

DOH Health Facility Guidelines 2022

Part S – Sustainability



Executive Summary

The DOH Health Facility Guidelines Part S is focussed on sustainability and green building initiatives specifically for healthcare.

Abu Dhabi construction industry is already covered by the requirement of Estidama. However, these requirements are not healthcare-specific. Part S of the DOH Guidelines should be seen as complementary to Estidama and a natural extension of the other components of the Guidelines.

It is hoped that through the Part S Guidelines, the Healthcare Industry will introduce initiatives and features that will put the healthcare facilities at the forefront of innovation in sustainability.

When these initiatives are implemented as an integral part of the design and construction process, the facilities should benefit from additional efficiency, lower maintenance costs and reduced recurrent costs. Therefore, the industry should not see the requirements of Part S as a burden but an opportunity to future-proof and protect the healthcare investments.

In line with the National sustainability strategies, compliance with the DOH Health Facility Guidelines Part S will set a progressive path towards Net Zero Carbon footprint by 2050.

This part has certain minimum mandatory requirements referred to as Sustainability Level 1. Level 1 is required for all future applications for licensing.

However, applicants are encouraged to voluntarily aim for higher levels of Sustainability at Levels 2 or 3. The DOH approvals will indicate the level of Sustainability achieved.



Table of Contents

Executive Summary	2
1. Part S “Sustainability	6
1.1 Introduction.....	6
1.2 UAE Net Zero 2050.....	6
1.2.1 Strategic alignment.....	6
1.3 What is Net Zero?	6
1.3.1 Renewable energy	7
1.3.2 Net Zero targets and Carbon Footprint	7
1.3.3 Initiatives covered within these Guidelines.....	7
1.4 Part S Guidelines Application.....	8
1.4.1 Compliance notes and clarifications.....	8
1.4.2 Mitigation Strategies	9
1.4.3 Future Green Energy and Green Products	9
1.4.4 Verification	10
1.4.5 Validity of the Sustainability Certificate.....	12
1.5 Definitions and Acronyms.....	13
1.6 Sustainability levels and compliance assessment.....	15
1.7 Sustainable Building Design Elements.....	16
1.7.1 Building Envelope Integrity.....	16
1.7.2 Day lighting.....	18
1.7.3 Extreme Heat-Specific Passive Design Measures.....	21
1.7.4 Urban Heat Island Effect.....	23
1.7.5 Window to wall ratio	24

1.8	Resource Effectiveness: Energy	27
1.8.1	Envelope Minimum Requirements	27
1.8.2	HVAC System's Efficiency – Source :	30
1.8.3	HVAC System's Efficiency- Distribution	31
1.8.4	Hot Water Service	33
1.8.5	Internal Lighting	34
1.8.6	External Lighting	36
1.8.7	Vertical Transportation	38
1.8.8	Renewable Energy	39
1.8.9	Systems Verification	42
1.8.10	Energy Monitoring	43
1.8.11	Night Cooling and Economizer Mode	45
1.8.12	Displacement Ventilation	46
1.8.13	FRESH AIR PRE-CONDITIONING SYSTEM	47
1.8.14	ECONOMIZERS	48
1.9	Resource Conservation: Water	50
1.9.1	Indoor Water Use Reduction	50
1.9.2	Water Monitoring	51
1.9.3	Leak Detection	52
1.9.4	Authorised sources of water re-use	53
1.10	Resource: Materials & Waste	54
1.10.1	Indoor Material Emission Reduction	54
1.10.2	Mercury Source Reduction	57
1.10.3	Refrigerant Management	58
1.10.4	Cleaning Products and Protocols	59

1.10.5 Construction and Demolition Waste Management Plan (CDWMP).....	61
1.10.6 Commitment to Carbon Footprint Reduction (GHG) & Net Zero Carbon.....	62
1.11 Doing More with Less	66

1. Part S “Sustainability”

1.1 Introduction

Abu Dhabi 2030 vision toward sustainability was developed to ensure integration among the three major aspects of sustainability: environmental, economic and social vision. It aims to preserve and enhance Abu Dhabi's natural heritage in the efficient use of resources and contributing to a better quality of life for all.

The Sustainable Guideline Part S (the Guide) provides sustainability categories, requirements and ready-to-use specifications which can be easily adopted and applied in the healthcare buildings. Applying these guideline will result in more sustainable buildings that have more efficient use of resources such as energy consumption, water use, building materials and long-term maintenance.

These Guidelines are part of the broader UAE sustainability addenda including the reduction in the carbon footprint of the healthcare facilities.

Part S prefers and promotes designs which avoid the problems at the earliest possible stage with smart strategies. Guidelines do not reward designs which first create the problem, then attempt to solve them by the application of numerous high-cost features. In short, these Guidelines prefer solutions which “do more with less” resources.

Part S also covers initiatives which contribute to a healthier environment through the selection of building materials which are both healthy and sustainable.

The intended users of the Part S guidelines include health facility owners, investors, Architects, engineers, buildings professionals and construction contractors.

These guidelines were developed by a diverse group of professionals from different backgrounds, supported by research and studies of many other sustainability guidelines and initiatives.

Part S Sustainability Guidelines are complementary to the existing Estidama standards which are mandatory for all buildings in Abu Dhabi but are not healthcare-specific. Therefore, these Guidelines should be seen as additional to Estidama and mandatory for all types of healthcare facilities.

1.2 UAE Net Zero 2050

The UAE Net Zero by 2050 strategic initiative is a national drive to achieve net-zero emissions by 2050, making the Emirates the first Middle East and North Africa (MENA) nation to do so.

1.2.1 Strategic alignment

The initiative aligns with the Principles of the UAE's roadmap for accelerating national economic development. It also aligns with the Paris Agreement, which calls on countries to prepare long-term strategies to reduce greenhouse gas (GHG) emissions and limit the rise in global temperature to 1.5C compared to pre-industrial levels.

Government authorities are responsible for developing plans that introduce the measures necessary to reduce emissions while also ensuring economic growth based on principles of sustainability. These Guidelines are part of the initiative, covering the healthcare sector.

1.3 What is Net Zero?

Put simply, net zero refers to the balance between the amount of greenhouse gas produced and the amount removed from the atmosphere. We reach net zero when the amount we add is no more than the amount taken away. Single buildings may not have full control over the production of greenhouse gases by the producers of energy. However, they can substantially reduce their carbon footprint by the careful design strategies, reduction of energy use and building materials produced using sustainable methods. Over time green and renewable energy and green certified products will become

available, allowing more facilities to reach the Net Zero targets. In the future, where such measures are insufficient for achieving the Net Zero targets within a single facility, carbon credit trading may be utilised.

1.3.1 Renewable energy

The deployment and use of clean energy solutions is one of the main pillars of the UAE's model of addressing the challenge of climate change and reducing GHG emissions. The country began developing clean energy projects more than 15 years ago. Current trends predict the production capacity of clean energy, including solar and nuclear, to reach 14 GW by 2030, up from about 100 MW in 2015 and 2.4 GW in 2020.

The UAE supports green infrastructure and clean energy projects, including those in the healthcare sector.

1.3.2 Net Zero targets and Carbon Footprint

For healthcare facilities within the Emirate of Abu Dhabi the following targets apply:

- All healthcare facilities to achieve a reduction of 20% in their Carbon Footprint by 2030
- All healthcare facilities to achieve Net Zero by 2050

For the first target, towards 2030, facility owners and operators may be required to keep data indicating the progression towards the target of 20%. The DOH audit team may require the inspection of such data.

For the second target, in the future applicants will be required to provide certificates from the Municipality indicating that the building achieves Net Zero. These certificates (when they become available) should be submitted to the DOH, when requested.

1.3.3 Initiatives covered within these Guidelines

The Part S Guidelines include initiatives which apply to the design and construction and influence the ongoing sustainable operation of the facility through a reduction in energy and water use. These initiatives, supported by principles and checklists, classified under various topics.

In these Guidelines, the aim is to reduce the carbon footprint to the minimum that is practical and possible. These are measures that can be practically verified through the submission and approval of designs and evidence of compliance during construction without having to look further to external factors.

Further reduction on the carbon footprint of an individual facility, in order to achieve the above targets is expected to be possible in the future, using carbon credits such as:

- Renewable energy or approved energy credits
- Certified green products that may offer approved credits

These Guidelines may be updated as the Government Net Zero initiatives are progressively implemented towards the 2030 and 2050 targets and further green products become available. Meanwhile all new applications should commence compliance with the minimum requirements of the Sustainability Guidelines Part S.

1.4 Part S Guidelines Application

The provisions of these Guidelines are applied to health facilities in Abu Dhabi as set out below.

These Guidelines are set out under 3 levels as described below.

Levels	Compliance Requirement	Applies to:
Level 1 Green	Compliance with Level 1 is mandatory for all existing and new facilities. As part of any new License approval, a Level 1 - Green Sustainability Certificate will be issued to the applicant. This Certificate will be valid for 5 years but may be renewed upon application and further inspection by the DOH. For existing facilities after verification by the DOH, the same type of Level 1 Certificate will be issued. The timing of inspections for existing facility compliance will be entirely up to the DOH.	• All new and existing facilities which are stand-alone (ie not a tenancy within another facility) • All new and existing facilities which are a tenancy within another facility, only to the extent that the owner/operator of the healthcare tenancy can control the components included in Part S Guidelines
Level 2 Advanced	Compliance with Level 2 is optional but highly recommended. Applicants who voluntarily comply with the Level 2 requirements of these Guidelines will receive a Level 2 - Advanced Sustainability Certificate from the DOH as part of the license to operate. This Certificate will be valid for 5 years but may be renewed upon application and further inspection by the DOH.	• Any facility in any condition, both new and existing • All parts of the facility, whether new, existing or being refurbished or extended
Level 3 Ultimate	Compliance with Level 3 is optional but exceptional commitment to sustainability. Applicants who voluntarily comply with the Level 3 requirements of these Guidelines will receive a Level 3 - Ultimate Sustainability Certificate from the DOH as part of the license to operate. This Certificate will be valid for 5 years but may be renewed upon application and further inspection by the DOH.	• Any facility in any condition, both new and existing • All parts of the facility, whether new, existing or being refurbished or extended

1.4.1 Compliance notes and clarifications

As part of the submission of design documents, applicants must state the level of Sustainability which is claimed (Level 1, 2 or 3).

The DOH assessors will evaluate against the level claimed. If the application achieves the level claimed the same level of Sustainability Certificate will be granted.

If the sustainability is assessed to be at a lower level, then the DOH will grant a Sustainability at a lower level. The minimum acceptable level is Level 1 – Green.

Applicants are encouraged to aim for higher Levels 2 and 3. They should be proud to publicise their achievements under the higher Sustainability levels and the DOH would fully supportive of such promotions as this would encourage others to follow.

For provisions which apply to the existing buildings (see above), if any physical work or modification to the building is required, the facility owners/ operators should prepare such plans using pre-qualified consultants and submit to the DOH for approval in a similar manner to other building modifications. In other words, if a change to the building is required, it cannot be implemented without prior approval of the relevant authorities, even if it is for the purpose of compliance with these Part S Guidelines.

1.4.2 Mitigation Strategies

In existing buildings if it is impossible to comply with certain aspects of these guidelines Mitigation strategies may be offered as shown in the Checklists included in these Guidelines. As part of the Mitigation Strategy, the applicants must first declare their non-compliance, indicating that they understand what is required. Then they can offer the Mitigation strategy for consideration by the DOH. The approval or rejection of such Mitigation strategies will be entirely up to the DOH assessors and the decisions will be final.

If there are no Mitigation possibilities for certain requirements of these Guidelines due to the special circumstances of the existing facility, the applicants may request a discussion with the DOH Licensing department and seek direction. It should be noted that these Guidelines (part S) apply only to stand-alone facilities where the owner/ operator has control over the development. It also applies to tenancies only to the extent that the tenant, being the health facility owner/ operator has control over the provisions of the main building. Where power, chilled water, façade treatment etc is provided as part of the existing building, compliance with those provisions is not required.

However, it is anticipated that in the future, based on the Government's commitment to Sustainability, the host building may also be required to upgrade their provisions. When that happens, then tenants will also be required to match the compliance.

1.4.3 Future Green Energy and Green Products

It is anticipated that over time Green Energy and Green certified products will become available in the market. Facility owners/ operators and consultants should look for such products and use them when they are available, as part of the compliance requirements of these Guidelines.

1.4.4 Verification

The initiatives and requirements under the above 3 Levels are set out within the text of these Guidelines. Two types of initiatives are mentioned based on the verification method:

Requirements	Verification method	Verification
Design	These requirements must be incorporated in the design of the facility and the documents which are submitted to the DOH for licensing applications.	• Verified as part of the Detailed Design submission (1) • Verified as part of the planning review by the DOH • At Level 1, if compliance is not possible or practical due to special circumstances of the project, then mitigation strategies should be offered (2)
Construction	These requirements must be applied during the construction of the facility including any new documents, records or testing data which must be generated.	• Verified as part of the 90% inspection • Verified as part of the documents which need to be made available to the inspectors during the 90% inspection • Verified as part of the 100% inspection including any missing documents identified at the 90% inspection • At Level 1, if compliance is not possible or practical due to special circumstances of the project, then mitigation strategies should be offered (2)
Operation	DOH officers	• Facility owners/ operators are required to keep records of any elements of the Part S Guidelines which refer to continuing operation, such as energy or water use. DOH may inspect the facilities at any time with or without any applications being lodged for modifications. The data should verify compliance with these Guidelines.

Note (1) – The requirements of Part S require verification of many items such as extracts from specifications. Therefore, such verification will require the submission and approval of the application at Step 3 of the approval process being the Detailed design Submission (refer to Part A of the Guidelines).

Note (2) – The approval of the mitigation strategies will depend on the sole decision of the DOH and such approval should not be automatically expected. The decision is not subject to any appeal or trade-offs with other building features. It should be noted that mitigation strategies are available only under Level 1 which is the minimum mandatory requirement for Sustainability. Mitigation strategies will not be considered as part of Levels 2 and 3 as these Levels are optional.

1.4.5 Validity of the Sustainability Certificate

Once a Sustainability certificate is issued by the DOH, it will remain current for 5 years. Before the end of this validity period, the facility owners must call for the renewal of the Sustainability certificate. The minimum level for the renewal of the Sustainability Certificate is Level 1 – Green. However, the applicants can also request a renewal of the Sustainability Certificate at a high level if:

- The facility has been refurbished to achieve a higher sustainability level
- The requirements of higher sustainability levels have been progressively implemented and verification can be provided
- The facility has been expanded substantially and new blocks comply with higher sustainability levels as per Part S. In such cases only the new blocks will gain the higher levels.

1.5 Definitions and Acronyms

Acronym	Description
AHRI	Air-Conditioning, Heating, and Refrigeration Institute
ASTM	American Society for Testing of Materials
BLB	Building Log Book
Green Spaces	Spaces with plants, trees, green covers, etc.
Blue Spaces	Spaces with water surfaces, sea, oceans, etc.
CDWMP	Construction and Demolition Waste Management Plan
CIBSE	Chartered Institution of Building Services Engineers
GWP	Global Warming Potential
HVAC	Heating, Ventilation, and Air Conditioning
IAQ	Indoor Air Quality
Km	Kilometre
LPD	Light Power Density
Mg	Milligram
Kg	Kilogram
Light Pollution	Light that extends beyond its source such that the additional light is wasted in an unwanted area or in an area where it inhibits view of the night sky
LRV	A colour's Light Reflectance Value (LRV) measures the amount of visible and usable light that reflects from (or absorbs into) a painted surface. Simply put, LRV measures the percentage of light a paint colour reflects.
LPD	Lighting Power density , measured in installed Wattage of lights divided by the m2 area in W/m2.
MSDS	Material Safety Data Sheet
ODP	Ozone Depleting Potential
PTAC	Packaged Terminal Air Conditioners
PTHP	Packaged Terminal Heat Pumps
ppm	parts per million
Regional Materials	Materials that are extracted, harvested, recovered, and manufactured within a radius of 500km
Sealant	Any material that fills and seals gaps between other materials
SMACNA	Sheet Metal and Air Conditioning Contractor's National Association
SRI	The Solar Reflectance Index (SRI) is a measure of the solar reflectance and emissivity of materials that can be used as an

Acronym	Description
	indicator of how hot they are likely to become when solar radiation is incident on their surface
VOC	Volatile Organic Compound.
WB	Water Based.
SB	Solvent Based
SHGC	Solar Heat Gain Coefficient
SFP	Specific Fan Power (Watt per L per sec)
U Values (W/m ² .K)	Thermal transmittance measured in Watts per m2 Kelvin
Shading Coefficient (SC)	The shading coefficient (SC) is derived by comparing the solar radiant heat transmission properties of any glass with a clear float glass having a total solar heat transmittance of 0.87 (i.e. clear float glass about 4mm thick
EER	Energy Efficiency Ratio
SEER	Seasonal Energy Efficiency Ratio
COP	Coefficient of Performance
SCOP	Seasonal Coefficient of Performance
IPLV	Integrated Part Load Value

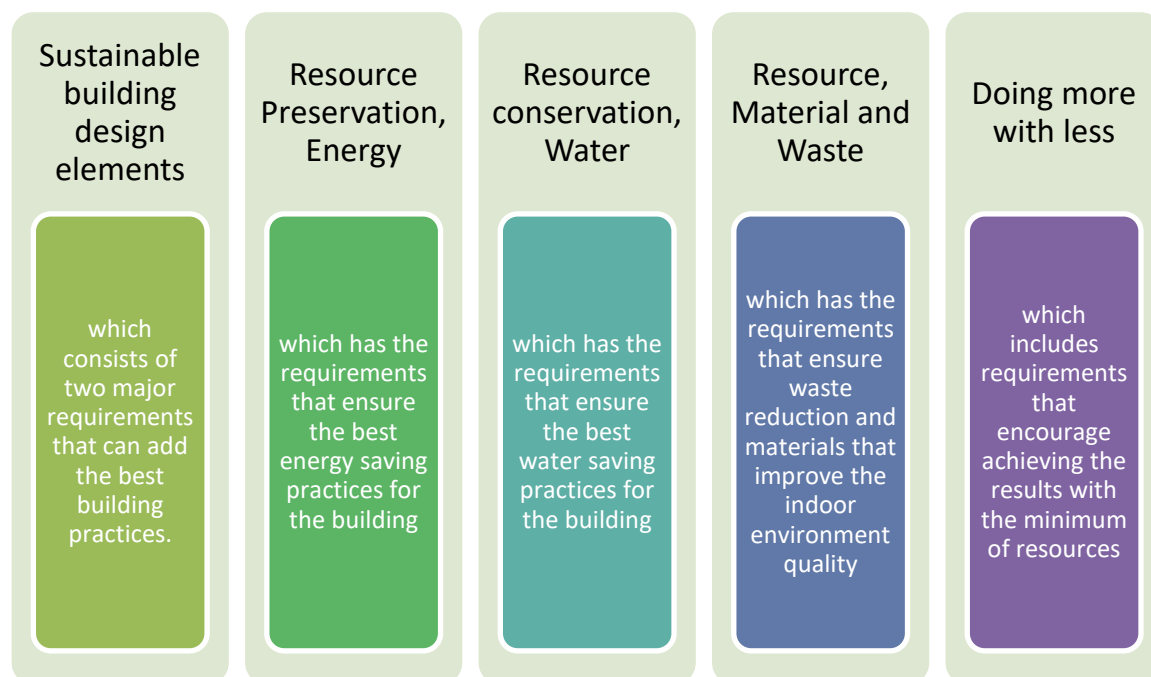
1.6 Sustainability levels and compliance assessment

2022 Part S – Sustainability will consist of four major categories which support the main Sustainable features which are the Building Design, Water, Energy, and Materials.

Each category will have number of requirements that we considered to ensure that the building can approach the best sustainable practices within the three levels we have.

The DOH will determine the level from the checklist provided and based on the evidence presented.

In this guideline, the main focus was taken to carry the best building practices that can add a value on buildings in terms of:



1.7 Sustainable Building Design Elements

1.7.1 Building Envelope Integrity

Intent

Ensure that the building envelope is well protected against any adverse external impacts such as condensation, water ingress, and air infiltration.

During Design

Level 1

- Within the design package ensure that the contractor scope is clear on the following:
 - Conduct On-site water infiltration and air-tightness tests of the building envelope
 - Provide Off-site testing of prototypes for custom-made cladding systems before installation
 - Conduct a review of standard product pre-testing certificate for pre-tested systems before installation

Level 2

- Provide Drawings and/or specifications for air tightness to be confirmed during construction using a blower door test; or
- Show schematics/detailed drawings and manufacturer's data sheets showing air flow ratings for all materials intended for use to achieve the airtightness:
 - Continuous air barrier on all exterior opaque surfaces (walls, roof, and floor if raised) with airtightness ratings
 - Sealed window and door frames and joinery details
 - Sealed envelope penetrations (pipes, ducts, cables)
 - Sealed and taped envelope junctions (wall corners, wall and roof joints)
 - Self-closing external doors
 - Entrance vestibule
 - Air Curtains on external doors
 - Door Sweeps

Design Checklist

1.5.1 Building Envelope Integrity (Level 1)	Yes	No	N/A	Supporting Documents
Has the design specified the airtightness requirements in your tender documents for the contractor?				Extract of the tender document specifications
Remarks/Mitigation:				
1.5.1 Building Envelope Integrity (Level 2)	Yes	No	N/A	Supporting Documents
Has the design specified in tender documents or drawings the use of blower doors?				Extract of drawings or specifications

Has the design specified the applicable points that the contractor should follow to ensure the airtightness is achieved?				Extract from specifications
--	--	--	--	-----------------------------

During Construction

Level 1

- Conduct On-site water infiltration and air-tightness tests of the building envelope to ensure performance, post installation.
- The performance of the building envelop should have a limited air leakage to avoid the building from any heat leakage from the outer side to the internal spaces of the building or any cooling leakage from the internal spaces to the outer side. Building Air Leakage results after doing the air-tightness test: building shall be tested as per ASTM E779 and should not exceed 3.64l/s/m² @75Pa based upon the area of exposed façade.
- Provide Off-site testing of prototypes for custom-made cladding systems before installation; to demonstrate from the manufacturer that the cladding materials will be well tight and demonstrate that there will no air leakage after installation.
- Conduct a review of standard product pre-testing certificate for pre-tested systems before installation; and provide a proof of this if the same material that will be used in the project has been installed in another project and it has been pre-tested for its tightness efficiency.

Level 2

- A blower door test should be performed for building air leakage.
- Continuous air barrier on all exterior opaque surfaces (walls, roof, floor if raised). This can be an airtight wrap made of special paper with very low permeability to air, or a rubberized paint with similar properties.
- Provide date-stamped photographs taken during construction showing the make and model matching the specifications or data sheets as applicable:
 - Continuous air barrier on all exterior opaque surfaces
 - Sealed window and door frames and joinery details
 - Sealed envelope penetrations (pipes, ducts, cables)
 - Sealed and taped envelope junctions (wall corners, wall and roof joints)
 - Self-closing external doors
 - Entrance vestibule
 - Air Curtains on external doors which mechanically push air down creating a barrier between the inside and the outside air to limit the air exchange when opening doors
 - Door Sweeps hat cover any gap between the door and the floor
- Maintain and present purchase receipts for each applicable item showing the make and model matching the specifications or data sheets as applicable

Construction Checklist

1.5.1 Building Envelope Integrity (Level 1)	Yes	No	N/A	Supporting Documents
Has the contractor completed the envelop elements 100%?				Date stamped Photos
Has the contractor conducted water ingress test?				Date stamped Photos
Has the contractor hired a 3 rd party for the air tightness test and conducted it?				3 rd party report
Has the contractor used custom-made cladding?				If 'yes' contractor to submit the custom-made test report from the manufacture.
Has the contractor used a previously installed cladding system? If yes, please submit the previous tested results.				If 'yes' contractor to submit previous air tightness test from previous site, or manufacture.
Remarks/Mitigation:				
1.5.1 Building Envelope Integrity (Level 2)	Yes	No	N/A	Supporting Documents
Has the contractor met the make and model requirements applicable in the project?				Schedule of the applicable models. Date stamped photos. Delivery notes of the items.

1.7.2 Day lighting

Intent

Ensure that the building design maximizes the use of the natural daylight within building and reduce the use of the artificial lighting through these provisions:

- Install daylight sensors to light fittings that receive sufficient daylight luminance.
- Install occupancy sensors in all rooms intended for individual occupancy, conferencing or meeting rooms, open plan offices spaces and hallways or corridors.
- Demonstrate that glare control devices have been designed and installed, such as:
 - Automated or manually controlled internal or external glare control devices to all Windows
 - Automated glare control devices must be connected to the building management System
 - All manually controlled internal glare control devices must be no wider than 4 linear meters and be directly controllable by occupants.
- Demonstrate a minimum daylight luminance of 250 Lux on the working plane (762mm from finished floor level) for a percentage of the occupied area (minimum of 50% of the occupied spaces sensitive areas that can't have natural daylight can be excluded from calculations).

During Design

Level 1

- Provide floor plans, elevations and sections;
- Submit extracts from specifications listing all glazing performance criteria;
- Submit extracts from specifications listing all glare control devices demonstrating their specifications;
- Submit extracts from specifications indicating requirements for daylight and occupancy sensors;
- Prepare Simulation plots showing Isolux contours relevant to the day lighting using any sufficient software;
- Provide Spreadsheet of areas meeting requirements; and
- Client signs a confirmation that all spaces comply with the requirements for daylight and occupancy sensors.

Design Checklist

1.5.1 Day lighting (Level 1)	Yes	No	N/A	Supporting Documents
Has the design shown provisions of daylight sensors to the light fittings that receive sufficient daylight luminance of 250 Lux on the working plane for 25% of the occupied spaces (sensitive areas that can't have natural daylight can be excluded from calculations)				Floor plans highlighting the sensors locations. Extracts from specification highlighting the sensors performance. Area schedule
Has the design shown occupancy sensors in all rooms intended for individual occupancy, conferencing, meeting rooms, open plan offices spaces and hallways or corridors				Extract plans highlighting the occupancy sensors locations Extract from specification highlighting the performance and specification of the occupancy sensors.
Has the design required glare control devices?				Extracts from specifications listing all glare control devices demonstrating their specifications and types.
Remarks/ Mitigation:				
1.5.1 Day lighting (Level 2)	Yes	No	N/A	Supporting Documents
Have the design shown daylight sensors to the light fittings that receive sufficient daylight luminance of 250 Lux on the working plane minimum of 50% of the occupied spaces (sensitive areas that can't have natural daylight can be excluded from calculations)				Floor plans highlighting the sensors locations. Extracts from specification highlighting the sensors performance. Area schedule
1.5.1 Day lighting (Level 3)	Yes	No	N/A	Supporting Documents

Has the design incorporated a study on building orientation, or added shading elements to the windows which are located at the southern direction (windows for the occupied rooms only).				Window schedule Architecture plans Thermal imaging simulation.
Does the design include products such as light tubes with reflectors to bring daylight into the space to compensate for internal void spaces ?				Product information Detailed drawings
Does the design include internal void spaces?				If yes, skylight should be added to provide a natural daylight. Roof plan demonstrating the location of the skylight with sun, glare and heat control.

During Construction

Level 1

- Submit Extracts from specifications listing all glazing performance criteria received from the supplier;
- Submit extracts from specifications listing all glare control devices received from the supplier;
- Submit extracts from specifications indicating requirements for daylight and occupancy sensors received from the supplier;
- Submit simulation plots showing Isolux contours after construction stage;
- Provide a spreadsheet of areas meeting requirements; and for daylight and occupancy sensors.
- Demonstrate a minimum daylight luminance of 250 Lux on the working plane (762mm from finished floor level) for a percentage of the occupied area (minimum of 25% of the occupied spaces). Sensitive areas that cannot have natural daylight can be excluded from calculations).

Level 2

- Demonstrate a minimum daylight luminance of 250 Lux on the working plane (762mm from finished floor level) for a percentage of the occupied area (minimum of 50% of the occupied spaces). Sensitive areas that can't have natural daylight can be excluded from calculations.

Level 3

- After achieving Level 1 and 2 requirements, provide a study on the windows location, orientation, heights, specifications, etc. and thermal imaging using simulation software prior to construction stage to demonstrate that the maximum daylight has been given to the building .
- In case the windows face south, shading elements should be studied in a way to break the direct sun exposure as it will carry the highest heating rates and to reflect the sun light inside the building.
- Provide skylights over internal voids and atriums to reduce the reliance on artificial lighting. Provide sufficient sun, heat and glare control or provide products to bring natural light into the space.
- Monitor the use of natural vs artificial light through light sensors.

Construction Checklist

1.5.1 Day lighting (Level 1)	Yes	No	N/A	Supporting Documents
Has the contractor installed the daylight sensors to the light fittings that receive sufficient daylight luminance of 250 Lux on the working plane minimum of 25% of the occupied spaces (sensitive areas that can't have natural daylight can be excluded from calculations)				As built drawings Delivery notes Specification of the sensors
Has the contractor installed occupancy sensors in all rooms intended for individual occupancy, conferencing, meeting rooms, open plan offices spaces and hallways or corridors				As built drawings Delivery notes Specification of the sensors
Has the contractor installed the glare control devices?				As built drawings Delivery note Specification of the control devices
Has the contractor amended the results given in the daylight analysis (if any).				Approval from the consultant/inspectors.
Has the contractor conducted training for the end user to understand the sensors functionality and their purposes?				Attendance sheet for the training Confirmation from the client/end-user
1.5.2 Day lighting (Level 2)	Yes	No	N/A	Supporting Documents
Has the contractor installed the daylight sensors to the light fittings that receive sufficient daylight luminance of 250 Lux on the working plane minimum of 50% of the occupied (spaces sensitive areas that can't have natural daylight can be excluded from calculations)				As built drawings Delivery notes Specification of the
1.5.2 Day lighting (Level 3)	Yes	No	N/A	Supporting Documents
Has the contractor incorporated all design stage Level 3 requirements?				As built drawings. Area schedule

1.7.3 Extreme Heat-Specific Passive Design Measures

Intent

Encourage Passive design strategies through these requirements:

- Maximize open-grid pavement systems.
- Provide high-reflectivity paving materials, such as light concrete or white aggregate.
- Provide native or adapted planting to reduce micro temperatures and increase shading.
- Provide evaporative cooling solutions through fountains, misters, water features, etc.
- Orient buildings and massing to self-shade in summer and extreme heat conditions.
- Design enclosure systems with exterior shading devices to minimize solar heat gain during peak

summer conditions.

- Vestibules are required for building entrances routinely used by occupants but not for emergency exits, maintenance doors, loading docks, or other specialty entrances. Occupant entrances that separate conditioned space from the exterior should be protected with an enclosed vestibule, where all doors opening into and out of the vestibule are equipped with self-closing devices. Vestibules should be designed so that in passing through the vestibule it is not necessary for the interior and exterior doors to open at the same time. Interior and exterior doors should have a minimum distance between them of not less than 2.1m when in the closed position. Vestibules should be designed only as areas to traverse between the exterior and the interior. The exterior envelope of conditioned vestibules should comply with the requirements for a conditioned space. Either the interior or exterior envelope of unconditioned vestibules should comply with the requirements for a conditioned space.

During Design

- Provide floor plans, elevations and sections and other data to verify the intent of the points mentioned above.

Design Checklist

1.5.3 Extreme heat Specific Passive Design Measures (Level 1)	Yes	No	N/A	Supporting Documents
Has the design met three out of the seven requirements given under the Extreme heat Specific Passive Design Measures?				Extract from the specifications demonstrating the points met in the project Drawings demonstrating the points targeted.
Remarks/ Mitigation:				
1.5.3 Extreme heat Specific Passive Design Measures (Level 2)	Yes	No	N/A	Supporting Documents
Has the design met five out of the seven requirements given under the Extreme heat Specific Passive Design Measures?				Extract from the specifications demonstrating the points met in the project Drawings demonstrating the points targeted.

During Construction

- Submit Floor plans, elevations and sections (As built drawings);
- Submit Extracts from specifications (final as built).
- Show evidence photographs.

Construction Checklist

1.5.3 Extreme heat Specific Passive Design Measures (Level 1)	Yes	No	N/A	Supporting Documents
Have the contractor amended three out of the seven requirements given under the Extreme heat Specific Passive Design Measures?				As built drawings Date stamped photos Delivery notes

Remarks/ Mitigation:				
1.5.3 Extreme heat Specific Passive Design Measures (Level 2)	Yes	No	N/A	Supporting Documents
Have the contractor amended five out of the seven requirements given under the Extreme heat Specific Passive Design Measures?				As built drawings Date stamped photos Delivery notes

1.7.4 Urban Heat Island Effect

Intent

Minimize the effect of localized heat islands.

Requirements

- For all new buildings, all opaque external roofing surfaces must comply with a minimum Solar reflectance Index (SRI) value according to notes below for a minimum of 75% of the roof area:
 - Steep Sloped Roofs (slopes steeper than 1:6) : SRI 29
 - Flat & Low Sloped Roofs: SRI 78
- For Level-3, the roof of the building should be provided with vegetated roof (green roof) for at least 30% of the total roof area, or for the remaining area after complying the following conditions:
 - The utility services should be grouped and distributed on each surface so that the space is optimized.
 - At least 150 m² of roof area is available on any roof surface.
- For all new buildings, at least 75% of the area for external walls must have a minimum Light Reflectance Value (LRV) of 45%.

During Design

- Provide floor plans, elevations, sections and data verifying the requirements.

Design Checklist

1.5.4 Heat Island Effect (Level 1)	Yes	No	N/A	Supporting Documents
Have the design complied with external roofing surfaces minimum Solar reflectance Index (SRI) value for a minimum of 75% of the roof area				Extract from the specifications Extract from the roof section.
Have the design complied with at least 75% of the area for external walls must have a minimum Light Reflectance Value (LRV) of 45%.				Extract from the specifications
Remarks/ Mitigation:				
1.5.4 Heat Island Effect (Level 2)	Yes	No	N/A	Supporting Documents
Have the design indicated the roof with vegetation (green roof) for at least 30% of the total roof area complying with the requirements?				Drawings demonstrating the vegetated area Drawings showing the utility services are grouped and distributed on each

				surface
--	--	--	--	---------

During Construction

- Submit Floor plans, elevations and sections (As built drawings);
- Submit Extracts from specifications (Final as built).

Construction Checklist

1.5.4 Heat Island Effect (Level 1)	Yes	No	N/A	Supporting Documents
Have the contractor complied with external roofing surfaces minimum Solar reflectance Index (SRI) value for a minimum of 75% of the roof area				As built drawing for the roof section As built drawing for the roof plan Material specification demonstrating the SRI level.
Have the contractor complied with at least 75% of the area for external walls must have a minimum Light Reflectance Value (LRV) of 45%.				Material specification demonstrating the SRI level on the walls. Delivery notes
Remarks/ Mitigation:				
1.5.4 Heat Island Effect (Level 2)	Yes	No	N/A	Supporting Documents
Have the Contractor constructed the roof with vegetated roof (green roof) for at least 30% of the total roof area complying with the requirement detail?				As built drawing for the roof demonstrating the vegetated area As built Drawings showing the utility services are grouped and distributed on each surface Date-stamped photos

1.7.5 Window to wall ratio

Intent

To control the glazing ratio of the building to minimize the heat gain and maximize the benefit of sun light.

Requirements

One of the following strategies should be achieved in the building's windows;

- 1) To use a small window opening (15% WWR) to illuminate a surface inside the space which then spreads the light out over a large area.
- 2) To use a moderately sized window (30% WWR) that "sees" an exterior reflective surface but is shaded from the direct sun. To increase the daylight availability, the selection of higher visible light transmittance (VLT>50) for the glass is also important.

During Design

- To submit the Calculation of “Glazing Area” and “Gross Exterior Wall Area” for each façade of the building, and the average area-weighted WWR; and
- All façade elevation drawings showing glazing dimensions and general building dimensions.

Note: Equation to Calculate the WWR is :

$$\text{WWR (\%)} = \frac{\sum \text{Glazing area (m}^2\text{)}}{\sum \text{Gross exterior wall area (m}^2\text{)}}$$

Design Checklist

1.5.5 Window to Wall Ratio (Level 1)	Yes	No	N/A	Supporting Documents
Has the design achieved window to wall ratio of 15% WWR as per the above requirements?				If ‘yes’: Window schedule to be submitted Calculations demonstrating the window to wall ratio If “no” then see below
Has the consultant window to wall ratio design complied with 30% WWR as per the above requirements?				Extract from the specifications highlighting the requirements of the 30% category. Window schedule to be submitted Calculations demonstrating the window to wall ratio
Remarks/ Mitigation:				

During Construction

- To submit the As-built drawings for the windows details implementing any modifications.
- To submit the updated construction calculations

Construction Checklist

1.5.5 Window to Wall Ratio (Level 1)	Yes	No	N/A	Supporting Documents
Has the Contractor complied with the window to wall ratio specified in the design stage 15% WWR?				If ‘yes’: As built Drawings of the windows Calculations demonstrating the window to wall ratio If “no”, then see below.
Have the Contractor complied with the window to wall ratio specified in the design stage 30% WWR?				Material submittal and specifications highlighting the 30% WWR requirements As built Drawings of the windows Calculations demonstrating the window

1.5.5 Window to Wall Ratio (Level 1)	Yes	No	N/A	Supporting Documents
				to wall ratio Delivery notes
Remarks/ Mitigation:				

1.8 Resource Effectiveness: Energy

1.8.1 Envelope Minimum Requirements

Intent To reduce the environmental and economic harms of excessive energy use by achieving a minimum level of energy efficiency for the building envelope.

Requirements

Adhere to the U Values for Wall, Window , Floor, Roof & Doors. In addition all insulation should be continuous and preferably entirely above deck.

Building Envelope Elements U-values

U Values (W/m ² .K)	Level 1	Level 2	Level 3
Roof	0.30	0.2	0.18
Wall	0.42	0.35	0.30
Floor (Above Basement)	-	-	0.5
External Doors (Insulated Opaque)	0.37	0.37	0.37

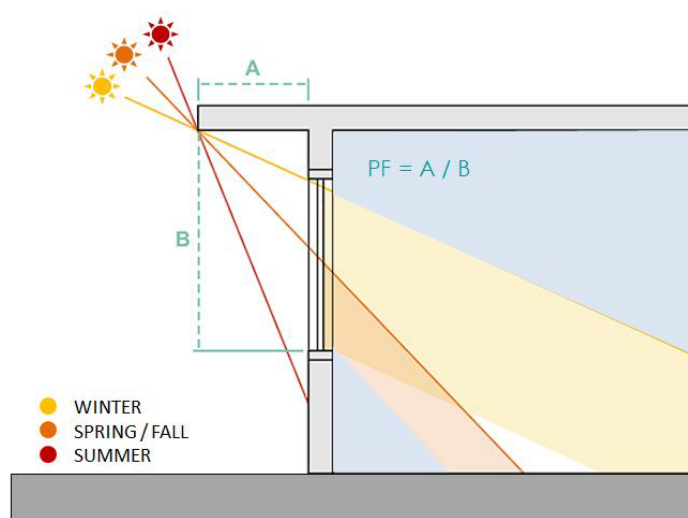
Glazing U-values

This includes all glazed surfaces which are external, windows, curtain walls , skylights etc. In addition it is mandatory to utilize thermal break frames.

U Values (W/m ² .K)	Level 1	Level 2	Level 3
U Values (W/m ² .K)	2.1	1.9	1.6
Shading Coefficient (max)	0.4	0.32	0.25
Light Transmittance (min)	0.25	0.25	0.15

Additionally, Solar Heat Gain Coefficient (SHGC) should be kept in range shown below , accounting for Projection Factor (PF) of external shading devices

SHGC all frame types	
PF < 0.25	0.23
0.25 ≤ PF < 0.50	0.30
PF ≥ 0.50	0.36



The projection factor (PF) is calculated as follows:

$$PF = A/B \quad A$$

A	Distance measured horizontally from the furthest continuous extremity of any overhang, eave, or permanently attached shading device to the vertical surface of the glazing
B	Distance measured vertically from the bottom of the glazing to the underside of the overhang, eave, or permanently attached shading device

Design Checklist

1.6.1 Envelope Minimum Requirements (Level 1)	Yes	No	N/A	Supporting Documents
Has the design specified the building Envelope minimum u-values				Extract from the specifications specifying the envelop targeted u-values u-value calculations Colour coded envelop elevations demonstrating the area of each opaque structure on the building envelop.
Has the design specified the glazing u-value				Extract from the specifications
Has the design specified the SHGC?				Extract from Specification
Remarks/ Mitigation:				
1.6.1 Envelope Minimum Requirements (Level 2)	Yes	No	N/A	Supporting Documents
Have the consultant specified the building Envelop minimum u-values for Level 2?				Extract from the specifications specifying the envelop targeted u-values u-value calculations Colour coded envelop elevations demonstrating the area of each opaque structure on the building envelop.
Has the consultant specified the glazing u-value for Level 2?				Extract from the specifications
1.6.1 Envelope Minimum Requirements (Level 3)	Yes	No	N/A	Supporting Documents
Has the consultant specified the building Envelop minimum u-values for Level 3?				Extract from the specifications specifying the envelop targeted u-values u-value calculations Colour coded envelop elevations demonstrating the area of each opaque structure on the building envelop.
Have the consultant specified the glazing u-value for Level 3?				Extract from the specifications

Construction Checklist

1.6.1 Envelope Minimum Requirements (Level 1)	Yes	No	N/A	Supporting Documents
Has the Contractor met the design requirements?				u-value calculations Colour coded enveloped elevations demonstrating the area of each opaque structure on the building envelop.
Has the contractor specified the glazing u-value ?				u-value calculation from the manufacture Material test report for the frame and the glazing u-values Date stamped photos
Has the contractor met the specified SHGC?				Extract from Glazing Specifications.
Remarks/ Mitigation:				
1.6.1 Envelope Minimum Requirements (Level 2)	Yes	No	N/A	Supporting Documents
Has the contractor achieved the building Envelop minimum u-values for Level 2?				u-value calculations Colour coded envelop elevations demonstrating the area of each opaque structure on the building envelop. Delivery notes of the building materials
Has the contractor achieved the glazing u-value for Level 2?				u-value calculation from the manufacture Material test report for the frame and the glazing u-values Date stamped photos
1.6.1 Envelope Minimum Requirements (Level 3)	Yes	No	N/A	Supporting Documents
Has the contractor the building Envelop minimum u-values for Level 3?				u-value calculations Colour coded envelop elevations demonstrating the area of each opaque structure on the building envelop.
Has the contractor achieved the glazing u-value for Level 3?				u-value calculation from the manufacture Material test report for the frame and the glazing u-values Date stamped photos

1.8.2 HVAC System's Efficiency – Source :

The following tables outline the minimum permissible seasonal system efficiency for various system types. The target efficiency indicated is based on performance under standard test conditions and procedures as outlined in AHRI standards specific to each system type.

The projects have to comply with the requirements for the respective table as per the HVAC system installed for mandatory Level 1 compliance.

Unitary Air Conditioners, VRF, Split (& multi-split) units

Equipment Type	Size Category	Subcategory or Rating Condition	Minimum Efficiency		Test Procedure
Air conditioners, Air cooled	< 19kW	Split system	13.0 SEER	3.81 SCoP	AHRI 210/240
		Single package	13.0 SEER	3.81 SCoP	
	> 19kW and < 40kW	Split system and single package	11.2 EER	3.28 CoP	AHRI 340/360
	> 40kW and < 70kW	Split system and single package	11.0 EER	3.22 CoP	
	> 70kW and < 223kW	Split system and single package	10.0 EER	2.93 CoP	
			9.7 IPLV	9.7 IPLV	
Air conditioners, Water and evaporative cooled	< 19kW	Split system and single package	9.7 EER	2.84 CoP	AHRI 340/360
			9.4 IPLV	9.4 IPLV	
	> 19kW and < 40kW	Split system and single package	12.1 EER	3.55 CoP	AHRI 210/240
	> 40kW and < 70kW	Split system and single package	11.5 EER	3.37 CoP	
	> 70kW and < 223kW	Split system and single package	11.0 EER	3.22 CoP	AHRI 340/360
	> 70kW and < 223kW	Split system and single package	11.5 EER	3.37 CoP	

Condensing Units

Equipment Type	Size Category	Subcategory or Rating Condition	Minimum Efficiency ³		Test Procedure
Air cooled,(Cooling mode)	< 19kW	Split system	13.0 SEER	3.81 SCoP	AHRI 210/240
		Single package	13.0 SEER	3.81 SCoP	
	> 19kW and < 40kW	Split system and single package	11.0 EER	3.22 CoP	AHRI 340/360
	> 40kW and < 70kW	Split system and single package	10.6 EER	3.11 CoP	
	> 70kW	Split system and single package	9.5 EER	2.78 CoP	
			9.2 IPLV	9.2 IPLV	

Packaged Terminal Air Conditioners (PTAC) & Packaged Terminal Heat Pumps (PTHP)

Equipment Type	Size Category (Input)	Subcategory or Rating Condition	Minimum Efficiency	Test Procedure
PTAC (Cooling mode)	All capacities	95°F db outdoor air	12.5 - (0.213 * Cap/1000) EER	AHRI 310/380
PTHP (Cooling mode)	All capacities	95°F db outdoor air	12.5 - (0.213 * Cap/1000) EER	AHRI 310/381

Air cooled chillers

Equipment Type	Size Category	Minimum Efficiency			Test Procedure
		Full Load, EER	Full Load, CoP	IPLV	
Air-cooled chillers	< 150 tons	> 9.562	> 2.803	> 12.500	AHRI 550/590
	> 150 tons	> 9.562	> 2.803	> 12.750	
Air cooled without condenser, electrical operated	All capacities	Air-cooled chillers without condensers must be rated with matching condensers and comply with the air-cooled chiller efficiency requirements			

Design Checklist

1.6.2 HVAC System (Level 1)	Yes	No	N/A	Supporting Documents
Has the design specified the building HVAC system requirements for Level 1?				Extract from the specifications demonstrating the HVAC system type Basis of design demonstrating the equipment efficiency Extract for the equipment schedule and its performance HVAC drawings
Remarks/ Mitigation:				

Construction Checklist

1.6.2 HVAC System (Level 1)	Yes	No	N/A	Supporting Documents
Has the contractor complied with the specified HVAC system specifications?				AS built drawings of the HVAC system Equipment schedule and their efficiency Delivery notes Date stamped photos
Remarks/ Mitigation:				

1.8.3 HVAC System's Efficiency- Distribution

- Each zone shall be controlled by individual thermostatic control capable of responding the temperature within the zone
- Fan Power performance for each system must conform to the relevant requirement from following table:

System Type	Maximum SFP, W/l/s
Central mechanical ventilation, incl. heating & cooling	1.8
Zonal supply system where fan is remote from zone, i.e., ceiling or roof mounted	1.2
Zonal extract system where fan is remote from zone	0.6
Zonal supply & extract ventilation units such as ceiling void or roof units serving single room/zone with heat recovery	2

System Type	Maximum SFP, W/l/s
Local supply & extract ventilation units such as wall/roof units serving single room/zone with heat recovery	1.8
Local supply & extract ventilation units such as window/wall/roof units serving single area (e.g. toilet extract)	0.4
Other local ventilation units	0.6
Fan assisted terminal VAV unit	1.2
Fan coil units (weighted average)	0.6

The following requirements must also be satisfied where applicable:

- All CHW pump motors shall be fitted with variable speed drives
- All Fan motors over 7.5kW should be provided with variable speed drives.
- All ducts located in unconditioned spaces shall be insulated with a minimum of R-5 insulation
- All ducts located in external spaces shall be insulated with a minimum of R-8 insulation
- All piping serving as part of cooling system shall be thermal insulated with a minimum of 38 mm insulation based on thermal conductivity R value 0.039 W/m.K

Design Checklist

1.6.2 HVAC System (Level 1)	Yes	No	N/A	Supporting Documents
Has the design specified the building HVAC system performance through the provision of separate thermostat for each zone?				Extract from HVAC drawings highlighting the thermostats. Extract from specification highlighting the thermostat specifications in the project.
Has the design specified the fan power performance according to the requirements of Level 1?				Extract from the specifications demonstrating the fan power performance according to the specified HVAC system of the project Extract from the fan schedule on the HVAC drawings.
Remarks/ Mitigation:				

Construction Checklist

1.6.2 HVAC System (Level 1)	Yes	No	N/A	Supporting Documents
Has the contractor followed the specified building HVAC system performance the provision of separate thermostat for each zone?				As built drawings of the HVAC system highlighting the thermostat location Extract from specification highlighting the thermostat specifications in the project. Date-stamped photos Delivery notes
Has the contractor followed the specified fan power performance according to the selected HVAC system requirements?				Fan power schedule Material submittal and specification.
Remarks/ Mitigation:				

1.8.4 Water Service

All electric water heating systems are to comply with the performance requirements detailed in the following table. Performance is given either as a minimum Energy Factor (EF) or a maximum Standby Loss (SL) dependent on the volume of the system (in litres).

Size Category (Input)	Subcategory or Rating Condition	Minimum Efficiency
< 12 kW	Resistance	0.97 - 0.000349V, EF
> 12 kW	Resistance	0.134V + 45.4 SL, W
< 24 amps and < 250 v litres	Heat pump	0.97 - 0.000349V, EF

Solar Hot Water Services

- Minimum of 40% of the total water demand inside the building should be from solar hot water collector.
- The solar hot water collector location should be determined from the supplier for the best orientation, it always recommended to be toward the southern direction and the angle can be tested from their software.

Design Checklist

1.6.4 Hot water Service (Level 1)	Yes	No	N/A	Supporting Documents
Has the design specified the building electric hot water system performance?				Extract from project specification highlighting the performance of the electrical hot water system performance
Has the design specified 40 % of the total hot water demand will be generated by the solar hot water collector?				Extract from the specifications demonstrating a minimum of 40% of the total water demand should be covered by solar hot water collector Water supply drawings highlighting the

1.6.4 Hot water Service (Level 1)	Yes	No	N/A	Supporting Documents
				location of the solar hot water collector. Efficiency report of the solar hot water collector demonstrating the orientation, efficiency, coverage, etc.
Remarks/ Mitigation:				
1.6.4 Hot water Service (Level 2)	Yes	No	N/A	Supporting Documents
Have the design specified 65 % of the total hot water demand will be generated by the solar hot water collector?				Extract from the specifications demonstrating a minimum of 65% of the total water demand should be covered by solar hot water collector Water supply drawings highlighting the location of the solar hot water collector. Efficiency report of the solar hot water collector demonstrating the orientation, efficiency, coverage, etc.

Construction Checklist

1.6.4 Hot water Service (Level 1)	Yes	No	N/A	Supporting Documents
Have the contractor installed a 40 % efficient solar hot water collector to cover the total hot water demand of the building?				Efficiency report for the solar hot water collector from the supplier As built drawings showing the location of the solar hot water collector Date-stamped photos
Remarks/ Mitigation:				

1.8.5 Internal Lighting

Internal lighting should be designed to achieve the following environmental parameters:

LIGHTING POWER					
	Whole Building	Space by Space		Whole Building	Space by Space
Building Area/ Type	(W/m2)	(W/m2)	Building Area Type	(W/m2)	(W/m2)
Healthcare Clinic or Centre	9.7		Hospital Nursery		5.8
Hospital or Medical supplies facility		13.6	Audience/Seating Area		11.6
Conference/Meeting/ Multipurpose		10.7	Lobby		9.7
Corridor/Transition		4.8	Stairway		5.8
Electrical/Mechanical		10.7	Dressing/Locker/Fitting		5.8
Food Preparation		11.6	Kitchen		11.6
Inactive storage		1.9	Bedroom		4.8
Dining Area		11.6	Active Storage		7.8
Inpatient Areas		10.7	Car Parking	2.9	
Reception/Waiting		20.3	Public & Staff Lounge		7.8
Bathroom/ Toilet		7.8			

- All internal lights should be LED lighting system with a long life time.

- Technical data sheet and LPD (light power density) calculations should be submitted prior to any procurement from the lighting suppliers.
- LPD template will be submitted as a reference.

The following sensors and controls are required to be provided as noted:

- Light reduction controls: occupant controls to reduce the connected lighting load in a reasonably uniform illumination pattern by at least 50 percent
- Daylight zone control: provide individual sensor/control that controls the lights independent of general area lighting. Each daylight control zone shall not exceed 232m²
- Occupancy sensors: installed in all meeting rooms, employee lunch and break rooms, private offices, restrooms, storage rooms, janitorial closets and other zones 28m² or less enclosed by ceiling height partitions. Devices must be programmed to automatically turn off lights within 15 minutes of all occupants leaving the space
- Time clock controls: in zones not controlled by occupancy sensors, automatic time switch control devices shall be used, incorporating override devices
- Specific application controls: dedicated controls for the following applications
 - Display/accent lighting
 - Task lighting
 - Non-visual lighting

Design Checklist

1.6.5 internal lighting (Level 1)	Yes	No	N/A	Supporting Documents
Has the design specified the lighting power density calculations according to the specification requirements of internal lighting?				Light power density calculations showing the W/m ² of each space. Drawings demonstrating the lights distribution in the building reflecting the LPD calculations Extract from the specifications
Has the design specified the exclusive use of LED lighting internally?				Extract from the specifications demonstrating the use of LED lights only.
Has the design specified a minimum of 3 out of 5 sensor types to the project internal lighting system?				Extract from specification demonstrating the sensor types and their specification Drawings demonstrating the location of the sensors.
Remarks/ Mitigation:				

Construction Checklist

1.6.5 internal lighting (Level 1)	Yes	No	N/A	Supporting Documents
Has the contractor applied the Light power density specified in the design?				Light power density calculations showing the W/m ² of each space As-built Drawings demonstrating the lights distribution in the building reflecting the LPD calculations Technical data sheet of each light type showing its wattage Delivery note Date-stamped photos
Has the contractor provided only LED lighting internally?				Commitment letter from the contractor demonstrating the use of LED lights only.
Has the contractor installed a minimum of 3 out of 5 sensors types to the project internal lighting system?				As built drawings demonstrating the sensors and their locations Technical data sheet of the sensors specifications. Delivery notes Date-stamped photos
Remarks/ Mitigation:				

1.8.6 External Lighting

External lighting should be designed to achieve the following environmental parameters:

Applications		Lighting Power Densities	
	Uncovered Parking Areas		
	Parking Lots and drives	1.45	W/m ²
	Building Grounds		
	Walkways less than 3 meters wide	2.95	W/linear meter
	Walkways 3 meters wide or greater	1.94	W/m ²
	Stairways	9.69	W/m ²
	Building Entrances and Exits		
	Main entries	88.6	W/linear meter of door width
	Other doors	59.1	W/linear meter of door width
	Canopies and Overhangs		
	Canopies (free standing and attached and overhangs)	12.1	W/m ²
	Uncovered Parking Areas Parking Lots and drives	1.94	W/m ² for each illuminated wall or surface or
		14.8	W/linear meter for each illuminated wall or surface length
	Building Grounds Walkways less than 3 meters wide	243.0	W per location and
		81.0	W per additional ATM per location

Applications		Lighting Power Densities	
	Walkways 3 meters wide or greater	12.1	W/m2 of uncovered area
	Loading areas for law enforcement, fire, ambulance and other emergency service vehicles	4.84	W/m2 of uncovered area

The following sensors and controls shall be provided for all exterior lighting applications:

- Automatic controls capable of turning off exterior lighting when sufficient daylight is available or when the lighting is not required during night-time hours

Design Checklist

1.6.6 External lighting (Level 1)	Yes	No	N/A	Supporting Documents
Has the design included the light power density calculations according to the specification?				Light power density calculations showing the W/m2 of each space type. Drawings reflecting the light distribution in the building according to the light power density calculations
Has the design specified the automatic controls?				Extract from the specifications demonstrating that Automatic controls capable of turning off exterior lighting when sufficient daylight is available or when the lighting is not required during night-time hours
Remarks/ Mitigation:				

Construction Checklist

1.6.6 External lighting (Level 1)	Yes	No	N/A	Supporting Documents
Has the contractor prepared the light power density calculations according to the design specification?				Light power density calculations showing the W/m2 of each space type. As-built Drawings reflecting the light distribution in the building according to the light power density calculations Technical data sheet of each light installed in the project showing its wattage Date-stamped photos
Has the contractor provided automatic controls required by design?				As built drawings demonstrating the location of the automatic controls Technical data sheet of the automatic control demonstrating their function according to the requirements Date-stamped photos
Remarks/ Mitigation:				

1.8.7 Vertical Transportation

Intent

To promote projects that specify and install energy efficient vertical movement and transportation systems.

Requirements

Lifts (Elevators)

Demonstrate that all lifts within the building are energy efficient as follows:

- Offer 'idle/downtime' features allowing the lift to operate in a stand-by mode during off-peak periods;
- Include a regenerative drive system (buildings over three stories only); and
- Use LED lighting and LCD display features.

During Design

- Extracts from the lift specifications detailing the 'idle/downtime' features, regenerative drive system and confirmation that specified lighting is LED and any display features are LCD.

During Construction

- Manufacturer's information of the installed lift(s) detailing the 'idle/downtime' features, regenerative drive system and confirmation that installed lighting is LED

Escalators/Travelators

Requirements

Demonstrate that all escalators and travelators within the building are energy efficient as follows:

- Offer an automated stop/start function linked to occupancy sensors to enable standby mode when there is no passenger demand; and
- Use LED strip lighting.

During Design

- Provide extracts from the escalator/travelator specifications detailing the automated stop/start system, occupancy sensors and confirmation that specified strip lighting is LED.

During Construction

- Provide Manufacturer's information of the installed escalator/travelator(s) detailing the automated stop/start system, occupancy sensors and confirmation that installed strip lighting is LED.

Design Checklist

1.6.7 Vertical transportation (Level 1)	Yes	No	N/A	Supporting Documents
Has the design specified the lifts specifications?				Extract from specification demonstrating the minimum requirements for the lifts specified in the requirement
Has the design specified the escalators specifications? (If applicable)				Extract from specification demonstrating the minimum requirements for the escalators specified in the requirement
Remarks/ Mitigation:				

Construction Checklist

1.6.7 Vertical transportation (Level 1)	Yes	No	N/A	Supporting Documents
Has the contractor installed the lifts according to the design specifications?				Technical data sheet demonstrating the required specifications highlighted in the requirement Delivery notes
Has the contractor installed the escalators according to the design specifications? (If applicable)				Technical data sheet demonstrating the required specifications highlighted in the requirement Delivery notes
Remarks/ Mitigation:				

1.8.8 Renewable Energy

Intent

To reward projects for the use of renewable technologies, therefore reducing the carbon emissions associated with building operation and the reliance on fossil fuel based power generation.

Demonstrate that a percentage of the developments total energy demand is supplied through renewable energy.

Requirements

- Demonstrate that an onsite renewable energy feasibility study has been undertaken, and that one or more appropriate technologies have been selected as a result of the study; and
- Demonstrate that a minimum of 10% percentage of the proposed buildings energy consumption is supplied through onsite renewable energy.

During Design

- On site system: to submit drawings, calculations, specifications, and locations of the renewable energy design

During Construction

- On site system: to show smart meters installations, photos of the renewable energy, readings from the meters

Level 2: the above requirement is for Level 2.

Level 3: a minimum of 20% of the total building energy consumption should be covered from onsite resources or via renewable offsite credit certificates for independent power producers within the same country.

Design Checklist

Note: there are no requirements under Level 1. The requirements of Levels 2 and 3 are shown below.

1.6.8 Renewable Energy (Level 2)	Yes	No	N/A	Supporting Documents
Has the design specified if on site renewable energy resources will be integrated to the project to cover 10% of the total connected load?				Feasibility study demonstrating the source of the renewable energy provide to the project Feasibility study demonstrating a minimum of 10% of the total connected load will be through renewable energy resources. Drawings demonstrating the location of the renewable energy resources Calculations demonstrating the energy production and how much it covers from the total building connected load
1.6.8 Renewable Energy (Level 3)	Yes	No	N/A	Supporting Documents
Has the design specified if on site or off-site renewable energy resources will be integrated to the project to cover 20% of the total connected load?				Feasibility study demonstrating the source of the renewable energy provide to the project Feasibility study demonstrating a minimum of 20% of the total connected load will be through renewable energy resources. Drawings demonstrating the location of the renewable energy resources Calculations demonstrating the energy production and how much it covers from the total building connected load For off site resources a location of the plant should be submitted and contract to be shown

Construction Checklist

1.6.8 Renewable Energy (Level 2)	Yes	No	N/A	Supporting Documents
Has the contractor installed on site or off-site renewable energy resources which are integrated to the project to cover 10% of the total connected load?				As built Drawings demonstrating the location of the renewable energy resources. Calculations demonstrating the energy production and how much it covers from the total building connected load Technical data sheet of the renewable energy system Smart meters to be installed and technical data sheet to be submitted For offsite resources a contract of a minimum 2 years should be signed.
1.6.8 Renewable Energy (Level 3)	Yes	No	N/A	Supporting Documents
Has the contractor installed on site or off-site renewable energy resources which are integrated to the project to cover 20% of the total connected load?				As built Drawings demonstrating the location of the renewable energy resources. Calculations demonstrating the energy production and how much it covers from the total building connected load Technical data sheet of the renewable energy system Smart meters to be installed and technical data sheet to be submitted For offsite resources a contract of a minimum 2 years should be signed.

1.8.9 Systems Verification

Intent

- To ensure that the building performs as designed to protect occupant health and provide comfort and ongoing building efficiency.

Systems that needs to be tested:

- Booster Pumps
- Transfer Pumps
- Fans
- HVAC & Fresh Air
- Solar Hot Water Collector
- Lighting and lighting control
- BMS (Building Management System)
- Main meters and Sub-meters

All inspections should be verified by the contractor and/or independent commissioning agent , reports to be inspected by DOH inspectors at 90% Stage.

During Design

- Prepare a report for all the connected load systems and clarify what are the systems efficiency and specifications and how they meet the requirements of the guideline

During Construction

- Prepare a final commissioning report demonstrating all the systems reading prior to operation stage by the contractor or supplier to be submitted to the DOH team for their final review and approval

Level 1: Above specifications to be included in tender documentation.

Level 2: 3rd party from the contractor side which is not involved in the project should monitor the commissioning stage and verify the final reports before submitting it to the DOH team

Design Checklist

1.6.9 system verification (Level 1)	Yes	No	N/A	Supporting Documents
Has the design specified the systems that needs to be tested according to the requirement?				Extract from specification demonstrating the systems that are in need to be tested
Remarks/ Mitigation:				
1.6.9 system verification (Level 2)	Yes	No	N/A	Supporting Documents
Have the design specified the 3 rd party requirements needed to test the project systems? Engagement of Commissioning Agent.				Extract from specification demonstrating that a 3 rd party from the contractor side which is not a part of the project will have to monitor the testing and commissioning stage.

Construction Checklist

1.6.9 system verification (Level 1)	Yes	No	N/A	Supporting Documents
Has the contractor the systems testing according to the requirement?				Schedule of the systems that are going to be tested in the building
Has the contractor prepared commissioning plan and commissioning report?				Extract from commissioning plan to be submitted demonstrating the commissioning strategies of the building's system and final commissioning report should be submitted highlighting all the systems readings to be in compliance with the project specifications.
Remarks/ Mitigation:				
1.6.9 system verification (Level 2)	Yes	No	N/A	Supporting Documents
Has the contractor assigned a 3 rd party to carry out the testing and commissioning stage?				Contractor to submit the 3 rd party contract meeting the 3 rd party conditions. 3 rd party to sign all the commissioning plans and final commissioning reports.

1.8.10 Energy Monitoring

Intent

- To encourage the provision of metering facilities that allow the energy performance of the building to be recorded and monitored to allow future improvement and understanding of the use of energy in buildings.

Requirements

- Demonstrate that easily accessible and clearly labelled energy sub-meters are provided, which enable a minimum of 90% of the estimated annual energy consumption of each fuel type (electricity, gas etc) to be monitored.
- In addition, separate meters must be provided for all plant exceeding the sizes in the table below:

Plant Description	Load kW
Cooling installations comprising one or more units feeding a common distribution circuit	20
Motor control centres providing power to HVAC equipment	10
Final electrical distribution boards (power/lighting)	10

During Design

- Submit Energy system schematics illustrating the proposed metering strategy confirming that the required level of metering will be achieved; and

- Submit Extracts from specifications and building services layout design drawings clearly indicating the type, extent and locations of all metering, and the Building Management System.
- Prepare Energy Monitoring Calculations should be submitted reflecting the meters and the loads from the SLD

During Construction

- Submit Energy system schematics illustrating the metering strategy confirming that the required level of metering has been achieved.
- Submit Manufacturer's data and as-built building services layout drawings clearly indicating the type, extent and locations of all metering, and Building Management System.
- Provide DOH team Photographic evidence confirming installation of specified meters and Building Management System.

Provide Energy Monitoring Calculations should be submitted reflecting the meters and the loads from the SLD.

Design Checklist

1.6.10 system verification (Level 1)	Yes	No	N/A	Supporting Documents
Has the design specified the energy monitoring strategy for the project?				Extract from specification demonstrating the energy monitoring strategy according to the guideline requirements where it should cover 90% of the total connected load Single line diagram to be submitted highlighting the energy meter strategy according to the requirements, meters locations, and their types along with the connection to the building management system. Energy monitoring calculations should be submitted reflecting the information given in the single line diagram according to the requirement
Remarks/ Mitigation:				

Construction Checklist

1.6.10 system verification (Level 1)	Yes	No	N/A	Supporting Documents
Has the contractor installed the energy monitoring strategy as per to the approved design strategy?				As built drawing highlighting the energy meter strategy according to the requirements, meters locations, and their types along with the connection to the building management system. Energy monitoring calculations should be submitted reflecting the information given in the single line diagram according to the requirement Manufacture data sheet of the energy

1.6.10 system verification (Level 1)	Yes	No	N/A	Supporting Documents
				meters Date stamped photographs for the energy meters and they should be labelled matching with the number demonstrated in the SLD
Remarks/ Mitigation:				

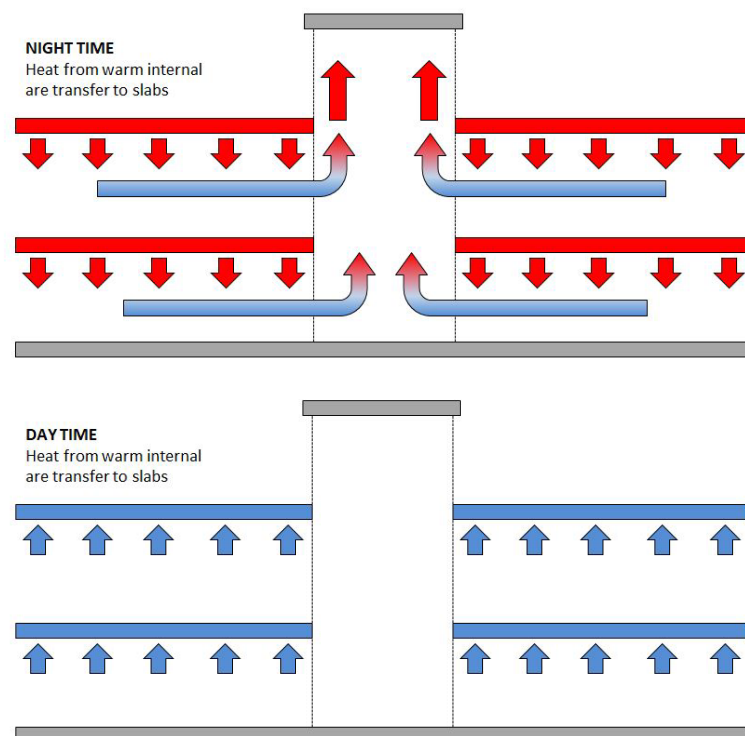
1.8.11 Night Cooling and Economizer Mode .

Night cooling by fresh air ventilation is used to lower the temperature of the building structure at night when outside air temperatures are relatively low. By cooling the structure of the building at night the requirement for daytime mechanical cooling can be reduced.

During night time, the main exposed fabric of the building is cooled thereby removing heat absorbed during the day. During the following day, the structure is then able to absorb more heat than would otherwise have been the case, resulting in a delayed heat gain to the space and a consequently slower rise in internal temperature.

Figure below illustrates the main principle.

To be efficient, night time ventilation air must be in direct contact with the main exposed structure (thermal mass) of the building which, during daytime, must also be in direct contact with the internal air.



Note: There are no requirements for Level 1. For Level 2 requirements see below.

Design Checklist

1.6.11 night cooling and economizer mode (Level 2)	Yes	No	N/A	Supporting Documents
Has the design incorporated night cooling by fresh air and economizer mode for the building?				Extract from specification demonstrating the use of the fresh air and economizer mode and the strategy functionality
Remarks/ Mitigation:				

Construction Checklist

1.6.11 night cooling and economizer mode (Level 2)	Yes	No	N/A	Supporting Documents
Has the contractor implemented the night cooling by fresh air and economizer mode for the building?				Strategy plan should be submitted demonstrating the actual implementation Date-stamped photographs showing the temperature after implementing the strategy
Remarks/ Mitigation:				

1.8.12 Displacement Ventilation

Displacement ventilation systems supply cooled air to the occupied space via low level wall mounted or floor mounted outlets. The cooled air tends to remain at low level until it comes into contact with a local heat source within the space such as a person or an item of equipment. It is then heated and rises to high level where it is extracted via a high level extract system.

Unlike more conventional ventilation systems this approach is deliberately designed to avoid the mixing of incoming supply air with room air. Instead, the supply air displaces the room air. This means that its cooling capacity is supplied directly to those parts of the occupied space where it is needed.

As a result, the supply air does not need to be cooled as much as would be the case in a conventional system. Conditioned air at approximately 18 °C (i.e. 2 to 4 K below the ambient room temperature) is usually sufficient. This compares with supply air temperatures of 11–15 °C which are more common in conventional systems. This increased supply air temperature means that low energy cooling solutions and free cooling options are more viable.

A displacement ventilation system can typically deliver 30–40 W/m² of cooling. This is a low energy solution for lobby spaces, atriums, reception areas and other non clinical spaces which have a larger volume.



Design Checklist

1.6.12 Displacement Ventilation (Level 2)	Yes	No	N/A	Supporting Documents
Has displacement ventilation utilized for large atriums, lobbies and other public spaces where appropriate ?				Show HVAC plans and subsequent calculations to document energy savings.
Remarks/ Mitigation:				

Construction Checklist

1.6.12 Displacement Ventilation (Level 2)	Yes	No	N/A	Supporting Documents
If applicable show as built drawings documenting the use of displacement ventilation .				Document the air handling units providing displacement ventilation and its design parameters.
Remarks/ Mitigation:				

1.8.13 FRESH AIR PRE-CONDITIONING SYSTEM

Intent

- To reduce the temperature difference between the outside air entering the building and the inside conditioned air

Requirements

- Demonstrate that the HVAC system has a heat recovery or indirect evaporative cooling device on the fresh air supply system. Refer to Part E for allowed air streams and types of energy recovery devices.

During Design

- Prepare Mechanical and electrical drawings showing the location of the pre-conditioning system, such as a heat recovery wheel, and indicating the percentage (%) of total air passing through the system; and
- Submit Manufacturer's data sheets for the device specifying the Temperature Transfer Efficiency (TTE); or
- Provide calculation to demonstrate efficiency in case the manufacturer's data does not specify the TTE.

During Construction

- Submit Date-stamped photographs of the installed device showing the make and model; or
- Submit Purchase receipts for the device showing the make and model.
- Submit Drawings and calculations showing the location of the installed equipment

Design Checklist

1.6.13 Fresh Air Pre-conditioning System (Level 2)	Yes	No	N/A	Supporting Documents
Does the design incorporate heat recovery systems for allowable air streams?				Design documentation Equipment Schedules
Remarks/ Mitigation:				

Construction Checklist

1.6.13 Fresh Air Pre-conditioning System (Level 2)	Yes	No	N/A	Supporting Documents
Have heat recovery systems been implemented on the project ?				Provide as built drawings Stamped Material submittals and approved commissioning reports for heat recovery systems.
Remarks/ Mitigation:				

1.8.14 ECONOMIZERS

Intent

To reduce the cooling energy use can in buildings when outside air conditions are suitable to cool the building with little or no need for mechanical cooling.

Requirements

uses monthly average outdoor air temperatures based on the project location to estimate the suitability of an economizer for the project.

Following are the temperature setpoints for air-side and water-side economizers.

Temperature set point	-Type of Economizer
15 °C	Air-side Economizer
25° C	Water-side Economizer

- When the outdoor dry bulb temperature is less than or equal to the setpoint, the economizer is activated.

Air-side Economizers

- The effectiveness of air-side economizers is highly dependent on the outside air temperature and humidity levels, which are measured through an outdoor sensor in the economizer system. Under suitable conditions, the outside air damper is fully open and the cooling compressors are turned down or shut off.

A decision on the inclusion of economizers should be based on analysis of outdoor air temperature and humidity in comparison to the desired indoor temperatures. While this measure has potential to reduce cooling energy significantly in some locations, increased capital and operating costs are possible if the system is not designed and maintained properly.

Air-side economizers should typically be avoided in following circumstances:

- Scarcity of sufficiently trained maintenance staff
- Hot and humid weather
- Especially corrosive climates, such as near an ocean

Water-side Economizers

A water-side economizer uses the evaporative cooling capacity of a cooling tower to produce chilled water. Such an economizer can be used instead of a chiller during the winter months. Water-side economizers offer cooling redundancy because they can provide chilled water if a chiller goes offline. This can reduce the risk of cooling system down time.

Condensation control and humidity management often restrict the use of such for the clinical areas but non clinical spaces can benefit from such measures.

Additionally, chillers with their rejection circuit used for hot water generation pre-heating are also common and can save lots of energy considering hospital has simultaneous heating and cooling demand.

During Design

- Provide System drawings showing the location, brand and model of the air economizers; and
- Manufacturer's data sheets for the air economizers specified.

During Construction

- As-Built conditions; and
- Date-stamped photographs of the economizers taken during or after installation showing the make and model; or
- Purchase receipts for the economizers showing the make and model.

Design Checklist

There are no Level 1 requirements for this item.

1.6.14 Economizers (Level 2)	Yes	No	N/A	Supporting Documents
Provide economizers if deemed appropriate for the project				Equipment data sheets Design Documentation
Remarks/ Mitigation:				

Construction Checklist

1.6.14 Economizers (Level 2)	Yes	No	N/A	Supporting Documents
Provide economizers if deemed appropriate for the project				As built drawing Installed equipment stamped photographs Installed equipment vendor simulated energy savings in KWH
Remarks/ Mitigation:				

1.9 Resource Conservation: Water

1.9.1 Indoor Water Use Reduction

Intent

- Reduce Water consumption internally by installing water efficient fixtures.

Requirements

- Install water fixtures with low flow rates to minimize water consumed by building occupants.

During Design

- Comply with the table below and incorporate in the project specifications.

During Construction

- Submit all the installed fixtures should have their technical data sheet demonstrating their flow rates.

Level 1: Project has more efficient flow rates as following

Fixtures Type	Flow rates
Bathroom Taps,	private 4 litres/min at 417.7 kPa
Bathroom Taps,	public 1.7 litres/min at 417.7 kPa
Shower Head	6 litres/min at 551.6 kPa
Sink Faucet	5.0 litres/min at 417.7 kPa
Bidets	4.0 litres/min
Urinal	0.5 litres/flushing cycle
Toilets	(Dual Flush) 4/2.5 litres/flushing cycle (full/low)

Cooling Tower & Process Water Use

Intent

- To conserve water used for cooling tower makeup while controlling microbes, corrosion, and scale in the condenser water system.
- To reduce potable water use for heat rejection by promoting the use of recycled water and/or alternatives to water-based heat rejection.

Requirements

- For cooling towers and evaporative condensers, conduct a one-time potable water analysis, measuring at least the five control parameters listed in Table 1.

Table 1. Maximum concentrations for parameters in condenser water

Parameter	Maximum level
Ca (as CaCO ₃)	1000 ppm
Total alkalinity	1000 ppm
SiO ₂	100 ppm
Cl ⁻	250 ppm
Conductivity	2000 µS/cm

- Calculate the number of cooling tower cycles by dividing the maximum allowed concentration level of each parameter by the actual concentration level of each parameter found in the potable makeup water. Limit cooling tower cycles to avoid exceeding maximum values for any of these parameters.

Table 2. cooling tower cycles

Cooling tower cycles	Levels
Maximum number of cycles achieved without exceeding any filtration levels or affecting operation of condenser water system (up to maximum of 10 cycles)	Level 1
Achieve a minimum 10 cycles by increasing the level of treatment in condenser or make-up water	Level 2
Use a minimum 20% recycled nonpotable water and comply with Level 2 requirement	Level 3

Design Checklist

1.7.1 Indoor Water User Reduction (Level 1)	Yes	No	N/A	Supporting Documents
Does the project comply with low flow requirements for potable water and cooling tower water use?				Demonstrate via specification and design documentation.
Remarks/ Mitigation:				

Construction Checklist

1.7.1 Indoor Water User Reduction (Level 1)	Yes	No	N/A	Supporting Documents
Does the project comply with low flow requirements for potable water and cooling tower water use ?				Evidence of purchase of low flow fixtures and reduction of water use for cooling tower.
Remarks/ Mitigation:				

1.9.2 Water Monitoring

Intent

- To monitor the external and internal water consumption by sub-meters to prevent from any over consumptions or leakages and efficient management.

Requirements

- To add sub meters on all external water uses: Fountains, hose bibs, irrigation, water bodies, swimming pool, heat rejection, etc.
- To add sub meter on all internal water uses: kitchen, toilets, etc.

During Design

- Submit water supply drawings demonstrating the number of water meters installed externally and internally along with the riser diagram.
- Submit specifications of the water meters which should demonstrate that easily accessible and clearly labelled water meters are provided and capable of monitoring the water consumption
- All sub meters should be connected to the Building Monitoring System.

During Construction

- Submit As-built drawings demonstrating the locations and the labels of the installed sub-meters.
- Submit the technical data sheet and material specifications.
- Photos for the sub-meters.

Design Checklist

1.7.3 Water Monitoring (Level 1)	Yes	No	N/A	Supporting Documents
Have meters been provided as per requirement				Design Documentation
Remarks/ Mitigation:				

Construction Checklist

1.7.3 Water Monitoring (Level 1)	Yes	No	N/A	Supporting Documents
Have meters been provided as per requirement				As built documentation Equipment cut sheets. Stamped Photographs with time.
Remarks/ Mitigation:				

1.9.3 Leak Detection

Intent

Demonstrate that a leak detection system has been installed that covers all main water distribution pipes within the project.

During Design

- Design drawings and narrative showing the location of all equipment and describing the leak detection strategy

During Construction

- As-Built drawings showing locations of leak detection equipment;
- Drawings showing the location of all equipment and describing the leak detection strategy. The specification must address how the system deals with different leakage rates, the alarm mechanism, and how false alarms are avoided;
- Manufacturer's information of installed leak detection systems; and
- Photographic evidence confirming the installation of the leak detection system.

Note: There are no requirements for Level 1. For Level 2 please see below.

Design Checklist

1.7.4 Leak Detection (Level 2)	Yes	No	N/A	Supporting Documents
Has the requisite information for leak detection system been provided?				Design Drawings Equipment Specification
Remarks/ Mitigation:				

Construction Checklist

1.7.4 Leak Detection (Level 2)	Yes	No	N/A	Supporting Documents
Has the requisite information for the installed leak detection system been provided?				As Built Drawings Stamped Material Submittals Evidence Photographs
Remarks/ Mitigation:				

1.9.4 Authorised sources of water re-use

Intent

It is encouraged to reuse water within the building and for its services. Water is a scarce resource and saving water is one of the primary goals of a sustainable building. Refer to the table below for type of water and its permissible use.

Traditional sources	Permissible uses
Rainwater	Irrigation
Stormwater	Toilet and urinal flushing
Greywater	Washing floors, walls, windows, plant, vehicles, and equipment
Condensate Water	Cooling Towers
	Outdoor irrigation

Note: There are no requirements for Level 1. For Level 2 see below.

Design Checklist

1.7.5 Authorized sources of water re-use (Level 2)	Yes	No	N/A	Supporting Documents
Has condensate recovery done from the chilled water system?				Design Documentation
Remarks/ Mitigation:				

Construction Checklist

1.7.5 Authorized sources of water re-use (Level 2)	Yes	No	N/A	Supporting Documents
Has condensate recovery done from the chilled water system?				As Built Documentation
Remarks/ Mitigation:				

1.10 Resource: Materials & Waste

1.10.1 Indoor Material Emission Reduction

Intent

- Ensure that all indoor materials are not exceeding the indoor healthy environment limits.

Requirements

Adhesive and Sealants:

- Demonstrate that a minimum of 100% (by weight) of all adhesives and sealants used on the building interior must not exceed the prescribed VOC limits in the table below. The VOC limits of the remaining non-compliant adhesives and sealants must be no more than 50% higher than values listed for each product type.

Product Type	Maximum grams of VOC per litre of adhesive or sealant, less water and exempt compounds
Indoor Carpet Adhesive	50
Carpet Pad Adhesive	50
Wood flooring Adhesive	100
Rubber flooring Adhesive	60
Sub-floor adhesive	50
Ceramic tile adhesive	65
Cove base adhesive	50
Plasterboard and wall panel adhesive	50
Multipurpose construction adhesive	70
Structural glazing adhesive	100
Architectural sealants	250

Paintings and Coatings

- Demonstrate that the interior surface area covered by paints and coatings in the project meet or are less than the maximum VOC content limits values for paints and coatings for 95% of all surface areas covered by paints and coatings as mentioned below. The VOC limits of the remaining non-compliant paints and coatings must be no more than 50% higher than the values listed above for each product type.

All paints and coatings must have fungal resistance.

Product Category	Type	Phase II (g/l)
Interior matt walls and ceilings (Gloss <25 @60°)	WB	30
	SB	30
Interior glossy walls and ceilings (Gloss >25 @60°)	WB	100
	SB	100
Interior trim and cladding paints for wood and metal	WB	130
	SB	300
Interior trim varnishes and wood stains, including opaque wood stains	WB	130
	SB	400
Interior minimal build wood stains	WB	130
	SB	700
Primers	WB	30
	SB	350
Binding Primers	WB	30

Product Category	Type	Phase II (g/l)
	SB	750
One-pack performance coatings	WB	140
	SB	500
Two-pack reactive performance coatings for specific end use such as floors	WB	140
	SB	500
Multi-coloured coatings	WB	100
	SB	100
Decorative effect coatings	WB	200
	SB	200

Carpet

Demonstrate that all carpet and carpet backing (underlay), if any meets or exceeds the Carpet and Rug Institute Green Label or Green Label Plus Program or Greengard Indoor Air Quality Certification Program for Carpets. It should be noted that in Healthcare, it is much more common to have either Direct Stick carpet (without any underlay). Also, it is common to use carpet tiles rather than broad or narrow loom to ensure it can be replaced if any damage is caused.

Hard Flooring

For all hard flooring which are used internally the following requirements should be met.

Demonstrate that all hard flooring systems and finishes have achieved FloorScore Certification or Greenguard Indoor Air Quality Certification for low emitting products. Hard flooring consists of the following:

- Vinyl Floor (or similar)
- Rubber Floor
- Terrazzo
- Ceramic tiles
- Porcelain tiles
- All natural stone finishes such as: granite, marble, etc. are excluded from the above.
- Epoxy flooring will be considered under architecture sealants and VOC limit should not exceed 250

Ceiling Systems

- Comply with the requirements listed for any Adhesives and Sealants. Comply with the requirements listed for any Paints and Coatings.
- Demonstrate that the construction materials do not exceed formaldehyde VOC content class E1 levels as defined by BS EN 13964:2004 section 4.5 or later update.

During Design

- To provide Specifications that should mention all the above materials characteristics and specifications
- To provide list of materials that will be used in the project and their specifications

During Constructions

- Provide Materials specifications from suppliers or delivery notes should be submitted to ensure purchasing the materials as per to the above specifications.

Design Checklist

1.8.1 Indoor Material Emission Reduction (Level 1)	Yes	No	N/A	Supporting Documents
Has the design defined the adhesive and sealant materials that will be used in the building?				Extract from the specifications highlighting the materials schedule
Has the design specified the adhesive and sealant materials VOC limits?				Extract from the specifications highlighting the materials VOC limits shown in the requirements
Has the design specified the paintings and coatings materials VOC limits?				Extract from the specifications highlighting the materials VOC limits shown in the requirements
Has the design specified the requirement of complying carpets use in the building?				Extract from the specification highlighting the requirement of meeting the carpets specifications
Has the design specified the requirements of hard flooring materials?				Extract from specification highlighting the requirement of meeting the hard flooring materials specifications
Has the design defined complying ceiling types in the building?				Extract from the specification highlighting the ceiling type Drawings demonstrating the ceiling type
Remarks/ Mitigation:				

Construction Checklist

1.8.1 Indoor Material Emission Reduction (Level 1)	Yes	No	N/A	Supporting Documents
Has the contractor applied the adhesive and sealant materials as per to the specified VOC limits?				Technical data sheet demonstrating the VOC limits for the adhesive and sealant materials used
Has the contractor installed the painting and coating materials as per to the specified VOC limits?				Technical data sheet demonstrating the VOC limits for the painting and coating materials used
Has the contractor applied carpets or carpets rug in the building as per to the required specifications?				Submit any of the following certificates: Carpet and Rug Institute Green Label or Green Label Plus Program or Greenguard Indoor Air Quality for the used carpets.
Has the contractor applied the hard flooring materials according to the required specification?				Submit any of the following certificates: FloorScore Certification or Greenguard Indoor Air Quality Certification for low emitting products
Has the contractor applied the ceiling systems according to the required specification?				Commitment letter from the supplier demonstrating that the material has no asbestos or formaldehyde content Demonstrate that the used materials are in compliance with the adhesive, sealant, coatings, and paintings VOC limits.
Remarks/ Mitigation:				

1.10.2 Mercury Source Reduction

Intent

- To reduce mercury-containing products and devices and mercury release through product substitution, capture, and recycling.

Requirements

- healthcare facilities may not use mercury-containing equipment, including thermostats, switching devices, and other building system sources. Lamps are excluded.
- Do not specify or install preheat, T-9, T-10, or T-12 fluorescents or mercury vapor high-intensity discharge (HID) lamps in the project. Do not specify probe-start metal halide HID lamps in any interior spaces.
- Specify and install illuminated exit signs that do not contain mercury and use less than 5 watts of electricity.
- Fluorescent and high-pressure sodium lamps must meet the criteria in Table 1.

Lamp	Maximum content
T-8 fluorescent, eight-foot	10 mg mercury
T-8 fluorescent, four-foot	3.5 mg mercury
T-8 fluorescent, U-bent	6 mg mercury
T-5 fluorescent, linear	2.5 mg mercury
T-5 fluorescent, circular	9 mg mercury
Compact fluorescent, nonintegral ballast	3.5 mg mercury
Compact fluorescent, integral ballast	3.5 mg mercury,
High-pressure sodium, up to 400 watts	10 mg mercury
High-pressure sodium, above 400 watts	32 mg mercury

During Design

- Provide specifications of the lamps used to be matching with the above maximum contents
- Provide specification for the illuminated exit signs with no mercury and less than 5 watts of electricity.

During Construction stage

- provide lamps technical data sheets
- provide illuminated exit sign technical data sheet
- to provide commitment letter from supplier that no mercury containments are in the illuminated exit signs

Design Checklist

1.8.2 Interior Finishes (Level 1)	Yes	No	N/A	Supporting Documents
Has the design defined the prohibited use of mercury content in equipment?				Extract from the specifications highlighting the prohibited use of the mercury content in equipment except lamps
Has the design specified the lamps mercury content allowed levels?				Extract from the specifications highlighting the mercury allowable levels in lamps

1.8.2 Interior Finishes (Level 1)	Yes	No	N/A	Supporting Documents
Has the design specified the exit signs specifications?				Extract from the specifications highlighting the criteria for the exit signs that should not have any mercury content, and use less than 5 watt electricity
Remarks/ Mitigation:				

Construction Checklist

1.8.2 Interior Finishes (Level 1)	Yes	No	N/A	Supporting Documents
Has the contractor ensured that there is no equipment containing mercury used in the building?				Commitment letter from the contractor or owner
Has the contractor followed the mercury allowable limits for the lamps?				Technical data sheet from the manufacture demonstrating the mercury levels in lamps used
Has the contractor installed the specified exist signs?				Technical data sheet from manufacture demonstrating no mercury is used in the exit signs and the use of maximum 5 watts electricity
Remarks/ Mitigation:				

1.10.3 Refrigerant Management

Intent

- To reduce stratospheric ozone depletion.

Requirements

- Do not use chlorofluorocarbon (CFC)-based refrigerants in new heating, ventilating, air-conditioning, and refrigeration (HVAC&R) systems.
- When reusing existing HVAC&R equipment, complete a comprehensive CFC phase-out conversion before project completion.
- Existing small HVAC&R units (defined as containing less than 0.5 pound [225 grams] of refrigerant) and other equipment, such as standard refrigerators, small water coolers, and any other equipment that contains less than 0.5 pound (225 grams) of refrigerant, are exempt.

During Design

- Provide specifications for the building HVAC&R systems.
- Commitment letter from owner that no CFC usage in the building
- Define the existing small HVAC&R units and their containments should be matching with the credit requirements

During Construction

- Provide equipment schedules
- Provide technical data sheet and equipment specification from supplier
- Commitment letter from the suppliers that no CFC based refrigerants are supplied.

Design Checklist

1.8.3 Refrigerant Management (Level 1)	Yes	No	N/A	Supporting Documents
Has the design ensured that there is no CDC-based refrigerant is specified in the HVAC&R systems?				Extracts from the design specifications
If HVAC&R equipment is re-used, has the design included a comprehensive CC phase out conversion?				Extracts from the design specifications
Remarks/ Mitigation:				

Construction Checklist

1.8.3 Refrigerant Management (Level 1)	Yes	No	N/A	Supporting Documents
Has the contractor complied with the prohibition of the use of CDC-based refrigerants?				Contractor undertaking letter supported by the as-built equipment technical specifications
If HVAC&R equipment is re-used, has the contractor ensured a comprehensive CC phase out conversion is implemented?				Contractor undertaking letter supported by the as-built equipment technical specifications
Remarks/ Mitigation:				

1.10.4 Cleaning Products and Protocols

Intent

- Provide cleaning effectiveness by selecting less hazardous products and establishing adequate cleaning protocols and practices

Requirements

All cleaning, disinfection and sanitization products are specified in the cleaning plan and meet one of the following requirements:

- Products are labelled as 'low-hazard' or 'safer' by an ISO Reference, or by a third-party certification recognized by the Municipality or DOH

- Hazard criteria must be specific for the product classes within the scope of this feature

The Safety Data Sheet (SDS) of each product discloses ingredients per EU Regulation 2015/830 (CLP).

The ingredients listed in Section 3 of the SDS, classified as Category 1, 1A or 1B for the following Globally Harmonized System (GHS) codes should be avoided:

- H311 (toxic in contact with skin)
- H312 (harmful in contact with skin)
- H317 (may cause allergic skin reaction). Individual terpenes may be present up to a concentration of 0.5% in undiluted products
- H334 (may cause allergy or asthma symptoms or breathing difficulties if inhaled)
- H340 (may cause genetic defects)
- H350 (may cause cancer)
- H360 (may damage fertility or the unborn child)
- H372 (may causes damage to organs through prolonged or repeated exposure)

Products to meet Feature X08 Materials Optimization.

During Design

- Commitment letter from owner that the cleaning materials will be matching with above requirements.

Design Checklist

1.8.4 Cleaning Products and Protocols (Level 1)	Yes	No	N/A	Supporting Documents
Has the design specified products which meet the low hazard requirements?				Extracts from product specifications indicating compliance.
Remarks/ Mitigation:				

Construction Checklist

1.8.4 Cleaning Products and Protocols (Level 1)	Yes	No	N/A	Supporting Documents
Has the construction achieved the design specifications for low hazard requirements?				Contractors undertaking letter and evidence from technical information for the products used.
Remarks/ Mitigation:				

1.10.5 Construction and Demolition Waste Management Plan (CDWMP)

Intent

- To further reduce the long-term environmental impacts associated with construction waste collection, transport and disposal

Requirements

- Demonstrate that the Contractor implemented monthly monitoring of the CDWMP, and achieved a minimum final recycling/salvage rate of 30% to 50% of construction and demolition waste (by weight or volume). This figure excludes all hazardous waste that must undergo specialized treatment

During Design

- Require the contractor to prepare CDWMP conforming to the above requirements; and
- Require the contractor to submit Schedule of items to be recycled/salvaged, their source within the project, their total estimated weight or volume and the name and location of potential reclaim/recycling haulers.

During Construction

- Prepare and submit the CDMP Plan
- Submit calculations supported with detailed receipts, summarizing final results of the CDWMP, showing the items recycled/salvaged, their source within the project, their total weight or volume, the name and location of the reclaim/recycling haulers, and potential markets for the recyclable materials.

This requirement only applies to Level 2.

Level 1: Demonstrate that the Contractor implemented monthly monitoring of the CDWMP, and achieved a minimum final recycling/salvage rate of 50% of construction and demolition waste (by weight or volume). This figure excludes all hazardous waste that must undergo specialized treatment

Level 2: Demonstrate that the Contractor implemented monthly monitoring of the CDWMP, and achieved a minimum final recycling/salvage rate of 70% of construction and demolition waste (by weight or volume). This figure excludes all hazardous waste that must undergo specialized treatment

Design Checklist

1.8.5 Construction and Demolition Waste Management (Levels 2&3)	Yes	No	N/A	Supporting Documents
Has the design specification required the contractor to prepare the CDMP and verify the end results?				Extracts from design specifications.
Remarks/ Mitigation:				

Construction Checklist

1.8.5 Construction and Demolition Waste Management (Level 2)	Yes	No	N/A	Supporting Documents
Has the Contractor provided the CDMP as well as the verified results achieving a minimum of 30% in recycling and salvage of the construction waste?				Copy of CDMP, calculations and verification documents as stated in this requirement
1.8.7 Construction and Demolition Waste Management (Level 3)	Yes	No	N/A	Supporting Documents

Has the Contractor provided the CDMP as well as the verified results achieving a minimum of 50% in recycling and salvage of the construction waste?				Copy of CDMP, calculations and verification documents as stated in this requirement
---	--	--	--	---

1.10.6 Commitment to Carbon Footprint Reduction (GHG) & Net Zero Carbon

Intent

- To ensure that healthcare facilities reduce their carbon footprint inline with UAE Building Code and Global COP26 commitments towards carbon neutrality.

Requirements

- Requirements mentioned here are aimed at mitigation by reducing the green house gas emissions and using materials which have low embodied carbon.

During Design

- Identify list of materials being used on the project and utilize low embodied carbon materials.
- Specify the following in effort to reduce embodied carbon & operational carbon:
 - Low refrigerant GWP and leakage rates
 - Equipment with long lifetimes
 - Equipment's with lower weight
 - Specify products and components that can be demounted and used
 - Specify products that can be disassembled, and materials recycled.
 - Design infrastructure to Recycle, reuse or compost 100 percent of its non-hazardous waste.
 - Reduce the amount of water it uses by 25 percent per square foot of buildings.
 - As per site conditions landscape the maximum area available to provide direct carbon offsets.
 - When the land area is very limited, utilize green roof and green facades as an alternative. Aim for an area equal to 50% of the land area as soft landscaping through a combination of landscaping at the ground level, on the roof, terraces and green façade.
 - Focus on building materials with high-impact potential for emissions reductions
 - Concrete
 - Steel
 - Wood
 - Insulation
 - Carpet
 - Gypsum Board
 - Design ability for the building to meet majority of its power needs through renewable energy to offset carbon emissions from purchased grid electricity.

During Construction

- Follow specified products and ensure that the client is aware of the embodied carbon in all products purchased.

- Collate data for the building embodied carbon to be provided in the building handover documents to the building operator.
- Collate data for CO2 emissions via the contractor's logistics (vehicle movement) during the build and report that to the building operator during handover.

Post Construction

- Comply with GHG (Greenhouse gas Emissions) accounting method for Scope 1 to Scope 3, described below.
 - Scope 1: Direct emissions from sources that are owned or controlled by the organization, including on-site fossil fuel combustion and fleet fuel consumption. All. Fuel based emissions should be measured on a quarterly basis. Scope 1 also includes, , Refrigerants use, Waste Generated, Anaesthetic Gasses consumed.
 - Scope 2: Indirect emissions from sources that are owned or controlled by the organization, including emissions that result from the generation of electricity, heat or steam purchased by the organization from a utility provider. This should be measured on quarterly basis. Scope 2 includes, purchased grid electricity, purchased chilled water, purchased heating.
 - Scope 3 Emissions are all indirect emissions not included in scope 2 – that occur in the value chain of the reporting hospital, including both upstream and downstream emissions. In other words, emissions that are linked to the hospital's operations. According to GHG protocol, scope 3 emissions primarily include all procurement related to hospital operations. The hospital operator should formulate this data in terms of \$ spend and utilize T1 & T2 carbon factors to convert this by material to kg CO2. T1 and T2 carbon factors are published by the UK Government, these should be used till the UAE Government publishes its own accounting factors.
- All Scope emissions combined should be provided to the DOH by each facility, monitored on a quarterly basis as a dashboard, comparing every year's quarterly profile to last year's quarterly profile.
- Buy all its food locally or from farms and producers that use sustainable practices, including using antibiotics responsibly.
- Increase its purchase of products and materials that meet environmental standards to 50 percent.
- Retro commission the building every 2 years to make sure that the building meets or exceeds its design energy kWh/m² year targets.
- Offer green transportation program for employees through electric vehicles and shared car-pooling schemes.

Common sources of Greenhouse Gas emissions

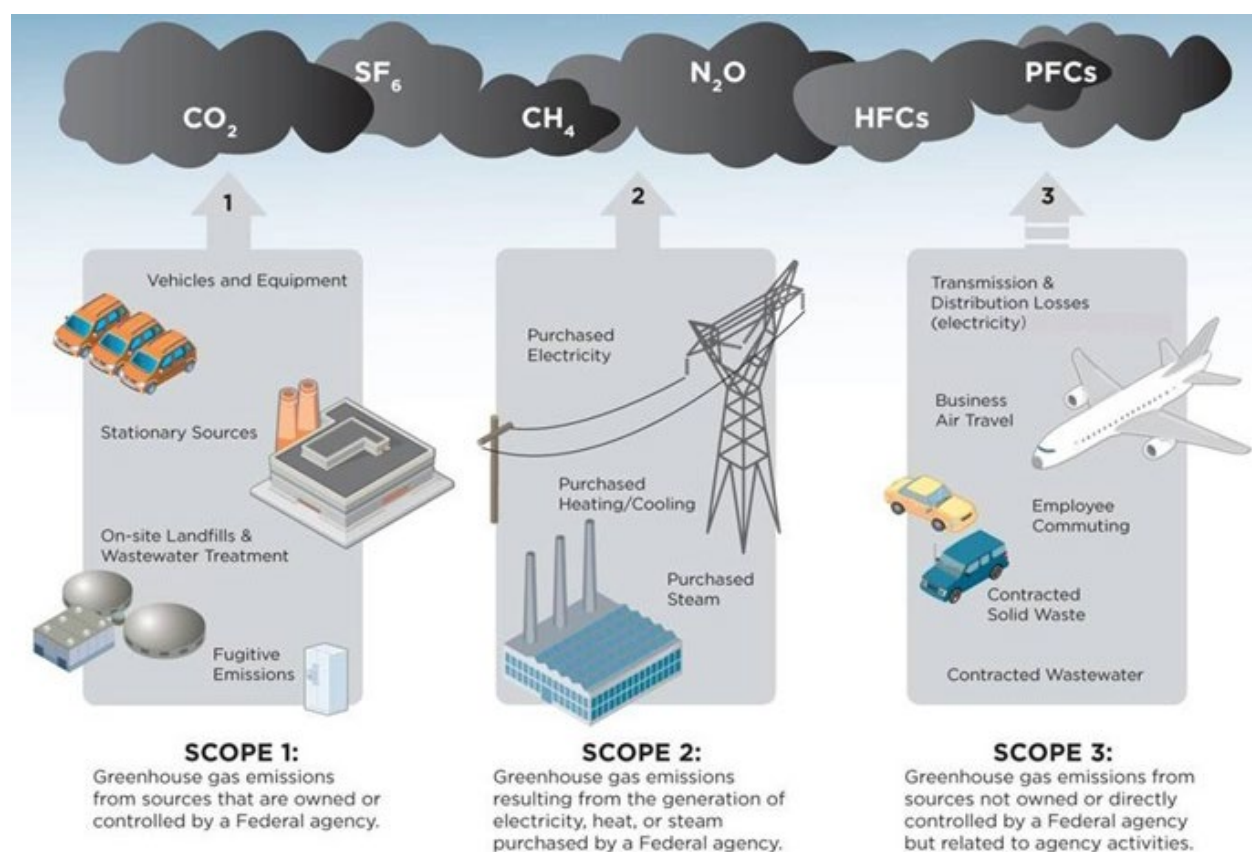


Figure: Scope 1, 2, 3 GHG Emissions, Image credit

<https://www.epa.gov/greeningepa/greenhouse-gases-epa>

This Requirement only applies to Level 2. There is no level 1 requirement.

Design Checklist

1.8.6 Commitment to Carbon Footprint Reduction (Levels 2&3)	Yes	No	N/A	Supporting Documents
Designer to submit list of low embodied carbon materials specified.				Extracts from design specifications and where necessary area and energy calculations.
Remarks/ Mitigation:				

Construction Checklist

1.8.6 Commitment to Carbon Footprint Reduction (Level 2)	Yes	No	N/A	Supporting Documents
Contractor to submit building overall embodied carbon upon completion				Submit report and supporting documentation of building materials.
1.8.6 Commitment to Carbon Footprint Reduction (Level 3)	Yes	No	N/A	Supporting Documents
Report Carbon Footprint across all 3 Scope's to DOH every quarter				Submit information to DOH.
Achieve 5% savings every subsequent year on the Carbon Footprint				Submit information to DOH.
Achieve Net Zero Carbon by offsetting remaining Carbon Footprint through Carbon Credits.				Submit information to DOH.

1.11 Doing More with Less

Doing more with less refers to a number of objectives which assist with sustainability:

- maximum use of resources used in the building
- greatest output for the smallest input
- greatest benefit over the longest period of time
- avoiding the root causes of waste rather than fixing them with mitigation strategies
- avoiding strategies which will force building and maintaining more areas than necessary
- adopting features which result in reduced costs and resources in future refurbishments and changes of use

As an example of the above objectives, we present two hypothetical hospitals, A and B. Both hospitals have the same services, specialties, project brief, bed numbers and staff numbers. Both hospitals can provide a good, safe level of service to the patients.

They are both located in the same area, subject to the same environmental and regulatory requirements. Both Hospitals achieve their goals for excellent customer satisfaction. They both comply with all relevant laws and regulations including Level 1 Sustainability under these Guidelines.

However, Hospital A achieves the results by Doing More with More (resources). Hospital B achieves the results by Doing More with Less (resources).

Under these Guidelines, Hospital B strategies will be encouraged and rewarded with Level 2 Sustainability status, whilst the strategies of Hospital A are discouraged and not rewarded.

Below is the hypothetical example of Hospital A vs Hospital B.

	Hospital A example (not recommended)	Hospital B example (recommended)
1	Hospital A has 12 storeys over a 5 storey grand lobby with a glass face. The lobby utilises triple glazed high E-value imported glass with electrically controlled sunshades to control the heat built-up in the lobby space. Air conditioning is boosted to keep the lobby cool.	Hospital B has 12 storeys. The lobby space extends between the ground floor and the mezzanine (1.5 to 2 levels). The extended entrance canopy serves to shield the glazing to the front of the lobby from direct sun exposure.
2	The floor-to-floor height for the typical floors is 5,800mm, using concrete slabs with 1000mm downturn beams in two directions. Suspended ceilings are generally at 3000mm.	The floor-to-floor height for the typical floors is 4,500mm, using flat concrete slabs with 2400x2400 drop caps with a total depth of 450mm. Suspended ceilings are generally at 2700mm with procedural rooms at 3000mm.
3	The building is mostly glass clad, offering continuous panoramic windows all around the building. These windows are then protected with electrically controlled sun shading devices and triple glazing. An	The building façade has an average of 30% glazing. The windows are shaded with fixed sun hoods. The sun hoods are also used for external access to the windows for cleaning.

	Hospital A example (not recommended)	Hospital B example (recommended)
	electrically operated gantry is used for access to windows for cleaning.	
4	The building has generous travel and circulation corridors with rooms generally to one side. The total travel and circulation area is around 65% of the net habitable areas.	The design has located the corridors in such a way that they serve the rooms on both sides. Most travel corridors are around 2500 wide. Total travel and circulation area is 24% of the net habitable areas.
5	Building A has a bespoke structural design with the columns reflecting and following the requirements of the Architectural plan. Therefore, based on the exact plan the structural grid is between 5.5m and 10m.	Building B has a regular structural grid of 8.4m in both directions. The architectural plans adapt to the same grid now and into the future. Therefore, the grid is not bound by today's architectural plans and are future-proofed.
6	Service risers are located to suite the latest Architectural plan, to avoiding clashes with the current design elements.	The service risers are strategically located with reference to the structural grid. The architectural plans adapt to the strategic services distribution providing further future-proofing as the functions change.
7	As part of the bespoke design, each department of the hospital is fully self-sufficient with dedicated staff facilities such as large meeting rooms for exclusive use of the staff in the same department.	Common staff facilities are located on the edges of the departments with access from inside and outside. So, these rooms can be made available to the whole facility on a booking basis. Therefore, the number of unused facilities is minimised.
8	The plans comply with Part B of these Guidelines and are appropriate for healthcare use. Rooms are located only in relation to the clinical functionality and adjacencies.	The plans comply with Part B of these Guidelines and are appropriate for healthcare use. However, as an additional factor, the orientation of the building(s) are considered. Rooms requiring daylight are located on the preferred sides, North, South and East. Service rooms and those which do not require any natural light are located mostly on the west. Rooms which are occupied infrequently are covered by movement sensors and the lights come on only when someone enters the room.
9	In some clinical areas metal, glass or other proprietary imported wall panelling system are used as a wall finish. These panels may be changed over time by ordering the same from the original supplier.	Generic, locally available wall systems are used with appropriate finishes suitable for clinical areas as per the Guidelines. Modifications and repair to the walls can be done by multiple local contractors using generic and commonly available material.
10	The facility has some good design features which can potentially impact on the operations, but the impact is not monitored against the increase in	The facility, including the management systems have provision for monitoring the use of renewable energy (from sources made available for public use) as well as the impact on carbon footprint, gradually working

	Hospital A example (not recommended)	Hospital B example (recommended)
	renewable energy use and reduction of the carbon footprint.	towards the Net Zero targets in these Guidelines.

There are no requirements at Level 1.

Based on the above example compliance at Level 2 for this sustainability category will require the following provisions:

Design Checklist

1.9 Doing More with Less (Level 2)				Supporting Documents
Does the Design follow the examples provided under Building B above?				Provide a short design report, explaining the design response to each of the 8 examples given above and describe how the solution has achieved a good result with minimum use of resources.

Note: The recommended examples under Hospital B provided are not exhaustive. Applicants may offer other strategies for the same categories to demonstrate “Doing More With Less”.

Construction Checklist

1.9 Doing More with Less (Level 2)				Supporting Documents
Has the contractor implemented the initiatives in the design initiatives provided in the design report?				Undertaking from the contractor, verified by 90% inspection.