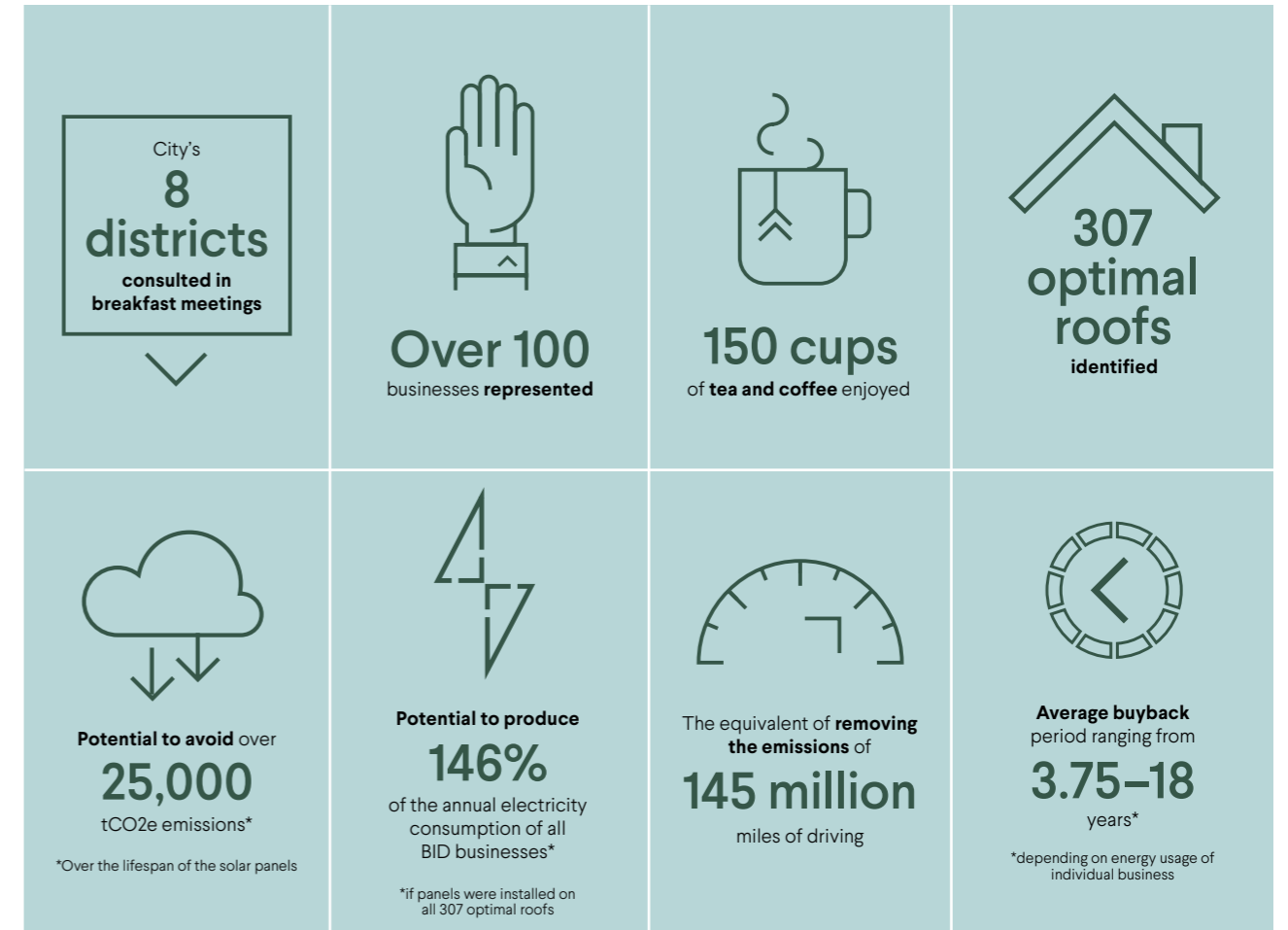
Executive Summary

Norwich, the vibrant City of Stories, is taking a bold step towards a net-zero carbon future with the innovative Norwich Solar System. This visionary project, undertaken in collaboration with the Norwich Eco Hub and Synfo and funded by the County Council's Norfolk Investment Framework, aims to establish what may be the UK's largest urban solar farm by harnessing the potential of suitable commercial rooftop space across all eight districts of the city.

With a focus on generating clean and renewable energy, the Norwich Solar System presents an exciting opportunity to create jobs, improve air quality, reduce reliance on fossil fuels, and save money for local businesses. By taking advantage of solar energy, this initiative can pave the way for a sustainable future, not just for Norwich today but also for generations to come.



Key Findings in Numbers



While the initial capital expenditure may pose a challenge for some businesses, the potential for significant returns over time through energy cost savings makes solar installations a lucrative and sustainable choice.

The environmental impact of the Norwich Solar System cannot be overlooked. This substantial increase in solar power generation presents a significant opportunity to reduce the city's carbon footprint and promote sustainable energy practices.

Conclusions and recommendations of study

This is just the start. This report is the first step towards gaining a richer understanding of the decarbonisation challenges facing businesses on their journey to net zero. It has become apparent from discussions taking place during the BID Breakfasts that through collaboration, businesses in Norwich can use their collective strengths and resources to create an urban solar farm effectively, efficiently and economically.

»»» Introduction

Norwich has around 100,000 buildings, with 31% non-residential. Of these, the Norwich BID area consists of over 700 levy paying businesses spanning 293ha, representing a large proportion of the energy usage in the city centre. The surge in energy prices, coupled with net zero aspirations presents an urgent opportunity to explore new forms of low carbon, low-cost energy for Norwich.

The Norwich Stripes shows how the average annual air temperature has warmed since 1882, with each red band being hotter than the last.

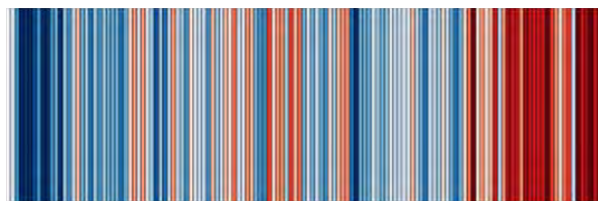


Figure 1 Norwich Annual Average Temperature 'Stripes' 1884 - 2022 courtesy of Tyndall centre for Climate Change Research, UEA

There is a solution that can address both the cost and the carbon reduction issues. By generating their own electricity, businesses can reduce their reliance on the grid and save money on their energy bills.

»»» Could solar be our answer?

Enter the Norwich Solar System. This report demonstrates how much electricity could be generated from harvesting sunlight across each district, the estimated rate of return and, importantly, how this helps Norwich become net zero by the national deadline of 2050 and limit the temperature increase to 1.5°C above pre-industrial levels¹. The Tyndall Centre for Climate Change Research has calculated that for Norwich to meet the conditions of the Paris Agreement, we must reduce our CO2 emissions each year by 12.7%. By decarbonising businesses, we can achieve the goal of Net Zero Norwich well before 2050 and put Norwich on the map for being a sustainable city success story.

In each of the eight Norwich districts, we presented case studies showcasing the best buildings for solar panels and estimated the potential they could produce. To illustrate the case studies, a digital surface model was created within ArcGIS, a powerful mapping tool, to remove residential buildings and apply a solar radiation model. Having applied filters to identify the most suitable sites, solar panels were modelled on each building using OpenSolar². Full details are included in the Norwich Solar System Technical Report.

Following the presentations, we pitched two questions to the audiences:

- What are the barriers to you installing solar panels at your premises?
- Why might you install solar panels at your premises?



“There is a solution that can address both the cost and the carbon reduction issues.”

»» Drivers and Barriers: Charting the Path to Success

The frequency of the drivers and barriers has been categorised depending on how often the subject was raised. A more detailed description of the drivers and barriers examined by the Norwich Solar System can be found in the Drivers and Barriers Report.

»» Drivers

Aside from the obvious benefits of reduced environmental impact and saving money on energy costs, among the most frequently mentioned drivers were:

- > Cost sharing and bargaining power
- > Access to expertise and resources
- > Shared learning and innovation

Cost sharing and bargaining power – options being created to pool financial resources, thereby reducing the individual financial burden on each company, making it easier for smaller businesses to participate in solar panel projects they might not have been able to afford alone. Collaboration was thought to create opportunities for better deals with suppliers, contractors, and other stakeholders.

Access to expertise and resources – by collaborating, businesses can tap into a broader range of knowledge, skills, and experience, enhancing the overall quality of the PV installation and potentially speeding up project completion.

Shared learning and innovation – collaboration was thought to foster an environment of shared learning and innovation, with the exchange of ideas, best practice, and lessons learned from previous projects.

A potential beneficial “domino effect” for Norwich was predicted if collaboration could be fostered.

The prospect of a favourable rate of return on solar investments further incentivises businesses to make the switch to solar energy. Engagement with sustainable practices is both becoming a greater priority for stakeholders – for example regulators and commissioners – and is increasingly becoming a market advantage, attracting both conscious consumers and potential employees.

»» Barriers

The most frequently mentioned barriers to businesses installing solar panels raised in the BID Breakfasts were:

- > Capital expenditure
- > Planning and conservation restrictions
- > Lack of landlord engagement

Capital expenditure - for some smaller businesses, installing solar panels simply isn't an option financially despite keenness to reduce their carbon emissions even before considering other costs such as scaffolding and ongoing maintenance contracts for cleaning of the panels. Some do not have the resources to undertake a project of that size, and would have to pay for consultancy, adding to the mounting costs. There is a degree of financial risk involved. Having invested in an onsite feasibility report, there is no guarantee that the roof will be able to take the weight of the panels, for example.

Planning and conservation restrictions - the granting of planning permission and conservation restrictions were raised very often as a barrier to installing rooftop solar. Norwich is a medieval city with around 1,500 listed buildings and sits within a conservation area, which can complicate any plans to install solar panels. As a Conservation Area, the local planning authority, Norwich City Council, can set standards reflecting what is considered a permitted development.

There was a perception that getting planning permission was too much effort, especially if permission was refused, having heard from others about the challenges involved.

Lack of landowner engagement – uninterested landlords were raised very often as a barrier to installing rooftop solar. With many of Norwich's buildings owned and leased to businesses, the relationship between landowner and tenant is crucial to supporting the development of potentially, the UK's largest urban solar farm.

There are many different opportunities for landlords and tenants to work together³, as there are mutual benefits. For landowners, introducing solar is already recognised as a relatively cheap retrofitting intervention to reduce a building's carbon emissions, improving their Energy Performance Certificate (EPC) rating and the building's value. For the tenant, their energy costs are lower and carbon emissions are reduced compared to using non-renewable energy tariffs. However, none of this is possible without an engaged landowner. Often, sections of the city are owned by a single landowner, which presents both opportunity and barriers for the Norwich Solar System. The BID Breakfasts engaged estate managers from some of Norwich's largest landowners who were keen to get involved.



»»» Opportunities Identified

To address the barriers and maximise the drivers, the report proposes several opportunities to explore further:

- > Pico grid
- > Collective procurement of solar panels
- > Policy support and legal facilitations
- > Local listed buildings consent order
- > Solar taskforce

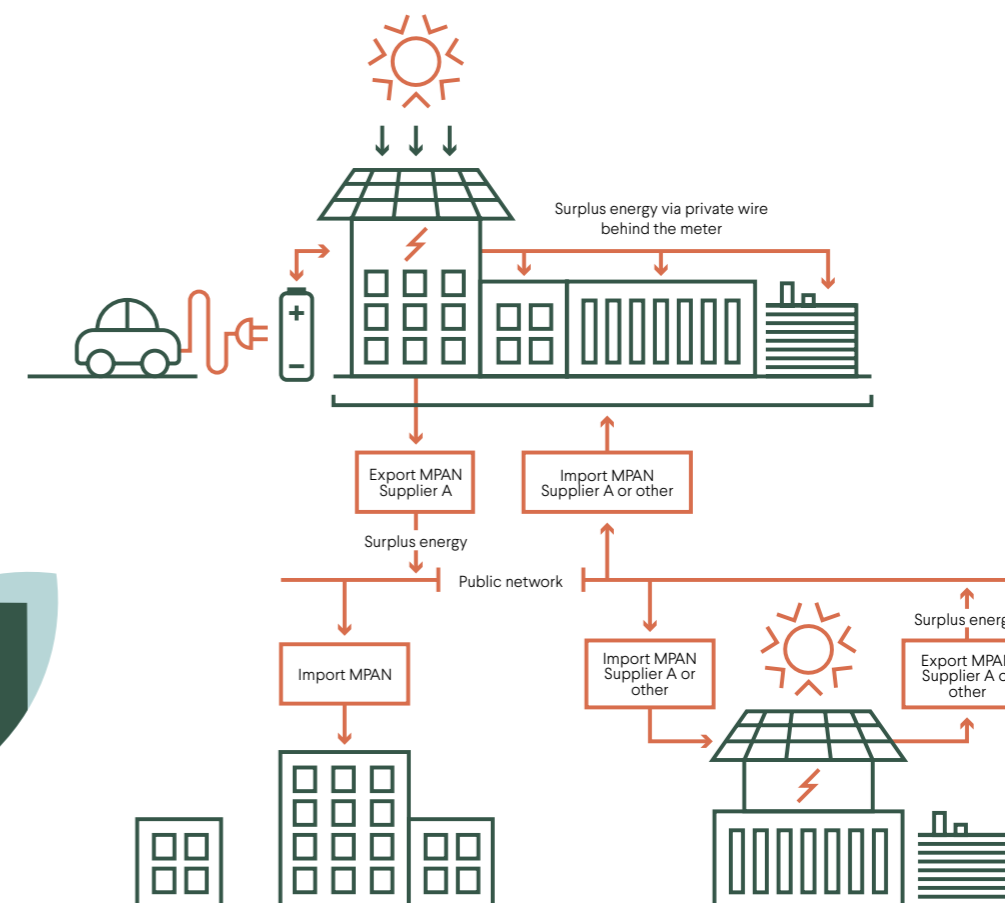
Pico grid – Commonly, solar panels generate electricity, with surplus stored in large onsite lithium-ion batteries. However, there is a proposed alternative. The Pico Grid localises green energy, with the possibility of private wires carrying surplus energy to neighbours under certain circumstances without having to feed into the grid. For businesses considering solar, the Pico concept makes solar panels cheaper as large batteries would not be required, and by selling surplus energy to neighbouring businesses, the rate of return on the panels would be increased.

For businesses unable to install solar panels, joining a Pico Grid could provide cheaper energy and free up space on the grid. This makes solar panels a much more appealing solution.

While the creation of Pico Grids may be physically possible, the idea is likely to be challenged under Ofgem's market rules. As policy and legislation regarding the development of an entity like a rooftop solar farm is piecemeal, much of the development approval process will fall upon local authorities.

Government offers general Low Carbon Technology (LCT) planning advice for this purpose.⁴ Ofgem have also concluded a recent consultation on arrangements affecting local government and energy with the results due to be published towards the end of 2023.⁵ Their vision is for more local government facilitation to ensure effective participation between local actors in a whole system place-based energy transition.

Pico grid



Collective procurement of solar panels and installation services – This approach allows businesses to pool their financial resources, making self-installation of solar panels more cost-effective and accessible, potentially to include working to increase the availability of suitably skilled local labour, to avoid having to incur the additional cost of contracting out of area. Additionally, research could be undertaken to explore the possibility of a third party installing solar panels for businesses free of charge by leasing their roof space. Under this arrangement, businesses would purchase renewable energy at a discounted price through a power purchase agreement (PPA). Such collaborations would enable businesses to not only reduce their carbon footprint but also contribute to their Environmental, Sustainability, and Governance (ESG) plans, showcasing their commitment to sustainability and conscious consumption.

Policy support and legal facilitation – While collaboration among businesses and stakeholders is essential, policy support and legal facilitation are equally crucial to drive the Norwich Solar System forward. Engaging with policymakers to align the aims of the initiative with the visions of decision-makers can create an enabling environment for sustainable energy projects. Furthermore, exploring successful precedents from other cities, like the Local Listed Buildings Consent Order introduced by the Royal Borough of Kensington and Chelsea (more below), can offer valuable insights and significantly contribute to the success of the Norwich Solar System and its integration into the city's urban fabric.

Local listed buildings consent order – The example of the Royal Borough of Kensington and Chelsea was raised at two BID Breakfasts as a potential solution. With over twice as many listed buildings as Norwich, Kensington and Chelsea faced similar challenges.⁶ In 2022, the Council introduced a Local Listed Buildings Consent Order which allowed landowners with Grade II and most Grade II* to install solar panels without applying for individual consent. Whilst restrictions remain over materials, fixings and the visual appearance, the process was streamlined by a simple, single application to the council. This saves the Council hours examining complex planning applications and landowners the time and expense of preparing a full application for listed building consent. With buildings contributing 80% of the boroughs carbon emissions⁷, the consent order encourages and champions solar energy as a solution to high-carbon energy dependence. Could a similar approach be adopted to utilise Norwich's wasted roofscapes?

Solar taskforce – Despite the current perceived restrictions surrounding solar panels, the opportunity they represent to reduce carbon emissions and save businesses money has been recognised. Recently, the government has implemented a Solar Taskforce to investigate the 'untapped potential'⁸ of commercial buildings to revolutionise solar power in the UK. Having set an ambitious target to increase solar capacity to 70GW by 2035, the Solar Taskforce has discussed publishing a solar roadmap in 2024 to help drive forward the agenda and to help make the Norwich Solar System a reality.

»»» Conclusion: Charting a Sustainable Future for Norwich

The Norwich Solar System signifies a pivotal moment in Norwich's journey towards a sustainable and green future. By embracing solar energy and promoting collaborative working, businesses can lead the charge in reducing carbon emissions, enhancing energy security, and making a positive impact on the environment. The success of this visionary project hinges on the active involvement and cooperation of various stakeholders, including businesses, policymakers, landlords, and tenants.

The Norwich Solar System is more than just a technical endeavour; it is a transformative roadmap towards a greener, more resilient, and sustainable Norwich.

It sets a precedent for other cities to follow, showcasing the potential of renewable energy sources and the benefits of collective action. By charting a path towards a net-zero carbon future, Norwich is poised to become a beacon of hope, a city that embodies sustainable practices, and a source of inspiration for other communities striving to tackle climate change and secure a better future for all. As Norwich embraces solar energy and works together to realise the Norwich Solar System, it takes a momentous step towards becoming a shining example of a sustainable and prosperous city.



»»» What's next?

From here, there are several avenues to explore to launch the Norwich Solar System.

1. A strategy to support businesses on the journey to net zero.
2. Pilot the innovative Pico Grid concept within the BID area, creating a solar zone around a cluster of identified businesses using power purchase agreements (PPAs) to demonstrate how it might work in practice.
3. Work with the policymakers to align the aims of the Norwich Solar System with the visions of decision makers.
4. Work with other agencies to attract green investment into Norwich to fund a city-wide scheme.
5. Investigate the potential for collective procurement of solar panels and solar installation services to make self-installation cost effective.
6. Undertake research in order to work with a third party to have a system installed free of charge by leasing roof space to a collective, who would sell energy back to the occupant at a below market discounted price through a PPA.

Appendix

¹ www.unfccc.int/process-and-meetings/the-paris-agreement

² www.opensolar.com

³ www3.rics.org/uk/en/journals/property-journal/commercialising-low-carbon-tech.html

⁴ www.gov.uk/guidance/renewable-and-low-carbon-energy

⁵ www.ofgem.gov.uk/publications/consultation-future-local-energy-institutions-and-governance

⁶ www.local.gov.uk/case-studies/royal-borough-kensington-and-chelsea-local-listed-building-consent-order#~:text=The%20Royal%20Borough%20of%20Kensington,for%20individual%20listed%20building%20consent

⁷ www.rbkc.gov.uk/newsroom/solar-power-more-homes-kensington-and-chelsea

⁸ www.gov.uk/government/news/untapped-potential-of-commercial-buildings-could-revolutionise-uk-solar-power

To find out more or read the full
technical reports please get in touch

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