

Sustainable Eastside

Advice Note No.3

A Guide to the Application of Solar Power in the Regeneration of Eastside

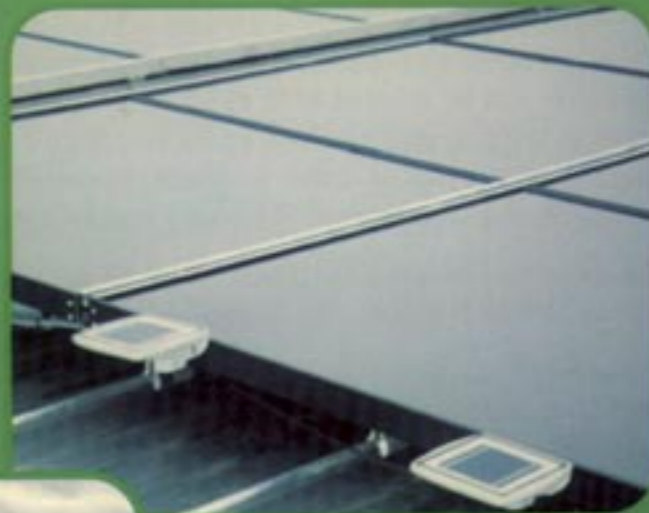
SOLAR WATER HEATING AND PV INSTALLERS

Genersys Plc www.genersys-solar.com
Imagination Solar Ltd www.imaginationsolar.com
Nuaire Ltd www.sunwarm.com
Riomay Ltd www.riomay.com
Solar Dawn www.solardawn.co.uk
Solar Tech Ltd www.solartech.plus.com

INSTALLERS OF PHOTOVOLTAIC PANELS

Beco Solar www.becosolar.com
BP Solar www.bpsolar.co.uk
Dulas www.dulas.org.uk
Energytech www.energytech.co.uk
Proven www.provenenergy.com
Solar Century www.solarcentury.co.uk

A full list of approved installers can be obtained from www.clear-skies.org



*Alexander Stadium,
Birmingham*

INCENTIVES AND FUNDING

Clear Skies

The £10 million Clear Skies initiative; can receive up to £100,000 for grants and £10,000 for feasibility studies, now fully allocated.

<http://www.clear-skies.org>

DTI Solar PV Grants Programme

Up to 55% of eligible costs can be grant funded for public sector bodies. Grants will last until January 2005.

www.est.co.uk/solar

Energy Saving Trust's Innovation Programme

Funds innovative carbon reduction projects. Focus more on energy efficiency to deliver Carbon emissions reductions.

http://www.practicalhelp.org.uk/initiatives/initiative.cfm?initiative_id=16

Energy Efficiency Commitment

EEC is a statutory obligation on energy suppliers with 15,000 or more domestic customers to deliver energy efficiency improvements in housing.

http://www.ofgem.gov.uk/temp/ofgem/cache/cmsattach/8178_EECaug04.pdf

Advice and support

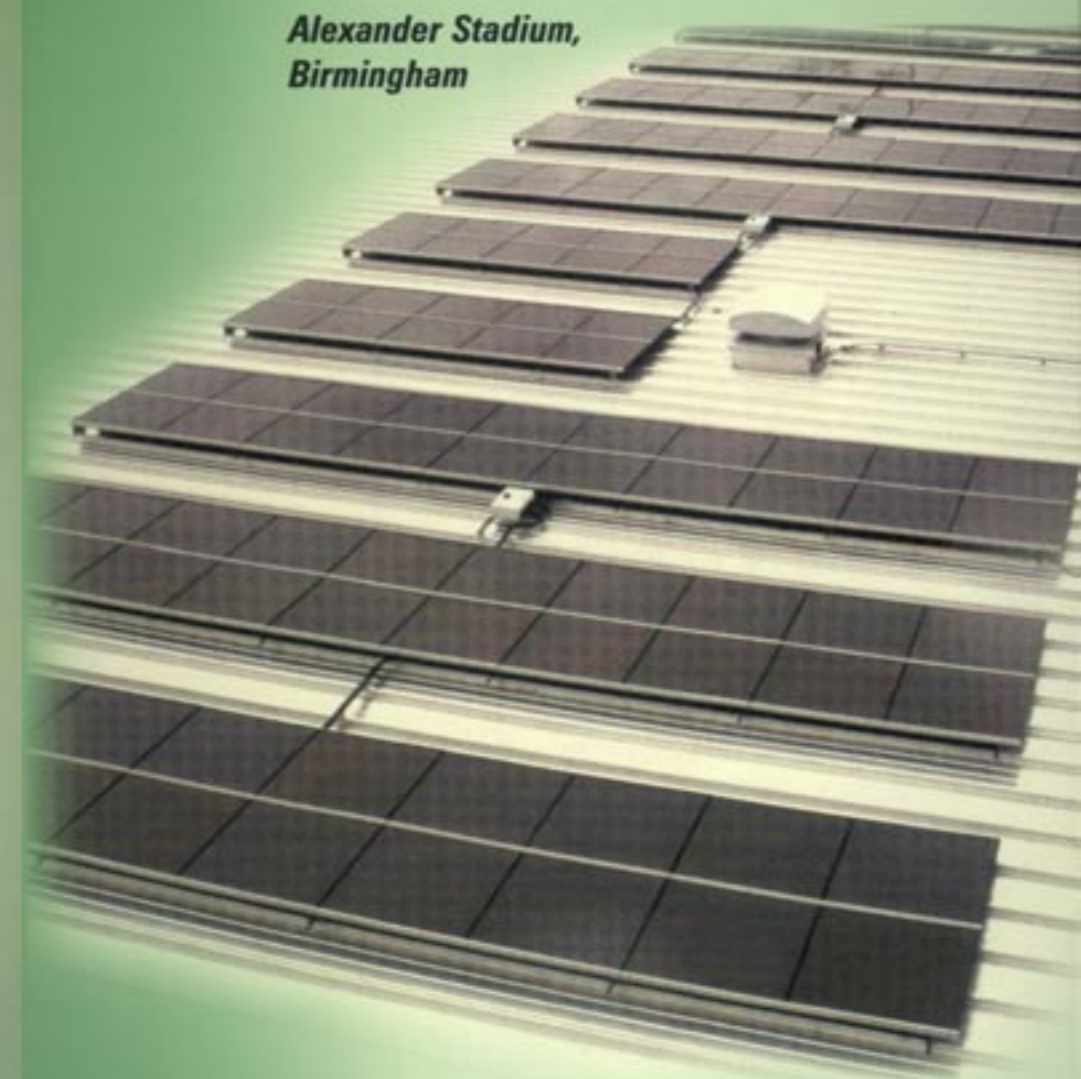
Energy Efficiency Advice Centres

Black Country & Central Midlands
Renewable Energy Advice Service
(REAS)Black Country Energy Efficiency Advice Centre
f: 0121 262 6405 f: 0121 200 1205

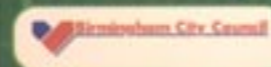
For further information contact:
Eastside Sustainability Advisor
t: 0121 464 0900

www.birmingham-sustainablebuildings.org

Study commissioned by Groundwork Birmingham and undertaken by Faber Maunsell.



*Alexander Stadium,
Birmingham*



INTRODUCTION

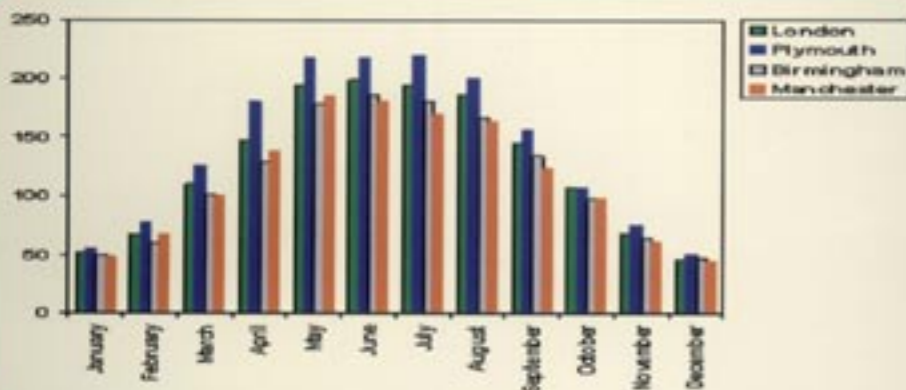
Eastside is a 170 hectare area adjacent to Birmingham City Centre core undergoing major economic regeneration (£6 billion projected investment over the next 10 years) with sustainable development at the heart of the process

The potential for three solar technologies - *passive solar*, *solar thermal* and *photovoltaics (PV)* - to be incorporated into the regeneration of Eastside presents numerous options.

The UK's Government's Energy White Paper and its own internal target of 10% electricity to be generated by renewables by 2010, with an aspiration for 20% by 2010 will drive developments across the UK to introduce renewables on an increased basis. Although wind, hydropower and bioenergy will make up a large part of the 10%, solar (particularly PV) is playing a small but increasing role.

The potential carbon savings (and cost savings for building users) would be a major asset and attraction to the area.

The graph below shows that the 30-year average of bright sunshine for Birmingham for the summer months was approximately 170 hours a month.



This is sufficient for all types of solar technology in this advice note to be utilised successfully. This shows that mains water could be heated above normal mains temperature (3-10°C on average) throughout the year, due to at least 2 hours of sunshine a day. Systems will be particularly successful during spring and summer months that have had, on average, over 5 hours of sunshine a day for the last 2 years in the Birmingham area.

WHAT ARE THE OPTIONS FOR SOLAR IN EASTSIDE ?

PASSIVE SOLAR -

Is the design of a building to maximise the benefits of natural elements: including the sun's own warmth to heat the building and warming and movement of air for ventilation. This achieves less reliance on active heating systems which use energy.

By considering building orientation (ie. facades orientated 45° of south), and layouts with living areas located facing south, the benefits are realised through natural "solar gain". This is now almost standard practice in building design.

The density of development proposed for Eastside will restrict the extent to which passive solar principles can be applied effectively to non-domestic developments.

However, as artificial lighting is one of the principle energy uses in offices, daylighting design is very applicable to Eastside developments. Solar shading, particularly on upper storeys, will also give large benefits.

Birmingham's Bourneville Village Trust, Christopher Taylor Court (sheltered housing 42 units) using passive solar design contributes 10% of the buildings heating demand, maintaining an internal temperature of 23°C.



The main advantages are

- Reduced quantity of heating required from conventional sources, less consumption of fossil fuels, lower heating bills.
- Using thermal mass (ie. heat stored in the mass of the building) can reduce heating demand and have a cooling effect.
- Avoidance or reduction of air conditioning by adopting natural ventilation strategies.

Passive solar; capital costs usually low or zero as this entails a design philosophy rather than additional components, overall running costs are reduced as less air conditioning and artificial lighting is used.

Maintenance is minimal as there are few mechanical systems.

Solar Thermal

Solar hot water systems use the energy from the sun to heat water; a heat collector (usually roof mounted facing south) heats a fluid, which via a heat exchanger provides hot water. These systems will continue to work even in diffuse lighting conditions.

Although more commonly used on a small-scale domestic basis they are increasingly adapted to larger scale commercial uses, such as offices where low temperature hot water can be used during the day.

For apartments with individual heating systems, top floor levels could be serviced by a solar thermal system. This would involve more complex services design, but could reduce the energy required for heating hot water by 800kWh for a 4 person dwelling.

Where there is suitable demand, solar water heating systems would also be suitable for schools, visitor attractions and offices where there are is a suitable daytime hot water demand such as kitchens or canteens as well as washrooms.

Photovoltaics

PV Systems convert energy from the sun into electricity through semi conductor cells; by incorporating photovoltaics into a development will enable the building to produce a percentage of its' electricity for free. It is most likely that any PV systems in Eastside would be connected to the grid so that excesses of electricity generated which are not used by the building (ie. offices on weekends) could be sold back to the grid at a profit.

Ideally PV's should face between southeast and southwest, at an elevation of 30-40° (although flat roofs will still operate at 90% of the ideal); these criteria should be easily met in

Eastside providing shading from adjacent structures is taken into account, ie. other taller buildings, trees, aerials.

Important - energy efficiency should be considered before the fitting of a PV system, there is no point fitting a system to a building which wastes energy in other areas.

Advantages

Photovoltaics are applicable to most of the development in Eastside due to the range of building types planned and the range of PVs available; they can be integrated into or bolted onto most roof types or integrated into atria, windows, shading or facades etc.

PV material does not have to be confined to building design as materials can be adapted to fit street lights, parking meters or the sides of bridges; they can also easily be retrofitted. South facing awnings over cafes or shops, if suitably unshaded could become photovoltaic canopies providing shade and a distinctive feature.

Canal Corridor- already proposals for an interactive lighting display in the Curzon St. Tunnel which could be powered by a PV array.

Photovoltaic panels on both facades and roofs with buildings having 'active' frontages - integrated PV panels into glass facades would make a good architectural feature and talking point.

Alexander Stadium, Birmingham

The PV roof for the Alexander Stadium received £270,000 funding from the DTI PV solar grants programme and £70,000 from Npower. This is a 102 kWp grid-connected installation and is the UK's largest solar roof covering 1500m². 80MW/yr is the estimated generation. The centre is predicted to generate more electricity annually than it uses and the excess will power other buildings on the site.

It is worth noting that under the DTI's PV solar grants programme that any applications in an Objective 2 area (which includes Eastside) can be eligible for an additional 10% funding.