Essex County Council

ESSEX SOLAR DESIGN GUIDE

September 2022 I Rev B

Levitt Bernstein People.Design

Etude

Structure for the Essex Solar Design Guide

1. **Why Solar Design** – introducing the main drivers for good solar design: daylighting, solar gains and mitigating overheating.

2. **Design principles** – exploring the different design decisions available to optimise the solar design of a building, including orientation and overshadowing (site layout, building form), glazing, and roof layout.

3. **Typologies** – one-pagers that explore the how the context for difference developments will impact on the design decisions. Typologies explored will be greenfield low-rise residential, urban higher-density residential and low rise simple non-domestic.

4. **Assessment and best practice guidance** – outlining the KPIs and methodologies that can help measure the performance of development against the goals of best practice solar design.

1 WHY SOLAR DESIGN?

Why consider solar design?

This Solar Design Guide has been produced by Etude and Levitt Bernstein on behalf of Essex County Council, to give developers, architects and homeowners an easy-to-use guide, laying out the key considerations for good solar design. The core principles of good solar design are to balance the needs of daylighting, useful solar gain and mitigating overheating:

Daylight

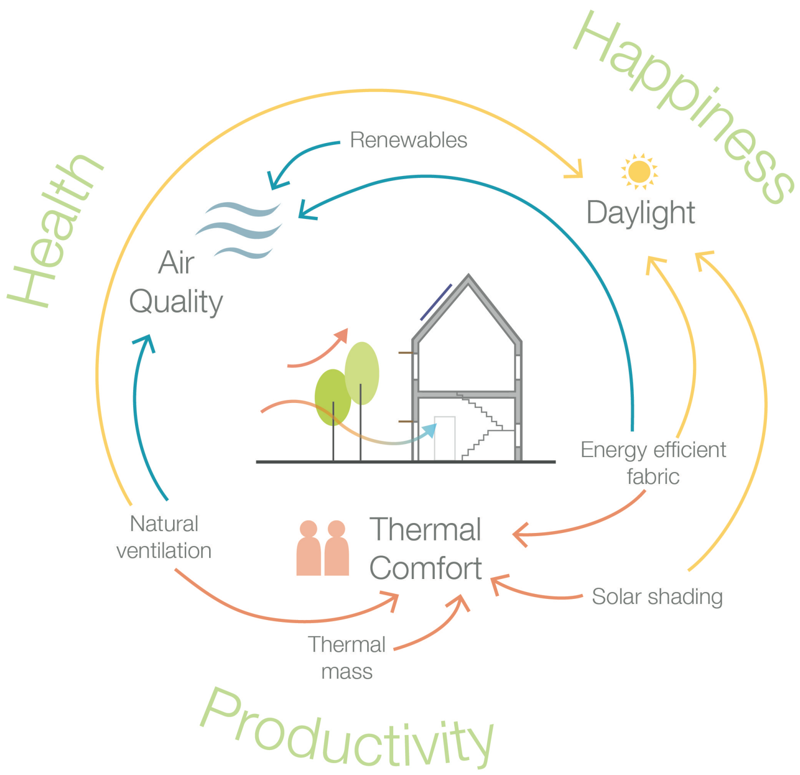
Daylight provision is important for buildings. We need daylight to see what we are doing, to give a connection with the outdoors and it can save energy, by reducing reliance on artificial lighting. However, too much daylight can also be a bad thing. Glare is bad for our eyes and can cause headaches and nausea, so careful design is important.

Useful solar gain

Solar heat gain from the sun can be useful. In winter months, useful solar gains can be used to offset the need for heating.

Too much solar gain

If we have too much solar gain there is an increased the risk of overheating. Climate change is already bringing warmer summers with more extreme temperature highs. With this, overheating in buildings is becoming an increasing threat to occupants' health and wellbeing, particularly for vulnerable people. In future years, this is set to become even more of an issue. All projects should prioritise natural methods of reducing overheating, over energy-intensive technology like air conditioning. The key steps are to reduce solar gains and maximise ventilation.



Definitions

- **Sunlight** is a term used to describe all light coming from the sun. It is made up of infrared, visible, and ultraviolet light. The term is typically used in this guide when assessing external spaces.
- **Daylight** is the light we need to be able to see (visible light). It can be either direct or diffuse (meaning indirect). North facing rooms can still achieve good daylight levels due to diffuse light.
- **Solar gain** is short wave radiation from the sun. When it passes through glazing, some of the energy is converted into long-wave radiation (heat). Solar gain is predominantly direct. North facing rooms will usually have low levels of solar gain.

2 DESIGN PRINCIPLES

Solar design principles | Site orientation

Orientation

Early consideration of orientation can have a significant impact on how much sun enters the building and therefore its energy performance and thermal comfort for occupants. Allowing solar gain can reduce how much energy is needed to heat the building in winter, conversely it can also cause summer overheating if not kept in balance.

Dual aspect buildings facing predominantly north and south allow for controllable solar gain to the south. This means buildings can benefit from useful solar gain in the winter while easily excluding excess solar gain in the summer.

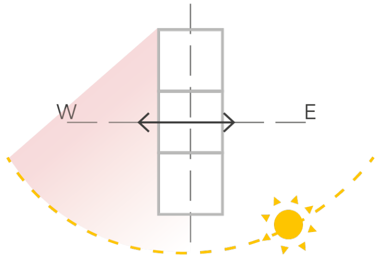
The low sun angle directed on east and particularly west facing facades can be more difficult to manage in summer, leaving buildings prone to excess solar gain and overheating if not designed carefully.

Where a building has a high performing building fabric it becomes more important to balance and regulate solar gains through the building design, to make use of the heat in winter without overheating in summer.

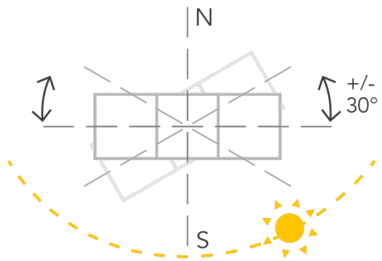
There may be constraints within the site and the larger context, such as complementing the existing urban pattern or challenging infill sites where a north south orientation is not feasible. Ensuring that as many facades as possible face south is best practice. An east-west orientation is less optimal for performance, and when this is required, other characteristics such as the 'form factor and window ratios must be optimised.

Design actions

- Orientate the largest building elevations within +/- 30° of south
- Site layout should maximise number of dwellings with a main living room that has at least one window on a wall facing 90° due south.



Inefficient Design *– Avoid large areas of elevation facing east west as this can mean the building is harder to protect from overheating (the lower sun angles restricts solar shading options) and less of the building will be able to benefit from solar gains.*



Optimised Design *- Ideally south facing allows for solar winter gain. Elevations facing +/- 30° south will benefit from useful solar gains in the winter*

+/- 30° south – this term is reference several times. To capture useful solar gains the largest elevations should be facing as close to south as possible. 30° either side of south is used as an approximate range so designers can make an informed judgement.

Case study

Goldsmith Street

Mikhail Riches Architects

At goldsmith street, the homes were arranged facing due South. The buildings were 2-3 stories high and streets positioned 14m apart, reducing overshadowing. Shading was provided above south facing windows to reduce excess solar gain in summer.

Solar design principles I Overshadowing

The massing and density of a development can influence access to sunlight, daylight and solar gains to internal and external spaces.

Site layout

It is best practice to avoid placing higher elements to the south of a site, ideally these should be placed to the north to avoid excessive shading of other buildings and external amenity spaces. Consideration should also be given to surrounding buildings off site. Allow strategic breaks in building massing to let sunlight in. When designing for sunlight consider the suns angle at different times of the day across different seasons.

Distances between buildings

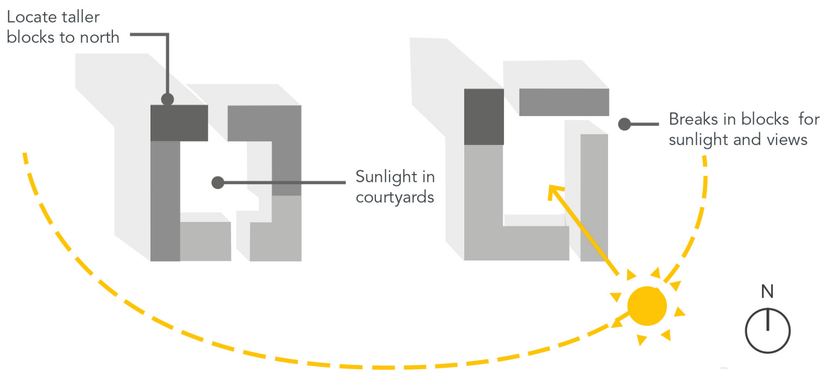
Building spacing and street proportions should be assessed to reduce the extent overshadowing. It is good practice to allow a distance of at least 1/1.5 times the buildings height between buildings. There is a balance to strike in dense contexts as taller buildings will make it difficult for all dwellings to receive sunlight in winter months. Ensure that year-round sun paths are thoroughly considered when designing to allow as many dwellings as possible to receive sunlight.

Courtyards and public amenity

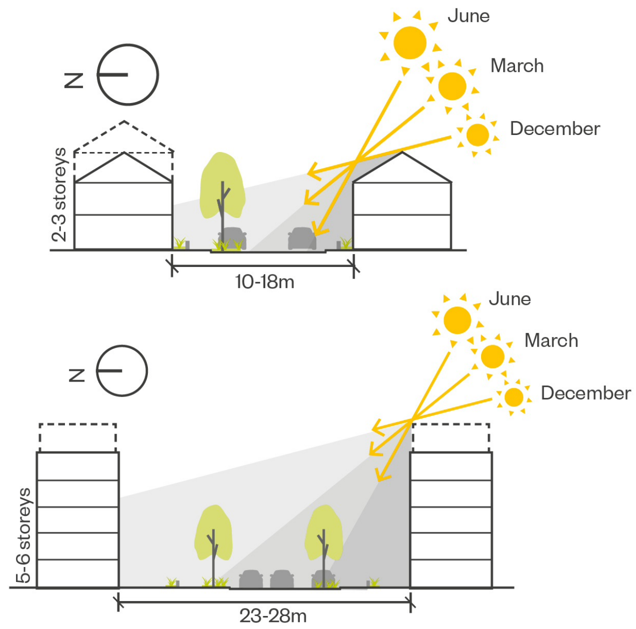
Sunlight is a welcome feature of external spaces such as communal gardens, public squares and roof terraces. It is best practice to design for at least half of the total area of amenity space to receive direct sunlight for two hours on the 21st March (spring equinox) as per BRE guidance "Site layout planning for daylight and sunlight".

Design actions

- Place higher elements to the north of the site to avoid overshadowing on and around the site
- Allow a distance of 1-1.5 times the building's height between buildings to avoid overshadowing
- Design green amenity space to receive sunlight as per BRE guidance



On high density developments taller blocks should be located to the north where possible to avoid overshadowing the shorter building. Break massing of buildings to allow for sunlight to penetrate into courtyards.



Allow a distance of 1-1.5 times the building's height between buildings to avoid overshadowing. Less than this will mean a whole buildings facade will not get solar gains in winter.

Designing for daylight

Daylight is not solely dependant on orientation. While a room facing north will not receive direct sunlight, it can still be adequately daylit as it receives diffuse light (i.e. reflected or scattered light). The amount of daylight a room receives is dependant on: external overshadowing from neighbouring buildings, overhangs or balconies; the size and location of windows; the depth of the room; the materials and colours used; and the visible light transmittance of the windows. The BRE "Site layout planning for daylight and sunlight" provides guidance on how to calculate internal daylight levels.

Room layout

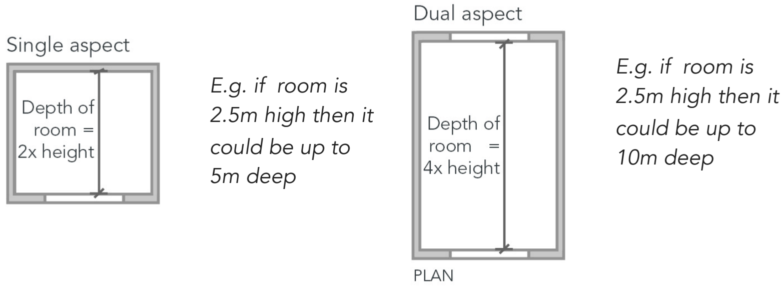
Reducing room depth, taller ceilings and higher window heads all allow more light to enter further into the room reducing the need for artificial lighting. Ground floor rooms in buildings receive less daylight than upper floors, so it is sometimes useful to have larger areas of glazing on the lower floors. However, orientation, privacy and security should be considered. Nearby obstacles such as buildings and trees, will reduce the daylight the rooms receive. Windows in alcoves, beneath overhangs and on inset balconies receive less daylight.

Materiality

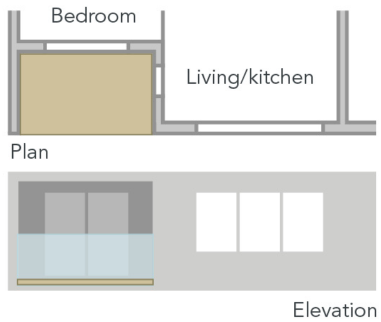
Using light-coloured materials around windows helps reflect daylight into buildings with overhangs or inset balconies. Also consider perforated or simple railing balustrades to allow light through. Using lighter coloured finishes internally increases light reflectance inside a room while also improving the perception of light.

Design actions

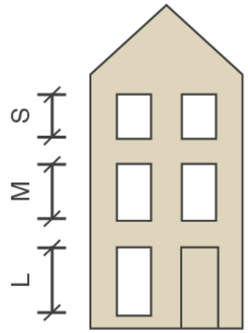
- Reduce room depth and increase floor to ceiling height to maximise daylight penetration.
- Consider larger windows at ground floor
- Lighter colour materials should be used to increase light reflectance in a room



Rules of thumb for room depths to increase daylight levels.



Inset balconies can reduce daylight levels, so projecting balconies are preferred.



Lower floors receive less daylight than upper floors. Depending on orientation and privacy, ground floors may require more glazing than upper floors.

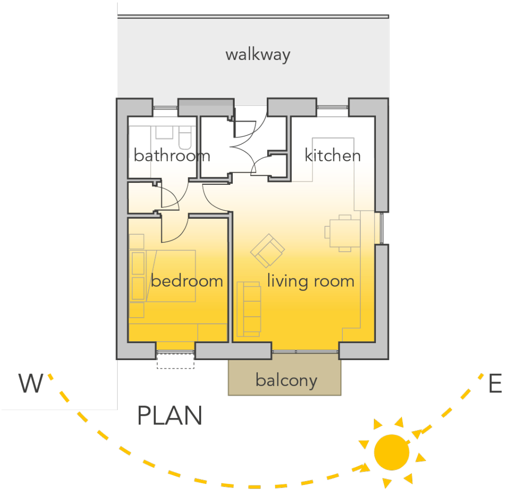
Solar design principles I Designing for solar gain

Room layouts for solar gain

To maximise useful solar gains in winter, rooms with the highest occupied hours should be positioned along the south side of the building. Ideally:

- Living rooms should face South or West.
- Kitchens North or East.
- Consider north facing home offices to avoid glare.
- Bedrooms should be avoided on the West elevations, because these receive solar gain at the end of the day, just before they are occupied, so carry a high risk of overheating.

*Note: with this strategy there is an increased risk of overheating. However, this can be effectively managed with suitable solar shading and prioritising dual aspect.



Typically, the spaces where people will spend most of their time are the ones which require most natural daylight and warmth in the winter.

Design actions

- Position occupied rooms to the south

Solar design principles I Glazing specification and proportions

Glazing specification

The g-value of glass is used to describe how much solar heat energy (short wave infrared radiation) can pass though a material. It is a factor on a scale from 1 to 0. Where 0 represents no solar gain and 1 represents maximum solar gain. For residential schemes a g-value of 0.5 is optimum. Reducing the g-value to mitigate the risk of overheating is not recommended. This can lead to larger proportions of glazing than is necessary, because glass has a higher conductive heat loss than an insulated wall, large amounts of glazing can greatly reduce the energy efficiency of the building.

Design actions

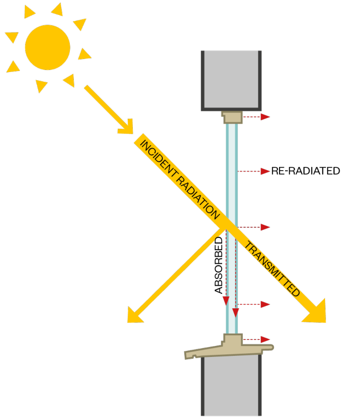
- Use a g-value of 0.5 (for schools this can lowered to between 0.4-0.5)
- Avoid tinted glass or glazing films, with g values of below 0.5 as these reduce useful solar gain in winter. If overheating is a problem, it is better to reduce the proportion of glazing or use solar shading.

How much glazing should there be?

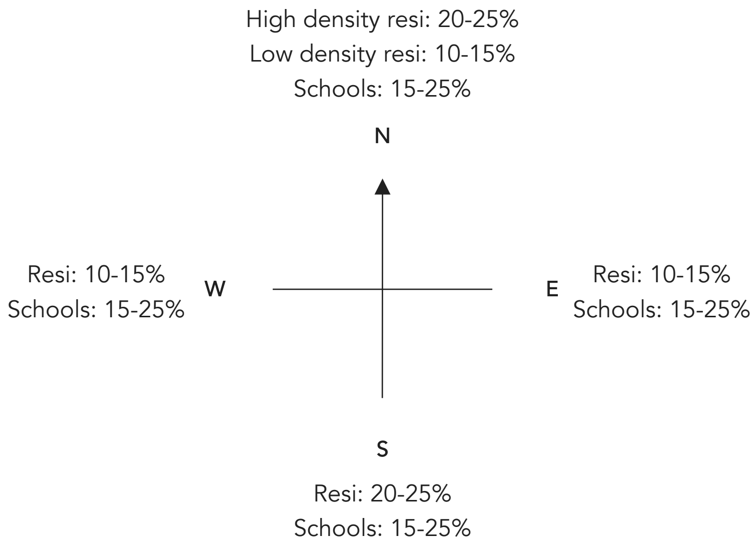
Getting the right glazing-to-wall ratio on each façade is a key feature of energy efficient design. Windows and doors conduct more heat than an external wall, even when they are super-efficient. It is useful to think about how much energy a window will lose compared to how much solar energy it will capture across the year. This will tell you whether you should really reduce the amount of glazing to a minimum (important on north facing elevations) or provide larger glazing areas (important in south facing elevations). Don't forget that glazing is expensive - being careful about where glazing is used is beneficial for energy, thermal comfort, and the project budget. Rooflights can be useful for providing daylight to spaces, but they should be used conservatively. They are often less energy efficient than standard windows and harder to shade, contributing to overheating risk.

Design actions

- Use LETI Climate Emergency Design Guide recommended glazing proportions



Sankey diagram (i.e. a flow diagram, where the width of the arrows is proportional to the flow rate) showing solar heat flow through a window. Incident radiation is reflected, absorbed, transmitted and re-radiated.



LETI Climate Emergency Design Guide recommended glazing proportions

Window design

Carefully consider window position and size to optimise daylight and solar gain, taking into account:

- Function - living areas tend to need more daylight than bedrooms.
- Size - room too big or deep for window size and window size too big for room.

Glazing below 800mm provides little benefit to internal daylight levels and is typically for view and enjoyment. When designing windows, keep the room proportion and layout of the room in mind. Note: upper floor windows (floor heigh 600mm above outside) can only be modelled as openable if guarding is at a minimum of 1.1m.

Horizontal windows are more effective than vertical windows in terms of improving daylight distribution and increasing the amount of openable area available for ventilation. They are typically easier to shade, lowering the risk of overheating. Horizontal windows in bedrooms also provide privacy and space for furniture. It is understood that due to local context or other design factors, this optimal approach may not always be possible.

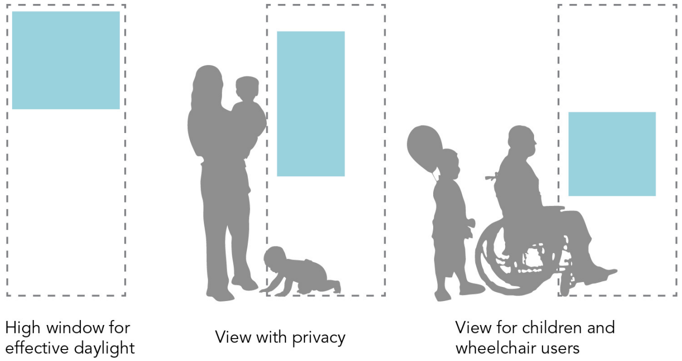
Where possible windows should be installed in the insulation line, to reduce thermal bridging.

Window openings

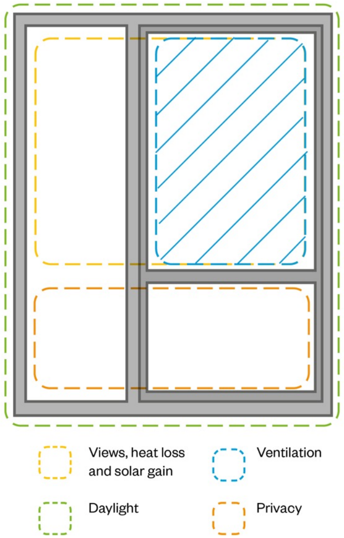
Consider how the windows open for effective ventilation. Side hung windows have a larger opening area than top hung windows. Consider potential conflicts with internal or external shading devices. Place windows on opposing sides of the room or at 90° to help with cross ventilation.

Design actions

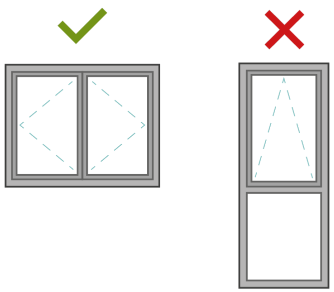
- Consider what portion of the window is useful for daylight, solar gain, ventilation, privacy and views.
- Favour horizontal windows over vertical glazing
- Favour side-hung over top-hung windows



Windows do not need to be full height to allow views and good daylighting.



Different zones of the window are useful for different reasons. Consider the effect of large windows on heat loss and heat gain together with what portion of the window can be opened for ventilation.



Horizontal windows are more effective than vertical windows in terms of improving room lighting distribution and increasing the amount of openable area available for ventilation

Solar design principles I Solar shading

Solar shading

When orientating buildings South, there is an elevated risk of overheating in summer. However, this can be counteracted with solar shading, applied to South, East and West elevations.

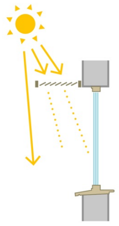
South facades offer the best opportunity to protect from solar gain. fixed shading such as **horizontal brise soleil** are really effective. In summer, when the sun is at a higher angle in the sky, they shade from unwanted solar gain, but in the winter, when sun angles are lower, useful solar gain still enters the space. For the depth of horizontal brise soleil, a useful rule of thumb is half the window height. In practice though, any amount of shading will be beneficial.

Balconies offer a similar opportunity to shade South facing windows. A preference should be made for stacked projecting balconies, as inset balconies have higher levels of thermal bridging and can create dark, dimly lit rooms. For top floor balcony windows, where there is no balcony above, a canopy or brise soleil should be considered.

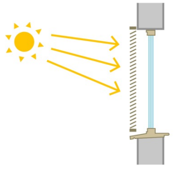
East and West facades are harder to shade effectively. Vertical brise soleil are not generally recommended as they can reduce useful solar gain in winter and cannot shade the sun early or late in the day. **Movable shutters** or **external blinds** are recommended. These can be left open in winter but closed in summer. They can be perforated or slatted to still allow air flow, or lockable to provide security.

Design actions

- South elevations – use horizontal brise soleil and projecting balconies
- East / west elevations – use shutters or external roller blinds
- Prioritise deck access over internal corridors

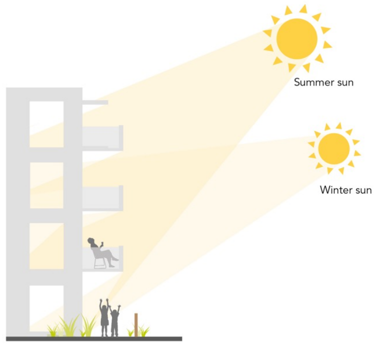


South
High angled sun can be controlled using horizontal shading above.

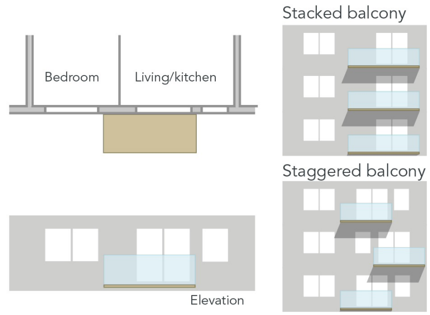


East/West
Low angled sun creates an overheating risk which can be prevented using external vertical shading e.g. shutters.

Prioritise projecting balconies over inset balconies, for better natural daylight and reduced thermal bridging (orange line represents the length of the thermal break)



Projecting balconies on South facades provide shade to windows below during summer, but allow usefull solar gain in winter.

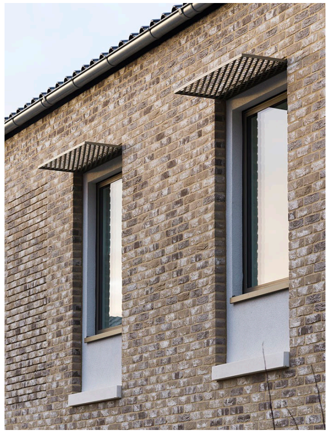


Prioritise stacked balconies over staggered balconies, to provide shade from unwanted solar gain in Summer.

Solar design principles | Shading examples

Real-life examples

Solar shading can come in many forms and should be specified based on the sun angle. Here are some examples of solar shading devices for both South facing and East/West elevations.

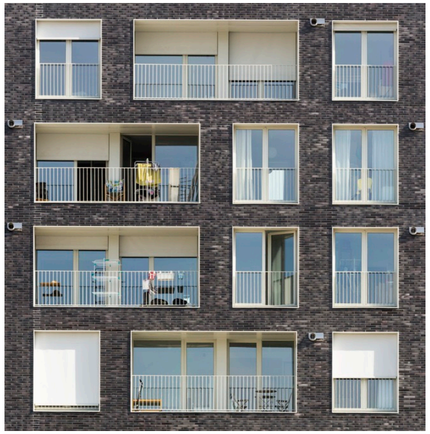


Goldsmith Street – Brise soleil to South facing windows

Concertina style shutters

Concertina style shutters

Sliding shutters by starshutters



External roller blinds

Awning style blinds

Ventilation

To improve thermal comfort in summertime, it's important to maximises natural ventilation. Where possible, windows should be designed to be fully openable and floors plans arranged to allow cross ventilation.

Dual aspect - Where possible, provide dual aspect flats. Cross ventilation is the most effective form of natural ventilation, while adjacent wall ventilation is less effective but better than single aspect.

To maximise natural ventilation, aim for a good room height of at least 2.5m and preferably 2.7m or more. For single sided ventilation the room depth should not exceed 2.5 times the room height. For cross ventilation the room depth should not exceed 5 times the room height.

When designing for ventilation, special consideration should be given to the requirements in Part O, particularly around noise, pollution, security and protection from falling and entrapment.

Where noise, security, pollution reduces the ability to fully open windows, alternative means of ventilation should be considered:

Acoustic restrictions – reduced opening, boosted mechanical ventilation, summer bypass, MVHR air tempering module, mechanical cooling (options should be considered in this order)

Security risk windows - mesh, bars, louvres, grills, lockable shutters (options considered in any order)

Pollution – mechanical ventilation and plants/trees

For buildings with MVHR systems, ensure this can be run in summer by pass mode to cool incoming air with the air leaving the building.

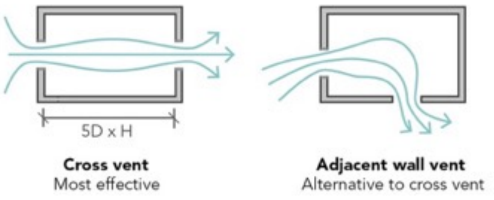


Diagram showing cross ventilation and adjacent wall ventilation.

Zehnder MVHR ComfoAir Q350 features summer bypass mode

Design actions

- Design for cross ventilation where possible
- Mechanical cooling should only be used once all other methods of ventilation have been considered.

Solar design principles I Green spaces

Green space cooling effect

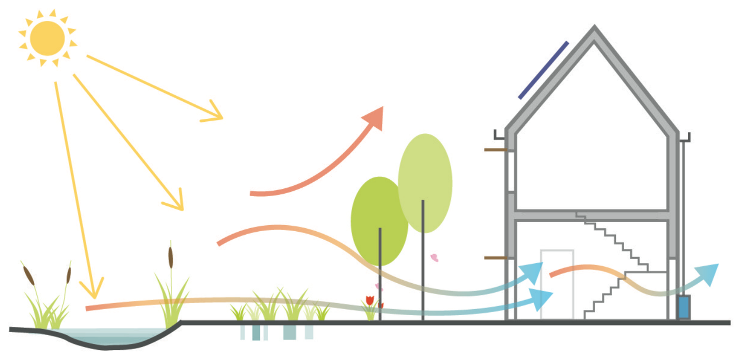
The incorporation of extensive blue and green infrastructure into the masterplan can help to locally reduce the indoor and outdoor temperature, reducing the urban heat island effect. Green walls, green roofs, trees, and bodies of water including those provided through SuDs in the landscape strategy will assist to keep the local temperature lower and aid in cooling. While it is widely understood that green and blue spaces reduce local temperatures, these measures should be used in combination with other building design based solar gain mitigation measures. Specifying large areas of hard, dark-coloured surfaces increases local air temperatures where it receives direct sunlight. This is because darker colours absorb the suns rays, known as the albedo effect.

Planting

Trees can provide additional shading to buildings and public realm. Deciduous trees allow for sunlight and solar gains to reach the buildings in winter when the leaves fall, while providing shading in summer. The size and age of trees can make the amount and longevity of shading difficult to predict. Therefore, shade from trees should not be relied upon as an overheating mitigation measure, they simply supplement the overall building design. When designing external spaces consider how much sunlight will be received on planted areas and select appropriate species to suit. Bird and bee houses also require specific conditions related to solar access.

Design actions

- Use extensive green and blue infrastructure to reduce local temperatures
- Use trees as an additional measure to supplement building design features to prevent overheating in buildings.
- Select plants and habitat features to suit solar access.



Green and blue infrastructure helps to cool the surrounding environment naturally and reduces the urban heat island effect. Water bodies are known to cool the air and can contribute to a cooler microclimate on the site. Trees outside a building can provide some shade, but they should not be depended on as the sole source of solar shading.

Solar design principles | Maximising potential for PVs

Harnessing energy from the sun for heating and electricity

Consider how the building form supports the capture of renewable energy, such as south facing roofs for PV. Utilise principles of passive solar design to reduce winter heating load, limit summertime overheating and implement efficient natural ventilation where possible.

Solar photovoltaics (PV) are ideally suited to buildings

Solar photovoltaic (PV) panels generate electricity when exposed to sunlight. They are usually the most appropriate form of renewable energy generation for a building as they are simple, mature and durable technology and can be installed on both roofs and suitable facades.

Roof design maximises solar photovoltaic energy generation

By considering solar photovoltaics at the very earliest of design stages, it's possible to optimise roof shape and orientation to maximise solar photovoltaic output – in turn maximising returns for occupants. How well a roof space is designed and utilised can be expressed in kWh of energy generated per m^2 of building footprint.

Renewable energy generation offers many benefits

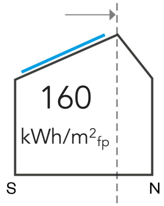
Generating electricity at the point of use offers several advantages, including:

- provision of cheap electricity close to demand that can offset electricity consumption at full retail price,
- the ability to directly power building systems or charge electric vehicles from rooftop solar energy, and
- immediate decarbonisation of electricity supplies (rather than having to wait for the UK grid to decarbonise)..

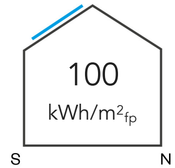
Future adaptability

Even if PVs are not proposed for current scheme, the design should be maximised to enable installation of PVs in the future.

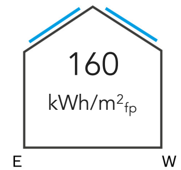
Pitched Roof



North South
Asymmetric pitch roof with a majority south facing roof

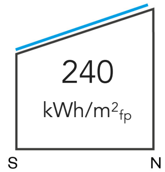


North South
Pitch roof with a south facing roof



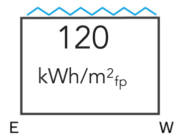
East West
Pitch roof with a majority east/west facing roof

Monopitch Roof

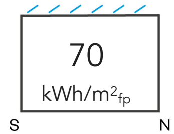


North South
Monopitch roof with a majority south facing roof

Flat Roof



East West
Flat roof with a east/west concertina PV array



North South
Flat roof with an angled south PV array

Roof design can be optimised to maximise energy output from photovoltaics. How well the roof space is utilised can be expressed in kWh generated per m^2 of building footprint (kWh/m$^2_{fp}$)

Design actions

- For North South pitched roofs, move ridgeline to create asymmetric pitch with majority South facing
- For mono-pitched roofs, slope roof to face South
- For flat roofs, design for East/West concertina PV array as opposed to North South

3 TYPOLOGIES

Building Typologies I 1. Urban high-density new-build residential

Orientation, overshadowing, daylight and solar gain

- Orientate buildings 30 degrees from South (where possible)
- Place higher elements to the North of the site
- Allow a distance of 1-1.5 times the building's height between buildings
- Design green amenity space to receive sunlight as per BRE guidance
- Position occupied spaces on the South façade

Glazing

- Favour horizontal windows over vertical glazing
- Use a g-value of around 0.5
- Use LETI glazing ratios: north = 10-20%, east = 10-15%, south = 20-25%, west = 10-15%

Shading

Overheating is a significant risk for this type of building, to reduce this:

- South Elevations – use horizontal brise soleil and projecting balconies
- East / West Elevations – Use shutters or external roller blinds
- Prioritise deck access over internal corridors

Ventilation

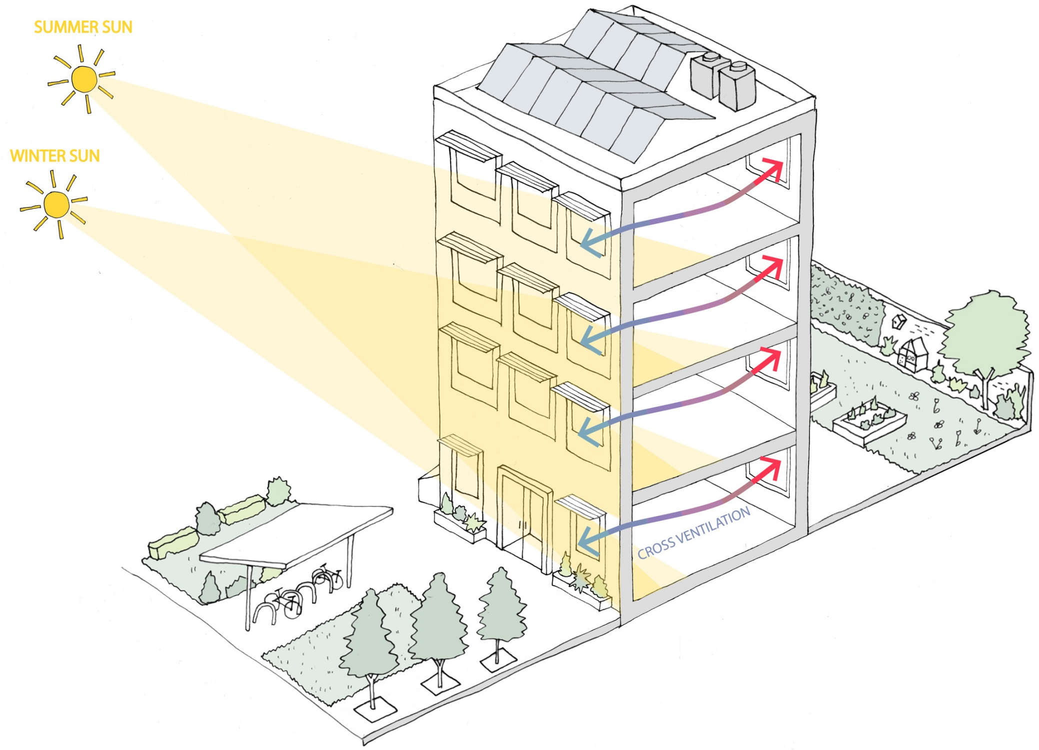
- Cross ventilation can be harder to achieve, so larger openings may be required.
- Mechanical cooling should only be used once all other methods of ventilation have been considered.

Green spaces

- Incorporate blue green spaces into masterplan

Maximise PV

- For flat roofs: prioritise East/West concertina array as opposed to North / South array.



Opportunities and constraints

- Due to their compact form, high density residential new builds have relatively low heat losses in winter, making them highly energy efficient.
- However, in summer the risk of overheating is a significant risk due to dense massing, reduced access to cross ventilation, high internal heat gains (within the dwellings, but also communal heating systems) and the urban heat island effect. It is therefore much more important to provide shading of windows and maximise natural ventilation.

Building Typologies I 2. Greenfield, large-scale, low-density new-build residential

Orientation, overshadowing, daylight and solar gain

- Streets should be arranged to face due South (to optimise useful winter solar gain and reduce risk of overheating)
- Leave room for green amenity space to the South
- Allow a distance of 1-1.5 times the building's height between buildings
- Design green amenity space to receive sunlight as per BRE guidance
- Position occupied spaces on the South façade

Glazing

- Favour horizontal windows over vertical glazing
- Use a g-value of around 0.5
- Use LETI glazing ratios: north = 10-15%, east = 10-15%, south 20-25%, west = 10-15%

Shading

- South Elevations – use horizontal brise soleil and projecting balconies
- East / West Elevations – Use shutters or external roller blinds

Ventilation

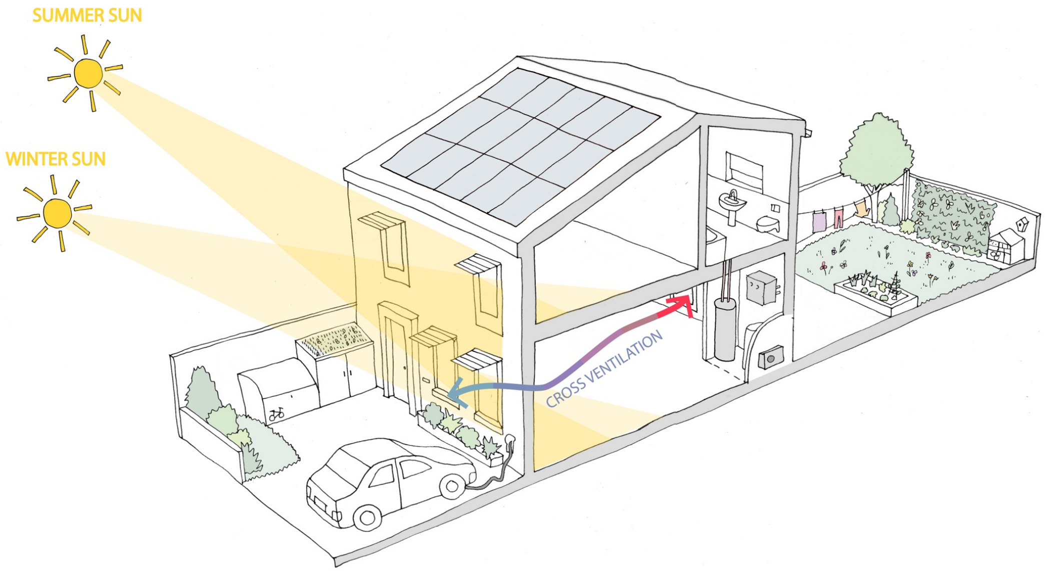
- Good opportunity for cross ventilation. Open plan living can maximise this.

Green spaces

- Incorporate blue green spaces into masterplan

Maximise PV

- Often feature North / South pitched roofs: move ridgeline to create asymmetric pitch with majority South facing
- Maximise renewables so that 100% of annual energy requirement is generated on-site



Opportunities and constraints

- Terraced streets offer a good opportunity to maximise South orientation. This optimises useful solar gain in winter and reduces the risk of overheating in summer (South facing glazing is easier to shade than East / West)
- Large areas of South facing roof are an ideal candidate for PVs
- Cross ventilation is much easier to implement. Open plan living can maximise this.
- Due to their large surface area (per useful floor area), low-density new build houses can have high heat loss. By optimising South facing glazing useful solar gains can offset this.

Building Typologies I 3. New build education (schools)

Orientation, overshadowing, daylight and solar gain

- Orientate buildings 30 degrees from South (where possible)
- Place higher elements to the North of the site
- Allow a distance of 1-1.5 times the building's height between buildings
- Design green amenity space to receive sunlight as per BRE guidance
- Position occupied spaces on the South façade

Glazing

- Favour horizontal windows over vertical glazing
- Use a g-value of between 0.4 - 0.5
- Use LETI glazing ratios: north = 15-25%, east = 15-25%, south = 15-25%, west = 15-25%

Shading

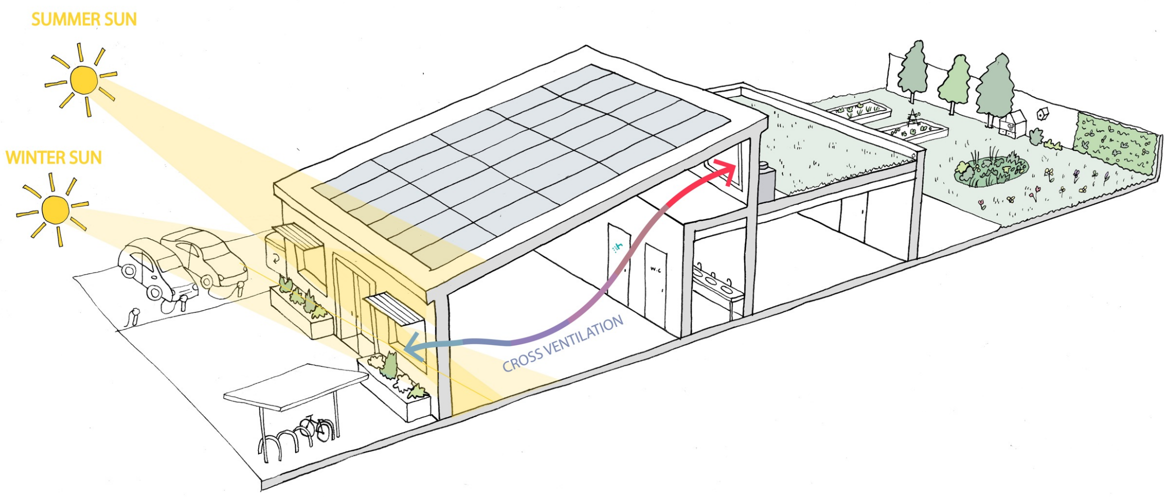
- South Elevations – use horizontal brise soleil and projecting balconies
- East / West Elevations – Use shutters or external roller blinds

Ventilation

- Design for cross ventilation where possible
- Incorporate blue green spaces into masterplan

Maximise PV

- Maximise renewables so that 70% of the roof is covered
- Mono pitched roofs angled South are able to generate more PV energy than flat roofs
- For flat rooves, design for East West concertina PV array as a opposed to North South
- For mono pitched roofs, slope roof to face South



Opportunities and constraints

- Often on large open sites, there is an opportunity to maximise the buildings orientation, overshadowing, density and massing.
- Schools often have large areas of roof space, so good potential for PVs, Net Zero Carbon (more energy generated than used on site) is usually achievable and in many cases it is possible to generate more energy which can be exported to the national grid.
- Where possible, schools should aim to be solely naturally ventilated in summer.

4 ASSESSMENTS AND BEST PRACTICE GUIDANCE

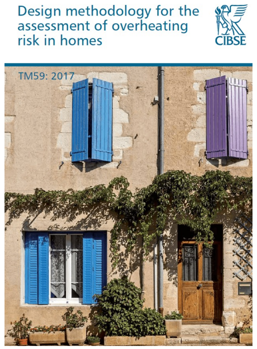
Assessments

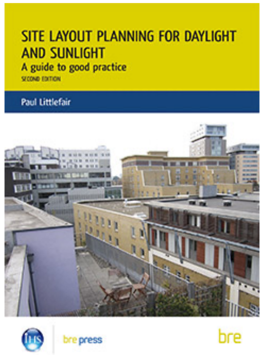
Daylighting

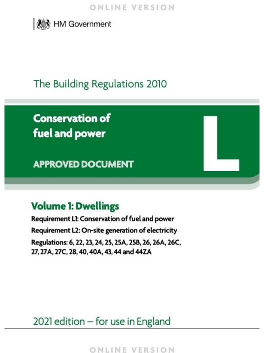
- BRE Site layout planning for daylight and sunlight (access to sunlight, ADF, % of sky, uniformity factor)
- BS EN 17037 – daylighting for interiors and how to limit glare
  Right to Light - A right to light easement grants a landowner rights to receiving light to particular rooms within the building. This is a separate legal issue relating to how new buildings affect the daylight of surrounding existing buildings and should be calculated by a qualified surveyor.
- Software programs: grasshopper, ladybird, Velux daylight program, what else is there?

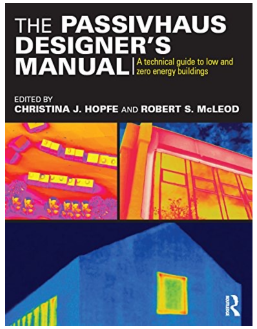
Overheating Risk

- Good Homes Alliance – Overheating in new homes. This document presents a methodology to identifying how at risk new build homes are from the risk of overheating. It is a useful tool to be used at the beginning of the design process, before any predictive modelling has been undertaken.
- TM59 – A design methodology for the assessment of overheating risk in homes using dynamic software (such as IES-VE, EDSL-TAS)
- Part O – This new building regulation applies to all new build properties registered with building control on or after June 2022. It contains two methods of compliance. A simplified method (morse suited to small single dwelling schemes) and a dynamic method (for more complex schemes). The dynamic method follows the TM59 methodology but with some additional requirements. Part O is part of building regulations and therefore a legal requirement for all buildings in England.
- BB101 - Guidelines on ventilation, thermal comfort and indoor air quality in schools
- TM52 – An assessment methodology used to assess the overheating risk in Europeon buildings. Generally used for non-domestic buildings (except schools, which use BB101)







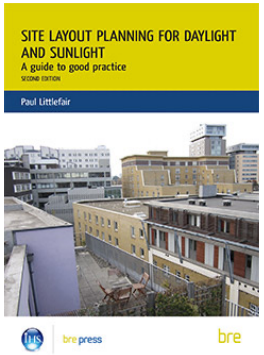


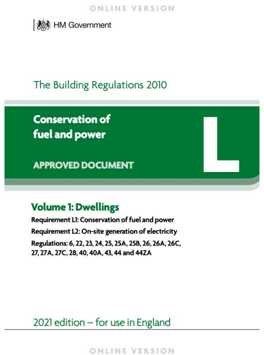
Assessments

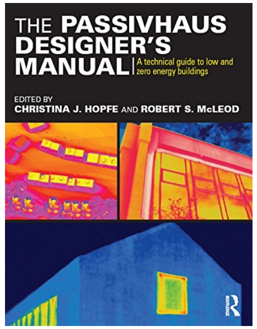
Energy Efficiency

Assessments:

- Passivhaus – The gold standard in building design. Applies a whole-building approach to deliver high-quality, energy efficient buildings.
- Part L (2021 issue) – For dwellings and non-dwellings, is the government's approved document for assessing energy consumption and generation. As it is part of building regulations, compliance is a legal requirement for all buildings in England.







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