The Norwich Solar System

Barriers and Drivers Report

Norwich Solar System Barriers and Drivers Report

Barriers and Drivers for Commercial Adoption of Solar Panels in Norwich City Centre

Summary

The following is a report of the issues regarding rooftop photovoltaic (PV) installation raised during a series of business breakfast meetings, the BID Breakfasts, across all eight designated Norwich Business Improvement Districts. The focus of this feasibility study is on the perceived barriers to installation and the drivers (aside from the implicit desire to reduce carbon emissions) motivate them to adopt solar PV solutions. The ambition has been to facilitate knowledge sharing and education of the processes, benefits, and pitfalls of installing solar panels to further the ambition to establish, possibly, the UK's largest urban solar farm.

The barriers expressed by the different forums included assumed capital cost and expected return on investment (ROI); lack of information; planning issues, including conservation; issues for business tenants, such as landowner indifference or poor communication and lines of responsibility.

Set against this, the drivers for installation consider brand profile, saving costs, the potential afforded by collaborative working and investing in local skill development, and the demands of external regulators.

The meetings also discussed future opportunities; how barriers might be mitigated, thus helping advance the drivers. These included exploring the potential for business exemplars, among costs, either through local consortiums, buyers' clubs, and further work on feasibility of PICO grids; ongoing promotion of rooftop solar and other renewable energy sources through information and experience sharing, and the use of exemplars, among businesses within Norwich and nationally; work with local stakeholders on skill development, and with Norwich City Council on Planning issues; and working to support business tenants with landowner engagement.

Meetings were universally positive, with a broad consensus on what need to be done to support environmental sustainability in the city.

1.0 Introduction

There is huge potential to increase installation of PV solar panels utilising businesses redundant roof space. With this in mind, the Norwich Eco Hub has worked with the Norwich Business Improvement District (BID) to study the feasibility of turning Norwich City Centre into an urban solar farm - potentially, the UK's largest - and to foster the creation of a consortium to use the energy generated for mutual benefit.

Following breakfast consultation meetings with representatives of businesses in all eight districts, we are able to identify and analyse the main factors that may drive the businesses toward solar array installation, and the that main barriers that get in the way. Mapping barriers and drivers in research and in practice is an important step toward understanding why a wider diffusion is not happening at a faster rate, whether in Norwich or elsewhere, given the imperative to reduce carbon emissions.

What follows is not the result of detailed formal quantitative or qualitative research but rather the gathering of views and experience voiced by those who attended the meetings. This consultation followed a comprehensive technical briefing on the potential of rooftop solar installation, details of which are reported elsewhere. The most important driver – to cut carbon emissions - is regarded as implicit, so was not discussed at the meetings.

2.0 Literature Review

To place our findings in a wider context, there follows a short review of recent comparable research. This has been analysed and summarised by for the first time by *K. Reindl and J. Palm in 2021*[3] drawing on 29 published research articles, followed by their own empirical research in Sweden in 2021.

Barriers to and enablers of installing PV in the residential sector have been well researched in recent years, but it would seem this is much less the case for the non-residential sector.

2.1 Barriers Identified in Earlier Research

The studies, mostly overseas, reveal findings which are not dissimilar to our own.

By far the most common type of barrier identified was economic, encompassing many different aspects, such as transaction costs, insurance costs, insufficient funds, inability to raise debt capital, high perceived installation and repair costs, and long pay-back period. Included among the economic barriers is the concern that installing PV systems on 10–15-year-old roofs not yet ready for replacement could incur substantial costs when roof replacement is later required.

Information/knowledge barriers were often mentioned. These include difficulties finding information about PV systems and unawareness of the possibility of installing PV. Administrative or organizational barriers concerned split incentives and difficulties sharing PV installation costs among tenants. Installation details were discussed as barriers in some studies, including insufficient guidelines for installation and problems of shading. Design barriers refer to lack of suitable space for PV panels on buildings and potential problems caused by reflections from the PV panels.

One barrier was that the structure of tariffs, for example, the lack of fixed rates and rate guarantees for the generated electricity, added to difficulties in calculating ROI. Identified regulatory barriers were, for example, problems obtaining permits and preservation regulations. Technological barriers concerned lack of trust in the technology or that solar was simply not a preferred technology. When maintenance barriers were discussed, they related to perceived problems maintaining the right temperature to avoid overheating. Security and insurance barriers concerned fire risks and risks of theft and vandalism. Ownership structure barriers reflected the situation in which buildings are owned for 10 years while the PV installation lifetime exceeds that. Barriers related to taxes and lack of subsidies were, surprisingly, mentioned in only one earlier study. Finally, other investment priorities and investments in other renewables were found to be barriers in earlier research.

Table 1 below summarizes the barriers to PV installation identified in these research studies, presenting them in descending order of how often they appeared in the reviewed literature.

Barrier mentioned	No. of references
Economic barriers	12
Information/knowledge barriers	8
Administrative/organizational barriers	4
Installation-related barriers	4
Design barriers	3
Tariff structure	3
Regulatory barriers	3
Technological barriers	2
Maintenance barriers	2
Security and insurance	2
Ownership structure	2
Taxation, lack of subsidies	1
Other investment priorities	1
Current use of other renewables	1

Table 1 Barriers to PV installation identified in earlier research

2.2 Drivers Found in Earlier Research

The most often mentioned type of enabler was related to the existence of subsidies, tax waivers, and feed-in tariffs, which some companies saw as a precondition for investing in PV. Another enabler was environmental concern, when a company wanted to contribute to, for example, reduced greenhouse gas (GHG) emissions. Another concerned the suitability of multi-floor commercial buildings, which were seen as having a good inherent temporal match of PV output to the demand curve, i.e., the correlation between peak power production and peak demand was good.

That PV was a mature technology and that roof-integrated PV panels were now common on the market were seen as enablers in some studies. Other identified enablers were the possibilities

afforded by PV installation to earn money from electricity production, reduce electricity costs, and secure protection from potential future electricity price increases. Some stated that installing PV panels could enhance a company's brand. Other companies saw the potential to become self-sufficient as an enabler, while some mentioned company goals and owner directives as important enablers.

The possibility to enter a third-party contract, so that the company did not need to own the PV itself, was regarded as another enabler. An existing relationship with an installer was seen as an enabler, as was the existence of a solar map, i.e., a city map showing how much sun exposure a building would experience. Finally, dynamic electricity pricing and power purchase agreements were seen as enablers.

Table 2 below presents the drivers of PV installation identified in earlier research, listed in descending order of how often they appeared in the reviewed literature.

Driver mentioned	**No. of references**
Subsidies, SREC (Solar Renewable Energy Certificate), feed-in tariffs, tax waivers	9
Environmental concerns	5
Commercial building suitability	5
Technological enablers	3
Opportunity to earn money	3
Opportunity to reduce expenses	3
Protection from future high electricity prices	3
Brand enhancement	2
Contribute to self-sufficiency	1
Company goals, owner directives	1
Taking advantage of third-party ownership	1
Pre-existing installer–customer relationships	1
Solar maps	1
Dynamic electricity pricing	1
Power Purchase agreements	1

Table 2. Drivers of PV installation identified in earlier research

2.3 Barriers and Drivers Identified in a recent Swedish Empirical Study

2.3.1 Swedish Study: Barriers[1]

Economic barriers were the most common barriers, and many discussed excessively long pay-off times and the profitability of installed PV. Taxes were seen by almost all respondents as a central barrier to installing PV in Sweden, especially for bigger property owners. Energy tax law in Sweden states that solar electricity that is self-produced and consumed in the same building is free of taxes, but only for plants up to 255 kW.

Table 5 below presents the barriers to PV installation mentioned by the Swedish respondents.

Often mentioned (by more than half)	Economic barriers
	Taxation, lack of subsidies
	Regulatory barriers
	Administrative/organizational barriers
	Design barriers
	Maintenance barriers
	Building construction barriers
Mentioned moderately often (by less than half)	Information/knowledge barriers
	Technological barriers
	Security and insurance
	Lack of electricity storage
	Tenants' electricity supply contracts
Mentioned only once	Just installed district heating
	National political instability
	Biggest area to install PV is residential buildings
	Conservative construction industry
	No detailed calculations of PV solar radiation – no solar map
	Time consuming

Table 3 - barriers to PV installation mentioned by the Swedish respondents.

2.3.2 Swedish Study: Drivers

One frequently mentioned driver was that PV installation was seen as a good opportunity to reduce expenses. Another common enabler mentioned was environmental concerns. All the companies that completed the questionnaire and participated in the interviews had formulated extensive environmental, climate, and/or energy goals. Many emphasized their overall engagement with sustainability questions. It was also common for the municipality to have the goal of becoming fossil fuel free, and installing PV was seen as a good way that municipally owned property companies could help achieve this goal.

At the same time, in relation to the emphasis of environmental concern, most respondents believed that a PV installation also needed to be economically sustainable. Many interviewees said that, in their opinion, PV installations had become more affordable in recent years (however, as seen above in the section on barriers, many still regarded economic issues as an important barrier). Moreover, an enabling factor highlighted was that installing PV panels was usually aligned with how the company wanted to promote itself and its business model.

Protection from future high electricity prices was an enabler for many of the respondents, prompting them to invest in PV installation. Many respondents also stated that they wanted to contribute to the energy system transition by installing PV systems.

Technology was mentioned as a driver by some of the respondents. One argument was that the technology had become so efficient that it was a good idea to install PV panels. Another argument was that that the company wanted to *test* the PV technology on its buildings. Some saw the technology as fairly easy to maintain and thus attractive. Installing PV was also seen by many as a brand enhancer that had PR value, symbolizing that the company cared about the environment.

Table 4 below presents the barriers to PV installation mentioned by the Swedish respondents:

Driver of PV installation mentioned by the Swedish respondents.

Often mentioned (by more than half)	Opportunity to reduce expenses
	Environmental concerns
	Opportunity to become economically sustainable
	Protection from future high electricity prices
	Contribute to energy system change
	Technological enablers
	Brand enhancement
Moderately mentioned (by less than half)	Contribute to self-sufficiency
	Follow other companies' examples
	Tenant demand
	Can be combined with renovation
	New construction
	Commercial building suitability
	Subsidies
	Company goals, owner directives
Mentioned only once	Sell own-produced electricity to tenants
	Reduced property operating costs, benefiting tenants (i.e., lower costs for them)
	Counteract capacity shortage

	Teach schoolchildren about energy and solar cells
	Increase property value

Table 4 – drivers of PV installation mentioned by the Swedish respondents

2.4 Comparable research: a summary

Common barriers identified in this study include economic, information/knowledge, and administrative/organizational barriers. New barriers identified in this Swedish study include building construction, lack of electricity storage, and tenants' existing electricity supply contracts. Enablers identified in this Swedish and in earlier research include subsidies, environmental concerns, and expense reduction. The Swedish material also revealed enablers not mentioned in earlier studies, such as the opportunity to earn money and taking advantage of third-party ownership.

3.0 Perceived Barriers to Installation: The Norwich Solar System

Using a similar approach after by *Reindl & Palm 2021, t*able 5 below sets out the type of barrier and the frequency of times it was brought up. This frequency has been categorised thus:

- Raised very often – i.e. in 100% of meetings
- Raised often – in 60% of meetings
- Raised occasionally – in 30% of meetings.

In some meetings, a particular barrier or driver was referenced more than once, but with a different aspect in mind, e.g. regarding the barrier CAPEX/ROI, the separately stated issues of installation and ongoing maintenance.

Barriers mentioned at the Business Breakfast meetings	*Frequency of issue being raised*
Capital Expenditure (CAPEX) and perceived Return on Investment (ROI)	Very often
Planning and Conservation restrictions	Very often
Landowner not engaged	Very often
Limited awareness	Often
Unclear lines of responsibility for PV installation	Occasionally
Roof space perceived as possibly unsuitable	Occasionally

Table 5– Perceived barriers to installation and frequency

3.1 Capital Expenditure (CAPEX)

The perceived initial cost of installing rooftop PV was understood to be a significant barrier for many of the businesses, raised **very often.** It was not clear which, if any, businesses had researched costs in detail prior to the district meetings. It is likely that following the technical presentation at the meetings, perceptions on CAPEX and likely ROI may have changed once the business representatives had been able to share their reflections in-house.

The CAPEX issues raised included high perceived transaction, installation, maintenance and repair costs. The ROI on PV installation was perceived as taking too long to materialise. Participating businesses were of varying sizes, and included social enterprises and charities, and it is likely that affordability would be a major issue for those with lower annual turnover. Some highlighted the lack of local businesses with sufficient capacity to undertake large scale projects, so having to consider contracting with firms many miles from Norwich, thus adding to costs. Scaffolding was also seen as a major expense. One company said that irrespective of their roof being suitably sited for solar installation (e.g. in terms of azimuth), any new works would require roof replacement, thus incurring substantial costs. Perceived maintenance costs – including periodic cleaning to maximise efficiency - after installation were also cited as barriers, involving a contract with the supplier, who (as mentioned) is likely to be out of area.

3.2 Planning and Conservation

Planning and Conservation restrictions were also cited **very often** as major barriers. Unlike residential properties and buildings, commercial properties do not fall under Permitted Development in the UK for PV installation. A full application is required to be submitted to the local planning authority (Norwich City Council in this case) which review proposals and decide if they are eligible and compliant with local regulations.

As of September 2023, Norwich City Council do not have specific policies specifically for rooftop solar panels, but they do have policies for renewable energy. Development where possible, aims to minimise reliance on non-renewable high-carbon energy sources and maximise the use of decentralised and renewable or low-carbon energy sources and sustainable construction technologies. Considerations addressed during a planning review will include such factors as building size and structure; installation safety criteria and standards; the impact on the surrounding environment, including the visual impact of the panels, potential shading on neighbouring properties, and the biodiversity impact. Significant weight is given to the published design principles in assessing development. Reduction of carbon emissions and improved energy efficiency through solar panel installation should also be considered.

Due to these factors, the review may take some time, and permissions may be refused in the end.

The participating businesses either experienced this process directly or were deterred from considering instillation through word of mouth of the other businesses.

Given the City's heritage status numerous participating businesses were based in one of approximately 1500 listed buildings, with the city centre itself inside a Conservation Area due to its historic or cultural significance. Some areas of the city are covered by Article 4 Directions, entailing that there are extra considerations for solar panels. The Planning review would encompass issues including the impact of the installation on the historic fabric of the building and its setting; visibility of the PV panels from the street; the mounting of the panels (e.g. flush with minimal visibility); their size, design, and placement; absence of impact on the original features or materials of the building. The materials used must be sympathetic to those of the original building.

One meeting raised the example of the Royal Borough of Kensington & Chelsea, the first local authority in the UK to relax planning consent on PV panel installation on listed buildings.

Two participants were medieval churches and as such, face additional approval hurdles. A church wishing to make a material change to their building or curtilage, if this is not covered by a specified list of exemptions, requires a faculty to be issued, as well as the above planning permission.

3.3 Lack of Landowner Engagement

It was recognised that there are considerable opportunities for landowner and tenants to work collaboratively on solar, offering value for both parties and reducing operational carbon emissions, for example see Royal Institute of Chartered Surveyors, 2020[1]

At least two landowner agents came to our meetings and were actively engaged with solar installation. However, the lack of interest or engagement of many of landowners was highlighted **very often** as a major barrier to the businesses who were tenants. Reasons for the landowners' reluctance is a matter for conjecture. Many of these were out of town, national or international corporates, their portfolio being perceived by our businesses as being too remote from them to be concerned about further investment in Norwich.

Barriers are also likely to include CAPEX /ROI. Commercial landowners might be hesitant to commit to a long payback period, especially if they plan to sell the property or are uncertain about its long-term ownership. Where they have such a short-term focus, they are more likely to prioritise immediate cost savings over long-term sustainability benefits. They may not fully appreciate the potential financial and environmental advantages of PV in the long run for their properties, or doubt whether the tenants would value the PV benefits enough to justify any increase in rent or management/service charges.

3.4 Limited Awareness

Lack of awareness and information was presented as being a major barrier **often.**

Though information presented at the meetings has begun to improve understanding, it was apparent that the capacity of many businesses (notably SMEs) is limited their ability to research options and to understand the benefits for their organisation. Included in this would be all the issues referenced above (e.g., rooftop suitability, technical aspects of solar, costs, tax reliefs, payback time savings on energy costs, and embarking on processes such as procurement of suppliers/installers, Planning issues, in some cases dealing with multiple ownership or multiple tenancy issues).

Some said they lacked knowledge of businesses that have successfully installed solar, their experience and outcomes.

Despite this barrier, the growing appetite to find out more and to consider solar, and to pool knowledge, was evidenced by the high representation of businesses at the district meetings.

3.5 Unclear Lines of Responsibility

Another deterrent for some businesses, raised **occasionally,** was a lack of clarity on who would be responsible for PV installation and any ongoing maintenance. These were tenants where the lease with the landowner was unclear on this, or there was split ownership of a building, or a hierarchy of property owners beyond the immediate landowner. Such issues were a recipe for further complexity in decision-making processes and potential disagreements about

implementation. Particular issues were also referenced for mixed-use occupancy, where a building houses one or more business but is also residential.

3.6 Roof Space Perceived as Unsuitable

Concern about rooftop suitability arose **occasionally**. In one case, the type of roof material used meant that there was known additional and substantial extra cost, in two other cases there was uncertainty as to whether their roof construction was able to withstand the weight of a PV array. Professional advice would probably have to be sought, at a cost, before an assessment could be made.

Another business suggested that plans to create a 'green roof' might get in the way of a PV installation, e.g. see Green Roofs: Types, Costs & Installation [2]

4.0 Drivers of Installation

Table 2 below sets out the type of barrier and the frequency of times it was brought up. This frequency has again been categorised thus:

- Raised very often – i.e. in 100% of meetings
- Raised often – in 60% of meetings
- Raised occasionally – in 30% of meetings

Drivers mentioned at the Business Breakfast meetings	*Frequency of issue being raised*
Opportunities afforded by collaborative working	Very often
ROI - energy cost savings	Very often
Brand benefit	Very often
Awareness of the potential of their roof space	Occasionally
Regulatory drivers	Occasionally
Landowner already engaged with PV	Occasionally

Table 2 – Perceived drivers to installation

4.1 Opportunities Afforded by Collaborative Working

The prospect of working together as part of a consortium or collaborative partnership on PV was raised **very often** as a driver. This included smaller businesses, e.g. Ber Street and the Lanes in Norwich, where collaboration already takes place on other projects, or businesses purchasing electricity from a neighbouring company which is able to generate power in excess of their needs. The idea of a solar buyers' club, and possible partnership to Solar Energy UK (formerly the Solar Trade Association) was suggested in the meetings.

Benefits of collaborative working voiced included:

- **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 PV 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. Bulk purchasing of PV panels and related equipment

can lead to cost savings, securing favourable terms, and accessing a more extensive network of suppliers.

- **Access to Expertise and Resources -** the lack of knowledge barrier (discussed above) might be mitigated by each member of the consortium bringing unique expertise, resources, and capabilities to the table. 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, leading to continuous improvement in PV installation techniques and technologies.

- **Improving Local Supplier Provision -** by working together and with local training providers (e.g. City College Norwich, Apprenticeships Norfolk) businesses could promote the green skills agenda, and in this case supporting the development of a local skilled labour force in PV technical support, supply and installation.

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

4.2 ROI

Despite CAPEX/ROI being seen as a barrier, it would appear from discussion in the meetings that once a cost/benefit analysis is carried out this issue was **very often** be seen as a potential driver, despite the variable payback time. This is likely to have been fostered by recent huge price increases in non-renewable energy.

There was discussion also of added incentives including the prospects of use of energy sharing agreements or the Smart Export Guarantee (SEG) and the potential income generation of electric vehicle (EV) charging for staff and customers.

Tax-wise, further incentives referenced included the 100% first-year capital allowance on the cost of purchasing and installing solar panels.

4.3 Brand Profile

Potential brand benefit was also mentioned **very often,** with businesses being, in part, motivated to be involved in PV installation to be seen among customers, the public and fellow businesses as environmentally responsible and forward-thinking, and as an exemplar of good practice, thereby positively impacting their reputation.

Some companies highlighted direct evidence of this, where customers or service users directly influenced them to consider PV, a trend which may grow alongside increasing awareness of climate change issues. Others saw opportunities to expand in response to the likely increasing demand for PV supply and installation.

In addition, embracing environmental policies was seen as offering a competitive advantage for businesses. Differentiating as an eco-friendly and socially responsible organisation can attract customers, employees, and investors who value sustainability.

This also served as one of the drivers of collaborative working since involvement can enhance market position, creating a more significant impact in the market, leading to increased visibility and credibility. Customers and stakeholders may view the collaborative effort positively.

A pan Norwich city centre collaboration was seen as a way of "putting Norwich on the map" leading to mutual brand benefit.

4.4 Regulatory Drivers

Various external regulatory obligations and incentives were referenced **occasionally** as influencing the policies of the businesses represented.

These include:

• The Regulatory and Policy Environment: Government regulations and policies play a significant role in influencing businesses to adopt environmentally friendly practices.

• Supply Chain Expectations: Businesses with complex supply chains may face pressure from partners and suppliers to demonstrate eco-friendly practices. These companies may require suppliers to meet certain environmental standards, including using renewable energy sources, to be part of their supply network. Environmental Social Governance (ESG) was held to be a major and growing influence, it being a framework that helps stakeholders understand how an organisation is managing risks and opportunities related to environmental, social, and governance criteria.

• Stakeholders, including customers, employees, investors, commissioners, grant makers and campaign groups, exert their own pressure on businesses, social enterprise, and charities to be more environmentally responsible. They may demand action-orientated environmental policies, transparent reporting on sustainability efforts and expect companies to take tangible actions, such as investing in renewable energy sources like solar power where practicable.

4.5 Additional Drivers

Occasional mention was also made of the following as drivers.

Awareness of the Potential of Roof Space - some businesses came to the district meetings, motivated in part by the advance perception that their large roof space might be suitable for PV installation.

Progressive Landowners - Notwithstanding the barriers regarding landowners, some were positively engaged with PV installation and were working constructively with their business tenants.

5.0 Barrier Mitigators

Within the district meetings, arising from the discussion of barriers and drivers, there was consideration of some potential developments which might further the Norwich Solar System project in turning the Norwich BID area into an urban rooftop solar farm and then encourage businesses to form an energy consortium to use the energy generated.

The developments mentioned, which might be referred to as "barrier mitigators", were as follows:

- Further explore of the potential for businesses of sharing energy costs. For example, through the fostering or creation of local consortiums, buyers' clubs, and further work on feasibility of energy sharing agreements and infrastructure. Although costs have reduced over the recent years, the upfront investment can still be perceived as prohibitive, particularly for lower-income households or businesses with tight budgets.

- Continue to promote the use of rooftop solar and other renewable energy sources through information and experience sharing, and the use of exemplars, among businesses within Norwich and nationally.

- Work with Norwich City Council Planning Department to explore the scope for developing an increased mutual understanding between the business sector and the Department, regarding city centre commercial rooftop solar installation, particularly with regard to Heritage and Conservation.

- Work with local stakeholders to review and if necessary, develop the "green skills" strategy for the Norwich area, to include upskilling the local labour force and the capacity of local businesses on installation and ongoing maintenance, including cleaning.

- Consider how commercial tenants can work together to campaign to develop landowner policies on rooftop PV installation, including leasing roof space for PV panels to a third party which takes responsibility for installation and maintenance of the panels.

6.0 Conclusion

This study is just a first step towards gaining a fuller picture of the barriers to and enablers of PV adoption facing business property owners and tenants within area covered by Norwich BID. There is scope for the learning gain from this exercise and the Norwich Solar Project overall to mitigate the barriers and to encourage collaborative working to fuel the drivers of rooftop solar. It has become apparent from discussion that shared consortium working offers a strategic approach for Norwich businesses to leverage their collective strengths and resources to implement solar panel installations more effectively, efficiently, and economically. This can be a win-win situation for the participating businesses, the environment, and the broader community.

Notes

1 Commercialising low-carbon tech: Low-carbon technologies are not only essential to meeting climate goals they can provide valuable income streams for asset owners. Jamie Baxter & Cecile Bousquet – Royal Institute of Chartered Surveyors, 2020 Commercialising low-carbon tech | Journals | RICS

2 Green Roofs: Types, Costs & Installation, Homebuilding 2021 Green Roofs: Types, Costs & Installation | Homebuilding

3 Published in *Renewable and Sustainable Energy Reviews Volume 141, May 2021, K. Reindl, J. Palm, 2021, International Institute for Industrial Environmental Economics (IIIEE), Lund University, Box 196, 221 00, Lund, Sweden* Installing PV: Barriers and enablers experienced by non-residential property owners - ScienceDirect

Norwich
Business
Improvement
District

To find out more please get in touch

Norwich BID, The Forum, Millenium Plain, Norwich, NR2 1TF
01603 559570 info@norwichbid.co.uk
@NorwichBIDUK

norwichbid.co.uk