



ProCredit
H O L D I N G



Greening ProCredit premises guide



This document was developed by our partner, Internationale Projekt Consult (IPC) GmbH, in co-operation with ProCredit Holding. We thank IPC for their expert advice in the development of this guide.

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1. Foreword

Introduction and overview

ProCredit's corporate policy is based on environmental and ecological principles. Protecting the environment and natural resources and promoting measures that mitigate climate change are therefore a prominent part of our approach to doing business. From as early as 2011, the ProCredit group began to develop and implement a comprehensive environmental management concept that aims to reduce the impact of our banks on the environment.

Applying ProCredit's environmental principles

In accordance with the green principles enumerated in our corporate policy, we apply ecological criteria to the choices we make whenever we renovate existing or new ProCredit bank premises, both owned and rented. This guide presents a collection of measures that can be undertaken during all renovation projects. The objective is not only to improve energy efficiency, but also to lessen the environmental impact of our activities by taking environmentally friendly measures and decisions. This guide provides a comprehensive, but not exhaustive, list of recommendations which can be adapted to the varying conditions and situations of all ProCredit banks around the world.

By implementing energy efficiency measures, the banks can reduce their energy consumption and overall greenhouse gas emissions, and thus also reduce energy costs.

ProCredit business premises

Due to the reorientation of the ProCredit group and the focus on financial services for small and medium enterprises, all ProCredit banks have implemented infrastructural changes, adapting their networks to suit the current corporate policy in terms of size and location.

ProCredit meets the needs and requirements of our clients at three different types of premises, differentiated by their levels of infrastructure and services:

- Service Points are the smallest and most widespread outlets in the network. They serve the general public and all banking transactions can be conducted here. Most have a 24/7 zone, also called a "Self-Service Area", in the entrance area where clients can use a number of self-service machines. Some Service Points are in the same location as a Service Centre and may either share an entrance or have a separate way in.
- Service Centres serve business clients and deal with loans in the USD/EUR 10,000 – 50,000 range. Around 10 – 12 Business Client Advisers (BCAs) work in each of the Service Centres.
- Branches are responsible for larger loan clients and have facilities commensurate with their need for appropriate financial advice.

Illustrations of the above mentioned premises are provided on pages 8 and 9.



To consider when planning improvement works

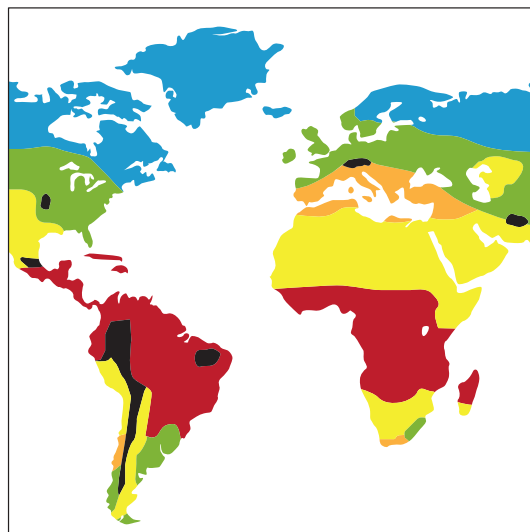
The main purpose of these measures is to optimise the use of energy and resources in the banks, while improving working conditions, overall environmental performance and increasing the efficiency of our operations. Changing the operational set-up for equipment, performing maintenance work and monitoring overall energy and resource usage are ideal ways to start. This entails making small adjustments in the set-up and processes on our premises without having to make a significant financial investment. It includes, for instance, changing the thermostat temperature settings in the heating system, or scheduling regular window cleanings (to allow more light to come in). The next areas to address are the lighting system and the plug loads. Lighting can consume a great deal of energy, which means that improvements are likely to have a significant impact on energy savings. Plug loads refer to the energy load resulting from any equipment that is plugged into an outlet – including computers, printers, scanners and refrigerators. Lowering this load reduces energy consumption. These improvements may require a small investment, but usually pay for themselves within a relatively short period of time.

As the name suggests, the building envelope serves to enclose and insulate the interior of the premises, and comprises the walls, roof, windows, and floors. Before making any changes to the heating and cooling systems, it is recommended to improve the building envelope first, as it is usually expensive to change the heating, ventilation and air-conditioning (HVAC) system (and it might not even be possible in rented premises). By ensuring that the building has good thermal insulation, it may be possible to reduce the heating or cooling loads on the HVAC system without having to replace the entire system.

However, when considering any changes to the building envelope and the HVAC system, it is also important to take the local climate into account. The climate affects the amount of cooling and heating required for the building, and therefore also has an impact on the sizing of the HVAC system.

World map

- Polar
- Temperate
- Arid
- Tropical
- Mediterranean
- Mountains









Using the guide

The section *All Areas* (see page 10) presents the most important measures that apply to all areas of the different types of typical ProCredit premises. The reader will then be guided through the layout of a building, area by area. Our walkthrough starts with *Front of Building* (see page 20) and is followed by *Self-Service Areas* (see page 26), *Customer Service Areas* (see page 30), *Toilets and Kitchens* (see page 36) and *Offices and Meeting Rooms* (see page 42).

The recommended measures are divided into six groups. Each section introduces the various measures that apply to a particular area, starting with a general description of the characteristics and followed by points to keep in mind with regard to operations and maintenance issues before renovations are carried out. In addition, the specific advantages of the measures and technical details to discuss with suppliers or potential installers of the technology are presented. If you need information about measures that are not addressed here, please consult Group Environmental Management at ProCredit Holding.

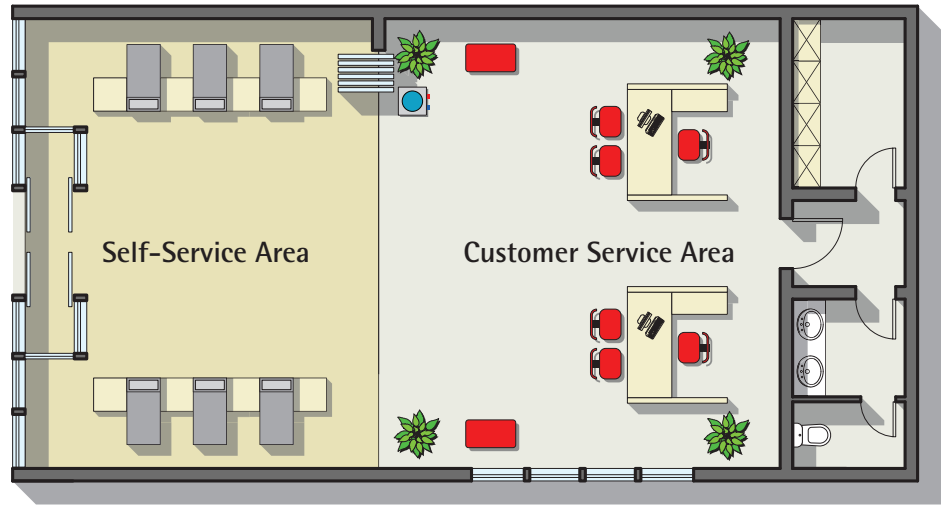
The *Glossary* (see page 48) at the end of the guide provides simple definitions of the technical terms that are used in this document. It also provides additional information about the environmental impact of certain gases, for example, and the various certifications and energy labels in use around the world.

The measures in this guide are categorised according to six groups:

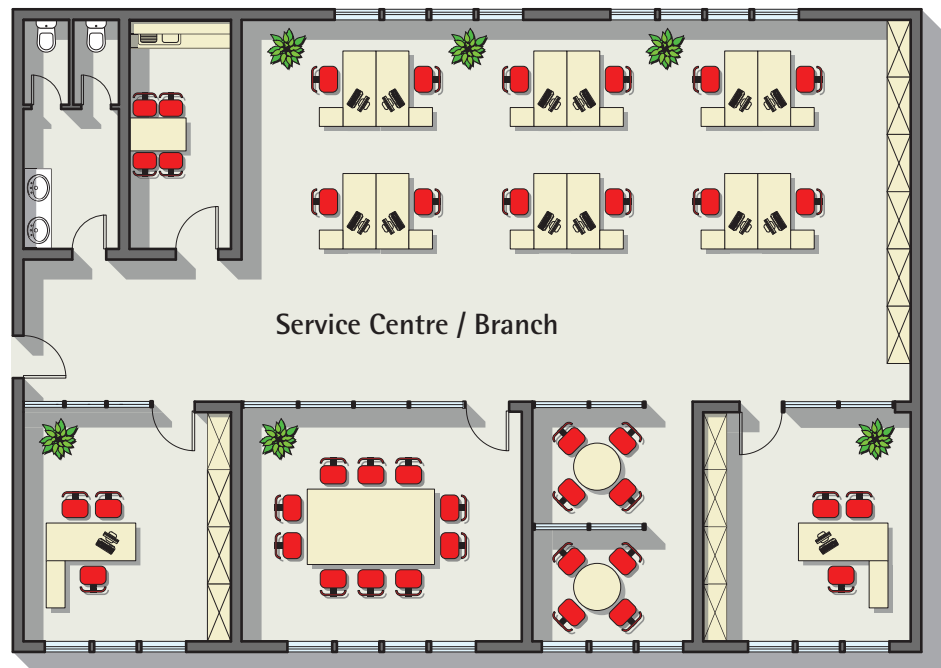
-  Building Envelope
-  Heating & Cooling
-  Lighting
-  Equipment
-  Water
-  Green Procurement



Examples of ProCredit premises



Service Point



Service Centre / Branch

Service Point

Customer Service Area

Functionality:

Transaction services for business clients and all services for private clients

Workstations for 2 Client Advisers

24/7 Self-Service Area

Functionality:

Cash and transaction services via ATM, cash in-cash out ATM, drop box, telephone to Call Centre, terminal, PayBox, e-Banking

Location: city centre with high pedestrian traffic

Service Centre / Branch

Functionality:

Financial services for business clients

Typically with embedded Service Point, e.g. in front of Service Centre / Branch *or* with Service Centre / Branch on the second floor and Service Point on the first floor

Workstations for typically with 10-12 Business Client Advisers

Location: Not directly in the city centre, but within easy reach by car (e.g. industrial area).



2. All Areas

2.1 Introduction

Regardless of the particular features of a given building, some measures and tips are applicable for all areas. These can and should be implemented where possible.

Points to consider:



Building envelope

- Is the building envelope - including the roof, floor and external walls - well insulated? (Windows are discussed in a separate section.)



Heating and cooling

- Are all windows and doors closed when the heating/cooling system is switched on?
- Are radiators blocked by anything that could prevent air circulation?
- Are the air conditioners cleaned and checked regularly (for leaks, etc.)?



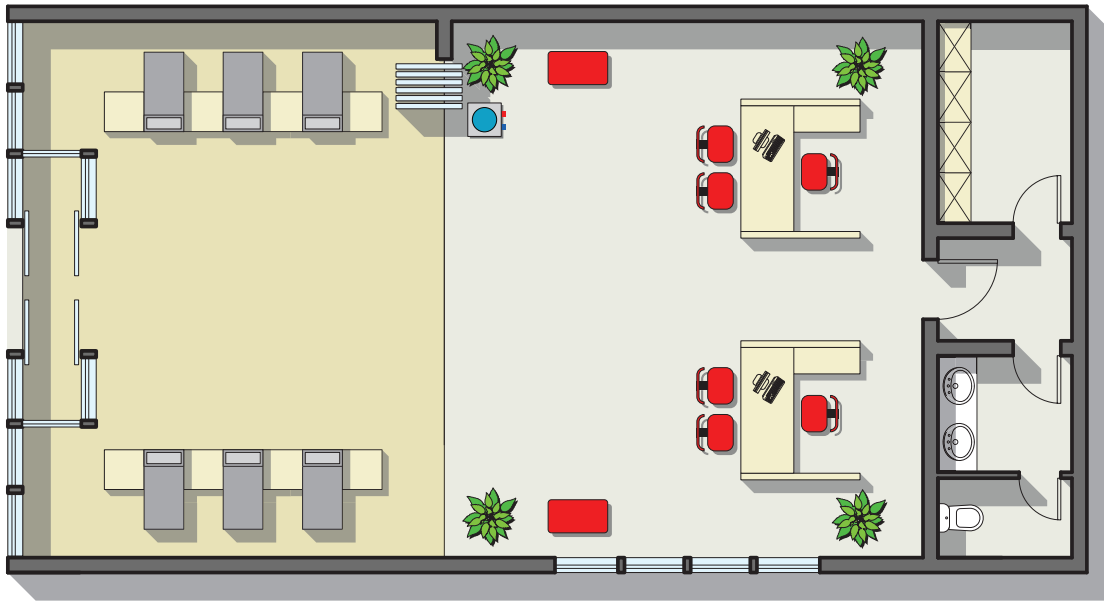
Lighting

- Are workstations placed near the windows?
- Are the light fixtures cleaned regularly?
- Is artificial lighting switched off when there is sufficient daylight?
- Are there switches for all lights?



Green procurement

- Are electricity generation sources in your country "clean"?
- Are recyclable materials being collected and recycled?



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- Insulate the roof 12
- Insulate the walls – external or internal 12



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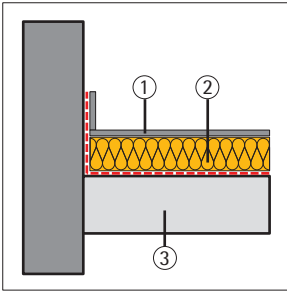


- Maximise use of natural light 16
- Instal light shelves or light tubes 16
- Instal skylights 17
- Avoid over-illumination 17



- Use energy efficient lighting 18
- Use solar photovoltaic systems as an alternative electricity source 18
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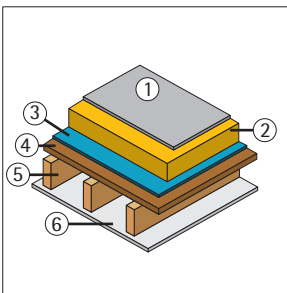
Floor insulation



- 1) Floor (tiles or similar)
- 2) Insulation in the dry lining
- 3) Concrete slab

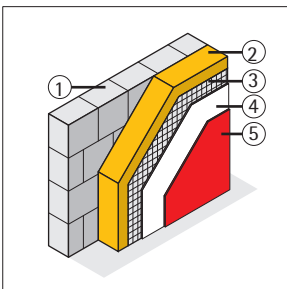
The U-value indicates how well parts of a building transfer heat. The lower the U-value is, the better the thermal performance will be.

Flat roof insulation



- 1) Waterproofing layer
- 2) Insulation
- 3) Vapour control layer
- 4) Decking
- 5) Existing sound (roof) joists
- 6) Ceiling

External wall insulation



- 1) Masonry block
- 2) Wall insulation
- 3) Metal or fibrous mesh reinforcement
- 4) Waterproof render
- 5) Decorative finish coat

2.2 Measures



Insulate the floors

Floors separating heated and unheated spaces or cooled and uncooled spaces should be well insulated to prevent heat loss or heat gain through the floors.

Concrete floors can be insulated by adding a layer of insulation above the floor slab, before the chosen floor covering. Other types of floors, such as suspended floors (where there is a void below, such as a basement), can be insulated from below. In regions with very cold winters, it may be best to instal insulation both above and below the floor slab.

In addition to the insulation layer, water-proofing is an important protective measure against moisture build-up.

Advantages

- Floor insulation reduces heat loss through floors
- It reduces the cooling load of the space that needs to be heated or cooled
- Less energy is needed to cool and heat the space



Insulate the roof

Roof insulation provides a barrier between the interior of the building and the external environment, preventing heat loss. On a flat roof, the insulation is usually installed between the roof deck and the roof covering. The materials used and methods of installing roof insulation vary, but the efficiency levels can be compared using the U-value. It is also important to keep in mind that the insulation material for roofs has to be fire-resistant.

Advantages

- Roof insulation prevents heat loss from the roof during cold seasons
- It reduces the amount of energy needed to heat or cool the space



Insulate the walls – external or internal

Wall insulation usually involves gluing or bolting insulation panels to the masonry or plaster of building walls. Standard insulation materials include XPS (extruded polystyrene) and EPS (expanded polystyrene). These insulation materials work to insulate the building and reduce the amount of heat travelling through the wall. Proper installation of insulation is critical for it to be effective. Therefore, choosing a qualified and experienced installer is important.

It may not always be possible to insulate the walls externally, for example in cases where the original building facade has to be preserved. In such cases, walls can also be insulated from the inside, which tends to be less expensive than insulating walls externally. The disadvantage of adding interior wall insulation is that it reduces the working space within the office, and existing interior fittings such as electrical sockets and light switches have to be moved.

Poorly installed interior insulation can also cause condensation problems over time.

Advantages

- Insulation reduces the U-value of the building envelope, which helps to keep the interior space warm in the winter and cool in the summer
- Weak points in walls, called thermal bridges, can be fixed by insulating the walls externally
- External wall insulation means that internal space will not be reduced
- Insulation improves weather-proofing and sound insulation
- It reduces condensation on internal walls



Consider air or ground source heat pumps

Air and ground source heat pumps work to harness the natural heat from the air or ground (through buried pipes) outside.

Heat pumps absorb heat from the air or ground using a volatile fluid (usually a refrigerant) in an evaporated state. Heat pumps compress the vapour, which causes the temperature to increase. The pressurised, heated fluid is then sent to radiators throughout the building, heating the workspace.

Heat pumps work best in moderate climates. They are therefore more suitable for underfloor heating or large radiators which provide heat at a lower temperature over longer periods of time. This also means that the internal space has to be well insulated and draught-proof to ensure that it can be comfortably heated.

Ground source heat pumps also require a significant amount of space for installation, and preparing the land to lay the pipes can be expensive. Air source heat pumps are easier to instal than ground source pumps, but they are less efficient.

Advantages

- Heat pumps use a renewable source of heat, from either the air or the ground
- They release fewer emissions than other heating systems
- They are more cost effective than electric or oil-based heating

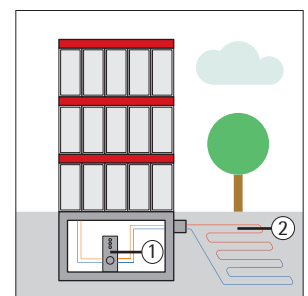


Consider solar water heating systems

Solar water heating systems (SWHSs) can provide space heating, domestic hot water, or both. Via a solar heat collector that is exposed to the sun, water is heated and is then either directly circulated through the radiators inside the working or living space or transferred via a heat exchanger to a secondary water circuit which circulates through the radiator (either partially or fully, depending on the design of the solar thermal system).

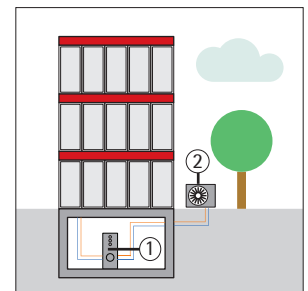
Solar heat collectors should be installed in the area of the premises with the most direct exposure to the sun, which is usually the roof. Regular maintenance is necessary to ensure that the heat collectors are clean and unshaded, and that the pipes are free of any mineral build-up.

Ground source heat pumps



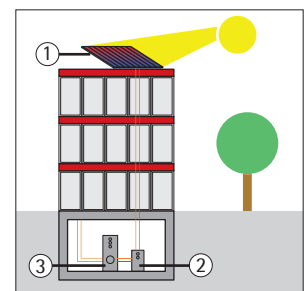
- 1) Heat pump
- 2) Underground water pipes

Air source heat pumps



- 1) Indoor unit / air handler
- 2) Outdoor unit / heat pump

Solar water heating systems



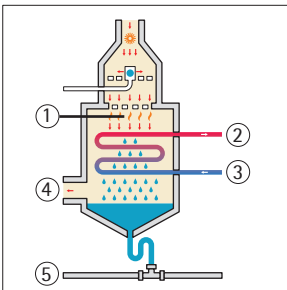
- 1) Solar thermal collector
- 2) Circulation pump
- 3) Storage tank and heat exchanger

There are two main types of SWHSs – a thermosyphon system or a forced circulation system. The difference is that the thermosyphon system uses the natural movement of hot and cold water to circulate the water through the pipes, while the forced circulation system uses a pump to move the water through the system. Thermosyphon systems are only suitable for frost-free climates, i.e. where freezing temperatures are uncommon. In all other climates, the forced circulation system is recommended, to ensure that the system works through the winter without freezing up.

Advantages

- SWHSs use a renewable source of energy: sunlight
- The amount of energy consumed from operating the pump to keep water moving through the pipes is low

Energy efficient boiler systems



- 1) Gas combustion
- 2) Heating outflow
- 3) Heating return flow
- 4) Waste gas
- 5) Condensation drain



Use energy efficient boiler systems

The boiler is the central element of the heating system; it heats water that can be used for space heating and hot water supply. The heated water is piped through the building to radiators, which heat the working or living space.

The efficiency of a boiler-powered heating system is rated using an efficiency coefficient (η), which indicates how well the boiler converts the energy of the source into heat. Non-condensing boilers can achieve efficiencies of up to 95% while condensing boilers can achieve up to 100% efficiency. Condensing boilers are more efficient than traditional boilers in that they use a heat exchanger to recover heat from the exhaust gases. They therefore require less energy to heat water because it has already been pre-heated by the exhaust gases.

Boilers can use a wide range of fuel sources, including wood (biomass), coal, oil, natural gas or electricity. The ideal fuels are biomass (if it can be obtained from a sustainable source) and natural gas. Biomass boilers can have efficiencies matching those of gas boilers and they use a renewable source of fuel. However, biomass boilers require more maintenance, because they have to be fed fuel and the resulting ash has to be emptied regularly.

Advantages

- Natural gas is a significantly cleaner fuel source – it emits approximately 50% less carbon dioxide than coal
- Liquefied petroleum gas (LPG) is a commonly used solution for places where piped natural gas is not available
- Renewable energy sources can be used to fuel the boilers (e.g. biomass)

Choose boilers with an efficiency $\eta \geq 90\%$ or condensing boilers.
Choose fuels with low carbon emissions.



Use energy efficient air conditioners

An energy efficient air conditioner is better at converting electricity into cooling (or heating) power. When choosing an air conditioner, pay attention to the Energy Efficiency Ratio (EER): the higher the better.

A relatively new improvement in air conditioning technology is the inverter. An inverter air conditioner has a motor that can continuously regulate the temperature of the space by slowing down or speeding up as required. This is in contrast to standard air conditioners, which have a fixed speed and switch on and off to maintain the room temperature. If the air conditioner is required for long periods of time or is also used for heating, the savings will be greater and the investment will pay for itself within a shorter period of time.

It is also important to consult a specialist in order to determine what size air conditioner is appropriate for the space to be cooled or heated, as this has a definite impact on the efficiency of the system. Furthermore, the air conditioner should not use the refrigerant R-22, as it contributes to ozone depletion.

Advantages

- Energy efficient air conditioners use less electricity
- Inverter air conditioners
 - react more quickly to changes in temperature
 - avoid fluctuations in temperature that occur with standard fixed speed systems
 - are quieter than other types of air conditioners

Choose air conditioners with an
EER ≥ 3.2 (W/W) or
EER ≥ 11 (BTU/Wh).



Use water heat pumps

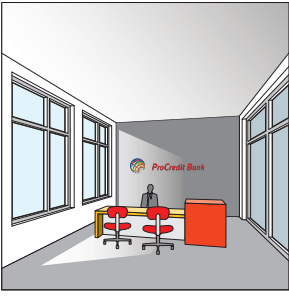
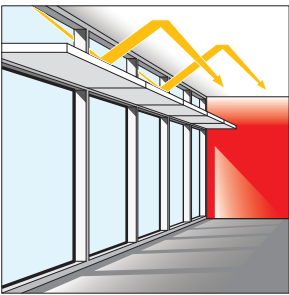
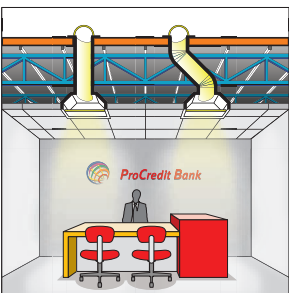
Water heat pumps draw heat from the surrounding space and use it to heat the water in the storage tank. To prevent heat loss from the storage tanks, the tanks should be well insulated. The EU energy label rates the energy efficiency of hot water storage tanks from A+ (least losses) to G (most losses).

It is important to note that heat pumps work most efficiently in relatively stable climates without extreme weather and temperature fluctuations.

Advantages

- Water heat pumps are more efficient than conventional electric water heaters
- It is possible to set up a combined heating, cooling and hot water system

Purchase at least A rated
(EU energy label)
hot water storage tanks.

Maximise daylight**Light shelves****Light tubes****Maximise use of natural light**

Office space should be organised in such a way that the use of daylight is maximised. Permanent work areas should be located near windows if possible, while the inner areas of the office can be used for rooms that are frequented for shorter periods of time and therefore do not need continuous lighting, such as copier/printer rooms or kitchens. Any artificial lighting in these inner areas will only be used for a short period of time, resulting in less energy consumption.

Advantages

- Natural light reduces the need for artificial lighting and therefore reduces energy consumption
- Occupants can work by daylight and enjoy natural sunlight
- Natural light creates a better working environment, enhances productivity and reduces stress

**Instal light shelves or light tubes**

Architectural light shelves and light tubes are fixtures that bring more daylight into an interior space.

Light shelves are mounted horizontally, above eye level, usually on the south-facing side of a building, which receives the most sun. The highly reflective upper surface of the shelves, which are attached directly to the windows, reflects the daylight coming through the window onto the ceiling.

To ensure that the light is then reflected back into the working space, the ceiling and walls must be painted a light colour. The light shelves must be positioned so as to achieve a balance between glare protection and reflection of the light into the space. They also have to be cleaned regularly in order to prevent dust build-up, which can impede their ability to reflect light.

Light tubes run from the exterior of the building to the interior, transporting light from the outside to the inside. The exterior part of the light tube should be positioned to receive the maximum amount of sunlight, and also serves as the conduit for the light. Short straight tubes usually do the best job of transporting light, whereas longer, curved or angled tubes cause much of the light to be lost.

Advantages

- Light shelves and tubes bring daylight into parts of the interior space that would not naturally be exposed to daylight
- They reduce the need for artificial lighting and therefore reduce energy consumption
- They help to reduce glare
- Natural light contributes to a comfortable and productive working environment



Instal skylights

Skylights are essentially windows on the roof of a building that allow sunlight to come in, as well as providing a view of the sky. The position and size of the skylight will affect how much light and heat will enter the space through it. In countries north of the equator, north-facing skylights will provide light, but not directly from the sun. This helps to prevent excessive solar heat gain in the warmer months. In countries south of the equator, south-facing skylights will provide the same effect.

Skylights are an ideal solution for lighting atrium spaces, as they reduce the need for artificial lighting on a few levels of the building. They can also be installed if the working space is very large and daylight from the windows does not penetrate the space effectively.

Advantages

- Skylights reduce the need for artificial lighting and therefore reduce energy consumption
- South-facing skylights (in countries north of the equator) also contribute to passive solar heat gain in winter months



Avoid over-illumination

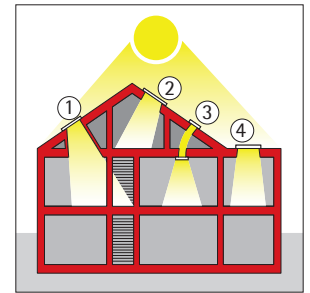
Over-illumination means that there is too much light in a space or the light is too bright. The amount of lux represents the amount of light in a space and can be measured using a piece of equipment called a "lux meter". Another simple method for determining whether a space is over-illuminated is to ask the occupants. The appropriate level of light depends on how the space is used.

Over-illumination can occur in spaces with older lighting installations, when lights were not as efficient or when tasks were mostly paper-based, as opposed to people working on computers (which emit their own light). Using the same number of lighting points with light bulbs that generate more lumens per watt may result in over-illumination of a space. This is a common problem when changing from incandescent or halogen light bulbs to LED light fittings. Therefore, close attention should be paid to lux levels when making these types of changes.

Advantages

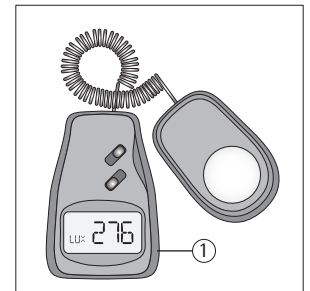
- Avoiding over-illumination saves energy
- The proper amount of light prevents discomfort - such as eye strain, migraine headaches, fatigue or stress - for the occupants of the space

Skylights



- 1) Skylights
- 2) Roof windows
- 3) Light tubes
- 4) Flat roof skylights

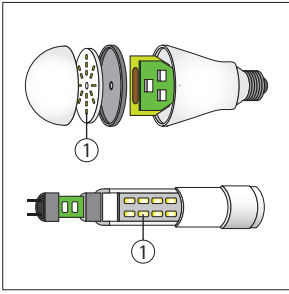
Over-illumination



- 1) Lux meter

Ideal lux levels:
Office – 500 lux
Toilets – 300 lux
Stairs and corridors – 50 lux

Energy efficient lighting



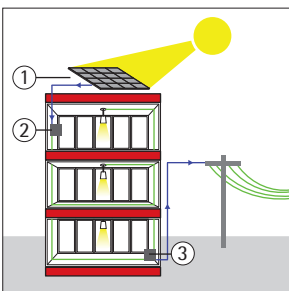
1) LEDs

We all know how much light a 60-watt incandescent / halogen bulb will produce. But the brightness of new LED lightbulbs is measured in lumens, so here is the comparison between watts and lumens to help you do the conversion.

Incandescent / halogen bulb: lumens

- 40 W bulb: ≥ 450 lumens
- 60 W bulb: ≥ 800 lumens
- 75 W bulb: $\geq 1,100$ lumens
- 100 W bulb: $\geq 1,600$ lumens

Photovoltaic system



- 1) Photovoltaic solar panels
- 2) Inverter
- 3) Grid connection point

A well-designed solar PV system should have a Performance Ratio $\geq 80\%$

**Use energy efficient lighting**

Light emitting diodes (LEDs) are the most energy efficient lighting solution currently available. They use less energy than other types of light bulbs to produce the same amount of light. This is because they do a better job of converting electricity into light than incandescent or halogen light bulbs, which convert a lot of the electricity into unwanted heat.

When replacing incandescent or halogen light bulbs with LED bulbs, it is important to note the amount of light (in lumens) that will be produced by the new light bulbs rather than the wattage.

It may not always be possible to switch directly from incandescent and halogen bulbs to LED bulbs. Therefore, it is important to check that the fittings (transformers/inverters) will accept the newer lighting technologies before purchasing the new fixtures.

Advantages

- LEDs provide significant energy and cost savings
- They have a relatively short payback period
- They do not generate as much heat as incandescent or halogen light bulbs

**Use solar photovoltaic systems as an alternative electricity source**

Solar photovoltaic (PV) systems convert light energy from the sun into electrical energy, either working as a supplement to the electricity drawn from the grid or as an alternative source of electricity. A solar PV system consists of solar PV panels, an inverter and cables.

Because a solar PV system requires light to generate electricity, the position of the panels is crucial. The panels usually need to be placed on the roof, ideally in an area that is free from shade (caused by taller buildings or trees) and they should be positioned facing south in the northern hemisphere (and north in the southern hemisphere) so that the rays of the sun will hit the panels at the steepest possible angle.

Advantages

- Solar PV systems use a renewable source of energy: sunlight, which results in energy and cost savings
- They are less restricted with respect to location than other types of renewable energy technologies (e.g. hydropower or wind power)
- Standard solar PV systems have no moving parts and are therefore less likely to break
- They are easy to clean and maintain

Provide recycling bins

Recycling bins should be placed near desks to separate waste items that can be recycled, such as paper, plastic, aluminium cans or glass. Depending on the city or country, the items that can be collected for recycling will vary. Where only specific types of materials can be collected for recycling, it may be helpful to create a quick list for staff to refer to. Hazardous waste (such as light bulbs or batteries) should also be carefully collected and disposed of appropriately in accordance with local regulations.

It may be necessary to work with private recycling companies if there are no state-managed recycling facilities. In this case, the reliability of the companies should be verified; for example, how do they collect and transport the recyclables, and what do they do with the recycled material after they have collected it?

Advantages

- Recycling reduces waste and therefore the amount of rubbish in landfills, which release harmful chemicals and greenhouse gases, causing environmental pollution and contributing to global warming
- Recycling channels waste back into circulation for reuse and helps to conserve raw materials and the energy used to create consumer products from these raw materials

Recycling bins



3. Front of Building

3.1 Introduction

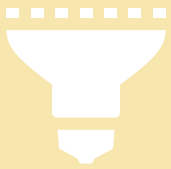
The front of a building is the first thing that clients and other parties see and it provides the first impression. It consists of the facade, including the windows and signs, and sometimes the car park if it is adjacent to the building.

Points to consider:



Building envelope

- What kinds of windows are currently installed?
- Are they double- or triple-glazed?
- Can the windows be changed?
- Is the front of the building exposed to direct sunlight?



Lighting

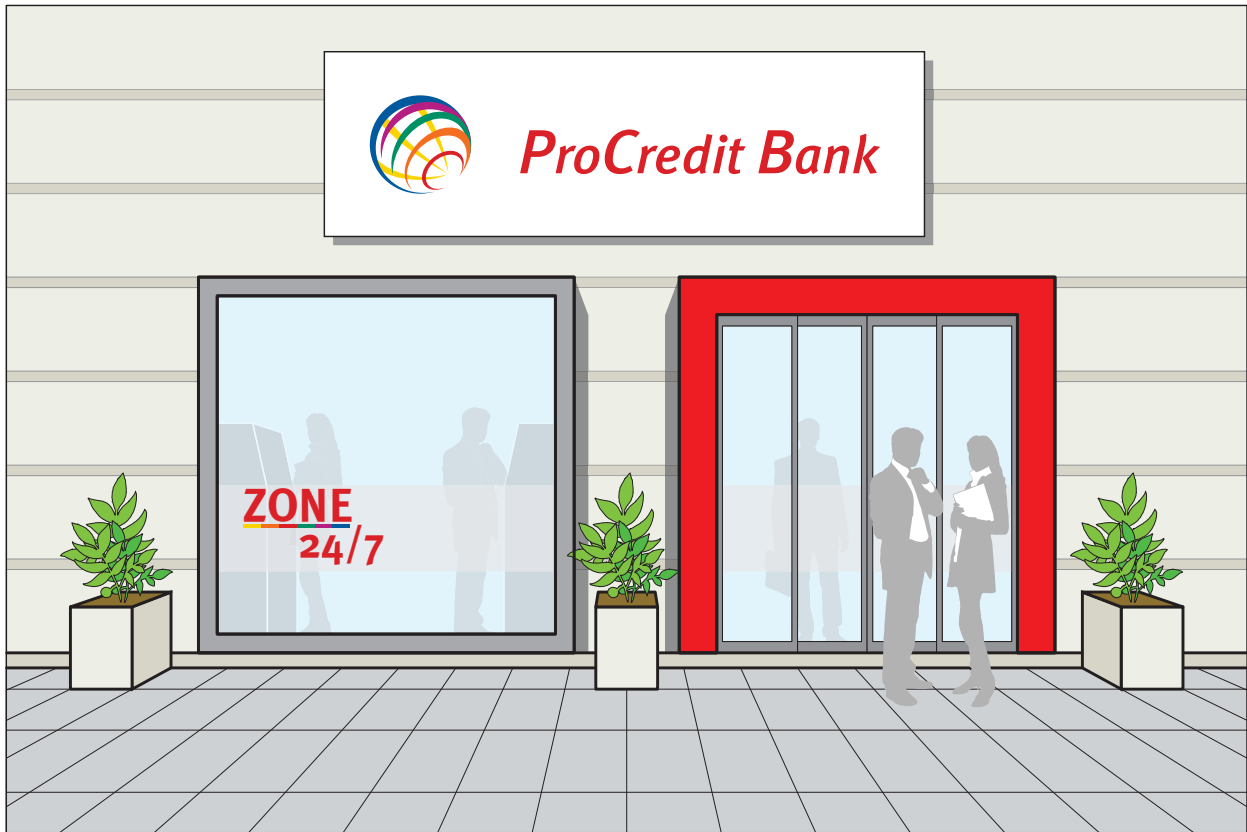
- Is the signage lit up for the whole night?
- What type of outdoor lighting is needed?



Green procurement

- Is the office located near public transport?
- How do the BCAs visit clients?
- Is the roof surface complete or partial?





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Limit total glass area22

Instal double- or triple-glazed windows22

Use window film.....23

Use shading for windows....23



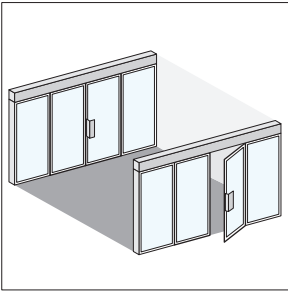
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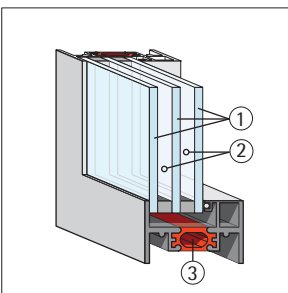
Consider environmentally friendly travel options25

Double doors



Limit total glass area to between 30% - 50%.

Triple-glazed window



- 1) Glass layers
- 2) Air / gas layers
- 3) Thermal block

3.2 Measures



Instal double doors

When two doors are constructed to separate two areas, they are known as double doors, as they create an air barrier. For double doors to be effective, only one door should be open at any given time.

The space between the doors and the space after the second (interior) door can be heated separately.

Advantages

- Double doors keep air from entering the space
- They prevent outside temperatures from affecting the interior space
- They create separate thermal and security spaces



Limit total glass area

Glass is often favoured for entrance areas, as it conveys openness and makes clients feel welcome. However, the total area of glass should be limited to between 30% and 50% for the total building envelope. Glass allows a significantly greater degree of heat transfer than walls, allowing heat to escape more quickly in cold seasons and to enter more easily in warmer seasons.

Advantages

- Limiting the total glass area helps the building's heating and cooling system to work more efficiently
- It reduces the amount of energy needed to heat and cool the interior space



Instal double- or triple-glazed windows

Glazing refers to the layers of glass that make up a window pane. Double-glazed windows consist of two layers of glass with a layer of air or inert gas sealed between them; triple-glazed windows follow the same concept with three layers of glass and two layers of air or inert gas. The layers of glass and air are sealed and held together with a frame that can be made of wood, PVC or aluminium with thermal breaks.

Windows can create cold spots in offices when the walls, roof and floor are better insulated than the windows. To mitigate this problem, the degree of glazing should be as close as possible to the standard of insulation elsewhere in the space. This means that additional investment in triple-glazed windows makes sense when the rest of the building is very well insulated, or in very cold climates, where every bit of insulation helps.

Other than the number of layers of glass, it is also important to consider the frame material, as heat can be transferred through the frame as well. PVC frames offer better insulation than aluminium frames, do not require painting and have good moisture resistance. If aluminium frames are chosen, they should come with thermal breaks.

Advantages

- Efficient windows prevent the flow of heat from one space to another
- They provide better sound insulation
- They enhance security due to their thickness

Use window film

If double- or triple-glazed windows are not a feasible option, another method of reducing solar heat gain or loss is to apply window film, a type of thin film or laminate coating that can be applied to the interior surfaces of glass windows.

There is a wide variety of window films available on the market that cater to different needs – for example, glare prevention or privacy protection. These window films can be applied directly to the glass and act as a kind of sunscreen in that they block detrimental UV rays. The films also control the levels of heat and light passing through the glass.

However, window films are far less efficient than double- or triple-glazed windows. To enhance the overall efficiency, window films can be used in combination with external shading devices. Some examples are horizontal projections, roof overhangs or window reveals. However, bear in mind that these external shading devices may then reduce the amount of sunlight entering the office and increase the need for artificial lighting.

Advantages

- Window films are easier to instal than new windows
- They are comparatively inexpensive
- They block harmful UV rays and prevent glare, while still allowing most of the visible light into the working space

Use shading for windows

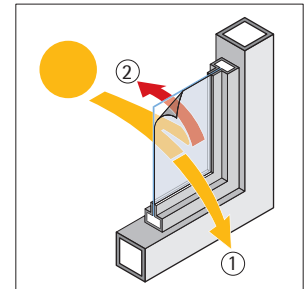
Shading options for windows include roof overhangs and awnings for the exterior of a building, and shutters and blinds for both the exterior and interior. These can be used in combination with solar films to further reduce unwanted heat or light from the sun.

Overhangs (structures installed from the roof or above windows to provide shade) are usually installed above the entire length of wall and are best suited for new construction projects and in places where there is perpetual hot weather or where the sun often shines directly into the interior space. Awnings are similar to overhangs, but are easier to instal on existing buildings. One disadvantage of overhangs and awnings is that most are non-adjustable and are therefore not ideal for variable light conditions.

Shutters and blinds offer more flexibility in terms of the amount of light that is let into the space. They also provide more privacy, but they may not be as effective in reducing solar heat gain inside the building. They are better suited

Windows with U-value $\leq 1.2 \text{ W/m}^2\text{K}$ are better able to prevent heat loss in cold months and heat gain in warm months.

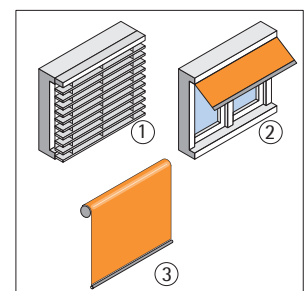
Window film



- 1) Visible light
- 2) Excess solar heat and ultraviolet radiation

Window films will ideally have high Visible Light Transmittance and high Total Solar Energy Rejected values, in addition to low U-values.

Shading for windows



- OUTSIDE
- 1) Horizontal blinds
 - 2) Retractable awning
- INSIDE
- 3) Roller shades

for changing light conditions or for climates in which solar heat gain may be desirable (e.g. in winter months), as shutters and blinds can be raised completely to allow sunlight in.

Advantages

- Shading reduces solar heat gain in the office space and therefore reduces the cooling load of the building
- It helps to reduce glare
- It protects the privacy of the interior space
- It can serve as an architectural element, adding beauty to the building
- Exterior shading solutions are more effective than interior shades because they block solar heat gain before it is transmitted through the windows into the interior space
- Interior shading is usually cheaper to instal and can be easily adjusted by the occupants as needed



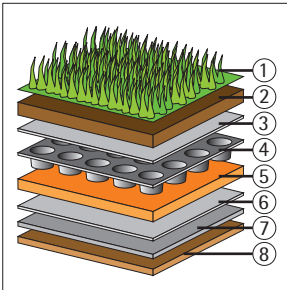
Use LED signage with timers

Exterior signage featuring the bank's name and logo can be illuminated using an LED light box with a timer.

Advantages

- LED light boxes with timers significantly reduce energy consumption (compared to timer-less light boxes, which are illuminated continuously)

Green roof or roof garden



- 1) Plants
- 2) Growing medium
- 3) Filter fabric
- 4) Drainage / storage layer
- 5) Insulation
- 6) Waterproof membrane
- 7) Protection board
- 8) Roof deck



Create a green roof or a roof garden

A green roof is a roof that is partially or fully covered with a growing medium and vegetation. When there is space for people to walk or gather, the green roof can also function as a roof garden.

There are two main types of green roofs – extensive or intensive. Extensive green roofs usually have a thin layer of growing medium and are therefore lightweight. This option is suitable for large areas, relatively inexpensive, and does not usually require a lot of maintenance. However, the choice of plants is limited due to the thin growing medium.

In contrast, intensive green roofs have much better insulation properties and allow for a greater variety of plants. At the same time, their dense, deep soil results in a heavier load on the roof, and the more complex system requires higher investment and more maintenance.

Advantages

- Green roofs reduce a building's cooling load
- They reduce heating need
- They increase sound insulation
- They make the building more attractive
- They improve air quality

Consider environmentally friendly travel options

Our impact on the environment starts with the journey from home to the office, and from the office to clients' premises and back. Here are some ways to make travel more environmentally friendly:

- Choose an office location that is near various public transport options
- Encourage staff to car pool (share rides so that more than one person is using the car)
- Provide fuel-efficient driving lessons to car users
- Instal GPS systems to ensure more efficient driving and monitoring
- Maintain a fleet of bicycles or low-emission cars

Advantages

- Using an office that is close to public transport encourages employees and clients to use it
- Taking public transport instead of driving a private vehicle can significantly reduce overall carbon emissions and fuel use
- Car-pooling reduces the number of car journeys and therefore reduces the amount of carbon emissions
- Low-emission, fuel-efficient cars have less impact on the environment
- Promoting environmentally friendly ways of travelling demonstrates the bank's commitment to being as energy efficient and environmentally friendly as possible

Low-emission cars should have emissions $\leq 120\text{g CO}_2/\text{km}$

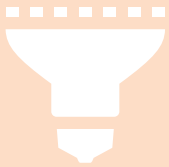


4. Self-Service Areas

4.1 Introduction

Self-Service Areas contain various kinds of equipment, such as ATMs and cash-in machines, which allows clients to carry out transactions quickly and independently. Self-Service Areas should in general be accessible to clients around the clock and therefore has to be illuminated throughout the night so that clients are aware that it is open for business.

Points to consider:



Lighting

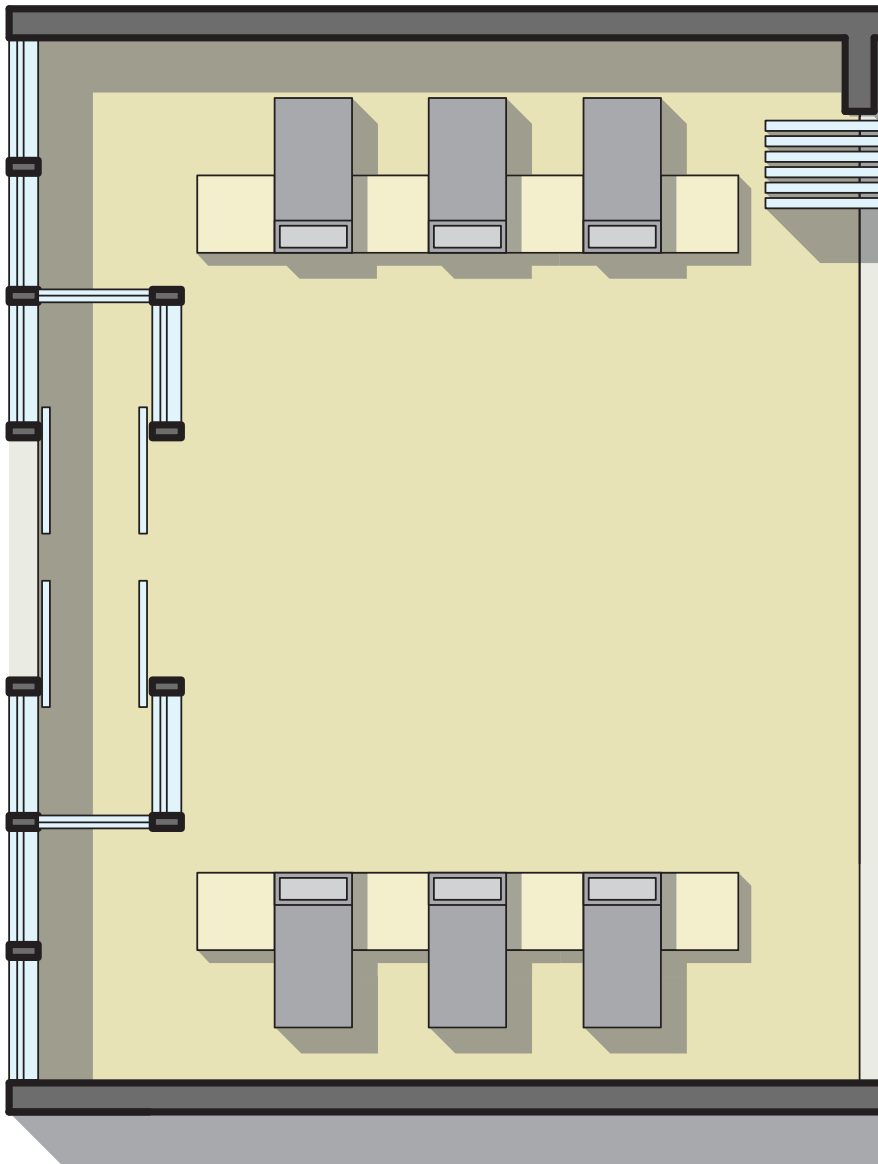
- If there are motion-sensor/timer-controlled lights, what are the settings?



Equipment

- How much electricity does the equipment consume?
- Is energy efficiency taken into consideration when choosing equipment?





Set lighting in dimmed mode
with motion sensors28



Purchase energy efficient
equipment.....28

4.2 Measures



Set lighting in dimmed mode with motion sensors

Though some Self-Service Areas are open 24 hours, the traffic flow at certain hours will be much lower. Therefore, lights with motion sensors can be installed so that the areas remain dimly lit until someone enters, whereupon the light will come up to full brightness.

The Self-Service Areas must be illuminated so that clients know that they are open, but with a dimmer system they will be lit to only around 75% of capacity or less when they are empty. When installing this kind of system, it is important to purchase dimmable light bulbs, such as dimmable LEDs.

Advantages

- Dimmer systems use less energy while ensuring that clients feel comfortable entering the Self-Service Area



Purchase energy efficient equipment

Energy efficient automated teller machines (ATM) may come with LED screens and lighting, and power management systems that can monitor and manage the amount of power required to operate and perform transactions.

These machines use a significant amount of energy, as they are usually left on all the time even though actual usage is only about 8 to 9 minutes per hour. A power management system would therefore allow them to be placed on energy-saving mode. Other types of equipment that may be found in the Self-Service Areas include computers, monitors and screens. These should also be as energy efficient as possible (based on Energy Star or the EU energy label, for example).

Advantages

- Energy efficient equipment contributes to significant energy savings, especially in 24-hour Self-Service Areas, where the ATMs are on all the time



5. Customer Service Areas

5.1 Introduction

The Customer Service Area is where clients do their regular transactions with their Client Advisers. Lighting, heating and/or cooling is required during opening hours.

Points to consider:



Heating and cooling

- Is the office well insulated?
- Can the temperature in different areas be controlled separately?
- Can the heating/cooling system be changed?



Equipment

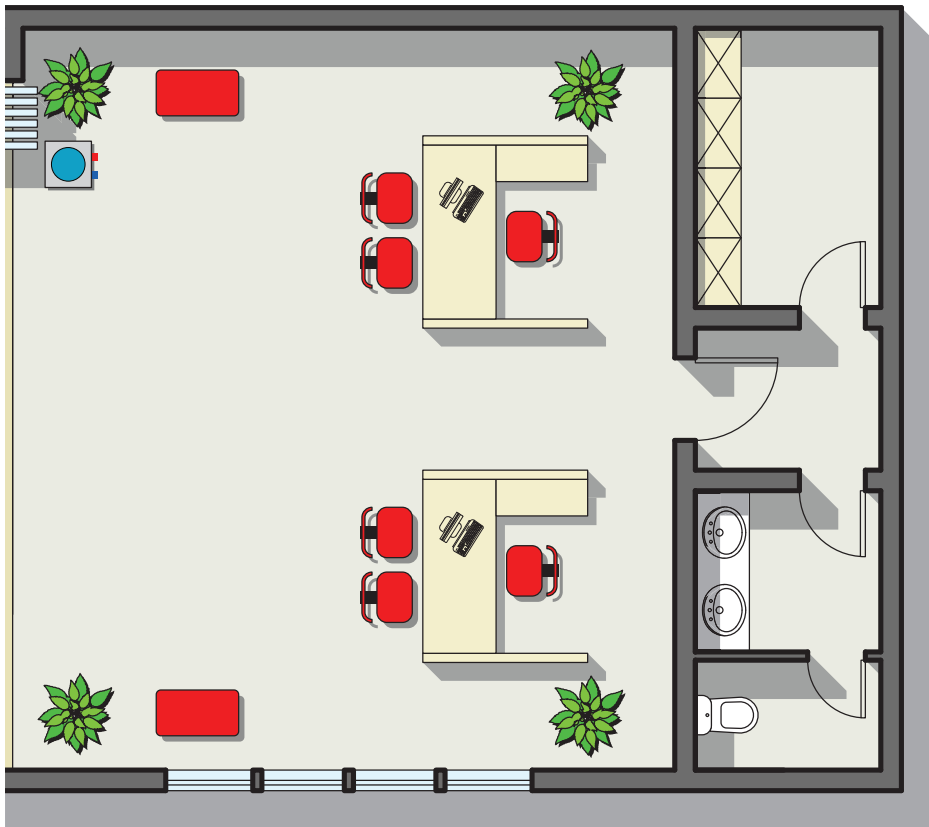
- Are promotional materials changed too frequently?



Green procurement

- Are furniture and stationery purchased from an environmentally friendly source?
- Can printed promotional materials be reused or recycled?





Allow heating and cooling system to "coast"32



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5.2 Measures



Allow heating and cooling system to "coast"

"Coasting" means that the heating and cooling system is turned off before people leave the office; for example, the heater can be switched off 30 minutes before the end of the work day. The temperature within the work area is then allowed to increase or decrease gradually, as turning off the heating and cooling system does not cause an immediate change of temperature in the occupied space.

It is important to consider the temperature difference between indoors and outdoors. If the difference is too big, the temperature will change relatively quickly and may cause discomfort to the occupants of the space. Coasting is most appropriate in cases where the temperature difference between the outside and inside is relatively small.

Advantages

- Coasting saves energy while maintaining comfort within the space
- The heating or cooling system can be programmed to start up slightly before the occupants are due to arrive at the office
- Coasting makes the interior environment comfortable for staff as well as clients visiting the branch

Energy efficient office equipment



Use energy efficient office equipment

Energy efficient equipment includes printers, scanners, computers, and laptops, all of which may be classified under the Energy Star or EU energy label. In general, laptops are more energy efficient than desktop computers. The Energy Management Option (EMO), power saving or standby mode of the equipment should also be turned on.

Multi-function devices also help to reduce energy consumption, as they generally use about half of the energy of a separate printer, scanner, fax machine and copier.

If a multi-function device is not necessary for the office, energy- and ink-saving printers with Memjet technology are a good alternative. The new technology features a print head that is as wide as the paper and therefore does not have to sweep over the pages while printing, which reduces the amount of printing time per page.

Advantages

- Laptops are made of less material than desktop computers and consume far less power during operation – savings of 50% can be achieved by switching from a desktop computer to a laptop
- The EMO option saves energy
- Memjet technology reduces energy consumption
- Unlike laser printers, new energy efficient inkjet printers do not emit fine dust, which is a health hazard
- The printers provide permanent ink print outs, which can be kept for a longer period of time



Use energy efficient monitors/screens for frequently changing promotional material

Energy efficient monitors and display screens consume little power. For example, most LED screens use about a third less power than conventional plasma screens.

For information that is changed or updated regularly, it may make more sense to use these energy efficient monitors or screens rather than printed posters.

Advantages

- Energy efficient screens and monitors that show promotional material and provide information to clients for up to 8 hours a day reduce energy consumption



Use posters for promotional material that does not change frequently

For promotional material or information that does not need to be changed or updated often, posters are a better alternative to screens or monitors. Naturally, they should be printed on recycled paper.

Advantages

- Printing posters has less of an environmental impact than powering monitors for up to 8 hours a day



Source environmentally friendly or forest friendly furniture

Furniture should ideally be sourced from manufacturers in the country or region. The source of the raw materials and the production facility should also be located in the country/region, and not just the supplier's office. In addition, ask suppliers about their production and transportation methods.

Forest Stewardship Council (FSC) certification is a reliable indicator that furniture is forest friendly.

- Forest Management Certification is awarded to forest managers or owners whose management practices meet the requirements of the FSC Principles and Criteria.
- Chain of Custody certification applies to manufacturers, processors and traders of FSC certified forest products. It verifies that FSC certified material and products have been used along the production chain.
- Controlled Wood certification is designed to allow organisations to avoid the categories of wood that are considered unacceptable. FSC Controlled Wood can only be combined with FSC certified wood in products labelled "FSC Mix".

FSC is not the only certification available for environmentally friendly furniture, however. Other global labels include level[®], SCS, and the Sustainable Furnishings Council (SFC) Member Seal. As people become more aware of the importance of sustainability and environmental friendliness, the number of these eco labels is increasing.

Source environmentally friendly or forest friendly furniture



Advantages

- Purchasing forest friendly furniture from the country or region means that the furniture does not have to be transported over long distances, and shorter distances = less carbon emissions

Purchase environmentally friendly stationery

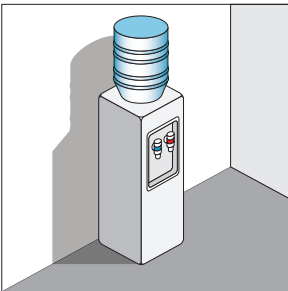
Environmentally friendly stationery and marketing materials can be made either from post-consumer recycled material or from sustainable or biodegradable materials. Pens and pencils can be made from plantation timber or bamboo. Try to avoid plastic folders or choose versions made from 100% recycled plastic.

Where possible, purchase stationery from regional manufacturers and producers.

Advantages

- Environmentally friendly stationery helps to close the recycling loop with post-consumer recyclable materials
- Purchasing non-plastic materials helps to reduce landfill waste

Water filter coolers for drinking water



Use water filter coolers to provide drinking water

In countries with potable tap water, it is recommended to use water filters. With this technology, tap water is passed through a filter that removes contaminants or other harmful additives. The water can then be heated or cooled and dispensed from the water filter cooler.

To ensure the quality of the water, the water filter coolers (which should also be energy efficient) should be regularly maintained and cleaned.

Advantages

- Water filter coolers reduce the need for bottled water, whose production, transport and disposal is very energy intensive
- The coolers can dispense either hot or cold water, which is convenient for both staff and visitors

Use mugs and reusable cups made from recycled material

Mugs and glasses should be made available for staff use. If a dishwasher is used to clean them, it should be an energy efficient and water-saving model.

Cups made from post-consumer recycled material or recyclable cups can be used for clients who are waiting to meet with BCAs. However, it is important to verify that the cups are actually recyclable, as not all paper cups can be recycled due to the plastic lining that is used to prevent the liquid from seeping through.

Advantages

- Mugs are more environmentally friendly than disposable cups, whether made of paper or plastic
- Recyclable cups help to close the recycling loop through use of post-consumer recycled material

Purchase plants

Plants can help reduce pollutants. Plants for an office environment should be easy to care for and not too large. Ideally, they should be sourced from the region.

Some examples of plants that are easy to care for include spider plants, golden pothos and philodendron. As the light levels in offices tend to be lower than outdoor levels, choose plants that are suited for lower light conditions or which grow well under artificial lighting. An example of a plant that does not require much light is lemon balm. Philodendron and dracaena are well known for removing pollutants from the environment. The suitability of these plants depends on the region.

Advantages

- Plants help to enhance the overall appearance of the office by bringing a bit of green into the workspace
- They remove pollutants from the air
- They can reduce stress levels and increase productivity

Include plants

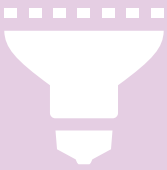


6. Toilets and Kitchens

6.1 Introduction

Toilets and kitchens are spaces that are used infrequently and usually for a short amount of time. The lighting system should be appropriate for this type of use. In addition, these areas account for most of the water consumption in a branch.

Points to consider:



Lighting

- If there are motion-sensor or timer-controlled lights, what are the settings?
- Are lights in usually unoccupied spaces left on?



Equipment

- How often is the dishwasher used?
- Is the dishwasher fully loaded before operation?
- Are electric equipment and appliances energy efficient?



Water

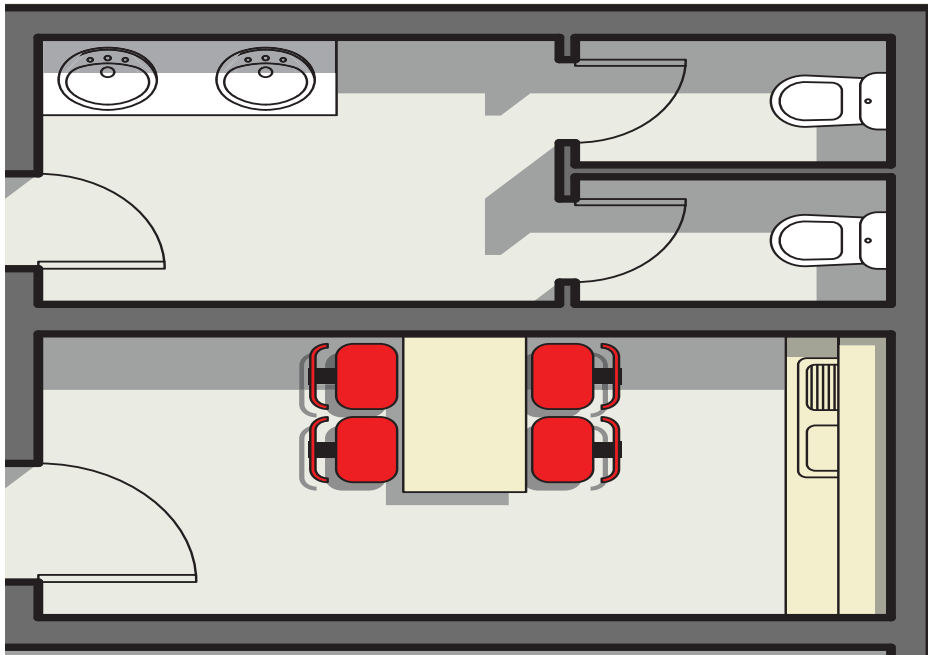
- How old are the building and the pipes?
- Is the plumbing checked regularly for leaks?
- What kinds of water fittings have been installed?
- If taps are automated, what are the settings?



Green procurement

- What kinds of soap, dishwasher liquid and cleaning products are being used?





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Buy environmentally friendly paper towels 41

Use non-toxic soap and cleaning products..... 41

6.2 Measures



Use motion sensors for lights

Motion sensors detect activity within a space and switch the lights on; after a pre-set amount of time, the lights are switched off again. Lights controlled by motion sensors are most effective and can save the most energy when installed in spaces which are often unoccupied, such as toilets or kitchens.

The two most common types of motion sensors used are passive infrared (PIR) sensors, which sense heat when people enter the space, and ultrasonic sensors, which detect motion and movement. Regardless of the type of sensor technology, it is important to aim the sensor at the entry point of the space.

Advantages

- Motion sensors save energy by keeping lights off when a space is not in use
- They ensure that the lights are switched on immediately upon entry, without requiring occupants to turn lights on (or off when they leave the space)
- They reduce the possibility of lights being left on inadvertently
- They make entry into these spaces safer for people who do not have a hand free to switch on the lights



Use energy efficient equipment

The dishwasher, refrigerator, microwave, oven and other appliances in the kitchen should be changed to energy efficient and water-saving models wherever possible, especially if they are frequently used. The EU energy label and Energy Star label are good indicators of the comparative efficiency of these products, allowing consumers to easily assess potential energy consumption before purchase. Some countries have their own energy labelling standards, which can also be used to compare various types of equipment.

Advantages

- Energy efficient equipment provides a quick way of reducing energy consumption. The longer the hours of operation, the more energy and cost savings will be gained from replacing old equipment with energy efficient models

Procure the best available EU energy label or Energy Star labelled equipment.

Use energy efficient hand dryers

While conventional hand dryers use hot air to dry hands, energy efficient models tend to use cool air at a high speed. The environmental impact of an energy efficient hand dryer occurs mostly during use, which is approximately 30 seconds per cycle.

Advantages

- Unlike conventional hand dryers, energy efficient hand dryers have efficient motors and no heating elements
- Energy efficient models reduce the amount of time required for hand drying and therefore reduce the amount of energy used
- Hand dryers have less of an environmental impact than paper towels

Choose high-speed cool air hand dryers.

Eliminate leaks

Depending on the age of the building, it might be a good idea have the pipes inspected by a professional in order to detect leaks and repair them.

Advantages

- Fixing leaky pipes saves water and costs

Consider dual flush toilets

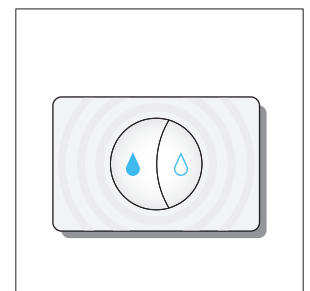
Dual flush toilets usually come with two buttons showing the two flush options – half flush or full flush. The half flush option reduces the amount of water used per flush.

It is important to ensure that the dual flush option is clearly indicated, either through the size of the buttons or through the use of labels or symbols. If the technology is unfamiliar to employees, further explanation may be necessary.

Advantages

- Dual flush toilets significantly reduce water consumption: a traditional toilet flush can use anywhere between 7 and 19 litres of water per flush, in contrast to the half flush option, which uses only about 4 litres of water

Dual flush toilets



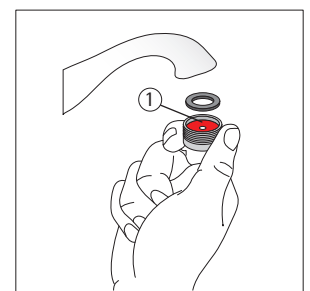
Instal low-flow faucets and faucet aerators

Low-flow faucets dispense less water per minute. Faucet aerators mix air into the water stream, maintaining steady pressure for an even flow. After installation, it is important to remember to carry out regular maintenance and cleaning.

Advantages

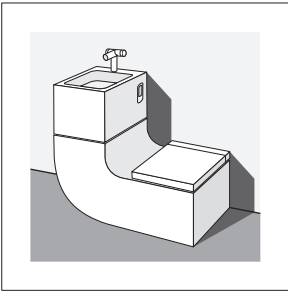
- Low-flow faucets and aerators reduce the amount of water dispensed when the tap is turned on without affecting performance; water consumption can be reduced by up to 50%

Low-flow faucets and faucet aerators



1) Faucet aerator

Combined sink and toilet



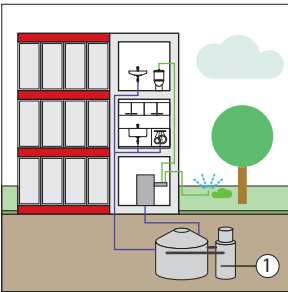
Instal a combined sink and toilet

In a combined sink and toilet, the sink is installed on top of the toilet tank. The sink dispenses fresh water which can be used for hand washing. That same water is then stored in the tank as greywater, which can be used to flush the toilet.

Advantages

- Combination units reduce the consumption of fresh, clean water by recycling the water used for hand washing to flush the toilet
- The units save space, which is ideal for small bathrooms
- They free up space for other purposes

Greywater collection system



1) Storage and filtering system

Greywater ■Reusable water ■

Instal a greywater recycling system

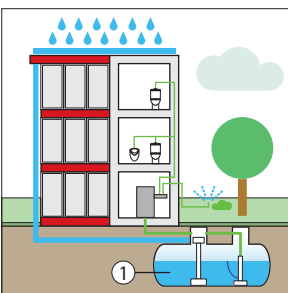
In areas with high water consumption, a greywater recycling system is a good way to use water for multiple purposes. After fresh water has been used once, it is considered to be greywater, which can be used for purposes which do not require clean, fresh water. Greywater can come from the bathroom sink, showers or washing machines, and does not contain serious contaminants. For example, water can be collected after hand washing or from air conditioning systems and then used to flush toilets or water plants.

If greywater is to be used for watering plants, eco-friendly soap must be used so that the greywater does not harm the plants.

Advantages

- Greywater recycling systems help to reduce overall water use by using the same supply of water multiple times
- They reduce the consumption of fresh, potable water, which is a precious resource

Rainwater harvesting system



1) Rainwater tank and filtering system

Rainwater ■Reusable rainwater ■

Instal a rainwater harvesting system

Rainwater harvesting refers to the capture, accumulation and storage of rainwater for use on site, rather than allowing it to run off. Rainwater can be used to water gardens or plants or to flush toilets. With appropriate filtering and treatment, this harvested rainwater can even be used as drinking water.

These systems must be properly installed and regularly maintained, as they are prone to contamination (e.g. from mosquitoes, algae, etc.). If the roof is used as part of the collection system, it must be checked to make sure that it does not allow chemicals to seep into the rainwater.

Advantages

- Rainwater harvesters ensure an independent water supply
- They can increase the availability of potable water
- They reduce demand for ground water
- They reduce flood and soil erosion

Buy environmentally friendly paper towels

If it is not possible to instal energy efficient hand dryers, an alternative is to provide environmentally friendly paper towels. These are made from 100% recycled, mostly post-consumer material and with minimal chemical bleaching. It may also be possible to buy towels made of non-tree paper, which comes from non-edible parts of plants or other crops grown for the purpose of paper production.

Advantages

- Environmentally friendly paper towels are less expensive than installing energy efficient hand dryers
- They do not consume energy while being used
- They can be used for several purposes (for example, wiping up spills in the kitchen)
- Paper towels with high post-consumer recycled content use less raw material

Use non-toxic soap and cleaning products

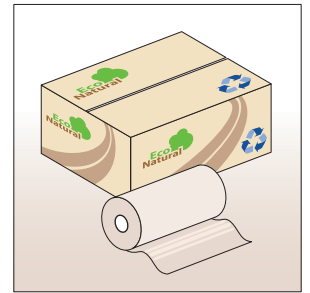
Non-toxic soaps, dishwashing liquids and cleaning products do not contain chemicals that are harmful to humans, animals or the environment. They can be plant-based and should ideally be free from synthetic fragrances, dyes and petrochemicals.

There are various labels that certify eco-friendly or non-toxic products. Some examples are the EU Ecolabel, Green Tick, and MAS Certified Green. As with all labels, the certification criteria and processes should be checked to ensure that the label is reliable and suitable.

Advantages

- Non-toxic cleaning products are safe for the environment, including soil and water

Environmentally friendly paper towels



Choose paper towels with high post-consumer recycled content.



7. Offices and Meeting Rooms

7.1 Introduction

When not meeting with clients, most BCAs work in the office during office hours. Therefore, the work space should be as conducive to productivity as possible and comfortably lit, heated and cooled. As BCAs may move around for meetings and client visits at different times, the office should offer maximum flexibility, e.g. in terms of lighting. Office space may also be separated with partition walls or glass to create small meeting spaces for private discussions with clients.

Points to consider:



Heating and cooling

- Are interior doors properly sealed?
- Are there programmable thermostats? What temperature are they set to? Is it season-appropriate? Where are the thermostats located?
- Are people comfortable in the space?



Lighting

- Is there anything blocking the windows and preventing daylight from entering the office?



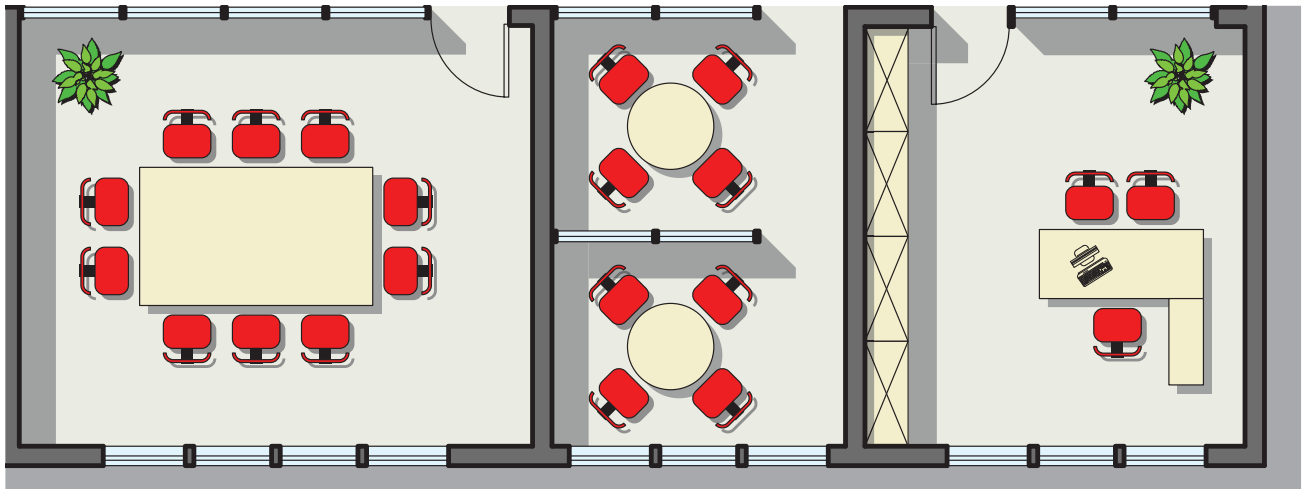
Equipment

- Are computers switched off when staff leave their desk for long periods?
- Is equipment shut down at the end of the working day?



Green procurement

- Is there a maintenance system for office equipment in place?
- Are there guidelines on what information needs to be printed?



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7.2 Measures



Set thermostats appropriately

Thermostats control heating and cooling systems by sending signals based on the temperature reading. They should be placed near the occupants, in the centre of the office, away from direct sunlight, air vents, windows and doors or any heat-producing equipment.

For countries that have four seasons, in summer time, thermostat temperatures should be set at between 22°C and 24°C. In winter time, temperatures should be set at between 20°C and 22°C. The difference in settings is due to seasonal clothing; people usually dress more warmly in winter time.

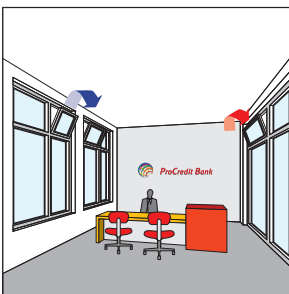
The placement of the thermostat is also crucial, as various factors can affect the accuracy of the temperature readings. For example, placing a thermostat near heat-producing equipment will cause a higher reading, triggering the cooling system, which then over-cools the space. Therefore, proper placement and setting of the thermostat are crucial for ensuring an efficient heating and cooling system, and for maintaining a comfortable environment in the office.

Ideal settings:
summer 22°C – 24°C,
winter 20°C – 22°C.

Advantages

- Properly set thermostats help to maintain a comfortable temperature in the working space
- They reduce the energy consumption of the heating and cooling system by avoiding over-heating or over-cooling

Natural ventilation



Allow for natural ventilation

Natural ventilation is a method of passive cooling and ventilation. This is usually achieved by allowing air to flow into the office space through open windows. This method provides fresh outdoor air and natural cooling for the occupants.

Natural ventilation is suitable in climates which have months during which the temperature is such that neither heating nor cooling (through mechanical means) is required for maintaining a comfortable temperature in the office space. At the same time, staff should understand that opening the windows while the heating or cooling system is on will waste energy.

Advantages

- Natural ventilation saves energy by achieving cooling and ventilation through windows without the use of mechanical systems
- It allows occupants to enjoy fresh air in the office
- It helps to prevent the build-up of contaminants within the office



Zone workspaces and consider partition wall insulation

Interior walls are the walls that separate the various spaces within a unit. Their function is not only to separate the spaces in terms of use, but also with regard to heating, cooling and sound.

Partition walls should be well insulated, especially if the two areas they separate are rarely used at the same time, or have very different heating and cooling needs. For example, partition walls that separate the server room should be well insulated so that the cooler temperature within the server room can be easily maintained by the cooling system.

Advantages

- Zoning and partitions allow the various spaces to be used independently
- They prevent heat loss or gain from neighbouring spaces which have a different cooling or heating schedule



Zone lights appropriately

The lighting system should be designed to ensure that areas that are likely to receive the same amount of daylight are grouped together in the same lighting zone. Lights above areas near the windows should be connected to the same switches, and lights above areas that are further away from the windows should be connected to a different switch. Rooms with different occupancy schedules should also have separate lights.

Advantages

- Zoning makes the use of artificial lighting simple and efficient
- It ensures that occupants are able to turn the lights on only where they need it
- It eliminates unnecessary energy consumption in areas which do not need artificial lighting
- It avoids the problem of over-illumination and potential discomfort for the occupants



Provide task lighting

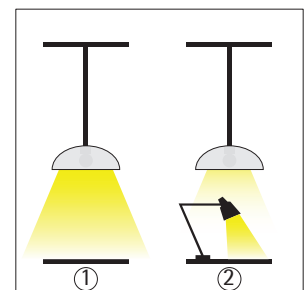
Task lighting refers to focused lighting that is provided to increase the illumination in reading and working areas. This light is usually provided by desk lamps that occupants can switch on when there is insufficient daylight or if their work requires more light than is currently available. This is a simple and effective solution when the lighting circuit cannot be changed to group the correct lighting areas together.

Advantages

- Task lighting provides better illumination
- It uses less energy than lighting up the whole office

Areas that receive the same amount of daylight should be grouped together in the lighting circuit.

Task lighting



- 1) Bright ambient lighting
- 2) Low or no ambient lighting with task lighting



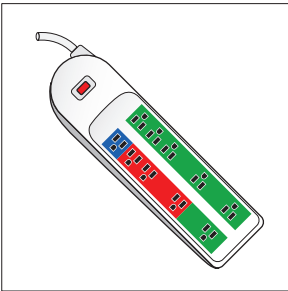
Set timers to turn lights on and off

Programmable timers are an easy way to ensure that lights are switched off at certain times of the day, for example during the lunch break or after work.

Advantages

- Timers can help to save electricity and money by ensuring that the lights are switched off at the end of the work day
- They are relatively inexpensive and do not consume much electricity

Power strips



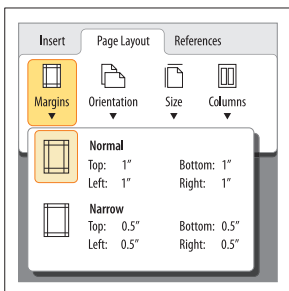
Use power strips

Most equipment continues to draw a certain amount of power even after it has been turned off. This is known as a vampire load and it can be eliminated through the use of advanced power strips. Advanced Power Strips (APS) are designed primarily for areas with a high concentration of electronics, and they work by preventing electronics from drawing power when they are off or not being used. They look similar to standard power strips, except that they include specific outlets for appliances with different uses, depending on the type of APS chosen. A timer-based APS can ensure that all electronic equipment is switched off and is not drawing power after office hours.

Advantages

- Power strips prevent energy waste due to equipment drawing power while not in use

Minimise paper and ink use



Minimise paper and ink use

There are many ways to reduce paper and ink consumption:

- Information can be circulated via email, rather than using paper, not only within the office, but also when communicating with clients
- Margins can be reduced so that more of the paper is used when printing
- Track printing amounts/frequency and set printing quotas
- Set the printer default so that printing is done on both sides of the paper
- If only one side of the paper is required, the other side can be used later for printing drafts or for note-taking

Advantages

- Reducing paper consumption in the office is good for the environment
- Less printing means less toner and ink are consumed



8. Glossary

Term	Explanation
Biodegradable	A biodegradable substance or object is one that is capable of being decomposed by bacteria or other living organisms and therefore avoids pollution.
Biomass	This term covers all biological material that is derived from living or recently living organisms, including forest residues, animal manure, wood chips and various plants. It is used not only as a source of fuel for heating, but can also be converted into transportation fuels such as ethanol or biodiesel.
Carbon dioxide (CO ₂)	Carbon dioxide is the most important greenhouse gas because so many human activities contribute to large emissions of CO ₂ . Every year, around 30 billion tonnes of CO ₂ is emitted into the atmosphere from the consumption of energy alone.
Carbon footprint	The carbon footprint measures the environmental impact of an individual, a lifestyle, an activity, or an organisation's product or operation, in units of carbon dioxide.
Cooling load	The total amount of heat that has to be removed from the space by the HVAC system is the cooling load of the space. Factors that influence the cooling load include the building envelope insulation (or lack thereof), the number of people in the space, and the lighting and equipment used in the space (that generate heat).
Energy efficiency	Energy efficiency refers to the amount of energy required to produce a given service or level of activity. The more energy efficient a technology or product is, the less energy it requires to produce the same level of service or activity.
Energy Efficiency Ratio (EER)	The EER is commonly used in relation to air conditioners or other cooling equipment, and indicates how well the air conditioner can convert the total electrical input (in watts W) into cooling power (in British Thermal Units BTU per hour h). $\text{Energy efficiency Ratio } \left(\frac{\text{BTU}}{\text{Wh}}\right) = \frac{\text{Cooling capacity } \left(\frac{\text{BTU}}{\text{h}}\right)}{\text{Total electrical input (W)}}$
Energy Star label	The Energy Star label indicates that a product is more energy efficient than the average product available.
Environmentally friendly	The term "environmentally friendly" is used to denote products or actions whose purpose is to reduce the negative impact on the environment. For example, environmentally friendly paper may be made from non-wood sources, or made from responsibly maintained and sustainable forests.
EU energy label	The EU energy label indicates how energy efficient a product is with a rating from A+++ (most efficient) to D (least efficient), as well as the expected annual energy consumption.
Forest Stewardship Council (FSC)	FSC is a global, not-for-profit organisation dedicated to the promotion of responsible forest management worldwide. FSC-certified products come from responsible and sustainable sources of wood. For more information, visit: https://ic.fsc.org
Greenhouse gases	Greenhouse gases are gases in the atmosphere that absorb and reflect radiation, which leads to the gradual warming of the earth (greenhouse effect). The main greenhouse gases are water vapour, carbon dioxide, methane, nitrous oxide and ozone.

Term	Explanation
Greywater	Greywater is relatively clean waste water that comes from the kitchen, bathroom (not the toilet), and laundry cycles. It can normally be reused or recycled with little or no treatment for landscape irrigation and other non-potable (non-consumption) uses.
Groundwater	Groundwater is the water that is found underneath the ground in cracks and spaces in soil, sand and rock; it makes up nearly 70% of the world's fresh water. Groundwater is brought to the surface through springs or flows into lakes and streams. Drilling and creating wells also brings groundwater to the surface. Pollution of groundwater may happen when landfills, fertilisers and pesticides leak harmful chemicals.
Heat pump	A heat pump is a device that channels heat energy from a source of heat to a destination by absorbing heat from a cold space and releasing it to a warmer one. Heat pumps usually run on electricity and are very efficient. They are considered to be the most environmentally friendly heating system because they do not burn fossil fuels (gas, oil) or biomass (wood, etc.) directly to generate heat.
Heating load	Heating load is defined as the total amount of heat that has to be added to a space by the HVAC system to maintain a desired temperature. Factors that influence the heating load include the building envelope insulation (or lack thereof), size of the space, and energy needed to heat the air from outside (if it is being used for ventilation).
HVAC (heating, ventilation, and air conditioning)	HVAC is the technology of indoor environmental comfort. Its goal is to provide thermal comfort and acceptable indoor air quality.
Inverter air conditioner	Inverters are able to control the speed of the compressor motor driving the refrigerant flow. This means that the cooling or heating power of an inverter air conditioner can be varied depending on the actual space temperature, which makes it much more energy efficient than a conventional single-speed air conditioner.
Inverter for solar photovoltaic (PV) systems	An inverter is an electronic device that changes direct current (DC) to alternating current (AC). It is commonly used with solar PV systems to change the DC generated by the solar PV panels into AC, which is accepted by the electricity grid.
Kilowatt (kW)	A kilowatt is equal to one thousand watts (W) and is typically used to state the capacity of engines or the power consumption of tools, machines and electrical equipment.
Kilowatt hour (kWh)	A kilowatt hour is a unit of energy that is used to measure the amount of energy delivered by electric utilities in an hour. It is a product of power in kilowatts (kW) and time (in hours h).
LED (light-emitting diode)	A semiconductor diode that converts applied voltage to light and is used in lamps and digital displays.
level® label	level® certification evaluates products, the facilities in which they are produced, and the organisation behind their production according to sustainability criteria in the four impact areas of Materials, Energy & Atmosphere, Human & Ecosystem Health, and Social Responsibility. For more information, visit: http://levelcertified.org/wp-content/uploads/2012/10/Level_Brochure_FINAL_black-background.pdf

Term	Explanation
Life cycle emissions	Life cycle emissions refer to the total emissions associated with a given product, from raw material extraction to materials processing, manufacture, distribution, use, repair and maintenance and disposal or recycling.
Light reflectance value (LRV)	The LRV of a colour indicates how light or dark it is on a scale from 0% (absolute black) to 100% (perfectly reflective white). It indicates the total quantity of visible and useable light reflected by a surface in all directions and at all wavelengths when illuminated by a light source (ref. British Standard BS 8300:2001/A1:2005).
Liquefied petroleum gas (LPG)	LPG is a mixture of flammable hydrocarbon gases used as fuel in heating appliances, for cooking, and powering vehicles. It is a type of fossil fuel, but releases less carbon dioxide per unit of energy into the atmosphere when burned compared to oil or coal.
Lumen (lm)	A lumen is a unit of measurement of visible light and indicates the "amount" of visible light emitted from a source. A simple way of thinking about a lumen is seeing it as the amount of light produced by a light bulb.
Lux (lx)	The lux is closely related to the lumen, but it takes into account the total area over which the light is spread. Therefore, 1 lux is 1 lumen per square metre. A simple way of thinking about a lux is seeing it as the amount of light received by the area from the light bulb(s).
Natural gas	Natural gas is a type of fossil fuel, a hydrocarbon gas made up mainly of methane. It is an energy source commonly used for electricity generation, heating and cooking. Every year, more than 100 trillion cubic feet of natural gas is consumed worldwide. According to The World Factbook (Central Intelligence Agency, USA), the top five exporters of natural gas around the world are Russia, Qatar, Norway, Canada and the Netherlands.
Post-consumer recycled material	Post-consumer recycled material is made from waste materials generated by households or by commercial, industrial and institutional facilities in their role as end-users of a product that can no longer be used for its initial purpose.
Renewable energy	Renewable energy sources are replenished by natural processes on a timescale sufficiently rapid to allow humans to use them more or less indefinitely (depending on the quantity consumed over time). These include animal dung, ethanol (derived from plant sugars), wood, wind, falling water and sunlight. The benefit of using renewable energy is that it avoids burning fossil fuels (coal, oil, natural gas) and therefore reduces the emission of greenhouse gases.
SCS certification	SCS Global Services is an independent third-party assessor providing certification and labelling in the areas of responsible forest products, climate change, life cycle considerations, sustainable agriculture, responsible sourcing, building interiors, and food. For more information, visit: http://www.scsglobalservices.com/scs-marks-and-labels

Term	Explanation
SFC member seal	The Sustainable Furnishings Council (SFC) is an organisation whose members take steps to minimise carbon emissions, waste stream pollutants, un-recyclable content and primary materials from unsustainable sources under their control. For more information, visit: http://www.sustainablefurnishings.org/content/our-mission
Solar photovoltaic panel	A solar photovoltaic (PV) panel is composed of individual solar PV cells which convert light energy from the sun into electrical energy.
Solar photovoltaic system	A solar photovoltaic system is made up of solar PV panels, an inverter and the cables connecting them.
Solar water heating system (SWHS)	A solar water heating system heats water using the heat from the sun and then channels it to the building as space heating or as a source of hot water.
Thermal break	A thermal break or thermal barrier is an element of low thermal conductivity placed in an assembly to reduce or prevent the flow of thermal energy between conductive materials. In the context of aluminium windows a separator material is used between the inner and outer frame to prevent the temperature transfer through the frame and condensation on the inside frame.
U-value (overall heat transfer coefficient)	The U-value indicates how well parts of a building transfer heat. The lower the U-value, the better the thermal performance.
Watt (W)	A watt describes the rate of the work which is done when a force of 1 Newton is needed to hold the velocity of an object at a constant value of 1 metre per second.

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